METRA UP-NW LINE

Cook, Lake, and McHenry Counties
Illinois

Alternatives Analysis Study

Locally Preferred Alternative Report

Document #9
Final Report
October 12, 2007

Prepared by

DMJM Harris

Documents submitted in association with the Metra UP-NW Alternatives Analysis:

1 *Work Plan*

2 *Purpose & Need*

3 *Initial Alternatives – Part I: Modes/Technologies*

4 *Evaluation Methodology*

5 *Initial Alternatives, Part I Screening and Part II: Conceptual Design*

6 *Screening of Initial Alternatives – Part II*

7 *Feasible Alternatives*

8 *Final Screening Results*

9 ***Locally Preferred Alternative Report***

Table of Contents

Locally Preferred Alternative Report

1.0 INTRODUCTION

1.1 Purpose and Organization

The purpose of this report is to describe the Locally Preferred Alternative (LPA). The LPA was selected based on evaluation measures derived from study goals. The project purpose and goals, initial alternatives, screening methodology, refined alternatives, and recommendations were all subject to review and comment by the Executive Steering Committee, the Technical Advisory Committee, interested agencies, and the public.

The report is organized as follows:

- In addition to the purpose and organization of this report, Section 1.0 provides study background including the study area, purpose and need for improvements, goals and objectives developed from the project purpose, and a summary of the methodology used to evaluate alternatives.
- Section 2.0 provides a summary of the process for this entire study including early definitions of alternatives and screening, description of feasible alternatives, and a summary of the final screening leading to selection of a recommended LPA.
- Section 3.0 documents public involvement for the study including Technical Advisory Committee meetings and public meetings.
- Section 4.0 provides a detailed description of the LPA including new infrastructure, proposed changes in operations, and requirements for additional locomotives and gallery cars.
- Section 5.0 includes the tentative implementation schedule (subject to approvals and availability of funding).
- Section 6.0 provides cost estimates for both the capital investment and operating and maintenance activities.
- Ridership projections are provided in Section 7.0 along with transportation system user benefits.
- Finally, next steps for implementation of the LPA are included in Section 8.0.

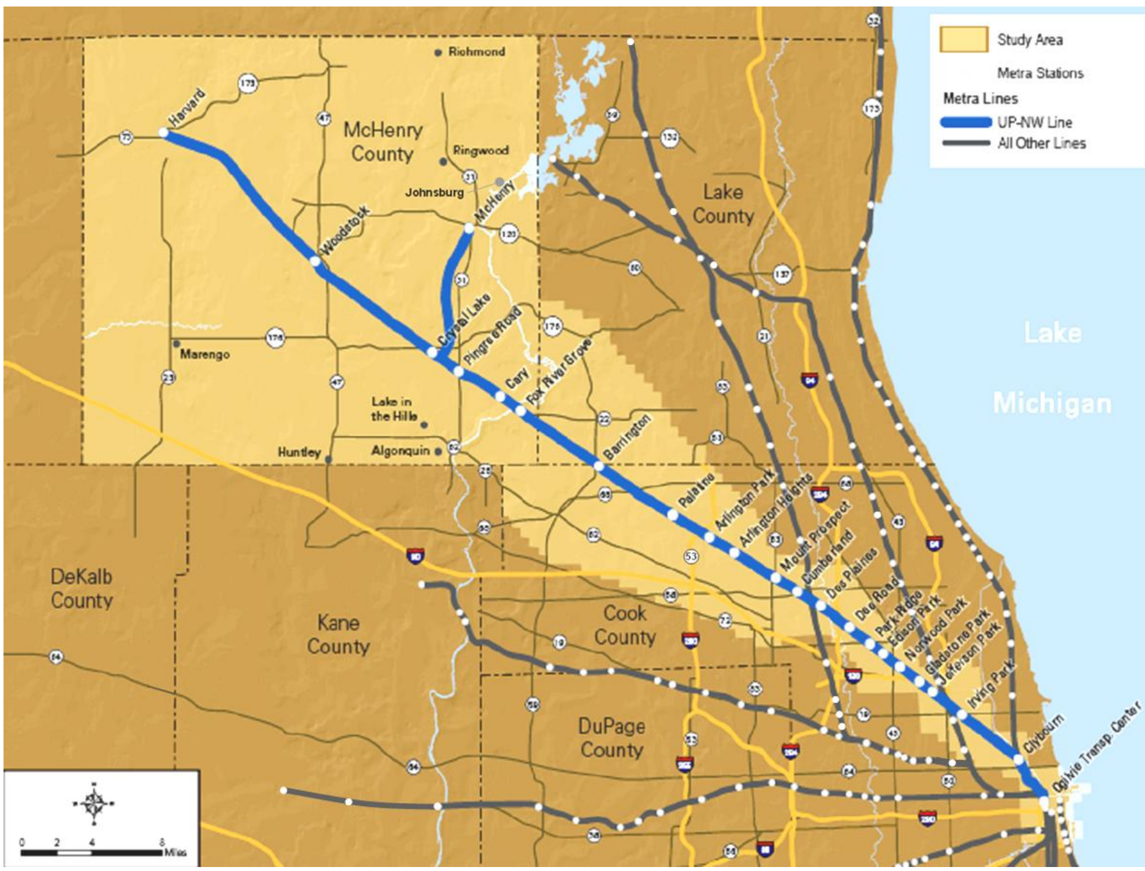
1.2 Background

Along the Union Pacific Northwest (UP-NW) Line, capacity is currently constrained on several fronts including rail capacity, rolling stock capacity, and commuter parking capacity. In order to identify, evaluate and ultimately select a preferred solution, Metra initiated an Alternatives Analysis. The goal of an Alternatives Analysis is to move from system-wide planning activities (where general needs have been identified) to a specific project providing a well-balanced solution to transportation problems in a specific corridor. The study area, study area needs, and project goals are presented below. In addition, a summary of the evaluation methodology used in this Alternatives Analysis has been included.

1.2.1 Study Area

The study area, shown in Figure 1-1, generally follows the UP-NW Line and includes all of McHenry County. The study area is located between the Milwaukee District West Line on the south and the North Central Service and Milwaukee District North Lines on the north. The study area includes the Chicago central business district (CBD).

Figure 1-1. Metra UP-NW Study Area



1.2.2 Purpose and Need for Improvements

The *Purpose and Need* document provides more in-depth discussion of the study area needs described below.

Travelers are facing ever-increasing congestion in reaching employment and educational resources within the corridor extending northwest from downtown Chicago.

The congestion creates different effects depending on mode and direction. For automobile users, the congestion in both directions results in higher delays, higher travel times, higher fuel consumption, and greater emissions. Interstate 90, the principal interstate serving the northwest suburbs, has volumes exceeding nominal capacity (indicating severe congestion and a level of service of "F") for 8 hours per day. The congestion problem is pressing even for reverse commuters.

For commuter rail users, congestion takes the form of crowded parking lots and crowded trains. Multiple commuter rail stations within the study corridor have parking utilization over ninety percent. When parking is unavailable, the tendency for the commuter is to choose journey to work by automobile. Many trains themselves are overcrowded. Even with up to eleven-car trains of gallery (double-decker) cars, some peak hour trains have standing room only.

For commuter rail users in the reverse commute direction, including those using other forms of transit at either end (or both ends) of their trip, there are two main needs. The first is increased frequency and decreased travel times. Currently, reverse commute trains are all local (i.e., no express trains) and are generally hourly. The second is efficient distribution from station areas to jobs and educational opportunities. Enhancing connections to existing and planned transit systems will be an important part of providing access to growing markets outside of Central Chicago.

Summary of Corridor Needs

- Access to jobs and educational opportunities
- Choice to avoid severe automobile congestion
- Increased transit supply to meet projected travel demand
- Continued support for transit-oriented development
- Solutions that avoid adverse impacts to the natural, cultural, and human environment, or when impacts are necessary, minimize such impacts
- Solutions with capital and operating costs within the local financial capability
- Leveraging of existing and planned transit systems in and connecting within the corridor

Physical constraints of the existing commuter rail system prevent further incremental improvements. Constraints include an antiquated signal system on portions of the line, and no signal system on the McHenry branch; single track on the McHenry branch; yards no longer positioned for the current and future demand; and yards constrained in downtown areas preventing expansion and preventing the running of longer (and higher capacity) trains. A significant investment is needed to add the capacity needed for current and future demand.

A project is needed to improve travel times, to address projected demand, and to provide greater choice to avoid severe congestion facing automobile traffic for the primary commute for residents in McHenry County and northwest Cook County suburbs to jobs in Central Chicago. The project should connect to and complement existing and planned transit systems within the northwest suburbs in order to leverage the area systems and increase the potential transit destinations for persons in the study corridor. The project should also support existing station-area development within the study corridor.

1.2.3 Goals and Objectives

Goals and objectives were developed from study area needs in order to create performance measures against which alternatives were compared. Table 1-1 summarizes the goals and specific, measurable objectives for that goal.

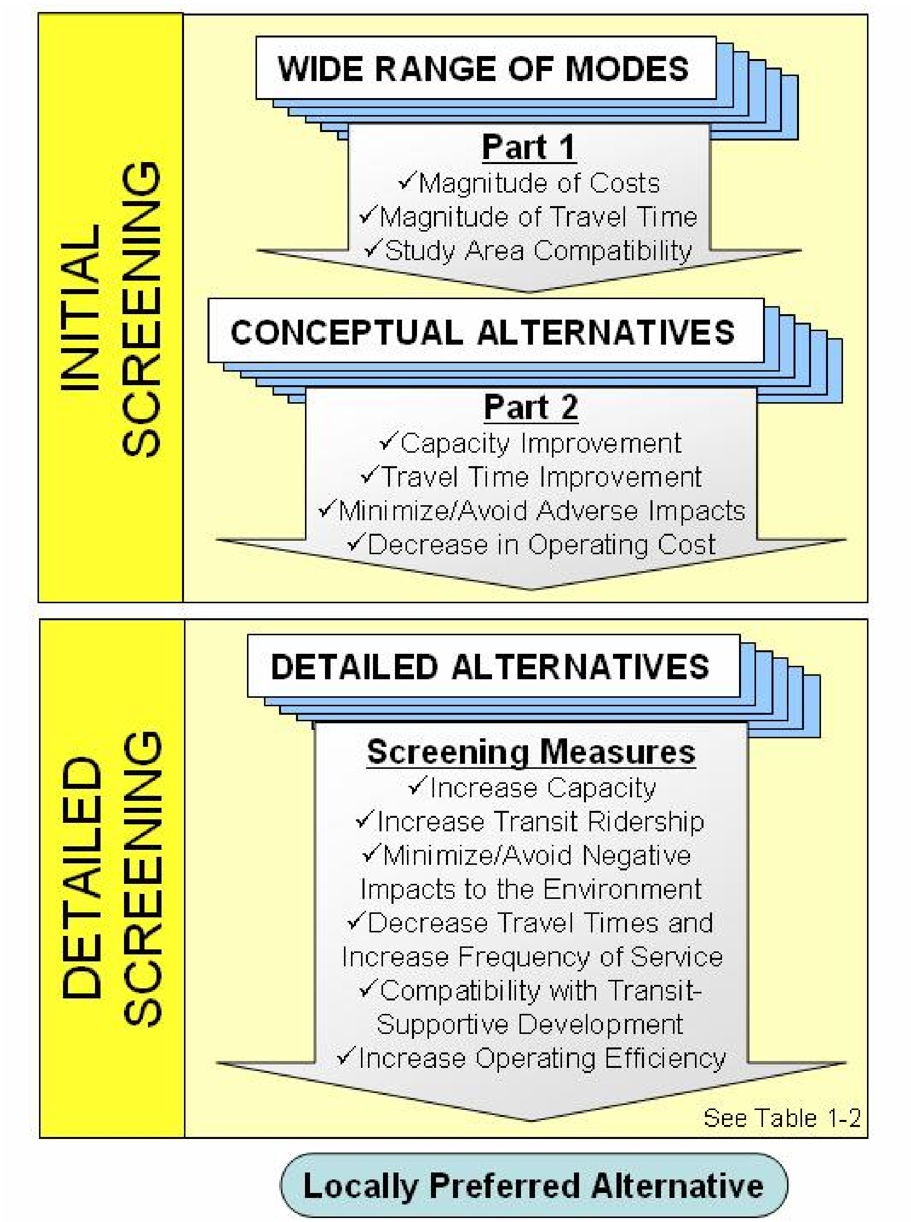
Table 1-1. Goals and Objectives

Goals	Objectives
Increase capacity to Central Chicago	Increase frequency in peak hours
	Increase total available seats in peak hours
	Increase availability of commuter parking or improve distribution of available parking
	Increase non-automobile access from home to station
	Increase access to employment (for the reverse commute movement)
Increase transit ridership	Increase the number of trips made by transit to Central Chicago
Decrease travel times and increase frequency of service, including the reverse commute direction, to increase competitiveness with automobile travel	Decrease average travel time
	Increase frequency of transit service to and from Central Chicago in peak hours
	Decrease travel time for the reverse commute movement
	Increase competitiveness with automobile travel
Avoidance or minimization of negative impacts to the environment	Decrease fuel consumption in the system
	Decrease emissions in the system
	Accomplish project within acceptable impacts to the natural, cultural, and social environment
Provide compatibility with transit-supportive development including increased station-area employment	Compatibility with existing and proposed land use plans
	Compatibility with transit-supportive land use
	Economic Development
Increase operating efficiency	Decrease operating cost
Be constructed, maintained and operated within the local financial capacity	Reasonable initial construction cost
	Reasonable annualized cost

1.2.4 Evaluation Methodology

Early in the study process, a methodology was developed to provide systematic screening steps for evaluation of potential solutions to transportation problems identified in the study area. Near the beginning of the study process, alternatives were described in general terms. Screening measures used broad categories with readily available data. Toward the end of the study process, alternatives were described with detailed components and screening measures using a combination of quantitative and qualitative criteria. Figure 1-2 depicts the overall flow of the evaluation methodology.

Figure 1-2. Evaluation Methodology Flow Chart



In the detailed screening, the objective was to determine which alternative provided good solutions meeting the purpose of the project in solving transportation problems in the study area. The alternative must provide a good balance in both measurement against technical criteria and acceptability by the public and stakeholders in the study area. Table 1-2 shows specific evaluation measures used in the detailed screening step of the study. Evaluation measures are shown with their corresponding objectives.

Table 1-2. Evaluation Measures for Detailed Screening

Goals	Objectives	Evaluation Measure
Increase capacity to Central Chicago	Increase frequency of transit trips in peak hours	▪ Number of transit trips in peak hours
	Increase total available seats in peak hours	▪ Number of seats available in peak hours
	Increase availability of parking or improve distribution of available parking	▪ Total available parking spaces for transit use ▪ Projected volume-over-capacity ratio for parking
	Increase non-automobile access from home to station	▪ Projected number of passengers with a non-auto mode of access
Increase transit ridership	Increase the number of trips made by transit to Central Chicago	▪ Projected ridership
Minimize negative impacts to the environment	Decrease fuel consumption in the system	▪ Fuel consumption (from model output)
	Decrease emissions in the system	▪ Tons of emissions (from model output)
	Accomplish project within acceptable impacts to the natural, cultural, and social environment	▪ Measures will correspond to commonly accepted measures for the affected environment[1]

[1] For instance, acres of wetland impacts, number of displacements, number of historic properties within the area of potential effect.

Table 1-2. Evaluation Measures for Detailed Screening (Continued)

Goals	Objectives	Evaluation Measures
Decrease travel times and increase frequency of service, including the reverse commute direction, to increase competitiveness with automobile travel	Decrease average travel time	▪ Average travel time for commuters in the peak hours (or travel times of two representative inbound trips) ▪ Transportation User Benefits (from model output)
	Increase frequency of transit service to and from Central Chicago in peak hours	▪ Average headway
	Increase access to employment (for the reverse commute movement)	▪ Projected number of passengers using the reverse commute movements
	Decrease travel time for the reverse commute movement	▪ Average travel time for commuters using the reverse commute movement (or travel times of two representative outbound trips to major employment locations)
	Increase competitiveness with automobile travel	▪ Difference between average travel time by automobile and average travel time by transit (or difference between travel times for two representative trips in the corridor) ▪ Qualitative indication of reliability based on existing data
Provide compatibility with transit-supportive development including increased station-area employment	Compatibility with existing and proposed land use plans	▪ Compatibility with existing and proposed land use plans
	Compatibility with transit-supportive land use	▪ Degree to which alternative contributes to concentrating development in close proximity to stations
	Economic Development	▪ Degree to which alternative contributes to (or supports) economic development
Increase operating effectiveness and efficiency	Decrease operating cost	▪ Operating cost per passenger mile and per vehicle mile

2.0 SUMMARY OF ALTERNATIVES ANALYSIS

This Alternatives Analysis study began with a wide range of alternatives including transit and highway options. Earlier screening (per the *Evaluation Methodology*) reduced this wide range of alternatives to three feasible alternatives: No-Build, Commuter Rail, and Commuter Bus to the Northwest Suburbs. In accord with Federal Transit Administration (FTA) guidance and with their concurrence, Transportation System Management (TSM) as a baseline was not carried into the final screening since any incremental improvements provided by the TSM options did not make technical sense. More detail on each step in the Alternatives Analysis process for this project is provided below.

Public involvement has been included throughout this study including Technical Advisory Committee meetings; project updates and meetings with mayors, interested business owners, and Pace; public meetings; Steering Committee meetings; and the Metra Connects website. Advisory Committee and public comments have been incorporated at each step in this study.

2.1 Definition and Screening of Initial Alternatives, Part I

After identification of needs within the study area, initial alternatives were developed. At the onset of the study, the initial alternatives were simply a wide range of available modes and technologies. The first part of initial screening compared the characteristics of these modes against study area needs in order to quickly focus on those modes most likely to reasonably and effectively address study area needs. Characteristics of modes included capacity, average speed, typical headways, station spacing, and costs.

The word “mode” was used broadly in this study to describe the types of guideway and vehicle categories considered for passenger travel. Details distinguishing various methods of guidance or propulsion and details regarding type of fuel within the mode classification were not considered in this early stage. For purposes of this Alternatives Analysis, the specific propulsion systems and sub-categories of technologies were grouped together under the main modal categories.

Modes were generally grouped within the following four categories: rail modes, rubber-tire modes, other fixed guideway modes, and highway modes. Modes within these categories are summarized below.

<u>Rail Modes</u>

This category includes modes which use traditional rail technologies. Rail rights-of-way and guideways can be above grade on elevated structures or embankments, below grade in tunnels or open “cuts,” or at-grade at street level. The rail guideways can be located in dedicated rights-of-way or they can share the street with other vehicular traffic and pedestrians. Depending on mode and function, station spacing for these systems can be as close as ¼ to ½ mile in the city and one to five miles in the farther suburbs. Rail propulsion systems generally use diesel engines on board the vehicle or electric motors powered by electricity delivered from a distant generating location and distributed by wires or a third rail. Hybrid engines, combining diesel and electric power on board the vehicle, are now emerging in propulsion systems for transit use. Rail modes range from those technologies traveling at high speeds on the rails to those operating more slowly in mixed traffic. Rail modes include:

- Commuter rail – typically serving long-distance (15 to 100 miles) work trips from outlying suburbs to large central cities with locomotive-hauled trains or self-propelled cars, normally operating on pre-existing freight railroad tracks or alignments.

- Intercity Rail – connecting cities using a network of pre-existing freight railroad tracks.

- High speed rail – typically competing with commuter air service, serving cities approximately 150 to 300 miles apart with speeds from 79 to over 120 miles per hour in the USA.

- Heavy rail rapid transit (sometimes called rail rapid transit or just rapid transit) – uses rail cars operating in an exclusive right-of-way with complete physical separation from other traffic, typically electrically powered by a high-voltage "third rail" adjacent to the track.

- Light rail transit (LRT) – operates as single cars or short trains (two to four cars), often in dedicated alignments, either on-street or in a separate right-of-way, typically drawing power from an overhead electric wire known as an overhead contact system.

- Modern streetcar – uses light rail transit technology in a street-operating environment typically providing frequent stops in or near the central business district.

<u>Rubber-Tire Modes</u>

Similar to the range of rail modes, rubber-tire alternatives can travel at higher speeds or lower speeds, operate in dedicated travelways or in mixed traffic, and can use different propulsion systems. Modes in this category include:

- Commuter bus – operating over longer distances with only a few stops, typically traveling on freeways from suburban park-and-ride lots to the central business district.

- Local bus – typically sharing general purpose lanes with other vehicles and making frequent stops to pick up and drop off passengers.

- Bus Rapid Transit (BRT) – characterized as an at-grade transit service with similar operating characteristics to a rail rapid transit system, including stations spaced at ½-mile to one-mile intervals, off-board fare collection, and boarding and alighting from several doors at once.

<u>Other Fixed Guideway Modes</u>

Several other technologies with transit applications either do not ride on steel rails or rubber tires, or have so many variations for the guideway that categorization as either a rail vehicle or a bus vehicle would be difficult. This category includes some emerging technologies.

- Magnetic levitation (maglev) – a fixed guideway technology that uses the magnetic effects of electrical current to lift and propel a vehicle along a guideway, rather than rely on traditional wheels for support, guidance and propulsion.

- Automated Guideway Transit (AGT) – automated operation and complete grade separation allow high-frequency and uninterrupted service. AGT encompasses a wide range of guideway configurations beyond traditional rail. Monorail is one subset of AGT and is sometimes evaluated as a separate mode from AGT.

- Personal Rapid Transit (PRT) and Group Rapid Transit (GRT) – specialized subsets of AGT characterized by small vehicles operating on a network of guideways in response to individual or group requests for service, allowing direct point-to-point transportation with no intermediate stops.

Highway Modes

Since some needs within the study corridor are related to highway congestion, the range of modes may also include highway capacity improvements. These capacity improvements generally take three forms: adding general use lanes, adding lanes for high-occupancy vehicles, and congestion management tolling.

Initial screening of these modes and technologies used three initial measures:

- Cost Order of Magnitude (based on recent U.S. projects)
  - This measure of effectiveness directly relates to the ability of a proposed alternative to be constructed within local financial capacity.
- Travel Time Order of Magnitude (based on U.S. projects)
  - This measure of effectiveness directly relates to a key project purpose: to decrease travel time, including travel time for the reverse commute.
- Mode compatible with Study Area
  - This measure examines station spacing, capacity of mode compared with demand from previous studies, and compatibility issues (such as winter-weather compatibility).

The main travel demand pattern in the study area is from suburban centers to the Chicago CBD. These suburban centers are spaced, on average, 2 to 5 miles apart. Key transportation problems in the study area include very high levels of congestion and congestion-related delay on expressways and major arterials within the study area. Some demand is present for reverse commuter movements. Total travel demand ranges in the tens of thousands of commuters per day. Modes must be compatible with these study area characteristics and needs.

Based on these basic study area needs and characteristics, several modes were eliminated from further study as they were not appropriate for the study area and do not address the purpose and need for this project. The modes inappropriate to address study area needs are listed below along with a brief explanation.

Intercity Rail – Intercity rail, such as Amtrak service, is appropriate for connecting major cities across states, even linking cities across a continent. The station spacing for intercity rail is not appropriate to address study area needs.

High Speed Rail – High speed service, such as Acela Express service connecting Boston and Washington, D.C., also has station spacing that is not appropriate to address study area needs.

Streetcar – With typical station spacing less than one quarter mile and travel speeds averaging ten miles per hour, streetcar service would not be appropriate for a 63-mile long study area with a need to move thousands of passengers to Central Chicago in a timely manner.

Local Bus – Local bus service is currently in operation in the study area. Many Pace routes act as feeders to Metra stations. Local bus service will continue to be part of the transit solution in the study area, but local bus service, similar to streetcar service, is not appropriate for the movement of passengers from suburban centers to Central Chicago.

Maglev – No maglev service is currently in revenue service in North America. Station spacing of 20 to 50 miles, similar to high speed rail, is not appropriate to address study area needs.

Personal Rapid Transit – Since a system is needed to move thousands of commuters per day, vehicle capacity of Personal Rapid Transit (PRT), only 4 to 10 passengers per vehicle, does not match study area needs.

Initial evaluation Used order of magnitude cost and travel time data as described in the *Evaluation Methodology* since these calculations do not require the development of specific alignments. Travel times were calculated from the average speeds. Table 2-1 provides a summary of initial costs per mile and the range of expected travel times. For the modes that do not exist currently in the corridor – Light Rail Transit (LRT), Bus Rapid Transit (BRT), and Automated Guideway Transit (AGT) – the initial cost calculation is based on the existing length of the commuter rail line to Harvard. For rapid transit, the initial cost is based on an assumption that a portion of the existing rapid transit system in the corridor – the O'Hare branch of the Chicago Transit Authority (CTA) Blue Line – would be utilized in order to reduce infrastructure costs. Options were compared against commuter rail because commuter rail already exists in the corridor and because previous studies identified the range of commuter rail capital cost.

Table 2-1. Cost and Travel Time Comparison of Modes

Mode	Range of Unit Costs	Range of Cost	Range of Travel Time[1]	Recommendation
Commuter Rail	See footnote[2]	$240 M to $350 M	1:01 – 1:29	Carry forward for further evaluation.
Heavy Rail Rapid Transit	$100M to $200M per mile[3]	$5,000 M to $10,000 M	1:30 – 2:00	Since Heavy Rail Rapid Transit (HRT) requires a new right-of-way and grade separation, the cost would be 20 to 25 times that of commuter rail. No savings in travel time is provided. HRT is **not recommended** for further study.

[1] Based on travel from Crystal Lake and Harvard to Ogilvie Transportation Center.

[2] Since previous studies in the corridor provide cost estimates for commuter rail service expansion, these estimates will be used rather than average national costs. The range of cost includes rolling stock.

[3] The average cost per mile for Rapid Transit assumes mainly at-grade and elevated sections. Below grade sections would raise the cost per mile.

Table 2-1. Cost and Travel Time Comparison of Modes (Continued)

Mode	Range of Unit Costs	Range of Cost	Range of Travel Time	Recommendation
Light Rail Transit (LRT)	$28M to $100M per mile	$1,800 M to $6,600 M	2:30 – 3:00	Since LRT requires a new right-of-way, the cost would be 8 to 15 times the cost of commuter rail. Travel times would approximately double. LRT is **not recommended** for further study.
Commuter Bus on existing highway network	$300,000 to $500,000 per vehicle[4]	$50 M to $200 M	Travel times similar to current highway peak hour travel	Carry forward for further evaluation. The cost would vary widely based on the availability of existing highway infrastructure and the number of vehicles required.
Commuter Bus with intermediate stops	$300,000 to $500,000 per vehicle	$50 M to $200 M	Similar to highway travel times	Carry forward for further evaluation. Intermediate stops would potentially address suburb-to-suburb travel.
Commuter Bus in HOV Lanes	Vehicle costs as above plus highway improvements	$700 M to $2,400 M	Travel times similar to Commuter Rail	Since the cost would be 3 to 5 times the cost of commuter rail without savings in travel time, commuter bus in dedicated lanes is **not recommended** for further study.
Bus Rapid Transit (BRT)	$1M to $85M per mile plus $1M per vehicle	$90 M to $5,500 M	2:30 – 3:30	BRT travel times would be 2 to 3 times those of commuter rail. For this project, BRT is **not recommended** for further study.
Automated Guideway Transit (AGT)	$90M to $300M per mile	$5,600 M to $19,000 M	Varies by specific technology	With some AGT technologies, AGT travel times may be comparable with commuter rail. However, since the cost would be 20 to 40 times greater (or more), AGT is **not recommended** for further study.
Highway Capacity Improvements	$2M to $15M per lane mile	$700 M to $2,200 M	Travel times would be improved over existing conditions.	Since the cost would be 3 to 5 times greater than commuter rail, highway capacity improvements are **not recommended** for further study.

[4] Based on projected demand forecasts, capacity for over 5,000 additional riders may be required by 2020. For this increase, over 140 vehicles would be required for a commuter bus system in this corridor. Cost per vehicle does not include maintenance facilities, station improvements, or roadway infrastructure improvements.

Following order-of-magnitude comparison, two modes remained which may have potential to address transportation needs in the corridor. Commuter rail offers the lowest travel time and can be implemented within the local financial capacity.[5] Two configurations of commuter bus may also have potential to address transportation needs in the corridor. Commuter bus, using existing highway infrastructure, has the potential for initial cost less than commuter rail although travel times in peak hours will be greater than commuter rail. Commuter bus with intermediate stops also has the potential for lower initial cost. Both options for commuter bus could service demand situated away from existing Metra UP-NW Line stations. Huntley and Marengo are examples of communities with growing population located away from existing stations. Schaumburg is an example of an employment center located away from existing Metra UP-NW Line stations. In the next step, these alternatives were developed in further detail.

Table 2-2 provides a summary of results of part 1 of the initial screening.

Table 2-2. Summary of Initial Screening, Part 1

Mode	Recommendation	Rationale
Commuter Rail	**Retain for further evaluation**	Comparatively low cost and good travel times
Intercity Rail	Drop from further study	Not compatible with study area needs
High Speed Rail	Drop from further study	Not compatible with study area needs
Heavy Rail Rapid Transit	Drop from further study	Very high initial cost without improvement in travel times
Light Rail Transit	Drop from further study	High initial cost with significantly worse travel times
Streetcar	Drop from further study	Not compatible with study area needs
Commuter Bus using existing infrastructure	**Retain for further evaluation**	More detail required to compare costs, travel times, and study area impacts
Commuter Bus with intermediate stops	**Retain for further evaluation**	More detail required to compare costs, travel times, and study area impacts
Commuter Bus using dedicated lanes	Drop from further study	High initial cost without improvement in travel times
Local Bus	Drop from further study	Not compatible with study area needs although will be part of an overall solution to the study area needs
Bus Rapid Transit	Drop from further study	Significantly longer travel times, potentially high initial cost, and station spacing not compatible with land use and study area needs
Magnetic Levitation	Drop from further study	Not compatible with study area needs
Automated Guideway Transit	Drop from further study	Very high initial cost without significant improvement in travel times
Personal Rapid Transit	Drop from further study	Not compatible with study area needs
Highway Capacity Improvements	Drop from further study	High initial cost without significant improvement in transit travel times

[5] The average annual capital program size for the Regional Transportation Authority from 2000 to 2004 was approximately $950 million. This figure was used as a reference point for local financial capacity.

2.2 Definition and Screening of Initial Alternatives, Part II

A summary of conceptual alternatives is presented below. For further detail on the conceptual alternatives evaluated, please refer to *Initial Alternatives, Part I Screening and Part II: Conceptual Design*. Conceptual alternatives are systems addressing infrastructure capacity, commuter parking capacity, travel times, schedules, yards, stations, signals, intelligent transportation systems (ITS), and station area amenities. The conceptual alternatives have the potential to effectively address project goals, including an increase in capacity and a decrease in travel time.

The conceptual alternatives included:

- **No-Build** – No changes would be made other than those already included in the long range plan. Normal replacement cycles for old cars and locomotives, and normal track maintenance would continue. This alternative does not improve capacity or travel time, nor does it remove existing impacts in Barrington, Crystal Lake, or McHenry.

- **Transportation System Management (TSM)** – The best improvement that could be made without a major capital investment would be to combine the Barrington and Crystal Lake yards into a single new yard (northwest of Woodstock) which allows staging of longer trains. The same schedule and train runs would be used, but some of the runs—now limited in length (i.e., number of cars) by the configuration and location of yards—would be expanded to 10-car trains. The TSM alternative would provide additional seats in peak periods. Parking capacity would not increase beyond planned expansion at Pingree Road.

- **Commuter Rail Alternative** – A complete system of new yards, new stations, additional commuter parking, additional train runs, additional rolling stock, expanded express service, expanded reverse commute service, and employer shuttles. The Commuter Rail Alternative would provide a substantial increase in capacity in peak periods and would provide reduced travel times.

- **Commuter Bus to Central Chicago** – This alternative primarily serves the southern portion of McHenry County which is furthest from Metra stations and closest to I-90. Travel time may be saved by placing boarding points closer to housing and running buses directly to key employment concentrations in the Chicago CBD. Transit capacity in the UP-NW corridor would increase with this alternative.

- **Commuter Bus to Northwest Suburbs** – This alternative recognizes travel demand from McHenry County to destinations in Cook County besides Central Chicago, primarily the employment concentrations in Schaumburg, Rolling Meadows, and Hoffman Estates. This alternative would serve a segment of commuters not currently riding Metra. Transit capacity in the UP-NW corridor would increase with this alternative.

Based on the steps outlined in the *Evaluation Methodology*, conceptual alternatives were evaluated using four measures of effectiveness. The eventual alternative to be implemented – a unified system of improvements – must provide a level of capacity improvement to accommodate projected growth. Incremental improvements can no longer provide the capacity needed or the overall system user benefits desired for the study corridor.

The legend for the following summary table (Table 2-3) is as follows:

- **Capacity Improvement**
  - ● Conceptual alternative has capability to add capacity in the range of demand needed in the future.
  - ⦿ Conceptual alternative adds only incremental capacity.
  - ○ Conceptual alternative does not add capacity.
- **Travel Time Improvement**
  - ● Conceptual alternative has capability to significantly decrease system travel time.
  - ⦿ Conceptual alternative only incrementally decreases travel time.
  - ○ Conceptual alternative does not contribute toward decreased travel time.
  - – Conceptual alternative may add travel time.
- **Minimization of Adverse Impacts**
  - ● Conceptual alternative has no apparent adverse impacts.
  - ⦿ Conceptual alternative may have minor adverse impacts.
  - ○ Conceptual alternative may have substantial impacts.
- **Decrease in Operational Cost**
  - ● Conceptual alternative has potential to decrease operational costs.
  - ⦿ Conceptual alternative may provide minor decrease.
  - ○ Conceptual alternative does not directly affect operational costs or may produce marginal changes.
  - – Conceptual alternative would likely increase operational costs.

Table 2-3. Initial Screening – Conceptual Alternatives Summary Matrix

Conceptual Alternative	Capacity Improvement	Travel Time Improvement	Minimization of Adverse Impacts	Decrease in Operating Cost	Carry Forward
No Build	○	○	○	○	Required
TSM	⦿	○	⦿	⦿	Potential Baseline
Commuter Rail	●	⦿	⦿	⦿	Yes
Commuter Bus to Chicago CBD	⦿/○	○/–	⦿	–	No
Commuter Bus to Northwest Suburbs	⦿	○/–	⦿	–	Yes

Note: Decrease in operating cost was estimated on a per passenger basis.

Table 2-3 shows the recommendation to drop further study of commuter bus to the Chicago CBD but retain commuter bus to employment concentrations in the northwest suburbs. Service to the Chicago CBD duplicates existing commuter rail service but with longer travel times and higher operational costs. Service to the northwest suburbs does not duplicate existing service although commuter rail with employer shuttles could potentially provide this service. Further study will be required to determine potential ridership and operating costs.

2.3 Definition of Feasible Alternatives

As stated above, three feasible alternatives (plus the No-Build Alternative) remained at this point in this Alternatives Analysis. Those conceptual alternatives which were recommended for further development included:

- No-Build
- Transportation Systems Management (TSM) – potentially the Baseline Alternative
- Commuter Rail Expansion and Extension
- Commuter Bus to Northwest Suburbs

Before developing detail for the TSM Alternative, the effectiveness of the TSM Alternative as the New Starts Baseline Alternative was examined. The New Starts Baseline Alternative, per Federal Transit Administration guidance, should represent the "best that can be done" to improve transit service in the corridor without major capital investment in new infrastructure. Without a major capital investment, the TSM Alternative would only address one of many needs within the corridor, that of capacity. The TSM Alternative would only add approximately two percent to the existing capacity since the ability to add rolling stock is limited by a number of other capacity constraints along the UP-NW Line.

The small capacity increase attainable with this TSM Alternative along with similar poor measures of effectiveness for potential TSM alternatives examined earlier in the Alternatives Analysis process indicated that a TSM alternative would not perform significantly better than the No-Build Alternative. After coordination with the Federal Transit Administration, the No-Build Alternative was recommended as the New Starts Baseline Alternative. With this concurrence, the TSM Alternative was <u>not</u> carried forward in the Alternatives Analysis process for further examination in the final screening.

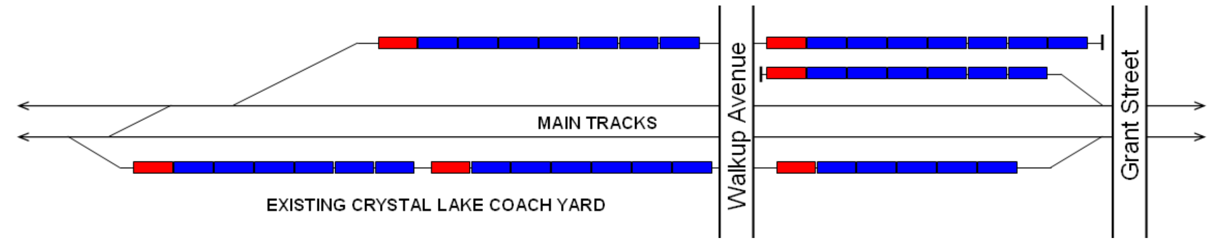
This section provides a summary overview of the remaining alternatives. For more detail on the feasible alternatives including infrastructure, rolling stock, fare policies, and additional stations, refer to document 7 in this study, *Feasible Alternatives*.

2.3.1 No-Build Alternative

With the No-Build Alternative, no changes would be made other than those already committed in the long-range plan. Committed projects impacting capacity include the Rand Road Traffic Signal Priority (TSP) project for Pace, Open Road Tolling on the Illinois State Toll Highway facilities, and several park-and-ride lots for the Ride Share program. All existing services and facilities would be maintained in the No-Build. Normal rehabilitation and replacement cycles for old cars and locomotives would continue. Regular track and structure maintenance would also continue (including rail grinding, tie replacement, and ballast work). Existing transportation policies and existing transit strategies would be continued in the corridor.

The No-Build Alternative does not improve capacity or travel time, and this alternative does not remove existing impacts due to configuration of yards or the presence of downtown yards in Crystal Lake or McHenry. The configuration of yards in downtown areas, as show in Figure 2-1, contributes to capacity constraints and yard inefficiencies. The No-Build Alternative does include expanded parking at the new Pingree Road station as provided in the station area master plan.

Figure 2-1. Schematic of Existing Crystal Lake Coach Yard



This is a schematic (not to scale) of the existing Crystal Lake Coach Yard. Train lengths and number of trains are limited by the existing yard configuration. Storage tracks on either side of the main line tracks cause operating inefficiencies.

2.3.2 Commuter Rail Capacity Expansion and Extension

The Commuter Rail Alternative would provide expanded reverse-commute service, increased capacity, and improved travel times.

The Commuter Rail Alternative would include a complete system of new yards, three new stations, additional commuter parking, additional train runs, additional rolling stock, expanded express service, expanded reverse-commute service, and employer shuttles. This alternative provides a substantial increase in capacity during peak periods both for inbound passengers and reverse-commute patrons. This alternative also provides improved travel times for many existing commuter rail patrons as well as future riders. Employer shuttles will provide the link from stations to major employers for both inbound and outbound commuters to the Northwest suburbs. Relocated yards will allow sufficient room to stage longer trains and provide a more efficient layout for improved operations including cleaning and inspection of rolling stock.

In the morning peak period, seven additional inbound trains and four additional outbound trains are proposed. Average headway would be reduced from 11 minutes to 7.5 minutes in the peak. With both added train runs and added gallery cars, the capacity in peak hours would increase by 63 percent.

To serve the growing number of households in McHenry County and in order to provide additional parking for commuter rail customers, new stations are proposed in Johnsburg, Prairie Grove, and Ridgefield. New coach yards (with cleaning and inspection facilities) are proposed in Johnsburg (near the end of the McHenry Branch) and northwest of Woodstock (along the UP-NW main line).

2.3.3 Commuter Bus to Northwest Suburbs

This alternative combines the existing Metra UP-NW service with new commuter bus service in order to address the needs within the study area. The added commuter bus service primarily addresses growth in the southern portions of McHenry County which are furthest from Metra stations and closest to I-90. This alternative recognizes travel demand from McHenry County to destinations in Cook County besides Central Chicago, primarily the employment concentrations in Schaumburg, Rolling Meadows, and the O'Hare vicinity. This alternative would serve a segment of commuters not currently riding Metra. Using Pace's new commuter equipment (accommodating up to 70 passengers per vehicle), transit capacity would increase in the corridor by 22 percent.

Two boarding locations are proposed along Randall Road to serve the southern tier of McHenry County. Boarding locations could include boarding platforms with shelter, parking, and passenger drop-off areas. Seven destination locations are proposed including connection with the Northwest Transportation Center in Schaumburg and connection with the CTA Blue Line station in Rosemont.

Commuter buses would travel on existing highway facilities. No corridor-wide dedicated lanes, HOV lanes, or dedicated shoulders are proposed. Transit priority measures (such as signal priority or a queue jumping lane) may be implemented at specific locations along the routes where severe congestion is impacting travel time.

The proposed schedule includes departures every five minutes in peak hours between 6:00 and 8:30 AM for the morning inbound service and between 4:00 and 6:30 PM for the afternoon outbound service. Midday service would include departures in both directions every 30 minutes. Fifty-five commuter coach buses with seating for seventy passengers would be required.

Fares would reflect Pace commuter (express) bus fares, currently $3 per ride. Driver inspection and/or validation would likely be the collection method, although electronic collection is feasible.

2.4 Detailed/Final Screening

This section provides the quantitative and qualitative summary of evaluation for the remaining three feasible alternatives. Quantitative measures are shown using appropriate units (such as capacity measured in number of seats or travel time measured in minutes). Qualitative measures are indicated with "+" meaning comparatively better, "–" meaning comparatively worse, and "○" meaning neither better nor worse. Summaries then are shown for each project goal followed by an overall summary of the goals. Individual quantitative measures in bold font indicate key differences for decision making.

2.4.1 Goal 1: Increase Transit Capacity

A key goal in meeting the project purpose and need was improvement of capacity on the UP-NW Line. Existing capacity is constrained by the number of train runs, by the number of cars in the existing train runs, and by existing parking and location of parking. The evaluation criteria for this goal measure improvements to these constrained features. All information is projected for 2030 based on details of the alternative or regional modeling of the alternative.

Table 2-4. Transit Capacity Evaluation Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Number of transit trips in peak hours	19,384	**23,663**	19,462
Capacity (seats) in peak hours	17,980	31,610	22,320
Available parking spaces for transit use	11,074	12,674	13,874
Overall demand-to-capacity ratio for parking	135%	139%	108%
Projected number of passengers with a non-auto mode of access	30.0%	29.0%	29.7%
Goal 1 Summary	○	+	○/+

While both build alternatives provide over twenty percent increase in capacity, only the Commuter Rail Alternative significantly increases transit trips. The Commuter Rail Alternative shows a twenty-two percent increase in transit trips while the Commuter Bus Alternative shows less than one percent increase in transit trips.

Mode of access for the Commuter Bus Alternative is decidedly skewed toward automobile access. The Commuter Bus Alternative established new boarding locations in suburban areas which have an automobile-dependent development pattern. The Commuter Rail Alternative supports non-motorized access from existing and developing housing in station areas.

2.4.2 Goal 2: Increase Transit Ridership

The first goal was to increase transit capacity. This goal examined projected use of that increased capacity. The project ridership is for 2030 and is based on regional modeling of each alternative.

Table 2-5. Transit Ridership Evaluation Measure

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Projected ridership (AM boardings)	19,384	23,663	19,059 Metra + 403 Commuter Bus = 19,462
Goal 2 Summary	○	+	○

Only the Commuter Rail Alternative significantly addressed the goal of increased transit ridership. Increased ridership is directly related to travel time savings provided by Commuter Rail compared to highway travel. Projected 2030 ridership on the Commuter Bus Alternative – 403 passengers – indicates this alternative should not be studied further.

2.4.3 Goal 3: Minimize (or Avoid) Negative Impacts to the Environment

Impacts to the environment were examined only at a screening level. Two categories of impacts were considered. The first involves regional measures such as air quality and energy use. The second category involved localized impacts of new stations, parking, yards, or other features of build alternatives. The regional measures were examined qualitatively based on modeling results. The Commuter Rail Alternative provided a lower level of negative regional impacts since thousands of trips are removed from automobiles and made instead on Metra. The Commuter Bus Alternative did not provide this sort of reduction. Sixty-two buses would be added to the highways in the corridor during peak hours.

Local impacts were investigated using readily available data on wetlands, endangered species, historic buildings, and other environmental categories.

Table 2-6. Environmental Evaluation Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Fuel consumption	○	+	–
Tons of emissions	○	+	–
Environmental Impacts	○	○	○
Goal 3 Summary	○	+	–

Compared to the No-Build Alternative, the Commuter Rail Alternative reduces vehicular fuel consumption and reduces related emissions. Because of low ridership on the Commuter Bus Alternative, the Commuter Bus Alternative does not reduce fuel consumption or related emissions.

The No-Build Alternative does not remove the impacts of downtown yards in Crystal Lake or McHenry. The Commuter Rail Alternative removes these downtown impacts but creates potential impacts to wetlands at the new yard locations. The parking areas for the Commuter Bus Alternative could create potential impacts especially related to stormwater management.

2.4.4 Goal 4: Decrease Travel Time

In addition to providing capacity for the growing demand, a key goal of this project is to decrease travel time for commuters. Travel time savings was evaluated for traditional commute movements to Central Chicago, intermediate commute movements to employment destinations in the Northwest Suburbs, and reverse-commute movements.

Table 2-7. Travel Time Evaluation Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Average travel time for commuters in the peak hours (travel times of two representative inbound trips)			
o First and Clay Streets in Woodstock to 233 South Wacker Drive in Chicago	93 minutes (minimum) 2 scheduled times	90 minutes (minimum) 5 scheduled times	N/A
o Lancaster Court in Crystal Lake to Continental Towers (Golf Road and South New Wilke) in Rolling Meadows	91 minutes (minimum) 3 scheduled times	70 minutes (average) 56 minutes (min.) 4 scheduled times	60 minutes 6 scheduled times
Transportation User Benefits (from model output)	-	**8,599 hours per weekday**	41 hours per weekday
Average headway	11 minutes	7.5 minutes	5 minutes
Projected number of passengers using the reverse-commute movements (boarding at Ogilvie Transportation Center or Clybourn)	767	1,016	N/A
Average travel time for commuters using the reverse-commute movement (travel times of two representative outbound trips to major employment locations)			
o Ogilvie Transportation Center to Continental Towers in Rolling Meadows	75 minutes (minimum) 2 scheduled times	58 minutes (minimum) 3 scheduled times	N/A
o Ogilvie Transportation Center to Crystal Lake Municipal Complex in Crystal Lake	88 minutes 1 scheduled time	91 minutes 1 scheduled time	N/A
Difference between average travel time by automobile and average travel time by transit (Woodstock to South Wacker Drive for Commuter Rail; Woodstock to Continental Towers for Commuter Bus)	6-19 minutes savings (with 45+ minutes savings during times of highway congestion)	9-22 minutes savings (with 48+ minutes savings during times of highway congestion)	5 minutes longer travel time than automobile
Qualitative indication of reliability based on existing data	+	+	–
Goal 4 Summary	○	+	–

Note: N/A indicates "not applicable" with the commuter bus component. Values with this alternative would be the same as the No-Build Alternative since the trip could still be made using existing commuter rail and existing transit connections.

2.4.5 Goal 5: Provide Compatibility with Transit-Supportive Development

Compatibility with existing and planned transit-support development was assessed qualitatively. Multiple stations along the existing UP-NW Line are surrounded by active transit-oriented developments. In fact, several of these developments are outpacing Metra's ability to expand service along the UP-NW Line.

Table 2-8. Transit-Supportive Land Use Evaluation Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Compatibility with existing and proposed land use plans	○	+	–
Degree to which alternative contributes to concentrating development in close proximity to stations	+	+	–
Degree to which alternative contributes to (or supports) economic development	○	+	–
Goal 5 Summary	+/○	+	–

The Commuter Bus Alternative would work counter to this goal. The Commuter Bus Alternative does not encourage medium- to high-density housing surrounding the boarding locations and does not encourage non-motorized access to boarding locations. The Commuter Rail Alternative promotes additional growth in existing transit-oriented developments. Two of three new station locations include transit-supportive features in the station area plans.

2.4.6 Goal 6: Improve Operating Efficiency

Operating costs were projected using an operating cost model which associates various operating costs with specific measures (such as train-miles, train-hours, and car-miles). With the scale of existing service, the changes in operating cost per unit are very small.

Table 2-9. Operating Efficiency Evaluation Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Operating cost per passenger mile and per vehicle mile	\$0.29/passenger mile \$7.34/car mile	\$0.28/passenger mile \$6.70/car mile	\$0.29/passenger mile \$7.34/car mile
Goal 6 Summary	○	○/+	–

The Commuter Rail Alternative would provide a very slight increase in operating efficiency measures compared to the No-Build Alternative. The Commuter Bus Alternative would cause an overall increase in operating cost, approximately \$100,000 per year. However, the number of passengers and total passenger miles are so small compared to over 500,000,000 annual passenger miles for existing passengers on commuter rail, the increase is not reflected in the displayed decimal places.

2.4.7 Summary of Final Screening Results

Table 2-10 provides a summary of the evaluation results. Overwhelmingly, the Commuter Rail Alternative is more effective at meeting project goals than the Commuter Bus Alternative.

Table 2-10: Summary of Evaluation Results

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Increase Transit Capacity	○	+	○/+
Increase Transit Ridership	○	+	○
Minimize or Avoid Negative Impacts to the Environment	○	+	–
Decrease Travel Time	○	+	–
Provide Compatibility with Transit-Supportive Development	+/○	+	–
Improve Operating Efficiency	○	○/+	–

At least three measures in particular indicate the favorability of the Commuter Rail Alternative: increased transit ridership, travel time savings, and support of transit-oriented development. Compared to the No-Build Alternative, the Commuter Rail Alternative provides increased ridership and travel times savings for new and existing passengers. The Commuter Bus Alternative provides very little increase in ridership and very little travel time savings especially in relationship to the cost of this alternative. In addition, the Commuter Bus Alternative would be counterproductive to existing and planned station-area development along the UP-NW Line. The following table quantitatively compares key measures at the final screening step. Measures show the difference between the build alternatives and the 2030 No-Build Alternative.

Table 2-11: Summary of Key Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative	Commuter Bus Alternative
Increased Transit Ridership (weekday, compared to No-Build)	–	4,279 boardings	97 boardings
Transportation System User Benefits (hours per weekday)	–	8,599 hours	41 hours
Cost Effectiveness Index	–	Medium	Low

See Section 7.2 for more detail regarding Transportations System User Benefit and Cost Effectiveness Index.

Table 2-11 shows key measures at the time of the final screening stage. As the Locally Preferred Alternative (LPA) is refined during the Alternatives Analysis (and during future Preliminary Engineering and Final Engineering phases), the key measures will be subject to change.

3.0 PUBLIC INVOLVEMENT SUMMARY

3.1 Summary of Meetings

Public involvement proceeded throughout the Alternatives Analysis process from initial review of study area needs through review of the recommended LPA. Technical Advisory Committee and public comments were incorporated at each step in the study.

Public involvement has included the following meetings:

- McHenry County Mayors (May 12, 2005, January 19, 2006, March 16, 2006, May 11, 2006, July 13, 2006, August 17, 2006, and November 9, 2006)
- Northwest Municipal Conference Transportation Committee (May 26, 2005 and May 9, 2007)
- Technical Advisory Committee (February 21, 2006)
- Pace Coordination Meeting (March 6, 2006)
- Technical Advisory Committee (May 9, 2006)
- Public Meeting (Arlington Heights – June 20, 2006)
- Public Meeting (Crystal Lake – June 22, 2006)
- Prairie Stone FTA and Business Leaders Presentation (June 27, 2006)
- Pace Coordination Meeting (October 18, 2006)
- McHenry County Council of Governments (June 27, 2007 and July 23, 2007)

3.2 Technical Advisory Committee and Public Review of Proposed LPA

Public involvement has included the following meetings:

- Technical Advisory Committee (June 21, 2007)
- Public Meeting (Arlington Heights – July 10, 2007)
- Public Meeting (Crystal Lake – July 12, 2007)

In addition to meetings, the Metra Connects website provides the latest study information including public meeting exhibits (http://metraconnects.metrarail.com/upnw.php).

Following each round of meetings, comments have been received and incorporated into alternatives under study. Input from agencies, elected officials and the public have been vital in shaping the alternatives and supporting the LPA. A summary of public review comments follows in Section 3.3.

3.3 Summary of Public Review Comments Regarding the Proposed LPA

Public informational meetings were held on July 10 and 12, 2007 in Arlington Heights and Crystal Lake. The informational meetings included a presentation on the study process and the recommendation from the study team. Displays were available around the meeting room along with multiple Metra representatives allowing discussion and questions specific to individual interests. Approximately 33 people attended the public meetings. Over 24 comments have been received to date. Comments were received via comment form at meetings, mail, fax, and through the Metra Connects website.

Eighteen of 24 comments made on comment cards at the meetings (plus two comments received through the website) specifically supported the recommended LPA, the Commuter Rail Alternative. There were no comments supporting any alternatives which had been dropped from further study. Comments emphasized benefits of the LPA including:

- Improved travel times
- Expanded midday service
- Support of economic development and further transit-oriented development
- Signalization of the McHenry Branch
- Improved connections to other transit service
- Station improvements at the existing McHenry station
- Reduction of noise in Crystal Lake (by relocation of the yard)

Several comments requested further expansion of the LPA to include:

- Stations at Deval and Mayfair allowing connection with other Metra lines
- Development of special event schedules with expanded service for events such as the Chicago Air Show[6]
- Addition of a pedestrian crossing at Dee Road
- Expanded track improvements to allow improved speeds, especially outbound speeds along with new locomotives to allow faster acceleration and decreased travel times
- Use of “Diesel Multiple Units” (abbreviated DMUs) in order to have more frequent, faster, and less costly midday service

One comment expressed concern over the close proximity of some stations which leads to more station stops and increased travel times. As part of this study, removal of stations is not planned. However, increased express service and the use of “turn back” service (where some trains only run between Ogilvie Transportation Center and Des Plaines) will mean some trains will not be delayed with frequent station stops.

Multiple comments expressed concern regarding funding. The main thrust of these comments was the need for state and local funding to match requested federal funds. Funds would be needed for construction, operation, and maintenance. One comment pointed out the problems

[6] Note that the LPA only depicts normal weekday operation which was necessary for transportation modeling. The yards, track work, and rolling stock would allow development of special event schedules if desired in the future.

associated with deferred maintenance of transit infrastructure and the lack of transit operating funds. One comment expressed concern over passing project costs along to riders with higher ticket prices. One comment mentioned the funding need for the next project phase, preliminary engineering.

One question was in regard to Pace and CTA involvement in the study process. Pace and CTA have been involved in all study steps since the start of the study. Both agencies have representation on the Technical Advisory Committee and both agencies reviewed all documents (and provided comments and questions). In addition, two coordination meetings were held with Pace.

Multiple comments related to potential future studies of extensions. These comments included discussion of extensions of the MD-W Line to Huntley and Marengo, discussion of extension of the UP-NW main line to Madison, and discussion of extension of the McHenry branch to Lake Geneva.

Multiple comments related to providing a transit connection to O'Hare. The UP-NW Line is one of only two Metra lines providing connection to O'Hare outside of downtown Chicago. Jefferson Park provides an easy connection directly to the CTA Blue Line which brings passengers into the O'Hare domestic terminal. Improved service to Jefferson Park will mean the ease of connection to O'Hare will also improve.

At the public meeting in Crystal Lake, options for access to Peterson Park and neighborhoods on the south side of McCullom Lake were shown. Comments from representatives of the neighborhood association expressed strong preference for "option 2" which replaces the existing unsignalized at-grade Lakewood Road crossing with a proper, signalized crossing.

One comment expressed concern about added closure time at at-grade crossings due to both more trains and longer trains. The time that the gates are down already impacts vehicles and pedestrians. A second comment stated that multiple crossing gates appear to be down far longer than needed especially when the at-grade crossing is on the far side of a station where trains approach slowly.

One final question related to whether signalization of the McHenry Branch would allow implementation of a "quiet zone" near the Crystal Lake junction.

4.0 LOCALLY PREFERRED ALTERNATIVE

This section provides a detailed description of the Locally Preferred Alternative (LPA).

4.1 General Description

The Commuter Rail Alternative provides a complete system of two new layover yards, three new stations, additional parking, additional train runs, additional rolling stock, expanded express service, expanded reverse-commute service, and employer shuttles. This alternative provides substantial increase in capacity during peak periods both for inbound passengers and reverse-commute patrons. This alternative also provides improved travel times for many existing commuter rail patrons as well as future riders. Employer shuttles will provide the link from stations to major employers for both inbound and outbound commuters to the Northwest suburbs. The relocated yards will allow modern, efficient design for the yards. Figure 4-1 on the following page provides a map showing a summary of the LPA.

Table 4-1: Locally Preferred Alternative Description

Project Definition	Length (miles)	Existing: 167.8 Track Miles Additional: 1.7 Track Miles
	Mode/Technology	Commuter Rail
	Number of Stations	Existing: 22 Additional: 3
	Number of vehicles/rolling stock	Existing Locomotives: 18 Proposed Additional: 3 Existing Gallery Cars: 129 Proposed Additional: 34

4.2 Infrastructure

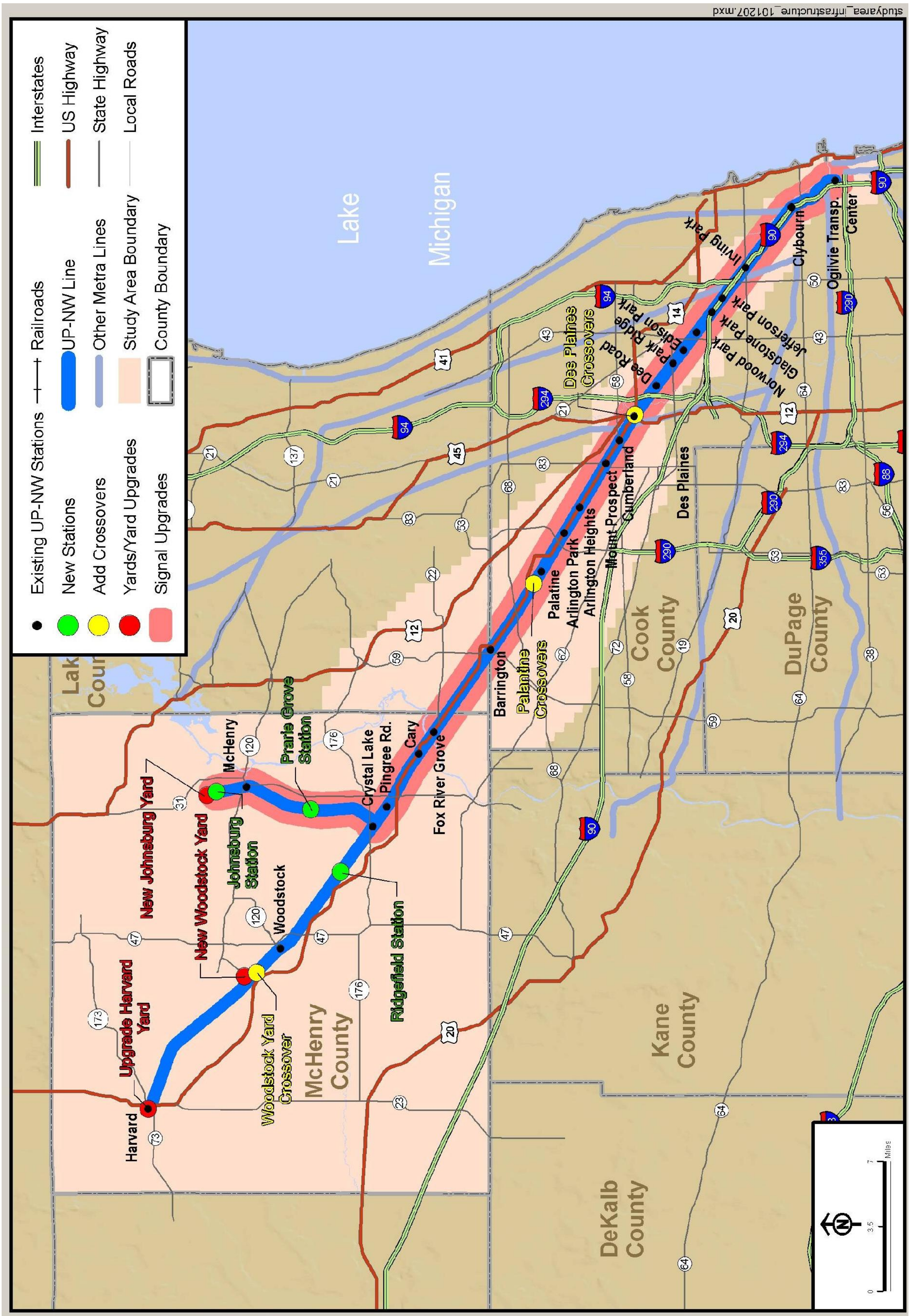
4.2.1 Existing Track and Extensions

Service would be extended 1.6 miles from the existing McHenry station to the proposed Johnsburg station (with an additional 0.1 miles to the entry turnout into the Johnsburg Yard). This single track is already in place and is currently used by occasional freight traffic (averaging one round-trip train each week). New main line track construction is not needed with this project.

Track changes are required to support the proposed schedule. In order to allow outbound trains to enter the proposed Woodstock yard, a crossover will be required southeast of Lamb Road. In order to allow "short-turn" trains,[7] crossovers are proposed between Graceland Avenue and Deval junction in Des Plaines (just to the northwest of the station) and between the Palatine station and Quentin Road (also just to the northwest of the station). In order to allow movement of outbound express trains to local tracks, a universal crossover is proposed between the center and outbound tracks between Graceland Avenue and Deval junction.

[7] A "short-turn" train is a train that does not run the full length between Ogilvie Transportation Center and one of the proposed yards. The purpose of "short-turn" trains is to provide a higher level of service to a particular section of the line with a lower operating cost and lower rolling stock requirement.

Figure 4-1. LPA Infrastructure Summary Map



4.2.2 Existing and Proposed Yards

Existing yards at Barrington, Crystal Lake, and McHenry would be decommissioned.

Both new yards will include sufficient tracks and lengths of tracks to support the number and lengths of trains in the schedule. To improve operations, each yard will include facilities for cleaning, inspection, and servicing of toilets. Yards will also include 480-volt power hook-up, crew facilities, and employee parking. To lessen the impacts of light intrusion into planned neighborhoods surrounding the yards and stations, low-height lighting is proposed.

4.2.2.1 Woodstock Yard

The Woodstock Yard is proposed northwest of the Woodstock station in the vicinity of Lamb Road. To accommodate overnight storage requirements for the new schedule, Woodstock Yard would have ten tracks.

4.2.2.2 Johnsburg Yard

The Johnsburg Yard is proposed north of McCullom Lake Road in the Village of Johnsburg. This yard will support additional service on the McHenry Branch. The Johnsburg Yard will have eight tracks, five for proposed trains, one for potential future expansion, and two for non-revenue equipment storage. An earth berm for noise and visual screening is proposed at the Johnsburg yard site.

4.2.2.3 Harvard Yard

Harvard Yard is an existing yard in the City of Harvard. Four trains are currently parked overnight at Harvard. Four trains are proposed in the new schedule. However, additional gallery cars are proposed for some of the trains. The additional train lengths exceed the existing capacity of the yard. The LPA includes addition of one yard track in an existing “empty bay” within the Harvard Yard.

4.2.3 Existing and Proposed Stations

Three new stations are proposed with the Commuter Rail Alternative along with station improvements at several existing stations in order to accommodate longer trains and provide facilities for reverse-commute patrons.

4.2.3.1 Existing Stations

Various existing stations will have platform extensions ranging from 136 to over 1000 platform feet. The extensions are to accommodate longer trains associated with the new operating schedule. Warming houses are also proposed at several stations projected to have substantial reverse-commute ridership. Elevators are proposed at Clybourn station in order to provide ADA accessibility.

Parking expansion is proposed at several stations based on model results. Table 4-2 shows proposed parking expansion at existing stations.

Table 4-2. Proposed Parking at Existing Stations

Station	Proposed Added Parking	Parking Type
Harvard	60 spaces	Several small expansions of existing surface lots and one new surface lot
Woodstock	600 spaces	Surface lot to the northwest of existing station area parking
Cary	60 spaces	Surface expansion on existing right-of-way
Fox River Grove	270 spaces	Surface expansion based on Fox River Grove's Station Area Plan
Barrington	TBD (*To be determined*)	Parking structure is already under study in Barrington
Palatine	TBD (approximately 77 spaces)	Change of existing unused dedicated office parking to daily commuter rail parking

4.2.3.2 Johnsburg

This station would be located just north of McCullom Lake Road in the Village of Johnsburg near the north end of the McHenry Branch. This station would serve a planned residential development as well as residents in north and northeast McHenry County.

Based on model results, 500 surface parking spaces are proposed at the Johnsburg station. An access road would connect the station and station parking to McCullom Lake Road. The station design will include passenger drop-off and pick-up. A traffic signal is proposed at the intersection of the access road with McCullom Lake Road. The traffic signal would include a pedestrian signal in order to cross McCullom Lake Road to access the station area.

The Johnsburg station will be served by an existing bicycle path extending from south of Prairie Grove to Ringwood, north of Johnsburg. Motorized traffic is not allowed on this bicycle path. The Johnsburg station area will include street networks with sidewalks to facilitate pedestrian access from proposed nearby residences.

Existing land use at this station location is agricultural. However, review of a planned housing development is underway with the Village of Johnsburg and will likely be under construction prior to 2010.

4.2.3.3 Prairie Grove

This station would be located between McHenry and Crystal Lake north of Edgewood Road. This station would serve a planned residential and mixed-use development as well as residents in the Prairie Grove vicinity.

Based on model results, 500 surface parking spaces are proposed at the Prairie Grove station. An access road will be provided as part of the station area design. The station design will include passenger drop-off and pick-up.

The Prairie Grove station will be served by an existing bicycle path extending from south of Crystal Lake to Ringwood, north of Johnsburg. Motorized traffic is not allowed on this bicycle path. The Prairie Grove station area will include street networks with sidewalks to facilitate pedestrian access from proposed nearby residences.

The existing land use is agricultural. However, a housing development surrounding the proposed station is under review by Prairie Grove.

4.2.3.4 Ridgefield

This station would be located just west of the intersection of Country Club Road and the Union Pacific main line tracks between Woodstock and Crystal Lake. Currently, many riders travel Country Club Road in order to access the Crystal Lake station. This station will reduce automobile trips and correspondingly decrease vehicle miles traveled, associated congestion, associated vehicle emissions, and associated vehicle energy use. Based on model results, 600 surface parking spaces are proposed at the Ridgefield station. An access road along with curbside passenger drop-off and pick-up will be provided in the design. Unlike the other two new stations, Ridgefield will mainly be accessed by automobile. There is not a station area development plan at this time. The existing land use is agricultural.

4.3 Operations

The proposed schedule provides for an improvement in service frequency during peak hours. Between 6:30 and 9:30 AM, 24 inbound arrivals at Ogilvie Transportation Center (OTC) are proposed (compared to 17 inbound arrivals with the No-Build). During the peak-service time between 7:00 and 8:30 AM, 17 inbound arrivals at OTC are proposed (compared to 10 inbound arrivals with the No-Build). For reverse commuters, eight trains are proposed to depart OTC between 6:15 and 9:15 AM (compared to four with the No-Build).

Between 6:30 and 9:30 AM, the proposed average headway at OTC is 7.5 minutes (compared to 11 minutes for the No-Build). During the peak-service time between 7:00 and 8:30 AM, the proposed average headway at OTC is 5.5 minutes (compared to 10 minutes for the No-Build).

The improved frequency provides a substantial capacity increase over the existing conditions. Between 6:30 and 9:30 AM, the proposed capacity (measured in number of available seats) is 23,780, a 23 percent increase over existing. (Existing capacity in this time period is 19,404.) During the peak-service time between 7:00 and 8:30 AM, the proposed capacity is 15,950, a 13 percent increase over existing. (Existing capacity in this peak-service time is 14,148.)

4.3.1 Travel Time Savings

The LPA provides improved travel time in several ways. The new schedule provides additional express service saving, on average, three minutes per passenger in peak hours. The new schedule also increases frequency of service which decreases wait time, a component of a traveler’s total trip time. Increased frequency at some stations prevents riders from having to travel greater distance by automobile in order to access stations with higher frequency (as is the case with the No-Build Alternative). The location of new stations shortens the automobile trip for a number of riders which decreases overall trip time. Table 4-3 provides some representative trip travel time comparisons. The last entry in the table shows a representative travel time improvement for a reverse-commute movement to a high employment location in the northwest suburbs.

Table 4-3. Travel Time Evaluation Measures

Evaluation Criteria	No-Build Alternative	Commuter Rail Alternative
Average travel time for commuters in the peak hours (travel times of two representative inbound trips)		
o First and Clay Streets in Woodstock to 233 South Wacker Drive in Chicago	93 minutes (minimum) 2 scheduled times	90 minutes (minimum) 5 scheduled times
o Lancaster Court in Crystal Lake to Continental Towers (Golf Road and South New Wilke) in Rolling Meadows	91 minutes (minimum) 3 scheduled times	70 minutes (average) 56 minutes (min.) 4 scheduled times
Difference between average travel time by automobile and average travel time by transit (Woodstock to South Wacker Drive for Commuter Rail; Woodstock to Continental Towers for Commuter Bus)	6-19 minutes savings (with 45+ minutes savings during times of highway congestion)	9-22 minutes savings (with 48+ minutes savings during times of highway congestion)
Transportation User Benefits (total travel time savings from model output)	-	**8,873 hours per weekday**
Average headway (6:30 to 9:30 AM)	11 minutes	7.5 minutes
Average travel time for commuters using the reverse-commute movement (travel times to a representative outbound major employment locations)		
o Ogilvie Transportation Center to Continental Towers in Rolling Meadows	75 minutes (minimum) 2 scheduled times	58 minutes (minimum) 3 scheduled times

The transportation system user benefit—the total travel time savings calculated from the transportation demand model—for the LPA is projected at 8,873 hours per weekday. Annually, the user benefit projects to 2,400,000 hours. See Section 7.2 for more information regarding the transportation system user benefit.

4.3.2 Fare Policy

The LPA would follow Metra's fare policy. There are currently no transfer fares between Metra commuter rail, Pace bus, and CTA rail or bus. For employer shuttles, the fare policy has not been determined. For existing employer shuttles in other areas, fares vary by employer preference. Some employers pay for the shuttle service. Other employers collect a monthly fare from employees using the shuttle.

4.4 Rolling Stock

4.4.1 Overview

Added trains and longer trains require additional locomotives and gallery cars. Although seven train runs are added in the peak hours, only three additional equipment sets are required due to the use of short-turn train runs (briefly described in Section 4.2.1 above).

4.4.2 Locomotives

To accommodate the proposed schedule, three additional locomotives are required. In addition to new locomotives, several existing locomotives will require retrofitting for the new in-cab, four-aspect signal system.

4.4.3 Gallery Cars

For expanded capacity, 34 additional gallery cars are required. Three of these gallery cars will be cab cars. Average seating capacity in the new gallery cars is 145.

4.4.4 Equipment Relay Details

Equipment relays are developed to ensure all equipment can be rotated through modern yards for cleaning and inspection. The equipment relays indicate yard storage requirements. Equipment relays also are developed to efficiently use equipment when that equipment is shared between lines. During periods when equipment is not needed on the UP-NW Line, the equipment is rotated to another line – in this case, the Union Pacific North Line.

4.4.5 Employer Shuttles

For modeling purposes, twelve shuttles were assumed based on departure stations, departure times and run times. The assumed vehicles are 26-foot shuttle buses. The specific equipment needs may be refined during later project phases and in discussion with employers.

4.5 Signals and Communication

4.5.1 Overview

The signal system requires improvement in order to increase line capacity. The McHenry Branch is currently "dark" meaning there is no signal system. The main line currently uses a standard left-hand operation. Signals only face the current direction of travel in double-track territory and on the outer tracks in triple-track territory. The center track has bi-directional signals. The new signal system will include in-cab, four-aspect signals. While most locomotives running on the UP-NW Line have already been retrofitted, retrofitting several locomotives for the new signal system will be required. The CTC upgrades will allow for reduced intervals between trains, thus allowing additional trains and greater flexibility of service.

4.5.2 McHenry Branch

With the LPA, the McHenry Branch will be signalized. The signals include interlockings, intermediate signals, and upgrades to at-grade crossings.

4.5.3 Main Line Signals

On the main line, control points will be added at new crossovers and turnouts. The signal system will be upgraded to included bi-directional signals between Clybourn and Crystal Lake junction on all tracks. All at-grade crossings will be upgraded for the new signal system.

4.6 Employer Shuttle Concept

4.6.1 Overview

Employment growth in suburban locations often is dispersed due to auto-oriented development. This is the case in the Chicago suburbs. Most major employment locations are not in station areas. A major hurdle to providing suburb-to-suburb and reverse-commute service is the connection from station area to employer, often termed "the last mile." The LPA proposes employer shuttles to multiple major employment locations in the northwest suburbs.

Note that no new feeder bus service (home-based to station areas) is proposed with the LPA.

4.6.2 Potential Destinations

Top employment locations within five miles of suburban stations were determined. Employer types were screened for attributes likely to contribute toward shuttle demand. Employment types for potential destinations include data processing (including data processing related to financial institutions), hospitals, manufacturing, and offices.

4.6.3 Departure Stations

In order to provide minimum travel times to employment locations, potential departure stations for employer shuttles include Des Plaines, Mount Prospect, Arlington Heights, Arlington Park, Barrington, and Pingree Road. Five shuttles are proposed from Arlington Park due to its central location to several high employment locations including office and manufacturing.

4.6.4 Schedule

Employer shuttles are proposed to leave departure stations two minutes after arrival of an inbound or outbound train (except when two trains arrive within a few minutes of each other). Run times to employers range from under eight minutes up to 18 minutes. Shuttles return to the station following the run in order to shuttle the next group of arriving passengers.

4.6.5 Equipment Required

Twelve shuttles were assumed based on departure stations, departure times and run times. The assumed vehicles are 26-foot shuttle buses. The specific equipment needs may be refined during later project phases and in discussion with employers. Model results indicate some preliminary shuttle destinations may only require a vehicle such as a 16-passenger van while other shuttle destinations may require a larger, 40-foot shuttle bus.

Model results indicate shuttle boardings of 2,120 (per weekday). Note that the employer destinations were only selected for preliminary modeling purposes. Discussions with employers were not initiated during the Alternatives Analysis since system start-up would be still several years away and be subject to FTA approval to enter subsequent implementation steps and depend on the availability of funds.

5.0 PROJECTED IMPLEMENTATION SCHEDULE

The following schedule was used in the Alternatives Analysis for the purpose of cost estimating. The schedule is subject to change including change based on the availability of funds.

June 2007 – Initiated NEPA process with agency scoping meeting

2008 – Initiate Preliminary Engineering (subject to approval to enter Preliminary Engineering by FTA)

2009 – Initiate Final Engineering (subject to approval to enter Final Engineering by FTA)

2010 – Initiate Construction

2011 – Woodstock Yard in operation

Two locomotives and 12 new gallery cars received

Applicable trains moved to Woodstock Yard from existing yards

Schedule related to Woodstock Yard is implemented

2012 – Johnsburg Yard in operation

One locomotive and 22 new gallery cars received

Remaining trains moved to Johnsburg Yard from existing yards

Complete new schedule implemented

6.0 OPINION OF COST

Project cost involves two elements. The first is capital cost, the cost to physically build the alternative. The second is operating and maintenance cost, the annual cost to operate the system and maintain the infrastructure. These costs are outlined below.

6.1 Capital Costs

Capital costs include the cost to build the project. A number of cost elements are included in the capital cost projection including infrastructure, right-of-way acquisition, rolling stock, design engineering, construction management, and other costs related to project administration.

In 2007 dollars, the capital cost estimate for the LPA is $381.5 million. As unit costs will grow between 2007 and the “year of expenditure” (the year or years in which the expenditure actually occurs), the “year of expenditure” capital cost estimate for the LPA is $430 million.

Table 6-1. Cost Estimate by Project Element

Project Element	Cost (2007$)
Coach Yard and Station at Johnsburg	53,200,000
Coach Yard at Woodstock	54,300,000
Harvard Yard Improvements	810,000
Prairie Grove and Ridgefield Stations	22,700,000
Improvements at Existing Platforms and Stations	46,100,000
Track Work (Added Crossovers)	5,300,000
Add Signals on McHenry Branch	16,770,000
Upgrade Signals from Ogilvie Transportation Center to Crystal Lake	96,930,000
Locomotives, Gallery Cars, and Employer Shuttle Vehicles	85,400,000
Total	**$381,510,000**

For use in computing the Cost-Effectiveness Index (CEI), the estimated annualized capital cost is $30,555,000.

6.2 Operating Costs

Annual operating and maintenance costs are projected using an operating cost model which associates various operating costs with specific measures (such as guideway miles, train-miles, train-hours, car-miles, and so forth). Although some project elements (such as the modernized layover yards) provide improved operating efficiency, with the scale of existing service, the changes in operating cost per unit are very small.

Based on the new schedule and the addition of rolling stock, the projected change in annual operating and maintenance cost (compared to the No-Build Alternative) is $8,967,000 (in 2007 dollars).

7.0 PROJECTED RIDERSHIP

Transportation demand modeling provides two primary results used in evaluating alternatives: ridership and benefits. These values are presented below.

7.1 Ridership Projections

Ridership is expressed in weekday boardings. For the design year 2030, the projected non-CBD boardings on the UP-NW Line for the LPA are 24,128. This is an increase of 4,355 boardings over the 2030 No-Build projections.[8] Table 7-1 shows the projected ridership for the LPA.

Table 7-1. Projected Ridership for Locally Preferred Alternative

Fare Zone Pairs	Stations included in Fare Zone Pairs	2002 Observed On Counts	Modeled Daily Boardings	
			No-Build Alternative	Locally Preferred Alternative
IJKM	Pingree Road – Harvard and Pingree Road – Johnsburg	2,393	3,848	4,775
GH	Barrington – Cary	3,208	4,138	4,295
EF	Arlington Heights – Palatine	6,115	5,459	6,419
D	Des Plaines – Mount Prospect	3,039	3,238	4,253
BC	Irving Park – Dee Road	3,506	3,090	4,386
	Totals	18,261	19,773	24,128

The LPA includes employer shuttles. 2,120 riders are projected to transfer from Metra commuter trains to the employer shuttles.

7.2 Transportation System User Benefit

Transportation system user benefits are measured in hours saved compared to the No-Build Alternative. Savings may be incurred through a mode shift for a new passenger (who, based on system improvements, now finds the trip faster on transit compared to automobile) or through improved transit travel times for existing passengers. Improved travel times could be the result of increased express train service or improved frequency of service (which decreases wait time).

Compared to the No-Build Alternative, the LPA provides a transportation system user benefit of 8,873 hours per weekday. For use in the calculation of the CEI, this works out to 2,400,000 annual hours saved. Table 7-2 shows the inputs to the cost effectiveness calculation. Note that the values are subject to refinement during preliminary and final engineering phases.

[8] The LPA has been further refined since the final screening. This refinement has further improved both boardings and user benefits. The change in boardings in Section 7.1 and the user benefits in Section 7.2 show this slight change from the summary listed in Tables 2-4, 2-5, and 2-11.

Table 7-2. Estimated Transportation System User Benefits

Total Capital Cost	$381,510,000
Annualized Capital Cost	$ 30,555,000
Annual Operating and Maintenance Costs	$ 8,967,000
Total Annualized Cost	$ 39,522,000
Daily User Benefits (hours)	8,873
Annualization Factor	270.5
Annual User Benefits (hours)	2,400,000
Cost Effectiveness Index	$ 16.47
Anticipated New Starts Cost Effectiveness Rating	*Medium*

All dollar values are in 2007 dollars.

Using the cost and benefit figures above, the CEI (in 2007 dollars) computes to $16.47 per hour saved. This falls within the range of a "medium" rating based on FTA's cost effectiveness breakpoints for fiscal year 2009. Breakpoints are shown in Table 7-3.

Table 7-3. FY2009 Cost Effectiveness Breakpoints

Cost Effectiveness Rating	Cost Effectiveness Value
High	Less than or equal to $11.99
Medium-High	Between $12.00 and $15.49
Medium	Between $15.50 and $23.99
Medium-Low	Between $24.00 and $29.99
Low	Greater than or equal to $30.00

8.0 NEXT STEPS

The next steps in this Alternatives Analysis move the project toward review by the Federal Transit Administration for approval to enter the next phase, Preliminary Engineering. The next steps include:

8.1 Environmental Analysis

Environmental analysis was initiated with an agency scoping meeting held on June 21, 2007. Based on screening of the potential affected environment, an Environmental Assessment (EA) is the expected document for this project. Progress on the EA will continue in coordination with Preliminary Engineering (pending approval to enter Preliminary Engineering by FTA).

8.2 Continued Coordination with Stakeholders

Coordination with FTA, Union Pacific Railroad, interested agencies (related to the EA), and affected communities will continue until and following approval to enter Preliminary Engineering.

8.3 Resolution of Outstanding Issues

Progress toward resolution of outstanding issues will continue until and following approval to enter Preliminary Engineering. At this time, these issues include:

- Coordination with other Union Pacific operations for the use of California Avenue Yard for daytime layover
- Coordination at the proposed Woodstock Yard with regard to a potential yard lead and a switching engine for efficient yard operations
- Coordination along the McHenry Branch with regard to a passing siding allowing more reliable operations on the McHenry Branch

Other issues may arise based on Union Pacific Railroad, FTA or other agency review.

8.4 Submittal to FTA and Request to Enter Preliminary Engineering

The LPA document, New Starts forms, land use data, and financial plans will be submitted to FTA with a request to enter Preliminary Engineering.