Appendix P
Safety and Security Technical Memorandum

RED AHEAD
Moving Ahead to a Better Red

Red Line Extension

Chicago Red Line Extension Project

Safety and Security
Technical Memorandum

April 27, 2015
Updated September 9, 2015

Prepared for:
Chicago Transit Authority
567 W. Lake Street
Chicago, IL 60661

Prepared by:
CWC Transit Group
125 S. Wacker Drive
Suite 600
Chicago, IL 60606

cta

Table of Contents

Section 1 Summary 1-1
1.1 Safety and Security Defined 1-1
1.2 Key Findings 1-1
1.2.1 No Build Alternative 1-1
1.2.2 Bus Rapid Transit Alternative 1-1
1.2.3 Union Pacific Railroad Rail Alternative 1-2
1.2.4 Halsted Rail Alternative 1-3
1.3 2014-2015 Red Line Extension Project Update 1-4

Section 2 Introduction 2-1

Section 3 Methods for Impact Evaluation 3-1
3.1 Regulatory Framework 3-1
3.1.1 Federal 3-1
3.1.2 State 3-2
3.1.3 Regional and Local 3-3
3.1.3.1 Regional Transportation Authority of Northeastern Illinois 3-3
3.1.3.2 Chicago Transit Authority 3-3
3.1.3.3 City of Chicago 3-4
3.1.3.4 Village of Calumet Park 3-5
3.1.4 Other 3-5
3.1.4.1 National Fire Protection Association 3-5
3.1.4.2 Union Pacific Railroad 3-6
3.2 Impact Analysis Thresholds 3-7
3.2.1 Construction Impacts 3-7
3.3 Area of Potential Impact 3-8
3.4 Methods 3-8
3.4.1 Safety 3-9
3.4.2 Security 3-10

Section 4 Affected Environment 4-1
4.1 Bus Rapid Transit Alternative 4-1
4.1.1 Major Safety and Security Incidents on CTA Bus System 4-1
4.1.2 Crime Summary 4-1

4.1.3 Pedestrian Safety 4-2
4.1.4 Pedestrian Security 4-4
4.1.5 Emergency Services 4-4
4.2 Union Pacific Railroad Rail Alternative 4-4
4.2.1 Major Safety and Security Incidents on CTA Rail System 4-4
4.2.2 Crime Summary 4-4
4.2.3 Segment UA 4-7
4.2.3.1 Pedestrian Safety 4-7
4.2.3.2 Pedestrian Security 4-10
4.2.3.3 Highway-Rail Grade Crossings 4-10
4.2.3.4 Emergency Services 4-11
4.2.4 Segment UB 4-12
4.2.4.1 Pedestrian Safety 4-12
4.2.4.2 Pedestrian Security 4-14
4.2.4.3 Emergency Services 4-14
4.3 Halsted Rail Alternative 4-14
4.3.1 Major Safety and Security Incidents on CTA Rail System 4-14
4.3.2 Crime Summary 4-14
4.3.3 Segment HA 4-14
4.3.3.1 Pedestrian Safety 4-15
4.3.3.2 Pedestrian Security 4-18
4.3.3.3 Emergency Services 4-18
4.3.4 Segment HB 4-18
4.3.4.1 Pedestrian Safety 4-18
4.3.4.2 Pedestrian Security 4-19
4.3.4.3 Emergency Services 4-19

Section 5 Impacts and Mitigations 5-1
5.1 No Build Alternative 5-1
5.2 Bus Rapid Transit Alternative 5-1
5.2.1 Permanent Impacts and Mitigations - Bus Rapid Transit Alternative 5-1
5.2.2 Construction Impacts and Mitigations - Bus Rapid Transit Alternative 5-5
5.2.3 Cumulative Impacts and Mitigations - Bus Rapid Transit Alternative 5-5
5.3 Union Pacific Railroad Rail Alternative - Right-of-Way Option 5-6

5.3.1 Permanent Impacts and Mitigations - Union Pacific Railroad Rail Alternative - Right-of-Way Option 5-6
5.3.1.1 Segment UA 5-6
5.3.1.2 Segment UB 5-10
5.3.2 Construction Impacts and Mitigations - Union Pacific Railroad Rail Alternative - Right-of-Way Option 5-12
5.3.2.1 Segment UA 5-12
5.3.2.2 Segment UB 5-13
5.3.3 Cumulative Impacts and Mitigations – Union Pacific Railroad Rail Alternative - Right-of-Way Option 5-13
5.3.4 120th Street Yard and Shop 5-13
5.3.4.1 Permanent Impacts and Mitigations 5-13
5.3.4.2 Construction Impacts and Mitigations 5-14
5.4 Union Pacific Railroad Rail Alternative - East Option 5-14
5.4.1 Permanent Impacts and Mitigations - Union Pacific Railroad Rail Alternative - East Option 5-14
5.4.1.1 Segment UA 5-14
5.4.1.2 Segment UB 5-17
5.4.2 Construction Impacts and Mitigations - Union Pacific Railroad Rail Alternative - East Option 5-18
5.4.2.1 Segment UA 5-18
5.4.2.2 Segment UB 5-18
5.4.3 Cumulative Impacts and Mitigations - Union Pacific Railroad Rail Alternative - East Option 5-18
5.4.3.1 Segment UA 5-18
5.4.3.2 Segment UB 5-19
5.4.4 120th Street Yard and Shop 5-19
5.5 Union Pacific Railroad Rail Alternative - West Option 5-19
5.5.1 Permanent Impacts and Mitigations - Union Pacific Railroad Rail Alternative - West Option 5-19
5.5.1.1 Segment UA 5-19
5.5.1.2 Segment UB 5-20
5.5.2 Construction Impacts and Mitigations - Union Pacific Railroad Rail Alternative - West Option 5-20
5.5.2.1 Segment UA 5-21
5.5.2.2 Segment UB 5-21

5.5.3 Cumulative Impacts and Mitigations - Union Pacific Railroad Rail Alternative - West Option 5-21
5.5.3.1 Segment UA 5-21
5.5.3.2 Segment UB 5-21
5.5.4 120th Street Yard and Shop 5-21
5.6 Halsted Rail Alternative 5-21
5.6.1 Permanent Impacts and Mitigations - Halsted Rail Alternative 5-21
5.6.1.1 Segment HA 5-21
5.6.1.2 Segment HB 5-24
5.6.2 Construction Impacts and Mitigations - Halsted Rail Alternative 5-26
5.6.2.1 Segment HA 5-27
5.6.2.2 Segment HB 5-27
5.6.3 Cumulative Impacts and Mitigations – Halsted Rail Alternative 5-27
5.6.4 119th Street Yard and Shop 5-27
5.6.4.1 Permanent Impacts and Mitigations 5-27
5.6.4.2 Construction Impacts and Mitigations 5-28

Section 6 Impacts Remaining after Mitigation 6-1
6.1 No Build Alternative 6-1
6.2 Bus Rapid Transit Alternative 6-1
6.3 Union Pacific Railroad Rail Alternative - Right-of-Way Option 6-2
6.3.1 Segment UA 6-2
6.3.2 Segment UB 6-3
6.3.3 120th Street Yard and Shop 6-4
6.4 Union Pacific Railroad Rail Alternative - East Option 6-4
6.4.1 Segment UA 6-4
6.4.2 Segment UB 6-5
6.4.3 120th Street Yard and Shop 6-5
6.5 Union Pacific Railroad Rail Alternative - West Option 6-5
6.5.1 Segment UA 6-5
6.5.2 Segment UB 6-6
6.5.3 120th Street Yard and Shop 6-6
6.6 Halsted Rail Alternative 6-6
6.6.1 Segment HA 6-6
6.6.2 Segment HB 6-7

6.6.3 119th Street Yard and Shop 6-8

Section 7 References Cited 7-1

Appendices

Appendix A: Tables and Figures

Appendix B: 2014-2015 Red Line Extension Project Update

Figures

Figure 2-1: RLE Project Alternatives 2-2
Figure 4-1: Reported Chicago Transit Authority-Related Crimes in Chicago (2009-2011) 4-6
Figure 4-2: 103rd Street at the Union Pacific Railroad tracks, looking west 4-8
Figure 4-3: 111th Street at the Union Pacific Railroad tracks, looking west 4-9
Figure 4-4: 130th Street at Evans Avenue, looking east 4-13
Figure 4-5: 130th Street/Doty Avenue at the Kensington Branch rail line, looking west 4-13
Figure 4-6: 103rd Street and Halsted Street, looking northwest 4-15
Figure 4-7: 111th Street and Halsted Street, looking northwest 4-16
Figure 4-8: 119th Street and Halsted Street, looking northwest 4-17
Figure 4-9: Halsted Street and Vermont Avenue, looking northeast 4-19
Figure 5-1: Potential Sidewalk Connections at 103rd Street Station Parking Lots 5-8
Figure 5-2: Pedestrian Crossing Gates at Isabella Street on Chicago Transit Authority Purple Line 5-17
Figure 5-3: Intertrack Fencing at a Metra Station 5-17
Figure 5-4: Multiple Threat Pedestrian Crash 5-26
Figure A-1: Emergency Services Map A-5
Figure A-2: Crime Heat Map - North Area A-6
Figure A-3: Crime Heat Map - Southwest Area A-7
Figure A-4: Crime Heat Map - Southeast Area A-8

Tables

Table 3-1: CTA Risk Assessment Matrix 3-9
Table 4-1: Crashes at 103rd Street and Union Pacific Railroad Grade Crossing 4-11
Table 4-2: Crashes at 111th Street and Union Pacific Railroad Grade Crossing 4-11
Table 5-1: Change in Major Incidents for Bus Rapid Transit Alternative 5-1
Table 5-2: Change in Major Incidents for Segment UA 5-6

Table 5-3: Change in Major Incidents for Segment UB 5-10
Table 5-4: Calculated Expected Crash Frequencies at Union Pacific Railroad Grade Crossings5-16
Table 5-5: Change in Major Incidents for Segment HA 5-22
Table 5-6: Change in Major Incidents for Segment HB 5-25
Table 6-1: Impacts Remaining after Mitigation - Bus Rapid Transit Alternative 6-1
Table 6-2: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Right-of-Way Option, Segment UA 6-2
Table 6-3: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Rail Alternative ROW Option, Segment UB 6-3
Table 6-4: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Rail Alternative Right-of-Way Option, 120th Street Yard and Shop 6-4
Table 6-5: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Rail Alternative East Option, Segment UA 6-5
Table 6-6: Impacts Remaining after Mitigation - Halsted Rail Alternative, Segment HA 6-6
Table 6-7: Impacts Remaining after Mitigation - Halsted Rail Alternative, Segment HB 6-7
Table 6-8: Impacts Remaining after Mitigation - Halsted Rail Alternative, 119th Street Yard and Shop 6-8
Table A-1: Safety and Security Incident Summary for Entire Chicago Transit Authority Bus System A-1
Table A-2: Safety and Security Incident Summary for Entire Chicago Transit Authority Rail System A-1
Table A-3: Crimes on Chicago Transit Authority Buses and at Bus Stops A-2
Table A-4: Crimes on Chicago Transit Authority Trains, Platforms, and Other Property in Chicago A-3
Table A-5: Pedestrian Crashes within ⅛ mile of Proposed Station Locations A-3

Abbreviations

ADA	Americans with Disabilities Act
ADT	average daily traffic
BRT	Bus Rapid Transit
CDOT	Chicago Department of Transportation
CFR	Code of Federal Regulations
CHA	Chicago Housing Authority
CTA	Chicago Transit Authority
EIS	Environmental Impact Statement
FTA	Federal Transit Administration
ICC	Illinois Commerce Commission
IDOT	Illinois Department of Transportation
mph	miles per hour
MUTCD	Manual on Uniform Traffic Control Devices
MWRD	Metropolitan Water Reclamation District
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
RLE	Red Line Extension
ROW	right-of-way
RTA	Regional Transit Authority
RTD	Regional Transportation District
UPRR	Union Pacific Railroad
VMT	vehicle miles traveled
VRH	vehicle revenue hours

Section 1
Summary

This technical memorandum was prepared to support an environmental impact statement (EIS) for the Chicago Transit Authority (CTA) Red Line Extension (RLE) Project. The purpose is to identify, evaluate, and characterize potential safety and security impacts and mitigation measures within the project area or associated with various RLE Project alternatives. Impacts can relate to transit patrons, employees, pedestrians, motorists, and the public.

1.1 Safety and Security Defined

Safety refers to freedom from harm resulting from unintentional acts or circumstances. With regard to the RLE Project, safety includes all incidents within the CTA right-of-way (ROW); including areas along tracks, in yards, and at stations, meeting certain threshold criteria (see Section 3.2). Examples could include collisions, derailments, fires, property damage, injuries, and fatalities.

Security refers to freedom from harm resulting from intentional acts or circumstances. Intentional acts include crimes, and must be reported if the intentional act meets thresholds for notification as specified in the Federal Transit Administration's (FTA's) State Safety Oversight Rule (40 Code of Federal Regulations [CFR] Part 659).

1.2 Key Findings

The following sections summarize the identified adverse impacts for each alternative considered, the mitigation measures to address the adverse impacts, and the impacts remaining after mitigation. Issues that the local community identified as important safety and security concerns are also addressed in the summary. Details regarding impacts that are not adverse or not substantially adverse can be found in Section 5 and Section 6 in this document.

1.2.1 No Build Alternative

There would be no expected permanent impacts, construction impacts, or cumulative impacts on safety and security associated with the No Build Alternative. Therefore, there would be no mitigation measures and no impacts remaining after mitigation.

1.2.2 Bus Rapid Transit Alternative

The Bus Rapid Transit (BRT) Alternative would have the following impacts:

- Pedestrian Safety - An adverse impact was identified at the proposed Kensington Avenue stop because a large number of pedestrians would need to cross Michigan Avenue without traffic controls or other pedestrian safety treatments. This impact would be mitigated through the installation of traffic signals, median refuge islands, and/or other pedestrian crossing

treatments as applicable in coordination with the results of traffic studies completed during the final design phase. The impact remaining after mitigation would be not adverse.

- Bus Stop Security - The public scoping comments included concerns about the potential for crime at stops. In general, either existing major bus stops would be upgraded with new shelters, or BRT stops would be located away from existing crime hot spots. With increased ridership, more pedestrian activity would be expected than under the No Build Alternative. The bus stop crime impacts would all be either not adverse or beneficial.

- Parking Security - All parking facilities would be designed, constructed, and operated with features such as open design, lighting, surveillance cameras and/or security patrols, convex mirrors, emergency push buttons, fencing, and landscaping. For surface lots, pedestrian access routes through or adjacent to parking lots would be considered on a case-by-case basis where they could increase the pedestrian activity and pass-by surveillance. Given these design elements, there would be no adverse impacts on parking security.

- Neighborhood Security - The public scoping comments included concerns about the potential for increased crime in neighborhoods surrounding proposed stops. The addition of BRT service in an existing corridor served by frequent bus service (route #34) would not be expected to generate changes in travel patterns or demographics to an extent that would affect crime in surrounding neighborhoods. Therefore, there would be no adverse impacts on neighborhood security.

- Emergency Services - The public comments received during the scoping period included concerns about the ability of first responders to access construction areas and it is assumed that there would also be concerns about access through construction areas. It is expected that the BRT Alternative would be constructed with equipment temporarily occupying the parking lane, and without closures of the through travel lanes. Therefore, access for emergency services would not be restricted, and the impacts would be not adverse.

1.2.3 Union Pacific Railroad Rail Alternative

The UPRR Rail Alternative would have the following impacts:

- Pedestrian Safety - An adverse impact was identified at the proposed 103rd Street, 111th Street, and Michigan Avenue stations because a large number of pedestrians would need to cross major streets without traffic controls or other pedestrian safety treatments. This impact would be mitigated through the installation of traffic signals, median refuge islands, and/or other pedestrian crossing treatments as applicable in coordination with the results of traffic studies completed during the final design phase. The remaining impact would be not adverse.

- Station Security - The public scoping comments included concerns about the potential for crime at stations. All stations would be designed and constructed in compliance with the standards and guidelines in CTA's *Design and Rehabilitation Criteria Manual* (1996) and other

design guidelines. Stations would be well lit, with clear lines of sight. The final design would consider lines of sight for surveillance by station personnel as well as video cameras. Given these design elements, there would be no adverse impacts on station security.

- Parking Security - As described for the BRT Alternative above, all parking facilities and pedestrian access routes would be designed, constructed, and operated with security features. Given these design elements, there would be no adverse impacts on parking security.

- Neighborhood Security - The public scoping comments included concerns about the potential for increased crime in neighborhoods surrounding proposed stations. A literature review of multiple sources found that new train stations would be unlikely to have much, if any, impact on neighborhood crime (Plano 1993, Denver Regional Transportation District [RTD] 2006, Liggett et al. 2003, San Diego Association of Governments 2007). However, some studies have found a correlation between train service and higher crime rates, particularly in low-income areas similar to the project area (Poister 1996, Ihlanfeldt 2003, Block and Davis 1996). The impact would therefore be not substantially adverse. Suggested mitigation measures would be security surveillance cameras and sidewalk lighting along commercial streets within the immediate vicinity (one block, or 660 feet) of train station entrances. The remaining impacts would be not adverse.

- Highway-Rail Crossings - An increase in train volumes, pedestrian volumes, and motor vehicle volumes in the vicinity of the 103rd Street and 111th Street stations would have both cumulative and permanent adverse impacts on safety for the East Option and the West Option. Pedestrian gates blocking the sidewalks is a potential mitigation measure for these two at-grade crossings. Fencing could be installed around parking lots and ROW lines, or intertrack fencing could be installed between the Union Pacific Railroad (UPRR) tracks to prevent pedestrians from crossing the tracks at places other than the designated locations. The remaining impacts would be not adverse.

- Emergency Services - The public comments received during the scoping period included concerns about the ability of first responders to access construction areas and it is assumed that there would also be concerns about access through construction areas. Emergency services would be able to access construction sites at all times in the same way contractors access the sites, and detours would be needed at times due to roadway closures. The impacts would be not substantially adverse. As a mitigation, to minimize detour lengths, neither adjacent roadways nor adjacent through streets operating in the same direction would be closed simultaneously. The remaining impacts would be not substantially adverse.

1.2.4 Halsted Rail Alternative

The Halsted Rail Alternative would have the following impacts:

- Station Security - The public scoping comments included concerns about the potential for crime at stations. As described for the UPRR Rail Alternative above, all stations would be

designed and constructed in compliance with CTA guidelines and standards, and would incorporate security features. Given these design elements, there would be no adverse impacts on station security.

- Parking Security - As described for the BRT Alternative above, all parking facilities and pedestrian access routes would be designed, constructed, and operated with security features. Given these design elements, there would be no adverse impacts on parking security.

- Neighborhood Security - The public scoping comments included concerns about the potential for increased crime in neighborhoods surrounding proposed stations. As explained above for the UPRR Rail Alternative, research associated with this issue indicates that the impact would be not substantially adverse. The suggested mitigation measures would be the same as for the UPRR Rail Alternative.

- Emergency Services - The public comments received during the scoping period included concerns about the ability of first responders to access construction areas and it is assumed that there would also be concerns about access through construction areas. Emergency services would be able to access construction sites at all times in the same way contractors access the sites, and detours would be needed at times due to roadway closures. The impacts would be not substantially adverse. As a mitigation, only short segments of Halsted Street (less than ½ mile long) would be closed at any given time to prevent adjacent major cross streets from being closed simultaneously. The remaining impacts would be not substantially adverse.

1.3 2014-2015 Red Line Extension Project Update

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 B of this technical memorandum summarizes the refined alignments and any additional or different impacts that would result. The information in Appendix B supersedes information presented in other chapters of this technical memorandum.

Section 2
Introduction

The CTA is proposing to extend the Red Line from the existing 95th Street Terminal to the vicinity of 130th Street, subject to the availability of funding. The proposed RLE would include four stations. Each station 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 CTA is also planning 95th Street Terminal improvements that are anticipated to be completed prior to the proposed RLE construction.

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. 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, Hegewisch, and South Deering. The project area comprises residential (primarily single family), industrial (both existing and vacant), transportation (including freight), and commercial development.

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

- No Build Alternative
- BRT Alternative
- UPRR Rail Alternative
  - ROW Option
  - East Option
  - West Option
- Halsted Rail Alternative

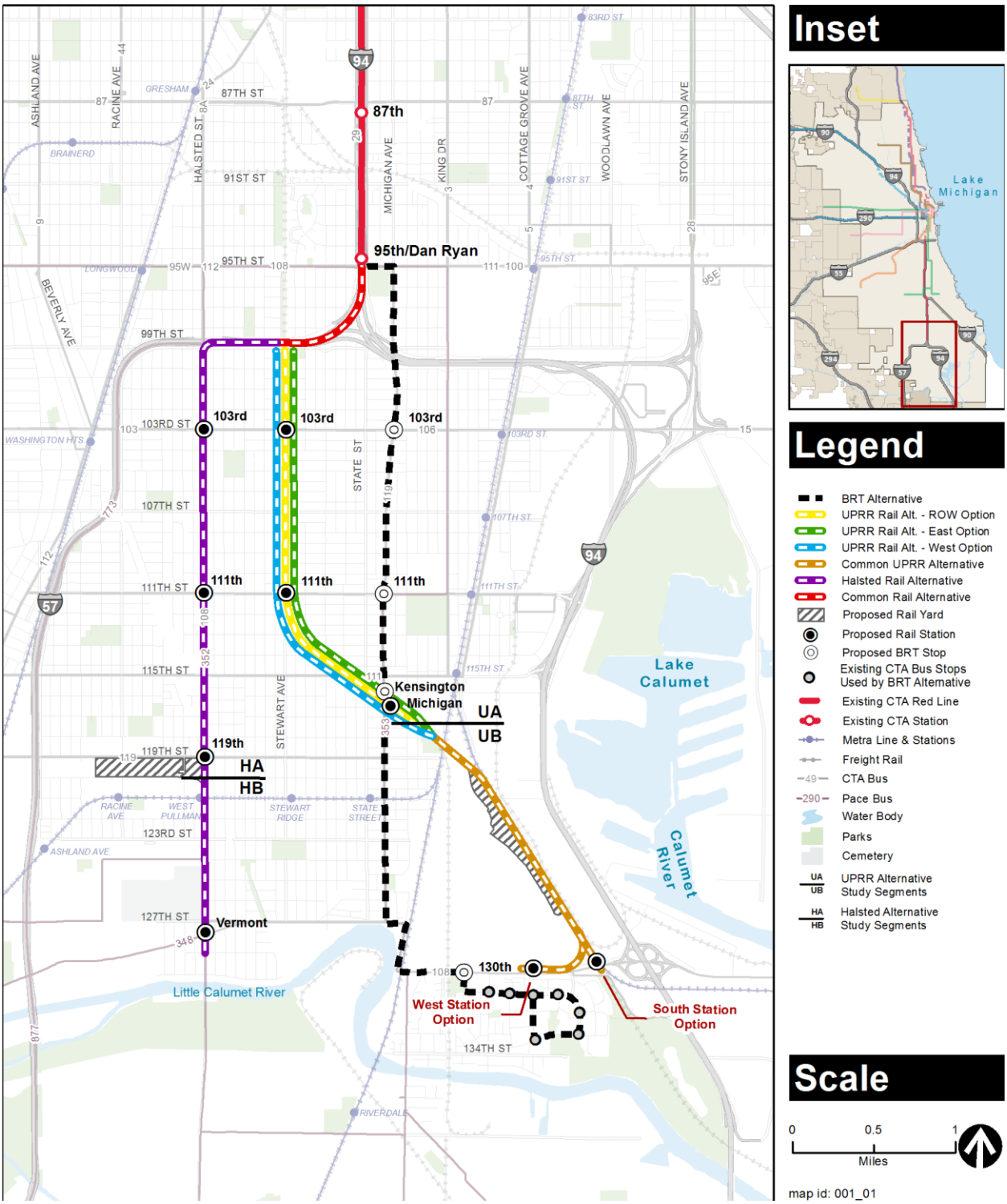

Figure 2-1: RLE Project Alternatives

The No Build Alternative is a required alternative as part of the NEPA environmental analysis and is used for comparison purposes to assess the relative benefits and impacts of extending the Red Line. 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 other than committed transportation improvements that are already in the Chicago Metropolitan Agency for Planning (CMAP) Fiscal Year 2010–2015 Transportation Improvement Program (TIP) and the improvements to 95th Street Terminal. The TIP projects within the project area consist of four bridge reconstructions, several road improvement projects including resurfacing and coordination of signal timing on 95th Street, work on Metra's facilities, construction of a bicycle/pedestrian multi-use trail, and preservation of historic facilities. The No Build Alternative includes regular maintenance of existing track and structures, and bus transit service would be focused on the preservation of existing services and projects. All elements of the No Build Alternative are included in each of the other alternatives. Under this alternative, travel times would not improve from existing conditions.

The BRT Alternative (formerly referred to as the Transportation Systems Management Alternative) is a 5.0-mile, limited-stop, enhanced BRT route, which is assumed to operate 24 hours per day between the existing 95th Street Terminal and the intersection of 130th Street and Eberhart Avenue. No dedicated bus lanes would be provided for the BRT Alternative; however, parking lanes would be removed for some portions of the alignment and four stops with improved bus shelters and park & ride facilities 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 would not continue south of the 130th Street stop, the bus route would continue through Altgeld Gardens along the existing route with six stops. The BRT Alternative would be consistent with bus routing changes that may occur as part of improvements to the 95th Street Terminal. Under this alternative, travel times between 130th Street and the Loop would improve over existing conditions.

The UPRR Rail Alternative is a 5.3-mile extension of the heavy rail transit Red Line from its existing 95th Street Terminal 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. This alternative includes construction and operation of new heavy rail transit tracks, mostly in existing transportation corridors. The UPRR Rail Alternative has three options for alignment (ROW, East, and West), all of which would include operation on elevated structure from 95th Street to just past the Canadian National/Metra Electric District tracks near 119th Street. The alignment would then transition to at-grade through an industrial area with no public through streets, terminating at 130th Street in the vicinity of Altgeld Gardens. Four new stations would be constructed at 103rd Street, 111th Street, Michigan Avenue, and 130th Street. The 130th Street station would be the terminal station, with two options under evaluation: the South Station Option and the West Station Option. A new yard and shop facility would be sited near 120th Street and Cottage Grove Avenue. The bus routes in the vicinity of the UPRR Rail Alternative would be modified to enhance connectivity between the Red Line and the bus network. The hours

of operation and service frequency for the UPRR Rail Alternative are assumed to be the same as for the current Red Line. Under this alternative, travel times between 130th Street and the Loop would improve substantially over existing conditions.

The Halsted Rail Alternative is a 5.0-mile heavy rail transit extension of the existing Red Line. In this alternative, the Red Line would operate on an elevated structure running south from 95th Street along I-57 until Halsted Street. The alignment would then turn south and continue along Halsted Street to the intersection of Halsted Street and Vermont Avenue near 127th Street. This alternative would include four new stations at 103rd Street, 111th Street, 119th Street, and Vermont Avenue. The Vermont Avenue station would be the terminal station. A new yard and shop would be sited west of Halsted Street and between the 119th Street and Vermont Avenue stations. The bus routes in the vicinity of the Halsted Rail Alternative would be modified to enhance connectivity to the Red Line. The hours of operation and service frequency for the Halsted Rail Alternative are assumed to be the same as for the current Red Line. Under this alternative, travel times between 127th Street and the Loop would improve substantially over existing conditions. This alternative would not extend rail to Altgeld Gardens, which would be served by bus connecting to the Vermont terminal station.

Section 3
Methods for Impact Evaluation

This section describes the process used to conduct an analysis of potential safety and security impacts that could result from the construction and operation of the alternatives analyzed in the EIS for the RLE Project. This technical memorandum also identifies potential options to avoid, minimize, and mitigate adverse impacts.

3.1 Regulatory Framework

The following sections briefly discuss the regulatory framework used to guide the evaluation of project safety and security.

3.1.1 Federal

States with rail fixed guideway systems must comply with 49 CFR Part 659. This rule sets the FTA's requirements for improving rail transit safety and security. Part 659, Implementation Guidelines, produced by the FTA Office of Safety and Security (2006) lists the following requirements:

- Designating a Safety and Security Oversight agency
- Developing a program standard and supporting procedures
- Requiring, reviewing, and approving rail transit agency System Safety Program Plans and System Security Plans
- Requiring an annual cycle for rail transit agencies to review System Safety Program Plans and System Security Plans to determine whether they should be updated
- Requiring and overseeing implementation of the rail transit agency internal safety and security audit program and requiring, reviewing, and approving annual reports and certifications from rail transit agencies
- Requiring and overseeing implementation of the rail transit agency hazard management process
- Requiring and receiving notification of accidents meeting the revised Part 659 thresholds
- Conducting investigations of accidents meeting the revised Part 659 thresholds
- Conducting Three-Year safety and security reviews at rail transit agencies

- Requiring, reviewing, approving, and tracking corrective action plans for findings from accident investigations and Three-Year reviews
- Reporting to FTA

To inform employees about the hazards associated with chemicals in their workplaces, the Occupational Safety and Health Administration issued a Hazard Communication Standard, which is published in 29 CFR 1910.1200 or 1926.59. The Hazard Communication Standard requires that CTA make its employees aware of the hazards of chemicals in their workplace, provide access to information about these chemicals, and properly train employees to work safely with the chemicals.

The Federal Railroad Administration requires all railroads to comply with regulations under Title 49 CFR Part 214 - Roadway Worker Safety, which identifies requirements for workers performing construction, inspection, or maintenance activities in close proximity to active railroad tracks and identifies measures to be followed to provide on-track safety for workers.

On January 9, 2013 a Final Rule was issued to amend Part 611 of Title 49 of the CFR, under which the FTA evaluates and rates major transit capital investments seeking funding under the discretionary programs authorized by Section 5309 of Title 49, U.S. Code. The FTA's Proposed New Starts and Small Starts Policy Guidance, released on the same date as the Final Rule, includes factors to calculate the expected change in injuries and fatalities based on the projected change in vehicle-miles traveled (VMT) for automobile and transit modes, but not other modes such as pedestrians or bicyclists. The guidance also assigns an economic value to each injury and fatality. The analysis to quantify the economic value associated with the Preferred Alternative will be completed as a part of the New Starts process and in the Final EIS.

3.1.2 State

The Illinois Regional Transportation Authority (RTA) Act includes a section on safety (Section 2.11) that requires the RTA to develop and adopt a system safety program and requires all applicable Service Boards (i.e., CTA) to meet all compliance standards associated with Part 659 (Illinois General Assembly 1997).

The Illinois Commercial Transportation Law grants authority to the Illinois Commerce Commission (ICC) to create safety standards for passenger and freight trail carriers for the purpose of protecting public safety (Illinois General Assembly 1996). The ICC Rail Safety Program includes the following functions (ICC 2012c):

- "Manage crossing safety projects paid, in part, by the Grade Crossing Protection Fund.
- Engineering oversight of all safety improvements and/or modifications to the state's public highway/rail crossings.

- Inspection of all Railroad track in the state for defects which could cause train derailments.
- Oversight of all Railroad hazardous material shipments through the state, including radioactive waste and spent nuclear fuel.
- Engineering oversight of all improvements/modifications to highway traffic signal systems interconnected with railroad warning devices.
- Implementation of Illinois' Operation Lifesaver public education campaign.
- Investigation of highway/rail collisions and other rail-related incidents that occur in Illinois."

This analysis assumes that all portions of the proposed project within the jurisdiction of the Illinois Department of Transportation (IDOT) would comply with all design standards in the *Bureau of Design and Environment Manual* (IDOT 2010a) or obtain authorizations for design exceptions as required.

3.1.3 Regional and Local

3.1.3.1 Regional Transportation Authority of Northeastern Illinois

The RTA of Northeastern Illinois is designated as the state safety oversight agency for the CTA's heavy rail rapid transit system. In accordance with Part 659, the RTA has developed program standards and requirements to be followed by the CTA. These standards require the CTA to complete all of the activities described in Section 3.1.1.

3.1.3.2 Chicago Transit Authority

The CTA implements policies, plans, and actions specifically directed toward maintaining safety and security during construction and operation of the transit system. Safety and security planning is included in the CTA's *Rail System Safety Program Plan* and *Security and Emergency Preparedness Plan*, both of which are required of the CTA under 49 CFR Part 659 as noted above. These documents are typically not available for public dissemination due to information security concerns.

The CTA's *Safety and Security Management Plan* includes information on the integration of safety and security into the project development process, responsibilities of various parties, the hazard management process, safety and security design criteria, and the safety and security verification process (CTA 2011b). The primary responsibilities of contractors during the construction phase include developing a Construction Safety and Security Plan, performing job safety analysis, and monitoring safety and security activities. In addition, personnel requiring access to the track bed must undergo an 8-hour CTA rail safety training program.

The CTA, along with the Chicago Police Department as a security partner, also regularly coordinates with the Department of Homeland Security and the Federal Security Director for the Transportation Security Administration. This coordination includes triennial security reviews, the

most recent of which is in progress and is planned to be coordinated with Metra, the regional commuter rail agency, and Pace, a suburban bus transit provider. The CTA's *Security and Emergency Preparedness Plan* is updated annually. The CTA participates in the BASE (Baseline Assessment for Security Enhancement) program, which measures performance in 17 categories related to safety and security.

Other existing CTA manuals that include design standards relevant to safety and security include the *Design and Rehabilitation Criteria Manual* (1996) and the *Bus Facilities Handbook* (2007). The standards in all CTA manuals would be followed for new construction where feasible and practical.

The design standards in the *Design and Rehabilitation Criteria Manual* address system safety, security, fire protection, human factors, reliability, maintainability, configuration management, and quality control. Patron safety is the highest priority in system safety objectives. Construction, installation, inspection, and testing procedures and the safety of CTA personnel are additional objectives.

The *Design and Rehabilitation Criteria Manual* emphasizes the importance of an open station concept, with plenty of lighting to eliminate dark spaces; transparent furnishings; and minimum widths of vertical and horizontal circulation elements (such as stairs, escalators, and aisles) to be determined by the CTA based on passenger volume forecasts.

The *Bus Facilities Handbook* provides the dimensions of bus stops and the appropriate places to locate street furniture and landscaping to ensure safe and accessible operations.

Construction safety is addressed in the CTA's (2011) *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System* (Construction Safety Manual). The Construction Safety Manual is applicable whenever contractors or consultants perform work on, above, or adjacent to the CTA rail system in order to protect themselves, their employees, sub-contractors, CTA passengers, employees, and the public. The Construction Safety Manual is not addressed to CTA personnel. A comprehensive system of CTA standard operating procedures and rail service bulletins directed to CTA rail-operating personnel governs operations throughout the rail system and supports the safe and expeditious movement of trains.

3.1.3.3 City of Chicago

The portions of the project within the City of Chicago must comply with all applicable City of Chicago Building Code regulations (City of Chicago 2012a). The City of Chicago Building Code contains provisions for structural design, construction material performance, accessibility, fire protection systems, means of egress, and more. Many elements of the code would be applicable to the design of stations and track structure.

3.1.3.4 Village of Calumet Park

Portions of the proposed project within the Village of Calumet Park (along the west side of Halsted Street from 123rd Street to 125th Street) must comply with all requirements of the Village of Calumet Park Building Department (Village of Calumet Park 2013). Requirements are included for construction, demolition, electrical, plumbing, sidewalks, and more.

3.1.4 Other

3.1.4.1 National Fire Protection Association

Fire Code regulations for transit infrastructure are codified in the National Fire Protection Association (NFPA) 130 *Standard for Fixed Guideway Transit and Passenger Rail Systems* (NFPA 2010a). Topics addressed in the NFPA 130 Standard include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire safety requirements for new and existing buildings and their premises. Fire compartmentalization and evacuation requirements for transit facilities include the following:

- Enclosed stations or portions of stations must be of non-combustible construction built to a fire resistant period of 4 hours.
- Non-public areas must be separated from public areas by construction providing at least 2 hours of fire resistance.
- Commercial spaces (and other non-transit uses) must have at least 3 hours of fire resistance separation.
- Non-public area fire resistance requirements include 3 hours for electrical substations, 4 hours for generator rooms, and 2 hours for enclosed staircases, electrical code shafts, other plant rooms, storerooms, and refuse storage.
- Evacuation time for station occupant load must be a maximum of 4 minutes from the platform to ground level point of safety access and 6 minutes from the most remote point on the platform.
- The number of normal accessways (typically open stairways or escalators) can vary and is a function of exit time, given entraining and detraining peak passengers loads.
- Enclosed stairs must be provided at one or both ends of the platform of enclosed stations. Enclosed exits are for passenger use in emergencies, and must be electronically locked for security reasons. Electronically controlled locks must disengage upon fire alarm control panel command or in the event of a power loss. At least one enclosed stair must be designated for firefighter entry.

- Maximum travel distance to an exit on a platform must be 300 feet or less.
- Exit signs and emergency lighting must be provided and must have connections to secondary power.
- Automatic sprinkler systems must be provided for commercial spaces, storage, refuse storage, escalator pits, mechanical plant rooms, and other areas with combustible loading. Otherwise, public areas need not have sprinkler systems as long as non-combustible construction provides negligible fire load.
- Standpipe and hose systems must be in accordance with NFPA 14, *Standard for the Installation of Standpipes and Hose Systems* (NFPA 2010b), and must be installed in enclosed stations.
- Elevators counted as contributing to the means of egress capacity must be accessed via holding areas or lobbies that must be separate from the platform by a smoke-tight fire separation having a fire resistance rating of at least 1 hour, but not less than the time required to evacuate the holding area occupant load. Other requirements include having at least one stair accessible from the holding area, 5 square feet per person size requirements, pressurization to a minimum of 25 Pascals when smoke control is activated, and emergency alarm devices with two-way communication to the system operations control center.

3.1.4.2 Union Pacific Railroad

Several of the EIS alternative footprints would be in and/or adjacent to the active UPRR freight railroad corridor. The analysis considered safety and security issues related to portions of the project area in or adjacent to the freight railroad corridor.

To address the safety risk of collapse of the CTA structure due to damage caused by potential freight train derailment, the CTA track structure will generally have a minimum horizontal separation of 50 feet from the centerline of a proposed third track, planned to be located east of the existing two tracks. A crash wall capable of protecting the CTA track structure and piers from being struck by a derailed train will be provided where the minimum separation distance cannot be achieved. Where crash walls are not practical, the design of the CTA structure will include crash-worthy piers meeting American Railway Engineering and Maintenance of Way Association (2012) requirements.

The American Association of Railroads and its member Class I railroads, including UPRR, also currently participate in e-RAILSAFE program to improve the security of railroad employees, operations, and facilities. The program requires all third-party railroad contractors, vendors, and suppliers to comply with the following:

- Complete a railroad safety training course.
- Complete a railroad security awareness course.

- Acquire a contractor photo identification credential.
- Pass a criminal background check.

The Union Pacific Corporation will require flagging when activities have the potential to foul the track.

3.2 Impact Analysis Thresholds

There are no specific thresholds for safety and security identified under NEPA. The FTA requires transit agencies to report major safety and security incidents within 30 days of their occurrence. This EIS addresses potential safety and security impacts through a combination of qualitative and quantitative analysis. For the purpose of this EIS, an adverse safety and security impact is defined as an impact that would cause one or more of the following:

- Creation of the potential for increased rate of reportable major incidents to the FTA. Major incidents include fatalities, mainline derailments, injuries requiring off-site medical attention, property damage greater than or equal to $25,000, or an evacuation due to life safety reasons (National Transit Database 2010).
- Failure to meet the applicable design standards related to safety.
- Marked increase in pedestrian or motorist safety incidents at highway-rail grade crossings in the immediate vicinity of proposed CTA stations.
- The potential for a marked increase in pedestrian safety incidents in the immediate vicinity of proposed CTA stations.
- The potential for a marked increase in crime incidents near proposed CTA stations.
- Notable increases in emergency response times.
- Marked increase in other security risks on or off the CTA system.

3.2.1 Construction Impacts

The Construction Safety Manual provides guidance regarding security (CTA 2011). For the purpose of this EIS, the following safety and security impacts would be considered adverse:

- The contractor failed to provide a site security plan including measures to prevent unauthorized entry to the site and measures to prevent vandalism.
- Pre-existing security equipment (e.g., at the 95th Street Terminal or City of Chicago “Blue Light” cameras) was disabled without first incorporating similar temporary or permanent

security measures for the construction site, or without prior consent from the CTA's Office of Security.

- A CTA safety inspector determined that the contractor or contractor personnel committed serious or repeated violations of the safety rules or procedures contained in or referenced in the Construction Safety Manual.
- The contractor failed to take prompt and decisive corrective action on safety deficiencies identified at the work site.
- Closure of major roadways or extensive detours that noticeably degrade emergency response times.

3.3 Area of Potential Impact

The area of potential impact for safety and security includes a ½-mile radius centered on each of the proposed stations and stops as well as the existing 95th Street Terminal. One-half mile is used as an approximation of the distance most patrons will walk to a station and is therefore used to measure general pedestrian safety and security in the surrounding neighborhood. Pedestrian activity concentrates in the immediate vicinity of a station, which for this analysis is defined as the area within one full block, or ⅛ mile (660 feet) of station entrances or bus stops.

A small portion of the Village of Calumet Park, and the following Chicago community areas are within the area of potential impact: Beverly, Morgan Park, Pullman, Riverdale, Roseland, Washington Heights, and West Pullman.

3.4 Methods

Impacts on safety and security for the RLE Project were conducted pursuant to NEPA guidance (40 CFR 1508). This section describes the methods that were used to evaluate the safety and security impacts of each alternative.

The CTA has a formal process for the management of safety hazards and security threats and vulnerabilities. This process includes the identification of potential hazards and a risk assessment process. The risk assessment process includes a determination of severity (critical or marginal) and probability of occurrence (probable, occasional, or remote). These factors are put into a Hazard

- **Critical risks** are those that result in death or serious injury to workers, customers, or the public; in system loss; or in major to severe damage to the system environment.
- **Marginal risks** result in minor or less than minor injuries, or service disruptions
- **Probable risks** can be expected to happen regularly, at a rate of 1 in 20 or more.
- **Occasional risks** can be expected to happen at some point during the life of the item or system, at a rate of 1 in 20 to 1 in 200.
- **Remote risks** probably will not occur, but remain a possibility.

Assessment Matrix (see Table 3-1 and sidebar) to determine the required action (CTA 2011b).

The risk assessment process was used in the analysis of potential adverse impacts in this memorandum. Beneficial impacts are analyzed qualitatively on a scale of low impact, medium impact, or high impact. The classification as a low, medium, or high impact was based on the frequency of the event, the scope of work for the alternative being considered, and professional judgment.

The first priority is to eliminate or minimize hazards through design (CTA 1996). This analysis identified minimization measures for the prototypical design. The second priority is to mitigate the hazard, reducing it to an acceptable level of safety. Mitigation measures were developed in response to specific hazards identified. The third priority is to install warning devices to alert persons to the hazard. If it is impossible or impractical to eliminate, minimize, or mitigate identified hazards, then the CTA would develop special procedures and training.

Table 3-1: CTA Risk Assessment Matrix

Probability/Severity	Critical	Marginal
Probable	**Unacceptable** - Requires design or safety solution. Considered "Adverse" for NEPA analysis.	**Undesirable** - Requires management review and mitigating action if at all possible. Considered "Adverse" for NEPA analysis.
Occasional	**Undesirable** - Requires management review and mitigating action if at all possible. Considered "Adverse" for NEPA analysis.	**Review** to determine and sustain acceptability. Considered "Not Substantially Adverse" for NEPA analysis.
Remote	**Review** to determine and sustain acceptability. Considered "Not Substantially Adverse" for NEPA analysis.	**Acceptable** with no review needed. Considered "Not Adverse" for NEPA analysis.

3.4.1 Safety

The safety assessment considered hazards to pedestrians, bicyclists, transit patrons, employees, motorists, and the transit system itself as they relate to the project area. The following types of analysis were conducted:

- The expected change in the number of major incidents reportable to the FTA was performed by multiplying the expected change in service hours for each mode (rail versus bus) for each alternative by the incident rate per service hour for that mode. Major incidents include fatalities, mainline derailments, injuries requiring immediate off-site medical attention, property damage greater than or equal to $25,000, or an evacuation due to life safety reasons (National Transit Database 2010).

- The "Expected Crash Frequency" (ECF) at existing highway-rail grade crossings was calculated using Equation 7-3.1 in the IDOT *Bureau of Design and Environment Manual*, and compared to actual crash frequency shown in ICC data. A site survey was also conducted to evaluate the

presence of existing warnings of approaching trains (e.g., signs, signals, gates), and fencing to prevent or discourage crossing except at authorized locations.

- The existing pedestrian environment near proposed station sites was evaluated both quantitatively and qualitatively. The number of traffic crashes involving pedestrians was evaluated. Recognizing that the number of incidents is related to exposure, the existing pedestrian environment was considered. The evaluated issues included the presence of sidewalks, crosswalks, curb ramps, pedestrian signals, and lighting. Conditions at intersections were considered, including pedestrian delays, number of lanes crossed, traffic volumes, and speed of traffic. The location and adequacy of barriers near railroad tracks (curbs, fences, and vegetation) to channelize pedestrians and bicyclists was considered.

- The public comments received during the scoping period included concerns about the ability of first responders to access construction areas. The impact of the construction and operation of the project on emergency response times was evaluated qualitatively based on the locations of proposed construction areas and proposed transit stations in relation to at-grade rail crossings and public health and safety facilities (e.g., fire stations, hospitals).

- The general safety of the CTA system, including train stations or bus stops, was addressed by assuming newly constructed project elements would conform to CTA standards described in Section 3.1.3.2. The various design standards cover all track, structural, station, electrical, and mechanical elements, as well as other items. In general, stations would be well lit, with clear lines of sight. The final design would also consider lines of sight for surveillance by station personnel as well as video cameras. This guidance is consistent with the results of a community visioning session for the project, where participants noted security as one of their top concerns, and requested well-lit areas, security personnel, and glass elevators as high priorities (Developing Communities Project et al. 2010).

- Fire safety was addressed by assuming newly constructed project elements would conform to NFPA 130 standards for fire protection, prevention, detection, notification, suppression, and evacuation. These standards state that the design would include fire retardant materials, surveillance and detection equipment, adequate egress routes for patrons, and adequate ingress routes for emergency responders. In addition, sprinklers, fire extinguishers, and standpipe systems would be installed where required by code.

Measures to mitigate safety concerns, or to improve safety, were identified where applicable. The inclusion of these mitigation measures in the project could help to avoid certain impacts entirely, reduce the probability of incident occurrence, reduce the severity of incidents that occur, or compensate for the impacts in some way.

3.4.2 Security

Security includes intentional acts, including crime to persons or property, and acts of terrorism. The goal of the design for the RLE Project would be to deter and detect acts of vandalism,

terrorism, and other criminal acts. The design would allow for rapid response by emergency services (CTA 1996).

The public scoping comments included concerns about the potential for crime at stations and in surrounding neighborhoods as a result of the project. The existing crime activity in the areas surrounding proposed transit stations was evaluated by using geographic information systems to identify existing crime hot spots in the project area (see Figure A-2 through Figure A-4 in Appendix A). A literature review was completed to determine how the proposed transit stations would be expected to affect crime in the immediate vicinity of proposed stations and in surrounding neighborhoods. The potential for crime at parking lots and parking garages was also considered.

The potential for other security incidents to occur, particularly related to homeland security risks, was analyzed qualitatively for each alternative. A more detailed analysis of these risks will be conducted by CTA for the selected NEPA preferred alternative identified in the EIS. This Threat and Vulnerability Assessment to be completed by the CTA will ultimately identify security threats in the transit system, and make recommendations to reduce those threats.

The analysis included identification of mitigation measures that could be incorporated into the project's Safety and Security Plan to be developed in the final design phase. The inclusion of these mitigation measures in the project could help to avoid certain impacts entirely, reduce the probability of incident occurrence, reduce the severity of incidents that do occur, or compensate for the impacts in some way.

Section 4
Affected Environment

The affected environment for this analysis includes areas that could be affected by impacts on the CTA system (e.g., vehicles, stations, rail yards), impacts in the areas surrounding stations, and cumulative impacts related to other reasonably foreseeable projects. Groups covered in the affected environment include transit passengers, operators, employees, contractors, and the general public. Members of these groups all come in contact with the system in some way, and could be susceptible to certain safety and security impacts.

4.1 Bus Rapid Transit Alternative

The affected environment for the BRT Alternative includes the CTA bus system, proposed BRT stations and stops, and the area in the immediate vicinity of proposed stations.

4.1.1 Major Safety and Security Incidents on CTA Bus System

The CTA is required to report major safety and security incidents, such as collisions, fires, fatalities, serious injuries, and more, to the FTA within 30 days of their occurrence. The minimum thresholds for reporting these incidents are described in Section 3.2 of this document. Table A-1 shows a summary of these incidents for the most recent three years of complete data for the entire CTA bus system. From 2009 through 2011, there were 1,025 incidents, including 7 fatalities and 1,814 injuries requiring immediate off-site medical attention.

4.1.2 Crime Summary

Criminal incidents occurring on the CTA system and on other property (e.g., rail yards, maintenance facilities, parking facilities) are recorded by local police in the jurisdiction in which they occur. In some cases, such as fatalities and serious injuries, these criminal incidents could also be counted as "major safety and security incidents" (see Section 4.1.1). Table A-3 shows the number and percent of crime types occurring on CTA buses and at CTA bus stops throughout the City of Chicago. Incidents at maintenance facilities, parking facilities, and other locations are shown in the last column of Table A-4.

Over the three-year period, there was an average of 3.6 incidents per day reported on buses, 1.3 incidents per day reported at bus stops, and 2.4 incidents per day on other property. Robbery, which involves violence or the threat of violence, was more common at bus stops, while theft was more common on buses. Battery, which involves actual harm to an individual, was more common on buses, while assault was more common at bus stops. Narcotics crimes are very rare on CTA buses, but very common at bus stops and on other property. Criminal damage is a problem everywhere in the affected environment, but more so on buses and on other property than at bus stops. Section 4.2.2 provides additional analysis and comparison to the rail system.

4.1.3 Pedestrian Safety

The BRT Alternative would include improved bus shelters along Michigan Avenue at the intersections of 103rd Street, 111th Street, and at Kensington Avenue. Improved shelters would also be provided on 130th Street at Eberhart Avenue. Seven existing route #34 bus stops along local residential streets would also be used in the Altgeld Gardens neighborhood. Because many of the BRT stops would be at the intersection of one or more major through streets, the safety of pedestrians crossing those streets to access stations or nearby destinations would be a concern.
Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

Table A-5 shows frequencies of traffic crashes involving pedestrians for the past five years (2007–2011) within one full block, or ⅛ mile (660 feet), for the intersections where the BRT stops would be. The intersections with the highest number of pedestrian crashes in the region typically have 5 to 10 pedestrian crashes per year (Chicago Metropolitan Agency for Planning 2008).

103rd Street Stop

The five years of data show a high crash frequency (22) within ⅛ mile of 103rd Street and Michigan Avenue, with 10 of the crashes occurring at the intersection of 103rd Street and Michigan Avenue, 1 at 103rd Place and Michigan Avenue, 1 at 103rd Street and Wabash Avenue, and the remaining 10 at mid-block locations, mostly along 103rd Street east of Michigan Avenue.

Michigan Avenue is a two-lane collector street carrying 14,300 vehicles per weekday, and 103rd Street is a two-lane minor arterial carrying 21,700 vehicles per weekday (Chicago Department of Transportation [CDOT] 2006). The intersection of 103rd Street and Michigan Avenue is controlled by traffic signals, with transverse crosswalk markings and pedestrian crossing signals on all legs of the intersection. Lighting is typical of that found along major streets in the City of Chicago.

111th Street Stop

The five years of data show a high crash frequency (20) within ⅛ mile of 111th Street and Michigan Avenue, with 6 incidents at the intersection of 111th Street and Michigan Avenue, 1 at 111th Street and State Street, and 13 at mid-block locations.

Michigan Avenue is a two-lane collector carrying 11,900 vehicles per weekday, and 111th Street is a two-lane minor arterial carrying 12,200 vehicles per weekday (CDOT 2006). The intersections of 111th Street and Michigan Avenue, 112th Street and Michigan Avenue, and 111th Street and State Street are signalized. Transverse crosswalk markings and pedestrian crossing signals are present at all three intersections. Lighting is typical of that found along major streets in the City of Chicago.

Kensington Avenue Stop

The five years of data show the crash frequency near Michigan Avenue and Kensington Avenue (eight) is lower than the frequencies near 103rd Street or 111th Street, but the level of pedestrian

activity is also much lower, so this is an expected result. Of the eight crashes within ⅛ mile of Kensington Avenue, five occurred at the intersection of Michigan Avenue and 115th Street, one occurred at 116th Street, and two occurred at mid-block locations.

Michigan Avenue and 115th Street are both two-lane collector streets carrying 11,900 vehicles per weekday and 11,700 vehicles per weekday, respectively (CDOT 2006). Kensington Avenue is a two-lane residential street terminating at Michigan Avenue to form a three-leg intersection. The intersection of 115th Street and Michigan Avenue is controlled by traffic signals, while 116th Street and Kensington Avenue both stop for Michigan Avenue. Transverse crosswalk markings and pedestrian crossing signals are present on all four legs of the intersections at 115th Street and 116th Street, but only on the north and east legs at Kensington Avenue. Lighting is typical of that found along major streets in the City of Chicago.

Eberhart Avenue Stop
The data show only one pedestrian crash in five years near 130th Street and Eberhart Avenue, which occurred one block to the south at 131st Street and Eberhart Avenue. However, the level of pedestrian activity is low, so the existing crash frequency is consistent with expectations.

The traffic volume on 130th Street, a five-lane arterial roadway, is 25,100 vehicles per day traveling at high speeds (CDOT 2006). Eberhart Avenue is a two-lane local residential street with a planted median, and 131st Street is a two-way local residential street. Eberhart stops for 130th Street, and the intersection of 131st Street and Eberhart Avenue is controlled by all-way stop signs. There are no marked crosswalks across 130th Street and no sidewalks along the street. There are sidewalks along Eberhart Avenue and along the south side of 131st Street. There is roadway lighting along 130th Street and intersection lighting for the residential streets.

Additional Stops
The existing route #34 completes a 1.7-mile loop around the Altgeld Gardens neighborhood, making up to 14 stops on four residential streets: 131st Street, Ellis Avenue, 133rd Street, 133rd Place, and Langley Avenue. The proposed BRT route would operate on a similar route, but use Corliss Avenue instead of Langley Avenue, and only serve seven stops. There were 12 pedestrian crashes in this area over a five-year period, with 8 of them occurring at or near the intersections of 131st Street and Langley Avenue, 131st Street and Evans Avenue, or 131st Street and Corliss Avenue.

The Langley Avenue, Evans Avenue, and Corliss Avenue intersections are all three-legged intersections terminating at 131st Street. Vehicles on Evans Avenue stop for 131st Street. However, traffic on 131st Street stops for Langley Avenue and Corliss Avenue, neither of which have stop signs. There are curb-attached sidewalks and roadway lighting along all the area streets.

It is notable that the Chicago Housing Authority (CHA) has recently completed the rehabilitation of a total of 1,323 units in the Altgeld Gardens neighborhood, including 1,009 units at Altgeld Gardens and 314 units at Phillip Murray Homes. CHA is also working with stakeholders to explore the integration of a “town center” with a variety of land uses, including commercial, institutional,

residential and mixed-use development to bring much needed resources to the community (CHA 2012). This type of rehabilitation and redevelopment is likely to have a positive impact on pedestrian safety in the area.

4.1.4 Pedestrian Security

The *RLE Project Scoping Report* identified the potential for crime at new CTA stations and in surrounding neighborhoods as a concern of residents. Figure A-2 and Figure A-4 show a "heat map" of the crime density (measured in crimes per acre) for 2009 through 2011 in the public ROW (e.g., streets, sidewalks, alleys, parks) and other open areas (railroad property, vacant lots, parking lots) near each proposed station site (City of Chicago 2012b). The highest crime areas along the BRT alignment are clustered at the 95th Street Terminal; 103rd Street and Michigan Avenue; Michigan Avenue from 111th Street to 111th Place; 119th Street and Michigan Avenue; and 131st Street and Langley Avenue.

4.1.5 Emergency Services

The *RLE Project Scoping Report* identified the potential for emergency access *to* construction areas as a concern of residents. It is assumed that residents would also be concerned about emergency access through construction areas, and the impact of detours on response times. Figure A-1 (City of Chicago 2012b) shows a map of the police, fire, and hospital facilities in the area.

The affected environment for the BRT Alternative falls entirely within the boundaries of the 5th Police District, with the station at 727 E. 111th Street. Several fire stations are in the corridor: Engine 93 (330 W. 104th Street), Engine 62 (34 E. 114th Street), Engine 75 (11958 S. State Street), and Engine 80 (12701 S. Doty Avenue). Fire stations also house ambulances serving hospitals. The only hospital near the corridor is Roseland Community Hospital at 45 W. 111th Street.

4.2 Union Pacific Railroad Rail Alternative

The affected environment for the UPRR Rail Alternative includes the CTA rail system, proposed station areas, and the area in the immediate vicinity of proposed station locations.

4.2.1 Major Safety and Security Incidents on CTA Rail System

As noted in Section 4.1.1, the CTA is required to report major safety and security incidents to the FTA. Table A-2 shows a summary of these incidents for the most recent three years of complete data for the entire CTA rail system. From 2009 through 2011, there were 209 incidents, including 28 fatalities and 191 injuries requiring immediate off-site medical attention. Additional details about the incidents are not provided in the available data.

4.2.2 Crime Summary

As noted in Section 4.1.2, criminal incidents occurring on CTA trains, platforms, and other property (e.g., rail yards, maintenance facilities, parking facilities) are recorded by local police in

the jurisdiction in which they occur. Table A-4 shows the number and percent of crime types occurring on CTA trains, on CTA platforms, and on other property throughout the City of Chicago. The incidents on other property include elements of both the bus and rail system, such as rail yards, vehicle maintenance facilities, offices, and parking garages.

Over the three-year period, there was an average of 4.1 incidents per day reported on trains, 5.7 incidents per day reported on train platforms, and 2.4 per day on other property.

Robbery and theft were both more common on trains than on train platforms. Narcotics crimes are mostly the possession of small amounts of marijuana, but often other drugs (e.g., crack cocaine, cocaine, and heroin) as well. Narcotics crimes were more common at train platforms than on trains. Figure 4-1 is a bar chart comparing the percentages of different types of crimes on the bus system, on the rail system, and on other CTA property.

Deceptive practice was the second most common crime reported. The Illinois Compiled Statues defines unfair or deceptive acts or practices as "including but not limited to the use or employment of any deception fraud, false pretense, false promise, misrepresentation or the concealment, suppression or omission of any material fact, with intent that others rely upon the concealment, suppression or omission of such material fact, or the use or employment of any practice described in Section 2 of the 'Uniform Deceptive Trade Practices Act,' approved August 5, 1965, in the conduct of any trade or commerce are hereby declared unlawful whether any person has in fact been misled, deceived or damaged thereby" (815 ILCS 505/2). Examples of these practices include credit card fraud, illegal use of cash card, theft of lost or mislaid property, and theft of labor or services. These crimes occurred on CTA buses or trains, on platforms at train stations, or at CTA property such as garages.

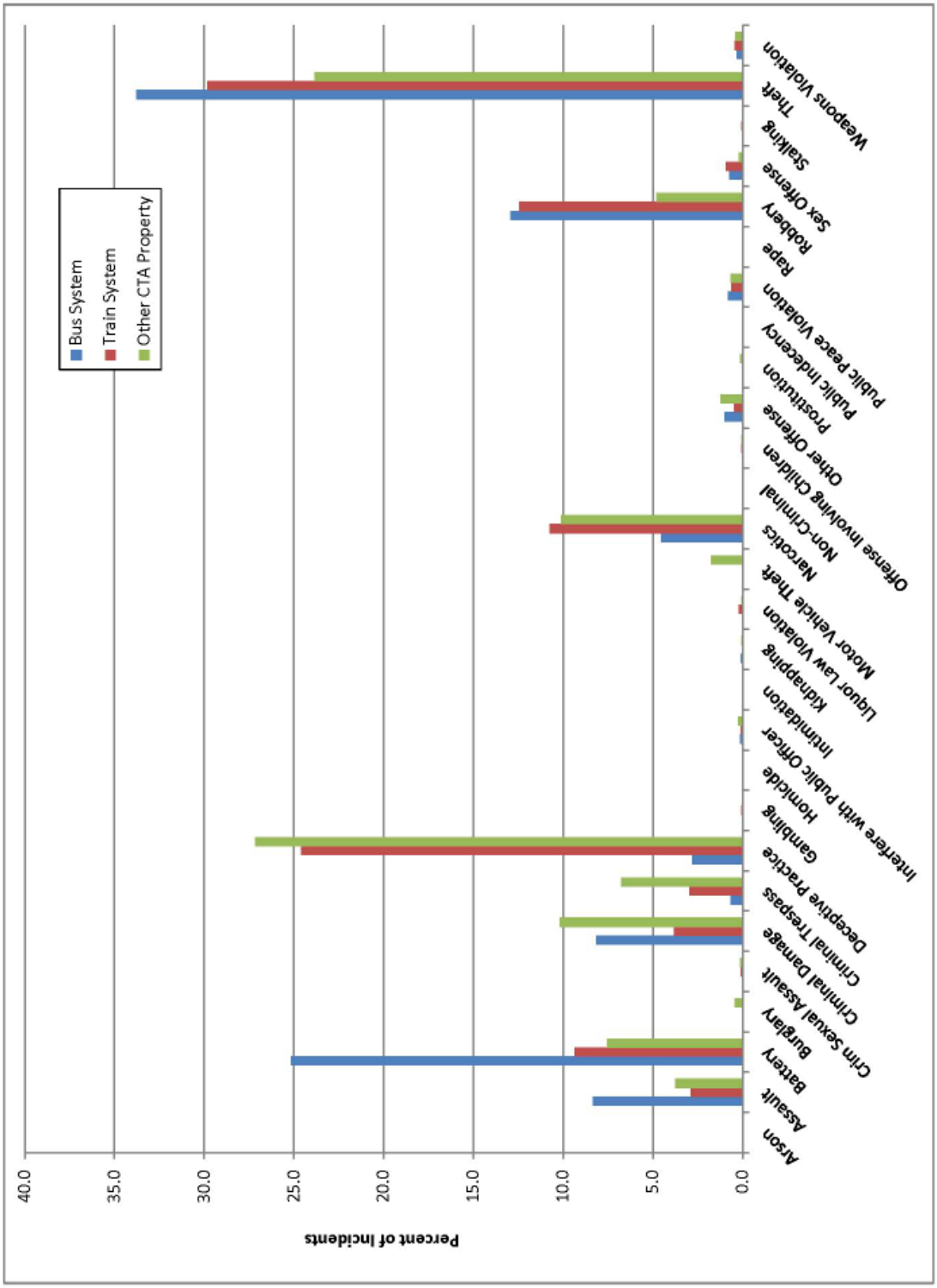

Figure 4-1: Reported Chicago Transit Authority-Related Crimes in Chicago (2009-2011)
Source: City of Chicago 2012

Over 96 percent of the CTA-related crimes fell into eight categories: assault, battery, criminal damage, criminal trespassing, deceptive practice, narcotics, robbery, and theft. Theft (30.2 percent of crimes) was the most commonly reported CTA-related crime, mostly pick-pocketing. Robbery (11.5 percent) is similar to theft, but involves violence or the threat of violence. Assault (4.6 percent) and battery (13.7 percent) are also similar crimes with differing levels of severity. Assault is the threatening of a victim, while battery is the actual harm of an individual. Both were more common on the bus system than on the rail system.

Criminal trespassing (2.8 percent), typically in the form of ROW intrusions, can occur from CTA platforms or elsewhere along the track. The intent of criminal trespassing is often to cause criminal damage (6.0 percent), usually graffiti. Criminal damage was most common at CTA garages and on other property (e.g., rail yards).

4.2.3 Segment UA

Segment UA (see Figure A-1) includes the portion of the UPRR Rail Alternative alignment from 95th Street to the crossing over the Metra Electric District railroad track southeast of the proposed Michigan Avenue station.

4.2.3.1 Pedestrian Safety

The primary station entrances for the UPRR Rail Alternative on Segment UA would be at 103rd Street, 111th Street, and Michigan Avenue. Auxiliary entrances would be at 103rd Place, 110th Street, and 116th Street. Because the primary entrances would be on major through streets, the safety of pedestrians crossing those streets to access stations or nearby destinations would be a concern. Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

Table A-5 shows the frequencies of traffic crashes involving pedestrians in the immediate vicinity of proposed stations.

There were fewer pedestrian crashes near the proposed station locations for the UPRR Rail Alternative than for the BRT Alternative (see Section 4.1.3) or the Halsted Rail Alternative (see Section 4.3.3.1), but this result is expected due to the lower amounts of pedestrian activity. The existing pedestrian environments around proposed stations are discussed qualitatively below to complement the crash data.

103rd Street Station

The crossing of 103rd Street at the UPRR tracks is shown in Figure 4-2. The street is an arterial carrying approximately 18,700 vehicles on an average weekday. The posted speed limit is 30 miles per hour (mph), but the 85th percentile speeds are 37 mph (IDOT 2010b). Drivers reduce speed over the UPRR tracks due to a slight hump in the roadway. There are two lanes in each direction, but on-street parking in the curb lanes effectively reduces the roadway to one lane in each direction for most of the day. There are two through lanes at times during peak travel periods due to parking restrictions prohibiting on-street parking from 7 AM to 9 AM in the eastbound direction and from 4 PM to 6 PM in the westbound direction.

Figure 4-2: 103rd Street at the Union Pacific Railroad tracks, looking west

The nearest controlled intersections to the 103rd Street station location are traffic signals at Normal Avenue, ⅛ mile west, and all-way stop signs at Princeton Avenue, ⅛ mile east. The nearest marked crosswalks across 103rd Street are at Eggleston Avenue, 140 feet west of the railroad tracks, and at Harvard Avenue, 195 feet east of the railroad tracks.

Standard 6-foot-wide sidewalks are on both sides of 103rd Street. Sidewalk ramps are present on all corners in the immediate vicinity of the 103rd Street station location, with new Americans with Disabilities Act (ADA)-compliant ramps on the north leg of Eggleston Avenue. Standard City of Chicago roadway lighting is present on 103rd Street. Eastbound bus stops for route #111 are at Normal Avenue, Eggleston Avenue, and Princeton Avenue. Westbound bus stops for route #111 are at Princeton Avenue, Harvard Avenue, and Normal Avenue.

The land uses along 103rd Street are primarily residential, with some light industrial, commercial, and vacant land uses as well. Block Park is immediately southeast of the railroad tracks along Harvard Avenue.

The auxiliary entrance to the 103rd Street station would be at 103rd Place, which is a residential street, and not a pedestrian safety concern.

111th Street Station

The crossing of 111th Street at the UPRR tracks is shown in Figure 4-3. The street is an arterial carrying approximately 12,800 vehicles on an average weekday. The posted speed limit is 30 mph. The 85th percentile speeds are not known. The roadway width allows for two lanes in each direction, but lightly used parking in the curb lanes effectively reduces the roadway to one through lane in each direction.

Figure 4-3: 111th Street at the Union Pacific Railroad tracks, looking west

The nearest controlled intersections are traffic signals at Normal Avenue, ⅛ mile west and all-way stop signs at Princeton Avenue, ⅛ mile east. The nearest marked crosswalks across 111th Street are at Eggleston Avenue, 230 feet west of the railroad tracks, and at Princeton Avenue to the east.

Standard 6-foot-wide sidewalks are on both sides of 111th Street. Sidewalk ramps are present on all corners in the immediate vicinity of the 111th Street station location, but do not meet all of the current ADA standards. Standard City of Chicago roadway lighting is present on 111th Street, with additional sidewalk lighting on the north side of the street. Eastbound bus stops for route #111 are at Normal Avenue, Eggleston Avenue, and Princeton Avenue. Westbound bus stops for route #111 are at Princeton Avenue, the east side of the UPRR tracks, and Normal Avenue.

The land uses along 111th Street are primarily residential, with an auto repair business northeast of the railroad tracks, several religious facilities, and vacant land northwest of the railroad tracks. The Agape Community Center is northeast of the railroad tracks.

The auxiliary entrance to the 111th Street station would be at 110th Street, which is a residential street, and not a pedestrian safety concern.

Michigan Avenue Station

The UPRR tracks are grade-separated as they cross over Michigan Avenue. Michigan Avenue is a two-lane collector street carrying approximately 11,900 vehicles on an average weekday. The nearest controlled intersections are traffic signals at 115th Street, 800 feet north, and all-way stop signs at 117th Street, 450 feet south. The nearest marked crosswalks across Michigan Avenue are at Kensington Avenue, 330 feet north of the railroad tracks, and at 116th Street, 115 feet south of the railroad tracks. The crosswalks at 116th Street are of the higher visibility international style, and are supplemented by pedestrian crossing warning signs.

The sidewalks along Michigan Avenue are approximately 12 feet wide. Sidewalk ramps are present on all corners in the immediate vicinity of the station location, but do not meet all of the current ADA standards. Standard City of Chicago roadway and sidewalk lighting are present along Michigan Avenue. Northbound and southbound bus stops for routes #34 and #119 are at 115th Street, Kensington Avenue, 116th Street, and 117th Street. Eastbound and westbound bus service is available along 115th Street on route #111.

There is a large amount of vacant land along Michigan Avenue and in the surrounding areas. However, there are plans for a new development on the southwest corner of Michigan Avenue and 115th Street called Roseland Plaza, a 91,000 square foot strip mall with 250 parking spaces that would be anchored by a grocery store. The existing occupied buildings are typically mixed-use, with ground floor retail and residential above. Nearby businesses include a gas station, corner store, hair salon, and Mexican restaurant. There are also religious facilities in the area.

The auxiliary entrance to the Michigan Avenue station would be at 116th Street, east of Michigan Avenue; 116th Street is a low-volume residential street, and not a pedestrian safety concern.

4.2.3.2 Pedestrian Security

As discussed in Section 4.1.4, the *RLE Project Scoping Report* identified the potential for crime at new CTA stations and in surrounding neighborhoods as a concern of residents. Figure A-2, Figure A-3, and Figure A-4 show the crime density (measured in crimes per acre) for 2009 through 2011 in the public ROW and open areas near each proposed station site. The highest crime areas along Segment UA are clustered at the 95th Street Terminal, and south of the Michigan Avenue station centered at 119th Street.

4.2.3.3 Highway-Rail Grade Crossings

There are two existing highway-rail at-grade crossings near proposed stations. The crossings are where the UPRR tracks intersect 103rd Street (see Figure 4-2) and 111th Street (see Figure 4-3). Both crossings have two-quadrant crossing gates and signals cantilevered over the roadway. There are no gates to block pedestrians on the sidewalks. The appropriate crossbuck signs, railroad crossing warning signs, and railroad crossing pavement markings are all present. There is fencing along the railroad ROW to the northwest at 103rd Street, and along the east side of the ROW at 111th Street, but other locations could be accessed by pedestrians.

The most current available Average Daily Traffic (ADT) volumes for 103rd Street and 111th Street are from 2006, and show 18,700 vehicles per weekday on 103rd Street and 12,800 vehicles per weekday on 111th Street (CDOT 2006). Pedestrian volumes are relatively low, but would be expected to increase with the addition of new transit stations. A total of 4,386 weekday passenger boardings are forecasted at the 103rd Street station and 5,048 weekday passenger boardings are forecasted at the 111th Street station, both in 2030 (AECOM 2009).

The existing train volumes (year 2009) on the UPRR line include 24 freight trains per day and 2 Amtrak passenger trains per day (Chicago Transportation Coordination Office 2011). If the

projects in the CREATE Program[1] are implemented, the volume is projected to increase to 44 freight trains and 4 passenger trains per day by 2029, an 85 percent increase in total volume compared to existing conditions.

The additional automobile and pedestrian traffic crossing the rail line, combined with additional rail traffic, could create a safety concern. The expected life of a railroad crossing device is 20 to 30 years, so a period of 25 years was used for analysis. Crash histories for the past 25 years (1987 through 2011) at the 103rd Street and 111th Street grade crossings are shown in Table 4–1 and Table 4–2, respectively. Both crossings had two recorded crashes in the 25-year period. For comparison, the most recent crash data for Cook County shows 161 collisions at 802 public grade crossings from 2007 through 2012 (ICC 2013). Based on this data, an average of one crash per grade crossing would be expected every 30 years.

Table 4–1: Crashes at 103rd Street and Union Pacific Railroad Grade Crossing

Date	Time	Crash Type	Warning Devices	Weather	Fatalities	Injuries
10/15/2006	12:30 PM	Freight-Pedestrian	Cantilever Signals and Gates	Cloudy	0	1
11/16/1989	5:25 AM	Freight-Truck	Gates	Cloudy	0	1

Source: (Illinois Commerce Commission 2012a)

Table 4–2: Crashes at 111th Street and Union Pacific Railroad Grade Crossing

Date	Time	Crash Type	Warning Devices	Weather	Fatalities	Injuries
4/11/2009	11:15 PM	Other-Auto	Cantilever Signals and Gates	Clear	0	0
6/5/2000	12:52 AM	Other-Auto	Cantilever Signals and Gates	Rain	0	0

Source: (Illinois Commerce Commission 2012b)

4.2.3.4 Emergency Services

As explained in Section 4.1.3, the *RLE Project Scoping Report* identified concerns regarding emergency access. Figure A-1 shows a map of the police, fire, and hospital facilities in the area.

The Segment UA alignment along the UPRR tracks forms the border of the 5th Police District to the east and the 22nd Police District to the west, from 95th Street to 111th Street. Southeast of 111th Street, Segment UA would be entirely within the 5th Police District. The 5th District station is at 727 E. 111th Street. The 22nd District station is at 1900 W. Monterey Avenue. Several fire stations are in the corridor: Engine 93 (330 W. 104th Street), Engine 62 (34 E. 114th Street), and Engine 75 (11958 S. State Street). Fire stations also house ambulances serving hospitals. The only hospital

[1] The Chicago Region Environmental and Transportation Efficiency (CREATE) Program is a partnership between U.S. Department of Transportation, the State of Illinois, City of Chicago, Metra, Amtrak, and the nation's freight railroads. The Program includes approximately 70 component projects designed to reduce delays to passenger rail, freight rail, and highway systems.

near the corridor is Roseland Community Hospital, three blocks east of the corridor at 45 W. 111th Street.

4.2.4 Segment UB

Segment UB (see Figure A-1) includes the portion of the proposed UPRR Rail Alternative alignment from the crossing over the Metra Electric District railroad tracks southeast of the proposed Michigan Avenue station to the terminal station at 130th Street.

4.2.4.1 Pedestrian Safety

There are two sites under consideration for a terminal station at 130th Street. The West Option would be a station along the north side of 130th Street between Evans Avenue and Ellis Avenue. The South Option would be a station along the Northern Indiana Commuter Transportation District South Shore Line and CSX Kensington Branch tracks, north of Doty Avenue and the 130th Street local road. Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

Table A-5 shows the crash data for both sites. There were two pedestrian crashes in the vicinity of the West Station Option site, both on Evans Avenue south of 130th Street, and no pedestrian crashes in the vicinity of the South Station Option site. The pedestrian environment for the two stations is described below.

130th Street Station - West Option

The West Station Option site along 130th Street is shown in Figure 4-4. The roadway is a four-lane principal arterial with a divided median, carrying approximately 25,100 vehicles on an average weekday. The speed limit is posted at 35 mph.

The nearest controlled intersections are traffic signals at Ellis Avenue, immediately to the east, and all-way stop signs at 127th Street and Indiana Street, 1.1 miles northwest. A cloverleaf interchange with I-94 is approximately 0.5 mile east of the 130th Street station location and an at-grade highway-rail crossing with the UPRR tracks is approximately 0.5 mile west of the 130th Street station location. There are no marked crosswalks at the intersection.

There are no sidewalks at the intersection, but there are 6-foot-wide, curb-attached sidewalks along Evans Avenue, Ellis Avenue, and throughout the Altgeld Gardens neighborhood to the south. There are no sidewalk ramps at the intersections of 130th Street and Ellis Avenue or Evans Avenue. Roadway lighting is present along both sides of 130th Street. There are no bus stops on 130th Street east of Eberhart Avenue, but the #34 route does use the roadway for some trips to Carver High School. The nearest bus stop is approximately 1,000 feet southeast at 131st Street and Corliss Avenue.

Figure 4-4: 130th Street at Evans Avenue, looking east

The north side of 130th Street is bordered by wetlands and a large Metropolitan Water Reclamation District (MWRD) treatment facility. The south side of 130th Street is bordered by Altgeld Gardens, a low-rise Chicago Housing Authority property focused on providing housing to low-income families. There are very few nearby businesses, but there is a grocery store, take-out restaurant, and check-cashing service just over ¼ mile west of the 130th Street station location, and a health clinic east of Ellis Avenue.

130th Street Station - South Option

Near the South Station Option site, there are two streets called 130th Street. One is the four-lane, principal arterial roadway with a bridge over the railroad tracks to the east. The other is a low-volume, local roadway immediately to the south of the arterial (see Figure 4-5). This parallel street provides access to a health clinic, Carver Military Academy High School, and the Beaubien Woods Forest Preserve.

Figure 4-5: 130th Street/Doty Avenue at the Kensington Branch rail line, looking west

The local 130th Street terminates at Ellis Avenue to the west and curves to become Doty Avenue to the southeast. There is a 6-foot-wide, curb-attached sidewalk along the south side of the street. There are no marked crosswalks

or sidewalk ramps. Roadway lighting is present along the south side of 130th Street. The nearest bus stops are 1,800 feet southwest, at Ellis Avenue and 131st Street, and 1,300 feet southeast, at Carver High School.

The east side of the 130th Street station site is bordered by wetlands and train tracks. Carver Military Academy High School and the Beaubien Woods Forest Preserve are to the south. A TCA Health medical clinic is 670 feet west of the 130th Street station site. Some residences are as close as 350 feet from the 130th Street station site, but there is no existing sidewalk connection. Along sidewalks, the nearest homes are approximately 1,200 feet from the 130th Street station site.

4.2.4.2 Pedestrian Security

As discussed in Section 4.1.4, the *RLE Project Scoping Report* identified the potential for crime at new CTA stations and in surrounding neighborhoods as a concern of residents. Figure A-4 shows the crime density (measured in crimes per acre) for 2009 through 2011 in the public ROW and other open areas near the proposed 130th Street station sites. The highest crime area near Segment UB is at 131st Street and Langley Avenue, approximately ¼ mile southwest of the proposed 130th Street station West Option site.

4.2.4.3 Emergency Services

As explained in Section 4.1.3, the *RLE Project Scoping Report* identified concerns regarding emergency access. Figure A-1 shows a map of the police, fire, and hospital facilities in the area.

Segment UB is entirely within Chicago's 5th Police District. The 5th District station is at 727 E. 111th Street. The nearest fire stations are Engine 75 (11958 S. State Street) and Engine 80 (12701 S. Doty Avenue). Fire stations also house ambulances serving hospitals. The nearest hospital is Roseland Community Hospital at 45 W. 111th Street.

4.3 Halsted Rail Alternative

The affected environment for the Halsted Rail Alternative includes the CTA rail system, proposed station areas, and the area in the immediate vicinity of proposed stations.

4.3.1 Major Safety and Security Incidents on CTA Rail System

The major incident summary for the CTA rail system described in Section 4.2.1 also applies to the Halsted Rail Alternative.

4.3.2 Crime Summary

The crime summary for the CTA rail system described in Section 4.2.2 also applies to the Halsted Rail Alternative.

4.3.3 Segment HA

Segment HA (see Figure A-1) includes the portion of the Halsted Rail Alternative alignment from 95th Street to 119th Street, including the proposed 119th Street station and its surrounding area.

4.3.3.1 Pedestrian Safety

The station entrances for the Halsted Rail Alternative on Segment HA would be at 103rd Street, 111th Street, and 119th Street. Because the entrances would all be at the intersection of two major through streets, the safety of pedestrians crossing those streets to access stations or nearby destinations would be a concern. Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

Table A-5 shows the frequencies of traffic crashes involving pedestrians in the immediate vicinity of the proposed stations.

For the Halsted Rail Alternative, there were a high number of pedestrian crashes near 103rd Street, 111th Street, and 119th Street, and a moderate number of crashes near Vermont Avenue. The existing pedestrian environments around proposed stations are discussed qualitatively below to complement the crash data.

103rd Street Station

The intersection of 103rd Street and Halsted Street is shown in Figure 4-6. At this location, Halsted Street is a major arterial carrying approximately 31,800 vehicles per weekday and 103rd Street is a minor arterial carrying 21,000 vehicles per weekday (CDOT 2006). Halsted Street has two through lanes in each direction, a landscaped median or left turn lanes, and on-street parking permitted. On 103rd Street there is one through lane in each direction with on-street parking permitted, but lightly used. Left turn lanes are marked on Halsted Street, but not 103rd Street.

Figure 4-6: 103rd Street and Halsted Street, looking northwest

The intersection of 103rd Street and Halsted Street is controlled by traffic signals, with protected-permissive left turn phasing for all approaches except the westbound direction. There are also red light enforcement cameras at the intersection. High visibility crosswalk markings and pedestrian crossing signals are present on all four legs of the intersection. The adjacent intersections within 660 feet are two-way stop controlled except the 103rd Street and Peoria Street intersection, which is controlled by all-way stop signs.

Sidewalks on Halsted Street are mostly 14 to 16 feet wide, and sidewalks on 103rd Street are 9 to 11 feet wide. ADA-compliant sidewalk ramps are present on all but the northeast corner of the 103rd Street and Halsted Street intersection. Standard City of Chicago roadway lighting is present on

both streets. The bus stops on Halsted Street for routes #8A, #108, and #352 are on the far side of the intersection;[2] on 103rd Street for route #103 on the west leg of the intersection; and at intersections ⅛ mile away in all four directions.

The land uses adjacent to the intersection are primarily commercial, and include a drug store, a fast food restaurant, a currency exchange, and a title load business.

111th Street Station

The intersection of 111th Street and Halsted Street is shown in Figure 4-7. At this location, Halsted Street is a major arterial carrying approximately 30,000 vehicles per weekday and 111th Street is a minor arterial carrying 11,800 vehicles per weekday (CDOT 2006, IDOT 2010b). Halsted Street has two through lanes in each direction, a landscaped median or left turn lanes, and on-street parking permitted. At this location, 111th Street has one through lane in each direction with on-street parking permitted, but lightly used. Left turn lanes are marked on Halsted Street, but not 111th Street.

Figure 4-7: 111th Street and Halsted Street, looking northwest

The intersection of 111th Street and Halsted Street is controlled by traffic signals, with protected-permissive left turn phasing for all approaches except the westbound direction. High visibility crosswalk markings and pedestrian countdown signals are present on all four legs of the intersection. The adjacent intersections within 660 feet are two-way stop controlled except 111th Street and Peoria Street, which is controlled by all-way stop signs.

Sidewalks on Halsted Street are 13 to 17 feet wide, and sidewalks on 111th Street are 11 to 13 feet wide. ADA-compliant sidewalk ramps are present on the east side of Halsted Street and older ramps are present on the west side of the street. Standard City of Chicago roadway lighting is present on both streets. Bus stops are on Halsted Street for routes #8A, #108, and #352 on the near side of the intersection; on 111th Street for route #111 on the far side of the intersection; and at intersections ⅛ mile away in all four directions.

[2] Bus stops on the "near side" of an intersection are on the corner in advance of the intersection in the direction of travel. Bus stops on the "far side" of an intersection are on the corner just past the intersection in the direction of travel.

The land uses adjacent to the intersection are primarily commercial, and include fast food restaurants, a currency exchange, tax preparation services, insurance providers, and auto repair businesses.

119th Street Station

The intersection of 119th Street and Halsted Street is shown in Figure 4-8. At this location, Halsted Street is a major arterial carrying approximately 30,300 vehicles per weekday and 119th Street is a minor arterial carrying 11,500 vehicles per weekday (CDOT 2006). Halsted Street has two through lanes in each direction, a landscaped median or left turn lanes, and on-street parking permitted. At this location, 119th Street has one through lane in each direction with on-street parking permitted, but lightly used. Left turn lanes are marked on Halsted Street and 119th Street.

Figure 4-8: 119th Street and Halsted Street, looking northwest

The intersection of 119th Street and Halsted Street is controlled by traffic signals, with protected-permissive left turn phasing for all approaches. There are also red light enforcement cameras at the intersection. High visibility crosswalk markings and pedestrian countdown signals are present on all four legs of the intersection. The adjacent intersections within 660 feet are two-way stop controlled except 120th Street and Halsted Street, which is signalized.

Sidewalks on Halsted Street are approximately 16 feet wide at the intersection, but they narrow to 6 feet wide north of the intersection. Sidewalks on 119th Street vary from 12 to 19 feet wide, but end on the south side of the street at the alley west of Halsted Street. ADA-compliant sidewalk ramps are present on the west side of Halsted Street and older ramps are present on the east side of the street. Standard City of Chicago roadway lighting is present on both streets. Bus stops are on Halsted Street for routes #8A, #108, #352, and #359 on the far side of the intersection; on 119th Street for route #119 on the west leg of the intersection; and at intersections ⅛ mile away in all four directions.

The land on three of the four intersection quadrants is largely vacant. However, the Major Taylor Trail is northwest and southeast of the intersection on former rail ROW that is also now occupied by high-tension power lines. A busy strip mall containing a grocery store, dollar store, and clothing store is on the southwest corner of the intersection. The West Pullman branch of the Chicago Public Library is just west of the intersection on the north side of 119th Street.

4.3.3.2 Pedestrian Security

As discussed in Section 4.1.4, the *RLE Project Scoping Report* identified the potential for crime at new CTA stations and in surrounding neighborhoods as a concern of residents. Figure A-2 and Figure A-3 show the crime density (measured in crimes per acre) for 2009 through 2011 in the public ROW and open areas near each proposed station site. The highest crime area along Segment HA is centered on the 95th Street Terminal, with a lower intensity area near 111th Street, and low levels of crime near the proposed 103rd Street or 119th Street station locations.

4.3.3.3 Emergency Services

As explained in Section 4.1.3, the *RLE Project Scoping Report* identified concerns regarding emergency access. Figure A-1 shows a map of the police, fire, and hospital facilities in the area.

Segment HA falls within the boundaries of Chicago's 22nd Police District north of 1115th Street and within the 5th Police District south of 115th Street. The 22nd District station is at 1900 W. Monterey Avenue. The 5th District station is at 727 E. 111th Street. Several fire stations are in the corridor: Engine 93 (330 W. 104th Street), Truck 24 (10400 S. Vincennes Avenue), and Engine 115 (11940 S. Peoria Street). Fire stations also house ambulances serving hospitals. The only hospital near the corridor is Roseland Community Hospital at 45 W. 111th Street.

4.3.4 Segment HB

Segment HB (see Figure A-1) includes the portion of the Halsted Rail Alternative alignment from south of 119th Street to Vermont Avenue.

4.3.4.1 Pedestrian Safety

The Halsted Rail Alternative would include one train station in Segment HB. The primary station entrance would be south of Vermont Avenue and the auxiliary entrance would be north of 128th Place. Table A-5 shows the pedestrian crash data for this site. There were five pedestrian crashes within ⅛ mile of the station entrances in the five-year period. The pedestrian environment for the station is described below.

Vermont Avenue Station

The intersection of Vermont Avenue and Halsted Street is shown in Figure 4-9. At this location, Halsted Street is a major arterial carrying approximately 23,600 vehicles per weekday and Vermont Avenue is classified as a collector carrying 5,100 vehicles per weekday (CDOT 2006, IDOT 2010b). Halsted Street has two through lanes in each direction, a landscaped median or left turn lanes, and on-street parking permitted. Vermont Avenue has one through lane in each direction with on-street parking permitted. Left turn lanes are marked on Halsted Street and Vermont Avenue.

The intersection of Halsted Street and Vermont Avenue is controlled by traffic signals with standard two-phase operation. High visibility crosswalk markings and pedestrian countdown signals are present on all four legs of the intersection. Approximately 445 feet north of the intersection is 127th Street, which is also signalized. The Vermont Avenue and Peoria Avenue intersections and the Halsted Street and 128th Place intersections are also controlled by all-way stop signs. Other adjacent intersections are two-way stop controlled.

Figure 4-9: Halsted Street and Vermont Avenue, looking northeast

Sidewalks on Halsted Street are 13 to 17 feet wide and sidewalks on Vermont Avenue vary from 6 to 10 feet wide depending on the location. Sidewalk ramps are present on all corners of the Halsted Street and Vermont Avenue intersection, but do not meet the newest ADA standards. Standard City of Chicago roadway lighting is present on both streets. Bus (CTA) routes #8A and #108 stop on eastbound Vermont Avenue, but do not operate throughout the entire day south of 119th Street. Bus (Pace) route #352 also serves the corridor, and stops on Halsted Street at 128th Place and 127th Street, but not at Vermont Avenue.

The land uses adjacent to the intersection are mostly commercial. There is a strip mall in the southwest quadrant containing a laundromat, dry cleaner, barbershop, and beauty salon. There is a car dealership on the southeast corner, a vacant building on the northeast corner, and a religious facility on the northwest corner.

4.3.4.2 Pedestrian Security

As discussed in Section 4.1.4, the RLE Project Scoping Report identified the potential for crime at new CTA stations and in surrounding neighborhoods as a concern of residents. Figure A-2 and Figure A-3 show the crime density (measured in crimes per acre) for 2009 through 2011 in the public ROW and other open areas near each proposed station site. Crime near the proposed Vermont Avenue station appears to be very low.

4.3.4.3 Emergency Services

As explained in Section 4.1.3, the *RLE Project Scoping Report* identified concerns regarding emergency access. Figure A-1 shows a map of the police, fire, and hospital facilities in the area.

Segment HB falls mostly within the boundaries of Chicago's 5th Police District. However, Halsted Street borders the Village of Calumet Park from 123rd Street to 125th Street to the west, and Cedar

Park Cemetery (unincorporated area) from 125th Street to 127th Street also to the west. Chicago's 5th District police station is at 727 E. 111th Street. The Village of Calumet Park police station is six full blocks (0.625 mile) west of Halsted Street at 12409 S. Throop Street. Chicago's Engine 115 is at 11940 S. Peoria Street, one block west of Halsted Street. Calumet Park's fire station is 1 mile west of Halsted Street at 12457 S. Ashland Avenue. Fire stations also house ambulances serving hospitals. The nearest hospitals are Roseland Community Hospital at 45 W. 111th Street and MetroSouth Medical Center, 2 miles west in Blue Island.

Section 5
Impacts and Mitigations

This section analyzes the impacts of the RLE Project for each alternative in three categories: permanent, construction, and cumulative.

5.1 No Build Alternative

There would not be expected permanent impacts, construction impacts, or cumulative impacts on safety and security associated with the No Build Alternative.

5.2 Bus Rapid Transit Alternative

The permanent and construction impacts and mitigations for the BRT Alternative are discussed below.

5.2.1 Permanent Impacts and Mitigations - Bus Rapid Transit Alternative

5.2.1.1.1 Major Incidents

The forecasted change in major incidents reportable to the FTA was calculated by multiplying the change in vehicle revenue hours (VRH) for the BRT Alternative by the existing major incident rate for the CTA buses (see Table 5-1). The additional service hours would be expected to increase the *frequency* of major incidents by an average of 0.19 per year, or 1 every 5.4 years, compared to existing conditions. However, the incident *rate* would not be expected to change substantially. It is also possible that the incident rate for BRT would be lower than for local bus service because buses would not need to merge in and out of traffic as often to make stops. The CTA attempts to minimize bus incidents by continuously upgrading the bus fleet and through extensive driver training. The impact on major incidents would be not adverse.

Table 5-1: Change in Major Incidents for Bus Rapid Transit Alternative

Item	Bus	Rail	Total
A. Annual Change in VRH	10,307	0	10,307
B. Annual Major Incidents per Million VRH (2009-2011)	18.06	6.52	13.89
C. Annual Change in Major Incidents [(A/1,000,000)*B)]	0.19	0	0.19

Sources: (CTA 2009, National Transit Database 2012)
VRH = vehicle revenue hours

5.2.1.1.2 Motor Vehicle Safety

The FTA released Proposed New Starts and Small Starts Policy guidance on January 9, 2013 that includes factors used to measure the change in safety as a result of transit projects. The factors use the change in VMT to estimate changes in injuries and fatalities for automobiles and transit.

The BRT Alternative is expected to cause a small shift in travel modes from motor vehicles to transit, thus decreasing automobile VMT and slightly increasing bus VMT. This shift is expected to result in a small decrease in fatalities and injuries, and the associated costs.

5.2.1.1.3 Pedestrian Safety

Under existing conditions, nearly 600 passengers per day board or alight on Michigan Avenue at 115th Street, which is controlled by traffic signals. Many of these passengers would likely shift to the faster BRT service that would stop ½ block south at Kensington Avenue, where Michigan Avenue is uncontrolled. A large volume of pedestrians crossing a major street without positive traffic control would cause an adverse impact on pedestrian safety. Signals are already in place at the intersections of 103rd Street and 111th Street with Michigan Avenue, so there would be no adverse impact at those two locations. At the intersection of 130th Street and Eberhart Avenue, signals, sidewalks, sidewalk ramps, and marked crosswalks are part of the project design, so there would be no adverse impacts on pedestrian safety at that intersection. There would also be no adverse pedestrian safety impacts at the additional bus stops in the Altgeld Gardens neighborhood. Pedestrians would likely not have difficulty safely crossing the low-volume local streets in this area.

Traffic signals are one option for mitigating the adverse pedestrian safety impacts at Kensington Avenue if the minimum requirements for traffic signals described in the Manual on Uniform Traffic Control Devices (MUTCD) are met. Based on the existing bus passenger volumes at the intersection, the pedestrian volume signal warrant[3] could likely be met. Other pedestrian crossing treatments, such as refuge medians with appropriate signage, would also have the potential to mitigate safety impacts if confirmed by the results of a traffic gap study. Alternatively, the Kensington Avenue BRT stop could be relocated to 115th Street, which would allow pedestrians to cross Michigan Avenue at an existing signal.

5.2.1.1.4 Bus Stop Security

Research that compared bus stops with varying crime rates within the downtown area identified several variables with statistically significant correlations to bus stop crime (Liggett et al. 2001). The presence of liquor stores, check cashing establishments, vacant lots, vacant buildings, rundown buildings, and litter were all related to higher crime rates. The presence of large commercial storefronts, presence of bus shelters, better visibility, higher automobile traffic, and more pedestrian activity were all associated with lower crime rates. The researchers recommended siting bus stops away from corners containing the variables correlated with more crime where possible in order to reduce impacts. The potential impact for each bus stop is described below:

[3] The MUTCD contains nine sets of factors called Warrants that can be used, in part, to determine whether traffic signals should be installed at an intersection. The pedestrian volume signal warrant (Warrant 4) is used where pedestrians experience delay crossing a major street and the volumes of pedestrians and vehicles on a major street exceed some threshold values.

- 103rd Street and Michigan Avenue - A mix of negative and positive factors would influence bus stop crime at 103rd Street. Negative factors include locating the proposed bus stops within the existing crime hot spot at 103rd Street, where there is an existing liquor store on the northeast corner of the intersection. Positive factors include replacing vacant land on the east side of Michigan Avenue with a park & ride lot, installing new lighted bus shelters, and attracting more pedestrian activity due to the enhanced transit service. Given that there are existing bus stops at this location, the overall impact on bus stop crime would be not adverse.

- 111th Street and Michigan Avenue - A mix of negative and positive factors would influence bus stop crime at 103rd Street. Negative factors include locating the proposed bus stops within the existing crime hot spot at 111th Street, where there is a currency exchange on the northeast corner. Positive factors include replacing vacant land west of Michigan Avenue and south of 111th Place with a park & ride lot, installing new lighted bus shelters, and attracting more pedestrian activity due to the enhanced transit service. Given that there are existing bus stops at this location, the overall impact on bus stop crime would be not adverse.

- Kensington Avenue and Michigan Avenue - The proposed bus stops would be located between two higher crime areas north of 115th Street and south of 116th Street. The stops would be adjacent to a grocery store and hair salon at Kensington Avenue instead of a currency exchange at 115th Street or a corner store and gas station retail at 116th Street. Some vacant land and two buildings east of Michigan Avenue and south of Kensington Avenue would be replaced with a park & ride lot. A large amount of vacant land southwest of Michigan Avenue and 115th Street is also expected to be replaced with Roseland Plaza, a 91,000 square foot retail strip mall and 250-space parking lot that would include a new grocery store. New lighted bus shelters would be added, and pedestrian activity in the area would increase compared to the No Build Alternative. Overall, this would have a beneficial impact on bus stop crime.

- 130th Street - The proposed bus stops would be located at Eberhart Avenue, away from an existing crime hot spot, adjacent to vacant land and a public park, and approximately 300 to 400 feet west of an existing currency exchange. New lighted bus shelters would be added, and pedestrian activity in the area would increase compared to the No Build Alternative due to a large park & ride lot to be located on the north side of 130th Street. Overall, this would be expected to have no adverse impact on bus stop crime.

- Additional Stops - The proposed BRT route would serve seven existing bus stops in the Altgeld Gardens neighborhood on 131st Street, Ellis Avenue, 133rd Street, 133rd Place, and Corliss Avenue. Because these stops are existing, pedestrian activity would not be likely to change markedly as a result of the proposed BRT service. The overall impact on bus stop crime would be expected to be not adverse.

5.2.1.1.5 Parking Security

Research in Los Angeles found that a large percentage—60 percent of "serious crime" and 19 percent of all crimes—of the crime at transit facilities occurred in park & ride lots, and that larger

parking lots with less pedestrian activity and less visibility from the sidewalk resulted in more thefts (Loukaitou-Sideris et al. 2002) than at more active, more visible lots. There was no correlation between the presence of a parking attendant and crime, but a trial of a bicycle security patrol in large Vancouver commuter parking lots found that the patrol significantly reduced theft (Barclay et al. 1996). Other sources also suggest that security patrols can improve security at parking lots (Witherspoon Security Consulting 2012).

For these reasons, all parking facilities would incorporate an open design that eliminates blind spots and isolated areas, including in parking garage stairwells. All parking facilities would be well lit, well maintained, and incorporate security surveillance cameras and/or frequent security patrols during the hours the lots are open. Emergency push buttons would also be considered in the final design. In parking garages, convex mirrors would be used to improve visibility around corners for both pedestrians and drivers. The design will also adhere to the fencing and landscaping design requirements in the Chicago Landscape Ordinance (City of Chicago 1991).

Security impacts for parking facilities at each proposed station are described below:

- 103rd Street - A surface parking lot would be located on the east side of Michigan Avenue, mostly between 102nd Street and 102nd Place. The lot would be modestly sized, easily visible from the sidewalk, and therefore would be expected to have no adverse impact.

- 111th Street - An L-shaped parking lot would be located behind the commercial buildings to the west of Michigan Avenue, between 111th Place and 112th Street. Various design elements would be incorporated to provide security in the lot, which would result in no adverse impact. However, given the shape and location of the lot, additional mitigation measures described below would be considered.

- Kensington Avenue - A 1,000-space, three-story parking garage would be located east of Michigan Avenue between Kensington Avenue and 116th Street. Various design elements would be incorporated to improve security in the garage, which would result in no adverse impact.

- 130th Street - A 1,400-space, three-story parking garage would be located on the north side of 130th Street between Eberhart Avenue and St. Lawrence Avenue. Various design elements would be incorporated to improve security in the garage, which would result in no adverse impact.

As a mitigation, pedestrian access routes through or adjacent to surface parking lots would be considered on a case-by-case basis in the final design phase where total elimination of blind spots or isolated areas may be impractical, such as at the 111th Street lot. Where such sidewalks have the potential to increase pedestrian activity, perhaps by reducing walking distances to the transit station or other destinations, they could create pass-by surveillance that would deter criminal activity.

5.2.1.1.6 Neighborhood Security

Research regarding the impact of new transit service on crime in surrounding neighborhoods is primarily focused on rail stations, and is somewhat mixed in results. The majority of studies have found no adverse impact (see Section 5.3.1). The addition of a BRT service in an existing corridor served by frequent bus service (route #34) would be expected to generate fewer changes in travel patterns and demographics than a new rail alignment, and therefore would have fewer impacts. Therefore, no adverse impacts related to security are expected in the surrounding neighborhoods. Security impacts related to bus stops and parking lots are discussed above.

5.2.1.1.7 Terrorism and Homeland Security

Terrorist events could theoretically happen at any time and any place, including on CTA buses or at bus stops; however, an attack on the bus system is considered less likely than an attack on the rail system, due to the greater level of casualties, damage, and service disruption that would occur with an attack on the rail system. The addition of BRT service on Michigan Avenue is unlikely to further increase the risk of a terrorist attack beyond what currently exists. Therefore, the impact would be not adverse. The CTA prepares for acts of terrorism by updating various plans on a regular basis and coordinating with law enforcement and other agencies as described in Section 3.1.3.2.

5.2.2 Construction Impacts and Mitigations - Bus Rapid Transit Alternative

The BRT Alternative primarily involves the construction of bus shelters, sidewalks, and parking facilities. While there is always a chance that a contractor could fail to follow all safety and security rules, the limited scope of work would minimize the risk of incidents resulting in fatalities, injuries, or criminal acts such as vandalism or theft on construction sites.

To mitigate risks, contractors would be required to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with other relevant aspects of the CTA's *Safety and Security Management Plan* or other manuals and policies (CTA 2011b). The contractor would take prompt and decisive corrective action on safety deficiencies identified at the work site.

5.2.2.1.1 Emergency Services

It is expected that the BRT Alternative would be constructed with construction equipment temporarily occupying the parking lane, and without closures of the through travel lanes. Therefore, access for emergency services would not be restricted, and the impacts would be not adverse. Contractors would follow the MUTCD design standards for temporary traffic control and would obtain required local permits.

5.2.3 Cumulative Impacts and Mitigations – Bus Rapid Transit Alternative

There would not be expected cumulative impacts on safety and security associated with the BRT Alternative.

5.3 Union Pacific Railroad Rail Alternative - Right-of-Way Option

The permanent and construction impacts and mitigations for the UPRR Rail Alternative ROW Option are discussed below.

5.3.1 Permanent Impacts and Mitigations - Union Pacific Railroad Rail Alternative - Right-of-Way Option

5.3.1.1 Segment UA

5.3.1.1.1 Major Incidents

The forecasted change in major incidents reportable to the FTA was calculated by multiplying the change in VRH for the CTA rail and bus systems by the existing major incident rates for those modes (see Table 5-2). For Segment UA, the UPRR Rail Alternative would be expected to increase the *frequency* of major incidents on the rail system by an average of 0.16 per year and decrease the *frequency* of major incidents on the bus system by an average of 0.29 per year compared to existing conditions. The sum of the two changes in crash frequency results in a decrease of 0.13 major incidents per year, or 1 every 7.5 years. However, the incident *rates* for each mode would not be expected to change substantially. It is also possible that the incident rate for the project area would be lower than for the system as a whole given its newer infrastructure. The CTA also attempts to minimize incidents by continuously upgrading the bus and rail fleets and through extensive operator training. The impact on major incidents would be not adverse.

Table 5-2: Change in Major Incidents for Segment UA

Item	Bus	Rail	Total
A. Annual Change in VRH	-15,994	23,816	7,822
B. Annual Major Incidents per Million VRH (2009-2011)	18.06	6.52	13.89
C. Annual Change in Major Incidents [(A/1,000,000)*B)]	-0.29	0.16	-0.13

Sources: (CTA 2009, National Transit Database 2012)
VRH = vehicle revenue hours

5.3.1.1.2 Motor Vehicle Safety

The FTA released Proposed New Starts and Small Starts Policy guidance on January 9, 2013 that includes factors used to measure the change in safety as a result of transit projects. The factors use the change in VMT to estimate changes in injuries and fatalities for automobiles and transit.

The UPRR Rail Alternative is expected to cause a small shift in travel modes from automobiles and buses to rail transit, thus decreasing automobile and bus VMT, and slightly increasing rail VMT. Overall, this would be expected to lead to a small decrease in fatalities and injuries, and the associated costs.

5.3.1.1.3 Pedestrian Safety

The new train stations at 103rd Street, 111th Street, and Michigan Avenue would generate a large amount of pedestrian activity, causing a large increase in the number of pedestrians crossing the three major through streets near stations compared to the No Build Alternative. All three streets

have ADT volumes over 10,000 vehicles per day. The nearest controlled intersections (signals or all-way stops) to proposed station locations are approximately one block away in most cases. However, many pedestrians will want to cross the streets immediately adjacent to the station entrances, particularly to access the nearest available bus stops (assumed to be adjacent to stations). Therefore, a large volume of pedestrians would be expected to cross the major streets without positive traffic control, which would be an adverse impact on pedestrian safety.

It is expected that the minimum requirements for traffic signals described in the MUTCD would be met by pedestrian volumes at any of the three station locations. If warranted by an engineering traffic study, traffic signals would be included to mitigate the pedestrian safety impacts. Other pedestrian crossing treatments, such as refuge medians with appropriate signage, would also have the potential to adequately reduce pedestrian delays and improve safety if confirmed by the results of a traffic gap study.

5.3.1.1.4 Parking Security

As described in Section 5.2.1, research has found that larger parking lots with less pedestrian activity and less visibility from the sidewalk can result in more thefts (Loukaitou-Sideris et al. 2002). Security impacts for parking facilities at the three proposed stations on Segment UA are described below:

- 103rd Street - Two 100-space surface parking lots would be expected to have no adverse impact.
- 111th Street - Two 100-space surface parking lots would be expected to have no adverse impact.
- Michigan Avenue - A 750-space, three-story parking structure would be located northeast of State Street and 116th Street and a 250-space surface lot would be located southeast of Michigan Avenue and Kensington Avenue. Various design elements would be incorporated to improve security for the facilities, which would result in no adverse impacts. However, given the size and location of the surface lot, additional mitigation would be considered as described below.

Mitigation measures would be the same as described for the BRT Alternative (see Section 5.2.1).

Figure 5-1 shows an example of potential locations for sidewalk connections through surface parking lots at the 103rd Street station.

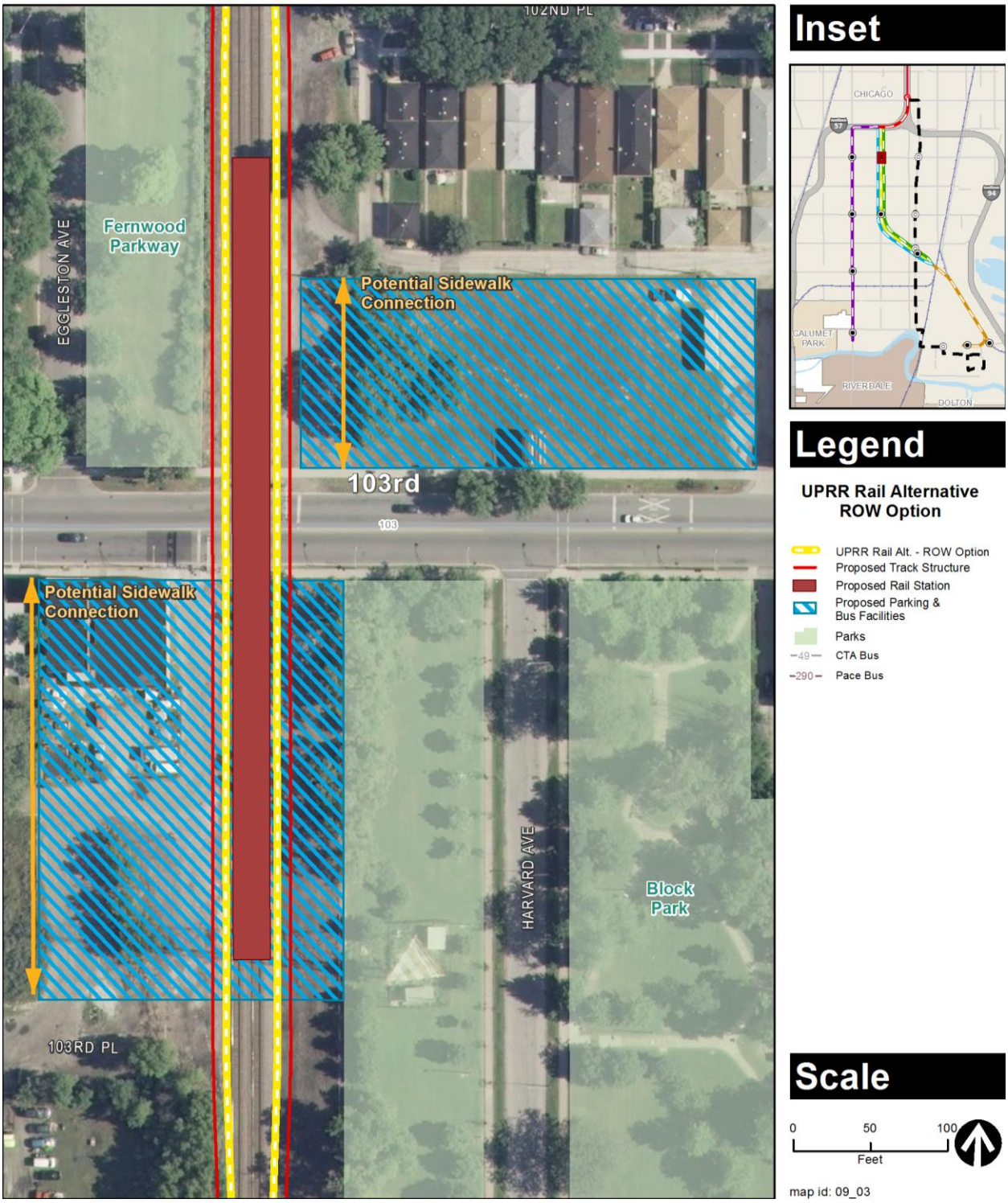

Figure 5-1: Potential Sidewalk Connections at 103rd Street Station Parking Lots

5.3.1.1.5 Neighborhood Security

Comments from the general public during the EIS scoping process included concerns about the potential for increased crime in the neighborhoods surrounding new rail transit stations compared to existing conditions. A literature review was conducted to determine whether the presence or introduction of rail transit stations is expected to have an impact on neighborhood crime. Results were mixed. Studies in Baltimore and Denver examined crime before and after the opening of stations and found no significant relationship to crime rates (Plano 1993, Denver RTD 2006). However, a study of two stations in Atlanta found slight increases in crime after station openings, with rates regressing to the mean over the next several months (Poister 1996).

A study of crime patterns around Los Angeles Green Line stations considered more variables related to the surrounding environment, and found that the rail line had no significant impacts on crime trends (Liggett et al. 2003). This study is mirrored by a recent study in San Diego to compare crime rates in neighborhoods that are similar demographically, but differ with respect to rail transit access. No significant differences in crime were found between similar neighborhoods with and without train access, and crime around San Diego's Green Line extension followed city and county trends after opening (San Diego Association of Governments 2007).

However, an econometric model of crime activity in Atlanta found that adding rail access increases crime in low-income neighborhoods (Ihlanfeldt 2003). A study of street robberies in four Chicago police districts found a disproportionate number of crimes per acre near rapid transit stations (Block and Davis 1996). However, the level of pedestrian and commercial activity is also higher near transit stations, and it was not clear whether the number of crimes was disproportionately high compared to those measures. Regardless, street robberies on the wealthier northeast side peaked not directly outside a train station, but within 1,000 feet of a train station. On the lower income west side, robberies were more widespread throughout the neighborhood, and were concentrated around commercial activity on major streets rather than at train stations.

Overall, it appears that new train stations would be unlikely to have much, if any, impact on neighborhood crime, but research indicates that some risk would remain, particularly in low-income areas. The impact would be not substantially adverse. Suggested mitigation measures would be security surveillance cameras and sidewalk lighting along commercial streets within the immediate vicinity (one block, or 660 feet) of train station entrances. CTA would need to coordinate the implementation of these measures with the City of Chicago because the cameras and lighting would be located on City ROW.

5.3.1.1.6 Terrorism and Homeland Security

As a whole, the CTA heavy rail system is potentially a high profile target of would-be terrorists. However, the damage inflicted by attacking the Red Line within the project area (i.e., south of 95th Street) would not be as large as attacking higher ridership areas and would not cause the same level of service disruption as attacking a more central location. Therefore, it is unlikely that the Red Line Extension would be a primary target of terrorists. The probability of an attack is

remote, but the damage would be critical. Based on the Risk Assessment Matrix in Table 3-1, this is classified as a not substantially adverse impact.

The CTA prepares for acts of terrorism by updating various safety and security plans on a regular basis and coordinating with law enforcement and other agencies as described in Section 3.1.3.2. As additional mitigation, access to the areas under the tracks, where a bomb could be concealed in a vehicle or other container, would be prohibited. A means of detecting intrusions, most likely video and/or thermal imaging, with analytics software to alert security personnel to potential threats, would be considered in the final design of the project. Lighting under the elevated structure would also be considered to deter terrorism and other criminal activity, and improve surveillance visibility. Parking would also be prohibited where the tracks pass over public roadways.

5.3.1.2 Segment UB

5.3.1.2.1 Major Incidents

The forecasted change in major incidents reportable to the FTA was calculated by multiplying the change in VRH for the CTA rail and bus systems by the existing major incident rates for those modes (see Table 5-3). The change in VRH for Segment UB would be expected to increase the frequency of major incidents on the rail system by an average of 0.09 per year and increase the *frequency* of major incidents on the bus system by an average of 0.22 per year compared to existing conditions. The sum of the two changes in crash frequency results in an increase of 0.30 major incidents per year, or 1 every 3.3 years. However, the incident *rates* for each mode would not be expected to change substantially. It is also possible that the incident rate for the project area would be lower than for the system as a whole given its newer infrastructure. The CTA also attempts to minimize incidents by continuously upgrading the bus and rail fleets, and through extensive operator training. The impact on major incidents would be not adverse.

Table 5-3: Change in Major Incidents for Segment UB

Item	Bus	Rail	Total
A. Annual Change in VRH	12,003	13,411	25,414
B. Annual Major Incidents per Million VRH (2009-2011)	18.06	6.52	13.89
C. Annual Change in Major Incidents [(A/1,000,000)*B)]	0.22	0.09	0.30

Sources: (CTA 2009, National Transit Database 2012)
VRH = vehicle revenue hours

5.3.1.2.2 Motor Vehicle Safety

The impacts and mitigations associated with Segment UB would be the same as described for segment UA (see Section 5.3.1.1).

5.3.1.2.3 Pedestrian Safety

Either option for a train station at 130th Street would generate a large amount of pedestrian activity. For the West Option, pedestrians from the Altgeld Gardens neighborhood would need to cross 130th Street at Evans Avenue. A traffic signal, sidewalks, curb ramps, and marked crosswalks

are included in the design, so there would be no adverse impact given these improvements. It is suggested that the entire 130th Street corridor from at least Indiana Avenue to Ellis Avenue be considered for a future redesign with "complete streets" principles. Reduced speeds, narrower travel lanes, pedestrian crossing treatments, bicycle facilities, and opportunities for development would all be considered for the corridor.

For the South Option station, an auxiliary entrance would allow pedestrians to access the station without crossing 130th Street. This would result in no adverse impact for the South Option station, and would offer superior safety to the West Option station, even accounting for the pedestrian facilities to be constructed.

5.3.1.2.4 Parking Security

As described in Section 5.2.1, research has found that larger parking lots with less pedestrian activity and less visibility from the sidewalk can result in more thefts (Loukaitou-Sideris et al. 2002). All parking facilities would incorporate design features as described for the BRT Alternative in Section 5.2.1. Security impacts for the parking facilities at the two 130th Street station options are described below:

- 130th Street South Option - A 2,300-space, seven-story parking structure would be located adjacent to the 130th Street station location. Various design elements would be incorporated to improve security in the garage, which would result in no adverse impact.

- 130th Street West Option - A 1,950-space, four-story parking structure and a 350-space surface lot would be located adjacent to the 130th Street station site in an area of very low pedestrian activity. Various design elements would be incorporated to improve security at the lots, which would result in no adverse impacts.

Mitigation measures would be the same as described for the BRT Alternative (see Section 5.2.1).

5.3.1.2.5 Neighborhood Security

The probability of adverse impacts on neighborhood security on Segment UB would be limited because Segment UB does not have any stations centered in neighborhoods. There are no commercial streets within the immediate vicinity of the two 130th Street station locations, so the probability of adverse security impacts would also be limited in those areas. The impacts would therefore be not adverse. No mitigation measures would be necessary.

5.3.1.2.6 Terrorism and Homeland Security

The impacts and mitigation measures for Segment UB would be the same as those for Segment UA (see Section 5.3.1.1), except that the train line would not pass over any public roadways, so parking prohibitions would not apply.

5.3.2 Construction Impacts and Mitigations - Union Pacific Railroad Rail Alternative - Right-of-Way Option

The UPRR Rail Alternative ROW Option would require the removal of the existing UPRR tracks and construction of an extension of the existing CTA Red Line, mostly on elevated structure. The extensive scope of work for this alternative would create a need for a large number of contractors in many areas over a long time period. To mitigate risks of safety and security incidents, contractors would be required to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with other relevant aspects of the CTA's *Safety and Security Management Plan* or other manuals and policies (CTA 2011b). The contractor would take prompt and decisive corrective action on safety deficiencies identified at the work site.

5.3.2.1 Segment UA

5.3.2.1.1 Emergency Services

The elevated structure would cross over seven arterial or collector streets (103rd Street, 107th Street, 111th Street, Wentworth Avenue, 115th Street, State Street, and Michigan Avenue) and five local residential streets (101st Street, 109th Street, 116th Street, Indiana Avenue, and Prairie Avenue) on Segment UA. All but four of the streets (Michigan Avenue, 116th Street, Indiana Avenue, and Prairie Avenue) currently have at-grade crossings with the UPRR.

For at-grade crossings, full road closures would be required for approximately two weeks to remove the crossing. If the profile of the roadway were to be reconstructed, a through street would need to be one-way for approximately two months, while a minor street would likely be closed completely. For major streets, the new bridge spans for the Red Line structure could be rolled into place over a weekend with a full closure. For local streets, the roadway could be closed for approximately a week to set the new bridge.

At Michigan Avenue, the existing structure could be demolished and the new bridge span for the Red Line could be rolled into place over a weekend with a full closure. For the other three local streets with grade-separated crossings, full road closures could be required for approximately two weeks to remove each existing bridge structure. New structures could be either rolled in over a weekend or the road could be closed for approximately 1 week to set a new bridge structure.

Emergency services would be able to access construction sites at all times in the same way contractors access the sites. Emergency services wishing to cross the tracks would have to use recommended detours, just as with a typical roadway construction project. The impacts would be not substantially adverse.

As a mitigation, neither adjacent roadways nor adjacent through streets operating in the same direction would be closed simultaneously. For example, while 111th Street is closed, 109th Street and Wentworth Avenue would remain open because they are the nearest crossings, and 107th Street and 115th Street would also remain open because they are the nearest east-west

arterial/collector streets. Traffic management plans would be created during the final engineering phase of the project, and would identify detour and emergency access routes. Detour routes would generally follow the nearest arterial or collector streets. Contractors would follow the MUTCD design standards for temporary traffic control and would obtain required local permits.

5.3.2.2 Segment UB

5.3.2.2.1 Emergency Services

South and east of the Canadian National/Metra Electric tracks, the new tracks would be located adjacent to an existing railroad with no public roadway crossings. Emergency services would be able to access construction sites at all times in the same way contractors access the sites. The impacts would be not adverse.

As a mitigation, an access road for the MWRD would be constructed prior to the new CTA tracks if necessary to maintain access to the MWRD facility. This roadway could also be used by emergency services. Traffic management plans would be created during the final engineering phase of the project if necessary. The plans would identify detour and emergency access routes, which would generally follow the nearest arterial or collector streets. Contractors would also follow the MUTCD design standards for temporary traffic control and would obtain the required local permits.

5.3.3 Cumulative Impacts and Mitigations – Union Pacific Railroad Rail Alternative - Right-of-Way Option

There would not be any expected cumulative impacts on safety and security associated with the UPRR Rail Alternative ROW Option.

5.3.4 120th Street Yard and Shop

5.3.4.1 Permanent Impacts and Mitigations

5.3.4.1.1 Security

A study of ROW intrusions for the CTA's Red and Purple Modernization Project found a large number of incidents at the Howard Yard and the Linden Yard, primarily related to graffiti. Some of the same type of activity would be likely to occur at the proposed 120th Street yard and shop. However, the relatively isolated location of the proposed yard and shop may help to reduce the frequency of incidents from a regular occurrence to an occasional occurrence. The yard would be located adjacent to a water treatment plant for the MWRD and other industrial facilities, separated from residential areas by railroads and major arterial streets. It would be approximately 1 mile southeast of the proposed Michigan Avenue station and 0.75 mile northwest of the proposed 130th Street station South Option. Given the occasional probability and the marginal severity, the risk per the CTA's risk assessment matrix (see Table 3-1) is classified as "Review" for acceptability, or not substantially adverse for the NEPA analysis.

To mitigate the risk of security incidents, the design of the yard and shop would comply with all relevant design standards, as discussed in Section 3.1. Security fencing at least 8 feet in height

would be installed around the perimeter of the yard per FTA guidance (FTA 2004). Security cameras would be installed to monitor potential access points. The latest technologies available for automated intrusion detection, such as thermal imaging with analytics software, would be reviewed at the time of final design and construction.

5.3.4.2 Construction Impacts and Mitigations

The construction impacts and mitigation measures associated with the 120th Street yard and shop would be the same as the general construction impacts and mitigation measures associated with Segment UA (see Section 5.3.2.1).

5.4 Union Pacific Railroad Rail Alternative - East Option

The impacts and mitigations for the UPRR Rail Alternative East Option would be the same as described for the UPRR Rail Alternative ROW Option (see Section 5.2.3) except as noted below.

5.4.1 Permanent Impacts and Mitigations - Union Pacific Railroad Rail Alternative - East Option

5.4.1.1 Segment UA

5.4.1.1.1 Major Incidents

The impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.1.1).

5.4.1.1.2 Motor Vehicle Safety

The impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.1.1).

5.4.1.1.3 Pedestrian Safety

The impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.1.1), but new traffic signals in the vicinity of the station for mitigation would likely need to be interconnected with the railroad crossing warning devices. Pedestrian safety impacts related to crossing the railroad tracks are discussed below under "Highway-Rail Grade Crossings."

5.4.1.1.4 Parking Security

The parking security impacts for the UPRR Rail Alternative East Option would be similar to those described for the ROW Option, but some differences in proposed sizes and locations affect the impacts:

- 103rd Street - The East Option would include a 75-space parking lot east of the station and a 125-space lot west of the station. Both would be small and would be visible from the sidewalks along 103rd Street, resulting in no adverse impact.

- 111th Street - The East Option would include a 55-space parking lot east of the station along 110th Place and a 145-space lot west of the station between 110th Street and 111th Street. The 55-space lot would be located on a minor residential street with little pedestrian activity for surveillance. A large portion of the 145-space lot would be far from 111th Street, limiting visibility. Various design elements would be incorporated to improve security in the lot, which would result in no adverse impact. However, given the locations of the lots, additional mitigation would be considered.

- Michigan Avenue - The East Option would include an 825-space, three-story parking structure west of the UPRR tracks and a 175-space surface lot southeast of Michigan Avenue and Kensington Avenue. Various design elements would be incorporated to improve security in the lots, which would result in no adverse impacts. However, the surface lot would be sited such that portions may not be easily visible from sidewalks, so additional mitigation would be considered.

Mitigation measures would be the same as described for the BRT Alternative (see Section 5.2.1).

5.4.1.1.5 Neighborhood Security

The impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.1.1).

5.4.1.1.6 Terrorism and Homeland Security

The impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.1.1), except access would be permitted under the rail structure for park uses at Wendell Smith Park and Block Park.

5.4.1.1.7 Highway-Rail Grade Crossings

The UPRR Rail Alternative East Option would directly increase the number of vehicles (mostly buses) and pedestrians crossing the UPRR tracks at 103rd Street and 111th Street compared to the No Build Alternative, and could indirectly induce land development that would further increase traffic volumes.

Table 5-4 shows the Expected Crash Frequency (ECF) for the 103rd Street and 111th Street crossings using Equation 7-3.1 in the IDOT *Bureau of Design and Environment Manual* (IDOT 2010a). Future ADT volumes have not been forecasted, but a modest 1 percent annual growth in vehicle traffic between the construction year (2018) and the planning horizon year (2030) was assumed for the build conditions. This increase in traffic volume would result in an approximately 11 percent increase in ECF at each of the crossings in the UPRR Alternative East Option compared to the No Build Alternative. At 103rd Street, a crash would be expected once every 10.4 years (1/ECF) instead of every 11.6 years. At 111th Street, a crash would be expected once every 14.7 years instead of every 16.3 years. This frequency would be considered an occasional risk with critical severity, which is classified as adverse.

Table 5-4: Calculated Expected Crash Frequencies at Union Pacific Railroad Grade Crossings

Scenario	Item	103rd Street	111th Street
Existing (2009)	Average Daily Traffic	18,700	12,800
	Daily Train Volume	26	26
	Expected Crash Frequency	0.047	0.033
	Existing Crash Frequency	0.080	0.080
No Build Alternative (2030)	Average Daily Traffic	18,700	12,800
	Daily Train Volume	48	48
	Expected Crash Frequency	0.086	0.061
Union Pacific Railroad Alternative, East Option (2030)	Average Daily Traffic	21,100	14,400
	Daily Train Volume	48	48
	Expected Crash Frequency	0.096	0.068

The new CTA train stations would be expected to generate additional pedestrian volume crossing the UPRR tracks at 103rd Street and 111th Street. Some of the pedestrians would come from the planned surface parking lots and some would come from the surrounding neighborhood. For the East Option, a 125-space parking lot would be located across the tracks from the 103rd Street station entrance and a 145-space parking lot would be located across the tracks from the 111th Street station entrance. It is assumed that bus stops would be relocated adjacent to the station entrances, eliminating the need for passengers making bus-rail connections to cross the tracks on foot.

Given that transit passengers are often in a hurry, and given the likely delays to pedestrians due to the expected increase in freight volumes over existing conditions, it is reasonable to think that some pedestrians may choose to take unacceptable safety risks by crossing the tracks while the signals are flashing. This adverse impact could be mitigated in one or more ways. Pedestrian crossing gates could be used at sidewalks to provide the same level of warning to pedestrians as is provided to motorists. Pedestrian crossing gates are provided at other CTA at-grade crossings (see Figure 5-2). Pending coordination with the UPRR, intertrack fencing with signs clearly prohibiting crossing would be installed between tracks to discourage pedestrians from crossing at locations other than designated crossing points (see Figure 5-3). If intertrack fencing is not feasible, fencing would be installed along parking lots or at the ROW line to prevent unsafe pedestrian crossings of the railroad tracks.

Figure 5-2: Pedestrian Crossing Gates at Isabella Street on Chicago Transit Authority Purple Line

Figure 5-3: Intertrack Fencing at a Metra Station

5.4.1.2 Segment UB

The design of Segment UB for the UPRR Rail Alternative is the same for all three options. Therefore, the impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.1.2).

5.4.2 Construction Impacts and Mitigations - Union Pacific Railroad Rail Alternative - East Option

The overall scope of work for the UPRR Rail Alternative East Option would be similar to the UPRR Rail Alternative ROW Option, but the elevated CTA rail line would be constructed adjacent to the existing, at-grade freight railroad line instead of in place of it. Completing construction adjacent to an active freight rail line could create some additional construction safety risks for the project. To mitigate risks of safety and security incidents, contractors would be required to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with other relevant aspects of the CTA's *Safety and Security Management Plan* or other manuals and policies (CTA 2011b). The contractor would take prompt and decisive corrective action on safety deficiencies identified at the work site.

5.4.2.1 Segment UA

5.4.2.1.1 Emergency Services

Impacts for Segment UA for the East Option would be the same as described for the ROW Option (see Section 5.3.2.1), except existing railroad grade crossings would not be removed, and the roadway profiles would not be reconstructed.

5.4.2.2 Segment UB

The design of Segment UB for the UPRR Rail Alternative is the same for all three options. Therefore, the impacts and mitigations associated with the East Option would be the same as described for the ROW Option (see Section 5.3.2.2).

5.4.3 Cumulative Impacts and Mitigations - Union Pacific Railroad Rail Alternative - East Option

5.4.3.1 Segment UA

5.4.3.1.1 Highway-Rail Crossings

In addition to the expected increase in automobile and pedestrian traffic volumes as a result of the RLE Project (see Section 5.4.1.1) compared to the No Build Alternative, the full implementation of the CREATE program would increase the number of trains using the UPRR tracks from 26 to 48 per day, an 85 percent increase over existing conditions. The proposed Metra SouthEast Service Line could also increase the number of passenger trains per day on the line beyond the existing two Amtrak trains per day. Based on Equation 7-3.1 in the IDOT *Bureau of Design and Environment Manual*, increases in train volume proportionally increase the ECF at highway-rail grade crossings (IDOT 2010a). This increase in crash potential would be an adverse impact at the existing highway-rail grade crossings along the UPRR tracks at 101st Street, 103rd Street, 107th Street, 109th Street, 111th Street, Wentworth Avenue, 115th Street, and State Street. All of these crossings currently have gates on both roadway approaches and flashing lights. Crash potential could be further mitigated by installing safety protection technologies for vehicles to prevent drivers from going around the gates, and by installing pedestrian gates on the sidewalks.

5.4.3.2 Segment UB

There would be no cumulative impacts on safety and security for Segment UB of the UPRR Rail Alternative East Option.

5.4.4 120th Street Yard and Shop

The permanent and construction impacts and mitigations associated with the 120th Street yard and shop for the East Option would be the same as described for the ROW Option (see Section 5.3.3).

5.5 Union Pacific Railroad Rail Alternative - West Option

The impacts and mitigations for the UPRR Rail Alternative West Option would be the same as described for the UPRR Rail Alternative East Option (see Section 5.4) except as noted below.

5.5.1 Permanent Impacts and Mitigations - Union Pacific Railroad Rail Alternative - West Option

5.5.1.1 Segment UA

5.5.1.1.1 Major Incidents

The impacts associated with the West Option would be the same as described for the ROW Option and the East Option (see Section 5.3.1.1).

5.5.1.1.2 Motor Vehicle Safety

The impacts and mitigations associated with the West Option would be the same as described for the ROW Option and the East Option (see Section 5.3.1.1).

5.5.1.1.3 Pedestrian Safety

The impacts and mitigations associated with the West Option would be the same as described for the East Option (see Section 5.4.1.1). Pedestrian safety impacts related to crossing the railroad tracks are discussed below under “Highway-Rail Grade Crossings.”

5.5.1.1.4 Parking Security

The parking security impacts for the UPRR Rail Alternative West Option would be similar to those described for the ROW Option, but some differences in proposed sizes and locations affect the impacts:

- 103rd Street - The West Option would include a 200-space parking lot west of the station, north of 104th Street. The lot would be somewhat large and portions could be difficult to see from the adjacent sidewalks. Various design elements would be incorporated to improve security in the lot, which would result in no adverse impact. However, given the size and location of the lot, additional mitigation would be considered.

- 111th Street - A 200-space parking lot would be located west of the station, between 110th Street and 111th Street. A large portion of the 145-space lot would be far from 111th Street or

other public sidewalks, limiting visibility. Various design elements would be incorporated to improve security in the lot, which would result in no adverse impact. However, given the location of the lot, additional mitigation would be considered.

- Michigan Avenue - A 1,000-space, five-story parking structure would be located west of the UPRR tracks and northeast of the 116th Street and State Street intersection. Various design elements would be incorporated to improve security for the structure, which would result in no adverse impact.

Mitigation measures would be the same as described for the BRT Alternative (see Section 5.2.1).

5.5.1.1.5 Neighborhood Security

The impacts and mitigations associated with the West Option would be the same as described for the ROW Option (see Section 5.3.1.1).

5.5.1.1.6 Terrorism and Homeland Security

The impacts and mitigations associated with the West Option would be the same as described for the ROW Option (see Section 5.3.1.1), except access would be permitted under the rail structure for park uses at Fernwood Parkway Park.

5.5.1.1.7 Highway-Rail Grade Crossings

Compared to the East Option, the volume of pedestrians crossing the tracks to access the new station would be lower for the West Option because the proposed parking lots would be located on the same side of the tracks as the proposed stations. However, the presence of the new train station adjacent to the highway-rail grade crossing would still generate additional pedestrian volume and create an adverse safety impact at 103rd Street and 111th Street. This impact could be mitigated in the same ways described for the East Option in Section 5.4.1.1, with pedestrian crossing gates and/or intertrack fencing.

5.5.1.2 Segment UB

The design of Segment UB for the UPRR Rail Alternative is the same for all three options. Therefore, the impacts and mitigations associated with the West Option would be the same as described for the ROW Option (See Section 5.3.1.2).

5.5.2 Construction Impacts and Mitigations - Union Pacific Railroad Rail Alternative - West Option

The overall scope of work for the UPRR Rail Alternative West Option would be similar to the UPRR Rail Alternative ROW Option, but the CTA rail line would be constructed west of the at-grade UPRR freight railroad line instead of east of the line. To mitigate risks of safety and security incidents, contractors would be required to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with other relevant aspects of the CTA's *Safety and Security Management Plan* or other manuals and policies (CTA

2011b). The contractor would take prompt and decisive corrective action on safety deficiencies identified at the work site.

5.5.2.1 Segment UA

5.5.2.1.1 Emergency Services

The impacts and mitigating actions for the West Option would be the same as described for the East Option (see Section 5.4.2.1).

5.5.2.2 Segment UB

The design of Segment UB for the UPRR Rail Alternative is the same for all three options. Therefore, the impacts and mitigations associated with the West Option would be the same as described for the ROW Option (see Section 5.3.1.2).

5.5.3 Cumulative Impacts and Mitigations - Union Pacific Railroad Rail Alternative - West Option

5.5.3.1 Segment UA

The cumulative impacts for the UPRR Rail Alternative West Option would be the same as described for the East Option (see Section 5.4.3.1).

5.5.3.2 Segment UB

There would be no cumulative impacts on safety and security for Segment UB of the UPRR Rail Alternative West Option.

5.5.4 120th Street Yard and Shop

The permanent and construction impacts and mitigations associated with the 120th Street yard and shop in the West Option would be the same as described for the ROW Option (see Section 5.3.3).

5.6 Halsted Rail Alternative

The permanent and construction impacts and mitigations for the Halsted Rail Alternative are discussed below.

5.6.1 Permanent Impacts and Mitigations - Halsted Rail Alternative

5.6.1.1 Segment HA

5.6.1.1.1 Major Incidents

The forecasted change in major incidents reportable to the FTA was calculated by multiplying the change in VRH for the CTA rail and bus systems by the existing major incident rates for those modes (see Table 5-5). For Segment HA, the Halsted Rail Alternative would be expected to increase the *frequency* of major incidents on the rail system by approximately 0.18 per year and decrease the *frequency* of major incidents on the bus system by approximately 0.48 per year compared to existing conditions. Combining the two results in a decrease of 0.30 major incidents

per year, or 1 every 3.3 years. However, the incident *rates* for each mode would not be expected to change substantially. It is also possible that the incident rate for the project area would be lower than for the system as a whole given its newer infrastructure. The CTA also attempts to minimize incidents by continuously upgrading the bus and rail fleets and through extensive operator training. The impact on major incidents would be not adverse.

Table 5-5: Change in Major Incidents for Segment HA

Item	Bus	Rail	Total
A. Annual Change in VRH	-26,406	26,919	513
B. Annual Major Incidents per Million VRH (2009-2011)	18.06	6.52	13.89
C. Annual Change in Major Incidents [(A/1,000,000)*B)]	-0.48	0.18	-0.30

Sources: (CTA 2009, National Transit Database 2012)
VRH = vehicle revenue hours

5.6.1.1.2 Motor Vehicle Safety

The FTA released Proposed New Starts and Small Starts Policy guidance on January 9, 2013 that includes factors used to measure the change in safety as a result of transit projects. The factors use the change in VMT to estimate changes in injuries and fatalities for automobiles and transit.

The Halsted Rail Alternative is expected to cause a small shift in travel modes from automobiles and buses to rail transit, thus decreasing automobile and bus VMT, and slightly increasing rail VMT. Overall, this would lead to a small decrease in fatalities and injuries, and the associated costs.

5.6.1.1.3 Pedestrian Safety

The new train stations at 103rd Street, 111th Street, and 119th Street would generate a large amount of pedestrian activity, potentially increasing in the number of pedestrians crossing at the intersections near station entrances compared to the No Build Alternative. Impacts at each station location are described below:

- 103rd Street - Station entrances would be located on all four corners of the intersection with Halsted Street. Therefore, the number of pedestrians crossing Halsted Street and 103rd Street would not be directly increased by the RLE Project. However, new stations would be expected to generate changes in land use and increased economic activity, indirectly increasing the pedestrians crossing in the vicinity of the station compared to the No Build Alternative. There are existing pedestrian safety concerns at the intersection (see Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

- Table A-5). An increase in the volume of pedestrians would possibly increase the *frequency* of pedestrian crashes, but likely not the *crash rate* due to the safety-in-numbers effect.[4]

[4] Safety in numbers is the hypothesis that increasing the size of a group or situation can reduce the rate of incidents involving that group or situation. Related to pedestrian safety, an increased number of

Therefore, the impact would be not adverse. Pedestrian safety improvements such as curb extensions, refuge medians, leading pedestrian intervals, and protected-only lagging left turns would be considered in the final design.

- 111th Street - Station entrances would be located on all four corners of the intersection with Halsted Street. Therefore, the number of pedestrians crossing Halsted Street and 103rd Street would not be directly increased by implementation of the Halsted Rail Alternative. However, new stations would be expected to generate changes in land use and increased economic activity, indirectly increasing the pedestrians crossing in the vicinity of the station compared to the No Build Alternative. There are existing pedestrian safety concerns regarding this intersection (see Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

- Table A-5). An increase in the volume of pedestrians would possibly increase the *frequency* of pedestrian crashes, but likely not the *crash rate* due to the safety-in-numbers effect. Therefore, the impact would be categorized as not adverse. Pedestrian safety improvements such as those described for the 103rd Street station would also be considered in the final design.

- 119th Street - The entrances for the 119th Street station would be located north of 119th Street and south of 118th Street, on both sides of Halsted Street. Having these entrances would directly increase the number of pedestrians crossing 119th Street to make the connection from the eastbound #119 bus. New stations would also be expected to generate changes in land use and increased economic activity, indirectly increasing the pedestrians crossing in the vicinity of the station compared to the No Build Alternative. There are existing pedestrian safety concerns regarding the 119th Street intersection (see Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

- Table A-5). An increase in the volume of pedestrians would possibly increase the *frequency* of pedestrian crashes, but likely not the *crash rate* due to the safety-in-numbers effect. Therefore, the impact would be not adverse. Pedestrian safety improvements such as those described for the 103rd Street station would also be considered in the final design at both the 118th Street and 119th Street intersections.

5.6.1.1.4 Parking Security

As described in Section 5.2.1, research has found that larger parking lots with less pedestrian activity and less visibility from the sidewalk can result in more thefts (Loukaitou-Sideris et al. 2002). All parking facilities would incorporate design features as described for the BRT Alternative

---

pedestrians at an intersection could increase driver awareness of pedestrians at that intersection, thus causing drivers to behave more carefully and crash rates (and sometimes absolute frequency) to decrease.

in Section 5.2.1. Security impacts for parking facilities at the three proposed stations on Segment HA are described below:

- 103rd Street - A 200-space surface parking lot would be located at the northwest corner of 103rd Street and Halsted Street. The lot would be easily visible from the sidewalk and would be expected to have no adverse impact.
- 111th Street - A 200-space surface parking lot would be located at the northwest corner of 111th Street and Halsted Street. The lot would be easily visible from the sidewalk and would be expected to have no adverse impact.
- 119th Street - A 1,000-space surface parking lot would be located at the southwest corner of 119th Street and Halsted Street. The lot would be very large and would be partially hidden under elevated rail tracks going to the proposed rail yard. Various design elements would be incorporated to improve security in the lot, which would result in no adverse impact. However, given the size of the lot, additional mitigation would be considered.

Mitigation measures would be the same as described for the BRT Alternative (see Section 5.2.1).

5.6.1.1.5 Neighborhood Security

As described in Section 5.3.1.1, a review of research related to crime in neighborhoods surrounding new transit stations found that a marked impact on neighborhood crime would be unlikely, but some risk would remain, particularly in low-income areas. The impact on neighborhood security would be not substantially adverse. Suggested mitigation measures would be security surveillance cameras and sidewalk lighting along commercial streets within one block (660 feet of train station entrances. CTA would need to coordinate the implementation of these measures with the City of Chicago because the cameras and lighting would be located on City ROW.

5.6.1.1.6 Terrorism and Homeland Security

The risks of terrorism for the Halsted Rail Alternative would be similar to those described for the UPRR Rail Alternative (see Section 5.3.1.1). As a whole, the CTA rail system is potentially a high profile target for terrorism, but other parts of the system are more likely targets than the proposed portions in the project area. The probability of an attack is remote, but the damage would be critical. Based on the Risk Assessment Matrix in Table 3-1, this is classified as a not substantially adverse impact.

The CTA prepares for acts of terrorism by updating various plans on a regular basis and coordinating with law enforcement and other agencies as described in Section 3.1.3.2. Unlike the UPRR Rail Alternative, access to the areas under the track structure could not be prohibited for mitigation purposes with the Halsted Rail Alternative, because the train line would be above a public roadway. Lighting and surveillance equipment would be considered in the final design phase to deter criminal activities and to facilitate criminal and vehicle identification

5.6.1.2 Segment HB

5.6.1.2.1 Major Incidents

Table 5-6 shows the forecasted change in major incidents reportable to the FTA. For Segment HB, the Halsted Rail Alternative would be expected to increase the *frequency* of major incidents on the rail system by approximately 0.06 per year and decrease the *frequency* of major incidents on the bus system by approximately 0.05 per year compared to existing conditions. Combining the two results in approximately no change in major incidents. The incident *rates* for each mode would also not be expected to change substantially. It is also possible that the incident rate for the project would be lower than for the system as a whole given its newer infrastructure. The CTA also attempts to minimize incidents by continuously upgrading the bus and rail fleets and through extensive operator training. The impact on major incidents would be not adverse.

Table 5-6: Change in Major Incidents for Segment HB

Item	Bus	Rail	Total
A. Annual Change in VRH	-2,848	8,472	5,624
B. Annual Major Incidents per Million VRH (2009-2011)	18.06	6.52	13.89
C. Annual Change in Major Incidents [(A/1,000,000)*B)]	-0.05	0.06	0.00

Sources: (CTA 2009, National Transit Database 2012)
VRH = vehicle revenue hours

5.6.1.2.2 Motor Vehicle Safety

The impacts and mitigations associated with the Segment HB would be the same as described for Segment HA (see Section 5.6.1.1).

5.6.1.2.3 Pedestrian Safety

The new train station at Vermont Avenue would have station entrances on both sides of Halsted Street south of Vermont Avenue and north of 128th Place. Implementation of the Halsted Rail Alternative would not directly increase the number of pedestrians crossing at Halsted Street and Vermont Avenue. However, new stations would be expected to generate changes in land use and increased economic activity, indirectly increasing the pedestrians crossing in the vicinity of the station compared to the No Build Alternative.

An increase in the volume of pedestrians would not be expected to have an adverse impact on crash rates at a signalized intersection such as Vermont Avenue. However, the intersection of 128th Place and Halsted Street is controlled by all-way stop signs. All-way stop signs can have an adverse impact on pedestrian safety on multi-lane streets such as Halsted Street due to a situation known as the multiple-threat, where one driver stops, but a second driver cannot see the pedestrian crossing (see Figure 5-4) and fails to come to a complete stop. It is expected that the minimum requirements for traffic signals described in the MUTCD could be met at the 128th Place and Halsted Street intersection. Traffic signals would be considered for mitigation in coordination with the results of traffic studies completed during the final design phase. Pedestrian safety improvements such as curb extensions, refuge medians, leading pedestrian intervals, and protected-only lagging left turns would also be considered at both intersections in the final design.

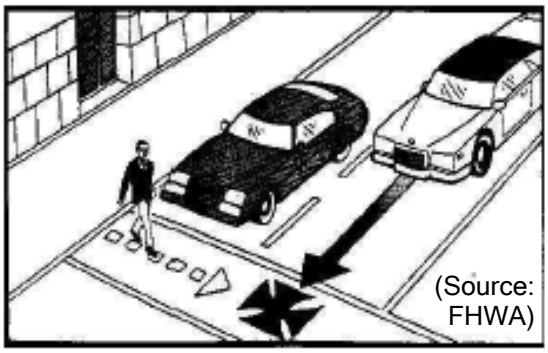

Figure 5-4: Multiple Threat Pedestrian Crash

5.6.1.2.4 Parking Security

As described in Section 5.2.1, research has found that larger parking lots with less pedestrian activity and less visibility from the sidewalk can result in more thefts (Loukaitou-Sideris et al. 2002). All parking facilities would incorporate design features as described for the BRT Alternative in Section 5.2.1. Mitigation measures would also be the same as described for the BRT Alternative (see Section 5.2.1).

Two parking facilities are proposed for the Vermont Avenue station. A 300-space surface parking lot would be located on the east side of Halsted Street between Vermont Avenue and 128th Place. The lot would be easily visible from the sidewalk and would be expected to have no adverse impact on security. A 2,000 space, six-story parking structure would be located on the west side of Halsted Street between Vermont Avenue and 128th Place. Various design elements would be incorporated to improve security in the garage, which would result in no adverse impact.

5.6.1.2.5 Neighborhood Security

The impacts and mitigation measures for Segment HB would be the same as those described for Segment HA (see Section 5.6.1.1).

5.6.1.2.6 Terrorism and Homeland Security

The impacts and mitigation measures for Segment HB would be the same as those described for Segment HA (see Section 5.6.1.1).

5.6.2 Construction Impacts and Mitigations - Halsted Rail Alternative

The Halsted Rail Alternative would include construction of a 5.0-mile extension of the existing CTA Red Line, mostly on elevated structure over the median of Halsted Street. The extensive scope of work for this alternative would create a need for a large number of contractors in many areas over a long time period. To mitigate risks of safety and security incidents, contractors would be required to develop a Construction Safety and Security Plan, perform job safety analysis, monitor safety and security activities, and comply with other relevant aspects of the CTA's *Safety*

and Security Management Plan or other manuals and policies (CTA 2011b). The contractor would take prompt and decisive corrective action on safety deficiencies identified at the work site.

5.6.2.1 Segment HA

5.6.2.1.1 Emergency Services

Construction work would be phased to minimize traffic impacts on Halsted Street and adjoining streets. However, elevated structure construction would require lane and street closures and superstructure erection would require temporary shutdown of all traffic along portions of Halsted Street. In order to maintain emergency access on cross-streets, only short segments of Halsted Street (less than ½ mile long) would be closed at any given time. Emergency services would need to access construction sites in the same way as contractors, by using various side streets and recommended detours. The impacts would be not substantially adverse.

As a mitigation, traffic management plans would be created during the final engineering phase of the project to identify detour and emergency access routes, which would generally follow the nearest arterial or collector streets. Contractors will also follow the MUTCD design standards for temporary traffic control and would obtain required local permits.

5.6.2.2 Segment HB

The construction impacts and mitigation measures for Segment HB would be the same as described for Segment HA (see Section 5.6.2.1).

5.6.3 Cumulative Impacts and Mitigations – Halsted Rail Alternative

There would not be expected cumulative impacts on safety and security associated with the Halsted Rail Alternative.

5.6.4 119th Street Yard and Shop

5.6.4.1 Permanent Impacts and Mitigations

A study of ROW intrusions for the CTA's Red and Purple Modernization Project found a large number of incidents at the Howard Yard and the Linden Yard, primarily related to graffiti. The same type of activity would be likely to occur at the proposed 119th Street yard and shop. The yard and shop would be located west of Halsted Street, and would be somewhat separated from residential areas by development north of 119th Street and south of 120th Street. It would also be just ¼ mile west of the proposed 119th Street station. The area surrounding 119th Street and Halsted Street has substantially less background crime activity than the area surrounding the Howard station on the CTA Red Line, so the expected occurrence of incidents would be occasional frequency. The combination of occasional probability and marginal severity for graffiti incidents results in a risk classification of "Review" per the CTA's risk assessment matrix (see Table 3-1), or not substantially adverse for the NEPA analysis.

To mitigate the risk of security incidents, the design of the yard and shop would comply with all relevant design standards, as discussed in Section 3.1. Security fencing at least 8 feet in height

would be installed around the perimeter of the yard per FTA guidance (FTA 2004). Security cameras would be installed to monitor potential access points. The latest technologies available for automated intrusion detection, such as thermal imaging with analytics software, would be reviewed at the time of final design and construction.

5.6.4.2 Construction Impacts and Mitigations

The construction impacts and mitigation measures associated with the 119th Street yard and shop would be the same as the general construction impacts and mitigation measures associated with Segment HA (see Section 5.6.2.1).

Section 6
Impacts Remaining after Mitigation

This section describes the impacts of the RLE Project that would remain after mitigating for impacts as described in Section 5.

6.1 No Build Alternative

There would be no expected permanent impacts, construction impacts, or cumulative impacts on safety and security associated with the No Build Alternative. Therefore, there would also be no impacts remaining after mitigation.

6.2 Bus Rapid Transit Alternative

Table 6-1 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for seven topic areas for the BRT Alternative. There would be no remaining adverse impacts after mitigation. See Section 5.2 for details about the impacts.

Table 6-1: Impacts Remaining after Mitigation - Bus Rapid Transit Alternative

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Major Incidents	Not Adverse	None necessary	Not Adverse
Motor Vehicle Safety	Beneficial	None necessary	Beneficial
Pedestrian Safety	▪ Adverse (1 Location) ▪ Not Adverse (4 locations)	Install new traffic signals and/or other pedestrian crossing treatments (e.g., refuge medians).	▪ Not Adverse (5 locations)
Bus Stop Security	▪ Beneficial (1 location) ▪ Not Adverse (3 locations)	None necessary	▪ Beneficial (1 location) ▪ Not Adverse (3 locations)
Parking Security	Not Adverse	Consider pedestrian access routes (i.e., sidewalks) through or adjacent to surface lots on a case-by case basis where it would increase pass-by surveillance.	Not Adverse
Neighborhood Security	Not Adverse	None necessary	Not Adverse
Terrorism and Homeland Security	Not Adverse	Continue to update safety and security plans. Continue coordination with law enforcement, homeland security, and other agencies.	Not Adverse

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Construction Impacts			
Emergency Services	Not Adverse	Contractors would follow MUTCD standards for temporary traffic control, and would obtain required local permits.	Not Adverse

MUTCD = Manual on Uniform Traffic Control Devices

6.3 Union Pacific Railroad Rail Alternative - Right-of-Way Option

6.3.1 Segment UA

Table 6-1 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for six topic areas for the UPRR Rail Alternative ROW Option, Segment UA. There would be no remaining adverse impacts after mitigation. See Section 5.3 for details about the impacts.

Table 6-2: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Right-of-Way Option, Segment UA

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Major Incidents	Not Adverse	None necessary	Not Adverse
Motor Vehicle Safety	Beneficial	None necessary	Beneficial
Pedestrian Safety	Adverse	Install new traffic signals and/or other pedestrian crossing treatments (e.g., refuge medians).	Beneficial
Parking Security	Not Adverse	Consider pedestrian access routes (i.e., sidewalks) through or adjacent to surface lots on a case-by case basis where it would increase pass-by surveillance.	Not Adverse
Neighborhood Security	Not Substantially Adverse	Coordinate with City of Chicago to install sidewalk lighting and surveillance cameras along commercial streets within one block (660 feet) of station entrances.	Not Adverse
Terrorism and Homeland Security	Not Substantially Adverse	Continue to update safety and security plans. Continue coordination with law enforcement, homeland security, and other agencies. Prohibit parking where tracks cross over public streets. Prohibit access to areas under track structure with fencing, barriers, or signage. Include a means of detecting ROW intrusions in final design. Consider lighting under track structure for improved visibility and crime deterrence.	Not Adverse

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Construction Impacts			
Emergency Services	Not Substantially Adverse	Neither adjacent roadways nor adjacent parallel through streets would be closed simultaneously. Traffic management plans would be created that would identify recommended detour routes. Contractors would follow MUTCD standards for temporary traffic control and would obtain required local permits.	Not Substantially Adverse

ROW = right-of-way, MUTCD = Manual on Uniform Traffic Control Devices

6.3.2 Segment UB

Table 6-13 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for six topic areas for the UPRR Rail Alternative ROW Option, Segment UB. There would be no remaining adverse impacts after mitigation. See Section 5.3 for details about these impacts.

Table 6-3: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Rail Alternative ROW Option, Segment UB

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Major Incidents	Not Adverse	None necessary	Not Adverse
Motor Vehicle Safety	Beneficial	None necessary	Beneficial
Pedestrian Safety	Not Adverse	In addition to new traffic signal, sidewalks, curb ramps, and marked crosswalks planned at 130th Street and Evans Avenue, consider additional “complete streets” modifications for 130th Street corridor.	Not Adverse
Parking Security	Not Adverse	Consider pedestrian access routes (i.e., sidewalks) through or adjacent to surface lots on a case-by case basis where it would increase pass-by surveillance.	Not Adverse
Neighborhood Security	Not Adverse	None applicable	Not Adverse
Terrorism and Homeland Security	Not Substantially Adverse	Continue to update safety and security plans. Continue coordination with law enforcement, homeland security, and other agencies. Prohibit access to areas under track structure with fencing, barriers, or signage. Include a means of detecting ROW intrusions in final design. Consider lighting under track structure for improved visibility and crime deterrence.	Not Adverse

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Construction Impacts			
Emergency Services	Not Adverse	A new access road to the MWRD plant would be constructed prior to the new CTA rail alignment if necessary to maintain access. Traffic management plans would be created that would identify recommended detour routes. Contractors would follow MUTCD standards for temporary traffic control and would obtain required local permits.	Not Adverse

ROW = right-of-way, MWRD = Metropolitan Water Reclamation District, CTA = Chicago Transit Authority, MUTCD = Manual on Uniform Traffic Control Devices

6.3.3 120th Street Yard and Shop

Table 6-4 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for one topic area for the UPRR Rail Alternative, 120th Street yard and shop. There would be no remaining adverse impacts after mitigation. See Section 5.3 for details.

Table 6-4: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Rail Alternative Right-of-Way Option, 120th Street Yard and Shop

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Security	Not Substantially Adverse	Design of yard would comply with relevant design standards. Fencing or barriers would be included around perimeter of rail yard. Security cameras would monitor access points. Intrusion detection technologies would be considered in final design.	Not Substantially Adverse

6.4 Union Pacific Railroad Rail Alternative - East Option

6.4.1 Segment UA

The impacts remaining after mitigation for the East Option would be the same as described for the ROW Option (see Section 6.3.1), but with some changes and additions as shown in Table 6-5. There would be no remaining adverse impacts after mitigation. See Section 5.4 for details.

Table 6-5: Impacts Remaining after Mitigation - Union Pacific Railroad Rail Alternative Rail Alternative East Option, Segment UA

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Terrorism and Homeland Security	Not Substantially Adverse	Continue to update safety and security plans. Continue coordination with law enforcement, homeland security, and other agencies. Prohibit parking where tracks cross over public streets. Prohibit access to areas under track structure with fencing, barriers, or signage, except for park uses. Include a means of detecting ROW intrusions in final design. Consider lighting under track structure for improved visibility and crime deterrence.	Not Adverse
Highway-Rail Crossings	Adverse	Install safety protection technologies for vehicles and pedestrians at 103rd Street and 111th Street crossings. Install either intertrack fencing or fencing along parking lots and ROW lines to prevent pedestrian crossings away from sidewalks.	Not Adverse
Cumulative Impacts			
Highway-Rail Crossings	Adverse	Install safety protection technologies for vehicles and pedestrians at 103rd Street and 111th Street crossings.	Not Adverse

ROW = right-of-way

6.4.2 Segment UB

The design of Segment UB for the UPRR Rail Alternative would be the same for all three options. Therefore, the impacts remaining after mitigation associated with the East Option would be the same as described for the ROW Option (see Section 6.3.2).

6.4.3 120th Street Yard and Shop

The design of the 120th Street yard and shop for the UPRR Rail Alternative would be the same for all three options. Therefore, the impacts remaining after mitigation associated with the East Option would be the same as described for the ROW Option (see Section 6.3.3).

6.5 Union Pacific Railroad Rail Alternative - West Option

6.5.1 Segment UA

The impacts remaining after mitigation associated with the West Option would be the same as described for the East Option (see Section 6.3.1). There would be no remaining adverse impacts after mitigation. See Section 5.5 for details.

6.5.2 Segment UB

The design of Segment UB for the UPRR Rail Alternative would be the same for all three options. Therefore, the impacts and mitigations associated with the West Option would be the same as described for the ROW Option (see Section 6.3.2).

6.5.3 120th Street Yard and Shop

The design of the 120th Street yard and shop for the UPRR Rail Alternative would be the same for all three options. Therefore, the impacts remaining after mitigation associated with the East Option would be the same as described for the ROW Option (see Section 6.3.3).

6.6 Halsted Rail Alternative

6.6.1 Segment HA

Table 6-6 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for six topic areas for the Halsted Rail Alternative, Segment HA. There would be no remaining adverse impacts after mitigation. See Section 5.6 for details.

Table 6-6: Impacts Remaining after Mitigation - Halsted Rail Alternative, Segment HA

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Major Incidents	Not Adverse	None necessary	Not Adverse
Motor Vehicle Safety	Beneficial	None necessary	Beneficial
Pedestrian Safety	Not Adverse	Consider pedestrian safety improvements such as curb extensions, refuge medians, and signal timing modifications in final design.	Not Adverse or Beneficial
Parking Security	Not Adverse	Consider pedestrian access routes (i.e., sidewalks) through or adjacent to surface lots on a case-by case basis where it would increase pass-by surveillance.	Not Adverse
Neighborhood Security	Not Substantially Adverse	Coordinate with City of Chicago to install sidewalk lighting and surveillance cameras along commercial streets within one block (660 feet) of station entrances.	Not Adverse
Terrorism and Homeland Security	Not Substantially Adverse	Continue to update safety and security plans. Continue coordination with law enforcement, homeland security, and other agencies. Consider additional lighting and surveillance cameras under track structure for improved visibility and crime deterrence.	Not Substantially Adverse

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Construction Impacts			
Emergency Services	Not Substantially Adverse	Only short segments of Halsted Street (½ mile or less) would be closed at any given time. Traffic management plans would be created that would identify recommended detour routes. Contractors would follow MUTCD standards for temporary traffic control and would obtain required local permits.	Not Substantially Adverse

MUTCD = Manual on Uniform Traffic Control Devices

6.6.2 Segment HB

Table 6-7 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for six topic areas for the Halsted Rail Alternative, Segment HB. There would be no remaining adverse impacts after mitigation. See Section 5.6 for details.

Table 6-7: Impacts Remaining after Mitigation - Halsted Rail Alternative, Segment HB

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Major Incidents	Not Adverse	None necessary	Not Adverse
Motor Vehicle Safety	Beneficial	None necessary	Beneficial
Pedestrian Safety	Adverse	Replace all-way stop signs at Halsted Street and 128th Place with traffic signals if warranted per MUTCD standards. Otherwise, remove stop signs from Halsted Street only. Consider pedestrian safety improvements such as curb extensions, refuge medians, and signal timing modifications in final design.	Not Adverse or Beneficial
Parking Security	Not Adverse	Consider pedestrian access routes (i.e., sidewalks) through or adjacent to surface lots on a case-by case basis where it would increase pass-by surveillance.	Not Adverse
Neighborhood Security	Not Substantially Adverse	Coordinate with City of Chicago to install sidewalk lighting and surveillance cameras along commercial streets within one block (660 feet) of station entrances.	Not Adverse
Terrorism and Homeland Security	Not Substantially Adverse	Continue to update safety and security plans. Continue coordination with law enforcement, homeland security, and other agencies. Consider additional lighting and surveillance cameras under track structure for improved visibility and crime deterrence.	Not Substantially Adverse

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Construction Impacts			
Emergency Services	Not Substantially Adverse	Only short segments of Halsted Street (½ mile or less) would be closed at any given time. Traffic management plans would be created that would identify recommended detour routes. Contractors would follow MUTCD standards for temporary traffic control and would obtain required local permits.	Not Substantially Adverse

MUTCD = Manual on Uniform Traffic Control Devices

6.6.3 119th Street Yard and Shop

Table 6-8 summarizes the impacts, mitigation measures, and impacts remaining after mitigation for one topic area for the Halsted Rail Alternative, 119th Street yard and shop. There would be no remaining adverse impacts after mitigation. See Section 5.6.3 for details.

Table 6-8: Impacts Remaining after Mitigation - Halsted Rail Alternative, 119th Street Yard and Shop

Topic	Impact Before Mitigation	Mitigation	Impact Remaining after Mitigation
Permanent Impacts			
Security	Not Substantially Adverse	Design of yard would comply with all relevant design standards. Fencing or barriers would be included around perimeter of rail yard. Security cameras would monitor access points. Intrusion detection technologies would be considered in final design.	Not Substantially Adverse

Section 7
References Cited

AECOM. 2009. Final Report, Red, Orange, Yellow Line Extension Alternatives Analysis Travel Demand Forecasting Report, Table 4.6. December.

American Railway Engineering and Maintenance of Way Association. 2012. Manual for Railway Engineering.

Barclay, Paul, Jennifer Buckley, Paul J. Brantingham, Patricia L. Brantingham, and Terry Whinn-Yates. 1996. Preventing Auto Theft in Suburban Vancouver Commuter Lots: Effects of a Bike Patrol. Available at: http://www.popcenter.org/library/crimeprevention/volume_06/04_buckley.pdf. Accessed September 18, 2012.

Block, Richard, and Sean Davis. 1996. The Environs of Rapid Transit Stations: A Focus for Street Crime or Just Another Risky Place? Available at: http://www.popcenter.org/library/crimeprevention/volume_06/08_block.pdf. Accessed September 14, 2012.

Chicago Department of Transportation (CDOT). 2006. Chicago Traffic Tracker. Available at: http://webapps.cityofchicago.org/traffic/. Accessed August 21, 2012.

Chicago Housing Authority (CHA). 2012. Proposed FY2013 Moving to Work Annual Plan, pages 17 and 18. October/18. Available at: http://www.thecha.org/filebin/FY2013_Annual_Plan_FinalDraft2.pdf. Accessed February 18, 2013.
Chicago Metropolitan Agency for Planning. 2008. Analysis of High Crash Locations that Contain Intersections, Years 2005–2006. December. Available at: http://www.cmap.illinois.gov/documents/20583/5181803a-1191-48c0-abdd-773850c60eed. Accessed November 1, 2012.

Chicago Transit Authority (CTA). 1996. Design and Rehabilitation Criteria Manual.

CTA. 2007. Bus Facilities Handbook. December.

CTA. 2009. CTA Red Line Extension Alternatives Analysis, Locally Preferred Alternative Report.

CTA. 2011a. RBS_STOP.shp [GIS bus stop ridership data].

CTA. 2011b. Safety and Security Management Plan. April.

CTA. 2012. Annual Ridership Report, Calendar Year 2011. January/24. Available at: http://www.transitchicago.com/assets/1/ridership_reports/2011-Annual.pdf. Accessed August 23, 2012.

Chicago Transportation Coordination Office. 2011. Train model output raw data. May/27.

City of Chicago. 1991. Guide to the Chicago Landscape Ordinance. Available at: http://www.cityofchicago.org/content/dam/city/depts/streets/supp_info/LandscapeManual.pdf. Accessed October 31, 2012.

City of Chicago. 2012a. Building Code and Related Excerpts of the Municipal Code of Chicago. Available at: http://www.amlegal.com/nxt/gateway.dll/Illinois/chicagobuilding/buildingcodeandrelatedexcerptsofthemunic?f=templates$fn=default.htm$3.0$vid=amlegal:chicagobuilding_il. Accessed January 3, 2012.

City of Chicago. 2012b. Crimes - 2001 to present. Available at: http://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present/ijzp-q8t2. Accessed June 7, 2012.

City of Chicago. 2012c. Pedestrian crash data GIS shapefiles.

Denver Regional Transportation District (Denver RTD). 2006. Technical Memorandum: Neighborhood vs. Station Crime Myths and Facts. November/16.

Developing Communities Project, Metropolitan Planning Council, Chicago Metropolitan Agency for Planning, and Center for Neighborhood Technology. 2010. What Will Your Station Look Like? A Summary Report of the Developing Communities Project Community Visioning Session for the Proposed Red Line Extension. September.

Federal Railroad Administration, Office of Railroad Safety. 2012. Guidance on Pedestrian Crossing Safety at or near Passenger Stations. April. Available at: http://www.fra.dot.gov/rrs/downloads/PedestrianCrossingSafetyat_orNearPassengerStations.pdf. Accessed May 1, 2012.

Federal Transit Administration (FTA). 2012. Proposed New Starts and Small Starts Policy Guidance. January/9. Available at: http://www.fta.dot.gov/documents/NewStartsPolicyGuidance.pdf. Accessed January 21, 2013.

FTA Office of Research Demonstration and Innovation/Office of Program Management, November, 2004. Transit Security Design Considerations FTA-TRI-MA-26 7085-05. Available at: http://transit-safety.fta.dot.gov/Secrity/SecurityInitiatives/DesignConsiderations/CD/front.htm#preface

FTA Office of Safety and Security. 2006. Implementation Guidelines for 49 CFR Part 659. March. Available at: http://www.fta.dot.gov/documents/Imp_Guidelines.pdf. Accessed May 7, 2012.

Illinois Commerce Commission (ICC). 2012a. Crossing Number 867234A Collision History. Available at: http://www.icc.illinois.gov/railroad/collisions.aspx?dotId=867234A&dot=867234A&v=. Accessed August 20, 2012.

ICC. 2012b. Crossing Number 840131W Collision History. Available at: http://www.icc.illinois.gov/railroad/collisions.aspx?dotId=840131W&dot=840131W&v=. Accessed August 20, 2012.

ICC. 2012c. Railroad Safety. Available at: http://www.icc.illinois.gov/railroad/. Accessed May 7, 2012.

ICC. 2013. Crossing and Collision Statistics in Illinois: Cook County. Available at: http://www.icc.illinois.gov/railroad/crossingmap.aspx. Accessed January 3, 2013.

Ihlanfeldt, Keith R. 2003. Rail Transit and Neighborhood Crime: The Case of Atlanta, Georgia. Southern Economic Journal 70(2):273-294.

Illinois Department of Transportation (IDOT). 2010a. Bureau of Design and Environment Manual. September. Available at: http://www.dot.il.gov/desenv/bdemanual.html. Accessed September 4, 2012.

IDOT. 2010b. Traffic Count Database System. Available at: http://www.ms2soft.com/tcds/tsearch.asp?loc=Idot&mod=TCDS. Accessed August 23, 2012.

Illinois General Assembly. 1996. Illinois Commercial Transportation Law (625 ILCS 5). January/1. Available at: http://www.ilga.gov/legislation/ilcs/ilcs4.asp?DocName=062500050HCh%2E+18C&ActID=1815&ChapterID=49&SeqStart=159100000&SeqEnd=182900000. Accessed May 7, 2012.

Illinois General Assembly. 1997. Regional Transportation Authority Act (70 ILCS 3615). July/30. Available at: http://www.ilga.gov/legislation/ilcs/ilcs5.asp?ActID=984&ChapterID=15. Accessed May 7, 2012.

Illinois General Assembly. 1978. Consumer Fraud and Deceptive Business Practices Act. Available at: http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=2356&ChapterID=67. Accessed January 7, 2013.

Liggett, Robin, Anastasia Loukaitou-Sideris, and Hiroyuki Iseki. 2001. Bus Stop-Environmental Connection: Do Characteristics of the Built Environment Correlate with Bus Stop Crime? Available at http://www.uctc.net/papers/613.pdf. Accessed September 13, 2012.

Liggett, Robin, Anastasia Loukaitou-Sideris, and Hiroyuki Iseki. 2002. Journeys to Crime: Assessing the Effects of a Light Rail Line on Crime in the Neighborhoods. July. Available at http://www.uctc.net/papers/614.pdf. Accessed April 25, 2012.

Loukaitou-Sideris, Anastasia, Robin Liggett, and Hiroyuki Iseki. 2002. The Geography of Transit Crime: Documentation and Evaluation of Crime Incidence on and around the Green Line Stations in Los Angeles. Available at http://fastracks01.thenewpush.com/media/uploads/nm/The_geography_of_Transit_Crime.pdf. Accessed April 25, 2012.

National Fire Protection Association (NFPA) Part 130. 2010a. Standard for Fixed Guideway Transit and Passenger Rail Systems. Available at: http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=130&cookie_test=1

NFPA 14. 2010b. Standard for the Installation of Standpipes and Hose Systems. Available at: http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=14&cookie_test=1

National Transit Database. 2010. 2010 Safety and Security Reporting Manual. Available at: http://www.ntdprogram.gov/ntdprogram/pubs/safetyRM/2010/html/2010_Safety_and_Security_Reporting_Manual_TOC.htm

National Transit Database. 2012. Safety & Security Data. September/5. Available at: http://www.ntdprogram.gov/ntdprogram/pubs/MonthlyData/S&STimeSeriesMay2012-MajorOnly-09052012.xls. Accessed September 24, 2012.

Plano, Stephen L. 1993. Transit-Generated Crime: Perception vs. Reality: A Sociogeographic Study of Neighborhoods Adjacent to Section B of Baltimore Metro. *Transportation Research Record* 1402:59-62.

Poister, Theodore H. 1996. Transit-Related Crime in Suburban Areas. Journal of Urban Affairs. 18(1):63-76.

San Diego Association of Governments. 2009. Understanding Transit's Impact on Public Safety. June. Available at: http://sandiegohealth.org/sandag/publicationid_1483_10995.pdf. Accessed April 25, 2012.

Village of Calumet Park. 2013. Building Department Forms. Available at: http://www.calumetparkvillage.org/buildingdept_forms.php. Accessed January 3, 2013.

Witherspoon Security Consulting. 2012. Parking Lot and Garage Security. Available at: http://www.security-expert.org/parkinglots.htm. Accessed October 31, 2012

Appendix A
Tables and Figures

Table A-1: Safety and Security Incident Summary for Entire Chicago Transit Authority Bus System

Year	Major Incident Type						Vehicle Revenue Hours	Major Incidents per Million Vehicle Revenue Hours
	Collisions	Derailments	Fires	Security	Not Otherwise Classified	Total		
2009	273	0	3	39	15	330	7,008,308	47.09
2010	252	0	1	72	6	331	5,955,896	55.58
2011	272	0	8	77	7	364	5,955,896	61.12
Total	797	0	12	188	28	1,025	18,920,100	54.18

Source: (National Transit Database 2012)

Table A-2: Safety and Security Incident Summary for Entire Chicago Transit Authority Rail System

Year	Major Incident Type						Vehicle Revenue Hours	Major Incidents per Million Vehicle Revenue Hours
	Collisions	Derailments	Fires	Security	Not Otherwise Classified	Total		
2009	21	2	4	33	7	67	3,732,593	17.95
2010	21	3	4	28	7	63	3,479,766	18.10
2011	10	1	3	56	9	79	3,479,766	22.70
Total	52	6	11	117	23	209	10,692,125	19.55

Source: (National Transit Database 2012)

Table A-3: Crimes on Chicago Transit Authority Buses and at Bus Stops

Type of Crime	Crimes on CTA Buses in Chicago		Crimes at CTA Bus Stops in Chicago	
	2009 2011	Percent	2009 2011	Percent
Arson	0	0.0	0	0.0
Assault	378	9.5	77	5.2
Battery	1,109	27.9	264	17.9
Burglary	0	0.0	1	0.1
Criminal Sexual Assault	1	0.0	1	0.1
Criminal Damage	375	9.4	70	4.7
Criminal Trespassing	15	0.4	23	1.6
Deceptive Practice	133	3.3	20	1.4
Gambling	0	0.0	3	0.2
Homicide	1	0.0	0	0.0
Interfere with Public Officer	4	0.1	4	0.3
Intimidation	2	0.1	1	0.1
Kidnapping	0	0.0	6	0.4
Liquor Law Violation	0	0.0	3	0.2
Motor Vehicle Theft	1	0.0	0	0.0
Narcotics	36	0.9	212	14.4
Non-Criminal	2	0.1	0	0.0
Offense Involving Children	1	0.0	0	0.0
Other Offense	34	0.9	22	1.5
Prostitution	0	0.0	0	0.0
Public Indecency	1	0.0	0	0.0
Public Peace Violation	33	0.8	12	0.8
Rape	0	0.0	0	0.0
Robbery	275	6.9	431	29.2
Sex Offense	22	0.6	19	1.3
Stalking	0	0.0	3	0.2
Theft	1,546	38.8	298	20.2
Weapons Violation	12	0.3	6	0.4
Total	3,981	100.0	1,476	100.0

Source: (City of Chicago 2012b)

CTA = Chicago Transit Authority

Table A-4: Crimes on Chicago Transit Authority Trains, Platforms, and Other Property in Chicago

Type of Crime	Crimes on CTA Trains in Chicago		Crimes on CTA Platforms in Chicago		Crimes at CTA Garages and Other Property in Chicago	
	2009 2011	Percent	2009 2011	Percent	2009 2011	Percent
Arson	0	0.0	2	0.0	0	0.0
Assault	85	1.9	228	3.6	97	3.8
Battery	400	8.9	606	9.7	196	7.6
Burglary	0	0.0	2	0.0	12	0.5
Criminal Sexual Assault	7	0.2	4	0.1	4	0.2
Criminal Damage	202	4.5	211	3.4	264	10.2
Criminal Trespassing	27	0.6	294	4.7	175	6.8
Deceptive Practice	184	4.1	2,463	39.2	702	27.1
Gambling	4	0.1	4	0.1	1	0.0
Homicide	0	0.0	1	0.0	1	0.0
Interfere with Public Officer	3	0.1	8	0.1	7	0.3
Intimidation	0	0.0	1	0.0	0	0.0
Kidnapping	0	0.0	3	0.0	2	0.1
Liquor Law Violation	3	0.1	20	0.3	2	0.1
Motor Vehicle Theft	0	0.0	0	0.0	46	1.8
Narcotics	316	7.1	843	13.4	262	10.1
Non-Criminal	0	0.0	0	0.0	0	0.0
Offense Involving Children	4	0.1	3	0.0	2	0.1
Other Offense	21	0.5	30	0.5	32	1.2
Prostitution	0	0.0	0	0.0	4	0.2
Public Indecency	1	0.0	2	0.0	0	0.0
Public Peace Violation	19	0.4	51	0.8	18	0.7
Rape	0	0.0	0	0.0	0	0.0
Robbery	846	18.9	494	7.9	125	4.8
Sex Offense	72	1.6	29	0.5	6	0.2
Stalking	4	0.1	4	0.1	0	0.0
Theft	2,270	50.7	939	15.0	617	23.9
Weapons Violation	13	0.3	36	0.6	11	0.4
Total	4,481	100.0	6,278	100.0	2,586	100.0

Source: (City of Chicago 2012b)
CTA = Chicago Transit Authority

Table A-5: Pedestrian Crashes within ⅛ mile of Proposed Station Locations

Station	2007	2008	2009	2010	2011	Total
BRT Alternative						
103rd Street	7	4	7	3	1	22
111th Street	6	4	3	6	1	20
Kensington Avenue	2	2	2	2	0	8
130th Street and Eberhart Avenue	0	0	1	0	0	1
131st Street, Ellis Avenue, 133rd Street/Place, Corliss Avenue	1	1	2	2	6	12
UPRR Rail Alternative						
103rd Street	1	0	0	1	0	2
111th Street	1	1	1	0	1	4
Michigan Avenue	2	1	1	0	0	4
130th Street - West Option	1	0	1	0	0	2
130th Street - South Option	0	0	0	0	0	0
Halsted Rail Alternative						
103rd Street	3	4	2	2	3	14
111th Street	5	3	3	5	3	19
119th Street	4	2	4	0	2	12
Vermont Avenue	1	1	1	1	1	5

Sources: (City of Chicago 2012c, CTA 2011a)

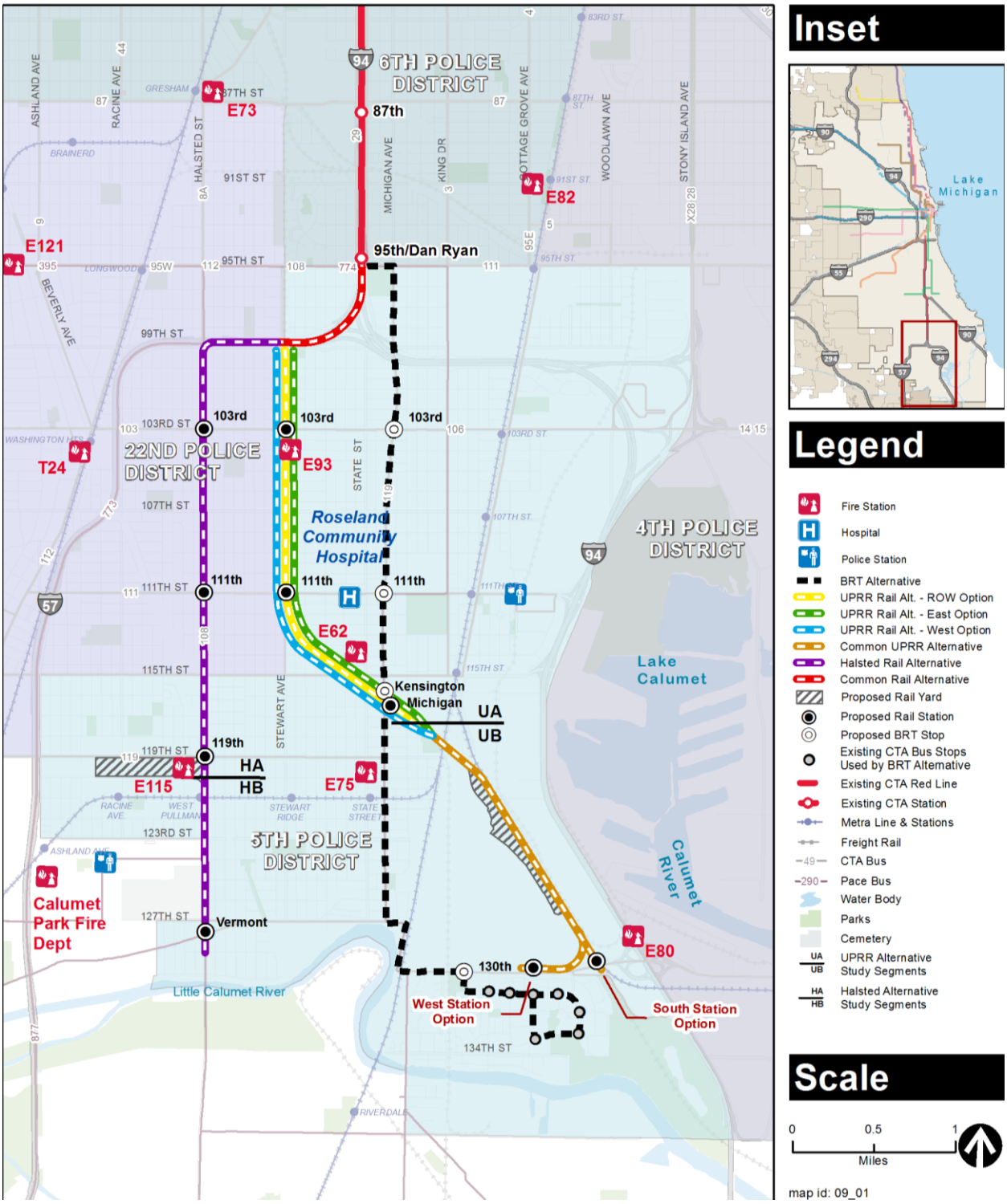

Figure A-1: Emergency Services Map

Source: (City of Chicago 2012b)

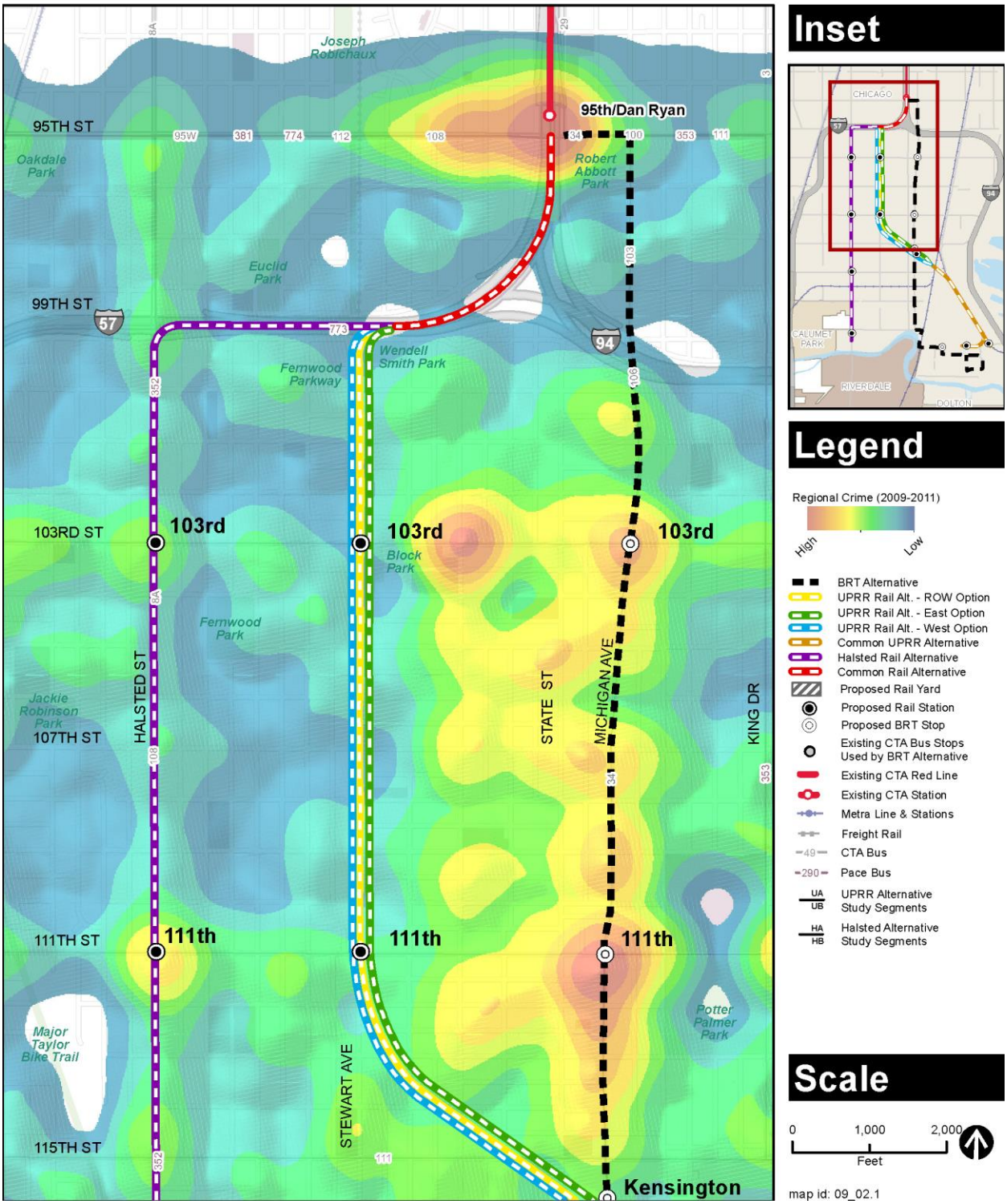

Figure A-2: Crime Heat Map - North Area

Source: (City of Chicago 2012b)

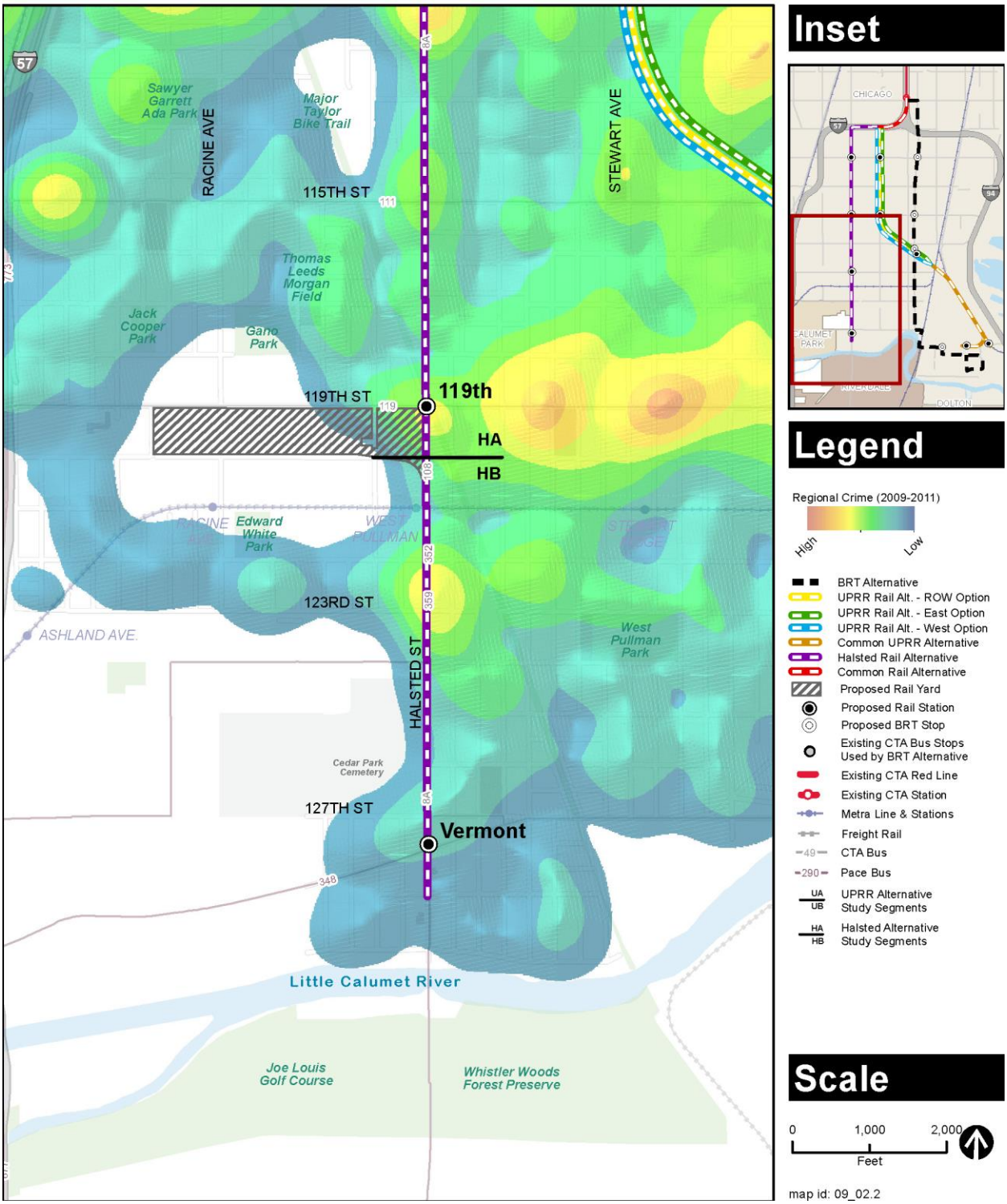

Figure A-3: Crime Heat Map - Southwest Area

Source: (City of Chicago 2012b)

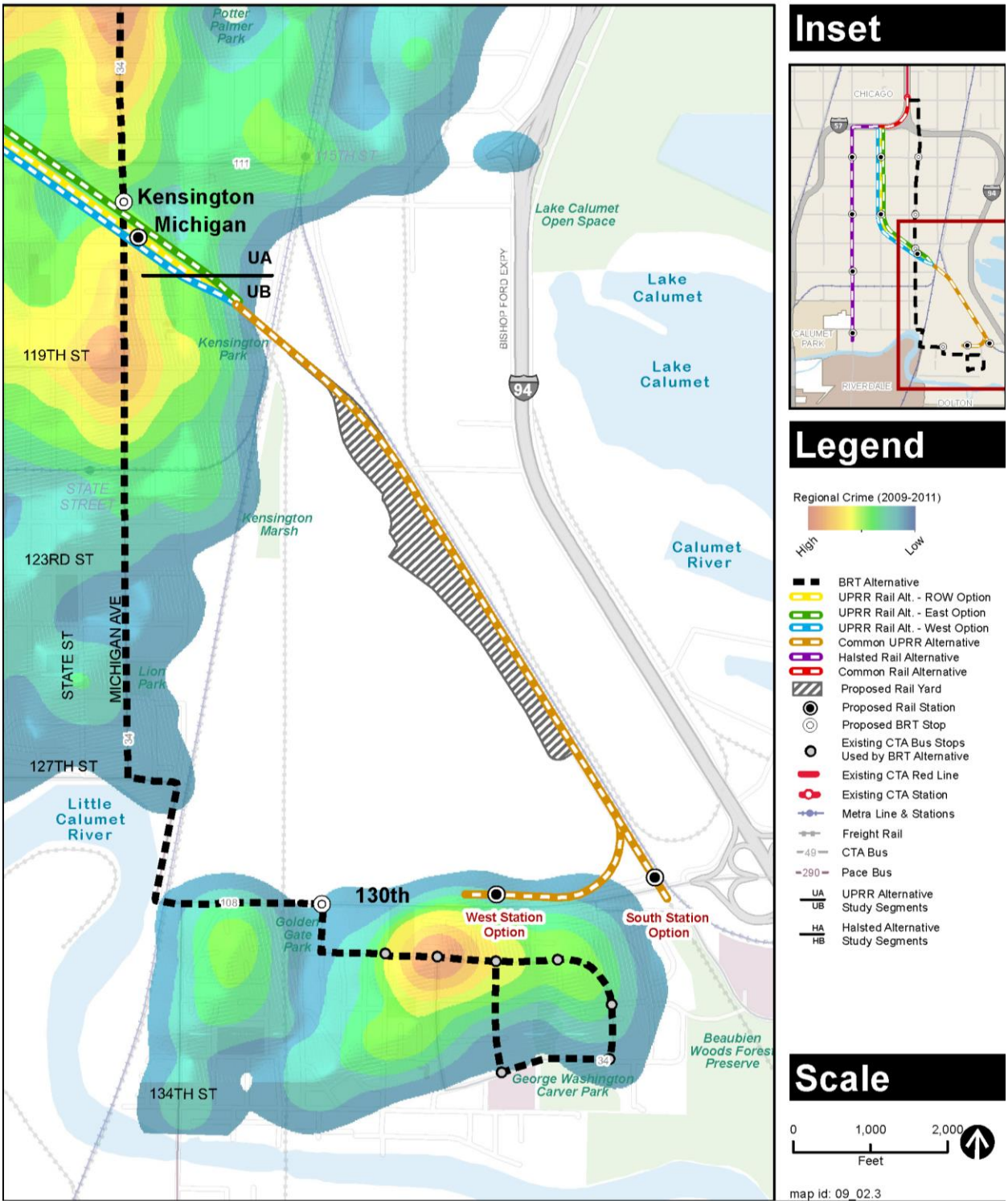

Figure A-4: Crime Heat Map - Southeast Area

Source: (City of Chicago 2012b)

Appendix B
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.

The refined East and West Option alignments would have no additional or different impacts from those described in the technical memoranda for the following resource areas: construction, transportation, land use and economic development, historic and cultural resources, safety and security, hazardous materials, indirect and cumulative, air quality, floodplains, vegetation and wildlife habitat, threatened and endangered species, and geology and soils.