



Before & After Study

HIAWATHA LIGHT RAIL TRANSIT LINE



A service of the
 **Metropolitan Council**

August 2010



Image Courtesy of David Lawrence

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Metro Transit

Design and layout by:
SRF Consulting Group, Inc.

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David Lawrence
Metro Transit
Mn/DOT, David R. Gonzalez
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Note: This report examines the planning, development, funding, construction and early operations of Minnesota's first light-rail service—the Hiawatha Line—from the early 1980s through December 2006. It is a success story that has advanced public transportation—and future rail initiatives—in the Minneapolis/St. Paul region.

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HIAWATHA LIGHT RAIL TRANSIT LINE SYSTEM MAP

Hiawatha Light Rail Transit System

The Twin Cities of Minneapolis and Saint Paul have enjoyed an effective mass transit system since the 1880s that supported and defined the cities' rapid growth and prosperity. Over the last 50 years, that system evolved into a bus-only network of routes and operations that were taken over by a public agency in the early 1970s.

Public transit in the Twin Cities endured challenges to ridership, effectiveness and efficiency from the late 1970s to the mid-1990s. However, conditions began to change as congestion, growth, dissatisfaction with highway expansion and neighborhood activism combined to resurrect interest in mass transit and especially a rebirth of the electric railway system in the form of light rail transit (LRT). As bus ridership began to rebound, a corridor along Highway 55, known as the Hiawatha Corridor, was selected for the Twin Cities' first LRT project. In 2004, the Hiawatha LRT project opened, spanning 12 miles and connecting three of the Twin Cities' most popular destinations - downtown Minneapolis, Minneapolis/Saint Paul (MSP) International Airport and the Mall of America in Bloomington. The map on page 2 provides an illustration of the line, the stations that are served and park-and-ride lots.

From the beginning, the Hiawatha LRT project was met with political opposition, both because of its initial price tag and skepticism that LRT would attract any riders in a predominately auto-oriented urban area. From its opening on June 26, 2004, to December 2005, the Hiawatha LRT served customers 10.9 million times, which is 65 percent higher than ridership projections. Customers use the Hiawatha LRT for transportation to downtown Minneapolis, the Metrodome, University of Minnesota, eleven neighborhoods, Minnehaha Park, MSP International Airport, Mall of America and the VA Medical Center. More than 50 percent of train riders are new to transit service since rail service began.

The Hiawatha LRT vehicle fleet consists of 24 cars, each of which is 94 feet in length. Trains generally consist of two cars coupled together. Each car has four doorways and can hold 66 seated passengers, with standing room for an additional 120. Inside each car are four luggage racks and four bicycle hangers. Each car is fully ADA compliant with four wheelchair locations per car. Trains travel in both directions along the line with a top speed of 55 mph, a general service speed of 40 mph, and slower speeds in downtown Minneapolis. Trains run throughout the day/evening with increased service during peak periods. Service is provided every 7.5 minutes during the peak periods from 6 a.m. to 9 a.m. and 3 p.m. to 6 p.m., every 10 to 15 minutes from 9 a.m. to 9 p.m., and every 30 minutes from 9 p.m. to 1 a.m. Forty-six Metro Transit bus routes connect to 13 rail stations with timed transfers. Light-rail fares are equal to bus fares.



Planning History

The Hiawatha LRT had been at some level of consideration for over three decades before construction actually began. For many projects, the progression from Environmental Impact Statement (EIS) to Preliminary Engineering and then to Final Construction is straightforward. One step leads to the next with little or no intervening time. The history of the Hiawatha LRT is such that this linear progression is not always easy to follow. What follows is an explanation of the planning history of the project and a description of the documents and points in time that will be used as points of reference for the purposes of this report. The explanation of how the Hiawatha LRT was ultimately realized must start in the 1950s. At that time, the Twin Cities, like many metropolitan areas, were planning and constructing limited-access highways for circulation within the cities and for connection to the nascent Interstate Highway System. As vital as these facilities have become, the process of construction, particularly in the inner core areas, had a severe and lingering impact on the communities that were either eliminated or severed to accommodate the new roadways.

PRE-1985

The backlash from neighborhoods around the country threatened with highway construction contributed to the eventual passage of the National Environmental Policy Act of 1969 (NEPA). It is this law that requires an EIS for federally funded projects of all types. But highway construction was a major target of the new regulations.

Along the Hiawatha corridor, the proposal for a six- to eight-lane freeway was already being implemented. A swath of land several blocks wide was cleared to make way for the freeway, which was to be below grade, and the frontage roads that would parallel the freeway at-grade with the surrounding neighborhoods. A limited amount of construction had also already occurred. The 1969 NEPA Act, however, provided an opportunity for the area residents to temporarily halt the construction of the highway and force the Highway Department to prepare an EIS for the proposed facility.

From the perspective of the neighborhoods, the EIS had the desired effect. The freeway as originally proposed would not be built—in its place would be a four-lane divided at-grade arterial roadway. Most of the existing access would be closed, with access concentrated on a few signalized intersections. The roadway would be designed for 40 mile per hour operation.

When finally completed in 1985, the Final EIS not only included a downscaled roadway, it included an LRT line alongside. As envisioned in the EIS, the LRT line would connect downtown Minneapolis to the MSP International Airport. The EIS recommended further study for an extension to the Met Stadium site (now the Mall of America), but this extension was not officially included in the Record of Decision.

1985 to 1999

While the EIS recommended the construction of LRT, it did not answer the question of how the rail line would be paid for or who would operate the system. It also did not address how the Hiawatha LRT would fit into a regional network. During the late 1980s and early 1990s, several attempts were made to deal with these issues. One of the most significant of these efforts, from the perspective of the Hiawatha LRT, was the development of the Hennepin County Regional Rail Authority's LRT Plan that included the Hiawatha LRT. This plan led to the writing of a Draft Environmental Impact Statement (DEIS) for a limited network of lines in the County that included the Hiawatha line but only up to 46th Street. However, the DEIS did not proceed to a Record of Decision, and no FEIS was prepared.

Spread over several years, the roadway project was nearing completion in 1997, when the Minnesota Department of Transportation (Mn/DOT) began studying the concept of creating a busway in the right-of-way that had been reserved for LRT. The reason for this was simple; Mn/DOT had the authority and funding to build a road for buses, but no funding for a rail transit line. Before the plans for the busway were complete, though, the prospect of funding the LRT portion of the project was jump-started with a federal grant and followed by the passage of the first installment of the state's share of the capital cost in 1998.

In 1999, after the passage of the second and final installment of

the state share, planning began in earnest. One of the first steps to be taken was the update of the 1985 EIS. Mn/DOT, the lead agency for construction of the line, prepared both the EIS update and an additional Environmental Assessment (EA) to cover the section of the line south of the MSP International Airport, which was not included in the original EIS.

1999 to 2001

During most of 1999 and into early 2000, Mn/DOT continued with Preliminary Engineering (PE). One of the unique characteristics of the Hiawatha LRT is that it was the first major construction project managed by Mn/DOT under the design-build contracting philosophy. This increased the importance of the preliminary design documents, because they also represented the contract documents for the design-build contract. These were completed in early 2000 and included in the Request for Proposal (RFP).

2001 to 2004

In the design-build format of construction, construction begins before the final design is completed. Although Federal Transit Administration rules suggest that final design should be a point in time with respect to the examination of scope change, ultimately the final design is not complete until construction is complete.



TIMELINE

1967 – Metropolitan Council and the Metropolitan Transit Commission (MTC) conduct analysis of alternate transit technologies.

1970 – MTC continues study of various transit technologies.

1974 – Metropolitan Council develops summary report of travel in the Twin Cities metropolitan area.

1975 – Minnesota legislature prohibits rail transit planning.

1980 – Minnesota legislature lifts prohibition of rail transit planning.

LRT is selected as preferred alternative in the Hiawatha Avenue DEIS.

State legislation enables counties to establish regional railroad authorities.

Hennepin County establishes first regional rail authority.

1981 – Metropolitan Council, Mn/DOT, and MTC conduct the *Light Rail Transit Feasibility Study*.

1982 – The Hiawatha DEIS is circulated for public comment and submitted to Federal Highway Administration (FHWA) for approval.

1984 – Mn/DOT and the City of Minneapolis complete the Hiawatha Avenue location and design study (includes LRT).

The Minnesota Legislature creates the Regional Transit Board (RTB).

1985 – Metropolitan Council, Hennepin County Regional Rail Authority (HCRRA), Minneapolis, St. Paul, et. al. complete the *LRT Implementation Planning Program, Twin Cities Metropolitan Area*.

The Minnesota Legislature prohibits expenditure of public funds on LRT.

The FHWA approves the Final Environmental Impact Statement (FEIS).

1986 – Metropolitan Council completes *A Study of Potential Transit Capital Investments in Twin Cities Corridors – Long Range Transit Analysis*, which includes the Hiawatha LRT.

1987 – The Minnesota Legislature removes the 1985 prohibition, gives regional railroad authorities authority to conduct rail transit planning, and sets maximum levy limit.

The Minnesota Legislature directs HCRRA to prepare a *Comprehensive LRT System Plan* for

Hennepin County and reduces levy authority from four miles to two miles.

1988 – *The Comprehensive LRT System Plan for Hennepin County* is completed by HCRRA and submitted to the Minnesota Legislature on June 21, 1988.

The Minnesota Legislature appropriates funds for railroad authorities for the engineering design and construction of LRT, which includes Hiawatha.

HCRRA begins the EIS for Stage 1 LRT System in Hennepin County per the comprehensive plan.

HCRRA begins preliminary design of the Hiawatha LRT.

1989 – Minnesota Legislature clarifies roles of the Regional Transit Board, Metropolitan Council, and regional railroad authorities concerning the planning, implementation, and financing of LRT.

HCRRA completes DEIS for Stage 1 LRT System in Hennepin County.



Image Courtesy of David Lawrence

1990 – Preliminary Engineering and EIS for Stage 1 LRT (included Hiawatha to 46th Street) in Hennepin County is completed.

The Regional LRT Development and Financial Plan is prepared by the Regional Transit Board.

HCRRA begins to acquire the Coach Yard site for yard and shops.

1991 – HCRRA completes work on preliminary design, preliminary engineering, and system design criteria for HCRRA LRT system (includes Hiawatha Avenue LRT).

HCRRA acquires the Dome Spur.

The Regional LRT Coordination Plan is completed by the Regional Transit Board.

1992 – The Regional Transit Facilities Plan is completed by the Metropolitan Council.

The Metropolitan LRT Joint Powers Board is formed.

1993 – The Minnesota Legislature approves LRT Governance Bill, which designates Mn/DOT as the agency responsible for LRT final design and construction. Rail authorities are responsible jointly with Mn/DOT for system

planning, preliminary engineering, community participation, and system standards.

1994 – The Minnesota Legislature reforms regional transportation governance folding the Regional Transit Board and Metropolitan Transit Commission into the Metropolitan Council.

1998 – The Minnesota Legislature approves \$40 million for the design and construction of the Hiawatha LRT.

Mn/DOT begins Preliminary Engineering for the Hiawatha LRT, reevaluation of Hiawatha EIS, and an EA for LRT in Bloomington.

Hiawatha governance structure established per statute to include Corridor Management Committee and Community Advisory Committee as advisors to the Commissioner of Transportation.

1999 – The consultant team of BRW/PBQD is selected to complete Preliminary Engineering.

The Minnesota Legislature approves an additional \$60 million for design and construction of the Hiawatha LRT.

The Minnesota Legislature eliminates the Metropolitan LRT Joint Powers Board and redefines role of counties in LRT planning and construction.

The City of Minneapolis conducts a study to determine the location of the downtown alignment and selects 5th Street.

HCRRA approves expenditure of up to \$70 million for construction of the Hiawatha LRT.

Metropolitan Airports Commission approves expenditure for up to \$70 million for construction of the Hiawatha LRT within the confines of airport property.

Project Organization

METROPOLITAN COUNCIL

Federal Grantee
Owner
Final Decision Maker

METRO TRANSIT

Operator

MINNESOTA DEPARTMENT OF TRANSPORTATION (MN/DOT)

Constructor
Right of Way (ROW)

METROPOLITAN AIRPORTS COMMISSION (MAC)

Tunnel and airport stations

HENNEPIN COUNTY

Right of Way (ROW)

HIAWATHA PROJECT OFFICE (HPO)

Coordination
Project Management

CORRIDOR MANAGEMENT COMMITTEE (CMC)

Policy input

COMMUNITY ADVISORY COMMITTEE

Public Input

CITY OF MINNEAPOLIS

Land Use
Downtown Utilities
Contra-flow bus lane

CITY OF BLOOMINGTON

Land Use

As the most complex and expensive public works project in the history of Minnesota, the Hiawatha LRT project required the involvement and coordination of the federal, state and local governments and several public agencies. The commitment displayed by each member of the Hiawatha LRT team was exceptional and required constant attention to the complex interplay of responsibility and authority. In this section, we recount the contributions of the principal team members in the successful completion of this landmark project.

METROPOLITAN COUNCIL

The Metropolitan Council is the Metropolitan Planning Organization (MPO) for the Minneapolis-Saint Paul Metropolitan Area. Appointed by the Governor of the State of Minnesota, the 17 members are responsible for providing long-range planning for the region. As the regional MPO, the Council was the grantee for Federal Transit Administration (FTA) funding of the Hiawatha LRT project and, therefore, the Council was both the policymaking body and final decision maker for all aspects of the project. In addition, the Council was solely accountable to the FTA for completing the project on schedule and within budget and continues to be responsible for ensuring that federal regulations related to the expenditure of federal money are followed.

METRO TRANSIT

Metro Transit, a division of the Metropolitan Council, is the operator of the line. During construction, Metro Transit was responsible for design review, rail activation, integrated testing, start-up, and connecting bus service. Metro Transit also managed procurement of the light rail vehicles and fare collection system. The fare collection system was designed to integrate fare collection across both rail and bus systems, including bus services provided by other operators in the region. Metro Transit continues to be responsible for revenue operation and maintenance of this fare collection system.

MINNESOTA DEPARTMENT OF TRANSPORTATION

The Minnesota Department of Transportation (Mn/DOT), as directed by Minnesota law, had primary responsibility for the design and construction of the Hiawatha project. Mn/DOT prepared preliminary design plans and contracted for final design and construction. To save time and minimize disruptions to the traveling public, Mn/DOT used the design-build construction management approach, where many aspects of design and construction occurred simultaneously.

Mn/DOT was the contracting agency and was responsible for oversight of the design-build contract. Mn/DOT also played a significant role in acquiring right-of-way and completing the environmental documentation.

METROPOLITAN AIRPORTS COMMISSION

The Minneapolis-St. Paul International Airport (MSP) is owned and operated by the Metropolitan Airports Commission (MAC). MAC was responsible for the design and construction of the airport tunnel civil work and the two light rail stations within the airport property. MAC contracted directly for both design and construction of the tunnel and stations. The operation and maintenance of the tunnel and station infrastructure is cooperatively maintained by Metro Transit and MAC staff.

HENNEPIN COUNTY

When established in 1980, the HCRRA's mission was to acquire abandoned railroad corridors in order to preserve them for future transportation use. As a unit of government, the HCRRA has authority to establish levies to fund rail transit projects. HCRRA was a capital investment partner in the Hiawatha Light Rail Transit (LRT) Line, contributing \$84.2 million toward design and construction (11.8 percent of the total capital investment). The land for Hiawatha Operations and Maintenance yard and shop was donated by the HCRRA. Hennepin County was also responsible for 50% of the net operating expenses. This is defined as

total expenses minus revenue (including fares, federal money, and advertising).

HIAWATHA PROJECT OFFICE

In an effort to streamline project administration and construction, the Hiawatha Project Office (HPO) was created to bring together staff from the Metropolitan Council, Metro Transit, Mn/DOT, and MAC staff as well as the project management consultant. Serving as the face of the Hiawatha LRT project, the staff at the HPO worked together to successfully build the largest public works project in the state of Minnesota.

CORRIDOR MANAGEMENT COMMITTEE

The Corridor Management Committee (CMC) was established by Minnesota statute 473.3994 to advise the Metropolitan Council and Mn/DOT in the design and construction of light rail transit. Consisting of elected and appointed public officials, the committee met monthly during design and construction of the LRT line. CMC members were an important conduit in providing the Metropolitan Council and Commissioner of Transportation with input on planning, design, and construction.

COMMUNITY ADVISORY COMMITTEE

Empowered by statute, the 40-member Community Advisory Committee (CAC) kept residents, transit riders, and the general public continuously informed and involved in the project and facilitated two-way communication between the project team and neighborhood groups. Serving as an advisory committee to the CMC, the committee also provided input on issues that directly affected the community, such as land use around stations, design of stations, feeder bus routings, and impacts on residential and business communities along the corridor. Over the course of five years, CAC members contributed thousands of hours, reaching out to stakeholders, evaluating plans, raising issues, and recommending actions regarding how the LRT would affect livability along the line.



Project Scope

THE CORRIDOR

When first proposed and recommended in the 1985 FEIS, the Hiawatha LRT line was to extend from downtown Minneapolis to the Minneapolis-Saint Paul Airport. An extension to the site of the Metropolitan Stadium was suggested for further study but was not officially in the Record of Decision. When serious planning resumed in 1998, the line still connected downtown to the airport but was extended to the Mall of America, which had been constructed on the site of the former Metropolitan Stadium in the intervening years. This was reflected in the 1999 FEIS reevaluation and EA and in the final configuration of the line.

Minnesota Statute 473.3994 created a Corridor Management Committee to advise the Metropolitan Council and Mn/DOT in the design and construction of light rail transit. The legislation also specified the makeup of the committee. For the Hiawatha line, the committee was to consist of one member appointed by the city of Minneapolis; one member appointed by Hennepin County; the commissioner of transportation or a designee; two members appointed by the Metropolitan Council, one of whom would be designated as chair of the committee; and one member appointed by the Metropolitan Airports Commission.

DOWNTOWN MINNEAPOLIS

- Warehouse District/Hennepin Avenue Station

- Nicollet Mall Station

- Government Plaza Station

- Downtown East/Metrodome Station

CEDAR FRANKLIN SECTION

- Cedar-Riverside Station

- Franklin Avenue Station

LAKE STREET VICINITY

- Lake Street/Midtown Station

SOUTH MINNEAPOLIS

- 38th Street Station

- 46th Street Station

- 50th Street/Minnehaha Park Station

FEDERAL PROPERTY AREA

- VA Medical Center Station

- Fort Snelling Station

AIRPORT

- Airport–Lindbergh Terminal Station

- Airport–Humphrey Terminal Station

BLOOMINGTON

- Bloomington Central Station

- 28th Avenue Station

- Mall of America Station



Image Courtesy of David Lawrence



DOWNTOWN MINNEAPOLIS

Over the years, there have been many proposals and many studies dealing with how to bring LRT through downtown Minneapolis. But the final alignment is remarkably similar to the 1985 FEIS.

PRINCIPAL STREETS

The 1985 FEIS envisioned that LRT would operate on 5th and 6th Streets as a one-way loop. Traffic would still operate parallel to the train.

During 1999, the responsibility to select a downtown alignment was given to a special commission made up of downtown interests. The recommendation from that commission was to put both tracks on 5th Street and allow a limited amount of traffic but not at the same volume as had previously used the street. A single lane would be available primarily for access to existing parking garages, loading docks and other facilities. The block between 3rd Avenue and 4th Avenue would be closed entirely to accommodate the Government Center Station. The alignment would leave downtown on the rail right-of-way north of the Metrodome Stadium. This is how the Hiawatha line was constructed.

TERMINUS

With the reconfiguration of the downtown track to place it entirely on 5th Street, the terminal station was shifted to the block between Hennepin Avenue and First Avenue with a tail track extending farther to the northwest into the next block. During preliminary design, the tail track was eliminated and the section between Nicollet Avenue and 1st Avenue became an add alternate. The elimination of this track also eliminated the Warehouse station. Prior to signing the Full Funding Grant Agreement, Congress appropriated an additional \$60 million to restore the Warehouse station and the tail track. The critically important Warehouse station and track were once again included in the alignment which was approved by FTA.

This track was also proposed to be extended to west of 3rd Avenue North to connect with the downtown Minneapolis station of the proposed Northstar Commuter Rail Line. In 2000, it was still felt that both would open at the same time. However, the commuter rail line was delayed and the extension of Hiawatha to 3rd Avenue North was deferred and made a part of the Northstar project.

DOWNTOWN EAST

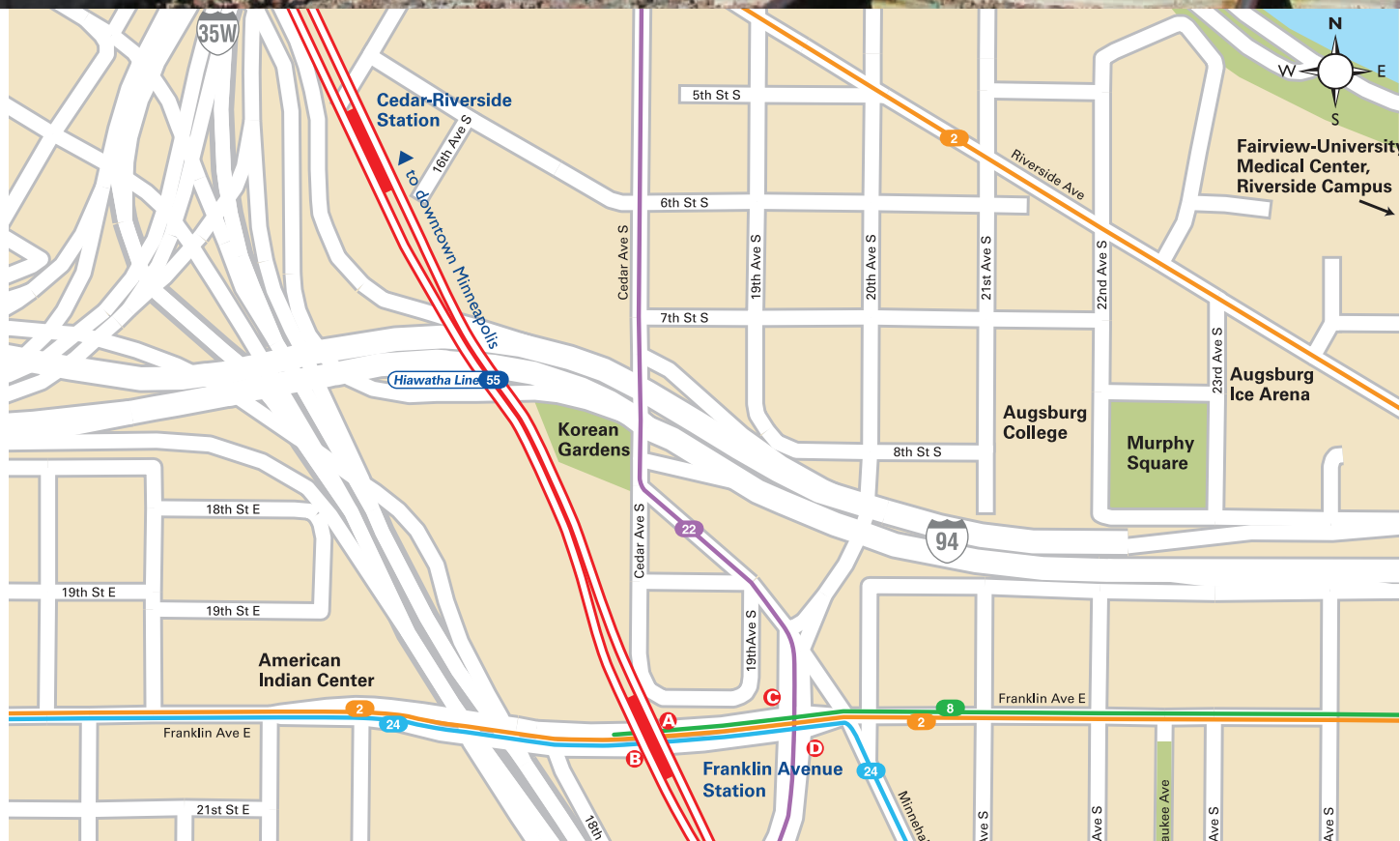
On the east end of downtown, near the Metrodome, the track was initially proposed to make two 90 degree turns to get from 5th Street to 4th Street. During PE, it was determined that a much better design would be to cross the city block defined by 4th and 5th Streets at an angle. This would require taking the entire block. After PE was completed, complicated land transfer negotiations resulted in the project only taking possession of the actual track and station areas with the remaining triangular pieces transferred to the Metropolitan Sports Facility Commission, on the half near the Dome, and to the City of Minneapolis. The City was able to successfully construct a 450-space parking garage under the block before construction of the station and in a manner that preserves the structural integrity of both the track and the parking structure.

STATIONS

During construction, the design of the Nicollet Mall station was changed. The original freestanding design was altered to accommodate the construction of a new hotel to the north and to allow a direct connection to a skyway that would cross 5th Street at the location of the station once the north side of the street is developed. As of this date, the hotel has not been built, but the existing station as it was constructed will not have to be altered significantly when the time comes.



Image Courtesy of David Lawrence



CEDAR FRANKLIN SECTION

As soon as the track crosses the Downtown East Block, the alignment enters the former right-of-way of the Milwaukee Road railroad. At one time, this was the entrance into downtown of the Milwaukee Road's Chicago-to-Minneapolis mainline. From 11th Street to 26th Street, the Hiawatha LRT line operates on what used to be a four-track mainline that carried the famous first class express passenger train – also named the Hiawatha – which provided daily passenger service between Minneapolis and Chicago as well as to Portland and Seattle.

GENERAL ALIGNMENT

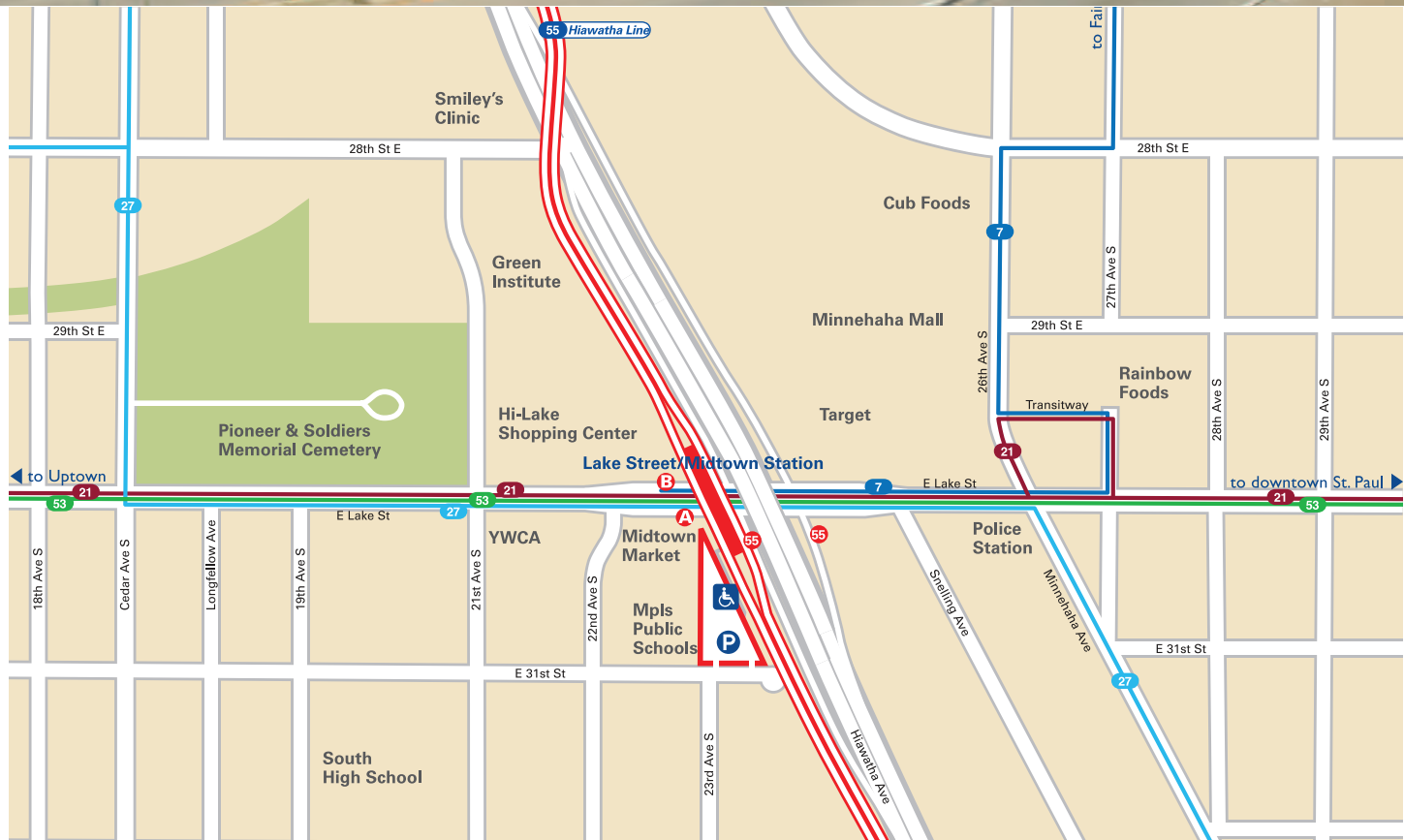
The general alignment that the LRT line follows today is the same as what was envisioned in the 1985 FEIS. The entry into downtown near the present Downtown East station is the same as would have served the 5th Street/6th Street loop as is the use of the Milwaukee Road mainline. This alignment was carried forward into the 1999 EIS re-evaluation.

Although not directly relevant to this discussion, had the effort to construct the Hennepin County Phase 1 system in 1990 and the resulting DEIS been completed, this portion of the Hiawatha alignment would not have been built. The HCRRA plan would have brought the alignment across 29th Street to the vicinity of Nicollet Avenue and then entered downtown Minneapolis in tunnel.

Although there was no resulting scope change, during preliminary engineering there was consideration given to re-routing this alignment through this area to bring the track out to Cedar Avenue. Because the EIS re-evaluation had already been completed, a separate environmental process had to be followed to consider this revision. Ultimately, it was determined that in addition to the extra time, slower speed and increased alignment length, the re-route would have a disproportionate impact on residents in the Cedar-Riverside high-rises and the City of Minneapolis public housing buildings. Efforts to re-align the mainline were dropped prior to the completion of PE.

STATIONS

The 1985 FEIS envisioned stations in this segment at 24th Street and at 15th Avenue. In the 1999 EIS reevaluation, the 24th Street station was relocated to Franklin Avenue.



LAKE STREET VICINITY

The Lake Street vicinity as it is used in this report refers to the section of alignment from 26th Street to 31st Street. The significant feature of this section of the alignment is that the tracks must cross Hiawatha Avenue from the east side to the west side. The railroad right-of-way that the LRT line follows north of 26th Street had been abandoned but the right-of-way to the south is still in operation and therefore unavailable for use by the LRT system.

GENERAL ALIGNMENT

In the 1985 FEIS, the option of crossing Hiawatha Avenue at-grade was reviewed but was rejected because of the high volumes of traffic expected for this section of the roadway. It was determined that the relatively high frequency of train crossings would result in severe congestion as traffic would be forced to stop to allow the train to cross. The FEIS recommended that the track cross underneath Hiawatha in tunnel and come back to grade before crossing Lake Street. At that time, it was anticipated that Hiawatha and Lake would intersect with an at-grade signalized intersection.

Prior to the reconstruction of the roadway in this area, the determination was made that an at-grade intersection at Hiawatha and Lake would not operate at acceptable levels of service and that a better solution would be to separate the two roadways. Hiawatha Avenue now crosses Lake Street on a bridge; a single point interchange provides access between the two roadways.

When active consideration of Hiawatha resumed in 1999, discussions during the PE process assumed that LRT would be separated from Hiawatha but instead of a tunnel, a bridge was substituted. This option was less expensive. In the 1999 FEIS reevaluation, a bridge from 26th Street to 28th Street was assumed. However, the station at Lake Street was still to be at-grade. This initial decision was made based upon concerns by the neighborhood and City staff that an aerial structure would not be as integrated into the community.

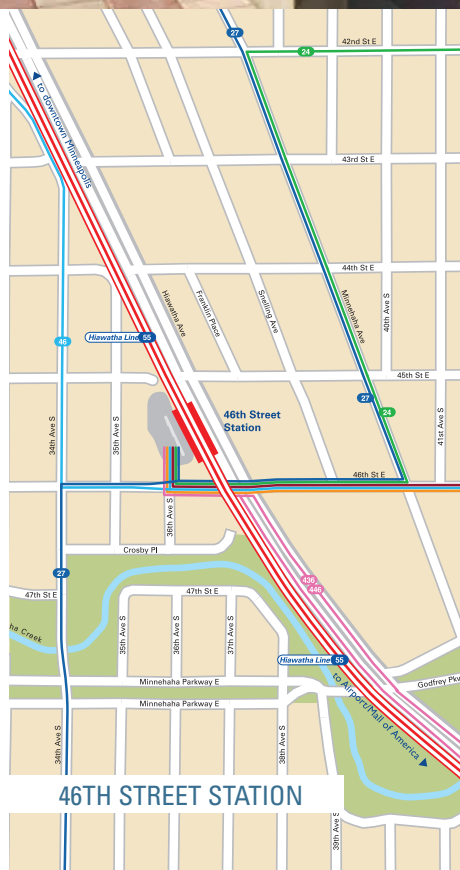
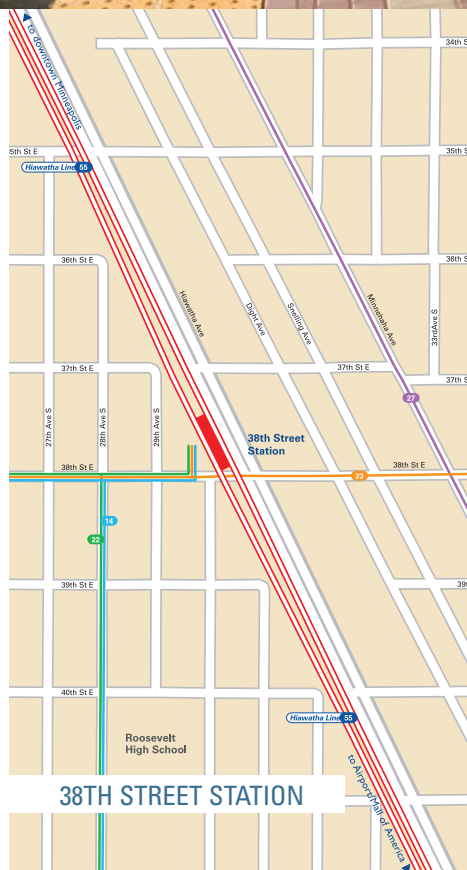
Following completion of the FEIS reevaluation, during preliminary engineering, further analysis of the traffic operations in this area determined that an at-grade crossing would have significant impacts on traffic. The fly-over bridge that now begins south of 26th Street was extended to cross Lake Street and come back to grade just north of 31st Street. This design was reflected in the contract documents.

A characteristic of the design-build contracting approach is that the contractor has the option of making design changes that will make it easier for the contractor to maintain schedule or reduce cost to the contractor. As part of contract negotiations with the team that ultimately became the contractor for the project, the design of the fly-over bridge was changed from a structure with piers to a structure that was supported by retaining walls, known in the industry as MSE walls. After the design-build contractor began work and final design was underway, the change in design was criticized by the neighborhood and City staff because of the barrier effect the MSE wall created. Political pressure forced the project to return to a pier-supported structure from 28th street to Lake Street at additional cost to the project.

The City also participated in the funding of escalators at the Lake Street station, which were added during the PE process. Both the Lake Street station and the Franklin Avenue station, which is also above grade, had elevators for those who could not use the stairs. But the City felt that it was necessary to include escalators at Lake Street because of the height of the structure and the expected volume of passengers.



Image Courtesy of David Lawrence



SOUTH MINNEAPOLIS

This segment includes the portion of the alignment from 31st Street to 54th Street.

GENERAL ALIGNMENT

The 1985 FEIS specified that the LRT alignment in this section would parallel the roadway on the west side. For the most part, this represented a straightforward design. However, there are two sections that required special consideration.

In the vicinity of Minnehaha Park, a great deal of concern for the impact on the park was expressed by interested parties in the EIS process. Several options were studied. Ultimately the design that was selected was the creation of a tunnel, not by digging down but by covering the road and track over, elevating the land surface. This land bridge would connect Minnehaha Parkway with Minnehaha Park, eliminating an at-grade crossing of either the roadway or the track. The tunnel structure would have three portals, two for the roadway and one for the trains. This design was carried forward through PE and final design and is essentially the design that was constructed.

Another area of significant study for the roadway was the area south of 52nd Street. The FEIS recommended that, instead of upgrading the existing roadway between 52nd Street and the Crosstown Highway, the roadway be rerouted to the east around the neighborhood. The track would continue on the existing right-of-way, but instead of being on the west side of the road the track would travel the two blocks between 52nd and 54th in the middle of the street, which would be converted from a four-lane road to a two-lane road. This is essentially what was eventually constructed.



Image Courtesy of Mn/DOT, David R. Gonzalez



VA MEDICAL CENTER STATION



FORT SNELLING STATION

FEDERAL PROPERTY AREA

This segment includes the area from Minnehaha Avenue to the Lindbergh tunnel portal.

GENERAL ALIGNMENT

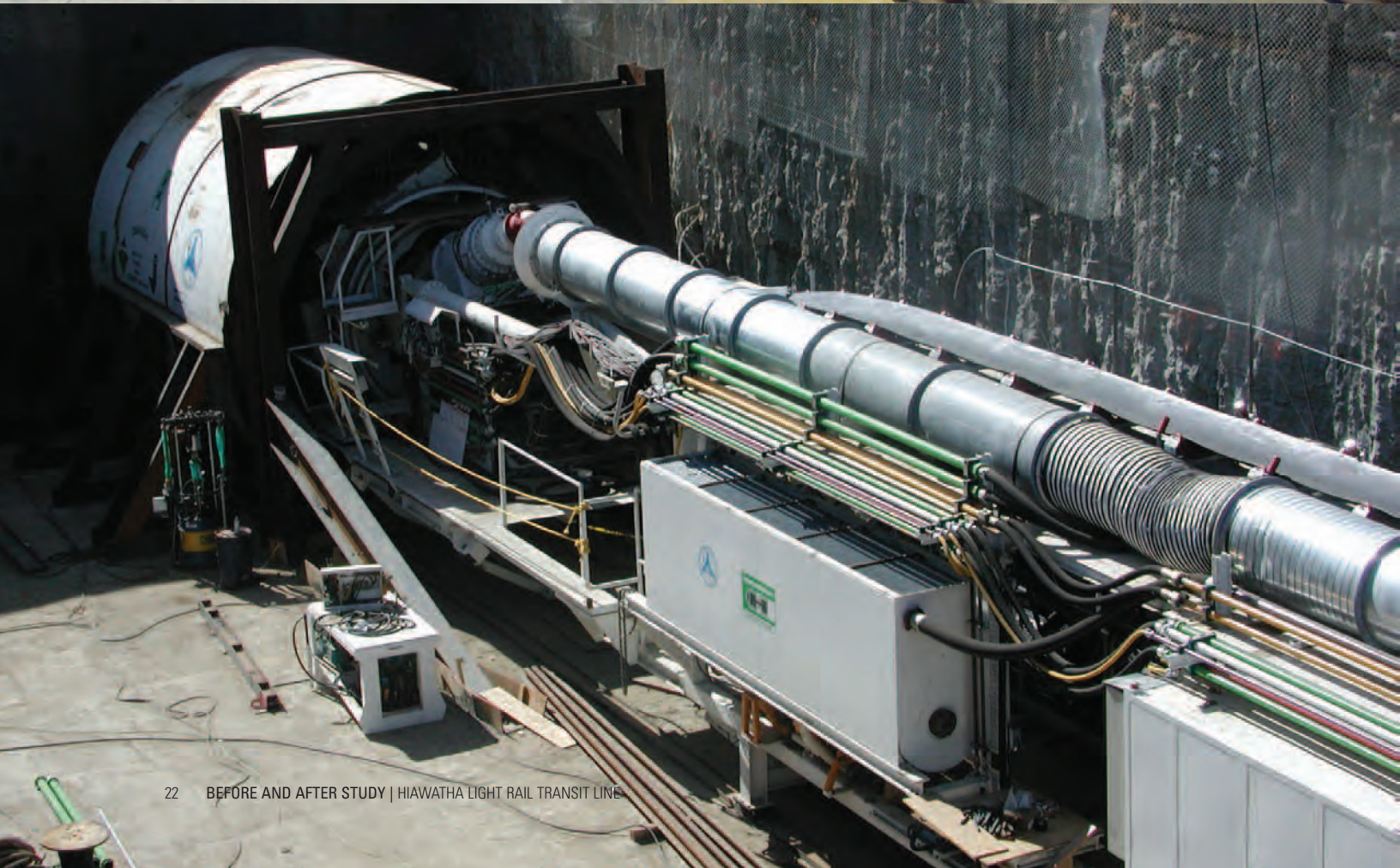
As the alignment travels from the 50th street station to points south, it continues along Minnehaha Avenue in the center median of the city street. It is a one city block embedded track section. It then continues as a dedicated right-of-way ballasted track section and enters the federal property where the Veteran's Administration hospital is located adjacent to the tracks.

Here is where the VA station is located. The decision to route the alignment this way was due to this being the most direct route to the airport property. As the alignment continues south of the VA station it enters a direct fixated track section on a flyover bridge crossing over Highway 62, more often referred to as the Crosstown. The route continues south toward the airport and is still on federal property. The Fort Snelling station is located adjacent to the federal government administrative services Whipple building. The alignment continues southward, entering the Lindbergh tunnel approximately one-half mile from the station.

Due to the proximity of adjacent land on this federal property, it allowed Metro Transit to construct a 950-car surface park and ride lot to satisfy some of the demands for park and ride options.



Image Courtesy of Mn/DOT, David R. Gonzalez



AIRPORT

This segment includes the portion of the alignment from south of the Fort Snelling station through the 1.8-mile airport tunnel, ending at the Hubert H. Humphrey (HHH) above-ground station south of the tunnel.

GENERAL ALIGNMENT

The Metropolitan Airports Commission (MAC) was responsible for the construction of LRT stations near both airport terminals, with the Lindbergh station being constructed in the tunnel near the airport TRAM service that carries travelers from airport parking ramps to the terminal. MAC also built an at-grade station at the Humphrey terminal. Subsequently MAC developed plans to add a skyway to the HHH station to allow for safer access to the station platform from the adjacent parking structure for airport employees and customer parking.

MAC was solely responsible for the entire design and civil construction of the tunnel. Construction included LRT tunnels, station signage, artwork and certain ancillary facilities. In addition, MAC provided permanent lighting, including blue lights in the tunnel bore; installation of the fire protection system in the tunnel; installation of all system conduits; construction of the vent shafts; provision of fans and housing; and provisions for sump and pump systems in the tunnel.

Total cost of the tunnel, stations and associated construction was \$84.5 million. Staff from the Minnesota Department of Transportation (Mn/DOT) and MAC met weekly during construction to keep the projects synchronized.



Image Courtesy of David Lawrence



BLOOMINGTON

The original design for the south end of the Bloomington segment included a single station with a park-and-ride adjacent to Mall of America station, with capacity of the park-and-ride limited to 200 spaces. This parking capacity in combination with the Hiawatha Line's largest park-and-ride at Fort Snelling station would have provided total capacity for the full line of only 1,080 spaces. Given travel patterns in the region, planners recognized that 200 spaces in Bloomington would be woefully inadequate to serve Bloomington's needs as well as commuters coming from points south of the Minnesota River wishing to take light rail to downtown and elsewhere.

The original plan also called for the American Boulevard station to be constructed at the intersection of 34th Avenue and American Boulevard. McGough Construction was in the midst of a major redevelopment of the entire Bloomington Corporate Center campus, which is strategically situated on the Hiawatha alignment between the airport and the Mall of America.

To better serve this area, Bloomington Central station was built and American Boulevard station was deferred. In addition, 28th Avenue station was created to satisfy the need for park-and-ride spaces. The line opened with a 600-car surface lot adjacent to the 28th Avenue station which filled to capacity by 2006. In August 2006 design began for the construction of a four-level parking ramp which when completed held 1,450 cars.



YARDS AND SHOPS

Storage, servicing and repair of revenue vehicles are conducted in the yard located south of Downtown Minneapolis, near I-94, north of East Franklin Avenue and west of Cedar Avenue. Access is provided to/from both mainline tracks. The yard area and maintenance facilities are designed to ensure the expedient and efficient traffic work flow and space allocations

Yard movements are made only on radio direction from the Rail Control Center (RCC). The maximum yard speed is up to ten miles an hour. Yard switches are remotely controlled. Interlocking signals are provided at the yard/mainline interface.

The Operations & Maintenance (O&M) Building is located at the yard site. The RCC is also housed at this building. Other functions that occur at this building include preventive and corrective maintenance, heavy repairs, undercar cleaning, wheel truing, vehicle body repairs, traction motor servicing, HVAC and electronic repairs. The building also contains machine shop, truck and wheel shop, bridge crane, welding shop, sheet metal, tool and parts storage area, maintenance staff offices,



Image Courtesy of David Lawrence

operations staff offices, storage, lockers, administration staff offices, lunchroom, and conference and training rooms.



Image Courtesy of David Lawrence

VEHICLES

The light rail vehicles (LRVs) for the Hiawatha Corridor LRT are Bombardier Model LF70. They are six-axle, double-ended, articulated transit vehicle capable of bi-directional operation as a single unit or in multi-unit train under manual control by an operator in the lead cab. The pantograph is located on the roof of the LRV for power collection from the overhead catenary.

Passengers will board through four low-level double doors located on each side of the vehicle. To facilitate rapid loading and to meet ADA requirements, the Hiawatha Corridor LRVs

are configured with low-level boarding at approximately 14 inches above top of rail. 70% of the interior floor area is low level seating and standing. The vehicle seats a minimum of 66 persons, 4 wheelchair accessible spaces, 4 bicycles, and luggage racks.

Hiawatha Corridor LRT trains are operated by a single train operator. Each train consists of one to two car train sets. Each vehicle is equipped for independent 2-way operations with an operator's cab at each end.





RIGHT-OF-WAY

The Minnesota Department of Transportation (MnDOT), under state law, was responsible for acquiring land for the project as well as contracting and managing the Design/Build consortium. MnDOT assumed the role of agent for the Metropolitan Council, the designated Grantee, and Metro Transit.

In September 2000, the Met Council requested waivers to several FTA property acquisition requirements related to notification and approval limits for individual property acquisitions. The FTA granted a waiver that required prior concurrence (or authorization) for offer amounts when the offer or property appraisal exceeded \$3 million. Prior concurrence also was required for settlements that were 20% or \$100,000 over the amount offered, whichever was greater.

The total budget for ROW acquisition was \$20.3 million not including donated right-of-way. A total of 46 parcels were acquired for the project including 14 “in-kind” parcels. The “in-kind” parcels included replacement of property and/or buildings on Federal property. The 14 “in-kind” parcels were

owned by Federal, State, County and other public entities that did not require certified appraisals. They were acquired through an agreement process rather than a sale. The 32 private parcels required certified appraisals. Eminent Domain proceedings were used when properties could not be acquired through a negotiation sale.

The most difficult parcel of land to acquire was a Mall of America (MOA) Corporation holding. To provide the land needed to bring trains into the Mall’s transit center, MOA planned to exchange a parcel it owned for a parcel on the side north of the Mall that was owned by the Metropolitan Airports Commission (MAC). An easement was necessary for the track running from the 28th Avenue Station to the MOA along the Kelly Farm property. The dispute was taken to court for a fair price decision. The parties involved were the MOA, MAC and the Met Council. Ultimately, the Met Council paid \$1.5 million to MAC for the Kelly Farm permanent easement.



FARE COLLECTION

The fare collection system is based on a barrier-free proof of payment system that is integrated with Metro Transit's bus fare collection system. The fare collection is comprised of the following features.

- Ticket Vending Machines (TVMs) provided at the entrances to each station generally on the platform near the main entry points, but determined on a station site basis. TVMs are capable of accepting debit and credit cards. TVMs also accept electronic "smart" fare cards.



Image Courtesy of Mn/DOT, David R. Gonzalez



FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)/ENVIRONMENTAL ASSESSMENT

The Final Environmental Impact Statement (FEIS) for the reconstruction of Trunk Highway (TH) 55 (Hiawatha Avenue) was approved by the Federal Highway Administration (FHWA) in February 1985, followed by a Record of Decision (ROD) in April 1985 (FHWA-MN-EIS-83-01-F). The preferred alternative included upgrading TH 55 to a divided, at-grade arterial roadway with a parallel Light Rail Transit (LRT) corridor. Reconstruction of the roadway portion progressed in stages, starting in 1988, and was completed on September 12, 2003.

LRT planning had undergone several transformations since 1985, but construction of the major transit system had never begun. Therefore, it was determined in 1999 that an FEIS Reevaluation was needed for this project. The FEIS focused on the LRT portion from 5th Street North and 3rd Avenue North in downtown Minneapolis to the southern boundary of the Minneapolis/St. Paul International Airport approximately 400 feet north of Interstate 494 on 34th Avenue South.

The LRT segment from the airport to the Mall of America (formerly the Metropolitan Stadium site) was identified in the FEIS as warranting additional study. That portion of the LRT line was addressed in a separate Environmental Assessment that was completed in August 1999. Based upon the FEIS Reevaluation, changes to the proposed action did not result in significant additional environmental impact not evaluated in the EIS.

FTA issued a ROD on the reevaluation of the 1985 FEIS on the Hiawatha Corridor LRT line in April 2000. In the same month the Federal Aviation Administration also issued a Finding of No Significant Impact on an EA on the portion of the LRT project that would connect with the MSP International Airport. FTA approved the Hiawatha Line's entrance into final design in April 2000.



Image Courtesy of Mn/DOT, David R. Gonzalez

Operations

OPERATIONS 2004-2006

Metro Transit currently operates one Light Rail transit line. The Hiawatha LRT line is a 12-mile, double-tracked alignment between downtown Minneapolis and the Mall of America in Bloomington, with intermediate service to Minneapolis-St. Paul Airport. The route is primarily at grade, with bridges over major roadways and twin tunnels under the airport, and a cut-and-cover tunnel at Minnehaha Avenue. The alignment serves 17 stations. The Hiawatha LRT line has a fleet of 24 six-axle, articulated rail vehicles, with three on order for delivery in early 2007. The vehicles are designed to operate independently or coupled and operated as multiple-unit two-car train sets. Currently the Hiawatha line operates both one- and two-car train sets depending on the time of day and the day of the week. Maximum operating speed is 55 mph. Running time on the corridor is 37 minutes each way.

Train service is provided daily from 4:00 a.m. until about 1:00 a.m. the next day. Service is provided with 11 train sets of 1-2 cars each. The following chart summarizes the frequency of service by time of day and day of week.

Weekdays	Hours	Headway Minutes	Normal Consist
Early Morning	4:00 a.m. to 5:30 a.m.	15 to 30	2
Pre-AM Peak	5:30 a.m. to 6:30 a.m.	10	2
AM Peak	6:30 a.m. to 8:30 a.m.	7 to 8	2
Midday	8:30 a.m. to 3:30 p.m.	10	2
PM Peak	3:30 p.m. to 6:30 p.m.	7 to 9	2
Post-PM Peak	6:30 p.m. to 7:30 p.m.	10	2
Evening	7:30 p.m. to 10:15 p.m.	15	1-2
Late Evening	10:15 p.m. to 1:00 a.m.	30	1-2

Weekends & Holidays	Hours	Headway Minutes	Normal Consist
Early Morning	4:00 a.m. to 6:30 a.m.	30	1-2
Morning	6:30 a.m. to 8:30 a.m.	15	1-2
Midday	8:30 a.m. to 6:00 p.m. (Sunday begins at 9:30 a.m.)	10	1-2
Evening	6:00 p.m. to 10:15 p.m.	15	1-2
Late Evening	10:15 p.m. to 1:00 a.m.	30	1-2

In 2005 Metro Transit operated 12 train sets with a mix of one- and two-car consists during the AM and PM peak periods. To address loading problems with the pattern the peak schedules were adjusted in March, 2006. The revised schedule provided 11 two-car trains on a 7- to 8-minute headway during the peak of the peak. Recovery time was compressed during that period, and headways on the fringe of the peak were increased slightly to balance the cycle. This change significantly improved quality of service in the peak periods. In 2005, the first full calendar year of operation, on the entire alignment from Minneapolis to the Mall of America, the Hiawatha line operated the following amount of service:

2005 Actual	Weekday		Saturdays		Sundays		All Days	
Service	Totals	Averages	Totals	Averages	Totals	Averages	Totals	Averages
Train Miles	803,330	3,138	138,549	2,614	131,235	2,302	1,073,114	2,940
Car Miles	1,226,465	4,791	179,422	3,385	159,521	2,799	1,565,408	4,289
Train Hours	51,917	203	8,958	169	8,578	150	69,453	190
Car Hours	81,684	319	11,933	225	10,988	193	104,306	286

With the arrival of three new LRVs in December, 2006 and January 2007 the operation will change to 12 two-car consists during AM and PM peak periods.

In 2006, the Hiawatha line operated the following amount of service:

2006 Actual	Weekday		Saturdays		Sundays		All Days	
Service	Totals	Averages	Totals	Averages	Totals	Averages	Totals	Averages
Train Miles	750,459	2,966	142,866	2,646	136,803	2,359	1,051,387	2,881
Car Miles	1,341,021	5,300	214,698	3,976	204,575	3,527	1,817,934	4,981
Train Hours	49,833	197	9,559	177	9,240	159	69,509	190
Car Hours	93,119	368	17,246	319	13,241	228	125,071	343

ORIGINAL PLAN BEFORE STARTUP

The Original Operating Plan as of November, 2003 – seven months before startup – was for 11 train sets of 1-2 cars each operating on a 35-minute schedule with the headways shown below. This would utilize 22 cars in service at the peak, with 2 spare cars (9% spare ratio). These were the estimates based on pre-operation estimates updated to reflect some active run times developed during the integrated testing program.

Weekdays	Hours	Headway Minutes	Normal Consist
Early Morning SB	4:00 a.m. to 5:40 a.m.	30	2
Early Morning NB	4:30 a.m. to 5:00 a.m.	30	2
Pre-AM Peak SB	5:40 a.m. to 6:40 a.m.	15	2
Pre-AM Peak NB	5:00 a.m. to 5:30 a.m.	15	2
Pre-AM Peak NB	5:30 a.m. to 6:30 a.m.	10	2
AM Peak	6:40 a.m. to 9:30 a.m.	7 to 8	2
Midday	9:30 a.m. to 3:30 p.m.	10	2
PM Peak	3:30 p.m. to 6:30 p.m.	7 to 8	2
Evening	6:30 p.m. to 10:15 p.m.	15	2
Late Evening	10:15 p.m. to 1:00 a.m.	30	2

Weekends & Holidays	Hours	Headway Minutes	Normal Consist
Early Morning	4:00 a.m. to 6:30 a.m.	30	1
Morning	6:30 a.m. to 8:30 a.m.	15	1
Midday	8:30 a.m. to 6:00 p.m. (Sunday begins at 9:30 a.m.)	10	2
Evening	6:00 p.m. to 10:15 p.m.	15	2
Late Evening	10:15 p.m. to 1:00 a.m.	30	1

2003 Projected	Weekday		Saturdays		Sundays		All Days	
Service	Totals	Averages	Totals	Averages	Totals	Averages	Totals	Averages
Train Miles	772,096		120,037		120,037		1,012,170	
Car Miles	1,544,192		240,074		240,074		2,024,339	
Train Hours								
Car Hours	133,120		10,348		10,348		153,816	

When compared with the original plan, 2005 and 2006 incurred more train miles but less car miles and hours because Special Events increased train miles, but regularly scheduled trains operated with one- and two-car trains vs. the two-car plan. This more closely matched passenger demand at different times of the day, resulting in car mile and hour savings. The number of Special Events and their impact on ridership and train operations was the most surprising development since startup. These primarily are Twins baseball and Vikings/Gophers football games at the Metrodome/Downtown East station. Such ridership was anticipated in the planning for the system, but it wasn't expected to be as large as it turned out to be. Special Events brought on operational challenges of handling large crowds and emptying the platform at the Metrodome within an hour of the end of events.

Upon opening the first section of the railroad, from Minneapolis-Ft. Snelling there were signal preemption problems that caused auto traffic backups along Hiawatha Avenue. These were rectified in about six weeks. Upon opening the second section, from Ft. Snelling to Mall of America there were similar problems with larger traffic backups, especially near 34th Street and Highway 5/I-494. It took a year of working with the City of Bloomington to reach some compromises that resolved the preemption problems.

Park-and-ride lots at Ft. Snelling and 28th Ave in Bloomington have brought significant additional riders to the line – so much so that they have been expanded to accommodate more parking. A new ramp will be constructed over the next two years at 28th Ave to significantly increase park-and-ride capacity.



Transit Service in the Corridor

The intent of the Hiawatha LRT project was to increase the use of public transportation options along the corridor and to limit the growth of auto traffic traveling along Highway 55 for the daily commute. The following discussion reviews transit conditions before light rail, early ridership projections before completion of the line and the actual ridership numbers realized since opening.

TRANSIT SERVICE BEFORE LIGHT RAIL

Metro Transit's Central South Region, which includes the Hiawatha Corridor, was extensively studied for a major route restructuring during August of 2002. The Central South Region's Existing Conditions Report included the following findings:

- Transit services within the Central South Region of the metro area are primarily a radial grid oriented toward downtown St. Paul and Minneapolis. Many routes have complex multiple branches and short lines that make use of the service daunting to understand, especially to new riders or for current riders making new or occasional trips.
- This region also has a large number of widely dispersed, small park-and-ride lots. This network consists largely of small lots that are served by a single route, often with peak hour-only service and few transfer opportunities. A network of commuter services is needed that focuses on large park-and-ride lots (and potentially integrated with transit centers) that properly intercepts travelers.

EARLY PROJECTIONS

The need for additional connections to improve the network of commuter services in the metro area in part led to the consideration of light rail and the development of the Hiawatha line, the first light-rail transit in this area. The Hiawatha Line was projected to carry an average daily ridership of 24,800 by year 2020 when the final plans were approved in 2000.

ACTUAL RIDERSHIP TRENDS

In order to achieve the clearest picture of where the Hiawatha Corridor is today in terms of ridership, we first must examine where it has been. Fortunately, we can draw on data from three significant studies of this region which have been completed during the last five years:

- **The Hiawatha LRT Phase I Study**, conducted in November of 2004, examined ridership trends on the newly-opened Hiawatha LRT and serves as the baseline comparison for ridership trends.
- **The Hiawatha Ave Traffic Analysis**, a supporting document for the Before and After Study, examined Hiawatha LRT's impact on traffic congestion and speeds along Hiawatha Avenue.
- **The Hiawatha LRT Phase II Study**, conducted in October/November of 2006, served as a follow-up to the 2004 survey.

During November of 2004, Metro Transit conducted the Hiawatha LRT Phase I Study, a full analysis of rail and bus ridership in the Hiawatha Corridor. This study was intended to serve as a baseline comparison for the 2006 follow-up survey. The research was done with the objective of gaining a better understanding of the impact of light rail on commuting behaviors along the Hiawatha corridor during its first two years of service.

The study included a survey, platform counts at train stations and counts of those transferring to/from specific bus routes to/from the train. Though the primary objective of this research was to establish a benchmark for the current study, the following topline observations were made:

- A total of 20,635 passengers were observed boarding the train and 20,633 were observed alighting from the train.
- Total traffic (off and on) for Thursday was 19,559 (November 2004).
- Total traffic (off and on) for Saturday was 13,812 (November 2004).
- Total traffic (off and on) for Sunday was 7,897 (November 2004).

- The majority of both rail traffic and bus/rail transfers takes place on weekdays.
- Rail traffic increased throughout the day for both passengers getting on and those getting off the train.
- Fort Snelling and Nicollet Mall have the highest number of passengers getting on and off the train for all days.
- Government Plaza Station is also very active on weekdays.
- Warehouse/Hennepin Avenue Station is also very active on weekends.

As part of the initial Phase I Report, Metro Transit also completed the Hiawatha Avenue Traffic Analysis to compare traffic along Hiawatha Avenue before and after the light rail began operating. The major finding of this study is that traffic volumes in the corridor were lower in November 2004 and 2006 after rail service than they were in June 2004 before rail service began. The only exception is at northbound E. 26th Street in the AM peak hour, where it is believed that northbound vehicles using parallel north-south routes are turning back onto Hiawatha Avenue.

Metro Transit conducted the Hiawatha LRT Phase II Study to gain a better understanding of the impact of train service on travel behaviors along the Hiawatha Corridor, since the line had been operating over its complete length for almost two years. The November 2006 study used methodology similar to the November 2004 survey, including a survey, platform counts at train stations and counts of those transferring from bus to train or train to bus. Findings from the Phase II train rider survey include:

- 29% bus to an LRT station; 24% walk; 30% park and ride.
- 50% of respondents are new transit users since rail service started, two years or less.
- Among the 50% who began using transit since the train was introduced, 71% were greatly influenced to do so by the introduction of light rail.
- Significantly more train riders use the train during non-rush hour periods (67% vs. 77%), indicating the appeal of the train beyond daily commuting, to include special events such as sporting events.
- 75% headed to work/school.
- 80% own cars, yet choose train.
- 96% are satisfied with Metro Transit service.
- 60% said rail service influenced their decision to ride transit.
- 55% female / 45% male.
- 34% have household incomes over \$70,000.

Bus routes and the new Hiawatha Light Rail Line are designed to work together to increase mobility to many destinations in the urban and suburban parts of the Hiawatha Corridor. The summary of total daily ridership for bus and rail indicates that more people are making use of public transportation options along the corridor.

Overall, the number of light-rail riders carried has grown much faster than the number of in-service hours added, which means that the transit system has become more productive in terms of passengers per in-service hour (Table 1). It is noteworthy that ridership on weekends and in the off-peak in general has grown faster than it has during weekdays. The Hiawatha Corridor transit system has become more useful for people making trips for many non-work purposes since the opening of the Hiawatha Line. It can be posited that the Hiawatha Corridor is another case of rail transit influencing lifestyle choices. Those traveling in the corridor have become more transit- and less automobile-oriented.

TABLE 1: PASSENGERS PER IN-SERVICE HOUR, BUS AND RAIL

	2003	2006	% Increase
Weekday	41.8	48.9	17.0%
Saturday	38.5	49.3	28.1%
Sunday	36.7	46.5	26.7%

Hiawatha LRT provided service to 7.8 million riders in its first year of operations. This exceeds pre-construction estimates by 58.2 percent. By October 2005, ridership reached a million riders per month, a level that surpassed projections for the year 2020. In addition, approximately 50 percent of riders are new to transit service.

KEY FINDINGS

Overall, rail ridership has increased significantly since November 2004. During the 3-day sample periods in November 2004, 20,635 passengers were observed boarding and 20,633 were observed alighting from the trains. In the 3-day sample periods of November 2006, these totals had jumped to 40,757 boarding and 39,281 alighting, an increase of 20,122 boarding (97.5 percent), 18,648 alighting (90.4 percent). The increases in passengers boarding by day of the week are summarized in the following table:

TABLE 2: PASSENGER BOARDINGS DURING SAMPLED HOURS, YEARS 2004 & 2006

	2004 Rail	2006 Total*	Total Increase	% Increase
Weekday	9,786	23,185	13,399	136.9%
Saturday	6,885	17,746	10,861	157.7%
Sunday	3,964	10,466	6,502	164.0%

*Airport bus shuttle riders included in total to account for Humphrey Terminal

Maximum loads as high as 243 passengers on a two-car train were recorded on the non-event weekday in November 2006, while most peak-hour trains had a maximum load of about 200 passengers. Much of this growth is from the Minneapolis-St. Paul International Airport and Mall of America, but it doesn't explain all of it. For example, the two Fort Snelling park-and-rides continue to attract new transit riders going to the U of M and downtown Minneapolis. The daily ridership is considerably higher whenever there is a major special event along the line. The HHH Metrodome in downtown Minneapolis is the most significant contributor to the event-related ridership. Major events occur on average at least twice per month over the span of a year.

The two-car trains are full at the peak commute times and for the major special events. Ridership growth appears to be limited now by the lack of extra light rail cars, since most station platforms can only accommodate two-car trains. Expansion of the rail car fleet and the platforms to accommodate three-car trains may be considered in light of the expected increases in population and transit trips coming to the Hiawatha Corridor by 2030.

Ridership Forecasts

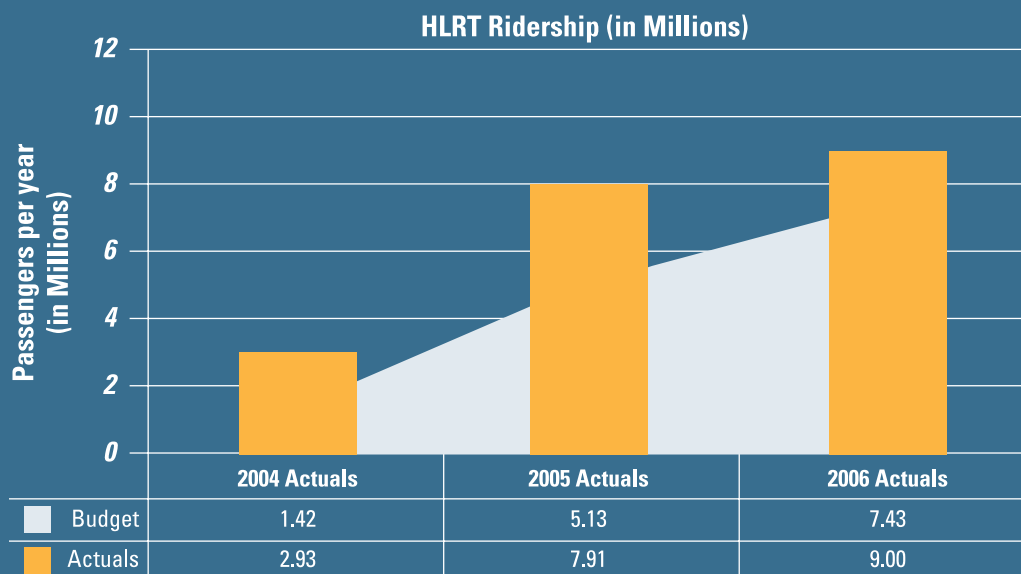
To plan for adequate light rail service, peak-period service demands were designed which included peak period peak direction boarding and alighting by station. Ridership projections were developed for the Metropolitan Council in August 1998 with revised ridership projections updated in August 1999. These ridership projections reported peak-hour LRT station boardings and alightings, as well as peak-hour line loads in the peak and off-peak directions. Ridership at individual downtown stations was not reported, with downtown ridership being reflected in aggregate as total boardings, total alightings and maximum load.

The revised August 1999 ridership projections included base-year ridership forecasts as well as ridership forecast estimates of total daily LRT passengers by station for year 2020. The ridership projections developed for the Metropolitan Council base system startup year forecasted 19,300 total daily LRT boardings, and for year 2020 forecasted a total of 24,600 daily LRT boardings.

The Hiawatha Light Rail Line opened to a high level of success. Year 2005, the first full year of LRT revenue operations achieved 23,756 total daily LRT boardings. In year 2006, the actual total daily LRT boardings were 26,574, an increase of 38% over the August 1999 base system startup year forecast of 19,300 total daily LRT boardings, and an increase of 8% over the 2020 forecasted total of 24,600 daily LRT boardings.

LRT ridership levels on Saturday and Sunday also achieved similar levels of success. In year 2006, Saturday daily LRT boardings were 26,594 and Sunday daily LRT boardings were 16,724.

The following chart details actual vs. budgeted ridership for years 2004 to 2006. For the period through December 31, 2006, total inception to-date ridership was 19.8 million versus the budget of 14.0 million. Actual ridership results through 2006 since inception exceeded budget by 5.8 million rides or 42%.



Capital Costs

The original FFGA for the Hiawatha LRT was executed on January 16, 2001, with a total project cost of \$675.4 million. In June 2003 an amendment to the FFGA was initiated with a new realignment at the Mall of America, and adjusted the total project cost to \$713.2 million. The required FFGA revenue operations date remained unchanged at no later than December 31, 2004. The completed line opened December 4, 2004, before the FFGA required revenue operations date of December 31, 2004, with the project within the approved project budget.

EARLY ESTIMATES

In 1985, the FEIS estimated the capital cost of constructing LRT from downtown Minneapolis to Bloomington at \$137,964,000. This original estimate, and other subsequent estimates in the following years, were not based upon a complete preliminary engineering effort and did not include almost 20 years of inflation adjustment.

In 1998, with increased work and analysis on building the LRT project, Mn/DOT commissioned the first preliminary engineering study of the line to develop a true capital cost estimate. This estimate was used with the initial project finance plan completed in August 1999 and was also used to develop the initial capital funding plan.

Adjustments to the project budget were made at two subsequent points in time, first with the completion of the Full Funding Grant Agreement with the FTA in January 2001, and the second with the MOA amendment to the FFGA in June 2003.

HIAWATHA CORRIDOR LIGHT RAIL TRANSIT FINANCIAL REPORT (SEPTEMBER 1999)

COSTS:

In August 1999, the Metropolitan Council, with the cooperation of the Minnesota Department of Transportation (Mn/DOT), issued the Hiawatha Corridor Light Rail Transit Financial Report, which was prepared to support the request for Section 5309 Discretionary New Starts Funding from the FTA. In this report, the capital cost of the Hiawatha LRT Project was estimated at \$548.6 million in year-of-expenditure dollars. This did not include

\$49.9 million in associated highway improvements and land assembly costs that were already known and later included in the Hiawatha Project Budget. Once included, the equivalent value of the August 1999 estimate would have been \$598.5 million.

FUNDING:

The overall funding as of August 2009 was as follows:

FTA Section 5309	\$274.3 M
State of Minnesota	\$100.0 M
MnDOT	\$ 17.3 M
HCRRA	\$ 87.0 M
MAC	\$ 70.0 M
Subtotal	\$548.6 M
STP	\$ 43.0 M
CMAQ	\$ 6.9 M
Total	\$598.5 M

Contributions from both Mn/DOT and HCRRA included the present value of land purchases that had been made over the years for both the initial highway construction and the later efforts by HCRRA to secure land as it was made available. The contributions by MAC represented a portion of the cost of the airport tunnel and the airport stations.

FULL FUNDING GRANT AGREEMENT

COSTS:

The Hiawatha LRT project budget as detailed in the Full Funding Grant Agreement, executed on January 16, 2001, was \$675,430,000.

SCOPE ADJUSTMENTS:

The original scope of the LRT project included a south terminus at the Mall of America. This south terminus was to be located across from the MOA east parking facility. When the original FFGA was negotiated and signed, MOA management was opposed to a station inside the parking facility. Subsequent to execution of the FFGA, the Metropolitan Council and Metro Transit continued discussions with the MOA management and successfully negotiated the new alignment.

AMENDED FULL FUNDING GRANT AGREEMENT

COSTS:

In June 2003, an amendment to the FFGA was initiated with a new realignment at the Mall of America, and adjusted the total project cost to \$713,162,915. The required FFGA revenue operations date remained unchanged at no later than December 31, 2004.

SCOPE ADJUSTMENTS:

The amendment to the FFGA was the result of a proposal to modify the alignment in Bloomington and to relocate the terminal station from the east side of 24th Avenue to the lower level of the Mall of America east parking garage. This new alignment improves access to the MOA, increases parking spaces at MOA Station, and creates a configuration more conducive to future transit-oriented development. This realignment also included the relocation of a proposed park-and-ride from the Mall of America station to a new station at 28th Avenue.

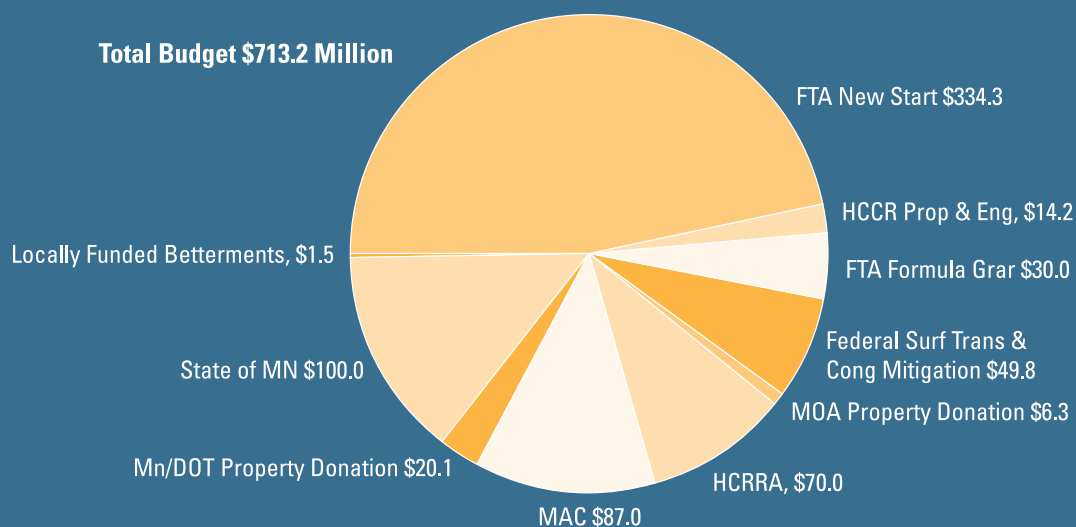
The necessary environmental clearances for the relocated MOA station were completed in July 2003. The Metropolitan Council and Metro Transit requested a Letter of No Prejudice (LONP) to

begin the design and construction effort of the MOA realignment to ensure completion within the FFGA revenue operations date timeframe. The FTA granted the LONP in August 2003. In June 2004 the Metropolitan Council opened a segment of the Hiawatha Line running from downtown Minneapolis to Fort Snelling. The completed line, including two airport stations and the MOA Station opened December 4, 2004, before the FFGA required revenue operations date of December 31, 2004, within the approved project budget.

FUNDING ADJUSTMENTS:

The additional \$37.75 million was funded through the use of \$30.0 million of Federal 5307 Formula Funds, which were made available by the Metropolitan Council. The remaining \$7.75 million was funded by \$6.3 million in in-kind contributions of property and \$1.5 million in local match. No additional Federal New Starts capital funds were required to fund this amendment to the FFGA.

HLRT PROJECT FUNDING SOURCE





Operating Costs

Estimates of the operating and maintenance (O&M) costs of the proposed Hiawatha LRT line were calculated at various stages of project development. The first of these was in the 1985 FEIS, which provided an operating cost estimate of \$6,980,000 in 1981 dollars, or approximately \$14.5 million in 2004. This estimate included the downtown-to-Bloomington alignment with cost of the preferred alternative slightly less. A significant amount of time elapsed between the 1985 FEIS and year 1998 when increased work and analysis on building the LRT project resumed. Due to this amount of time, the 1985 estimate is difficult to evaluate and make comparable assertions to the later numbers. During the period of 1999 to opening in 2004, Metro Transit prepared several O&M cost estimates.

1999 HIAWATHA PROJECT FINANCIAL REPORT

A revised estimate of the O&M costs for the LRT project was presented in the Hiawatha Corridor Light Rail Transit Financial Report, completed in August 1999. As part of the process of applying for New Starts Funding from the FTA, Metro Transit

was required to conduct a comprehensive financial analysis to demonstrate that it had the financial capacity to operate the LRT system following construction. With this report, Metro Transit projected that O&M costs for the year 2004 (assuming a full year of operation) would be \$15,127,000 in 2004 dollars. Projections for subsequent years were as follows:

Total LRT Operating Expenses (000s)	
2004	\$15,127
2005	\$15,581
2006	\$16,049

FUNDING SOURCES:

Funding for the O&M costs were originally forecasted to come from three sources including Passenger Fares, State General Fund Appropriations and Property Taxes. In 2001, the Minnesota State Legislature passed legislation providing a different funding source for transit operations. Beginning in July 2002, the State began transferring a portion of the State's Motor Vehicle Sales Tax (MVST) to the Council to replace the property tax that had been provided for transit operations. MVST is the largest source of operating funds for regional transit. In 2003, the State dedicated 20.5% of the transit fund for the Twin Cities Metropolitan Area transit needs. For 2004 through 2007, this dedicated amount has been increased to 21.5%. MVST revenues are distributed to the Metropolitan Council which distributes a portion of these funds to communities not served by Metro Transit based on a formula established in State Law. The Council distributes the remaining amount of these MVST funds to the Metropolitan Council bus and rail transit programs through its regular budget process. In addition, for the first three years of operations, the LRT received a special allocation of \$10 million in federal Congestion Mitigation and Air Quality (CMAQ) funds.

2001 FULL FUNDING GRANT AGREEMENT:

In an attachment to the full funding grant agreement submitted in January 2001, Metro Transit projected operating costs of \$16,600,000 for the first full year of LRT operations. Projections for subsequent years were not included in this submission.

2004 PRE-OPERATION COST ESTIMATES FINANCIAL REPORT:

In June 2004, prior to the start of revenue service, Metro Transit projected the following operating costs and funding.

In (000s)	2004	2005	2006
Total LRT Operating Expenses:	\$11,554	\$16,570	\$17,437
Operating Funding:			
Fare Revenue	\$1,786	\$5,654	\$5,654
State Funding	\$3,387	\$3,909	\$3,937
Hennepin County Funding	\$3,387	\$3,909	\$3,937
CMAQ Funding	\$2,995	\$3,097	\$3,908
Farebox Recovery Ratio:	15.5%	34.1%	32.4%

These operating cost estimates account for a partial year of service in 2004. The initial segment from downtown Minneapolis to the Minneapolis Airport opened in June 2004, with the extension to the Mall of America opening in December 2004. In the above Pre-Operation Cost Estimates, year 2005 is the first full year of revenue operations.

FUNDING SOURCES:

By 2004, funding for operating costs of LRT had changed since the original financial plans in 1999.

- In 2001, the Minnesota State Legislature passed legislation providing a different funding source for transit operations. Beginning in July 2002, the State began transferring a portion of the state's Motor Vehicle Sales Tax (MVST) to the Council to replace the property tax that had been provided for transit operations.
- For the first three years of operations, the LRT also received a special allocation of \$10 million in federal Congestion Mitigation and Air Quality (CMAQ) funds.
- In accordance with Laws of Minnesota 2003 First Special Session Chapter 19, Article 1, Section 3, the State of Minnesota provided an appropriation for operation of the Hiawatha Light Rail transit line. This appropriation was for paying 50 percent of operating costs for the Hiawatha LRT line after operating revenue and federal funds were used for light rail transit operations. The remaining operating costs up to a maximum of the amount provided by the State Appropriation are to be paid by the Hennepin County Regional Rail Authority (HCRRA).
- Special legislation from the State of Minnesota was also enacted to restrict Metro Transit from transferring funds from bus service to fund the new rail system. This restriction prohibited the use of any savings realized in the corridor from the operation of fewer buses to assist in funding LRT.



Revenues

ACTUAL REPORTED RESULTS

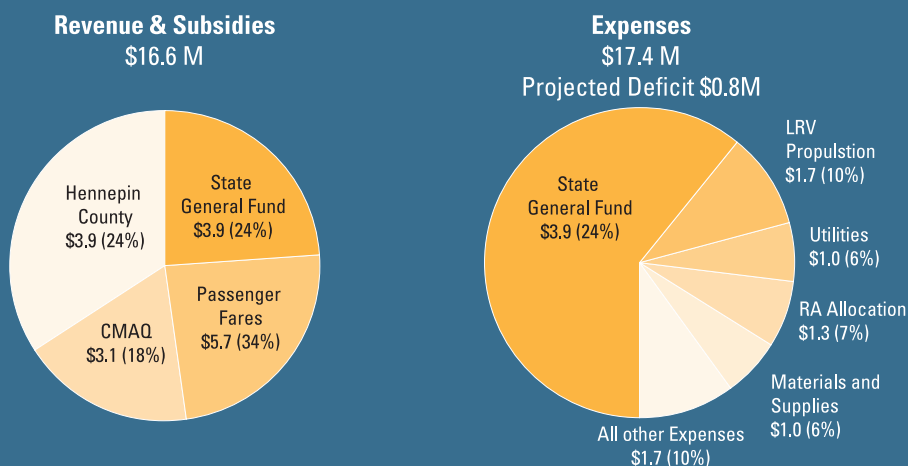
The pre-operation cost estimates were reasonable predictors of actual LRT O&M costs. Actual LRT operations included many challenges not originally forecasted. These included:

- a. Increases in ridership over the original estimates. Year 2005, the first full year of LRT revenue operations achieved 23,756 total daily LRT boardings. In year 2006, the actual total daily LRT boardings was 26,574, an increase of 38% over the August 1999 base system start up year forecast of 19,300 total daily LRT boardings, and an increase of 8% over the 2020 forecasted total of 24,600 daily LRT boardings. LRT ridership levels on Saturday and Sunday also achieved similar levels of success. In year 2006, Saturday daily LRT boardings were 26,594 and Sunday daily LRT boardings were 16,724.
- b. As stated in the section on ridership, for the period through December 31, 2006, total inception to-date ridership was 19.8 million versus the budget of 14.0 million. Actual ridership results through 2006 since inception exceeded budget by 5.8 million rides or 42%.
- c. Significant demand for special events games including the Minnesota Vikings, Minnesota Twins and Gophers. On average, special event game attendance riding the HLRT was 11.7% for the Vikings, 12.2% for the Twins, and 11.6% for the U of M Gophers. This increased demand resulted in additional hours of service and security costs not originally planned in the original LRT operations forecasts.
- d. Additional maintenance costs in the light rail airport tunnel due to water intrusion and freezing during the winter months.
- e. Increased maintenance and parts costs for the light-rail vehicles due to additional miles of operation beyond the original timeline forecasts. These additional hours of service expedited the levels of maintenance required on the light-rail vehicles.

In (000s):	2004	2005	2006
Actual Operating Expenses (NTD)	\$8,368	\$16,664	\$18,725
Actual Fare Revenues (NTD)	\$2,568	\$7,060	\$8,008
Operating Surplus Net Income	\$947	\$1,441	\$833
Actual Farebox Recovery Ratio:	30.7%	42.4%	42.7%
Forecasted Farebox Recovery Ratio:	15.5%	34.1%	32.4%

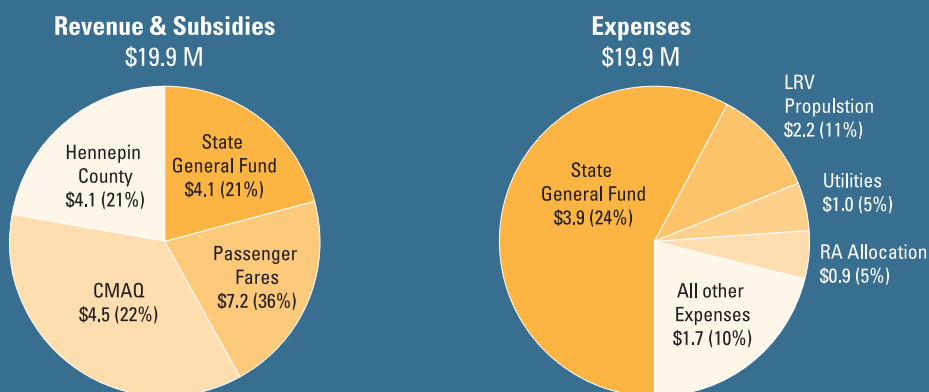
Year 2006 operations costs exceeded the pre-operations estimates of June 2004 by \$1,288,000 or 7.4% due to many of the variance items noted above. These costs were largely offset by increased passenger fares resulting in an actual farebox recovery ratio of 42.7% or 31.8% higher than the original 2004 forecast of 32.4%. The success of the operations of the Hiawatha LRT and significant increase in passenger levels resulted in an operating surplus for years 2004 to 2006 of over \$3.2 million.

OPERATING BUDGET 2005: REVENUE AND EXPENSES



The Operating Budget for 2005 had a proposed deficit due to increasing health care costs and costs of propulsion.

OPERATING BUDGET 2006: REVENUE AND EXPENSES



The Operating Budget for 2006 was balanced due to increases in ridership and resulting passenger fares.



Land Use

Station-area transit-oriented land use development as well as additional development in areas within close proximity to the corridor were anticipated as a result of the development of the Hiawatha light-rail transit line. The Metropolitan Council envisioned the Hiawatha LRT as a catalyst in furthering economic development by supporting a more efficient pattern of land use and infrastructure investment in the region. Over the long term, the improved accessibility provided by LRT is expected to result in significant levels of housing and job development within the Hiawatha Corridor, higher levels of transit ridership, and consequently less need for infrastructure investment elsewhere in the region. The following outlines the development projects forecasted before the project and the changes in land use policy, land use patterns, and economic development in the area after the project opened.

DEVELOPMENT PROJECTS FORECASTED BEFORE PROJECT

According to Metropolitan Council forecasts, the 7-county Minneapolis-St. Paul Metropolitan Area will grow by approximately 1 million people between 2000 and 2030. Already in this decade, the area's population grew by more than 168,000 people between 2000 and 2005, closely matching the forecasted growth rate for the 30-year period.

Government at all levels has adopted plans, established policies and modified regulations to stimulate increased employment, housing and tax base in the corridor. The Metropolitan Council is responsible for the area's regional planning. The Council's Regional Development Framework, adopted in January 2004, articulates four fundamental policies supporting land use/economic development in the region's transit corridors. Policy 2 specifically advocates planning and investing in multi-modal transportation choices to slow the growth of congestion and serve the region's economic needs.

Three interrelated factors important to enhance the effectiveness of transit service along dedicated transit corridors was considered in land use development around the Hiawatha LRT. First, the type and density of residential developments is key to bringing potential users within an easy walk or bicycle ride to the transit stop or station. Medium- to high-density housing—townhomes, condominiums and apartments—either as residential only developments or as a part of mixed-use developments, should be promoted to support transit investments and service. Second, a local street and pedestrian system that easily and safely connects housing to the transit stop or station needs to be in place. Third, attention also needs to be given to the destinations served by the corridor. Increasing the intensity of jobs and mix of activities and services at destination centers along with well-designed and interconnected pedestrian facilities will increase ridership.¹

In 1999, the Minneapolis Community Development Agency initiated the *Hiawatha LRT Corridor Transit-Oriented Development Market Study*. The purpose of this market study was to identify the potential for transit-oriented development in the LRT station areas over a 20-year timeframe. The market study identified four “catalyst stations” within the Hiawatha corridor that were recommended to

focus initial investments and transit-oriented development actions. These four stations include Downtown East, Lake Street, 46th Street and Bloomington stations. The study indicated that over a 20-year time frame, the four “catalyst station areas” would offer the potential for development of 9.4 million square feet of net new commercial development and 3,750 new occupied dwelling units, allocated as follows:

- **Downtown East:** 2.7 million square feet of commercial space, providing a comparatively low-cost and lower-density alternative to the Minneapolis Central Business District. Up to 1,500 residential units, including townhouses and mid-rise apartments, could be absorbed over the 20-year period.
- **Lake Street:** Redevelopment of underutilized commercial space, resulting in approximately 150,000 square feet of new development (a net increase of 20,000 square feet over existing inventory). This commercial development would be integrated with new residential development that could amount to 1,250 townhouse and apartment units.
- **46th Street:** Reconfiguration and redevelopment of 160,000 square feet of commercial and industrial structures, designed to promote the viability and integration of uses. This resulting development would create 149,000 square feet of new commercial space, along with up to 1,000 new townhouse and apartment units.
- **Bloomington:** 6.7 million square feet of commercial development. While this development would most likely occur regardless of the LRT stations, the light rail corridor can significantly influence the character of development (e.g., integration of buildings with nearby offices, hotels, stores/restaurants and public transit amenities) in this area.²

In other station areas along the corridor, the market study referenced studies drawn from the experiences of other light rail systems. These studies indicate light rail transit improvements will enhance property values and help spur new community development activity around stations, but this development may take longer due to necessary land acquisitions, building demolitions, etc.

DEVELOPMENT ACTIVITY AFTER PROJECT OPENED

Land use and station-area transit-oriented development, considered by most experts to take five years to establish momentum and results, is moving at or ahead of that pace. Before construction, planners predicted the areas surrounding LRT would draw 7,000 new housing units by 2020. By the end of 2005, more than 5,400 units were completed or under construction, and the City of Minneapolis had processed permits for 7,000 additional units for construction by 2008, according to the city planning department.

It is evident that substantial growth in employment, housing and tax base already has occurred. For easy comparison, the four stations identified as “catalyst station areas” are reviewed below to identify the development/planning activities that have occurred in these locations since the opening of the light-rail line.

HIAWATHA/LAKE STATION AREA MASTER PLAN

The area encompassed by this plan focuses on the area surrounding the Lake Street/Midtown Station of the Hiawatha LRT. The dominant feature of this station area is Lake Street, Minneapolis’ historic major east/west commercial corridor, linking the chain of lakes on the west with the Mississippi River on the east.

The plan for this station area was adopted in May 2001. Planning and urban design challenges include suburban-oriented shopping centers on either side of Hiawatha Avenue as well as bridge superstructures that cross over Lake Street. In the public realm, the plan contemplates streetscape improvements to Lake Street integrated with street-oriented mixed-use development, establishment of a “community circuit” providing pedestrian connections to LRT from each of the four station area quadrants (and integrated with the Hiawatha Trail and Midtown Greenway, both regional bicycle facilities), a public plaza adjacent to the LRT station, and neighborhood open space enhancements.

The plan also identifies twelve sites for potential redevelopment within the station area, most notably a “catalyst” site at the Hi-Lake Shopping Center, immediately to the west of the station. This site is proposed to be redeveloped at an average Federal Acquisition Regulation (FAR) of 2.0 on five acres, yielding between 150 and 450 new housing units, and between 50,000 and 150,000 square feet of retail, in structures ranging from three to six stories in height. Recent changes at the site include Corridor Flats, a four story mixed-use condominium building

under construction on Lake Street with a small grocery at ground level. Additional retail and housing is occurring along Lake Street in the vicinity of the station.

A Hi-Lake Action Plan was developed with Midtown Community Works, a partnership of government and institutions in the Midtown Minneapolis area. Short-term strategies include wayfinding signage in the area, under-bridge improvements to the pedestrian realm, public art, and improvements to a remnant parcel adjacent to the LRT stair/elevator towers.

46TH STREET STATION AREA MASTER PLAN

Most of the planning area consists of single-family detached homes or duplexes. However, the presence of older commercial and industrial uses in proximity to the station creates possibilities for redevelopment.

The plan for this station area was adopted by the Minneapolis City Council in December 2001. Specifically, the plan recommends a program of adding more than 500 residential units and 145,000 square feet of retail.⁵ A town square is envisioned as a central feature of this redevelopment area, creating a new public feature as well as creating a visual connection between the LRT station and Minnehaha Park. Implementation planning is occurring in 2007 and is addressing property owner participation, parcel configuration, development economics, utility relocation and infrastructure design.

Oaks Hiawatha Station, with 61 apartments and ground level retail, was completed in 2006. Under construction is Phase 1 of Hiawatha Flats, comprising 229 apartments in two buildings, including such features as indoor and outdoor swimming pools, a game room, theater and heated underground parking.⁶

DOWNTOWN EAST

In the vicinity of the emerging Mills Cultural District, a residential neighborhood is now under development, filling in the area between the Guthrie Theater and the LRT station. Between the Guthrie and the downtown core, the historic Milwaukee Road Depot has been renovated as a hospitality venue, and several residential projects have been built nearby. To the south and east of the Guthrie, condominium projects under construction include the Bridgewater (282 units) and the Zenith (160 units), with construction soon to begin on the Revue Flats (107 units). In addition to the projects already launched in this area, another 835 housing units are proposed to be completed between 2007 and 2009.

Approximately four blocks to the south of the Downtown East/Metrodome Station, major new residential construction has also occurred in the Elliott Park Neighborhood. Recently occupied is the Grant Park townhome and condominium project. Construction is nearly complete on the 27-story Skyscape condominium tower, a block from the Grant Park complex.

Immediately adjacent to the Downtown East/Metrodome Station, major redevelopment projects are in a proposal stage. Currently, the primary tenants of the Metrodome are the Minnesota Twins (Major League Baseball) and the Minnesota Vikings (National Football League). When the Twins move to their new outdoor ballpark, an alternative re-use of the current Metrodome site may occur.

BLOOMINGTON CENTRAL STATION

The initial phase of development in the Airport South District is occurring in the area surrounding the Bloomington Central Station. Bloomington Central Station, LLC, a partnership between McGough Development and Health Partners, has begun a 5-phase, \$730 million development of a new 43-acre urban district. When complete, this district will feature 1,100 new housing units, 9,000 jobs (7,000 of them new), almost 2 million square feet of new office space, a full-service hotel with 350 rooms, 75,000 square feet of street level retail and restaurant space, and a 1.59 acre park adjacent to the LRT station. The first phase of this project has been completed, with a renovation of the 550,000 square foot Health Partners Corporate Center and the completion of Reflections Condominiums, in two 17-level towers with 267 housing units.

Beyond the four “catalyst station areas” the following additional developments have occurred or are being planned along the line:

- Expansion of the 28th Avenue Park & Ride to 1,600, or 1,100 more spaces, in mid-2008.
- New American Boulevard . (on 34th Avenue) Station in Bloomington opens in 2008.
- Airport Humphrey Terminal Station re-opens in 2007, possible increase in flights there.
- New grocery store and nearly 4,000 new units of multi-family housing at 38th Street by 2012.
- New commercial and multi-family housing at Cedar-Riverside, likely by 2010.

In addition to these developments, the following other developments may also have been influenced by the LRT:

- Graves 601
- Minneapolis Central Library
- Bridgewater
- Zenith
- Grant Park

Although some of the growth described in this section would have happened without LRT, the line has been a powerful catalyst for both commercial and residential development. LRT supports growth by offering people an easy connection between where they live, work and shop.

¹ Ibid., p. 76

² *Hiawatha LRT Corridor Transit-Oriented Development Market Study*, 1999

³ City of Minneapolis, *Hiawatha / Lake Station Area Master Plan*, Executive Summary.

⁴ Ibid.

⁵ City of Minneapolis, *Minneapolis Planning Department Report: 46th & Hiawatha Station Area Master Plan*, pp. 6, 7

⁶ *Light Rail Apts. Under Way*, *Minnesota Real Estate Journal*, March 2007, p. 4.

⁷ See http://www.metrocouncil.org/planning/TOD/Bloomington_Station.pdf



Image Courtesy of David Lawrence

Special Issues

TUNNEL ICING

The management of water within the airport tunnels became a significant issue in the winter of 2004 – 2005. The presence of underground springs was well known during the mining of the airport tunnels, and infiltration was anticipated with water entering the tunnel through seams in the concrete liners. The tunnel drainage system was expected to handle the flow.

The winter climate, however, resulted in icing issues especially in the southerly end of the north tunnel bore. As the train brought sub-zero air into the tunnel, the water began to freeze on the tunnel floor next to the track instead of traveling approximately 1,000 feet to the drain. During the first winter, the ice built up to the ball of the rail. It was removed by manual labor using ice picks and hauling the ice chunks out of the tunnel with on-track equipment.

This process was completed each time the ice built up to levels that could interfere with train operations. Other mitigation efforts included reverse running trains in tunnel to force warm air from the interior of the tunnel over the ice. This provided minimal relief.

As a more permanent mitigation, hot water was circulated by

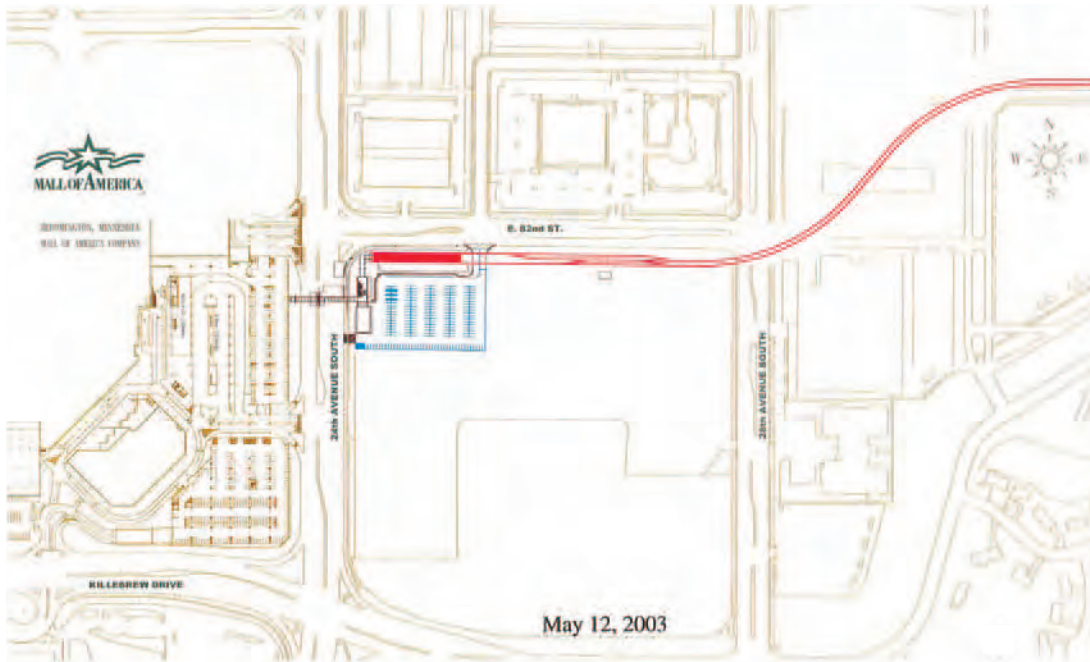
pumps through the hoses placed on the floor of the tunnel. The hoses were covered with insulated blankets to speed the melting of the ice. Northbound trains were slowed to 10 mph in this section to not disturb the hoses and blankets. This technique was effective despite a modest impact on the punctuality of northbound service.

Over the next two years more permanent corrections were implemented, including re-grouting the walls of the tunnel, which slowed down the amount of water entering this section of the tunnel.

The problem has now been mitigated with a series of heat sources and other modifications including an air curtain at the end of the tunnel to minimize the cold air brought in by the train. Several 480-volt infrared heaters have been placed on the wall of the tunnel in the affected section, switch heater elements have been attached to the track, and doors leading from the safety cross passages are held open in this section of the tunnel. Warmer air filters into the north bore from the south bore as southbound trains pass by the cross passages. Safety of the tunnel ventilation system is maintained as the doors will automatically shut if there is a fire in the tunnel requiring the use of the tunnel fan ventilation system.

This ice phenomenon was a major problem that was corrected through the persistence of many dedicated staff.

EXHIBIT A: EXISTING MALL OF AMERICA ALIGNMENT & STATION DESIGN



ENHANCED ALIGNMENT AT MALL OF AMERICA / BLOOMINGTON

JUSTIFICATION NARRATIVE

The Hiawatha Corridor Light Rail Project Full Funding Grant Agreement originally scoped the south end of the project in the City of Bloomington to include three stations, one of which was to offer 200 park-and-ride spaces. The terminal station at the Mall of America was located east of the Mall of America and east of a six-lane arterial street (see Exhibit A). This design limited the Bloomington portion of the Hiawatha LRT Project from achieving its full potential. These limitations are addressed in further detail below. This narrative will also describe how the new alignment enhanced the Hiawatha Corridor Light Rail Project.

DISADVANTAGES OF EXISTING MALL OF AMERICA STATION AND ALIGNMENT DESIGN

No Direct Access to Mall of America

In the original design, the Mall of America Station is located hundreds of feet from the actual mall. Given the station's location on the east side of 24th Avenue, a skyway was designed to

allow rail passengers to walk over the arterial street to provide separation from vehicular traffic. Total walking time from the rail station to the mall would be approximately 4 to 5 minutes without bags and strollers.

No Direct Bus/Rail Transfer at Mall of America

The original design calling for the rail station off Mall of America property creates two physically separate transit facilities near the mall that would create enormous inconvenience for transit passengers who need to transfer between modes. Passenger travel time required to make this mode transfer given the additional steps or elevator ride would have been 7 to 8 minutes. With the Mall of America bus transit center being Metro Transit's single busiest bus stop in its entire regional network, this original design for bus/rail intermodal transfer would have imposed a significant transfer penalty on passengers.

Insufficient Park and Ride Capacity

The original design for the Bloomington segment of the Hiawatha LRT line included a single station with a park-and-ride component. The station was the Mall of America station, and the capacity was limited to 200 spaces. This parking capacity in combination

with the Hiawatha Line's largest park-and-ride at Fort Snelling station would have provided total capacity for the full line of only 1,080 spaces.

Diminished Development Potential East of Mall of America

The original alignment included dual track from east to west paralleling 82nd Street up to the terminal at Mall of America station. The original placement of the track and station on the north perimeter of a large vacant parcel immediately east of Mall of America created a barrier from vehicular access to the site from the north – the direction from which the majority of traffic would access future development on this parcel. Specific site constraints would not allow for grade separation of the track and streets to allow for unencumbered access for vehicles to future development.

ADVANTAGES OF PROPOSED ENHANCED MALL OF AMERICA STATION AND ALIGNMENT DESIGN

Direct Access to Mall of America

The enhanced location of the Mall of America station provided for direct access by rail passengers to the mall. The location is on Mall of America property immediately adjacent to its eastside mall access. Rail passengers are no longer required to cross a busy arterial via a skyway and navigate through a busy parking garage to access the mall. Rail passengers alight the train and access the mall in less than two minutes. This direct access is very attractive to many of the approximately 40 million people who visit the mall annually. This direct access provides a much safer path for the hundreds of thousands of rail passengers traveling to the Mall of America shopping and entertainment complex.

In addition, the Mall of America is a significant employment center with over 10,000 full-time and part-time employees who work at the mall. Many of these employees, current and prospective, reside in the central cities and have improved access to these jobs via Hiawatha Light Rail Transit.

Premium Bus/Rail Transfers at Mall of America Station

The enhanced Mall of America Station location brings the rail mode to the bus transit center to create a bona fide multimodal Mall of America Transit Center. Premium transfers will be offered with the ability of intermodal passengers to transfer between modes simply by walking a few steps from the rail platform to the appropriate bus bay.

Bus/Rail Connections at New 28th Avenue Station

The LRT realignment in Bloomington offers improved bus/rail connectivity at 28th Avenue Station. While local bus service will focus on serving Mall of America station as described above, express bus service will directly connect with Hiawatha at the 28th Avenue Station. Design provisions include bus bays for ten buses that will offer cross-platform transfer capability for bus and rail passengers. Most of the bus service at this station will be longer-haul, peak express service coming from points south across the Minnesota River for passengers commuting to jobs at MSP International Airport or in Minneapolis.

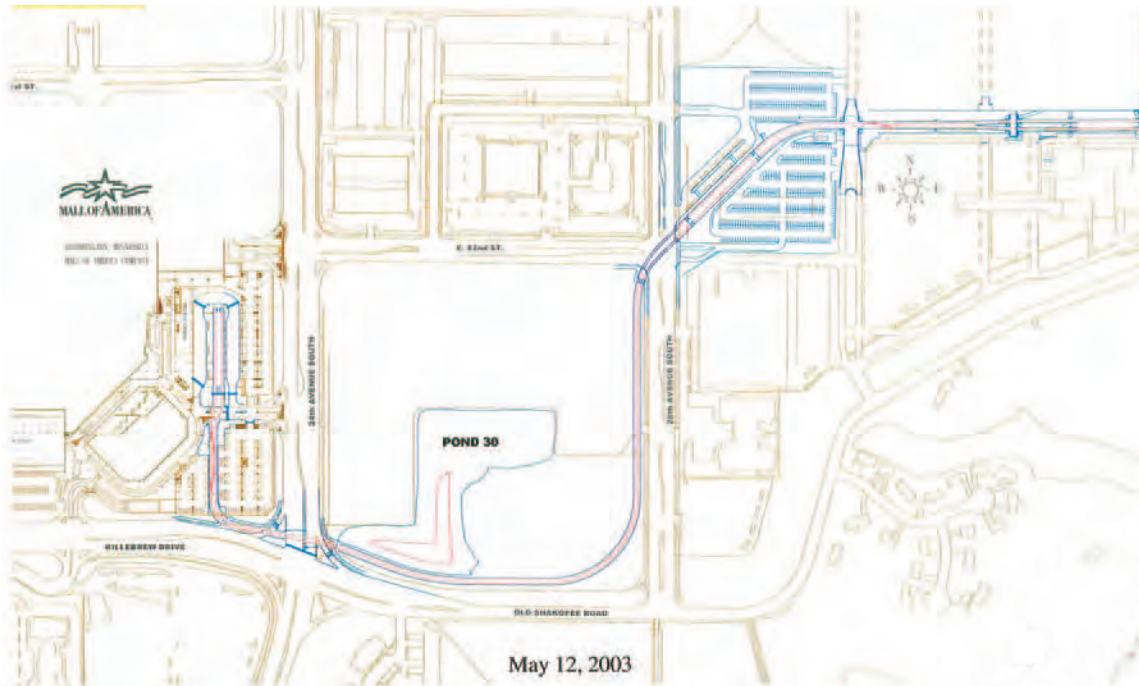
Expanded Park and Ride Capacity

The enhanced alignment and station locations in Bloomington provided an opportunity to triple park-and-ride capacity in Bloomington from 200 spaces to nearly 600 spaces at the 28th Avenue Station. This park-and-ride capacity increases the total Hiawatha all-day parking spaces to nearly 1,500. The 28th Avenue spaces are easily accessible for motorists coming from the south and the west.

Preserves Maximum Development Potential East of Mall of America

The enhanced alignment on the parcel east of the Mall of America respects the enormous development potential of this parcel by aligning the rail around the east and south perimeters of the parcel. This is clearly shown on Exhibit B. Moving the rail alignment away from 82nd Street provided for clear, unencumbered access for future development to the parcel from the north. It is expected that by 2030 this area of Bloomington will add 8,000 residents in 4,000 new households and be home to 35,000 jobs, all with direct access to Hiawatha LRT's three stations in east Bloomington.

EXHIBIT B: ACTION ALTERNATIVE - MALL OF AMERICA REALIGNMENT



TIMELINE TO ACCOMPLISH DESIGN/ROUTE CHANGES

- Environmental assessment – completed **May 2003**
- City of Bloomington approval – **June 2003**
- Corridor Management committee – **June 2003**
- Met Council Transportation Committee approval – **June 2003**
- FFGA Amendment approval – **June 9, 2003**
- Full Met Council approval – **June 11, 2003**
- Letter of no prejudice (LONP) approved **August 8, 2003**
- FTA approves enhanced alignment at Mall of America/ Bloomington – **July 2003**
- FTA determines the FFGA does not need to be amended. Federal 5307 formula funding approved of \$30 million. The total budget for the extension was \$37.75 million – **September 2003.**
- Land for embedded track into Mall of America and station land donated by MOA – **September 3, 2003**
- Station opened **December 4, 2004**

Summary

There were many champions supporting light rail, and a number of positive factors lined up sequentially which allowed the Hiawatha LRT project to move forward. The Hiawatha LRT project was designed and constructed within a timeframe that allowed the line to open early, in June 2004, with 12 stations fully functioning. The remaining five stations opened in December 2004, bringing the Hiawatha Light Rail system into full operation.

The construction and opening of Hiawatha on time and within budget was a success story. It was the strong partnership that was forged between the congressional offices, FTA, Metropolitan Council, Metro Transit, Mn/DOT, the state legislature, MAC and Hennepin County which gave the project the support and resources needed to build and open Hiawatha. Throughout the three-plus years of construction there was daily communication and coordination by Metro Transit, Mn/DOT, the Council, MAC and Hennepin County to ensure the timely completion of the line.

On June 26, 2004, Opening Day of the Hiawatha Light Rail Line, 250,000 residents of the Twin Cities attended the largest community celebration for the largest public works project in the state of Minnesota. Upon the opening of the line the customers were dazzled by the attractiveness of the cars and stations and the smooth and quiet ride. In December of 2005, one year after opening, the ridership projections were 65% higher than projected prior to startup. Hiawatha has proved to be the success story that planners anticipated. The success of the Hiawatha line is creating a demand for more rail vehicles and more park-and-ride lots. These issues along with others will be studied and addressed in the near future.

The Hiawatha Light Rail system has been embraced by commuters going to and from work, shoppers traveling to downtown Minneapolis and the Mall of America, travelers taking the train to and from the airport, sports fans riding to and from Twins and Vikings games, customers riding to community celebrations such as the Aquatennial and Holidazzle parades and, finally,

customers traveling to wherever Hiawatha Light Rail takes them. The Hiawatha Line, viewed by many as a community asset, has been and will continue to be used by residents of the entire metropolitan area. The Hiawatha Line serves the high traffic generators of downtown Minneapolis, the Mall of America and the Minneapolis-St. Paul International Airport.

The success of the Hiawatha Line has convinced this region that light rail is a popular transit choice. Building on the success of Hiawatha will most likely result in the building of future rail corridors in the Twin Cities.



Before & After Study

HIAWATHA LIGHT RAIL TRANSIT LINE



www.metrotransit.org