Appendix E
Description of Alternatives

RED AHEAD
Moving Ahead to a Better Red

Red Line Extension

Chicago Red Line Extension Project

Description of Alternatives

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Updated July 29, 2015

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Abbreviations

AREMA	American Railway Engineering and Maintenance-of-Way Association
BRT	Bus Rapid Transit
CDOT	Chicago Department of Transportation
CMAP	Chicago Metropolitan Agency for Planning
CN	Canadian National
CTA	Chicago Transit Authority
EIS	Environmental Impact Statement
IDOT	Illinois Department of Transportation
MWRD	Metropolitan Water Reclamation District of Greater Chicago
NEPA	National Environmental Policy Act
NICTD/CSS & SBRR	Northern Indiana Commuter Transportation District Chicago South Shore & South Bend Railroad
RLE	Red Line Extension
ROW	Right-of-Way
TIP	Transportation Improvement Program
UPRR	Union Pacific Railroad

Section 1
Background Information

The Chicago Transit Authority (CTA) is proposing to extend the Red Line from the 95th Street station to the vicinity of 130th Street, subject to the availability of funding. The proposed Red Line Extension (RLE) would include four stops. Each stop would include bus transfer and parking facilities. This project is one part of the Red Ahead Program to extend and enhance the entire Red Line.

The project area is 11 miles south of the Chicago central business district (commonly referred to as the Loop) and encompasses approximately 20 square miles. The boundaries of the project area are 95th Street on the north, Ashland Avenue on the west, Stony Island Avenue on the east, and the Calumet-Sag Channel/Little Calumet River and 134th Street on the south. The I-57 Expressway and I-94 Bishop Ford Freeway cross the western and eastern edges of the project area, respectively. Lake Calumet is in the eastern portion of the project area. Figure 1-1 shows the project area.

The project area encompasses parts of nine community areas in the City of Chicago and the eastern section of the Village of Calumet Park. Chicago community areas include Beverly, Washington Heights, Roseland, Morgan Park, Pullman, West Pullman, Riverdale, and South Deering. The project area comprises residential (primarily single family), industrial (both existing and vacant), transportation (including freight), and commercial development.

The Draft Environmental Impact Statement (EIS) will focus on the following alternatives that emerged from the Alternatives Analysis and National Environmental Policy Act (NEPA) scoping process, which are shown in Figure 1-2:

- No Build Alternative
- Bus Rapid Transit (BRT) Alternative
- Union Pacific Railroad (UPRR) Rail Alternative
    - Right-of-Way (ROW) Option
    - East Option
    - West Option
- Halsted Rail Alternative

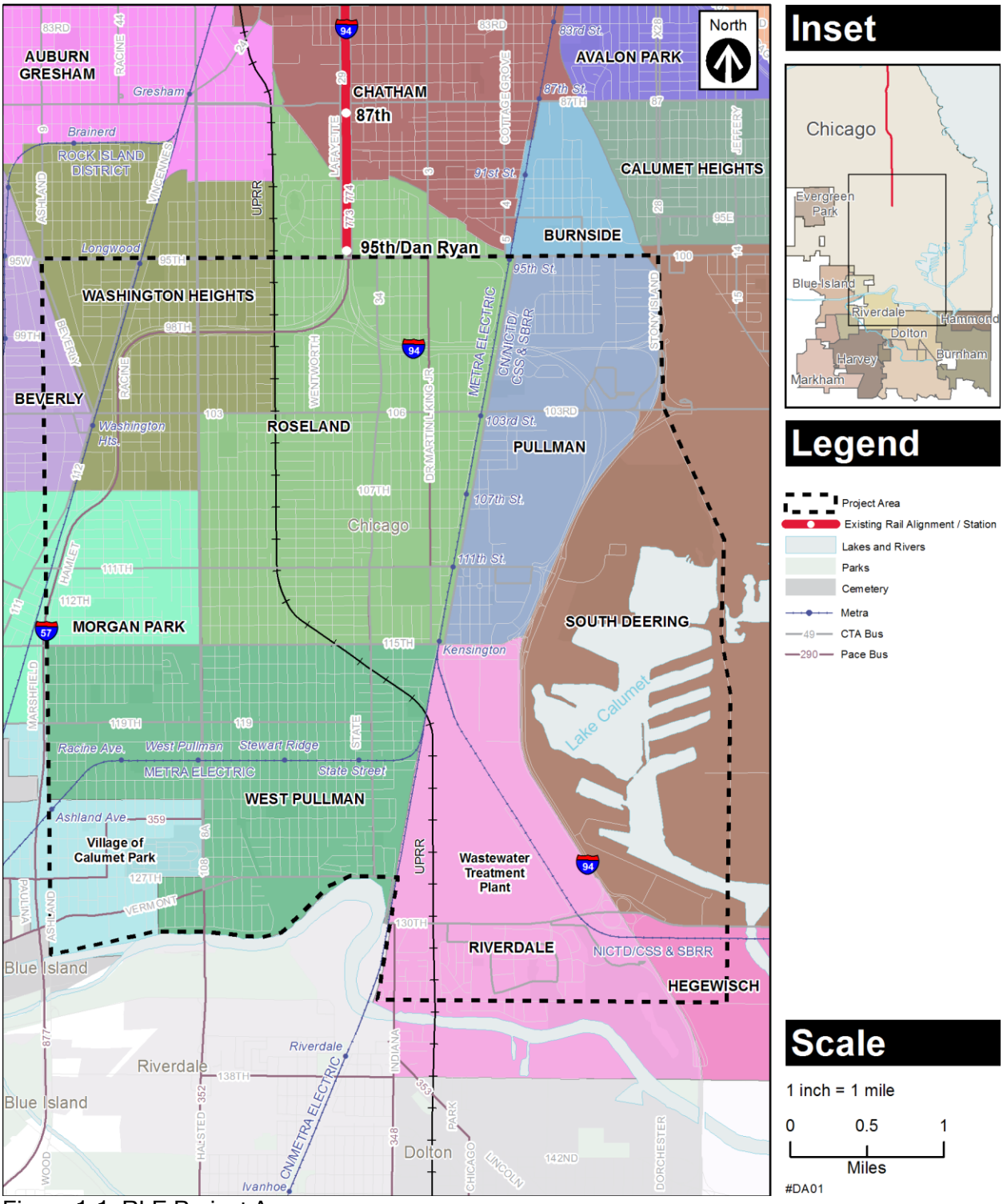


Figure 1-1: RLE Project Area

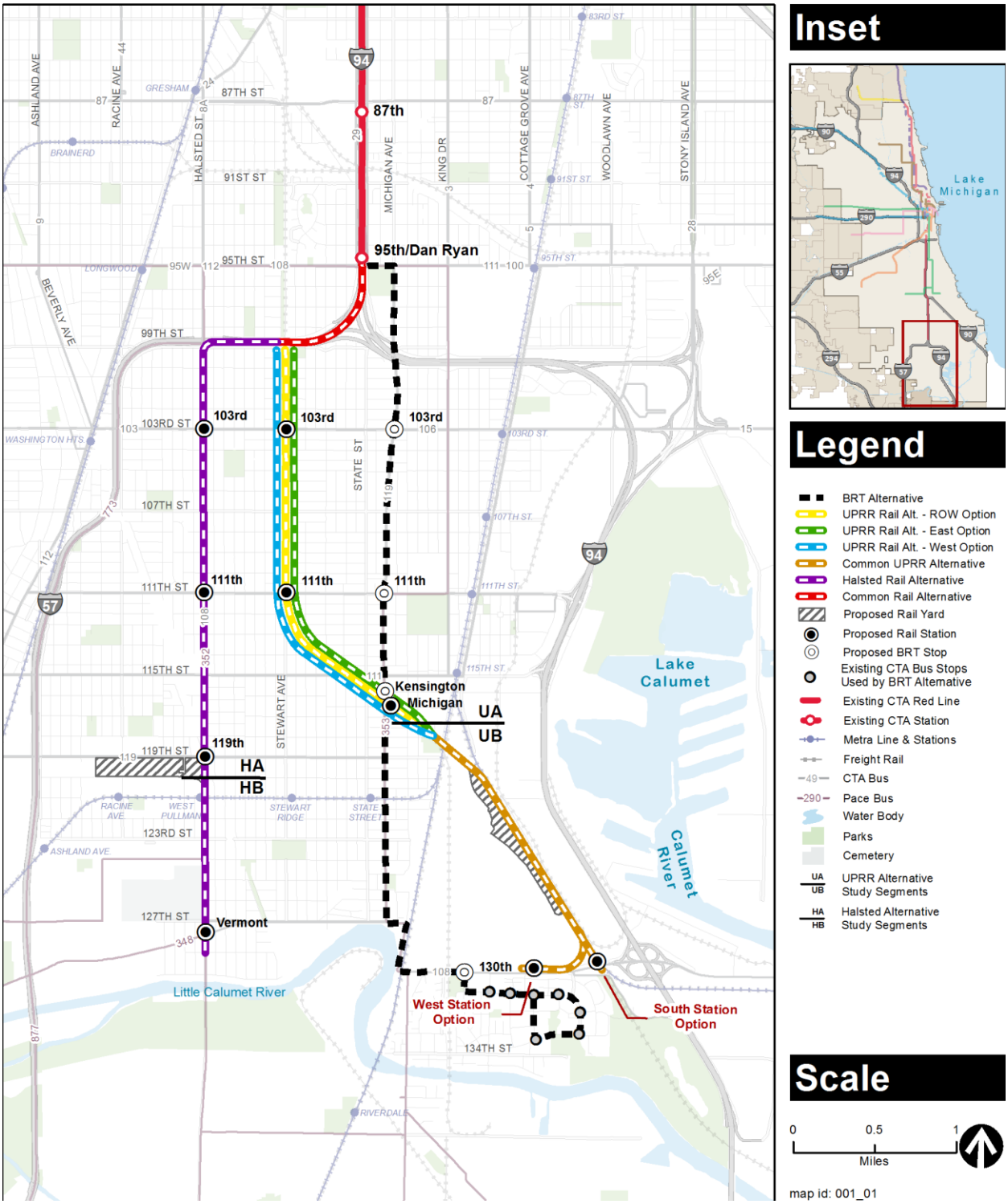


Figure 1-2: RLE Project Alternatives

This technical memorandum defines the four different alternatives (note: one alternative has three options) to be evaluated in the Draft EIS for potential environmental, economic, and social impacts. Each alternative will be described based on infrastructure improvements, stations, and operating plans.

Additional Information about the RLE Project

- The Dan Ryan branch of the Red Line (Cermak-Chinatown station to 95th Street station) opened for service in September 1969.
- In late 2006, CTA initiated an Alternatives Analysis study to identify and evaluate potential major fixed guideway transit solutions in the project area.
    - Community meetings to share the results of the Screen 1 process were held on April 10 and 11, 2007.
    - Community meetings to share the results of the Screen 2 process were held on December 3 and 4, 2008.
    - Community meetings to share the results of the Screen 3 process were held on June 3 and 4, 2009.
- On August 12, 2009, the UPRR Rail Alternative was designated by the Chicago Transit Board as the Locally Preferred Alternative.
- The NEPA scoping process occurred in 2009 with an agency scoping meeting held on September 24, 2009. Public scoping meetings were held on September 22 and 24, 2009. A Notice of Intent was published in the Federal Register on September 1, 2009.
- An Open House meeting to inform the public of progress on the RLE Project was held on August 2, 2011.

Updated July 29, 2015

In August 2014, based on the technical analysis and public input until then, CTA announced the NEPA Preferred Alternative—the UPRR Rail Alternative. CTA is considering two alignment (route) options of this alternative: the East Option and the West Option. At this time, CTA is also considering only the South Station Option of the 130th Street Station. In late 2014 and early 2015, CTA conducted additional engineering on the East and West Options to refine the East and West Option alignments. Appendix A of this technical memorandum summarizes the refined alignments and any additional or different impacts that would result. The information in Appendix A supersedes information presented in other chapters of this technical memorandum.

Section 2
No Build Alternative

NEPA requires analysis of the No Build Alternative. Comparison with the build alternatives helps to assess the relative benefits and impacts of the other alternatives being evaluated. The No Build Alternative is carried into the Draft EIS phase of the project development regardless of its performance versus the build alternatives under consideration. No new infrastructure would be constructed as part of the No Build Alternative. The bus routes assumed to be part of the No Build Alternative are illustrated in Figure 2-1.

The No Build Alternative is defined as the existing transportation system plus any committed transportation improvements that are already in the Chicago Metropolitan Agency for Planning (CMAP) Fiscal Year 2010–2015 Transportation Improvement Program (TIP). Table 2-1 lists the TIP projects within the project area, which consist of four bridge reconstructions, several road improvement projects including resurfacing and coordination of signal timing, work on Metra's facilities, construction of a bicycle/pedestrian multi-use trail, and preservation of historic facilities.

Improvements to the 95th Street Terminal are anticipated to be completed prior to construction of the RLE. While specific details on the improvements are not yet available, major renovations and expansions to the station house are aimed at providing more space and improving the walking flow of passengers, with new or expanded bus terminal facilities—as well as Red Line platform improvements. Included in the upgrades are the following:

- New station building with bright, airy spaces and clear sightlines
- Expanded platforms to provide more room and easier flow of passengers
- Station will be largely enclosed in glass for maximum light and protection from the elements
- Wider bus lanes and increased spacing between bus bays to reduce congestion
- Wider sidewalks and waiting areas in bus terminal for increased passenger comfort and safety
- Sound panels at platform level to provide a more comfortable, less noisy space
- Additional escalators and elevators
- Additional space in front of ticket vending machines and fare gates

All elements of the No Build Alternative are included in each of the other alternatives.

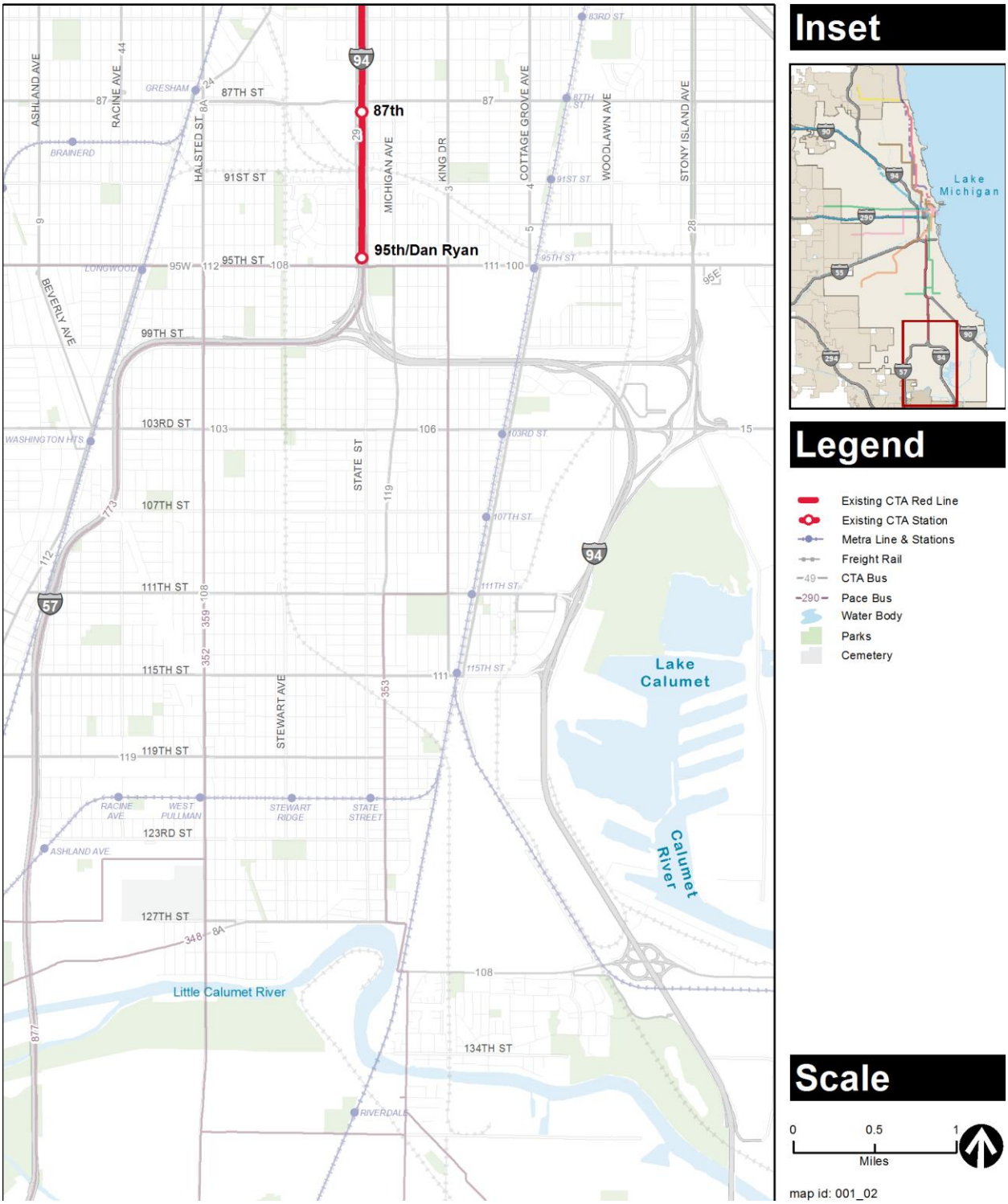


Figure 2-1: No Build Alternative

Table 2-1: Northbound Travel Times for No Build Alternative

Route Segment	Travel Time (minutes)
130th to 95th Street Station	28.0
130th to Jackson Station	57.0
130th to Clark/Division Station	64.5
130th to Howard Station	93.5

2.1 Infrastructure

No new infrastructure would be constructed as part of the No Build Alternative other than projects already committed through the CMAP TIP and regular maintenance of existing track and structures.

2.2 Stations

No stations would be constructed as part of the No Build Alternative.

2.3 Yard

The 98th Street yard and shop at the south end of the existing Red Line would continue to be used for Red Line trains. The 98th Street yard and shop would need to be replaced as it is past its useful life.

2.4 Operating Plan

As part of the No Build Alternative, bus transit service would be focused on the preservation of existing services and projects. Bus routes in the project area are not expected to change as part of the No Build Alternative. The following bus routes (shown in Figure 2-1) run in the project area: #8A, #9, #30, #34, #103, #106, #108, #111, #112, #115, #119, #348, #352, #353, and #359.

Red Line travel times during the morning peak period for the No Build Alternative are presented in Table 2-2.

Table 2-2: 2010-2015 CMAP TIP Projects in the Project Area; Projects Assumed in No Build Alternative

Agency	Location	Project	Expected Completion Date
Illinois Department of Transportation (IDOT)	I-94 Bishop Ford Expressway from Stony Island feeder includes Blue Island	Repair/replace two bridges	2016
IDOT	Bridge over I-94 Bishop Ford Expressway at 111th Street	Repair bridge	2013
IDOT	I-57 from US 30 (Lincoln Highway) to I-94 (Dan Ryan Expressway /Mainline)	Repair bridge	2013
Chicago Department of Transportation (CDOT)	95th Street from Western Avenue to Ewing Avenue	Coordination of traffic signal timing	2016
IDOT	Vermont Street from Western Avenue to 127th Street	Resurface road	2013
IDOT	IL 1 (Halsted Street) from 127th Street to 152nd Street	Resurface road	2013
Metra	Regionwide	Acquire shop facility and/or equipment; work on rail tower or yard; work on vehicle maintenance facility	2016
IDOT	Bike Facility: Palos Heights-Cal Sag Multi-Use Greenway from Centennial Trail to Burnham Greenway	Build bicycle and pedestrian facility	2014
IDOT	Hotel Florence from 11111 South Forestville Pullman Historic District	Preserve historic facility	2012
IDOT	North Pullman Historic District Area	Conduct landscaping, preserve historic facility	2013

Section 3
BRT Alternative

The proposed transportation system management alternative is a 5.5-mile long Bus Rapid Transit (BRT) route, which would operate between the existing 95th Street station and the intersection of 130th Street and Eberhart Avenue via 95th Street, Michigan Avenue, 127th Street, Indiana Avenue, and 130th Street. Four stops with improved bus shelters would be created at 103rd Street and Michigan Avenue, 111th Street and Michigan Avenue, Kensington Avenue and Michigan Avenue, and 130th Street and Eberhart Avenue. Although BRT service elements will not continue south of the 130th Street stop, the bus route will continue through Altgeld Gardens with stops at 131st Street and Langley Avenue, 131st Street and Corliss Avenue, 131st Street and Ingleside Avenue, 132nd Street and Ellis Avenue, 133rd Street and Ellis Avenue, and 133rd Place and Corliss Avenue. Figure 3-1 shows the BRT Alternative. Table 3-1 summarizes the streets on which the BRT Alternative would operate.

Table 3-1: BRT Alternative Street Summary

Street	Street Width (feet)	Number of Lanes	Center Turn Lane	Parking
95th Street	80	4	Yes	No
Michigan Avenue	40	2	No	Yes
127th Street	40	4	No	No
Indiana Avenue	40	4	No	No
130th Street	60	4	Yes	No

The BRT Alternative would incorporate bus routing changes that may occur as part of improvements to the 95th Street Terminal. The routing shown on the BRT Plans and Profiles reflects the existing station design. Routing will be adjusted when terminal is renovated.

3.1 Infrastructure

Projects already committed through the CMAP TIP would be constructed as described for the No Build Alternative. Regular maintenance of existing track and structures would continue.

No dedicated bus lanes would be provided for the BRT Alternative. Parking lanes would be removed for some portions of the alignment.

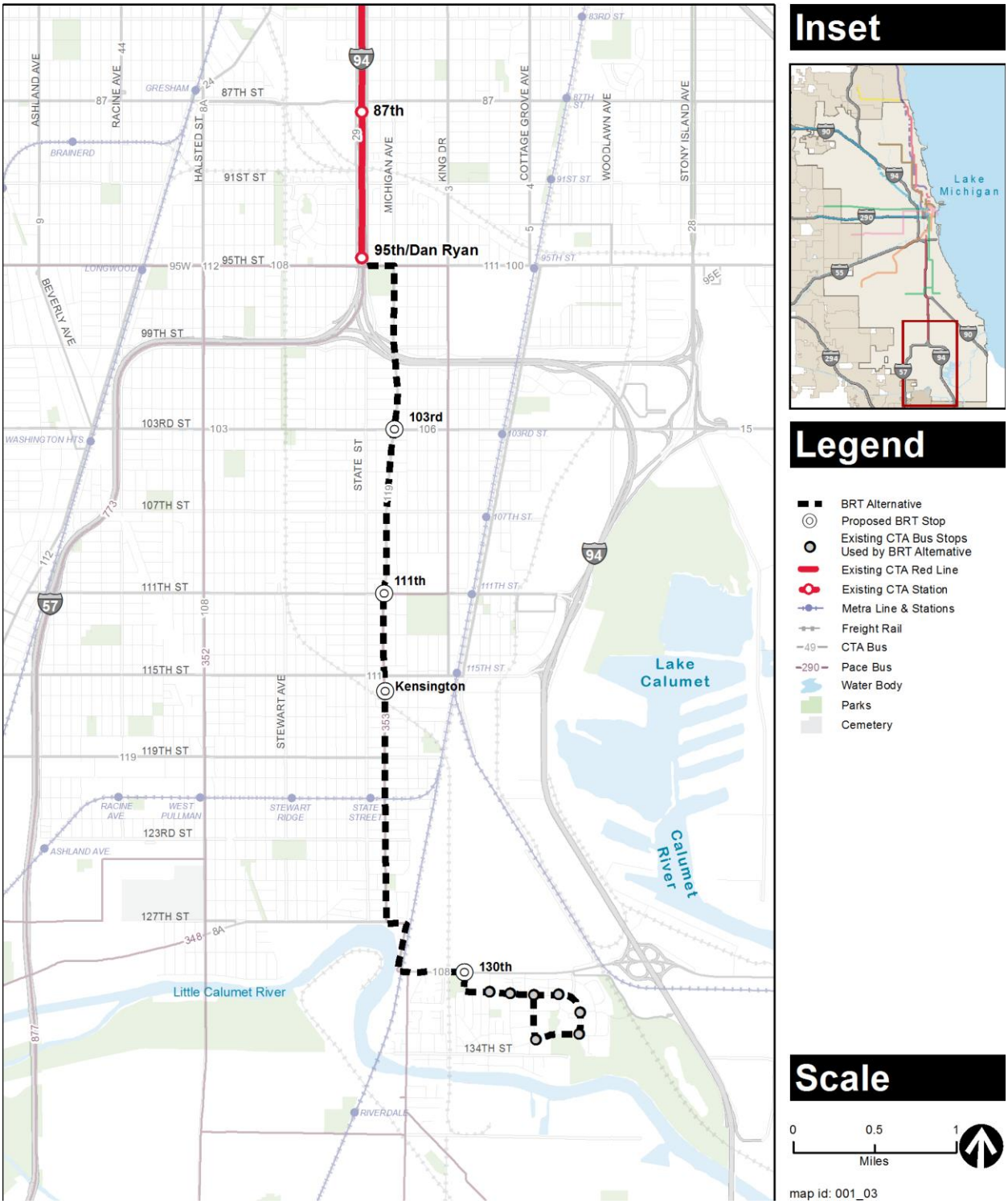


Figure 3-1: BRT Alternative

3.2 Stops and Parking

Improved bus shelters would be provided at the 103rd Street, 111th Place, Kensington Avenue, and 130th Street stops. Park & ride facilities with a total capacity of 700 parking spaces in the year of construction and up to 2,800 parking spaces in a later year (2030) would be constructed at the stop locations, as shown in Table 3-2.

Table 3-2: BRT Alternative Park & Ride Facility Parking Spaces

Location	Construction Year	Horizon Year (2030)
103rd Street	100	200
111th Street	100	200
Kensington Avenue	100	1,000
130th Street	400	1,400
Total	700	2,800

3.2.1 103rd Street Stop

Improved bus shelters for the 103rd Street stop would be on the northwest corner (nearside) of the 103rd Street and Michigan Avenue intersection for the southbound bus and at the northeast corner (farside) of the 103rd Street and Michigan Avenue intersection for the northbound bus. There are existing bus stops at these locations for CTA routes #34 and #119.

A surface parking lot with capacity for 200 spaces would be located on the southeast quadrant of the 102nd Street and Michigan Avenue intersection. The driveway for the parking lot would be on the west side of the lot, directly across from 102nd Place, onto Michigan Avenue.

3.2.2 111th Street Stop

Improved bus shelters for the 111th Street stop would be on the southwest corner (farside) of the 111th Street and Michigan Avenue intersection for the southbound bus and either the northeast or southeast corner (nearside or farside, respectively) of the 111th Street and Michigan Avenue intersection for the northbound bus. There are existing bus stops at these locations for CTA routes #34 and #119.

A surface parking lot with capacity for 200 spaces would be located on the southeast quadrant of the 111th Place and State Street intersection. Driveways for the parking lot would be on the north side of the parking lot, midway between State Street and Michigan Avenue, onto 111th Place, and on the south side of the parking lot, midway between State Street and Michigan Avenue, only 112th Street.

3.2.3 Kensington Avenue Stop

Improved bus shelters for the Kensington Avenue stop would be on the northwest corner (nearside) of the Kensington Avenue and Michigan Avenue intersection for the southbound bus

and at the southeast corner (nearside) of the Kensington Avenue and Michigan Avenue intersection for the northbound bus. There are existing bus stops at these locations for CTA routes #34 and #119.

A three-story parking garage with capacity for 1,000 spaces would be located on the southeast quadrant of the Kensington Avenue and Michigan Avenue intersection; the ground level of the parking garage would be available for retail and/or community facilities. Driveways for the parking garage would be on the west side of the parking structure, midway between Kensington Avenue and the railroad crossing, onto Michigan Avenue, and on the south side of the parking structure, midway between Indiana Avenue and the railroad crossing, onto 116th Street.

3.2.4 130th Street Stop

Improved bus shelters for the 130th Street stop would be on the southwest corner (nearside) of the 130th Street and Eberhart Avenue intersection for the southbound bus and at the northwest corner (farside) of the 130th Street and Eberhart Avenue intersection for the northbound bus. A signalized intersection with crosswalk is proposed at the 130th Street and Eberhart Avenue intersection.

A three-story parking garage with capacity for 1,400 spaces would be located on the northwest quadrant of the 130th Street and Water Treatment Plan Access Road intersection. Driveways for the parking garage would be on the south side of the parking lot, adjacent from Eberhart Avenue, onto 130th Street, and on the east side of the parking lot, onto the Water Treatment Plant Access Road.

3.2.5 Additional Stops

Although BRT service elements will not continue south of the 130th Street stop, the bus route will continue through Altgeld Gardens along the existing #34 route with stops at 131st Street and Langley Avenue, 131st Street and Corliss Avenue, 131st Street and Ingleside Avenue, 132nd Street and Ellis Avenue, 133rd Street and Ellis Avenue, and 133rd Place and Corliss Avenue. Existing bus shelters will remain unchanged.

3.3 Yard

The existing 103rd Street Garage at 1702 103rd Street would be used to store BRT Alternative buses.

3.4 Operating Plan

The BRT Alternative would add a limited-stop enhanced bus route, #X34, along the existing #34 South Michigan Avenue bus route to 130th Street. The BRT Alternative would utilize traffic signal priority at signalized intersections along 95th Street, Michigan Avenue, and 130th Street.

The BRT Alternative would require a net increase of 12, 60-foot articulated buses plus two spares.

The BRT Alternative bus would run 24 hours per day. Bus frequencies would be adjusted during peak periods to a four-minute frequency between 6 AM and 8 PM on weekdays and a 12-minute frequency on the existing route #34 to better serve anticipated demand.

Table 3-3 presents the proposed travel times during the morning peak period for the BRT Alternative via route #X34 and the Red Line.

Table 3-3: Northbound Travel Times for BRT Alternative

Route Segment	Travel Time (minutes)
130th Street to 95th Street Station	23.0
130th Street to Jackson Station	52.0
130th Street to Clark/Division Station	59.5
130th Street to Howard Station	88.5

Section 4
UPRR Rail Alternative

The proposed UPRR Rail Alternative would extend the heavy rail transit Red Line from the existing 95th Street Station to 130th Street, just west of I-94. The Chicago Transit Board designated the UPRR Rail Alternative as the Locally Preferred Alternative at its August 12, 2009 board meeting.

The UPRR Rail Alternative is a 5.3-mile extension of the existing Red Line. The trains would operate on an elevated structure heading south from 95th Street along I-57 for nearly ½ mile until reaching the UPRR corridor in the vicinity of Eggleston Avenue. The alignment would then turn south along the UPRR corridor to approximately 111th Street where it would turn southeast. East of Prairie Avenue, the alignment would cross over the Canadian National (CN)/Metra Electric tracks near 119th Street, where it would transition to an at-grade profile and then continue southeast along the Northern Indiana Commuter Transportation District Chicago South Shore & South Bend Railroad (NICTD/CSS & SBRR) ROW using a portion of the Norfolk Southern Railway and Consolidated Rail Corporation ROW to terminate at 130th Street. Four stations would be included at 103rd Street, 111th Street, Michigan Avenue, and 130th Street. Figure 4-1 shows the UPRR Rail Alternative.

Three UPRR Rail Alternative options for the segment between I-57 and the CN/Metra Electric tracks are studied in the EIS:

- ROW Option: CTA tracks placed in the UPRR ROW; UPRR trains would relocate to another corridor as part of a separate, earlier project that may occur regardless of RLE implementation. The City of Chicago is performing this separate, independent study to evaluate relocating the UPRR trains to another corridor.
- East Option: CTA tracks placed immediately adjacent to and east of the UPRR ROW.
- West Option: CTA tracks placed immediately adjacent to and west of the UPRR ROW.

Two options for the 130th Street terminal station are studied in the EIS:

- South Station Option: located to the west of the NICTD/CSS & SBRR ROW at 130th Street.
- West Station Option: located along the north side of 130th Street to the west of the NICTD/CSS & SBRR route.

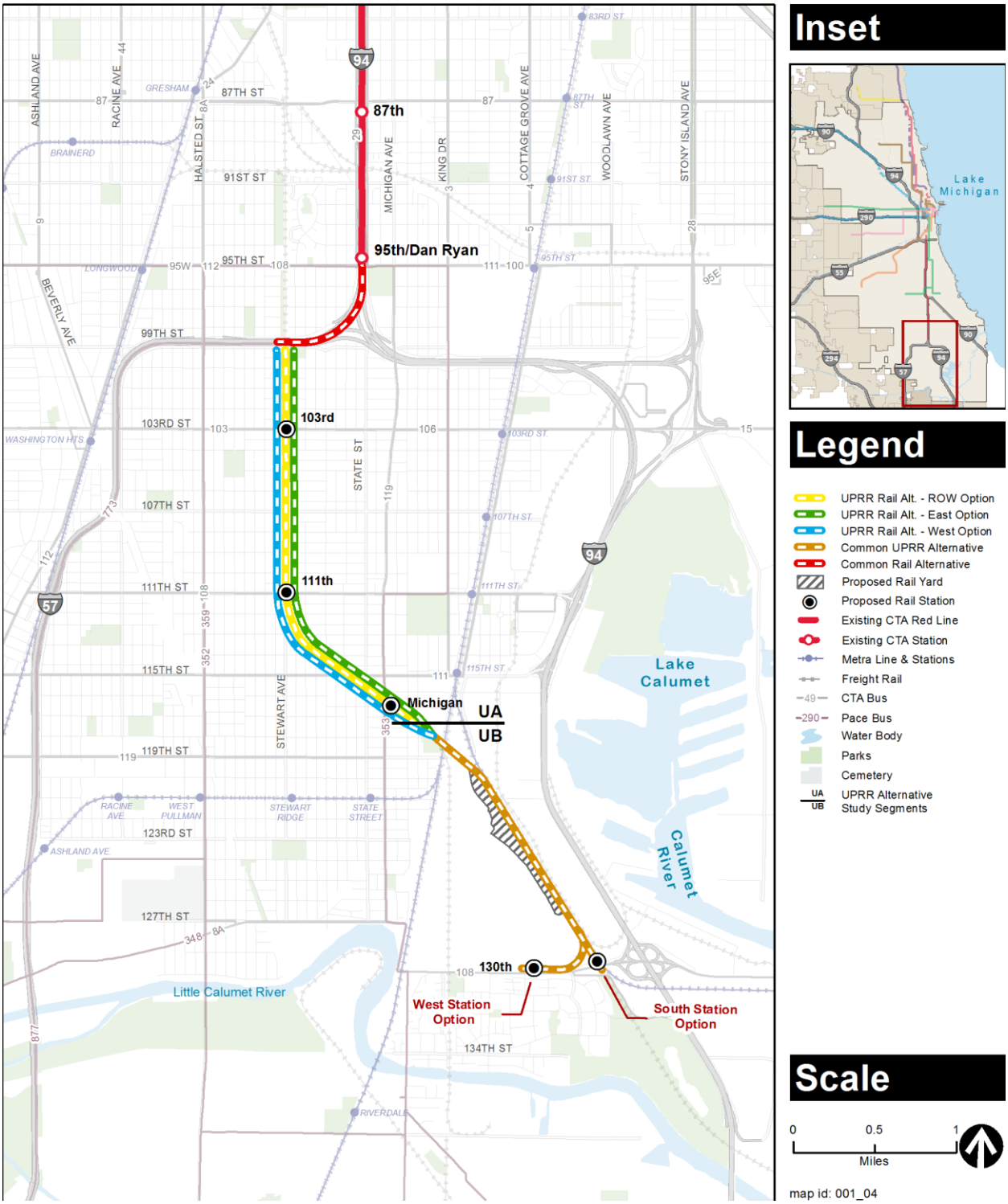


Figure 4-1: UPRR Rail Alternative Options

4.1 Infrastructure

Projects already committed through the CMAP TIP would be constructed as described for the No Build Alternative. Regular maintenance of existing track and structures would continue.

All three UPRR Rail Alternative options would include operation on elevated structure from 95th Street to the CN/Metra Electric tracks near 119th Street. The alignment would then continue at grade through an industrial area with no public through streets. Existing service driveways and Metropolitan Water Reclamation District of Greater Chicago (MWRD) access roads would be grade separated as indicated on the plans and profiles.

The elevated substructure would consist of reinforced cast-in-place concrete hammerhead piers on drilled shafts or steel piles. The superstructure would consist of steel girders with a concrete closed deck supporting direct fixation track with welded rail.

Minimum vertical clearances would be 14 feet 9 inches. At locations where the RLE alignment would cross UPRR tracks, the minimum vertical clearance would be 23 feet 4 inches.

Spans between piers are expected to typically be 60 to 100 feet, and as long as 140 feet. Span length is based on site conditions, geometrics, and clearance requirements. Table 4-1 lists the clearances between piers at viaducts and Figure 4-2 shows a typical span.

Table 4-1: UPRR Rail Alternative Span Widths at Viaducts

Street Crossing	ROW Option (feet)	East Option (feet)	West Option (feet)	Notes
I-57 ramp	105	105	105	Straddle Bent
Wentworth Avenue	85	85	85	
Northbound I-57*	100/100	100/100	100/100	Straddle Bent
UPRR*	-	-	100/100	
101st Street	75	75	75	
103rd Street	85	85	85	
107th Street	75	75	75	
109th Street	75	75	75	
111th Street	75	75	75	
Wentworth Avenue	85	85	85	
115th Street	120	120	120	Through Plate Girder
Perry Avenue	-	-	85	
State Avenue	85	85	85	
Michigan Avenue	85	85	85	

Street Crossing	ROW Option (feet)	East Option (feet)	West Option (feet)	Notes
116th Street	120	120	120	Through Plate Girder
Indiana Avenue	85	85	85	
UPRR*	-	-	85/100/10/100/100	Straddle Bent
Prairie Avenue	-	75	-	
CN/Metra Electric	100/70	115/70	110/70	Through Plate Girder

*Crossings may have multiple spans due to skewed alignment and the use of bent structure

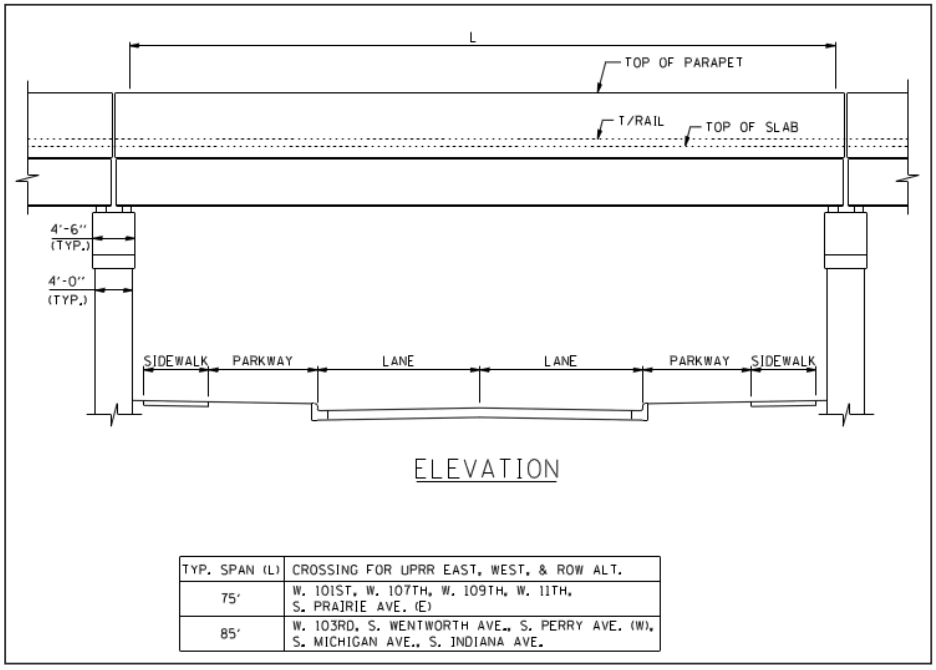


Figure 4-2: UPRR Rail Alternative typical span cross section

4.1.1 ROW Option

The UPRR Rail Alternative ROW Option would place the CTA tracks in the UPRR ROW between I-57 and the CN/Metra Electric tracks. UPRR trains along this alternative may relocate to another corridor as part of a separate, earlier project that would occur regardless of RLE implementation. Figure 4-3 shows a typical ROW Option cross section.

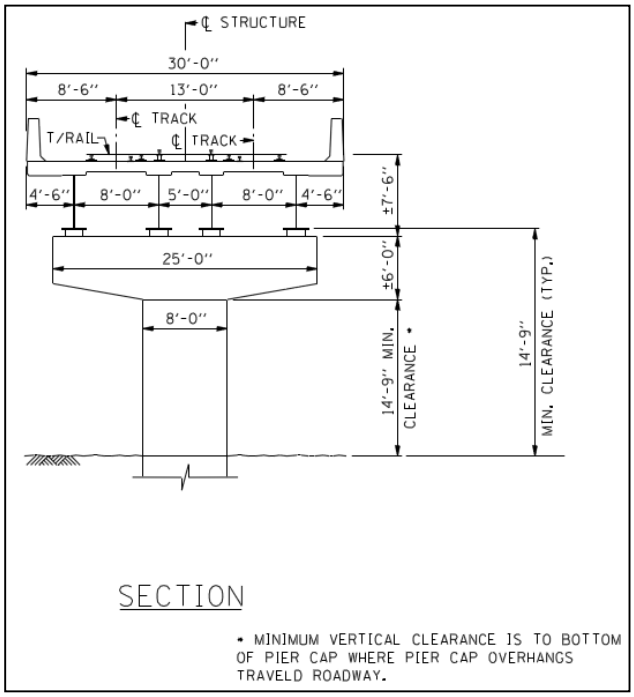


Figure 4-3: UPRR Rail Alternative ROW Option Typical Cross Section

Substations are tentatively proposed at the following locations: to the west of the CTA tracks between 104th and 105th Street, to the west of the CTA tracks between Perry Avenue and Lafayette Avenue, and to the west of the CTA tracks north of the proposed parking structure for the South Station Option or along the curve of the CTA tracks near 130th Street for the West Station Option. An additional substation is proposed within the 120th Street yard and shop facility.

4.1.2 East Option

In the UPRR Rail Alternative East Option, CTA tracks would be placed immediately adjacent to and east of the UPRR ROW between I-57 and the CN/Metra Electric tracks. The UPRR is evaluating adding a third track to the east of their two existing tracks. The distance between the centerline of the proposed easternmost UPRR third track and the CTA structure would be 50 feet except for the following locations: 103rd Street station (approximate stationing 154+00 to 181+00 and between State Street and Michigan Avenue (approximate stationing 255+00 to 270+00). Pier protection crash walls per American Railway Engineering and Maintenance-of-Way Association (AREMA) would be installed in areas where the CTA tracks are less than 50 feet from the UPRR tracks. Figure 4-4 shows a typical East Side Option cross section.

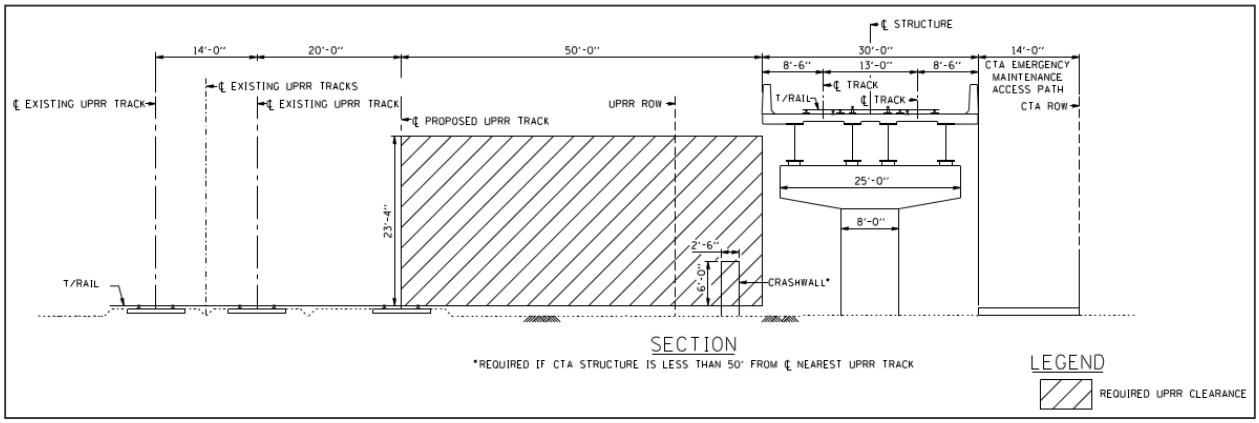


Figure 4-4: UPRR Rail Alternative East Option Typical Cross Section

The UPRR Rail Alternative East Option would include substations at the following locations: west of the UPRR tracks between 104th and 105th Streets, west of the UPRR tracks between Perry Avenue and Lafayette Avenue, and west of the CTA tracks south of the proposed yard location near 130th Street station. An additional substation is proposed within the 120th Street yard and shop facility.

4.1.3 West Option

In the UPRR Rail Alternative West Option, CTA tracks would be placed immediately adjacent to and west of the UPRR ROW between I-57 on the north end and the UPRR tracks near Kensington Park on the south end. The distance between the UPRR centerline of existing west track and the proposed CTA structure centerline of track would be 50 feet except for the following locations: 99th Street (approximate stationing 138+00 to 142+00) and at the Prairie Avenue/UPRR crossing (approximate stationing 275+00 to 285+00).

The UPRR Rail Alternative West Option would include substations at the following locations: east of the UPRR tracks between 105th Street and 105th Place, west of the UPRR tracks between Perry Avenue and Lafayette Avenue, and east of the CTA tracks south of the proposed yard location near 130th Street station. An additional substation is proposed within the 120th Street yard and shop facility.

4.2 Stations and Parking

Four stations would be included in the UPRR Rail Alternative options: 103rd Street, 111th Street, Michigan Avenue, and 130th Street. One terminal station with two options is under evaluation for the 130th Street station: the South Station Option and the West Station Option.

All stations would be island platforms, 26 feet wide and 520 feet long. Platforms would be built to accommodate ten-car trains. All stations would be ADA accessible with elevators. Station footprints are depicted on the Plans and Profiles.

Bus and park & ride facilities would be placed at all stations, with capacities of 1,500 parking spaces in the year of construction and up to 3,700 parking spaces in a later year (2030), as shown in Table 4-2.

Table 4-2: UPRR Rail Alternative Park & Ride Faciliy Parking Spaces

Location	Construction Year	Horizon Year (2030)
103rd Street	200	200
111th Street	200	200
Michigan Avenue	200	1,000
130th Street	900	2,300
Total	**1,500**	**3,700**

4.2.1 103rd Street Station

The primary entrance to the 103rd Street station would be on the north side of 103rd Street, and an auxiliary entrance would be on the north side of 103rd Place. Figure 4-5 shows an example rendering of the UPRR Rail Alternative elevated structure at the 103rd Street station.

As part of the ROW Option, two surface parking lots, each with capacity for 100 vehicles, would be located to the northeast and southwest of the intersection of 103rd Street with the UPRR tracks. A bus turnaround for CTA bus route #9 would be included at the northeast parking lot.

As part of the East Option, a surface parking lot with capacity for 75 vehicles would be located to the east of the tracks north of 103rd Street as well as a second surface parking lot with capacity for 125 vehicles located to the west of the tracks between 103rd Street and 103rd Place. A bus turnaround for CTA bus route #9 would be included at the northeast parking lot.

As part of the West Option, a surface parking lot with capacity for 200 vehicles would be located to the west of the tracks between 103rd Place and 104th Street. A bus turnaround for CTA bus route #9 would be included at the northeast corner of the 103rd Street and UPRR tracks intersection.

Source: *Locally Preferred Alternative Report, August 2009*

Figure 4-5: Example Rendering of the UPRR Rail Alternative Elevated Structure at the Proposed 103rd Street Station

4.2.2 111th Street Station

As part of the ROW and West Options, the primary entrance to the 111th Street station would be just north of 111th Street. An auxiliary entrance would be south of 110th Street.

As part of the East Option, the primary entrance to the 111th Street station would be just north of 111th Street. An auxiliary entrance would be at 110th Street.

As part of the ROW Option, two surface parking lots, each with capacity for 100 vehicles, would be located to the northeast and northwest of the intersection of 111th Street with the UPRR tracks. A bus turnaround for Pace bus route #352 would be included at the northwestern parking lot.

As part of the East Option, a surface parking lot with capacity for 55 vehicles would be located to the east of the tracks north of 110th Place, and a second surface parking lot with capacity for 145 vehicles located to the west of the tracks between 111th Street and 110th Street. A bus turnaround for Pace bus route #352 would be included at the northwestern parking lot.

As part of the West Option, a surface parking lot with capacity for 200 vehicles would be located to the west of the tracks between 110th Place and 110th Street. A bus turnaround for Pace bus route #352 would be included at the parking lot.

4.2.3 Michigan Avenue Station

As part of the ROW and West Options, the primary entrance to the Michigan Avenue station would be on the west side of Michigan Avenue, and an auxiliary entrance would be located on the south side of 116th Street.

As part of the East Option, a primary entrance to the Michigan Avenue station would be on the east side of Michigan Avenue. An auxiliary entrance would be on the north side of 116th Street.

As part of the ROW Option, a three-story parking garage with capacity for 750 vehicles would be located to the west of the tracks, northeast of the State Avenue and 116th Street intersection; the ground level of the parking garage would be available for retail and/or community facilities and would include a bus turnaround facility for CTA route #119 and Pace route #359. A second surface lot with capacity for 250 vehicles would be located to the east of the tracks, between 116th Street and Kensington Avenue.

As part of the East Option, a three-story parking garage with capacity for 825 vehicles would be located to the west of the tracks, northeast of the State Avenue and 116th Street intersection; the ground level of the parking garage would be available for retail and/or community facilities, and would include a bus turnaround facility for CTA route #119 and Pace route #359. A second surface lot with capacity for 175 vehicles would be located to the east of the tracks, between 116th Street and Kensington Avenue.

As part of the West Option, a five-story parking garage with capacity for 1,000 vehicles would be located to the west of the tracks, northeast of the State Avenue and 116th Street intersection; the ground level of the parking garage would be available for retail and/or community facilities, and would include a bus turnaround facility for CTA route #119 and Pace route #359.

4.2.4 130th Street Station

Two options for the 130th Street station will be studied in the EIS:

- South Station Option: along the NICTD/CSS & SBRR ROW at 130th Street
- West Station Option: along the north side of 130th Street to the west of the NICTD/CSS & SBRR route

The 130th Street station area is shown in Figure 4-6.

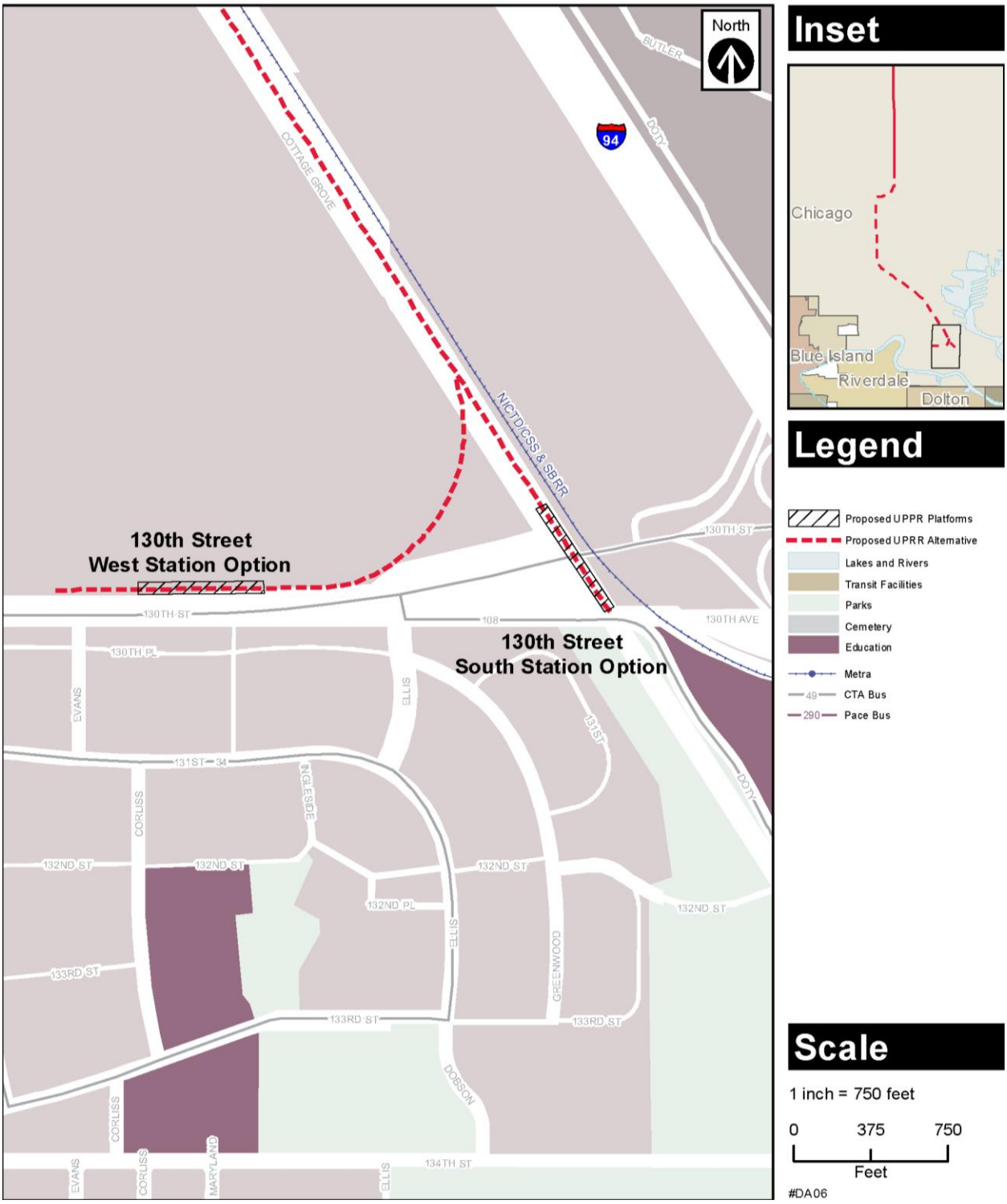


Figure 4-6: Station Area Showing South and West Station Options

The conceptual design for the station, based on Chicago Department of Transportation's December 2010 *130th Street Station Market/Access Study*, meets the needs for transit use, economic development, and connectivity to the proposed future pedestrian and bicycle trail network. The conceptual plans show a building approximately 15,000 square feet (200 feet by 75 feet), which would follow CTA's typical design standards for terminal stations. The station house would provide sufficient space for CTA customer operations, maintenance, mechanical rooms, staff offices, and areas for small retail stores. The retail area would primarily serve commuters and local residents.

Both the South and West Station Options would be configured with three tracks, creating a 600-foot long side and center platform arrangement. The boarding platform would be designed to allow for ten-car trains. The primary entrance to the station house would be handicap accessible.

Each station option would include a bus terminal with four bus bays and an overhead canopy. Buses would queue directly outside the primary entrance of the station to provide the closest possible connection between the rail line and bus routes. An auto drop-off area would be sited near the station house. Secure, weather-protected bicycle parking would be provided at the station. A park & ride facility with 2,300 parking spaces would be constructed by 2030 for the South Station Option, and a park & ride facility with 1,950 parking spaces plus a surface lot with 350 parking spaces would be constructed by 2030 for the West Station Option.

4.2.4.1 South Station Option

The South Station Option would be located between the MWRD facility (on the west) and the NICTD/CSS & SBRR rail tracks (on the east), using a portion of the Norfolk Southern Railway and Consolidated Rail Corporation right-of-ways. The concept plan shows a primary station entrance north of 130th Street at 130th Place, and an auxiliary entrance south of 130th Street between 130th Street and Doty Avenue; the tracks and platforms would extend beneath 130th Street. The handicapped-accessible auxiliary entrance on Doty Avenue would provide more convenient and direct access to Altgeld Gardens and Carver Military Academy.

The South Station Option site is constrained due to its tight location between the MWRD drying ponds and the train tracks. The parking area would be to the east of the existing MWRD fence. The parking area would be approximately 2.8 acres. In the construction year, a parking garage would be built with capacity for 900 vehicles. The parking garage would be developed into a seven-story parking garage with capacity for 2,300 vehicles by 2030.

The station area is significantly lower in elevation than 130th Street, which rises to cross the NICTD/CSS & SBRR tracks before crossing I-94. As a result, the station building would not be highly visible from the freeway or from cars travelling east towards the station entrance on Cottage Grove Avenue. The sloped areas adjacent to 130th Street limit the ability to place the South Option station house closer to the street.

Bus and vehicle traffic would enter and leave the station area from the current intersection of 130th Street and Cottage Grove Avenue. Cottage Grove Avenue, which primarily provides access to the MWRD drying ponds and truck traffic, would be relocated to circulate around the station. Ideally, transferring customers would not have to cross a general traffic lane to access bus transfer bays. Further refinement of this concept would likely eliminate general traffic from entering the parking lot near the station house. Currently, Cottage Grove Avenue intersects 130th Street at the same location as the proposed entrance to the South Option station. Cottage Grove Avenue would be relocated west of the station entrance. This would eliminate potential traffic conflicts between trucks servicing the MWRD facility and commuters entering the station. The new street alignment could also serve future commercial development along 130th Street.

4.2.4.2 West Station Option

The West Station Option would be located on the north side of 130th Street across from Evans Avenue, nearly ¼ mile west of the South Station Option location. The station would be west of Evans Avenue (on the south side of 130th Street) across from Altgeld Gardens. The West Station Option site is nearly twice the size of the South Station Option site, primarily due to available open land along the north side of 130th Street south of the MWRD facility. However, the dimensions of the station, bus terminal, and surface parking areas would be similar in total area as the South Station Option. The station area would be outside the existing MWRD fence. In the construction year, a surface lot would be constructed with capacity for 350 vehicles, and a parking garage would be built with capacity for 550 vehicles. The parking garage would be developed into a four-story parking garage with capacity for 1,950 vehicles by 2030.

There would be no intersections or crosswalks on 130th Street between Indiana Avenue and Cottage Grove Avenue. As a result, a signal and pedestrian crosswalk is proposed at the intersection of 130th Street and Evans Avenue to accommodate pedestrians from the south side of 130th Street. The proposed pedestrian crossing and signalized intersection would be located south of the primary station entrance.

4.3 120th Street Yard and Shop

A 270-car yard and shop facility would be sited on a combination of industrial/vacant land to the east of the CN/Metra Electric tracks and west of the NICTD/CSS & SBRR tracks at approximately 120th Street and Cottage Grove Avenue. The yard would be entirely at grade. A nominal amount of parking for employees would be included at the yard. A substation is tentatively proposed within the 120th Street yard on the west of the existing railroad tracks and to the east of the proposed shop facility. Figure 4-1 shows the proposed yard and shop location.

The 98th Street yard and shop at the south end of the existing Red Line could continue to be used for Red Line trains. The CTA would utilize the existing 98th Street shop for non-revenue equipment repairs once a new revenue shop is constructed.

4.4 Operating Plan

The UPRR Rail Alternative is anticipated to operate train sets consisting of eight cars. Although the design is for ten-car trains, the service plan is for eight-car trains as in operation today. The maximum scheduled capacity of each car is 90 passengers, which would provide a maximum capacity of 360 passengers for a four-car train, a maximum capacity of 720 passengers for an eight-car train, and a maximum capacity of 900 passengers for a ten-car train. The current Red Line vehicle requirement during the morning peak period is 304 cars. Based on the estimated travel time for the UPRR Rail Alternative, an additional 78 cars would be required in the morning rush period. This estimate includes 64 cars required for the schedule plus 14 spares.

CTA 2600-series rail cars are currently in use on the Red Line. As new CTA 5000-series rail cars replace older cars in the system, the cars currently operating on the Red Line could be replaced with CTA 5000-series or CTA 3200-series cars.

The hours of operation for the UPRR Rail Alternative would be the same as for the current Red Line, which operates 24 hours every day of the year. The UPRR Rail Alternative service frequency is expected to be the same as current service, which is approximately five minutes in the northbound direction and four minutes southbound during the morning peak period. Weekday service characteristics for the existing northbound Red Line and proposed UPRR Rail Alternative are presented in Table 4-3.

Table 4-3: UPRR Rail Alternative and Existing Northbound Red Line Weekday Service Characteristics

Service Period	Hours	Time Period	Average Northbound Frequency (minutes)	Train Length	Cars Required
Early Morning	3	3 AM-6 AM	13	8	
AM Peak	3	6 AM-9 AM	5	8	304
Base	6	9 AM-3 PM	7	8	184
PM Peak	3	3 PM-6 PM	5	8	304
Evening	4	6 PM-10 PM	7.5	4	
Late Evening/Owl	5	10 PM-3 AM	15	4	48

Proposed travel times during the morning peak period for the UPRR Rail Alternative are presented in Table 4-4.

Table 4-4: Northbound Red Line Travel Times for UPRR Rail Alternative

Route Segment	Travel Time (minutes)
130th to 95th Street Station	14.0
130th to Jackson Station	39.0
130th to Clark/Division Station	46.5
130th to Howard Station	75.5

Bus transit service from the south would serve the new stations. The UPRR Rail Alternative would result in the rerouting of 11 bus routes to new Red Line stations and elimination of two routes. Table 4-5 summarizes the proposed bus route changes to existing CTA bus routes that currently operate within the study area.

Table 4-5: Proposed Bus Route Changes for UPRR Rail Alternative

Bus Route	Proposed Change
#8A	None
#9	Terminate at 103rd Street station rather than 104th Street /Vincennes Avenue
#30	Terminate at 130th Street station rather than 130th Street /Exchange Avenue
#34	Terminate southbound at 130th Street station rather than 131st Street/Ellis Avenue
#103	Combine with #106; west terminal at Pulaski Avenue and east terminal at Stony Island Avenue
#106	Combine with #103; west terminal at Pulaski Avenue and east terminal at Stony Island Avenue
#108	Eliminate
#111	Serve 111th Street between 111th Street /Pulaski Avenue and 111th Street /Corliss Avenue
#112	Eliminate
#115	New bi-directional loop route via 115th Street, Cottage Grove Avenue, 95th Street, and Vincennes Avenue
#119	Terminate at 115th Street / Michigan Avenue
#348	Terminate southbound at 130th Street station rather than 136th Street /Indiana Avenue
#352	Terminate at 111th Street station rather than 95th Street station
#353	None
#359	Terminate at 115th Street station rather than 95th Street station

UPRR operates approximately 27 at-grade trains per day through this corridor. The potential exists for UPRR freight trains to affect access to the facilities in the UPRR Rail Alterative at the proposed 103rd Street and 111th Street stations. At these two stations areas, the UPRR is at-grade, so that passing freight railroad trains would interrupt access to the proposed Red Line stations. At the Michigan Avenue station, the UPRR is grade separated, so that access to the Red Line station could be maintained using Michigan Avenue, which passes underneath the UPRR.

Section 5
Halsted Rail Alternative

The proposed Halsted Rail Alternative is a five-mile extension of the existing Red Line. It would operate on an elevated structure running south from 95th Street along I-57 until Halsted Street. It would then turn south and continue along Halsted Street to the intersection of Halsted Street and Vermont Avenue near 127th Street. Four stations would be at 103rd Street, 111th Street, 119th Street, and Vermont Avenue. Figure 5-1 shows the Halsted Rail Alternative.

5.1 Infrastructure

Projects already committed through the CMAP TIP would be constructed as described for the No Build Alternative. Regular maintenance of existing track and structures would continue.

The proposed corridor would be elevated and would be required to span over I-94 and I-57, UPRR and Metra Electric, local roads, and pedestrian facilities. See Figures 5-2 and 5-3 for typical cross sections of the Halsted Rail Alternative.

The proposed typical structure required for the elevated section is anticipated to be similar to sections on the CTA's elevated Orange Line. Spans between piers would typically be 60 to 100 feet, and as long as 140 feet. Span length would be based on site conditions, geometrics, and clearance requirements. At specific locations, steel cross girder bents would be used. Lengths would be based on geometrics, horizontal clearances, and the use of pier protection crash walls per AREMA. Table 5-1 shows the horizontal clearances between piers at viaducts.

The substructure would be reinforced cast-in-place concrete hammerhead piers on drilled shafts or steel piles. The superstructure would consist of steel girders with a concrete closed deck supporting direct fixation track with welded rail. At the I-57 crossing at Halsted Street the profile height would be approximately 22 feet over the Halsted Street pavement, and approximately 34 feet over the expressway.

Minimum vertical clearances would be 14 feet 9 inches above local roads and 16 feet 6 inches above urban expressways. At locations where the proposed CTA structure would cross the UPRR, the minimum vertical clearance would be 23 feet 4 inches, per the UPRR standards. The minimum vertical clearance for the Metra Electric tracks would be 23 feet zero inches per AREMA standards.

Substations are proposed at the following locations: the northeast corner at the intersection of Halsted Street and 101st Street, the southeast corner at the intersection of Halsted Street and 110th Street, along Halsted Street between 120th Street and Metra Electric tracks, the southeast corner at the intersection of Halsted Street and 126th Street, and at the entrance to the yard along Peoria Street.

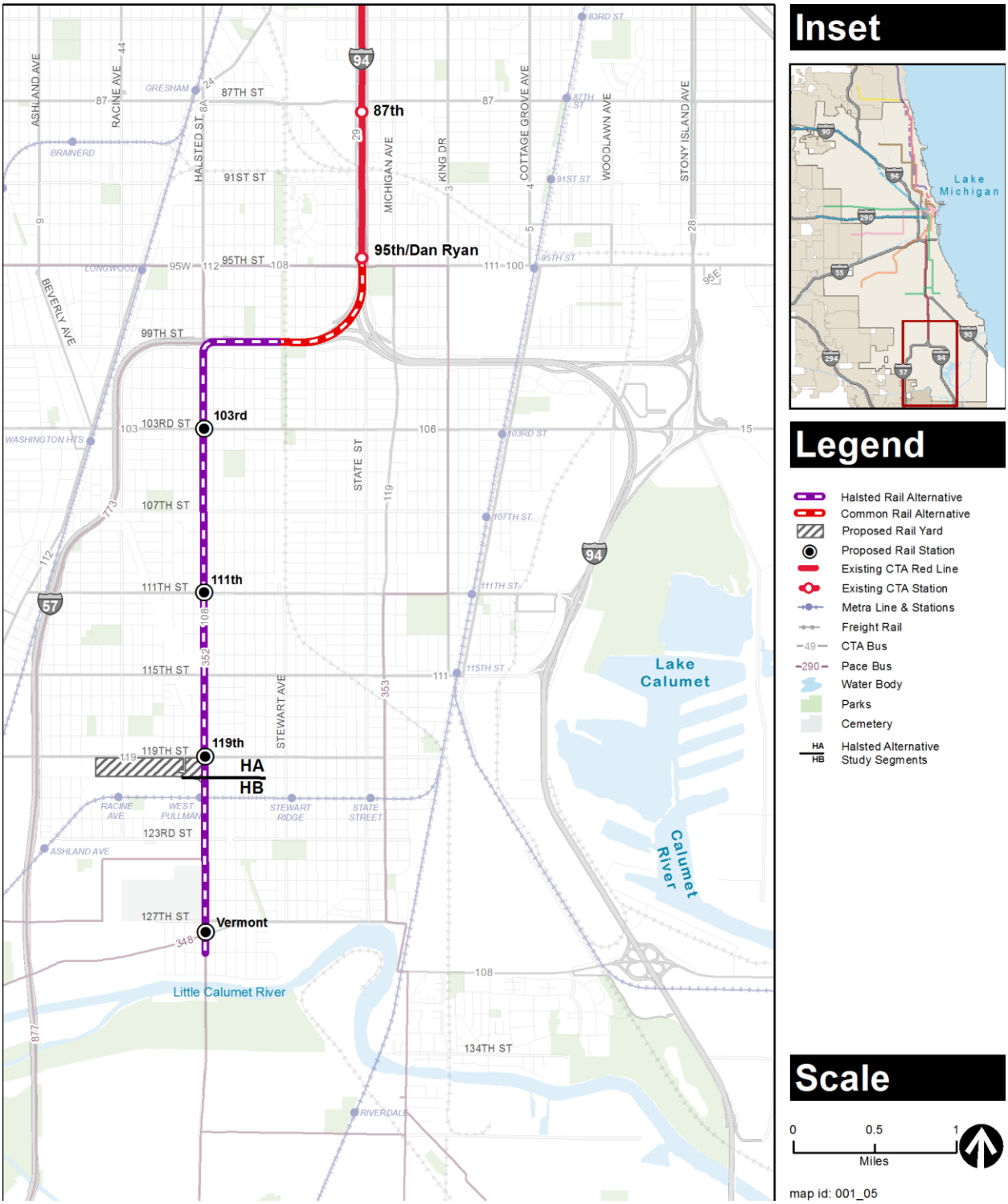
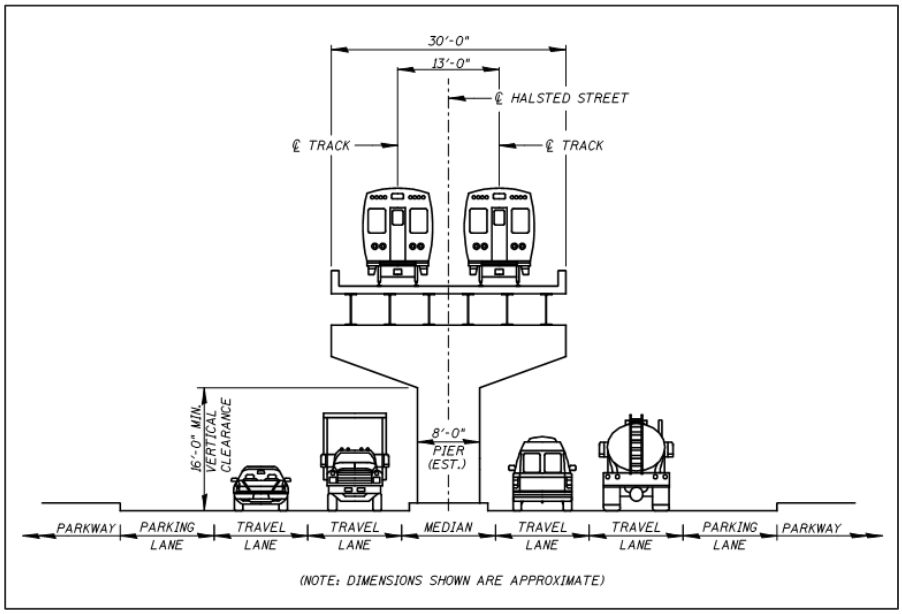
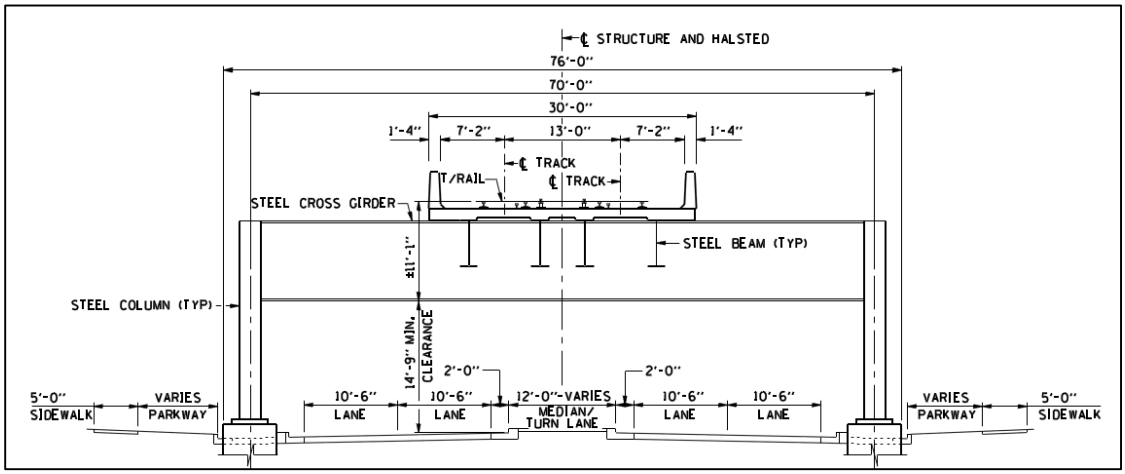


Figure 5-1: Halsted Rail Alternative



Source: *Red Line Extension Early Engineering Review Memo*

Figure 5-2: Halsted Rail Alternative Typical Hammerhead Cross Section



Source: *Red Line Extension Plans and Profiles*

Figure 5-3: Halsted Rail Alternative Typical Straddle Bent Cross Section

Table 5-1: Halsted Rail Span Widths at Viaducts

Street Crossing	Track Span Widths (feet)	Notes
I-57 Ramp	105	Straddle Bent
Wentworth Avenue	85	
UPRR	65	
Parnell Avenue	65	
Northbound I-57*	100/100	Straddle Bent

Street Crossing	Track Span Widths (feet)	Notes
Halsted Street*	100/100	Straddle Bent
100th Street	85	Straddle Bent
101st Street	85	Straddle Bent
102nd Street	75	Straddle Bent
103rd Street	75	Straddle Bent
104th Street	75	Straddle Bent
105th Street	85	Straddle Bent
106th Street	85	Straddle Bent
107th Street	85	Straddle Bent
108th Street	75	Straddle Bent
109th Street	70	Straddle Bent
110th Street	75	Straddle Bent
111th Street	80	Straddle Bent
112th Street	75	Straddle Bent
113th Street	75	Straddle Bent
114th Street	80	Straddle Bent
115th Street	85	Straddle Bent
116th Street	85	Straddle Bent
117th Street	85	Straddle Bent
118th Street	80	Straddle Bent
119th Street	85	Straddle Bent
120th Street	85	Straddle Bent
Metra Electric District – Blue Island Branch	80	Straddle Bent
122nd Street	70	Straddle Bent
123rd Street	75	Straddle Bent
124th Street	70	Straddle Bent
125th Street	70	Straddle Bent
126th Street	75	Straddle Bent
127th Street	85	Straddle Bent
Vermont Avenue	120	Straddle Bent
128th Street	75	Straddle Bent
129th Street	70	Straddle Bent

* Crossings may have multiple spans due to skewed alignment and the use of bent structure

5.2 Stations and Parking

This alternative would include four stations at 103rd Street, 111th Street, 119th Street, and Vermont Avenue. The 103rd, 111th, and 119th Street stations would be side platforms, with a minimum of 14 feet wide and 520 feet long with shelters. The Vermont Avenue station would be an island platform 26 feet wide and 520 feet long. Bus and park & ride facilities would be sited at all stations as shown in Table 5-2. All stations would be ADA accessible with elevators and stairs. Station footprints are depicted on the Plans and Profiles.

Table 5-2: Halsted Rail Alternative Park & Ride Facility Parking Spaces

Location	Construction Year	Horizon Year (2030)
103rd Street	200	200
111th Street	200	200
119th Street	200	1,000
Vermont Avenue	900	2,300
Total	1,500	3,700

5.2.1 103rd Street Station

Station entrances would be located on the east and west sidewalks of Halsted Street at the intersection with 103rd Street. The primary station entrance would be north of the intersection and the auxiliary entrance would be south of the intersection. Each entrance area would be on street level and contain an elevator and stairs.

The 103rd Street station would have a surface park & ride lot on the northwest parcel adjacent to the station at the intersection of 103rd Street and Halsted Street. This lot would provide approximately 200 parking spaces. A bus turnaround for CTA bus route #9 would be included at the northeast parking lot.

5.2.2 111th Street Station

Station entrances would be located on the east and west sidewalks of Halsted Street at the intersection with 111th Street. The primary station entrance would be north of the intersection and the auxiliary entrance would be south of the intersection. Each entrance area would be on street level and contain an elevator and stairs.

The 111th Street station would have a park & ride lot on the northwest parcel adjacent to the station at the intersection of 111th Street and Halsted Street. This lot would provide approximately 200 parking spaces.

5.2.3 119th Street Station

Station entrances would be located on the east and west sidewalks of Halsted Street at the intersection with 119th Street. The primary station entrance would be north of the intersection

with 119th Street and the auxiliary entrance would be south of the intersection with 118th Street. Each entrance area would be on street level and contain an elevator and stairs.

The 119th Street station would have a surface park & ride facility that would hold approximately 1,000 parking spaces. The lot would be on the southwest parcel at the intersection of 119th Street and Halsted Street. A bus turnaround for Pace bus route #359 would be included at the parking lot.

5.2.4 Vermont Street Station

Station entrances would be located on the east and west sidewalks of Halsted Street between the 128th Street and Vermont Avenue. The primary station entrance would be south of Vermont Avenue and the auxiliary entrance would be north of 128th Street. Each entrance area would be on street level and contain an elevator and stairs.

The Vermont Street station would have a surface park & ride lot with approximately 300 parking spaces located to the east of Halsted Street between Vermont Avenue and 128th Street. A seven-story park & ride facility with capacity for an addition 2,000 vehicles would be located to the west of Halsted Street between Vermont Avenue and 128th Street; the ground level of the parking garage would be available for CTA office space as well as retail and/or community facilities. Bus bays for CTA bus route #8A and Pace routes #348 and #352 would be included at the station.

5.3 119th Street Yard and Shop

The 119th Street yard and shop would be located south of the 119th Street station and north of Vermont Avenue station to the west of Halsted Street. The parcel on which the yard and shop would be constructed sits west of the proposed park & ride facility at the 119th Street station. Track height would transition from elevated at station height to at-grade between Halsted Street and Morgan Street, through the proposed park & ride facility. The yard would be entirely at grade. A nominal amount of parking for employees would be included at the yard. Figure 5-1 shows the location of the proposed yard and shop.

The 98th Street yard and shop at the south end of the existing Red Line could continue to be used for Red Line trains. The CTA would utilize the existing 98th Street shop for non-revenue equipment repairs once a new revenue equipment shop is constructed at 119th Street.

5.4 Operating Plan

The Halsted Rail Alternative is anticipated to operate train sets consisting of eight cars. Although the design is for ten-car trains, the service plan is for eight-car trains as in operation today. The maximum scheduled capacity of each car is 90 passengers, which would provide a maximum capacity of 360 passengers for a four-car train, a maximum capacity of 720 passengers for an eight-car train, and a maximum capacity of 900 passengers for a ten-car train. The current Red Line vehicle requirement during the morning peak period is 304 cars. Based on the estimated travel

time for the Halsted Rail Alternative, an additional 78 cars would be required in the morning rush period. This estimate includes 64 cars required for the schedule plus 14 spares.

CTA 2600-series rail cars are currently in use on the Red Line. As new CTA 5000-series rail cars replace older cars in the system, the cars currently operating on the Red Line could be replaced with CTA 5000-series or CTA 3200-series cars.

The hours of operation for the Halsted Rail Alternative would be the same as for the current Red Line, which operates 24 hours every day of the year. The Halsted Rail Alternative service frequency is expected to be the same as current service, which is approximately five minutes in the northbound direction and four minutes southbound during the morning peak period.

Bus transit service from the south would serve the new stations. The bus routes in the vicinity of the Halsted Rail Alternative would be modified to enhance connectivity between the Red Line and the existing bus network. Table 5-3 summarizes the proposed bus route changes to existing CTA bus routes that currently operate within the study area.

Table 5-3: Proposed Bus Route Changes for Halsted Rail Alternative

Bus Route	Proposed Change
#8A	None
#9	Terminate at 103rd Street station rather than 104th Street/Vincennes Avenue
#30	None
#34	None
#103	Combine with #106
#106	Combine with #103
#108	Eliminate
#111	Serve 111th Street between 111th Street/Pulaski Avenue and 111th Street/Corliss Avenue
#112	Eliminate
#115	New bi-directional loop route via 115th Street, Cottage Grove Avenue, 95th Street, and Vincennes Avenue
#119	Terminate at 115th Street/Michigan Avenue
#348	None
#352	Terminate at Vermont Avenue
#353	None
#359	Terminate at 119th Street

Section 6
Additional Resources

The following resources were used in preparing this technical memorandum.

Alternatives Analysis (https://team.cdm.com/eRoom/il/CTA_RedLineExtension_DEIS/0_1045d)

- Screen 1 Report (December 2008)
- Screen 2 Report (March 2009)
- Screen 3 Report (November 2009)
- Definition of Alternatives Summary - Draft (July 2009)
- RLE Locally Preferred Alternative Report (August 2009)

CDOT 130th Street Terminal Report (December 2010)
(https://team.cdm.com/eRoom/il/CTA_RedLineExtension_DEIS/0_f737)

CWC Early Draft EIS Work
(https://team.cdm.com/eRoom/il/CTA_RedLineExtension_DEIS/0_10004)

- Early Engineering Review (May 2011)
- Parkland Impacts Evaluation (May 2011)
- UPRR Alignment Options Impacts (June 2011)

CMAP Transportation Improvement Program (TIP) (http://www.cmap.illinois.gov/tip)

RLE EIS Plans and Profiles
(https://team.cdm.com/eRoom/il/CTA_RedLineExtension_DEIS/0_f4d6)

Appendix A
2014-2015 Red Line Extension Project Update

2014–2015 Red Line Extension Project Update

From 2012-2014, CTA evaluated benefits and impacts of four alternatives: the No Build Alternative, the Bus Rapid Transit Alternative (along Michigan Avenue), the Union Pacific Railroad (UPRR) Rail Alternative, and the Halsted Alternative. CTA evaluated three options of the UPRR Rail Alternative: Right-of-Way Option, East Option, and West Option. CTA also evaluated two options of the UPRR Rail Alternative 130th Street station: a South Station Option and a West Station Option. Based on the project description provided in Section 2 of this technical memorandum, CTA analyzed the impacts of these alternatives and station options. The benefits and impacts are included in the technical memoranda prepared in 2012-2014.

In August 2014, based on the technical analysis and public input, CTA announced the NEPA Preferred Alternative—the UPRR Rail Alternative. Additional conceptual engineering was conducted on the UPRR Rail Alternative to refine the East and West Option alignments. In addition, CTA is considering only the South Station Option of the 130th Street Station.

In late 2014 and early 2015, CTA conducted additional engineering and revised assumptions on the East and West Options to refine the alignments. The refinement of the East and West Options consisted of the following items:

- For the segment of the alignment along I-57, CTA shifted the proposed alignment from the median of I-57 to the north side of I-57 within the existing expressway right-of-way. The construction would be less complex, safer for construction workers, and have a shorter duration. The shift would also allow for fewer impacts to Wendell Smith Park for the East Option, and would allow for no permanent impacts to Wendell Smith Park for the West Option.

- CTA modified the curve speeds as the alignment heads south from I-57 along the UPRR tracks. The curve speed for both the East and West Options would be 35 mph.

- CTA shifted the East Option alignment near 103rd Street station to minimize impacts to Block Park and the Roseland Pumping Station.

- CTA modified the curves south of 103rd Street for both the East and West Options to 55 mph to maximize the train speed.

- CTA refined the layout of the 120th Street yard and shop to optimize yard operations. The refined layout of the yard would accommodate 340 train cars.

The refinement of the East and West Option alignments minimizes potential impacts to parks while providing flexibility for future design phases. The Draft Environmental Impact Statement contains the benefits and impacts of the refined East and West Option alignments and supersedes information presented in other chapters of this technical memorandum