

Cleveland Lakefront Freight Rail Bypass

Concept proposal and analysis



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SECTION ONE

Background and Overview

Introduction

Cleveland city officials and their consultants are conducting detailed studies of the Lake Erie waterfront. The scope of their studies is to evaluate ways to promote recreational and development opportunities along the lakefront to make it more of a community resource that improves the region's quality of life and economy. Part of the study's scope is to evaluate ways to improve access to the lakefront. One way is to make man-made barriers (highways, railways, etc.) less of an obstacle for people wanting to reach the water's edge. Another way is to improve transportation (road, transit, biking, pedestrian, etc.) to the North Coast.

It is important to note that highways and railways can be both an obstacle to and a resource for reaching Cleveland's lakefront. This report, conducted at the request of EcoCity Cleveland and the Cleveland Waterfront Coalition, will focus on the railways, and present a concept proposal for dealing with both the obstacle and accessibility issues via a single project -- the Cleveland Lakefront Freight Rail Bypass (or, more simply, the Lakefront Bypass).

Case examples

Cleveland city officials and their consultants often point to cold-weather cities like Chicago and Toronto as examples of what might be possible with Cleveland's lakefront. Both Chicago and Toronto are also case examples of how rail freight traffic has been relocated away from those cities' downtown lakefronts, and how other forms of rail traffic, namely commuter rail and/or rail transit were expanded or built new as part of their lakefront improvement and accessibility plans.

Anyone who has visited Chicago and Toronto in recent decades would likely agree that those cities have thriving lakefronts that are attractive not only to new downtown residential construction, but to recreational opportunities and tourism. Those land uses also provide a more environmentally benign edge than industrial and port uses for those cities' downtown waterfronts.

Starting in the 1890s, with the Columbian Exposition, Chicago officials made an important decision to promote their downtown as a lakefront a place for people to enjoy recreation and people watching. Railroad operations on the lakefront, particularly those of the Illinois Central on the south side of downtown, were put into trenches below street level and restricted only to passenger rail service. There are no through-downtown railways in Chicago, save for two local operation tracks at Chicago Union Station, which is a mile inland. All through freight train service is restricted to tracks even further inland. "Belt railroads," such as the Indiana Harbor Belt Railroad, were built around the city of Chicago so freight traffic could bypass the urban core. Today, these belt railroads are 2-5 tracks wide, and see more than a hundred freight trains a day. Near-downtown freight railroad yards that were still active in the 1960s have since been

redeveloped with housing, offices and retail starting in the 1980s. Dearborn Park is a notable example of this transformation.

Toronto is even more of an applicable example for Cleveland, given its history. As recently as the 1960s, Toronto was not known as a thriving, cosmopolitan city. It underwent a transformation in rapid order, as part of a regional planning effort. Much of that effort placed an emphasis on redeveloping Toronto's downtown lakefront, which was characterized by a string of weed-choked rail yards, associated underutilized railroad and port facilities, plus a decaying Toronto Union Station.

With the construction of a citywide subway system, and the addition of commuter trains on several freight lines, Toronto's lakefront Union Station gained new life and was restored to its former grandeur. The freight rail yards were redeveloped with a number of notable structures, including the CN Tower, Metro Convention Center, Skydome sports complex and hotel, plus new neighborhoods. A Harbourfront Line light-rail trolley was built in the 1990s from Union Station to the lakefront to serve the new housing, recreational and tourist sites. Although some local freight rail services remain to service lakefront industrial and port customers (mostly east of the Don River), east-west trunk line freight rail services, provided by Canadian National and Canadian Pacific, bypass the downtown lakefront on a belt line around the northern edges of the core city.

Overview

Cleveland has a lot in common with Chicago's and Toronto's earliest stages of developing their lakefronts, particularly in terms of those cities' decisions on what lakefront rail traffic should be kept and expanded, and what rail traffic should be relocated. But, to more effectively evaluate where Cleveland is today in terms of its lakefront railway users, an inventory of Cleveland's lakefront railroad infrastructure and operations is in order.

There are three distinct classifications of rail operations on Cleveland's lakefront, most of which operate in the downtown area -- freight, intercity passenger and light-rail transit.

Freight Rail: Most dominant of these is rail freight service, provided primarily by Norfolk Southern Corp., which operates nearly 50 daily freight trains on rights of way it owns along the lakefront, handling about 60 million gross tons of traffic per year. In better economic times in the late 1990s, NS dispatched approximately 55-60 trains along its lakefront tracks, which are its primary east-west artery between Chicago, St. Louis, Toledo, Detroit and Pittsburgh, Philadelphia, plus New Jersey/New York City.

These trains cross the Cuyahoga River at its mouth, and on a two-track drawbridge which is typically left in the "down" position owing to the frequency of rail traffic. This bridge, while left down, is only 5-10 feet above the river's waterline under most climatological conditions. The drawbridge is staffed 24 hours a day by NS employees who are in constant radio and telephone contact with NS train & engine employees, dispatchers and others.

According to NS operating personnel, between 7-13 daily freight trains must operate via the lakefront tracks and over the Cuyahoga River drawbridge to serve the Port of Cleveland, customers on Whiskey Island (ore docks, Cargill Salt) and other industrial customers in the immediate area.

Another freight rail carrier, CSX Transportation Inc., owns a lightly-used right of way along the lakefront east of downtown. Under Conrail ownership prior to 1999, this right of way was used by dozens of daily freight trains, but those were rerouted to the south and east sides of the city of Cleveland along a Conrail right of way CSX acquired in 1999.

CSX currently operates as many as one freight train a day on its lakefront tracks, and has trackage rights (access by long-term contract) over NS tracks along the lakefront west of downtown. According to the Ohio Rail Development Commission, CSX's agreement with NS, per federal Surface Transportation Board approval in 1998, allows CSX to operate up to several dozen freight trains per day via the lakefront. This agreement allows the lakefront CSX route to serve as a "relief valve" or sorts, in case of emergencies or traffic congestion on its primary right of way on the south/east sides of the city. CSX's primary right of way sees up to 50 daily freight trains as it is the company's primary artery between Cincinnati, St. Louis, Chicago and Buffalo, Boston, plus New York City.

Light-rail transit: Light-rail service on the Waterfront Line, owned and operated by the Greater Cleveland Regional Transit Authority, is another significant rail presence on the lakefront. However, its right of way and related facilities are restricted to the immediate downtown area. While the Waterfront Line has low ridership, it represents a significant, physical presence owing to its double track, overhead electrical power lines and support poles (called a catenary), 112 daily trains, three substantial station facilities and a winding, elevated section of trackage just east of the Cuyahoga River's mouth to traverse the NS main line and head south into the Flats District.

Intercity passenger rail: This is the third classification of rail service currently operating on Cleveland's lakefront, and is also the least extensive. This service is provided by Amtrak, the national passenger railroad, and comprised of four daily trains between Chicago and the East Coast which have contractual operating rights to travel on NS and CSX rights of way. All four Amtrak trains stop at the carrier's Cleveland Lakefront Station, at 200 Memorial Shoreway, across the highway from Cleveland Browns Stadium. Amtrak's station facility and parking lot is located on city-owned land, for which Amtrak is not obligated to make lease payments. However, Amtrak does own land at the former East 26th Street rail yard, just south of South Marginal Road, where the circus train is parked when the circus is in town.

History

There have been numerous efforts to detour freight and passenger rail traffic away from the lakefront, particularly in the vicinity of downtown. However, most of those efforts weren't intended to make the lakefront more suitable for recreational and development purposes. Instead,

they were sought to cope with rail and river traffic congestion in and near the drawbridge near the mouth of the Cuyahoga River. The earliest efforts dates back to the early 20th century.

Prior to 1910, all east-west rail traffic on the busiest trunk line railway through Cleveland -- the New York Central Railroad's (NYC, former Lake Shore & Michigan Southern) -- crossed the Cuyahoga River on a single-track lift bridge near the mouth of the river. That bridge was roughly at the same location as Norfolk Southern's present-day drawbridge at the north end of the Flats District. By 1910, NYC tracks in the vicinity of the lift bridge became horribly congested with train traffic, including roughly 100 NYC freight and passenger trains each day, according to railroad employee operating timetables from that era.

It should be noted that, prior to 1930, the city's Union Depot passenger station was located on the lakefront, between West 3rd and West 9th streets. Several dozen NYC daily passenger trains served this station each day, as did those of the Pennsylvania Railroad and the Cleveland, Cincinnati, Chicago & St. Louis (Big Four Route) Railroad. Additionally, the Pennsylvania Railroad (PRR) served the Cleveland & Pittsburgh Railway ore docks on Whiskey Island (the C&P was absorbed into the PRR about 1900), with its trains using the NYC lift bridge to reach its main line that curved southeast toward Pittsburgh on the east side of downtown Cleveland.

First Lakefront traffic reroute--1911: Faced with this rail traffic congestion, New York Central built a railway bypass around the southern and eastern sides of the city of Cleveland. Called the Cleveland Short Line Railroad (or, simply, the Short Line), this lakefront bypass opened in 1911. This mostly double-tracked route had no grade crossings with any streets and even passed underneath the Broadway-Harvard neighborhood through a series of single-track tunnels. When rail freight traffic declined in the 1960s-80s, some sections of the second main track were removed (mainly on the East Side). Today, most of this route is owned and used by CSX Transportation Inc. for its Midwest-East Coast freight mainline (see "Fifth Lakefront Traffic Reroute--1999"). The extreme westernmost portion of the Short Line is owned and used by Norfolk Southern Corp. for its Rockport Yard.

Second Lakefront traffic reroute--1930: Another detour of rail traffic off the lakefront began in 1930. This time, it was intercity rail passenger service that found a new route through the city. New York Central's long-distance passenger trains were put on new, passenger-only tracks using a new high bridge across the Cuyahoga River valley to reach the new Cleveland Union Terminal (Tower City Center today) on Public Square. The station also served passenger trains from four other railroads, with more than 70 scheduled arrivals and departures each day when the new station opened.

However, some of NYC's luxury express trains, like the *20th Century Limited*, *Commodore Vanderbilt*, and *Ohio State Limited* continued to operate via the lakefront. After rail passenger service declined and Cleveland Union Terminal was closed to long-distance passenger trains (owing to its high cost), the coming of Amtrak in the 1970s put all passenger trains back on the downtown Cleveland lakefront.

Third Lakefront traffic reroute--1983: Unlike the first two efforts, this detouring of rail traffic off the lakefront did not involve the construction of new rights of way. Conrail rebuilt the former

Pennsylvanian Railroad (PRR) route from Cleveland to Alliance, Ohio into a modern, high-volume railway, boosting train speeds from 40 mph (and often less) to 60 mph. With this reconstruction project, some Chicago-East Coast freight traffic was rerouted off another Conrail route via Canton and Mansfield to Cleveland and Toledo to rationalize Conrail's infrastructure. However, Conrail didn't want all of this freight traffic to travel via Cleveland's lakefront, due to congestion and other operational issues. Thus, it rebuilt a track connection (called the Harvard Connection) in the vicinity of the Harvard-Broadway neighborhood so that freight trains could use the Short Line to bypass downtown Cleveland altogether. The Harvard Connection was heavily used until the Conrail acquisition in 1999, and is used today by only two trains a day (freight transfers between Motor Yard in Macedonia and Rockport Yard in Cleveland). It remains intact and could again be used as a lakefront bypass for NS if CSX (the new owner of the Short Line -- see below) is willing to consent to it.

Fourth Lakefront traffic reroute--1999: The next major detour of rail traffic away from the Cleveland-area lakefront occurred with the 1999 acquisition of Conrail Corp. by CSX Transportation and Norfolk Southern Corp. (for more detail on the Conrail acquisition and how it has opened up an opportunity for the proposed Lakefront Bypass, see the section "Conrail acquisition").

Through the Cudell and Edgewater neighborhoods of Cleveland, and the West Shore suburbs of Lakewood, Rocky River, Bay Village, Avon Lake, Lorain and other adjacent communities, Norfolk Southern proposed tripling its freight train traffic. This added traffic was to operate over NS's former Nickel Plate Railroad trackage, from Buffalo, NY to its major rail yard near Bellevue, Ohio in Huron County. Significant community opposition to the expected increase in rail traffic was raised.

Instead, NS agreed to build a \$27 million, double-tracked connection (called the "Cloggsville Connection") just south of Cleveland's Ohio City neighborhood. This connection, along with another new track connection near Vermilion in Erie County, allowed NS to detour up to a dozen through freight trains daily, away from the populous West Shore suburbs, to a less populated, more industrialized route via Linndale and Berea. This detour route is envisioned as the western half of the Lakefront Bypass, proposed in this report.

Fifth Lakefront traffic reroute--1999: A more significant reroute of freight train traffic, away from the lakefront, also occurred as a result of the Conrail acquisition. As noted earlier, CSX acquired much of the former New York Central Cleveland Short Line Railroad around the southern and eastern sides of the city of Cleveland. CSX also acquired from Conrail the former New York Central line southwest of Greater Cleveland to Greenwich in Huron County, where CSX links up with its existing Chicago-Washington D.C. mainline. Furthermore, CSX acquired from Conrail the former New York Central line northeast from Greater Cleveland to New York City and Boston.

To stitch together these Conrail routes with its own rights of way, CSX invested more than \$200 million of its own capital to build new track connections, add long stretches of second track, widen overpasses, install gates/flashers at road-rail grade crossings, build sound barriers/add soundproofing to homes, and upgrade signaling systems. The end result was a new double-track

rail corridor from the Midwest to the East Coast along alignments which previously were either underutilized or not connected to each other.

CSX's investment meant the removal of up to 30 freight trains a day from Cleveland's lakefront, to join with the 20 former Conrail freights already routed via the Short Line. This routing is next to Interstate 480 near the Cleveland-Parma border, on a high bridge over the Cuyahoga Valley in suburban Brooklyn Heights/Cuyahoga Heights, beneath the Broadway-Harvard neighborhood, next to the RTA Red Line through University Circle and East Cleveland, and then parallel to East 131st Street into the Collinwood Yard.

Of all the efforts to relocate rail traffic off the Cleveland lakefront, this has proven to be the most significant. Ironically, however, this permanent reroute had little or nothing to do with lakefront issues. Instead, CSX simply wanted its own self-determined route through the city for its east-west freight traffic, and the Short Line provided that path.

Conrail acquisition

If it wasn't for the 1999 Conrail acquisition by Norfolk Southern Corp. and CSX Transportation Inc., it is quite likely that there would be no reasonable opportunity for detouring all but 7-13 daily freights away from the lakefront.

First, some historical background is in order. Conrail was set up in 1976 by the federal government to take over and rebuild six bankrupt Northeast railroads, including Penn-Central (by far, the largest of the six). Penn-Central in 1968 had acquired the former New York Central and Pennsylvania railroads. After an infusion of \$5.8 billion in federal funding to rebuild tracks and rail yards, buy new locomotives and rail cars, plus the abandonment of redundant rail lines and other assets, Conrail became a profitable railroad company starting in the 1980s. The federal government sold its ownership interest in Conrail in a public stock offering in 1987. Finally, Conrail was bought up by its competitors CSX and NS and its routes and other assets were divided up roughly evenly between them. Final approval of the acquisition by the federal regulatory agency having oversight of railroads, the Surface Transportation Board, was given in 1998. The actual operational changeover took place in June 1999.

Changes in rail traffic, resulting from the Conrail split, became a controversial, public issue in Greater Cleveland in the late 1990s. While NS proposed tripling its rail freight traffic through the West Shore suburbs, CSX planned to quadruple rail freight traffic along the Short Line through the southern and eastern portions of the city of Cleveland and adjacent suburbs. The community and environmental impacts of these dramatic changes in rail traffic patterns were taken into account by a final agreement approved by the federal Surface Transportation Board (STB). Given the wholesale, system-wide changes resulting from the Conrail split, serious operational problems resulted at NS and CSX. However, these problems were resolved in less than a year.

In terms of the scope of this report, the net effect of the Conrail acquisition was that as many as 30 freight trains were rerouted off the downtown lakefront onto CSX's newly acquired Short Line, south and east of the city of Cleveland. Equally as important, especially in terms of the

proposed Lakefront Bypass, as outlined in this report, NS freight traffic in the West Shore suburbs was redirected to a more inland route.

A consulting firm, Stone Consulting of Warren, Pa., was retained by NS during the Conrail acquisition process. This firm made two recommendations to NS, both of which have direct implications to the Lakefront Bypass proposed in this report. However, only one of those recommendations was adopted by NS -- to construct the Cloggsville Connection (south of Cleveland's Ohio City neighborhood) to allow a permanent detour of through freight traffic out of the West Shore suburbs.

The other recommendation by Stone Consulting was to rebuild a rail corridor and two track connections on the southeast side of downtown in the North Broadway neighborhood so that some rail freight traffic could be detoured away from downtown Cleveland's lakefront. While the Cloggsville Connection was accepted and implemented by NS, the North Broadway rail corridor wasn't. Political pressure and the availability of non-NS funding for roadway underpasses in Berea appeared to be difference in securing the West Shore bypass. No such external funding was made available to NS to implement the North Broadway rail corridor. Thus, the Lakefront Bypass remains unrealized and, therefore, is the subject of this report, as requested by EcoCity Cleveland and the Cleveland Waterfront Coalition.

NOTE: For a visual presentation on how railroad route ownership and rail traffic patterns have been affected in Northeast Ohio and in the Greater Cleveland area by the Conrail acquisition, refer to the maps on Pages 1.8-1.11.

SECTION TWO

Alternatives analysis of Lakefront Bypass

Overview

Identification of a recommended Cleveland Lakefront Freight Rail Bypass was the result of a careful consideration of various routing alternatives for rail traffic. Existing active rail rights of way that were analyzed include only those which are geographically proximate to Greater Cleveland so as to limit any loss of access to existing rail freight customers. Another factor was that this report considered only those rail lines that currently intersect with Norfolk Southern's existing Chicago-Pittsburgh mainline at two locations -- one somewhere west of Cleveland's lakefront and the other east of it. Given these practical limitations, only four route alternatives are worthy of consideration, and are presented in this section.

This analysis is greatly influenced by and based on the recent genesis of freight rail traffic flows in Northeast Ohio, affected primarily by the 1999 acquisition of Conrail rights of way by Norfolk Southern Corp. (NS) and CSX Transportation Inc. (CSX). These property acquisitions and the locations, alignments, ownership and engineering characteristics of rights of way of other rail lines were primary factors in the final recommendation of the proposed Lakefront Bypass. Other factors included the locations of existing and potential rail freight shippers, waterborne shipping and recreational traffic, residential areas and recreational sites.

The four lakefront bypass alternatives are:

- 1 -- CSX "Short Line"
- 2 -- NS/CSX Fort Wayne Line
- 3 -- NS Fort Wayne Line/NS Columbus-Bellevue line
- 4 -- NS Cloggsville Bypass/NS NKP Line/NS Randall Secondary

Alternative Route 1 -- CSX "Short Line"

Aside from the recommended Lakefront Bypass, this is the next-best alternative for diverting most of NS's freight train traffic away from the Cleveland lakefront. This alternative, if fully developed to accommodate all of NS's general and intermodal freight trains that don't have to operate via the lakefront, would divert NS traffic away from only 14 miles of its lakefront route. Thus, this option would have the least impact on existing NS freight operations among the three alternatives that aren't recommended by this analysis as effective and practical solutions for diverting freight train traffic from Cleveland's lakefront.

Prior to the purchase and "split" of Conrail assets, including rights of way, among NS and CSX, a significant portion of Conrail freight traffic bypassed Cleveland's downtown lakefront. The route used was a portion of the former Cleveland Short Line Railroad (known simply as the "Short Line), which was owned by Conrail. This right of way roughly parallels Interstate 480 along the Cleveland-Parma border, before turning northeast to cross the Cuyahoga River valley

on a high-level viaduct. Mostly double-tracked and equipped with automatic block signals, this flat route featured 50 mph top speeds for up to 20 Conrail freight trains a day.

At a location that is adjacent to the Mill Creek waterfalls in the South Broadway neighborhood of Cleveland, a single-track connection (called the Harvard Connection) linked the Short Line to Conrail's Cleveland Line to Alliance, Ohio and thence to Pittsburgh. Thus, east-west Conrail freight train traffic between the Midwest and the East could bypass downtown Cleveland's lakefront. However, heavy freight traffic could not easily use this bypass given the steep grades of the Harvard Connection. And, since local topography in the vicinity of the Mill Creek waterfalls prevented widening the right of way to two tracks, there was, and is, a restriction as to how much freight traffic could use this bypass without major reconstruction of the right of way.

There is one grade crossing on this route -- with another rail line near the Parma Chevy plant. Here, the CSX Short Line crosses a CSX secondary track with about 4-6 daily trains on it. The CSX Short Line crosses no navigable waterways. It does, however, pass next to several residential areas: the Idlewood Drive neighborhood in Brooklyn, the Ideal Trailer Park on Brookpark Road in Cleveland, and a number of streets near Mill Creek in Cleveland. The Mill Creek Park is the only recreational area next to the CSX Short Line.

The acquisition of Conrail by NS and CSX turned ownership of the Short Line over to CSX, which now runs up to 50 freight trains per day over the Short Line. NS runs two freight trains a day, carrying auto parts shipments from Motor Yard, near the Ford plant in Walton Hills, to Rockport Yard (near Hopkins Airport). NS does have trackage rights (a contractual usage agreement), per the federal Surface Transportation Board's approval of the Conrail acquisition, to use CSX's Short Line as a temporary, emergency detour route for freight traffic operating via the downtown lakefront. Thus, NS does have a possible "foot in the door" for using CSX's route for more of its freight traffic. And, since this route alternative is the most geographically proximate of the three alternatives presented herein to NS's lakefront tracks, it wouldn't diminish NS's access to many of its freight customers. Only 17 miles of NS's lakefront right of way would lose traffic under this alternative -- a preferred circumstance for existing NS customers wanting to enjoy their continued access.

There are significant disadvantages to using this route as a lakefront bypass for NS, however. While CSX has added a second main track on some single-tracked sections of the Short Line to accommodate former Conrail freight train traffic between the Midwest and the East Coast, a short section of single track remains through a series of tunnels in the Broadway-Harvard neighborhood. This often causes freight train congestion, as traffic in one direction must wait for frequent opposing rail traffic to clear the single-track section.

A major shortcoming of this bypass alternative is that NS doesn't own the right of way. Wherever possible, freight railroads like to keep their own traffic on their own rights of way. A comparable scenario is if General Motors asked Ford if it could use one of Ford's busy factories to manufacture its own competing brand of vehicles. To overcome this apparent fatal flaw to this bypass alternative, an expansion of track capacity on CSX's Short Line to handle diverted NS freight traffic would be needed.

A low-impact option is if NS diverted traffic over the CSX Short Line about 20 general freight trains a day (assuming that 12 NS intermodal freight trains per day continue to operate via the lakefront and up to eight NS intermodal freight trains are diverted via Canton as discussed under Alternatives 2 or 3 listed on the next few pages). CSX's existing freight train congestion problems associated with its single-track operation through the tunnels beneath the Harvard-Broadway neighborhood will require significant investment to accept additional traffic in this area. To overcome this shortcoming, implementation of one of two options would likely be needed.

One option is to increase CSX's track capacity on its Short Line by constructing an additional track through the series of single-track tunnels noted previously, requiring the widening of the tunnels and/or "day-lighting" them (remove the overhead earth to convert the tunnels to an open-air right of way). The other option is to build a third main track west of the Harvard Connection to and through NS's Rockport Yard to provide enough capacity for NS and CSX. This would likely require widening CSX's double-tracked, high-level viaduct over the Cuyahoga Valley and the widening of CSX's mainline next to I-480, involving the reconstruction of multiple road overpasses and underpasses along the rail line. It is likely that only one of these capacity enhancements would need to be undertaken to handle another 20 trains a day.

But either option would likely incur significant capital costs of at least \$100 million per option, with the net result of accommodating only 10 daily NS general freights via the CSX Short Line (assuming up to eight more trains are diverted via Canton per Alternatives 2 or 3 at a cost of no less than \$30 million to \$50 million). Yet, 12 daily NS intermodal and general freight trains plus another 7-13 lakefront freight trains that cannot be diverted (or up to 25 total trains) would continue to operate via the lakefront.

If NS's 12 daily intermodal and general trains (in addition to the 20 already proposed to be rerouted via the Short Line plus the eight trains previously suggested for a reroute via Canton) are all diverted to CSX's Short Line, significant additional capital costs would have to be incurred. A second track would have to be added to the Harvard Connection, next to the Mill Creek waterfalls, by removing part of the hillside next to the connection to make room for this new track. Or, instead, a new double-track "flyover" bridge for NS trains might be built instead of using the Harvard Connection. This would put NS traffic on the north side of the CSX line so it could return to NS's Chicago Line at CP190 (northwest of the CSX mainline). This would eliminate the need for those NS trains to cross over to the other side of the CSX line at grade and create a bottleneck. An NS flyover bridge would also potentially provide a more gentle grade and curvature than the existing Harvard Connection.

It is also likely that CSX's single-track tunnels beneath the Harvard-Broadway neighborhood would have to be widened or "day-lighted" to add a second track so CSX traffic congestion can be alleviated. The CSX high-bridge over the Cuyahoga River would need a totally new viaduct to accommodate a third main track. Similarly, the CSX Short Line next to I-480 would likely need to be widened to three tracks to accommodate at least 80 daily CSX/NS freight trains over this 10.5-mile CSX-owned segment, requiring the reconstruction/widening of nine roadway underpasses or overpasses. Additional NS track connection improvements at the east end of the Harvard Connection and at both ends of Rockport Yard would incur additional costs. Projected

capital costs for this option could be \$250 million to \$350 million. Should it still be desirable to divert eight NS intermodal trains via Canton, at least \$30 million to \$50 million should be added to the above costs. But, given a full-scale capacity enhancement of CSX's Short Line, at nearly \$350 million, this route should be able to handle the added NS intermodal traffic. If desired, a more detailed analysis will be needed to clarify these significant expenses.

Regardless, those issues make the rerouting of most NS lakefront freight traffic via CSX's Short Line very problematic. Use of CSX's Short Line is therefore not recommended as a Lakefront Bypass route for NS's major freight rail traffic through the Greater Cleveland area.

Alternative Route 2 -- NS/CSX Fort Wayne Line

Initially, under Conrail ownership, the Fort Wayne Line was a major route for freight traffic between Chicago and Pittsburgh, though it became less so starting in the 1980s. Conrail rerouted much traffic off this route (via Alliance, Canton, Mansfield, Lima and Ft. Wayne, IN) northwest from Alliance, through Cleveland and Toledo. Today, segments of the Ft. Wayne Line are under a mixture of ownership by NS (east of Crestline to Alliance), CSX (west of Crestline to Ft. Wayne) and NS (west of Ft. Wayne to the Chicago area). The Ft. Wayne Line remains lightly used with less than a dozen freight trains daily on the busiest segment east of Crestline to Alliance. Many double-tracked segments have since been single-tracked, with more single-tracking planned.

Per the federal Surface Transportation Board's approval of Conrail's acquisition by NS and CSX, NS gained trackage rights to operate up to eight of its freight trains per day on the CSX-owned segment west of Crestline to Bucyrus, and six of its trains per day west of Bucyrus to Ft. Wayne. NS runs about six daily trains over these CSX-owned segments. STB made this recommendation based on the need to give existing freight customers the same through-route access they enjoyed under Conrail while providing NS and CSX traffic several connections from the former Conrail Ft. Wayne Line to the routes they either owned prior to the Conrail acquisition, or since acquired new from Conrail. The STB also made the recommendation to give CSX competitive access to Ft. Wayne, whose rail shippers would otherwise have been served only by Norfolk Southern.

Thus, STB responded to pressure from freight shippers along the Ft. Wayne Line to enact the shared usage of this route. It is one of the few instances in Ohio, and indeed anywhere in the nation, where a shared operation exists on such a long railroad right of way (125 miles from Crestline, OH to Ft. Wayne, IN). This anomaly was made possible by the political pressure exerted by local shippers, and by the fact that the Ft. Wayne Line was (and is) so lightly used.

Given the length of this potential bypass -- about 405 miles (from Alliance, OH to the Chicago area) -- there are a limited number of NS freight trains that can be relocated away from Cleveland's lakefront to this route without significantly reducing access to NS's freight shippers along the more northerly route. However, NS operating employees indicate there are as many as eight daily intermodal freight trains that might be rerouted out of Cleveland and Toledo to the Ft. Wayne Line since those trains serve no customers en route between Alliance and the Chicago

area. This would still leave about 40 freight trains a day operating via Cleveland's lakefront, but it would have some positive impacts, in terms of traffic reductions on a more localized lakefront bypass within the Greater Cleveland area, such as CSX's Short Line or on the recommended Lakefront Bypass that would link a series of disconnected, NS-owned rights of way on the south side of downtown Cleveland.

The Ft. Wayne Line has hundreds of grade crossings, nearly all of which are with roads, but 20 (in Ohio and Indiana) crossings are with other railroads. It crosses no navigable waterways until near Chicago, which the diverted trains would have crossed anyway, had they not been diverted. Also, there are dozens of cities, towns and villages that have residential areas and parks near the tracks.

Routing more NS trains over the CSX-owned portion of the Ft. Wayne Line between Crestline and Ft. Wayne would require the renegotiation of the STB-approved trackage rights agreement between CSX and NS. While this may be possible, a potential glitch exists in NS's planned elimination of a second main track between Alliance and Canton, which would significantly reduce the traffic capacity over this segment, and thereby negatively affect the overall capacity for all through traffic over the entire Ft. Wayne Line. Already, under Conrail's previous ownership, a portion of the Ft. Wayne Line between Massillon and Wadsworth was reduced to single track. Outside forces would have to persuade NS to abandon its latest single-tracking plans to ensure that this right of way remains viable as a potential bypass route.

Another problem exists in that the Ft. Wayne Line, on the 125-mile segment between Crestline and Ft. Wayne, has had its electronic traffic control system removed. Not only did this reduce capacity of the line, it also reduced maximum freight train speeds from 70 mph to 49 mph. West of Ft. Wayne, the railway is in good condition, with the signal system left intact. Thus, 60 mph top speeds for trains are available.

There are, however, no known existing fatal flaws preventing using this route as a Cleveland-area bypass for up to eight daily NS intermodal freight trains. That assumes an expenditure of about \$40 million to \$70 million is invested to restore the passing sidings along the single-tracked sections of the Ft. Wayne Line, upgrade the existing through tracks and restore the signaling system where it has been removed. If additional diversions of about 10 trains a day were operationally possible, this could raise the capital costs of upgrading the Ft. Wayne Line to \$50 million to \$90 million. Given these high costs and limited ability of this option to serve as a serious bypass route, Alternative Route 2 is rejected.

Alternative Route 3 -- NS Fort Wayne Line/NS Columbus-Bellevue line

This option proposes using the eastern portion of Conrail's former Ft. Wayne Line, which is more fully described under Alternative Route 2 above. Under this alternative, a portion of freight rail traffic to/from Pittsburgh could continue west of Alliance (instead of northwest of Alliance on NS to/from Cleveland) to/from the CSX-owned right of way west of Crestline to/from Bucyrus, OH in Crawford County. At Bucyrus, NS trains could use an existing track connection (though requiring improvements) to transfer to/from NS's Columbus-Bellevue right of way,

which recently was double-tracked, to reach NS's major rail junction in Bellevue, OH in Huron County. Only 12 miles of this route option would use a non-NS owned right-of-way. This exception is a CSX-owned segment between Crestline and Bucyrus, over which NS operates about six trains per day, and has trackage rights to run up to eight trains per day.

At Bellevue, NS traffic rerouted away from Cleveland could use two of its own rights of way for the continued trek to/from Chicago. The least disruptive of these, from NS customers' likely points of view, is to use NS's former W&LE right of way northwest to Oak Harbor, OH, where trains could use a recently constructed track connection to rejoin the existing NS mainline out of Cleveland to/from Toledo and points west and north. This would bypass about 165 miles of NS's current mainline via Cleveland.

The other route option from Bellevue is for bypassed freight traffic to use NS's NKP Line west of Bellevue via Ft. Wayne to serve Chicago. This would bypass about 405 miles of NS's existing mainline via Cleveland, Toledo and other cities, resulting in a loss of access to a significant number of existing NS customers in those cities.

While such a bypass alternative would actually give NS greater operational flexibility, given the addition of routing options between Chicago and Pittsburgh, there are some disadvantages to this alternative. Foremost is the added route mileage just between Alliance and Toledo (140 current, 177 proposed) via slower-speed tracks for the eight daily diverted, time-sensitive intermodal trains. Approximately \$30 million to \$50 million would also have to be expended to divert just eight daily trains. If additional diversions of about 10 more trains per day were operationally possible, it would likely require capacity-enhancement investments from Oak Harbor to Bellevue, at NS's Bellevue interlocking, along the affected portion of NS's Columbus-Bellevue route, on CSX's single-tracked Crestline-Bucyrus segment, and on NS's single-tracked segment between Orrville and Massillon. Such improvements could be expected to cost between \$100 million to \$150 million -- just to divert up to 18 daily freight trains out of Cleveland. Moreover, external pressure would be needed to encourage NS to not proceed with its near-term plans to remove the second main track between Canton and Alliance, that would further reduce the capacity of this route option.

During the debates in the late 1990s surrounding the Conrail acquisition, there were some suggestions that NS traffic through Cleveland could instead use a regional railroad as a bypass. Under this suggestion, NS freight traffic would use the Ft. Wayne Line west of Alliance to Orrville, OH in Wayne County. There, some NS traffic could switch over to a regional railroad called the Wheeling & Lake Erie (W&LE) for 70 miles between Orrville and NS's major junction in Bellevue. But this was rejected due to the expense involved in rebuilding the W&LE to mainline standards. Current estimates show that upwards of \$100 million would be needed to rebuild the W&LE and upgrade its Orrville connection with NS. It should also be noted that there is a deep, institutional divide between NS and W&LE on a number of policy and operating issues that will take a great deal of effort to overcome. Given the costs and limited ability of this option to serve as a serious bypass route, Alternative Route 3 is rejected.

Alternative Route 4 -- NS Cloggsville Bypass/NS NKP Line/NS Randall Secondary

Not only is this route option far superior to the other three Lakefront Bypass alternatives, many of its features compare favorably with the existing lakefront route. It can accommodate more traffic for less money than any of the alternatives without degrading service access to existing Norfolk Southern customers. And it is shorter and flatter than the existing lakefront route. Indeed, Alternative Route 4 appears to have only two major drawbacks: that it cannot offer the 60 mph top speeds (for freight) of the lakefront route (50 mph would be the top freight speeds for this bypass); and it lacks all the tracks and connections necessary to be a high-capacity bypass route. Section Three will detail what is needed to make Alternative Route 4 a whole right of way by stitching together three different route segments, all owned by NS. Consideration of this lakefront bypass alternative will include a full, comparative analysis of its physical features with that of Norfolk Southern's existing mainline via the lakefront.

Proposed Route: The proposed routing of Alternative Route 4 is described here, from west to east (see also the map on Page 2.12). Eastbound NS traffic would leave the lakefront route (called the Chicago Line on Cleveland's West Side) at Norfolk Southern's CP190 (a dispatcher control point that is 190 miles from Buffalo, NY). CP190, located near Hopkins Airport and beneath the interchange of Interstates 480 and 71, is the western access to NS's Rockport Yard and to NS's Cloggsville Bypass tracks. Alternative Route 4 would use NS's double-tracked, eight-mile-long Cloggsville Bypass right of way (with only 10 trains per day on it) eastward and northeastward to an old railroad location called Cloggsville, near West 25th street, south of Cleveland's Ohio City neighborhood. There, Alternative Route 4 would use 2.5 miles of Norfolk Southern's double-tracked Nickel Plate Line (with only 16 trains per day on it) that crosses the Cuyahoga River valley on a high bridge (with an NS-staffed drawbridge above the river) passing south of downtown Cleveland. At the west end of NS's East 55th Street Yard, Alternative Route 4 would diverge onto a new, 2,000-foot-long track connection to reach NS's Randall Secondary. After traveling on two miles of the Randall Secondary, an eastbound freight using Alternative Route 4 would rejoin NS's lakefront route (called the Cleveland Line on Cleveland's East Side) at CP117 (a dispatcher control point that is 117 miles from Rochester, PA). Westbound NS traffic would also follow this same alternative route, but from the opposite direction.

Rationale and potential benefits: There are a number of reasons why Alternative Route 4 makes sense as the Lakefront Bypass, both from a railroad operational perspective and from a community interest perspective. The community's interest, as noted in Section One of this report, include the removal of noise, dust, vibrations and hazardous materials borne by dozens of freight trains that currently operate via Cleveland's lakefront tracks. Not only do a near-continuous string of high-density city neighborhoods abut the lakefront right of way on both sides of Cleveland (especially on the West Side), but downtown recreational, tourist, housing and office locations (current and proposed) also are adjacent to the tracks. Only three short sections of residential areas and one recreational site abut the tracks of Alternative Route 4. Aside from those exceptions, this alternative route passes primarily through industrial and commercial districts, which is why this route was chosen by area elected officials in the late 1990s as the preferred bypass for relocating freight traffic out of Cleveland's west-side Edgewater and Cudell neighborhoods, Lakewood and other West Shore suburbs. On the current lakefront route, there

are two road-rail grade crossings (East 26th Street and Bessemer Avenue -- both major truck routes), and only one road crossing (East 65th Street) exists on the bypass.

The bypass would lessen a barrier to waterborne traffic at the mouth of the Cuyahoga River, which is often blocked by the passage of frequent and lengthy NS freight trains which cross the river on a drawbridge just five feet above the average river level. The removal of all but 7-13 daily freight trains (which must continue to operate via the lakefront tracks) would also avail a path for planned commuter and intercity passenger rail services that would improve access to Cleveland's lakefront.

Numerous benefits would also accrue to NS from implementing Alternative Route 4, which give this bypass an advantage not only over the other three alternatives discussed in this section, but also over the current lakefront routing of NS freight traffic. Foremost is that Alternative Route 4 is actually 3.5 miles shorter than the lakefront routing (12.5 miles for the bypass versus 16 miles for the lakefront route).

Secondly, Alternative Route 4 would cross a navigable portion of the Cuyahoga River on a bridge that is about 50 feet above the river's average water level, versus only five feet of clearance at NS's lakefront drawbridge. While larger ships will require that the NS drawbridge on the NKP Line south of downtown be raised, recreational ships like the Goodtime III and Nautica Queen plus all tugboats and sailboats can pass beneath this bridge without it being raised. It should be noted that the shallowness of the river's depth at this location (28 feet) prevents the largest ships from navigating the upper portion of the navigable river, thereby keeping the larger ships nearer to the lakefront. There is another reason why river traffic is much less frequent beneath the NKP Line than that which passes beneath the NS drawbridge on the lakefront. Extensive recreational boating traffic is commonplace from Lake Erie marinas to reach the entertainment attractions and riverside docks at the north ends of the Flats District. Recreational traffic rarely ventures as far up river as the NKP Line drawbridge.

Operational considerations: Another major factor in favor of Alternative Route 4 is that NS owns all the route segments needed to create this alternative (unlike all previous alternatives). There is a minor exception, however, as a short section of commercial property on East 37th Street will have to be acquired for the construction of a 2,000-foot railroad connection between NS's NKP Line and NS's Randall Secondary.

Not only is Alternative Route 4 already owned by NS, it is in the same operating division as the existing lakefront route -- the Dearborn Division. Thus, the same NS dispatchers (or, at least, dispatchers within the same dispatch control center in Dearborn, MI) who guide freight traffic on the lakefront route would likely do the same for Alternative Route 4. However, significant changes would have to be made to NS's computer-aided dispatching system to accommodate right-of-way changes as proposed in this report. Those changes are accounted for in the capital investments detailed in Section Three.

Also, interviews of local NS operating employees and managers revealed their interest in Alternative Route 4 because it would divert general freight train traffic through Rockport Yard (near Hopkins Airport). Currently, most NS rail traffic, operating via the lakefront, must access

Rockport Yard only from the yard's west end. If general freights were rerouted via Alternative Route 4 through the Rockport Yard area, it would allow those trains to access the rail yard from both ends, thereby giving NS greater operational flexibility. However, NS operating employees said they did not support the diversion of intermodal traffic (now operating via the lakefront) through Rockport Yard, unless extensive capacity enhancements (ie: new track) are made at someone else's expense.

There are other operational issues to be considered regarding this route alternative. An important difference between Alternative Route 4 and the current lakefront route is the top speed of freight trains. Top speeds of 50 mph on the alternative route cannot match the 60 mph top speeds of the lakefront route. But Alternative Route 4 does not have any segments that restrict train speeds to less than 25 mph (a new third main track proposed to be built past Rockport Yard would raise that low-end to 50 mph for intermodal trains). Whereas, on the lakefront route, just east of East 26th Street, a series of five sharp curves, ranging from 3.5 to 6 degrees on a relatively steep grade of 0.66 percent according to NS track charts, requires freight trains to slow to 20 mph. NS operating personnel say that least one eastbound freight train each month stalls on the maximum 0.8-percent-grade climb, east of downtown on the lakefront route. This is due more from the fact that eastbound NS freights must slow to 20 mph before reaching the segment having the 0.8 percent grade, thus they cannot gain momentum to easily overcome that grade.

Some NS officials have expressed concern that gradients on Alternative Route 4 are too steep for relocating their heavier freight trains. This is puzzling, considering that this alternative route descends/climbs to a crossing of the Cuyahoga River that is about 45 feet higher than that of the lakefront route's river crossing. Such concerns were due from a late-1990s proposal, requested by NS, from Stone Consulting & Design of Warren, PA regarding the proposed linking of NS's NKP Line and NS's Randall Secondary, southeast of downtown. In its study, Stone Consulting suggested to NS that a vacant Erie Railroad track connection (once used by lightweight Erie RR passenger trains) be reactivated for NS freight use, near to RTA's rapid transit Campus Station, in the vicinity of East 37th Street. Under their proposal, a track connection would be built on the former Erie Railroad gradient, on the north side of the NKP Line at this location.

However, this vacated track connection has an extreme gradient of 2 percent, or double the maximum grade accepted by the rail freight industry for a new mainline railroad. Wilbur Smith & Associates representatives, who joined this report's author in an inspection of the East 37th Street area site as part of the data collection process for this analysis, noted that Stone Consulting's proposed track connection was impractical for two reasons. One reason is that the 2-percent grade is far too steep to handle mainline freight trains, especially for rail traffic going uphill -- which will occur on this track. There is no such thing as trains exclusively using one track in one direction, and a second track only for trains in the opposite direction. In modern railroad operations, any track can and will be used by freight trains operating in any direction.

The other reason for the impracticality of Stone Consulting's proposed track connection is that it would be only several feet from RTA's existing rapid transit line. Track worker safety issues have caused freight railroads to implement a policy that new track construction must have a minimum 25-foot separation between a freight railroad track and a passenger rail/transit track. Exceptions can be made if a waiver is granted by the affected freight railroad after expensive,

heavy-duty concrete barriers and other safety features are provided. An inspection of the East 37th Street area, with the help of consultants from Wilbur Smith & Associates, revealed that there is no room for the 25-foot separation or even the construction of barriers between Stone Consulting's proposed freight track connection and the RTA right of way without incurring significant additional costs to widen the elevated rights of way and their associated bridge structures. Furthermore, the recent widening of I-77 (which passes through this area on an overhead structure) included wider bridge supports which would reduce the lateral and overhead clearances for freight trains using Stone Consulting's proposed track connection. This clearance problem is particularly acute for double-stack intermodal trains and general freights carrying special high/wide loads.

This report suggests an alternative track connection in the East 37th Street area, located on the south side of NS's NKP Line. Here, a new track connection, featuring a six-degree curvature, would be built at the west end of a maximum, existing 0.66 percent gradient on the Randall Secondary (see Section Three of this report for more details). That would be the steepest gradient on the East Side of the Lakefront Bypass (compared to a maximum of 0.8 percent for the East Side of the existing lakefront route, as noted previously). A six-degree curve on the track connection, with sufficient super-elevation (curve banking), could avail top freight train speeds of about 25 mph, according to LTK Engineering. This is not only based on the proposed track curvature at this location, but the existing gradient, as well. Taken together, these factors produce a resistance gradient of about 0.9 percent.

According to NS track charts, the steepest gradient on Alternative Route 4 would be 0.92 percent, located on about 0.4 miles right of way built in 1998 by NS for the Cloggsville Bypass, just west of West 25th Street south of Ohio City. This section is already used by about 10 daily NS trains. This grade is negligibly different from a 0.91 percent grade on about 0.5 miles of the lakefront route, just east of Edgewater Park to Whiskey Island. The grade west of Edgewater Park to near West 140th Street (5 miles) ranges from 0.66 percent to 0.79 percent. That is similar to the West Side gradient on Alternative Route 4, from Fulton Road to Linndale (or 3.8 miles) which ranges from 0.63 percent to 0.80 percent. Outside of these two segments for both the bypass route and the lakefront route, West Side gradients are negligible (0.4 percent or less), NS track charts show. Furthermore, curvature along the intermediate, West Side segments along Alternative Route 4 are minor. The only exceptions are at the Cloggsville Connection (near West 25th Street) and at CP491 (near West 150th and I-480) where sharp curves exist but are used by existing NS through freights.

Conclusion: Capital costs (detailed in Section Three of this report) for implementing the recommended Lakefront Bypass (Alternative Route 4) are nearly \$59 million for diverting about 20 NS general freights per day away from the lakefront route. If all NS through freight trains (about 40 general and intermodal trains per day -- excepting other bypass options which are detailed in Alternatives 2 or 3 as presented in this section) are rerouted off the lakefront via the recommended Lakefront Bypass, one-time capital costs would likely rise to about \$133 million. This is the least expensive of all the options considered, in terms of the volume of traffic that can practically be detoured without reducing access to NS's existing freight rail customers in Northeast Ohio.

NS's operating costs would likely be the same or less if all of its through trains were rerouted off the lakefront to the Lakefront Bypass. Gradients on the Lakefront Bypass are, at worst, comparable to those on NS's busier lakefront route. And, in many cases, grades on the Lakefront Bypass are less steep or shorter than those on the lakefront route. This analysis underscores that the Lakefront Bypass actually has fewer overall gradient issues than the current lakefront route. Combined with the fact that the Lakefront Bypass is 3.5 miles shorter than the lakefront route, NS will likely enjoy quantifiable operational cost savings (in terms of fuel usage, plus maintenance on its rolling stock -- see Section Four for more detail) by diverting all through freight traffic away from its downtown Cleveland lakefront route. This would have to be determined by an operations simulation as part of a more detailed analysis. However, NS would likely see increased maintenance expenses owing to the additional tracks and signal systems for the proposed Lakefront Bypass, which NS would continue to own. Norfolk Southern's added maintenance costs would be mitigated if its ownership of the lakefront route were sold, such as to the Cleveland-Cuyahoga County Port Authority, Greater Cleveland Regional Transit Authority or some other entity.

Combined with the desire of Cleveland city officials and their constituents to relocate frequent, heavy freight train traffic from residential areas to more industrial areas of the city, reduce lakefront rail freight traffic, or to implement commuter rail services to improve access to the downtown lakefront, there are significant community benefits to be derived from diverting most freight train traffic away from Cleveland's lakefront to the recommended Lakefront Bypass.

There are also significant benefits that can be created for Norfolk Southern, in terms of operational cost savings and greater operational flexibility, by creating the Lakefront Bypass. Taken together, all of the operational and community factors demonstrate the superiority of the Lakefront Bypass, as recommended by this report, over the other three alternatives considered by this report -- and, in some cases, over NS's existing lakefront route. Those factors underscore that a fully developed Lakefront Bypass can offer significant benefits to Norfolk Southern and to the Greater Cleveland community seeks greater use of and access to its lakefront.

SECTION THREE

Projected capital investments for developing the proposed Lakefront Bypass

Presentation structure and analysis methodology

Presented in this section is a rationale and description of proposed railway infrastructure changes and an opinion of projected capital costs for those changes. The changes and costs are presented in portions, displayed as segments of the Lakefront Bypass railway. Greater detail is provided for locations that are significant in terms of their operations and/or infrastructure such as railroad interlockings (track junctions) where more changes would need to be made. These segments are displayed from generally West to East.

The starting point for this presentation is at Control Point 190 (an interlocking 190 miles from Buffalo) at the west end of Rockport Yard, near Hopkins International Airport. This is where Norfolk Southern's Cloggsville Bypass and the leads for Rockport Yard diverge from Norfolk Southern's Chicago Line.

The ending point of this presentation is at the former Erie Crossing, now called CP 117 (an interlocking 117 miles from Rochester, PA). This the location where the Norfolk Southern's Randall Secondary crosses Norfolk Southern's Cleveland Line at grade.

For each Lakefront Bypass segment or location, two options of a grouping of proposed changes are suggested, with diagrams displaying those changes. There also is a diagram for each segment or location showing the existing track structure and other important geographic features that are relevant to the railroad infrastructure or operations, or to proposed changes.

Option 1 Shown under this option are all changes that would likely be needed to the railroad infrastructure in order to accommodate Norfolk Southern's through general freight traffic (merchandise trains, coal trains etc.) that currently operate via Cleveland's lakefront. This does not include local freight traffic, or about 7-13 trains per day, that must continue to serve customers along the lakefront tracks. Relocated traffic under this option represents approximately 20 trains per day, or slightly less than half of Norfolk Southern's total freight traffic now operating via the lakefront. General freight trains are typically heavier, slower and noisier than other rail traffic and carry a majority of hazardous materials that are shipped by rail.

From CP 190 to the East 37th Street area southeast of downtown (roughly nine miles) Norfolk Southern currently operates about 10 freights trains per day. In 1999, these trains were rerouted off NS's former Nickel Plate Line through the West Shore communities (Lakewood, Avon Lake etc.). However, approximately six trains per day still use Norfolk Southern's Nickel Plate Line west of Cleveland. This traffic joins, and would continue to join the proposed Lakefront Bypass route at a location called "Cloggsville" (an old railroad name), south of the Ohio City neighborhood near West 25th Street. Norfolk Southern constructed a new double-track connection at this location in 1999 to permit the reroute of some traffic off its Nickel Plate Line west of Cleveland.

Under Option 1, the sum total (approximate) of daily railroad traffic on the Lakefront Bypass would be as follows:

CP190 -to- Cloggsville: 30 trains (presently 10 trains)
Cloggsville -to- East 37th Street area: 36 trains (presently 16 trains)
East 37th Street area -to- CP 117: 20 trains (presently 0.3 trains)

Thus, infrastructure investments to create the Lakefront Bypass, under Option 1, would need to be made according the new traffic patterns shown above.

Option 2 Shown under this option are all changes that would likely have to be made to railroad infrastructure in order to accommodate all of Norfolk Southern's through traffic that currently operates via the lakefront (excepting the local traffic -- about 7-13 trains per day). The relocated traffic under Option 2 would also include intermodal traffic (trailer trains, double-stack container trains, RoadRailer trains etc.), in addition to the through general freight traffic noted in Option 1. Intermodal traffic represents about 20 trains a day. When intermodal traffic is combined with the general freight traffic rerouted from the lakefront tracks, the total relocated freight traffic would be about 40 trains per day. It should be noted that no intermodal terminals would be directly affected by the implementation of the proposed Lakefront Bypass. The nearest NS intermodal terminal is in Maple Heights -- several miles east of the affected area.

Existing freight traffic, as noted under Option 1, would continue to operate on the tracks that would be used for the Lakefront Bypass. This includes about 10 trains per day operating over a majority of the route. Also, another six trains per day coming to/from the Nickel Plate Line at "Cloggsville" add to the traffic mix on about two miles of the Lakefront Bypass.

Under Option 2, the sum total (approximate) of daily railroad traffic on the Lakefront Bypass would be as follows:

CP190 -to- Cloggsville: 50 trains (presently 10 trains)
Cloggsville -to- East 37th Street area: 56 trains (presently 16 trains)
East 37th Street area -to- CP 117: 40 trains (presently 0.3 trains)

Thus, infrastructure investments to create the Lakefront Bypass, under Option 2, would need to be made according the new traffic patterns shown above.

Proposed infrastructure changes were developed after much information gathering and a careful review of it. Information gathered includes all known existing documentation, such as track charts, railroad employee timetables, detailed interlocked diagrams, satellite images, NS-guided inspections of railroad infrastructure and operations, interviews of Norfolk Southern operating employees, interviews of railroad consultants, plus photographs and on-site drawings made by this report's author. See "Resources" at the end of this report for a complete list of those inputs.

CP 190/Rockport Yard-west

Option 1 -- Assumes the conversion of existing manual/hand-throw switches at the west end of Rockport Yard to dispatcher-controlled (interlocked), power switches. According to NS operating personnel, this would increase the throughput capacity of Rockport Yard. Up to a dozen freight trains pick-up/set-out freight cars at the west of end of this yard each day. And, since general freights would pass through Rockport Yard area with the Lakefront Bypass, they would be able to access the rail yard from both the west and east ends. NS operating personnel say this would greatly aid their operational flexibility, since the current operation is for most general freights to access the yard only from the west end, at Control Point 190.

Option 1 proposed investments:

Replace five manual switches with powered, remote-control turnouts (@ \$125,000 per installation).....	\$ 625,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$1,325,000
Contingency (@20 pct).....	\$ 265,000
Subtotal.....	<u>\$1,590,000</u>
Engineering (@20 pct).....	<u>\$ 318,000</u>
TOTAL (Option 1) CP190/Rockport-west.....	\$1,908,000
	=====

Option 2 -- Included in this option are the conversions of existing manual/hand-throw switches at the west end of Rockport Yard to dispatcher-controlled power switches to increase the throughput capacity of the yard. Furthermore, the addition of a two-mile-long, third main track around the north side of the yard, parallel to the two Cloggsville mains, and engineered to allow 50 mph train speeds, is proposed to benefit higher-speed intermodal traffic. However, there is no room for this third track on the north side of Rockport Yard unless the rear 20-30 feet of six commercial properties on Industrial Parkway are acquired to relocate northward an existing stream and a paved NS access drive. A much more affordable solution, if NS permits it, is to shift the Cloggsville Bypass southward by one track space. This would result in the loss of one yard track. The investment needed for the western half of this third main track is represented at this location. The eastern portion of this investment is accounted for at the next location, CP491.

Option 2 proposed investments:

New crossover track.....	\$ 500,000
New turnout to West Park Secondary track.....	\$ 125,000
New turnout to new third Cloggsville main track.....	\$ 125,000
New track on 1 mile of new alignment.....	\$2,000,000
Realign Cloggsville Bypass main tracks southward.....	\$ 500,000
Replace five manual switches with powered, remote-control turnouts (@ \$125,000 per installation).....	\$ 625,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$4,575,000
Contingency (@20 pct).....	<u>\$ 915,000</u>
Subtotal.....	\$5,490,000
Engineering (@20 pct).....	<u>\$1,098,000</u>
TOTAL (Option 2) CP190/Rockport-west.....	\$6,588,000
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CP 491/Rockport Yard-east

Option 1 -- Proposed for this location is the addition of a crossover and a turnout at CP 491 to access a new 10,500-foot-long siding (a third track) from CP 491 to the northeastern approach to the Linndale Yard. However, the cost of the new third track is noted in the next segment (Linndale-Southwest). According to NS operating personnel, these additions would increase the through-capacity of Rockport Yard. About one dozen daily freight trains pick-up/set-out freight cars at this yard. And, since relocated general freights would pass through the Rockport Yard area with the proposed Lakefront Bypass, they would be able to service the yard from both ends. NS operating personnel say this would greatly improve their operational flexibility, since the current operation is for general freights to access the yard only from the west end, at CP 190.

Option 1 proposed investments:

Two new crossovers (@ \$500,000 per installation).....	\$1,000,000
Add new turnout to third main track.....	\$ 125,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$1,825,000
Contingency (@20 pct).....	<u>\$ 365,000</u>
Subtotal.....	\$2,190,000
Engineering (@20 pct).....	<u>\$ 438,000</u>
TOTAL (Option 1) CP491/Rockport-east.....	\$2,628,000
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Option 2 -- Proposed is the construction of a two-mile-long, third main track engineered for 50 mph train speeds (for most intermodal traffic) bypassing the north side of Rockport Yard. Half of the costs associated with this third main track are accounted for at this location, including the realignment of the Cloggsville Bypass tracks southward by one track space at the east end of Rockport Yard. The other half is accounted for at the previous location -- CP190/Rockport Yard-west. Also, all associated crossover tracks and their turnouts and attendant signalization are proposed. The proposed crossovers are aligned in a manner to continue the third main track east (northeast) of CP491, where part of a new third track proposed in Option 1 (as a siding) would be built. However, the costs for continuation of the third main track are accounted for in the next segment -- Linndale-Southwest.

Option 2 proposed investments:

Five new crossovers.....	\$2,500,000
New turnout to Cloggsville #2 track.....	\$ 125,000
New track on 1 mile of new alignment.....	\$2,000,000
Acquire property for new track (estimated).....	\$ 500,000
Realign Cloggsville Bypass main tracks southward.....	\$ 500,000
Widen railroad overpass of West 150th Street.....	\$2,000,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$8,325,000
Contingency (@20 pct).....	<u>\$1,665,000</u>
Subtotal.....	\$9,990,000
Engineering (@20 pct).....	<u>\$1,998,000</u>
TOTAL (Option 2) CP491/Rockport-east.....	\$11,988,000
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Linndale-Southwest

Option 1 -- Proposed for this segment is the construction of a 10,500-foot-long siding (a third track) from CP 491 to just beyond the east (northeast) lead track for the Linndale Yard. This siding would be used by general freights making set-outs/pick-ups of freight cars to/from the east end of Rockport Yard. Trains using this siding would likely block access to one or both access tracks to the lightly used Linndale Yard. New crossovers and a new turnout to access the the west end of this siding are accounted for at the previous location -- CP491/Rockport-east. The costs associated with accessing the east end of this siding, near Linndale Yard, are accounted for in this segment. Those costs include the construction of three new turnouts, a new crossover and a short section of rebuilt track. Given the three- to four-track width of the existing right of way, no property will need to be acquired. Also, all bridges on this segment are capable of accommodating the additional track proposed in Option 1. For example, a railroad overpass of West 130th is four track spaces wide.

Furthermore, with the proposed increase in freight train traffic, three sound barriers are proposed. One would be located on the north side of the mainline, behind the homes on Thornhope Road. The second would be located on the south side of the mainline, behind homes at the western ends of Wilton, Wainfleet, Kirton, Carrington and Bennington avenues. The third would be on the north side of the mainline in the vicinity of Cleveland’s James M. Dunphy Park on Jasper Avenue.

Option 1 proposed investments:

Construction of a 10,500-foot-long siding.....	\$4,000,000
One new crossover (@ \$500,000 per installation).....	\$ 500,000
Add three new #20 turnouts to third main track.....	\$ 375,000
Install three sound barriers (estimated).....	\$2,500,000
Alter NS dispatch system, microprocessors, cable etc.....	\$ 700,000
Subtotal.....	\$8,075,000
Contingency (@20 pct).....	\$1,615,000
Subtotal.....	\$9,690,000
Engineering (@20 pct).....	\$1,938,000
TOTAL (Option 1) Linndale-Southwest.....	\$11,628,000
	=====

Option 2 -- Construction of a 3.5-mile-long third main track over the entirety of this segment is the dominant feature of this option. This third main track will likely be needed, considering the amount of rail traffic to be routed via the Lakefront Bypass in Option 2, and that there is little room for additional through tracks in the next segment east -- Downtown-South. Thus, lower-priority trains can be held in the Linndale-Southwest segment until the higher-priority traffic clears from the next segment east.

Fortunately, no properties need to be acquired prior to building the third main track over the Linndale-Southwest segment, which had 3-4 tracks on it prior to the 1960s. For the most part, Norfolk Southern’s property can easily accommodate an additional track. However, one bridge will need to be widened -- the railroad overpass of Interstate 71 at Linndale. While this overpass is three track spaces wide, the east side of this bridge has a concrete deck on it for vehicular

access by railroad maintenance vehicles. Therefore, this bridge will need to be widened by one track space to preserve the vehicular access by NS crews.

Spacing between existing main tracks requires that the third main track be installed south of the two main tracks on the western portion (west of Knob), with the third main installed between the two main tracks at the eastern end of this segment (through the Knob interlocking). The Knob-area third main track will require the relocation of multiple four-wire, high-tension power poles. However, only half of the Knob-area section of third main track is accounted for in this section. The other half (about 4,000 feet of track) of the Knob-area third track is represented in the next segment -- Downtown-South. To provide this third main track over the entirety of the Linndale-Southwest segment, some track approaches to Linndale Yard will have to be altered, and crossovers and turnouts must be provided to preserve access to that yard.

Furthermore, with the proposed increase in freight train traffic, three sound barriers are proposed. One would be located on the north side of the mainline, behind the homes on Thornhope Road. The second would be located on the south side of the mainline, behind homes at the western ends of Wilton, Wainfleet, Kirton, Carrington and Bennington avenues. The third would be on the north side of the mainline in the vicinity of Cleveland's James M. Dunphy Park on Jasper Avenue.

Option 2 proposed investments:

Build 3.5 miles of third main track.....	\$7,000,000
Three new crossovers (@ \$500,000 per installation).....	\$1,500,000
Add six new #20 turnouts.....	\$ 750,000
Relocate eastern lead to Linndale Yard.....	\$ 500,000
Widen railroad bridge over I-71 at Linndale (estimated)..	\$4,000,000
Relocate four-wire high-tension power poles (estimated)..	\$2,000,000
Install three sound barriers (estimated).....	\$2,500,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$18,950,000
Contingency (@20 pct).....	<u>\$ 3,790,000</u>
Subtotal.....	\$22,740,000
Engineering (@20 pct).....	<u>\$ 4,548,000</u>
TOTAL (Option 2) Linndale-Southwest.....	\$27,288,000
	=====

Downtown-South

Option 1 -- Given the general lack of lateral space for additional tracks on this segment, accommodating additional rail traffic is more challenging. Yet it can be accomplished by several key improvements. One is the addition of a new crossover at the east end of Knob to create a bi-directional interlocking that is at least two miles from the nearest interlocking in either direction so an entire train can be held for other traffic to clear. Another improvement is the addition of two crossovers at or near the Cloggsville Connection where NKP Line traffic to/from Lorain diverges/emerges (this western crossover is proposed to be built just west of a short, 0.92 percent grade that is part of the Cloggsville Connection). The last improvement is the rebuilding and extension of an existing, 1-mile-long third track (a siding) located between the two main tracks east of the viaduct, to the East 37th Street area and the construction of three associated crossovers. These improvements should be more than adequate to accommodate an increase in rail traffic resulting from a relocation of up to 20 through general freight trains per day from the lakefront tracks (or about 36 trains total on the most densely trafficked portion from Cloggsville to East 37th, which includes existing traffic). Finally, considering that a significant increase in rail traffic is proposed to use Norfolk Southern's NKP viaduct/drawbridge over the Cuyahoga River and valley, a reconditioning of this structure and associated drawbridge mechanisms is highly recommended.

Option 1 proposed investments:

Add six new crossovers (@ \$500,000 per installation).....	\$ 3,000,000
Rebuild existing siding to mainline standards.....	\$ 1,000,000
Extend siding on east side of Cuyahoga River viaduct.....	\$ 500,000
Recondition Cuyahoga River viaduct/drawbridge (est.).....	\$10,000,000
Alter NS dispatch system, microprocessors, cable etc.....	\$ 700,000
Subtotal.....	\$15,200,000
Contingency (@20 pct).....	\$ 3,040,000
Subtotal.....	\$18,240,000
Engineering (@20 pct).....	\$ 3,648,000
TOTAL (Option 1) Downtown-South.....	\$21,888,000
	=====

Option 2 -- No significant infrastructure changes are proposed with this option, when compared to Option 1. This is due to the general lack of lateral existing space for additional tracks on this segment for providing more capacity for the proposed, added rail traffic. The current availability of two main tracks should be sufficient for accommodating up to 50-60 trains per day (per the rerouting of all through rail traffic away from the lakefront, plus all existing traffic on the Downtown-South segment). This capacity would be augmented by continuing the third main track another 4,000 feet eastward from the Linndale-Southwest segment, at the eastern vicinity of Knob. Continuation of the third main track over this portion, between the two existing main tracks, will require the relocation of numerous four-wire high-tension power poles. This third main track would provide Norfolk Southern the ability to hold lower-priority rail traffic on that track, in the event higher-priority traffic needs to clear the two-tracked sections that characterize much of the Downtown-South segment.

The traffic capacity expansions, as noted in Option 1 for this segment, will also augment the capabilities of handling additional trains for Option 2. Such expansions include the addition of

three new crossovers east of the Cuyahoga River viaduct. Also, an existing, but ill-maintained third track (a siding) located between the two main tracks east of the viaduct to the East 37th Street area is proposed to be rebuilt to mainline standards and slightly lengthened so that low-priority freight trains that are one mile long or less in length can be held until lower priority traffic clears.

Effectively used together, such track additions and improvements should be adequate in accommodating the projected increase in rail traffic resulting from a relocation of up to 40 general and intermodal freight trains per day from the lakefront tracks (or about 56 trains total on the most densely trafficked portion between Cloggsville and East 37th, which includes existing traffic). Finally, considering that a significant increase in rail traffic is proposed to use Norfolk Southern's NKP viaduct/drawbridge over the Cuyahoga River and valley, a thorough reconditioning of this structure is highly recommended. LTK Engineering questioned if it was possible to eliminate this drawbridge by raising the track level. This isn't affordable, considering that the drawbridge is part of a roughly 3,000-foot-long railway viaduct that must duck under the I-90/Inner Belt viaduct over the Cuyahoga Valley, thereby limiting overhead clearances.

Option 2 proposed investments:

Extend third main track 4,000 feet east of Knob.....	\$ 1,500,000
Add one turnout at east end of the new third main track..	\$ 125,000
Two six crossovers (@ \$500,000 per installation).....	\$ 3,000,000
Rebuild existing siding to mainline standards.....	\$ 1,000,000
Extend siding on east side of Cuyahoga River viaduct.....	\$ 500,000
Relocate high-tension power poles (estimated).....	\$ 2,500,000
Recondition Cuyahoga River trestle/drawbridge (est.).....	\$10,000,000
Alter NS dispatch system, microprocessors, cable etc.....	\$ 700,000
Subtotal.....	\$19,325,000
Contingency (@20 pct).....	<u>\$ 3,865,000</u>
Subtotal.....	\$23,190,000
Engineering (@20 pct).....	<u>\$ 4,638,000</u>
TOTAL (Option 2) Downtown-South.....	\$27,828,000
	=====

East 37th Street area

Option 1 -- The availability of potential track alignments for proposed track connections linking Norfolk Southern’s Nickel Plate Line to its Randall Secondary right of way, for the Lakefront Bypass, is extremely limited by the availability of lateral space. This is due to the presence of overhead support structures for the widened overpass of Interstate 77. Under this option, those support structures should not be a hindrance to the construction of a single-track connection. Furthermore, multiple existing track crossovers on NS’s Nickel Plate Line near East 37th Street make a new link (per the Lakefront Bypass) from the Randall Secondary to this mainline’s multiple tracks practical, without significant investment. This is especially true if only Norfolk Southern’s general freight traffic is to be relocated away from the downtown lakefront.

For Option 1, a proposed track connection between the two NS-owned railroad lines can be implemented with relative simplicity. This requires the acquisition of all or part of an adjacent commercial property and the removal of earthen and scrap materials from that property to develop the necessary track connection. The provision for, and construction of the first 1,000 feet of new Lakefront Bypass track, east of the East 37th Street area, is accounted for at this location. Costs relating to the East 37th Street area conclude just west of the railroad’s overpass of Interstate 490. East of that location to CP117 (former Erie Crossing), Norfolk Southern’s Randall Secondary would be used by Lakefront Bypass rail traffic.

Option 1 proposed investments:

Two new crossovers (@ \$500,000 per installation).....	\$1,000,000
Acquire portion of commercial property (estimate).....	\$ 250,000
Grading for new track connection.....	\$1,000,000
Construct 1,500 feet of new track connection.....	\$ 600,000
Two new #20 turnouts.....	\$ 250,000
Install crash barrier for I-77 support structure.....	\$ 250,000
Alter NS dispatch system, microprocessors, cable etc.....	\$ 700,000
Subtotal.....	\$4,050,000
Contingency (@20 pct).....	\$ 810,000
Subtotal.....	\$4,860,000
Engineering (@20 pct).....	\$ 972,000
TOTAL (Option 1) East 37th St. Area.....	\$5,832,000
	=====

Option 2 -- For this option, even more extensive railroad infrastructure changes, earth-moving and property acquisitions are deemed as essential at this location to develop the Lakefront Bypass. To accommodate all relocated rail traffic away from the lakefront, two track connections are proposed to link Norfolk Southern’s Nickel Plate Line to NS’s Randall Secondary right of way. Given the lack of available lateral space for added track connections, due to the presence of support structures for the recently widened overpass of Interstate 77, some creative changes will be needed.

Fortunately, sufficiently wide existing and former railroad rights of way in the vicinity of East 37th Street are available to make such a two-track connection possible. Relocating Norfolk Southern’s Nickel Plate Line about 50 feet northward to the former Cleveland Union Terminal right of way, between the west approaches of NS’s East 55th Street Yard and the East 37th Street

area, would provide sufficient lateral space for a connection to/from a double-tracked Lakefront Bypass right of way using NS's Randall Secondary east of the East 37th area. By moving NS's Nickel Plate Line's tracks to the long-abandoned, double-tracked CUT right of way, this would create enough room for the construction of 6-degree curve for the Lakefront Bypass right of way. Thus Lakefront Bypass trains moving to/from the Nickel Plate Line from/to the Randall Secondary would be able to maintain speeds of up to 30 mph, according to input from Wilbur Smith & Associates and LTK Engineering representatives.

With the Nickel Plate Line relocated to the former CUT right of right in the vicinity of East 37th Street, new construction of through tracks is only part of the equation. Also needed will be the construction of multiple crossovers on NS's relocated Nickel Plate Line near East 37th Street, the relocation of lead tracks to NS's East 55th Street Yard, and, possibly the replacement of the former CUT bridge over East 37th Street. Also, some utility structures might have to be addressed, such as the relocation or reinforcement of sub-grade fiber optic cable interducts. Relocating fiber optic cable interducts are typically very expensive, given the meticulous, labor-intensive work involved. Furthermore, a yard lead track diverging westward from this location, to a recently abandoned intermodal rail yard near Broadway Avenue and East 9th Street, will have to be removed under Option 2. This includes the removal of about 300 yards of a gradient and retaining wall for this lead track, which rises from east to west.

Option 2 proposed investments:

Four new crossovers (@ \$500,000 per installation).....	\$2,000,000
Relocate 3,000 feet of two NKP Line tracks.....	\$2,273,000
Replace former CUT bridge over East 37th Street.....	\$3,000,000
Acquire commercial property (estimate).....	\$1,000,000
Remove gradient for intermodal yard lead (estimated)....	\$1,000,000
Grading for new track connection.....	\$2,000,000
Construct 4,000 feet of new track connections.....	\$1,520,000
Relocate/reinforce fiber optic cable interducts (est.)...	\$3,000,000
Two new #20 turnouts.....	\$ 250,000
Install crash barrier for I-77 support structure.....	\$ 250,000
Alter NS dispatch system, microprocessors, cable etc....	\$ 700,000
Subtotal.....	\$16,993,000
Contingency (@20 pct).....	\$ 3,398,600
Subtotal.....	\$20,391,600
Engineering (@20 pct).....	\$ 4,078,320
TOTAL (Option 2) East 37th St. Area.....	\$24,469,920
	=====

Option 3 -- The East 37th Street area is the only location identified in this analysis where a third option was considered. However, this option is not recommended for its impracticality. This third option is presented herein for the simple reason that it was offered by Stone Consulting & Design of Warren, PA -- a consultant hired by Norfolk Southern prior to its 1999 acquisition of Conrail. Some significant changes have occurred since Stone Consulting made its recommendation to NS in the late 1990s. Foremost was the widening of Interstate 77 in the vicinity of East 37th Street. This resulted in the construction of broader support structures for the overhead highway, thereby restricting the available space for the construction of trackage beneath the I-77 overpass.

Another factor is a new national track-side work rule policy. This policy stipulates that, wherever new rail passenger transit rights of way are built next to freight railroads (or vice-versa), there be a 25-foot separation between the rail passenger transit and rail freight rights of way, for worker safety purposes. One of the Lakefront Bypass' connections (a so-called "flyover" track"), as proposed by Stone Consulting, would be located within 5 feet of the Greater Cleveland Regional Transit Authority's Red/Blue/Green transit lines near East 37th Street. But this proposed "flyover" connection for the proposed Lakefront Bypass appears unworkable for a couple of reasons. To address the lateral clearance issue, LTK Engineering suggests relocating RTA's tracks to the former NYC Food Terminal Access tracks in this vicinity. This, unfortunately, does not resolve another drawback to Stone Consulting's proposed "flyover" track.

Stone Consulting's proposed bypass route would use a right-of-way that has a nearly two-percent gradient, next to the RTA's transit tracks. Glenn Michael, director of railways for Wilbur Smith & Associates, noted that such steep gradients are generally not accepted by freight railroads. Freight railroads assume they will use all of their tracks for trains traveling in either direction. Thus, it would be difficult for most freight trains to climb up a 2 percent grade in the uphill direction -- a situation that can be assumed given the bi-directional track operations of most modern railroads.

Furthermore, lengthening the gradient isn't likely to be affordable, given the proximity of the Broadway Avenue overpass at the west end of Stone Consulting's proposed "flyover" track. While existing clearances, with the 2-percent gradient, will permit a double-track intermodal train to pass beneath Broadway Avenue, any lengthening of the "flyover" right of way to reduce its gradient will compromise the railway's clearance beneath Broadway Avenue. The alternative is to raise or relocate the Broadway Avenue overpass, which will incur a significant, unnecessary expense, provided the two previous, more affordable alternatives. Given these factors, Option 3 for the East 37th Street area is therefore rejected from further consideration.

North Broadway

Option 1 -- Nearly two miles of a former multi-track railway, now owned by Norfolk Southern and called the Randall Secondary, are proposed to be rebuilt to mainline standards. This includes replacing all existing through tracks (given their poor condition) with new tracks, and adding a second main track where needed to create this easternmost segment of the Lakefront Bypass. This segment also has the only road-rail grade crossing along the entire proposed Lakefront Bypass -- at East 65th Street. But this segment also has rail overpasses of two major roads, including East 55th and East 79th streets. Those overpasses are 3-4 tracks wide, providing more than enough lateral spaces for additional tracks, to accommodate proposed Lakefront Bypass rail traffic.

In this option, existing Norfolk Southern through tracks would be replaced with mainline-quality tracks. Those would be complemented by the construction of a new second main track, where needed, plus accompanying turnouts/crossovers, to expand capacity to be used by general freight train traffic rerouted away from the lakefront. Local NS freight traffic, especially that which uses Von Willer Yard, would be augmented by making that yard a dual-approach facility, complete with an extended lead at the yard's east end. Also, a section of sound barrier would be installed on the south side of the alignment, next to Track Road, to protect a residential area.

However, one track of this lightly-used rail yard would be sacrificed for the construction of the second main track in order to provide enough room for the sound barrier between the Lakefront Bypass and Track Road. Lastly, the double-tracked bypass would have a more gradual curvature than one that exists at East 55th Street on the Randall Secondary. Costs associated with the east end of this segment are accounted for in the presentation of the next location -- CP117. Those costs include two new crossovers and a new, interlocked turnout.

Option 1 proposed investments:

Replace Randall Secondary tracks and construct new second main tracks where needed (18,000 feet total).....	\$6,822,000
One new crossover (@ \$500,000 per installation).....	\$ 500,000
Four new #10 hand-throw turnouts.....	\$ 200,000
Install automatic crossing gates at East 65th Street.....	\$ 200,000
Construct sound barrier along Track Road.....	\$1,000,000
Replace existing pedestrian overpass.....	\$2,000,000
Extend Von Willer Yard lead track at east end of yard....	\$1,000,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$12,422,000
Contingency (@20 pct).....	<u>\$ 2,484,400</u>
Subtotal.....	\$14,906,400
Engineering (@20 pct).....	<u>\$ 2,981,280</u>
TOTAL (Option 1) North Broadway.....	\$17,887,680
	=====

Option 2 -- Nearly two miles of a former multi-track railway, now owned by Norfolk Southern and called the Randall Secondary, are proposed to be rebuilt to mainline standards. This includes replacing all existing through tracks (given their poor condition) with new tracks, and adding a second main track where needed to create this easternmost segment of the Lakefront Bypass.

This segment also has the only road-rail grade crossing along the entire proposed Lakefront Bypass -- at East 65th Street. But this segment also has rail overpasses of two major roads, including East 55th and East 79th streets. Those overpasses are 3-4 tracks wide, providing more than enough lateral spaces for additional tracks, per the proposed Lakefront Bypass.

Norfolk Southern's Von Willer Yard would be upgraded with the addition of lead tracks at its west end, thereby making it a dual-approach facility. Another yard improvement would be an extension of a lead track at the yard's east end so that switching moves don't interfere with mainline traffic on the Lakefront Bypass. Also, a section of sound barrier is proposed to be installed on the south side of the alignment, next to Track Road, to protect a residential area.

However, one track of this lightly-used rail yard would be sacrificed for construction of the second main track to provide enough room for the sound barrier between the Lakefront Bypass and Track Road. Lastly, the double-tracked bypass would have a more gradual curvature than one that exists at East 55th Street on the Randall Secondary. Costs associated with the east end of this segment are accounted for in the presentation of the next location -- CP117. Those costs include two crossovers and an interlocked turnout to a realigned Randall Secondary next to the Lakefront Bypass and across the Cleveland Line plus other major proposed changes.

Option 2 proposed investments:

Replace Randall Secondary tracks and construct new second main tracks where needed (18,000 feet total).....	\$6,822,000
One new crossover (@ \$500,000 per installation).....	\$ 500,000
Five new #10 hand-throw turnouts.....	\$ 250,000
Install automatic crossing gates at East 65th Street.....	\$ 200,000
Construct sound barrier along Track Road.....	\$1,000,000
Replace existing pedestrian overpass.....	\$2,000,000
Extend Von Willer Yard lead track at east end of yard....	\$1,000,000
Alter NS dispatch system, microprocessors, cable etc.....	<u>\$ 700,000</u>
Subtotal.....	\$12,472,000
Contingency (@20 pct).....	\$ 2,494,400
Subtotal.....	<u>\$14,966,400</u>
Engineering (@20 pct).....	<u>\$ 2,993,280</u>
TOTAL (Option 1) North Broadway.....	\$17,959,680
	=====

CP 117 and vicinity

Option 1 -- The replacement of the existing track connection between Norfolk Southern’s Randall Secondary and NS’s Cleveland Line, in the southwest quadrant of CP117 is the primary change at this location under Option 1. A connection offering a more gradual curvature to allow higher train speeds (thereby increasing traffic capacity) is proposed. This will require the acquisition of a portion of an adjacent commercial property and the relocation of an existing high-tension-line tower. Given their relatively poor condition, both existing through tracks on the Randall Secondary, west of CP117 to East 79th Street (within the vicinity of the interlocking), are to be replaced with new tracks.

Furthermore, two new crossovers are to be added -- one between the two Randall Secondary tracks to provide a double-tracked mainline west of CP 117. Also, south of CP 117, a new crossover is needed on the Cleveland Line to give Lakefront bypass trains full access to both main tracks of the Cleveland Line. Another change, suggested by NS operating personnel, though located three miles southeast of the end of the Lakefront Bypass, is the addition of an opposing crossover at CP114TE (ex-CP White, near Broadway Avenue’s overpass of the Cleveland Line). This addition would provide NS with greater operational flexibility, in that it would allow NS to hold lower-priority trains southeast of CP117 until higher priority trains clear the area.

Option 1 proposed investments:

Replace Randall Secondary tracks and construct new	
Second main tracks (2,000 feet total).....	\$ 800,000
New connecting track.....	\$ 500,000
Property acquisition (estimated).....	\$ 200,000
Relocate existing high-tension line tower (estimated)....	\$ 500,000
Two new CP117 crossovers (@ \$500,000 per installation)...	\$1,000,000
One new CP White crossover.....	\$ 500,000
Alter NS dispatch system, microprocessors, cable etc.....	\$ 700,000
Subtotal.....	\$4,200,000
Contingency (@20 pct).....	\$ 840,000
Subtotal.....	\$5,040,000
Engineering (@20 pct).....	\$1,008,000
TOTAL (Option 1) CP117 & Vicinity.....	\$6,048,000
	=====

Option 2 -- A total realignment of CP117 is needed to accommodate the rail traffic volumes proposed under this option. Not only are two new track connections proposed to link Norfolk Southern’s Randall Secondary to NS’s Cleveland Line to complete the Lakefront Bypass, but these should feature gradual curvatures for intermodal freight traffic to maintain relatively high speeds.

To provide enough room for these two new high-speed track connections, the Cleveland Line will have to be moved as far east through the interlocking as possible. Fortunately, Union Avenue’s overpass of the Cleveland Line, immediately south of CP117, has enough room beneath it to accommodate this major realignment. While this overpass was rebuilt in recent years, it used the abutments of the old road overpass, underneath which were also the lead tracks for a former Pennsylvania Railroad interchange yard. While the interchange yard was abandoned

many years ago, NS still owns the vacant property. This land is proposed to be used for the eastward realignment of the Cleveland Line at this location.

There are other commercial properties next to CP117 that will have to be acquired to make the improvements proposed in Option 2 possible, though no structural demolitions are required. An essential property acquisition is in the southwest quadrant of CP117 to permit the construction of the high-speed, double-tracked Lakefront Bypass connection. The other is in the northeast quadrant of CP117 to allow for a track connection that would give NS greater operational flexibility in accessing its Randall Secondary east of CP117 from the lakefront. But a greater potential use of this proposed track connection would be for the operation of a proposed commuter rail service between downtown Cleveland and Solon/Aurora.

To implement the proposed Lakefront Bypass, some utilities would have to be relocated. These include three high-tension-line poles and one high-tension-line tower, plus the relocation or reinforcement of sub-grade fiber optic cable interducts. Relocating fiber optic cable interducts are typically very expensive, given the meticulous, labor-intensive work involved. Further track construction is required for Option 2. This includes eight new crossovers, a 1,800-foot-long siding along the Randall Secondary west of CP117 to hold local freight trains, a relocated rail-rail grade crossing at CP117 and the realigned Cleveland Line trackage noted earlier.

Three main tracks south of CP117 along the Cleveland Line would continue for another 13,000 feet, past CP116 (the former CP Harvard, which this report proposes to eliminate) to CP114TE (formerly CP White, near Broadway Avenue’s overpass of the Cleveland Line). Not only is an extension of the third main track to CP114TE included as part of the costs at CP117, but so is the addition of an opposing crossover at CP114TE. Based on input from NS operating personnel, this addition could provide NS with greater operational flexibility, in that it would allow NS to hold lower-priority trains between CP117 and CP114TE until higher priority trains clear the area.

Option 2 proposed investments:

Replace Randall Secondary tracks and construct new	
Second main tracks (2,000 feet total).....	\$ 800,000
Two new connecting tracks.....	\$1,000,000
Realign the Cleveland Line through CP117.....	\$1,140,000
Add 13,000-foot third main track to CP114TE w/ turnout...	\$5,900,000
Build connection in NE quadrant of CP117.....	\$ 750,000
New #20 turnout to Randall Secondary w/ signalization....	\$ 250,000
New #20 turnout to Kinsman Connection w/ signalization...	\$ 250,000
Property acquisitions (estimated).....	\$ 400,000
Relocate high-tension line tower/poles (estimated).....	\$1,500,000
Relocate/reinforce fiber optic cable interducts (est.)...	\$3,000,000
Seven new CP117 crossovers (@ \$500,000/installation)....	\$3,500,000
One new CP White crossover.....	\$ 500,000
Alter NS dispatch system, microprocessors, cable etc....	<u>\$ 700,000</u>
Subtotal.....	\$19,690,000
Contingency (@20 pct).....	<u>\$ 3,938,000</u>
Subtotal.....	\$23,628,000
Engineering (@20 pct).....	<u>\$ 4,725,600</u>
TOTAL (Option 2) CP117 & Vicinity.....	\$28,353,600

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Total infrastructure costs of Lakefront Bypass

The two data tables presented on this page show the summary of an opinion of capital costs that are deemed as necessary for two options for developing the Lakefront Bypass. These two tables are compilations of all capital costs proposed in previous sections that detailed changes to specific locations (ie: track junctions) and geographically larger route segments. Those changes are listed in two categories based on proposed changes to railroad operations -- Option 1 and Option 2

Option 1 Under this option, proposed is the relocation away from the lakefront of all through general freight train traffic that doesn't have to operate via the lakefront (representing as many as 20 of about 30 daily general freight trains, not including another 20 daily intermodal freight trains). Cleveland-area Norfolk Southern operating employees, including trainmasters (local railroad managers) and train & engine crews, indicated that a reroute of through general freight traffic via their Rockport Yard would enhance the efficiency of their operations at this facility. However, this should not be construed as an endorsement of any proposed improvements.

Option 1 proposed investments:

CP190/Rockport Yard-west.....	\$ 1,908,000
CP491/Rockport Yard-east.....	\$ 2,628,000
Linndale-Southwest.....	\$11,628,000
Downtown-South.....	\$21,888,000
East 37th Street area.....	\$ 5,823,000
North Broadway.....	\$17,887,680
CP117 and vicinity.....	<u>\$ 6,048,000</u>
TOTAL (Option 1).....	\$67,812,680
	=====

Option 2 Per this option, proposed is the relocation away from the lakefront of all through freight train traffic (general plus intermodal) that doesn't have to operate via the lakefront (representing as many as 40 of about 50 daily total freight train movements). Cleveland-area Norfolk Southern operating employees, including trainmasters (local railroad managers) and train & engine crews, have indicated that a reroute of intermodal freight train traffic away from NS's lakefront route would have no benefit to NS.

Option 2 proposed investments:

CP190/Rockport Yard-west.....	\$ 6,588,000
CP491/Rockport Yard-east.....	\$11,988,000
Linndale-Southwest.....	\$27,288,000
Downtown-South.....	\$27,828,000
East 37th Street area.....	\$24,469,920
North Broadway.....	\$17,959,680
CP117 and vicinity.....	<u>\$28,353,600</u>
TOTAL (Option 2).....	\$141,475,200
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SECTION FOUR

Projected impacts from the proposed Lakefront Bypass

Overview

Considering the amount of rail freight traffic to be diverted per the recommended Lakefront Bypass (initially described as Alternative Route 4 in Section Two of this report and developed in detail within Section Three), this will have various degrees of impacts on a number of interests, including Norfolk Southern, the city of Cleveland and the region. These impacts can be measured on qualitative and quantitative levels, meaning some can be quantified and some cannot.

In order to gain the full advantage of the recommended Lakefront Bypass, an Option 2 level of investment (outlined in Section Three), totaling \$141,475,200 would likely have to be implemented. While this is the most expensive of the two options as it would divert all through rail traffic from the lakefront, it also offers the greatest potential benefits to the community. Option 1, having capital costs of \$67,812,680, would allow Norfolk Southern's general freights to access both ends of Rockport Yard and provide NS with greater operating flexibility.

To implement Option 2, all of its capital costs (\$73,662,520) that exceed Option 1's capital costs would have to be borne by other parties. Indeed, NS executives have argued that all costs of implementing the Lakefront Bypass should be funded by parties other than NS, since NS executives have said they are satisfied with the railroad's existing operations via the lakefront. Thus, if anyone wants to divert NS freight traffic from the lakefront, NS executives argue, it would have to be paid for by parties other than NS. However, this position ignores a number of potential benefits to NS, resulting from the Lakefront Bypass. Until studied further, no assurance of net benefits are positive. Those quantifiable benefits are described further in this section.

To be sure, the greatest benefits from the Lakefront Bypass are to the community. However, these are more qualitative in nature, and therefore more difficult on which to place a price tag. This is complicated by the fact that NS's lakefront route cannot be abandoned and removed, as 7-13 freight trains a day must continue to operate here to serve existing lakefront customers, such as the Port of Cleveland, Cargill Salt, the C&P iron ore offloading facilities, plus other local industries along the west and east sides of downtown on the lakefront route. Furthermore, Amtrak has four daily intercity passenger trains a day via NS's lakefront route to serve Amtrak's downtown Lakefront Station. These passenger trains also cannot be relocated unless Amtrak's host railroads first agree to it, and if some entity other than Amtrak will build for it a replacement passenger station facility somewhere along a bypass route outside of downtown Cleveland. Thus, there will always be mainline railroad tracks via Cleveland's downtown lakefront.

Lessons from cold-weather cities like Toronto and Chicago, which have vibrant lakefronts, show that lakefront railroad tracks can be utilized as a means to access and spur lakefront recreational, tourism and commercial development by using those tracks for local, regional or intercity passenger rail services. In Cleveland, the policy toward railroad infrastructure on its lakefront

ultimately will depend on how those tracks are viewed by local officials -- either as a barrier or as an untapped resource for lakefront development. But, the basic message is that the lakefront railroad tracks cannot be removed and should therefore be used in a way that effectively helps the lakefront become more accessible to the public.

Community impacts

Impacts on the quality of life in the community are the most difficult to determine, as they are primarily qualitative in nature. However, some logical arguments can be made that the Lakefront Bypass (as detailed in Alternative 4 in Section Two, and further developed in Section Three) will greatly improve the quality of life in the City of Cleveland and its overall metropolitan area.

Lakefront impacts: The primary motivation for this report is to find a way to remove a significant barrier to improving Cleveland's lakefront. There have been a number of proposals over the years for developing hotels, office buildings, convention halls and other facilities next to, on or above the lakefront railroad tracks. The existing and frequent heavy freight trains operating on those tracks have proven to be a deterrent to some of those proposals. With about 50 daily NS freight trains producing noise, vibration and dust, not to mention their haulage of hazardous shipments, their removal from the lakefront could reduce concerns by developers and regulators for the development of structures near or above the lakefront railway.

In Toronto, after its through freight trains were diverted away from its downtown lakefront, numerous structures were built next to, on or above lakefront tracks, which still accommodate limited freight train services and frequent commuter rail and intercity passenger rail services. Former freight rail yards were redeveloped with housing (such as the Harbourfront development) and tourist/recreational structures (such as CN Tower, Skydome, and the convention center). Similar developments are considered for downtown Cleveland's lakefront.

Commuter rail: Since all freight traffic cannot be removed, some officials suggest that the lakefront tracks could be used by planned commuter rail services from the suburbs and numerous city neighborhoods. Indeed, diverting rail freight traffic per Alternative Route 4 would avail four, mostly freight-free railway routes for commuter rail into downtown Cleveland's lakefront. Those four routes are:

- Aurora - Cleveland lakefront;
- Lorain - Cleveland lakefront;
- Collinwood - Cleveland lakefront;
- Hopkins Airport - Cleveland lakefront.

These potential commuter rail routes could become more important during the Ohio Department of Transportation's pending rebuilding of the Inner Belt highway through downtown Cleveland. Not only would these potential commuter rail routes serve as a means of traffic maintenance during the lengthy rebuilding of the Inner Belt, but they could also serve as a rationale for securing federal funding for implementing the Lakefront Bypass to divert freight train traffic away from Cleveland's lakefront, thereby availing railroad capacity for commuter rail.

The potential affiliation between the Inner Belt reconstruction project and the Lakefront Bypass should not be discounted, especially when commuter rail is considered. Miami-area interests used federal highway funds in the 1980s to build commuter rail between Miami and West Palm Beach as a maintenance of traffic resource during a total reconstruction of Interstate 95. Commuter rail service has since been improved and expanded over the years to meet rising customer demand.

Commuter rail to Cleveland's downtown lakefront would not only serve as a resource for tapping federal funds to construct the Lakefront Bypass. It would also convert the existing lakefront railroad rights of way from being a barrier to lakefront development and access, to becoming a resource for developing and accessing the lakefront. Given this circumstance, it could be assumed that the federal government might be asked to pay for half of the costs of implementing the Lakefront Bypass, or about \$66.64 million. As it happens, the Federal Transit Administration typically pays 50 percent of the capital costs for federally eligible transit projects. Additional costs for establishing commuter rail services on the four routes mentioned before would have to be offset by a variety of sources, including local, state and federal funds.

Neighborhood impacts: Direct impacts can be measured on existing neighborhoods located along the current lakefront freight railroad route versus those on the Lakefront Bypass (described per Alternative Route 4 in Section 2, and detailed in Section Three). Such impacts can be measured due to the number of residential areas affected by this proposal and the number of trains that would be routed through them.

On the current lakefront route, freight trains pass through a near-continuous string of residential areas on the West Side from near Edgewater Park and the Cudell neighborhood, past Lakewood's Bird Town, westward to West Park. On the East Side, the current lakefront route passes by fewer residences, since homes along this section are mixed among more widespread commercial and industrial structures. All residential and recreational sites along the lakefront route would see dramatically fewer freight trains per day -- to about 7-13. Even if commuter trains were to be added, they would be fewer in number than the current lakefront freight traffic and, due to the light weight of commuter trains, they would create far less noise impacts than freight trains.

By comparison, the proposed Lakefront Bypass passes through more industrial and commercial areas. Only three short sections of residential areas and one recreational site (James M. Dunphy Park on Jasper Ave.) immediately abut the Lakefront Bypass. Sound barriers are proposed to be built at those locations. There are other residential areas which are close to the tracks, but a number of small industrial and commercial buildings provide some buffering between the tracks and the homes. An example of this is the residential area north of Denison Avenue and east of West 73rd Street. More sound barriers may ultimately be needed than the four proposed in Section Three, depending on the results of detailed noise measurements and the collective desires expressed by those in the affected neighborhoods.

Below is a table comparing the extent of residential areas within 1,000 feet of the lakefront route and the proposed Lakefront Bypass. The extent of these proximate residential areas are measured

by the length of the right of way segments (measured in feet) that are near residences. Since residences are located within 1,000 feet on both sides of the two rights of way, those will be accounted for separately. If, for example, 2,000 feet of a given right of way has residences on both sides of that segment, the total residential extent is 4,000 feet. The charts below for this data are presented geographically from west to east.

Existing Lakefront Route:

City/neighborhood	extent of residential areas along railway	existing daily freight train traffic	proposed daily freight train traffic
Cleve./Riverside	2,800	47-49	7-9
Cleve./Puritas-Longmead	0	47-49	7-9
Cleve./Kamms Corners	14,500	47-49	7-9
Cleve./Jefferson	5,000	47-49	7-9
Lakewood/Birdtown	4,500	47-49	7-9
Cleve./Edgewater	5,000	47-49	7-9
Cleve./Cudell	6,000	47-49	7-9
Cleve./Detroit-Shoreway	2,000	47-49	7-9
Cleve./Downtown	1,500	50-52	11-13
Cleve./Goodrich-Kirkland Pk.	8,000	50-52	11-13
Cleve./Hough	3,300	50-52	11-13
Cleve./Central	700	50-52	11-13
Cleve./Fairfax	3,400	50-52	11-13
Cleve./Kinsman	4,900	50-52	11-13
Cleve./N. Broadway	0	50-52	11-13
TOTAL RESIDENTIAL EXTENT.... 61,600 linear feet of residential areas along this railroad route option			

Proposed Lakefront Bypass:

City/neighborhood	extent of residential areas along railway	existing daily freight train traffic	proposed daily freight train traffic
Cleve./Riverside	0	10	50
Cleve./Puritas-Longmead	8,500	10	50
Linndale	1,500	10	50
Brooklyn	0	10	50
Cleve./West Blvd.	4,700	10	50
Cleve./Stockyards	3,500	10	50
Cleve./Detroit-Shoreway	6,200	16	56
Cleve./Ohio City	4,000	16	56
Cleve./Tremont	800	16	56
Cleve./Industrial Valley	0	16	56
Cleve./N. Broadway	6,500	0.3	40-41
TOTAL RESIDENTIAL EXTENT.... 35,700 linear feet of residential areas along this railroad route option			

The above tables show that the proposed Lakefront Bypass has far fewer residential areas within 1,000 feet of its right of way than does the current lakefront route. But a much more detailed evaluation will be needed to determine the actual number of residents who would be affected by

their proximity to both of these two railroad rights of way. However, this preliminary review suggests that the Lakefront Bypass will relocate a majority of Norfolk Southern's freight train traffic to a route where it would negatively affect fewer residents.

Impacts on Norfolk Southern

Operating savings: It is estimated that Norfolk Southern will see operating cost savings by diverting its lakefront rail traffic to the proposed Lakefront Bypass for two reasons. First, the Lakefront Bypass is 3.5 route miles shorter than its current route via the lakefront. And, second, the Lakefront Bypass is flatter as it crosses the Cuyahoga River on a bridge that is about 45 feet higher than the Cuyahoga River bridge on NS's current lakefront route over which it directs most of its east-west rail traffic through Greater Cleveland.

The most quantifiable cost savings data is for the usage of diesel fuel. SEA Consultants Inc. conducted a Draft Environmental Impact Study (DEIS) in 2001 for a project called the Bayport Loop Buildout, which would expand a container terminal near Houston, Texas. In its DEIS, SEA Consultants projected that mainline railroad freight trains operated by BNSF Corp. would have diesel fuel consumption rates of 745.8 gross ton-miles-per gallon. BNSF employs many of the same locomotives that Norfolk Southern uses for its own mainline freight trains.

According to 2002 Norfolk Southern track charts, NS has about 61.8 million gross tons per mile of freight traffic routed via the Cleveland's downtown lakefront. Approximately 80 percent of this traffic, or about 50 million gross tons per mile, is proposed to be diverted via the Lakefront Bypass. Thus, based on SEA Consultants' analysis, 67,042 gallons of fuel per mile per year are used by the traffic proposed to be diverted. For the current 16-mile lakefront route, this translates to 1,072,672 gallons of diesel used in the first year. For the 12.5-mile proposed Lakefront Bypass, this translates to 838,025 gallons of fuel used in the first year.

Using existing (as of May 9, 2003) diesel fuel costs in Ohio and in adjacent states (per Travel Centers of America Inc.) range from \$1.379 to \$1.659 per gallon. Based on these numbers, fuel costs for the existing lakefront route range from \$1,479,214.60 to \$1,779,562.80 for the first year (in 2003 dollars). For the proposed Lakefront Bypass route, fuel costs would range from \$1,155,636.40 to \$1,390,283.40 for the first year (in 2003 dollars). Thus, by diverting most of its traffic off the lakefront to the proposed Lakefront Bypass, Norfolk Southern could realize an annual savings in fuel costs (in 2003 dollars) ranging from \$323,578.20 to \$389,279.40 per year, assuming freight traffic doesn't grow. However, rail traffic in Ohio is expected to increase. See the data noted in "Impacts on new business opportunities" (shown in the next portion of this section) to calculate potential additional fuel cost savings in the coming years, resulting from the Lakefront Bypass. LTK Engineering's Dave Staplin suggests that some or all of the fuel savings could be negated by the fact that more interlockings would have to be traversed by freight trains using the Lakefront Bypass when compared to the lakefront route. This may result in increased running times for freight trains, from Rockport Yard to CP116, via the Lakefront Bypass.

Given that the Lakefront Bypass offers a shorter route than the current lakefront route, additional savings could be realized in terms of maintenance on locomotives and rail cars. Considering that

a wide variety of rail cars are used on a regular basis by Norfolk Southern and all other railroads, these costs are much more difficult to determine. But, suffice it to say, since a shorter and flatter route through Greater Cleveland would be used via the Lakefront Bypass, significant cost savings could be enjoyed by those owning or leasing the various locomotives and rail cars passing through this area on Norfolk Southern's Chicago-Pittsburgh mainline, should the Lakefront Bypass be implemented. On the other hand, NS would also likely see increases in right-of-way maintenance costs, given the additions of new tracks and signal systems on its properties proposed to be used for the Lakefront Bypass. Determination of these added maintenance costs will require additional study. Those costs to NS could be reduced if its ownership of the lakefront route were sold to another entity, such as the Cleveland-Cuyahoga County Port Authority.

Impacts on new business opportunities: While specific traffic growth projections for Norfolk Southern are unavailable, a recent study conducted at the request of the Ohio Department of Transportation (ODOT) shows that overall rail traffic in Ohio will increase for the foreseeable future, until at least the year 2020.

In the executive summary for the ODOT-requested study, "Freight Impacts on Ohio's Roadway System" Cambridge Systematics Inc. said: "Rail traffic is forecast to grow at 1.4 percent per year, slower than the 2.3 percent per year growth rate of freight trucks. The rail tons originating or terminating in Ohio are forecast to increase from 131 million in 1998 to 149 million in 2020."

LTK Engineering's Dave Staplin suggests that railroad traffic growth rates typically are one-half of gross domestic product. At the current average GDP growth rate of 3.5 percent, rail volume growth is about 1.7 percent to 1.8 percent. LTK further notes that Ohio is a huge rail hub for the rest of the nation, with huge amount of rail tonnage passing through the state. Intermodal traffic growth is even higher -- at about 5 percent -- even during this period of slow economic growth. By 2020, using 4 percent growth rate for intermodal traffic and 1.5 percent, LTK's Dave Staplin says intermodal rail traffic could rise by 137 percent and carload rail traffic would grow by 39 percent. Thus, under Option 2 for diverted traffic to the Lakefront Bypass could rise from the proposed first-year levels (2002 base year) of 40-56 trains a day, to 84-108 trains per day in 2020. Similarly, the remaining lakefront freight traffic could rise from the proposed, first-year levels (2002 base year) of 7-13 trains per day (not including the existing four daily Amtrak passenger trains), to 10-18 trains per day (again, not including Amtrak), according to LTK's Staplin. Some of those lakefront freight trains do carry hazardous materials, notably petrochemicals. Those are carried by a local freight train that serves a petrochemical customer off West 110th Street. There is a possibility that this hazardous traffic could be kept away from the lakefront.

In a specific case that would affect the proposed Lakefront Bypass, NS officials note they are seeking new business between the Port of Cleveland and the International Steel Group's (ISG -- the former LTV Steel) facilities at the south end of Cleveland's industrial Flats District. This new business involves shipments that cannot be offloaded directly from lake shipping to their steel mill due to the shallow Cuyahoga River channel.

To serve this new customer would involve a roundabout route for proposed new NS trains. They would travel southwest from the Port of Cleveland, across NS's lakefront drawbridge over the Cuyahoga River on the current lakefront route. Near CP190 (near Hopkins Airport), these trains would use the northeast leg of the wye track to then go east on the north side of Rockport Yard. The trains would then travel northeast from CP491 up to Knob, where they would head east on the Flats access track to reach ISG's steel mills. NS officials emphasized in an April interview that this is still preliminary and, therefore, they did not know how many trains per day would be required to handle the potential ISG shipments. The impact of this new business on the proposed Lakefront Bypass is likely to be minimal, while it would increase rail traffic on the lakefront.

Impacts on proposed new infrastructure: According to NS officials, they are considering the construction of a new track connection in the southeast quadrant of CP117, the former Erie Crossing, located in Cleveland's North Broadway neighborhood. This track connection would simplify the movement of a local freight train which operates three days per week and serves customers (such as Stouffer's in Solon) on their Randall Secondary.

This train uses locomotives at both ends of its consist and is based out of Motor Yard in Macedonia. Given its point of origin, this train therefore must make a back-up move at CP117 to access the Randall Secondary east of CP117. While changes proposed at CP117 in Option 1 of Section Three of this report will not preclude the construction of NS's proposed track connection, changes proposed in Option 2 (detailed in Section Three) would preclude it.

A solution for this service, if Option 2 is implemented as outlined in Section Three of this report, would be to instead have this train based out of Rockport Yard instead of Motor Yard. This would negate the need for the back-up move, and thus, NS's proposed track connection. It should be noted that Rockport Yard and Motor Yard each are 11 miles away from CP117.

Additional opportunities to NS from Lakefront Bypass: Input from Cleveland-area operating employees of Norfolk Southern, including NS trainmasters suggest there are opportunities from diverting general freight traffic via the proposed Lakefront Bypass. Chief among these is it should make yard operations at NS's Rockport Yard, near Hopkins Airport, more efficient. This is especially true for 10-12 merchandise freight trains per day which make pick-up/set-out switching moves from the lakefront route at CP 190 (at the west end of the yard). More study is needed.

In Section Three, Option 1 of this report, only the through general freight train traffic now operating via the lakefront are proposed to be diverted via the Lakefront Bypass. This would route about 20 general freight trains per day through the Rockport Yard area, giving them access to both ends of the rail yard. NS operating employees say this would improve operational flexibility at Rockport Yard, since the current practice is to have those trains access the rail yard from only the western end at CP 190.

Potential drawbacks to NS from Lakefront Bypass: There are two potential drawbacks to NS operations by diverting freight traffic from the current lakefront route to the proposed Lakefront Bypass. Foremost is the diversion of all through traffic from the lakefront, or about 40 daily

general and intermodal freight trains, via the Rockport Yard area. Additional track capacity will have to be added in the vicinity of this rail yard.

Furthermore, if time-sensitive intermodal freight traffic is to be rerouted, it would no longer be able to maintain 60 mph top speeds (available via the lakefront route) if diverted to the Lakefront Bypass. While a new track is proposed to be constructed in the vicinity of Rockport Yard and designed to accommodate 50 mph top speeds, some intermodal trains would have to use the existing tracks around the north side of this rail yard, which are engineered for top speeds of only 25-35 mph. However, the shorter route of the Lakefront Bypass -- compared to the existing lakefront route which has some tight curves incurring 20 mph speed restrictions (which are proposed to be increased to 35 mph) just east of downtown -- may cancel out the speed differences on the West Side.

NS financial contribution to Lakefront Bypass: Given the potential operating benefits and cost savings to NS from diverting their through traffic (especially their through general freight traffic) via the proposed Lakefront Bypass, it is recommended that NS be asked to contribute a portion of the capital funding necessary to implement the bypass route. The actual amount of this contribution from NS should be determined by additional studies and direct negotiations by other affected parties showed by such studies as deriving benefits from the proposed Lakefront Bypass.

Other potential impacts

STB's "Conrail Agreement": There are no impacts from the Lakefront Bypass on an agreement approved by the Surface Transportation Board (the federal railroad regulatory body) governing the 1999 acquisition of Conrail by Norfolk Southern Corp. and CSX Transportation Inc. That agreement stipulates how many freight trains can be operated on some routes that pass through residential and other sensitive areas. There is no such limitation on any segments of the proposed Lakefront Bypass. In fact, it is because of the STB agreement that there are now more freight trains (about 10 daily) using the West Side segments of what is proposed to become the Lakefront Bypass. This added freight train traffic used to pass through Lakewood and other West Shore communities. Also, about 30 daily freight trains that used to operate via downtown Cleveland's lakefront now use CSX's "Short Line" (acquired from Conrail) which passes on the south and east sides of the City of Cleveland, which also was approved by the STB. Thus, not only are there no STB restrictions to diverting freight train traffic to the proposed Lakefront Bypass, development of this bypass would follow the spirit of the STB's "Conrail Agreement."

Improved Cuyahoga River access: The proposed Lakefront Bypass would cross a navigable section of the Cuyahoga River on a long viaduct that is roughly 50 feet above the river's average water level, compared to only five feet above the river at NS's lakefront drawbridge. Larger ships will still require that an existing drawbridge on the Lakefront Bypass route be raised for them. However, large recreational ships -- like the Goodtime III and Nautica Queen -- plus all tugboats, sailboats and some commercial ships can pass underneath this drawbridge without it being raised.

The 28-foot depth of the Cuyahoga River in the vicinity of this drawbridge prevents larger ships from navigating the upper portion of the Cuyahoga River's industrial areas. Thus, larger ships stay nearer to the lakefront where most recreational traffic is also concentrated. Recreational boating on the river is more frequent near its lakefront mouth, since most marinas and boat storage areas are located at the north end of the Cuyahoga River or along the Lake Erie shoreline. Also, most of the waterfront entertainment attractions and publicly accessible riverside docks are at the north end of the Flats District. Taken together, these factors show why most river-borne recreational and commercial water traffic rarely ventures as far up the Cuyahoga River as the proposed Lakefront Bypass' drawbridge.

Thus, diverting rail freight traffic to the Lakefront Bypass won't simply relocate the problems experienced by water craft in accessing the Cuyahoga River, or alternatively, Lake Erie. Obviously, fewer trains on the lakefront will improve such access. This benefit would be negated somewhat if commuter trains and more intercity passenger trains operated via the lakefront. Fully developed plans now pending could put as many commuter/intercity passenger trains on the lakefront as the number of NS freight trains now operating there. Although, passenger trains are faster and much shorter than freights, thereby reducing the time they would block river traffic.

LTK Engineering's Dave Staplin notes that existing growth rates in rail freight traffic should be taken into consideration here. Since the busiest portion of the Lakefront Bypass will be the segment crossing the Cuyahoga River viaduct, it might be worth studying a reconstruction of the viaduct with a modest increase in elevation, thereby eliminating the need for a drawbridge. This might make NS feel more secure in embracing the Lakefront Bypass as a route for all through traffic. Complicating this is the expense of rebuilding NS's 3,000-foot-long viaduct, as well as potential clearance problems with the overhead Inner Belt (I-90) viaduct.

Intercity passenger rail: In addition to planned commuter rail services in the Greater Cleveland area (as noted earlier in this section), other planned passenger rail services would also benefit from the proposed Lakefront Bypass. The Ohio Rail Development Commission (ORDC) is engaged in a feasibility study, called the Ohio & Lake Erie Regional Rail/Cleveland Hub Study. ORDC has hired TEMS Inc. and HNTB Inc. to conduct this study, which proposes to make Cleveland the hub of a four-route system of fast (up to 110 mph) passenger trains from Cleveland to Detroit, Cincinnati, Pittsburgh and Toronto. A fifth route, evaluated two years ago in a separate feasibility study (called the Midwest Regional Rail Initiative) by the same consultant, looked at developing fast passenger trains between Cleveland and Chicago (using the same Cleveland-Toledo segment as the Cleveland-Detroit leg of ORDC's Cleveland Hub Study).

ORDC's Cleveland Hub Study is scheduled for completion in late-summer 2003. All four routes under its evaluation are proposed to use the same routes via Cleveland's lakefront that would be relieved of most freight train traffic, as proposed by this analysis. Furthermore, ORDC and its consultants have singled out Cleveland's downtown lakefront as the most feasible location for a station for the Cleveland Hub's passenger trains. Since Cleveland city officials are looking at ways of increasing public access to the lakefront, the ORDC's study should be worthy of inclusion in any ongoing or future planning efforts to make the lakefront more attractive.

SECTION FIVE

Conclusion

This conceptual analysis shows that, if Cleveland city officials wish to divert freight train traffic away from the lakefront, such a diversion is physically possible, but not without the expenditure of significant public funding. The least-expensive, one-time capital costs for diverting rail traffic off of the lakefront range from nearly \$59 million to more than \$133 million, depending on the numbers and types of freight trains to be rerouted.

Potential resources for funding the Lakefront Bypass

Federal funding, from the U.S. Department of Transportation's Congestion Mitigation/Air Quality (CM/AQ) program, is highly recommended as a financial resource for developing the Lakefront Bypass. Diverting most of NS's lakefront traffic to the shorter and flatter bypass route is projected to reduce diesel fuel consumption by 234,647 gallons of diesel fuel per year, thereby causing measurable reductions in carbon dioxide emissions. More study is needed to determine the extent of those emission reductions. Furthermore, since less freight traffic will cause less fewer blockages to water craft traffic on the Cuyahoga River, this will significantly reduce the amount of idling by boats and ships as they wait for rail traffic to clear NS's lakefront drawbridge until the bridge can be raised. Lastly, the current lakefront route has two at-grade road crossings (East 26th Street and Bessemer Avenue) while the Lakefront Bypass would have only one (East 65th Street). All of these crossings are heavily used by truck traffic, which must idle while waiting for freight trains to pass.

More federal funding, through the Army Corps of Engineers, can be argued, as the diversion of freight train traffic from NS's lakefront drawbridge will improve the flow of shipping on the Cuyahoga River more than any of its ongoing dredging projects. A one-time expense to develop the Lakefront Bypass would have permanent benefits to shipping, as the bypass wouldn't require future attention or expense by the Corps of Engineers.

More federal funding, passed through by the state from the Federal Railroad Administration (FRA), can be used to improve automatic flashers and gates at the East 65th Street grade crossing, located on the Lakefront Bypass. Also, if the Ohio Railroad Development Commission proceeds with its plans to develop fast passenger trains as a result of its Cleveland Hub study, high-speed funding administered by the FRA could be used to add railroad capacity for fast passenger trains on the lakefront route by diverting lakefront freight train traffic. Two federally designated high-speed rail corridors -- Cleveland - Columbus - Cincinnati and Cleveland - Toledo - Chicago -- share the lakefront route from downtown Cleveland to Berea. And, two more federal designations may accrue from the Cleveland Hub study -- Cleveland - Toledo - Detroit and Cleveland - Pittsburgh -- both of which would also use the lakefront route on the west and east sides of Cleveland, respectively. While FRA lacks meaningful funding for high-speed rail projects, Greater Cleveland's Congressional Delegation could seek FRA high-speed rail funding specifically for developing the Lakefront Bypass.

More federal funding, through the Federal Highway Administration's (FHWA) Maintenance of Traffic account, could be used to relieve the lakefront route of most freight trains to create track capacity for the introduction of commuter rail services to and through downtown Cleveland. However, use of this FHWA program would be appropriate only if commuter rail is implemented as a means to maintain traffic during the pending, multiyear reconstruction of the Inner Belt (Interstate 90) in the vicinity of downtown Cleveland. Greater Miami used this FHWA program to start its commuter rail service when Interstate 95 underwent a major rebuilding in the 1980s.

More federal funding, this time through the Federal Transit Administration (FTA), can be used for new-start commuter rail services, including the construction of infrastructure necessary to create track capacity for commuter trains. Diverting freight train traffic away from the planned commuter rail route(s) is an eligible use for FTA funding.

The Cleveland-Cuyahoga County Port Authority, which not only promotes waterborne shipping, but other economic development projects, could be tapped for funding to develop the Lakefront Bypass. Specific to the port authority's basic mission, the Lakefront Bypass would increase the accessibility of the navigable Cuyahoga River to/from Lake Erie for cargo vessels by diverting freight trains off NS's drawbridge, located at the river's mouth.

The City of Cleveland, since it would greatly benefit from the diversion of freight train traffic, should be another source of funding for the proposed Lakefront Bypass. Fewer residential areas in the city would be affected by the noise, dust, emissions of burnt diesel fuel and vibrations from freight trains. And, the city's plans to improve the lakefront would also be aided further by the diversion of freight train traffic.

Norfolk Southern, which owns most lakefront railroad rights of way and operates all but one or two freight trains per day, of the 50 or so daily lakefront freight trains, will receive some direct operating benefits and cost saving by diverting some or all of its lakefront rail freight traffic. Fuel cost savings alone to NS are expected to range from \$323,578 to \$389,279 per year in (2003 dollars), not including projected 1.4-percent annual increases in statewide rail traffic growth. This also doesn't include a marginal corporate tax rate of about 40 percent, which would reduce NS's net savings. It is unlikely that NS will agree, at least initially, to help fund the capital costs of developing the Lakefront Bypass. NS is content to continue operating its through freight trains via its lakefront route. But efforts should be made, with further study data in hand and per direct negotiations, to secure a financial contribution from Norfolk Southern.

The Ohio Rail Development Commission, while lacking significant funding, its mission is the enhancement of freight, commuter and intercity passenger rail services. The Lakefront Bypass fits into that mission.

The Ohio Department of Transportation (ODOT), via both the highway and public transit divisions, might be expected to help fund the Lakefront Bypass, as it will assist the development of commuter rail services in Greater Cleveland and relieve highway congestion, particularly with the pending reconstruction of the Inner Belt (as noted under FHWA, above).

Closing comments

The intent of this conceptual analysis was to evaluate the rationales and alternatives for diverting freight train traffic away from the Cleveland lakefront. This report also suggests and details the best proposal for accomplishing this task, as well as multiple means to pay for it. This conceptual analysis shows that the proposed Cleveland Lakefront Freight Rail Bypass is possible and is projected to achieve numerous benefits for the region's citizens, the City of Cleveland, Norfolk Southern and others. Based on the preliminary data gathered and analyzed in this report, there is ample justification for diverting most lakefront freight train traffic to the proposed Lakefront Bypass. But it will be up to the affected stakeholders to determine if the Lakefront Bypass is affordable and desirable.

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