APPENDIX A: LEVEL 1 ALTERNATIVES SCREENING SUMMARIES

GreatLakesRail.org

Chicago – Detroit / Pontiac Passenger Rail Corridor Program

Level 1 Alternatives Analysis

SUMMARY

APRIL 2014

LIST OF APPENDICES

The following appendices can be found at the Program website here:
http://greatlakesrail.org/~grtlakes/index.php/site/documents-and-resources

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1 OVERVIEW OF LEVEL 1 ALTERNATIVES ANALYSIS

According to regulations established in Part 1502 of the Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations, an Environmental Impact Statement (EIS) must include an alternatives analysis. Over the course of the development of the Draft Environmental Impact Statement (DEIS), the Program Team evaluated potential route alternatives through four phases of screening - Level 1A Coarse Screening, Level 1A Fine Screening, and a combined Level 1B Coarse and Fine Screening. The methodology for the evaluation process was described in the Alternatives Evaluation Process and Criteria Technical Memorandum.

The Level 1A Coarse Screening was conducted in workshop format with the Program Team on January 24, 2013. For each subsection, a description of known physical, operational and environmental constraints was provided. A pass/fail screening approach was applied to all subsections. The screening approach identified those subsections that were infeasible and thus were eliminated from further consideration. The screening criteria used were physical constraints, operational conflicts, wrong endpoint, orphan subsection, and environmental impacts. Of the 68 subsections, a total of 51 passed and 17 failed.

The Level 1A Fine Screening workshop was held on March 19, 2013. At the workshop, the same 51 subsections that passed in the Level 1A coarse screening were evaluated further by the Program Team. The criteria used to evaluate the subsections were physical characteristics, operational feasibility, environmental constraints, and purpose and need. Of the 51 subsections, 38 passed and 13 failed.

The subsections which passed at the Level 1A Fine workshop were further examined through the Level 1B Coarse and Fine Screening. In the Level 1B Coarse Screening, the 38 subsections were put together in 85 possible route alternative combinations. In the Level 1B Coarse Screening, purpose and need, physical characteristics, operational feasibility, and environmental constraints were used to screen alternatives further. Of the 85 route alternatives identified at the beginning of the Level 1B Screening, 78 were recommended to fail and ten were advanced to Level 1B Fine Screening.

The Level 1B fine screening workshop was held on August 8, 2013. The Program Team reviewed the results of the Level 1B Coarse screening and further evaluated the ten route alternatives using additional criteria including capital cost, unconstrained travel time, curves > 1 degree 30 minutes, route miles, at-grade crossings, moveable bridges, diamonds, conflicting yards, availability of right of way to accommodate a dedicated intercity double track passenger system, environmental justice/title vi populations, section 4(f) impacts, threatened and endangered species impacts, and other environmental impacts. Of the ten routes reviewed, six were advanced to the Level 2 screening which will be done as part of the Tier 1 draft Environmental Impact Statement (EIS).

Following each phase of screening, a summary of the work done was made available to the public by posting it to the Program website. Additional outreach efforts included a self-guided presentation following Level 1A Fine screening, and following the Level 1B Fine screening public meetings were held in four locations throughout the

corridor – Chicago, Ill., Gary and Porter, Ind. and Dearborn, Mich. For additional information on the public outreach efforts, refer to Chapter 4 of the Tier 1 draft EIS.

A final Alternatives Analysis Report will be developed following the completion of the Level 2 analysis being done through the Tier 1 draft EIS. The Alternatives Analysis Report will provide a more detailed review of engineering, costs, and ridership associated with the routes recommended for the Level 3 analysis in the Tier 1 final EIS.

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Chicago – Detroit / Pontiac Passenger Rail Corridor Program

Workshop Summary

LEVEL 1A COARSE SCREENING SUMMARY

FEBRUARY 2013 REVISED MAY 2013

LEVEL 1A COARSE SCREENING SUMMARY

In accordance with the "Alternatives Evaluation Process and Criteria Technical Memorandum", dated December, 2012, the Program team has completed the first step in the alternatives evaluation process. On January 24, 2013, the team conducted a workshop to complete the Level 1A Coarse screening. This Level 1A Coarse screening is a first step in identifying the "reasonable" route alternatives that will be formally evaluated in the Tier 1 NEPA process. An initial 68 route subsections in the South of the Lake (SOTL) area were screened for their potential to support enhanced future accelerated passenger rail service along the Chicago-Detroit/Pontiac Corridor.

For each subsection, a description of known physical, operational and environmental constraints was provided. A pass/fail screening approach was applied to all subsections. The screening approach identified those subsections that were infeasible and thus were eliminated from further consideration, and recommended the remaining subsections as feasible for further analysis to determine if they have the potential to be used in creating reasonable route alternatives. It should be emphasized that many of subsections shown as "passing" at this early stage of the screening process are likely to be deemed infeasible after further analysis.

The screening criteria applied at the Coarse Level 1A level focused on:

- Physical constraints - whether the right-of-way width can accommodate the addition of a dedicated double track passenger main, curvature/circuitry, grades, abandonments, and encroachments,
- Operational conflicts - the volume of freight and passenger traffic and any freight conflicts such as freight yards, diamonds, and dispatch changes,
- Wrong Endpoint - any terminating subsection that does not utilize Chicago Union Station or has no logical connection to Porter, Ind. thus violating the Program's Purpose and Need,
- Orphan Subsection - any subsection that precludes a connection between Chicago Union Station and Porter, Ind. due to the failure of other connecting subsections.
- Environmental Impacts - obvious statutory restrictions on environmentally protected resources that would prevent passenger rail development or use.

Of the 68 subsections, a total of 51 passed and 17 failed. **Table 1** reflects a summary of the subsections that passed and the rationale for keeping them for further analysis. **Table 2** contains a summary of the subsections that failed and includes a description of why that particular subsection was eliminated. The attached schematic (**Figure 1**) provides an illustration of the findings made during the Level 1A Coarse screening with those failed subsections shown in red and passed subsections shown in green.

Table 1 - Level 1A Coarse screening passed subsection summary

Passed subsection:	Rationale for retention:
	Key to acronyms: CUS = Chicago Union Station SCAL = St. Charles Airline EIS = Environmental Impact Statement ROD = Record of Decision
1	Provides direct access to CUS and is consistent with Purpose and Need; capacity to provide dedicated double track is available; further analysis will focus on physical constraints.
8	Provides access to CUS via SCAL and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
9	Provides access to CUS via SCAL and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
10	Provides access to CUS via SCAL and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
11	Provides access to CUS via SCAL and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
12	Provides direct access to CUS and is consistent with Purpose and Need; capacity to provide dedicated double track is available; further analysis will focus on physical constraints.
15	Provides direct access to CUS and is consistent with Purpose and Need; capacity to provide dedicated double track is available; further analysis will focus on operational constraints.
16	Provides access to CUS via SCAL and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
16a	Provides access to CUS via SCAL and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
17	Provides access to CUS via SCAL and is consistent with Purpose and Need; capacity to provide dedicated double track is available; further analysis will focus on environmental constraints.
18	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on operational constraints.
19	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints. This connection is one of the recommended routes in the Chicago-St. Louis Tier I EIS ROD and could limit capacity.

20	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
22	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operation constraints. This is the recommended route in the Chicago-St. Louis Tier I EIS ROD and could limit capacity.
23	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
26	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
27	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
28	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on operational constraints.
29	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
30	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
31	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
32	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
33	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on operational constraints.
34	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
35	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
36	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
37	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
38	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
39	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
40	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.

41	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
42	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
43	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
45a	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints. This subsection runs through the Indiana Dunes National Lakeshore.
45b	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints. This subsection runs through the Indiana Dunes National Lakeshore.
46	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and operational constraints.
47	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
48	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
49	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on operational constraints.
51	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints.
52	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
53	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints.
54	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
55a	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
55b	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints. This subsection runs through the Indiana Dunes National Lakeshore.
56	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints. This subsection runs through the Indiana Dunes National Lakeshore.

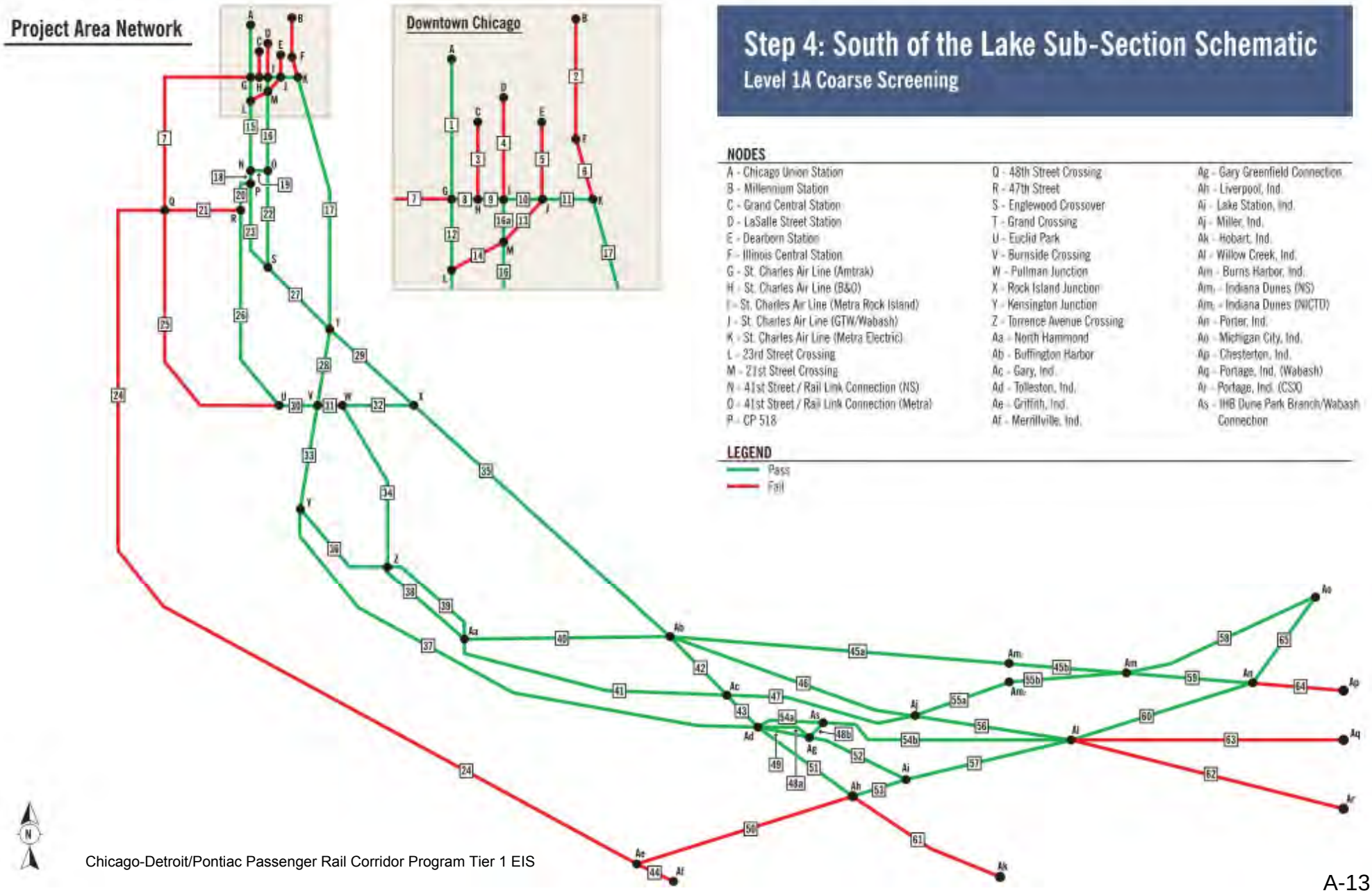
57	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.
58	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints. This subsection runs through the Indiana Dunes National Lakeshore.
59	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical and environmental constraints. This subsection runs through the Indiana Dunes National Lakeshore.
60	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on operational constraints.
65	Provides access to CUS and is consistent with Purpose and Need; further analysis will focus on physical constraints.

Table 2: Level 1A Coarse screening failed subsection summary

Failed subsection:	Rationale for dismissal:
	Key to acronyms: CUS = Chicago Union Station
2	This subsection provides access into Millennium Station and not CUS, thus it is not consistent with the Purpose and Need.
3	This subsection does not provide access to CUS, thus it is not consistent with the Purpose and Need. This subsection has also been abandoned and redeveloped.
4	This subsection provides access into LaSalle Street Station and not CUS, thus it is not consistent with the Purpose and Need.
5	This subsection does not provide access to CUS, thus it is not consistent with the Purpose and Need. This subsection has also been abandoned and redeveloped.
6	This subsection provides access into Millennium station and not CUS, thus it is not consistent with the Purpose and Need.
7	This subsection has operational and physical constraints as it cannot fully accommodate two new dedicated passenger tracks which are necessary to eliminate conflicts with existing passenger and freight trains.
13	This subsection does not provide access to CUS, thus it is not consistent with the Purpose and Need. This subsection has also been abandoned and redeveloped.
14	This subsection does not provide access to CUS, thus it is not consistent with the Purpose and Need. This subsection has also been abandoned and redeveloped.
21	This subsection does not provide connectivity between CUS and Porter, Ind. due to the failure of subsections 24 and 25, thus it is not consistent with the Purpose and Need.
24	This subsection is a circuitous route with significant physical and operational constraints due to the volume of existing freight traffic.
25	This subsection has operational, physical and environmental constraints due to the significant freight traffic, need for acquisition of residential and commercial property to establish a new right of way, and a one-mile public rail trail that would need to be reclaimed.
44	This subsection does not provide access to Porter, Ind., thus it is not consistent with the Purpose and Need.
50	This subsection has operational, physical and environmental constraints due to numerous

	incursions along an abandoned stretch of right-of-way, the need for multiple flyovers to maintain speeds, and, due to the failure of subsection 24, it does not provide connectivity between CUS and Porter, Ind., thus it is not consistent with Purpose and Need.
61	This subsection does not provide access to Porter, Ind., thus it is not consistent with the Purpose and Need.
62	This subsection does not provide access to Porter, Ind., thus it is not consistent with the Purpose and Need.
63	This subsection has been abandoned and does not provide access to Porter, Ind., thus it is not consistent with the Purpose and Need.
64	This subsection does not provide access to Porter, Ind., thus it is not consistent with the Purpose and Need.

Figure 1: Level 1A Coarse screening subsection summary (Green = passed, Red = failed)



GreatLakesRail.org

Chicago – Detroit / Pontiac Passenger Rail Corridor Program

Workshop Summary

LEVEL 1A FINE SCREENING SUMMARY

APRIL 22, 2013 REVISED MAY 2013

LEVEL 1A FINE SCREENING SUMMARY

In accordance with the "Alternatives Evaluation Process and Criteria Technical Memorandum," dated December, 2012, the Program team completed their second round of screening in the alternatives evaluation process. On March 19, 2013, the team held the Level 1A Fine screening workshop. Fifty-one (51) route subsections in the South of the Lake (SOTL) area between Chicago and Porter, Ind. were reviewed for their potential to support enhanced future accelerated passenger rail service along the Chicago-Detroit/Pontiac Corridor. These 51 route subsections were carried over from the first round, the Level 1A Coarse screening, completed on January 24, 2013 where an initial 68 route subsections were reviewed.

For each of the 51 subsections in the Level 1A Fine screening, a description of known physical, operational and environmental factors were provided. A pass/fail screening approach was applied to all subsections. The screening approach identified those subsections that were infeasible and thus were eliminated from further consideration. The remaining subsections will be moved forward to Level 1B screening where they will be assembled into routes. Each SOTL route will undergo further analysis to determine if they have the potential to be used in creating a reasonable route alternative that will be formally evaluated in the Tier 1 NEPA process.

The screening criteria applied at the Level 1A Fine screening workshop focused on:

- Physical characteristics - The existence of main tracks, number of curves >1˚30', width of existing right of way, number of existing at-grade crossings, physical obstructions or encroachments onto right of way, ownership.

- Operational feasibility - Freight conflicts: number of diamonds, freight conflicts: list of conflicting train yards, daily freight train movements, daily passenger train movements, number of bridges, ability to provide double rack between Chicago and Porter, Ind., operational issues, implementability.

- Environmental constraints - Hazardous waste and contaminated sites, threatened and endangered species, section 4(f) resources, water body crossings and floodplains, section 6(f) resources, and potential direct impacts to adjacent residential/commercial properties.

- Purpose and Need - Ability to provide a direct connection to Chicago Union Station and minimize conflicts between passenger and freight.

Of the 51 subsections reviewed, a total of 38 passed and 13 failed the Leve1 1A Fine screening. **Table 1** reflects a summary of the subsections that passed for further analysis in the next Level 1B screening. **Table 2** contains a summary of the subsections that failed and includes a description of why that particular subsection was eliminated. The attached schematic (**Figure 1**) provides an illustration of the findings of the Level 1A Fine screening. Failed subsections are shown in red and subsections that passed the Level 1A Fine screening are shown in green.

The Alternatives Evaluation Process and Criteria Technical Memorandum and both the Level 1A Coarse and Fine summaries can be viewed on the Program website at www.GreatLakesRail.org.

Table 1: Level 1A Fine screening passed subsection summary

Passed subsection:	**Rationale for retention:**
	Key to acronyms: CUS = Chicago Union Station SCAL = St. Charles Airline EIS = Environmental Impact Statement ROD = Record of Decision HSR = High Speed Rail Railroad Operators = CSX, CN, NS, EJ&E NICTD = Northern Indiana Commuter Transportation District 4(f) = publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites 6(f) = Land and parks acquired with Federal Land and Water Conservation Act funds CREATE = Chicago Regional Environmental and Transportation Efficiency Program (www.createprogram.org)
1	This subsection serves as the primary access to CUS for all other subsections. There is an existing dedicated double passenger track with the potential for a third track. Additional capacity will be needed to offset congestion at the location of the Amtrak storage and maintenance facility. Passenger tracks share operations with freight. There are potential environmental constraints concerning wetlands, floodplains, water bodies, water features, historic places and cultural resources.
8	Provides access to CUS via SCAL which presents numerous operational and geometric constraints. Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. This subsection is being considered as part of the Chicago to St. Louis HSR Tier 2 EIS which may impact implementability. There are potential environmental constraints concerning historic places and cultural resources.
9	Provides access to CUS via SCAL which presents numerous operational and geometric constraints Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. This subsection is being considered as part of the Chicago to St. Louis HSR Tier 2 EIS which may impact implementability. There are potential environmental constraints concerning parks.
10	Provides access to CUS via SCAL which presents numerous operational and geometric constraints. Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. This subsection is being considered as part of the Chicago to St. Louis HSR Tier 2 EIS which may impact implementability. There appear to be no environmental constraints.
11	Provides access to CUS via SCAL which presents numerous operational and geometric constraints. Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. This subsection is being considered as part of the Chicago to St. Louis HSR Tier 2 EIS which may impact implementability. There are potential environmental constraints concerning parks, historic places and cultural resources.

12	Provides direct access to CUS. There is an existing dedicated double passenger track with the potential for a third. Additional capacity will be needed to offset congestion at location of Amtrak storage and maintenance facility. This is a shared subsection with minimal freight with potential physical constraints. There are potential environmental constraints concerning wetlands, floodplains, water bodies and water features and parks.
15	Provides direct access to CUS. There are three existing dedicated passenger tracks with potential for a fourth. This is a shared subsection with minimal-moderate freight. There appear to be no environmental constraints.
16	Provides access to CUS via SCAL which presents numerous operational and geometric constraints. Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. This is already a double track passenger corridor, however the corridor will be close to capacity after Metra's Southwest Service is diverted to this subsection as a part of the CREATE P2/P3/EW2/GS19 project. Additional capacity would be needed to accommodate 56 additional high speed passenger trains. There are potential environmental constraints concerning historic places and cultural resources.
16a	Provides access to CUS via SCAL which presents numerous operational and geometric constraints. Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. This is already a double track passenger corridor, however the corridor will be close to capacity after Metra's Southwest Service is diverted to this subsection as a part of the CREATE P2/P3/EW2/GS19 project. Additional capacity would be needed to accommodate 56 additional high speed passenger trains. There appear to be no environmental constraints.
17	Provides access to CUS via SCAL which presents numerous operational and geometric constraints. Any solution will require a detailed engineering analysis to further assess the feasibility of connections into CUS. Unused double track CN right of way is available within this subsection. An agreement would need to be reached with CN to use this subsection. There are potential environmental constraints concerning recreational facilities, parks, historic places and cultural resources.
18	Provides access to CUS. Infrastructure investments through the CREATE project will allow for a dedicated double track passenger main with minimal freight conflict. There are potential operational conflicts with congestion and delays at Control Point (CP) 518 that will be alleviated after the completion of CREATE's P1 and P4 projects. There appear to be no environmental constraints.
19	Provides access to CUS. In its current configuration, using this subsection would require a backing move to get onto the NS Chicago Line and ultimately into Chicago Union Station. To eliminate the backing move, a new connection would be needed between this subsection and subsection 15 (NS Chicago Line). The new connection would require the acquisition of industrial property along W. Pershing Road which presents a potential environmental constraint. There appear to be no other environmental constraints.
22	Provides access to CUS. This is already a double track passenger corridor, however the corridor will be close to capacity after Metra's Southwest Service is diverted to this subsection as a part of the CREATE P2/P3/EW2/GS19 project. Additional capacity would be needed to accommodate 56 additional high speed passenger trains. Potential physical and operational issues at Englewood/NS Park Manor Yard. There are potential environmental constraints concerning parks.

23	Provides access to CUS. Infrastructure investments through the CREATE P1 and P4 projects will allow for a dedicated double track passenger main with no freight conflicts. There are potential operational conflicts with congestion and delays at Control Point (CP) 518 which will be alleviated after the completion of CREATE's P1 and P4 projects. There are potential environmental constraints concerning historic places and cultural resources.
27	Provides access to CUS. There is land available to add two dedicated passenger main tracks in the ComEd right of way. There appear to be no environmental constraints.
28	Provides access to CUS. Capacity is available for two dedicated passenger main tracks in CN right of way. There are potential environmental constraints concerning parks and recreational facilities.
29	Provides access to CUS. There is land available to add two dedicated passenger main tracks in the ComEd right of way. There are potential environmental constraints concerning threatened and endangered species.
33	Provides access to CUS. Open CN right of way is available for two dedicated passenger main tracks. There are potential environmental constraints concerning recreational facilities, parks, historic places and cultural resources.
35	Provides access to CUS. This subsection provides three potential corridors that include right of way owned by ComEd Utility, NS and CSX. There is land available to add dedicated double passenger main track on the ComEd right of way. NS policy limits joint freight and passenger operations to a speed of 79 mph. This section also contains two moveable bridges which present potential physical constraints. There are potential environmental constraints concerning wetlands, floodplains, water bodies, recreational facilities, parks and threatened and endangered species.
36	Provides access to CUS. This is an existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning wetlands, floodplains, water bodies, recreational facilities and threatened and endangered species.
37	Provides access to CUS. There is the ability to add a double dedicated passenger track with the exception of a two mile section between Calumet City Yard and Gibson Junction where significant physical and operational challenges exist. There are potential environmental constraints concerning wetlands, floodplains, water bodies, recreational facilities, parks and threatened and endangered species.
39	Provides access to CUS. This is the existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning impacts to residential/commercial property, wetlands, floodplains, water bodies, parks and threatened and endangered species.

41	Provides access to CUS. This is the existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning impacts to residential/commercial property, wetlands, floodplains, water features, recreational facilities, parks and threatened and endangered species.
42	Provides access to CUS. There is land available to add dedicated double passenger track within the CSX Fort Wayne and NS Sugar Track right of way. NS Sugar Track right of way is available for future passenger rail service in accordance with the Indiana Gateway Development Rights Agreement. There are potential physical constraints at Buffington Harbor and potential environmental constraints exist concerning wetlands, floodplains, water bodies, water features and threatened and endangered species.
43	Provides access to CUS. There is capacity to add dedicated double passenger track within the CSX Fort Wayne and NS Sugar Track right of way. NS Sugar Track right of way is available for future passenger rail service in accordance with the Indiana Gateway Development Rights Agreement. There are potential physical constraints at Buffington Harbor and potential environmental constraints exist concerning wetlands, floodplains, water bodies, water features and threatened and endangered species.
45a	Provides access to CUS. There is potential to provide two dedicated passenger mains within the NS right of way. NS policy limits joint freight and passenger operations to speed of 79 mph. There are potential environmental constraints concerning wetlands, floodplains, water bodies, water features, parks and threatened and endangered species. This subsection runs through the Indiana Dunes National Lakeshore.
45b	Provides access to CUS. There is potential to provide two dedicated passenger mains within the NS right of way. NS policy limits joint freight and passenger operations to speed of 79 mph. There are potential operational constraints at Burns Harbor Yard and potential environmental constraints exist concerning wetlands, floodplains, water bodies, water features, parks and threatened and endangered species. This subsection runs through the Indiana Dunes National Lakeshore.
46	Provides access to CUS. There is potential to provide two dedicated passenger mains within the CSX right of way, however, there are potential physical constraints at Pine Junction where three railroads converge - CSX, CN (EJ&E) and NS. There are potential environmental constraints concerning wetlands, floodplains, water bodies, water features, parks and threatened and endangered species.
47	Provides access to CUS. This is the existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning residential/commercial properties, 6(f) lands, wetlands, water bodies, recreational facilities, parks, historic places and threatened and endangered species.

48a	Provides access to CUS. There is land available to add dedicated double passenger track along abandoned, grade separated IHB right of way. There appear to be no environmental constraints.
49	Provides access to CUS. There is land available to provide two dedicated passenger mains within the CSX right of way. There are potential environmental constraints concerning wetlands and threatened and endangered species.
52	Provides access to CUS. There is land available to provide two dedicated passenger mains within the CSX right of way. There are potential environmental constraints concerning 6(f) lands, wetlands, floodplains, water bodies, water features, recreational facilities, parks and threatened and endangered species.
55a	Provides access to CUS. This is the existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning wetlands and threatened and endangered species.
55b	Provides access to CUS. This is the existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning wetlands floodplains, water bodies, water features, parks and threatened and endangered species.
56	Provides access to CUS. There is potential to provide two dedicated passenger mains within the CSX right of way. There are potential environmental constraints through the Indiana Dunes National Lake Shore.
57	Provides access to CUS. There is land available to provide two dedicated passenger mains within the CSX right of way. There are potential environmental constraints concerning 6(f) lands, wetlands, floodplains, water bodies, water features, recreational facilities, parks and threatened and endangered species.
58	Provides access to CUS. This is the existing passenger corridor (NICTD) with minimal freight. Use of this subsection would require agreement with underlying owner. Operations will require sophisticated scheduling and close coordination between future HSR and existing commuter rail and freight operations on this subsection. Improvements would likely be needed at key NICTD stations to accommodate HSR service. There are potential environmental constraints concerning wetlands floodplains, water bodies, water features, recreational facilities, parks, historic places and threatened and endangered species.
59	Provides access to CUS. There is potential to provide two dedicated passenger mains within the NS right of way. NS policy limits joint freight and passenger operations to speed of 79 mph. There are potential environmental constraints concerning wetlands, river, floodplains, water bodies, water features, parks and threatened and endangered species. This subsection travels through the Indiana Dunes National Lakeshore.

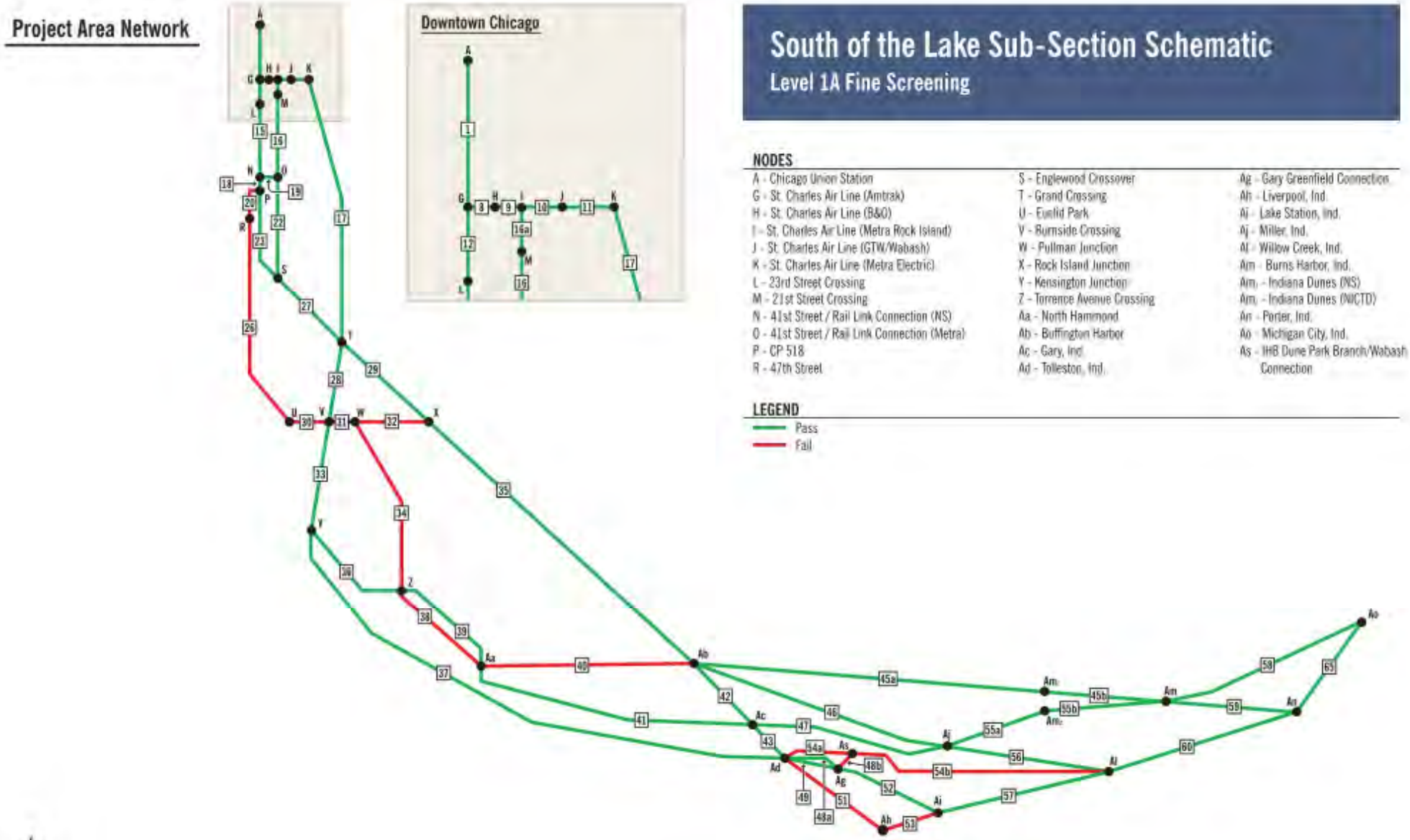
60	Provides access to CUS. There is land available to provide two dedicated passenger mains within the CSX right of way. There are potential environmental constraints concerning 6(f) lands, wetlands, floodplains, water bodies, water features, parks and threatened and endangered species.
65	Provides access to CUS. This is the existing Amtrak passenger corridor with two dedicated mains and no freight traffic. There is capacity for additional tracks within the existing right of way. There are potential environmental constraints concerning wetlands, river, floodplains, water bodies, water features, recreational facilities, parks and threatened and endangered species.

Table 2: Level 1A Fine screening failed subsection summary

Failed subsection:	Rationale for dismissal:
	Key to acronyms: 4(f) = publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites 6(f) = Land and parks acquired with Federal Land and Water Conservation Act funds
53	This subsection has operational and physical fatal flaws and major environmental impacts due to the major development that has occurred within the abandoned right of way, and the presence of 4(f) and 6(f) resources.
51	This subsection does not provide necessary connections without advancing subsection 53.
54b	This subsection has operational and physical fatal flaws and major environmental impacts due to the major development that has occurred within the abandoned right of way, and the potential for increased environmental impacts to Threatened and Endangered species populations located within and adjacent to the corridor.
48b	This subsection does not provide necessary connections without the advancement of subsection 54b.
54a	This subsection does not provide necessary connections without the advancement of subsection 48b and 54b.
40	This subsection has operational and physical fatal flaws due to the substantial freight volumes on the double track mains within the right of way and conflicts at the East Chicago freight yard. Use of this subsection does not minimize conflicts between passenger and freight and therefore does not meet the Purpose and Need.
38	This subsection has operational and physical fatal flaws due to the substantial freight volumes on the double track mains within the right of way and conflicts at Hegewisch Yard that is also used as the Ford Automotive transfer point. Use of this subsection does not minimize conflicts between passenger and freight and therefore does not meet the Purpose and Need.
34	This subsection has operational and physical fatal flaws and major environmental impacts due to the major freight volumes on the double track mains within the right of way, and the presence of 4(f) resources. Passenger traffic would have to pass through the congested Pullman Junction, around the heavily used Calumet and South Dearing Yards. Existing terrain and water features in the area quickly diminish the ability to add capacity along a large portion of the subsection. Use of this subsection does not minimize conflicts between passenger and freight and therefore does not meet the Purpose and Need.
32	This subsection has operational and physical fatal flaws due to the substantial freight volumes on the double track mains within the 66' right of way. Passenger traffic would have to pass through the congested Pullman Junction and travel around the South Chicago Yard. Use of this subsection does not minimize conflicts between passenger and freight and therefore does not meet the Purpose and Need.

31	This subsection has operational and physical fatal flaws due to the substantial freight volumes from three separate operators (Belt Railway Company of Chicago / Norfolk Southern / Chicago Rail Link). Passenger traffic would have to pass through the congested Pullman Junction and pass the South Chicago Yard. Use of this subsection does not minimize conflicts between passenger and freight and therefore does not meet the Purpose and Need.
30	This subsection has operational and physical fatal flaws due to the substantial freight volumes from three separate operators (Belt Railway Company of Chicago / Norfolk Southern / Chicago Rail Link). Passenger traffic would have to pass through the congested Pullman Junction and pass the South Chicago Yard. Use of this subsection does not minimize conflicts between passenger and freight and therefore does not meet the Purpose and Need. Use of this subsection requires the use of subsection 31.
26	This subsection does not provide necessary connections without the connections provided by subsection 30.
20	This subsection does not provide necessary connections without necessary connections to subsection 26.

Figure 1: Level 1A Fine screening subsection summary (Green = passed, Red = failed)



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Chicago – Detroit / Pontiac Passenger Rail Corridor Program

Alternatives Analysis

LEVEL 1B COARSE AND FINE SCREENING SUMMARIES

SEPTEMBER 2013

U.S. Department of Transportation
Federal Railroad Administration

MDOT
Michigan Department of Transportation

Indiana Department of Transportation

Illinois Department of Transportation

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1 INTRODUCTION

This document describes the methodology used by the Chicago-Detroit/Pontiac Passenger Rail Program Team to perform the Level 1B Coarse and Fine route analysis within the Program's South of the Lake (SOTL) area in Illinois and Indiana, and presents a summary of the results of the analysis.

1.1 Transitioning from Level 1A to Level 1B Screening

On March 19, 2013, the team held a Level 1A Fine screening workshop with participants from the Federal Railroad Administration, the Michigan Department of Transportation, Indiana Department of Transportation, Illinois Department of Transportation and the HNTB consultant team. Fifty-one (51) route subsections in the SOTL area between Chicago and Porter, Ind. were reviewed for their potential to support enhanced future accelerated passenger rail service along the Chicago-Detroit/Pontiac Corridor. Of the 51 subsections reviewed, a total of 38 passed and 13 failed based on a combination of physical, operational, and environmental reasons evaluated at the Level 1A level.

Public feedback was solicited on the results of the Level 1A screening. An online self-guided presentation was made available to the public during the open comment period from April 24 – June 12, 2013. Public comments were reviewed as part of the Level 1B Coarse and Fine screening of route alternatives. These comments confirmed that the subsections selected during the Level 1A Coarse and Fine screenings were feasible and should be evaluated further during the Level 1B Coarse and Fine screening steps.

2 SUMMARY: LEVEL 1B COARSE SCREENING

Using the analysis and outcomes of the Level 1A subsection screening workshop as a starting point for a Level 1B route analysis, the Program Team pieced together the remaining 38 subsections and evaluated every possible combination that provided a viable connection between Chicago Union Station and Michigan City, Ind.

First, working west to east, the Program Team identified 85 possible hybrid routes by calculating the variations of the 38 subsections between three basic control points:

1. Chicago Union Station to Grand Crossing,
2. Grand Crossing to Buffington Harbor/Kensington Junction, and
3. Buffington Harbor/Kensington Junction to Michigan City.

When analyzing the geography of the 38 subsections between Chicago and Michigan City it became apparent that these points were naturally created at Grand Crossing, Kensington Junction, and Buffington Harbor. The string of subsections between each of these control points is referred to as a subroute.

Next, the pass/fail approach was applied to identify which routes would be considered feasible and carried forward for additional analysis as part of the Level 1B Fine screening. The Program Team developed 12 distinct route failure codes to describe why a possible SOTL route could fail. Failure codes included a combination of reasons why various routes were identified as infeasible such as:

- Purpose and Need – Achieves top speeds of 110 mph.
- Physical Characteristics – Curve geometry that limits top speed, physical obstructions or encroachments onto right of way.
- Operational Feasibility – Ability to provide dedicated passenger double track, consistency with other rail improvement projects, freight conflicts.
- Environmental Constraints – Section 4(f) or section 6(f) properties, impact to human environment (residential/commercial/industrial properties).

Appendix 1 includes a matrix listing all possible 85 hybrid routes, the recommendations for pass/fail of each and, if recommended to fail, the corresponding failure code. The failure code rationale is explained in Appendix 1 with additional support provided in Appendix 3.

After the 85 hybrid routes were identified and evaluated in the matrix (Appendix 1), the Program Team then created a schematic for each to illustrate the string of subsections that were combined to make a particular hybrid route. The schematics were overlaid upon the Project Area Network (PAN) and color coded to illustrate which hybrid

routes received an initial recommendation of 'pass' (shown in green) and those that received an initial recommendation of 'fail' (shown in red). These 85 schematics are shown in Appendix 2.

Out of 85 hybrid routes identified, 75 were recommended to fail. All 75 shared common subsections determined to be infeasible as explained by their respective failure codes. Appendix 3 includes a series of annotated aerials that shows the details of the connections between the various subsections that were identified as infeasible. A map of each of the remaining 10 hybrid routes is included in Appendix 4. These 10 hybrid routes were advanced to Level 1B Fine screening for further evaluation.

3 SUMMARY: LEVEL 1B FINE SCREENING

On August 8, 2013, the Program team held the Level 1B Fine screening workshop with participants from the Federal Railroad Administration, the Michigan Department of Transportation, Indiana Department of Transportation, Illinois Department of Transportation and the HNTB consultant team.

During Level 1B Coarse screening, 85 hybrid routes were identified between Chicago Union Station and Michigan City, Ind. Seventy-five of the hybrid routes were determined to be infeasible and unable to support enhanced accelerated rail due to physical, operational and environmental constraints in eleven criteria. The ten remaining route alternatives were advanced to Level 1B Fine screening.

Using the analysis and outcomes of the Level 1B Coarse screening as a starting point for Level 1B Fine analysis, two additional criteria were used to evaluate the routes – capital cost and unconstrained travel time.

The Level 1B Fine screening criteria included:

1. Capital Cost
2. Unconstrained Travel Time
3. Curves > 1 degree 30 minutes
4. Route Miles
5. At-Grade Crossings
6. Moveable Bridges
7. Diamonds
8. Conflicting Yards
9. Availability of Right of Way to Accommodate a Dedicated Intercity Double Track Passenger System
10. Environmental Justice/Title VI Populations
11. Section 4(f) Impacts
12. Threatened and Endangered Species Impacts
13. Other Environmental Impacts

a. Section 6(f) properties

b. Wetlands

c. Agricultural lands

d. Hazardous waste sites

A narrative for each route provided an in depth view of characteristics along the route that could influence its success as a feasible option for becoming a "Reasonable Alternative."

3.1 Criteria evaluation methodology

The ten route alternatives were examined first by looking at the raw data for each criterion and then also by evaluating the sum of the criteria to understand how the routes compared to each other. Two additional methods were used to evaluate the raw data which included the dense ranking system and a standard deviation statistical analysis. These methods were used collectively to provide a measure of a route's feasibility.

The dense ranking methodology was used to address situations where alternatives had identical raw scores for a given criterion. Items with equal raw scores received the same ranking number, and the next item received the immediately following ranking number (i.e., 1, 1, 2, 3, 4, 5, 5, and 6). A ranking of one (1) is the most favorable ranking. As the ranking numbers got higher, the ranking became less favorable for a given criterion.

The raw data collected for each criterion was ranked for each of the Level 1B Fine routes to develop an understanding of the relative advantages and disadvantages of each route when compared to the others. The criteria rankings were then aggregated by route and ranked with each other to develop an overall ranking for each route.

The results of the dense ranking evaluation criteria for each of the feasible hybrid routes were laid out in a matrix. The results included raw data for each criterion and the ranking score associated with the route in comparison to the other routes.

As part of the fine level route screening process, a simple statistical analysis was performed to identify route alternatives that appeared to be outliers in terms of how they compared against all of the other route alternatives for each of the quantitatively-measured factors that was considered in the screening process. This was achieved by first calculating, for a given individual factor (for example, the number of at-grade road crossings), the average value across all the route alternatives (e.g. 40 at-grade road crossings per route). Then, the standard deviation was calculated for that factor across all route alternatives, providing a measure of how tightly grouped around the

average value were the values for the individual routes (e.g. with a standard deviation of 10 and an average of 40 for at-grade road crossings, there was found to be a fair amount of variation among the route alternatives in terms of this factor). Finally, a simple calculation was performed to determine how far the value for an individual route varied from the average, as expressed by multiples of the standard deviation (e.g. with an average value of 40 and a standard deviation of 10, a route with 50 at-grade road crossings would be considered to be 1 standard deviation above the average, whereas a route with 35 at-grade road crossings would be considered to be 0.5 standard deviations below the average).

Having completed these calculations for each route alternative, route alternatives with values that were found to be one standard deviation or more better than the mean (e.g. fewer at-grade road crossing than average) were determined to be favorable outliers as measured against that factor, whereas route alternatives with values that were found to be one standard deviation or more worse than the mean (e.g. more at grade road crossing) were determined to be unfavorable outliers. Route alternative with values that fell between one standard deviation better and one standard deviation worse than the average were considered non-outliers.

This analysis allowed for the screening process to focus in on situations where a route alternative, when measured against a given factor, was significantly better or worse than average, and compare that against the measure of that route alternative against other factors. In many cases, this provided insight beyond that allowed by a simple ranking of the alternatives against each factor, particularly where the differences between certain route alternatives were relatively small.

3.2 Screening results

Of the ten routes reviewed, six passed and four failed based on a combination of physical, operational, and environmental reasons evaluated. Table 1 reflects a summary of the route alternatives that passed and the rational for keeping them for further analysis. These routes will become the Reasonable Route Alternatives to be evaluated in the DEIS once they have been reviewed and confirmed by the public[1]. It was agreed upon by the Program Team to combine Route 5 and 6 into one route and Routes 9 and 10 into another route for analysis in the DEIS because the routes within each set vary only slightly from one another. The variation will be discussed in the DEIS as an alignment option. Table 2 contains a summary of the route alternatives that failed and includes a description of why that particular route was eliminated. The ten route maps can be found in Appendix 4. A summary table showing the raw data and rankings of each route is included in Appendix 5 and the standard deviation analysis can be found in Appendix 6.

[1] *The public comment period will run from September 16, 2013 through October 28, 2013. Public meeting schedules, meeting materials and comment forms can be accessed at the program website: www.greatlakesrail.org.*

Table 1 Rationale for Level 1B Fine routes passed

Route passed for level 2 analysis in the DEIS	Rationale for retention:
Route 2	This is the existing Amtrak Chicago to Detroit/Pontiac route through the South of the Lake (SOTL) area of analysis. It will be evaluated as both the No Build scenario and as a Build Alternative.
Route 4	This route has the ability to provide a dedicated double track passenger service with little need for additional right of way acquisition and appears to have less impact to the human environment with fewer instances of Environmental Justice/Title VI populations along the corridor. Preliminary estimates for travel times were consistent with Program goals to reduce travel time over the existing passenger service as stated in the Purpose and Need.
Route 5	This route has the ability to provide a dedicated double track passenger service with some need for additional right of way acquisition and appears to have less impact to both the human and natural environment as it avoids the larger Environmental Justice/Title VI populations along the corridor and the Indiana Dunes National Lakeshore.
Route 6	This route has the ability to provide a dedicated double track passenger service with little need for additional right of way acquisition and appears to have less impact to both the human and natural environment as it has fewer Environmental Justice/Title VI populations along the corridor and avoids the Indiana Dunes National Lakeshore. Preliminary estimates for travel times were consistent with Program goals to reduce travel time over the existing passenger service as stated in the Purpose and Need.
Route 9	This route has the ability to provide a dedicated double track passenger service with little need for additional right of way acquisition and appears to have less impact to both the human and natural environment as it has fewer Environmental Justice/Title VI populations along the corridor and avoids the Indiana Dunes National Lakeshore. Preliminary estimates for travel times were consistent with Program goals to reduce travel time over the existing passenger service as stated in the Purpose and Need.
Route 10	This route has the ability to provide a dedicated double track passenger service with little need for additional right of way acquisition and appears to have less impact to the natural environment as it avoids the Indiana Dunes National Lakeshore. Preliminary estimates for travel times were consistent with Program goals to reduce travel time over the existing passenger service as stated in the Purpose and Need.

Table 2 Rationale for Level 1B Fine routes dismissed

Route failed for level 2 analysis in the DEIS	Rationale for dismissal:
Route 1	The implementation of a dedicated double track passenger service along this route would increase conflicts with existing freight service and restrict speeds to less than 110 mph. Further, this route has a high potential for impacts to the natural environment as it would require acquisition of right of way through a large portion of the Indiana Dunes National Lakeshore. These factors are inconsistent with the Program's Purpose and Need.
Route 3	The implementation of a dedicated double track passenger service along this route would increase conflicts with existing freight and commuter service and restrict speeds to less than 110 mph. Further, this route has a high potential for impacts to the natural environment as it would require acquisition of right of way through a large portions of the Indiana Dunes National Lakeshore. These factors are inconsistent with the Program's Purpose and Need.
Route 7	Adding intercity passenger service to the NICTD portion of the route would increase conflicts with existing freight and commuter service and restrict speeds to less than 110 mph in the SOTL. Unconstrained travel time estimates also indicated that the travel time between Chicago and Michigan City, Ind. would be unacceptable and perform much worse than other alternatives when modeled with existing train traffic.
Route 8	Further, this route has a high potential for impacts to the natural environment as it would require acquisition of right of way through a large portion of the Indiana Dunes National Lakeshore. These factors are inconsistent with the Program's Purpose and Need.

APPENDIX 1: MATRIX FOR LEVEL 1B COARSE SCREENING

1.1 A matrix listing the 85 hybrid routes and their pass/fail recommendations

1.2 Failure code rationale

Appendix 1.1
Level 1B Coarse
Route Strings

	Route #	Route Component Sub-Sections																						CUS-Grand Crossing Sub-Route String	Grand Crossing-Buffington harbor/Kensington Junction Sub-Route	Buffington Harbor/Kensington Junction-Michigan City Sub-Route	Pass/Fail	Failure Likelihood	CUS-Grand Crossing Sub-Route Failure Code	Grand Crossing-BH/KJ Failure Code	BF/KJ-Michigan City Sub-Route Failure Code
		CUS-Grand Crossing Sub-Route								Buffington harbor/Kensington			Buffington Harbor/Kensington Junction-Michigan City Sub-Route																		
1	I				1	12	15	18	23	27	29	35	45a	45b	58									1-12-15-18-23-27	27-29-35	35-45a-45b-58	Pass				
2	II				1	12	15	18	23	27	29	35	45a	45b	59	65								1-12-15-18-23-27	27-29-35	35-45a-45b-59-65	Pass				
3	III				1	12	15	18	23	27	29	35	46	55a	55b	58								1-12-15-18-23-27	27-29-35	35-46-55a-55b-58	Pass				
4	IV				1	12	15	18	23	27	29	35	46	55a	55b	59	65							1-12-15-18-23-27	27-29-35	35-46-55a-55b-59-65	Pass				
5	V				1	12	15	18	23	27	29	35	46	56	60	65								1-12-15-18-23-27	27-29-35	35-46-56-60-65	Fail	High			Failure Code 6
6	VI				1	12	15	18	23	27	29	35	42	47	55a	55b	58							1-12-15-18-23-27	27-29-35	35-42-47-55a-55b-58	Fail	Medium			Failure Code 7
7	VII				1	12	15	18	23	27	29	35	42	47	55a	55b	59	65						1-12-15-18-23-27	27-29-35	35-42-47-55a-55b-59-65	Pass				
8	VIII				1	12	15	18	23	27	29	35	42	47	56	60	65							1-12-15-18-23-27	27-29-35	35-42-47-56-60-65	Fail	Medium			Failure Code 8
9	IX				1	12	15	18	23	27	29	35	42	43	48a	52	57	60	65					1-12-15-18-23-27	27-29-35	35-42-43-48a-52-57-60-65	Pass				
10	X				1	12	15	18	23	27	29	35	42	43	49	52	57	60	65					1-12-15-18-23-27	27-29-35	35-42-43-49-52-57-60-65	Pass				
11	XI				1	12	15	18	23	27	28	33	36	39	41	47	55a	55b	58					1-12-15-18-23-27	27-28-33	33-36-39-41-47-55a-55b-58	Fail	High		Failure Code 4	
12	XII				1	12	15	18	23	27	28	33	36	39	41	47	55a	55b	59	65				1-12-15-18-23-27	27-28-33	33-36-39-41-47-55a-55b-59-65	Fail	High		Failure Code 4	
13	XIII				1	12	15	18	23	27	28	33	36	39	41	47	56	60	65					1-12-15-18-23-27	27-28-33	33-36-39-41-47-56-60-65	Fail	High		Failure Code 4	Failure Code 9
14	XIV				1	12	15	18	23	27	28	33	36	39	41	43	48a	52	57	60	65			1-12-15-18-23-27	27-28-33	33-36-39-41-43-48a-52-57-60-65	Fail	High		Failure Code 4	Failure Code 10
15	XV				1	12	15	18	23	27	28	33	36	39	41	43	49	52	57	60	65			1-12-15-18-23-27	27-28-33	33-36-39-41-43-49-52-57-60-65	Fail	High		Failure Code 4	Failure Code 11
16	XVI				1	12	15	18	23	27	28	33	37	48a	52	57	60	65						1-12-15-18-23-27	27-28-33	33-37-48a-52-57-60-65	Fail	High		Failure Code 4	
17	XVII				1	12	15	18	23	27	28	33	37	49	52	57	60	65						1-12-15-18-23-27	27-28-33	33-37-49-52-57-60-65	Fail	High		Failure Code 4	
18	XVIII	1	8	9	16a	16	19	18	23	27	29	35	45a	45b	58									1-8-9-16a-16-19-18-23-27	27-29-35	35-45a-45b-58	Fail	High	Failure Code 3		
19	XIX	1	8	9	16a	16	19	18	23	27	29	35	45a	45b	59	65								1-8-9-16a-16-19-18-23-27	27-29-35	35-45a-45b-59-65	Fail	High	Failure Code 3		
20	XX	1	8	9	16a	16	19	18	23	27	29	35	46	55a	55b	58								1-8-9-16a-16-19-18-23-27	27-29-35	35-46-55a-55b-58	Fail	High	Failure Code 3		
21	XXI	1	8	9	16a	16	19	18	23	27	29	35	46	55a	55b	59	65							1-8-9-16a-16-19-18-23-27	27-29-35	35-46-55a-55b-59-65	Fail	High	Failure Code 3		
22	XXII	1	8	9	16a	16	19	18	23	27	29	35	46	56	60	65								1-8-9-16a-16-19-18-23-27	27-29-35	35-46-56-60-65	Fail	High	Failure Code 3		Failure Code 6
23	XXIII	1	8	9	16a	16	19	18	23	27	29	35	42	47	55a	55b	58							1-8-9-16a-16-19-18-23-27	27-29-35	35-42-47-55a-55b-58	Fail	High	Failure Code 3		Failure Code 7
24	XXIV	1	8	9	16a	16	19	18	23	27	29	35	42	47	55a	55b	59	65						1-8-9-16a-16-19-18-23-27	27-29-35	35-42-47-55a-55b-59-65	Fail	High	Failure Code 3		
25	XXV	1	8	9	16a	16	19	18	23	27	29	35	42	47	56	60	65							1-8-9-16a-16-19-18-23-27	27-29-35	35-42-47-56-60-65	Fail	High	Failure Code 3		Failure Code 8
26	XXVI	1	8	9	16a	16	19	18	23	27	29	35	42	43	48a	52	57	60	65					1-8-9-16a-16-19-18-23-27	27-29-35	35-42-43-48a-52-57-60-65	Fail	High	Failure Code 3		
27	XXVII	1	8	9	16a	16	19	18	23	27	29	35	42	43	49	52	57	60	65					1-8-9-16a-16-19-18-23-27	27-29-35	35-42-43-49-52-57-60-65	Fail	High	Failure Code 3		
28	XXVIII	1	8	9	16a	16	19	18	23	27	28	33	36	39	41	47	55a	55b	58					1-8-9-16a-16-19-18-23-27	27-28-33	33-36-39-41-47-55a-55b-58	Fail	High	Failure Code 3	Failure Code 4	
29	XXIX	1	8	9	16a	16	19	18	23	27	28	33	36	39	41	47	55a	55b	59	65				1-8-9-16a-16-19-18-23-27	27-28-33	33-36-39-41-47-55a-55b-59-65	Fail	High	Failure Code 3	Failure Code 4	
30	XXX	1	8	9	16a	16	19	18	23	27	28	33	36	39	41	47	56	60	65					1-8-9-16a-16-19-18-23-27	27-28-33	33-36-39-41-47-56-60-65	Fail	High	Failure Code 3	Failure Code 4	Failure Code 9
31	XXXI	1	8	9	16a	16	19	18	23	27	28	33	36	39	41	43	48a	52	57	60	65			1-8-9-16a-16-19-18-23-27	27-28-33	33-36-39-41-43-48a-52-57-60-65	Fail	High	Failure Code 3	Failure Code 4	Failure Code 10
32	XXXII	1	8	9	16a	16	19	18	23	27	28	33	36	39	41	43	49	52	57	60	65			1-8-9-16a-16-19-18-23-27	27-28-33	33-36-39-41-43-49-52-57-60-65	Fail	High	Failure Code 3	Failure Code 4	Failure Code 11
33	XXXIII	1	8	9	16a	16	19	18	23	27	28	33	37	48a	52	57	60	65						1-8-9-16a-16-19-18-23-27	27-28-33	33-37-48a-52-57-60-65	Fail	High	Failure Code 3	Failure Code 4	
34	XXXIV	1	8	9	16a	16	19	18	23	27	28	33	37	49	52	57	60	65						1-8-9-16a-16-19-18-23-27	27-28-33	33-37-49-52-57-60-65	Fail	High	Failure Code 3	Failure Code 4	
35	XXXV				1	12	15	19	22	27	29	35	45a	45b	58									1-12-15-19-22-27	27-29-35	35-45a-45b-58	Fail	High	Failure Code 1		
36	XXXVI				1	12	15	19	22	27	29	35	45a	45b	59	65								1-12-15-19-22-27	27-29-35	35-45a-45b-59-65	Fail	High	Failure Code 1		
37	XXXVII				1	12	15	19	22	27	29	35	46	55a	55b	58								1-12-15-19-22-27	27-29-35	35-46-55a-55b-58	Fail	High	Failure Code 1		
38	XXXVIII				1	12	15	19	22	27	29	35	46	55a	55b	59	65							1-12-15-19-22-27	27-29-35	35-46-55a-55b-59-65	Fail	High	Failure Code 1		
39	XXXIX				1	12	15	19	22	27	29	35	46	56	60	65								1-12-15-19-22-27	27-29-35	35-46-56-60-65	Fail	High	Failure Code 1		Failure Code 6
40	XL				1	12	15	19	22	27	29	35	42	47	55a	55b	58							1-12-15-19-22-27	27-29-35	35-42-47-55a-55b-58	Fail	High	Failure Code 1		Failure Code 7
41	XLI				1	12	15	19	22	27	29	35	42	47	55a	55b	59	65						1-12-15-19-22-27	27-29-35	35-42-47-55a-55b-59-65	Fail	High	Failure Code 1		
42	XLII				1	12	15	19	22	27	29	35	42	47	56	60	65							1-12-15-19-22-27	27-29-35	35-42-47-56-60-65	Fail	High	Failure Code 1		Failure Code 8
43	XLIII				1	12	15	19	22	27	29	35	42	43	48a	52	57	60	65					1-12-15-19-22-27	27-29-35	35-42-43-48a-52-57-60-65	Fail	High	Failure Code 1		
44	XLIV				1	12	15	19	22	27	29	35	42	43	49	52	57	60	65					1-12-15-19-22-27	27-29-35	35-42-43-49-52-57-60-65	Fail	High	Failure Code 1		
45	XLV				1	12	15	19	22	27	28	33	36	39	41	47	55a	55b	58					1-12-15-19-22-27	27-28-33	33-36-39-41-47-55a-55b-58	Fail	High	Failure Code 1	Failure Code 4	
46	XLVI				1	12	15	19	22	27	28	33	36	39	41	47	55a	55b	59	65				1-12-15-19-22-27	27-28-33	33-36-39-41-47-55a-55b-59-65	Fail	High	Failure Code 1	Failure Code 4	
47	XLVII				1	12	15	19	22	27	28	33	36	39	41	47	56	60	65					1-12-15-19-22-27	27-28-33	33-36-39-41-47-56-60-65	Fail	High	Failure Code 1	Failure Code 4	Failure Code 9
48	XLVIII				1	12	15	19	22	27	28	33	36	39	41	43	48a	52	57	60	65			1-12-15-19-22-27	27-28-33	33-36-39-41-43-48a-52-57-60-65	Fail	High	Failure Code 1	Failure Code 4	Failure Code 10
49	XLIX				1	12	15	19	22	27	28	33	36	39	41	43	49	52	57	60	65			1-12-15-19-22-27	27-28-33	33-36-39-41-43-49-52-57-60-65	Fail	High	Failure Code 1	Failure Code 4	Failure Code 11
50	L				1	12	15	19	22	27	28	33	37	48a	52	57	60	65						1-12-15-19-22-27	27-28-33	33-37-48a-52-57-60-65	Fail	High	Failure Code 1	Failure Code 4	
51	LI				1	12	15	19	22	27	28	33	37	49	52	57	60	65						1-12-15-19-22-27	27-28-33	33-37-49-52-57-60-65	Fail	High	Failure Code 1	Failure Code 4	
52	LII			1	8	9	16a	16	22	27	29	35	45a	45b	58									1-8-9-16a-16-22-27	27-29-35	35-45a-45b-58	Fail	High	Failure Code 2		
53	LIII			1	8	9	16a	16	22	27	29	35	45a	45b	59	65								1-8-9-16a-16-22-27	27-29-35	35-45a-45b-59-65	Fail	High	Failure Code 2		
54	LIV			1	8	9	16a	16	22	27	29	35	46	55a	55b	58								1-8-9-16a-16-22-27	27-29-35	35-46-55a-55b-58	Fail	High	Failure Code 2		
55	LV			1	8	9	16a	16	22	27	29	35	46	55a	55b	59	65							1-8-9-16a-16-22-27	27-29-35	35-46-55a-55b-59-65	Fail	High	Failure Code 2		
56	LVI			1	8	9	16a	16	22	27	29	35	46	56	60	65								1-8-9-16a-16-22-27	27-29-35	35-46-56-60-65	Fail	High	Failure Code 2		Failure Code 6
57	LVII			1	8	9	16a	16	22	27	29	35	42	47	55a	55b	58							1-8-9-16a-16-22-27	27-29-35	35-42-47-55a-55b-58	Fail	High	Failure Code 2		Failure Code 7
58	LVIII			1	8	9	16a	16	22	27	29	35	42	47	55a	55b	59	65						1-8-9-16a-16-22-27	27-29-35	35-42-47-55a-55b-59-65	Fail	High	Failure Code 2		
59	LIX			1	8	9	16a	16	22	27	29	35	42	47	56	60	65							1-8-9-16a-16-22-27	27-29-35	35-42-47-56-60-65	Fail	High	Failure Code 2		Failure Code 8
60	LX			1	8	9	16a	16	22	27	29	35	42	43	48a	52	57	60	65					1-8-9-16a-16-22-27	27-29-35	35-42-43-48a-52-57-60-65	Fail	High	Failure Code 2		
61	LXI			1	8	9	16a	16	22	27	29	35	42	43	49	52	57	60	65					1-8-9-16a-16-22-27	27-29-35	35-42-43-49-52-57-60-65	Fail	High	Failure Code 2		
62	LXII			1	8	9	16a	16	22	27	28	33	36	39	41	47	55a	55b	58					1-8-9-16a-16-22-27	27-28-33	33-36-39-41-47-55a-55b-58	Fail	High	Failure Code 2	Failure Code 4	
63	LXIII			1	8	9	16a	16	22	27	28	33	36	39	41	47	55a	55b	59	65				1-8-9-16a-16-22-27	27-28-33	33-36-39-41-47-55a-55b-59-65	Fail	High	Failure Code 2	Failure Code 4	
64	LXIV			1	8	9	16a	16	22	27	28	33	36	39	41	47	56	60	65					1-8-9-16a-16-22-27	27-28-33	33-36-39-41-47-56-60-65	Fail	High	Failure Code 2	Failure Code 4	Failure Code 9
65	LXV			1	8	9	16a	16	22	27	28	33	36	39	41	43	48a	52	57	60	65			1-8-9-16a-16-22-27	27-28-33	33-36-39-41-43-48a-52-57-60-65	Fail	High	Failure Code 2	Failure Code 4	Failure Code 10
66	LXVI			1	8	9	16a	16	22	27	28	33	36	39	41	43	49	52	57	60	65			1-8-9-16a-16-22-27	27-28-33	33-36-39-41-43-49-52-57-60-65	Fail	High	Failure Code 2	Failure Code 4	Failure Code 11

67	LXVII	1	8	9	16a	16	22	27	28	33	37	48a	52	57	60	65				1-8-9-16a-16-22-27	27-28-33	33-37-48a-52-57-60-65	Fail	High	Failure Code 2	Failure Code 4	
68	LXVIII	1	8	9	16a	16	22	27	28	33	37	49	52	57	60	65				1-8-9-16a-16-22-27	27-28-33	33-37-49-52-57-60-65	Fail	High	Failure Code 2	Failure Code 4	
69	LXIX		1	8	9	10	11	17	29	35	45a	45b	58							1-8-9-10-11-17	17-29-35	35-45a-45b-58	Fail	High		Failure Code 5	
70	LXX		1	8	9	10	11	17	29	35	45a	45b	59	65						1-8-9-10-11-17	17-29-35	35-45a-45b-59-65	Fail	High		Failure Code 5	
71	LXXI		1	8	9	10	11	17	29	35	46	55a	55b	58						1-8-9-10-11-17	17-29-35	35-46-55a-55b-58	Fail	High		Failure Code 5	
72	LXXII		1	8	9	10	11	17	29	35	46	55a	55b	59	65					1-8-9-10-11-17	17-29-35	35-46-55a-55b-59-65	Fail	High		Failure Code 5	
73	LXXIII		1	8	9	10	11	17	29	35	46	56	60	65						1-8-9-10-11-17	17-29-35	35-46-56-60-65	Fail	High		Failure Code 5	Failure Code 6
74	LXXIV		1	8	9	10	11	17	29	35	42	47	55a	55b	58					1-8-9-10-11-17	17-29-35	35-42-47-55a-55b-58	Fail	High		Failure Code 5	Failure Code 7
75	LXXV		1	8	9	10	11	17	29	35	42	47	55a	55b	59	65				1-8-9-10-11-17	17-29-35	35-42-47-55a-55b-59-65	Fail	High		Failure Code 5	
76	LXXVI		1	8	9	10	11	17	29	35	42	47	56	60	65					1-8-9-10-11-17	17-29-35	35-42-47-56-60-65	Fail	High		Failure Code 5	Failure Code 8
77	LXXVII		1	8	9	10	11	17	29	35	42	43	48a	52	57	60	65			1-8-9-10-11-17	17-29-35	35-42-43-48a-52-57-60-65	Fail	High		Failure Code 5	
78	LXXVIII		1	8	9	10	11	17	29	35	42	43	49	52	57	60	65			1-8-9-10-11-17	17-29-35	35-42-43-49-52-57-60-65	Fail	High		Failure Code 5	
79	LXXIX		1	8	9	10	11	17	28	33	36	39	41	47	55a	55b	58			1-8-9-10-11-17	17-28-33	33-36-39-41-47-55a-55b-58	Pass				
80	LXXX		1	8	9	10	11	17	28	33	36	39	41	47	55a	55b	59	65		1-8-9-10-11-17	17-28-33	33-36-39-41-47-55a-55b-59-65	Pass				
81	LXXXI		1	8	9	10	11	17	28	33	36	39	41	47	56	60	65			1-8-9-10-11-17	17-28-33	33-36-39-41-47-56-60-65	Fail	High			Failure Code 9
82	LXXXII		1	8	9	10	11	17	28	33	36	39	41	43	48a	52	57	60	65	1-8-9-10-11-17	17-28-33	33-36-39-41-43-48a-52-57-60-65	Fail	Medium			Failure Code 10
83	LXXXIII		1	8	9	10	11	17	28	33	36	39	41	43	49	52	57	60	65	1-8-9-10-11-17	17-28-33	33-36-39-41-43-49-52-57-60-65	Fail	Medium			Failure Code 11
84	LXXXIV		1	8	9	10	11	17	28	33	37	48a	52	57	60	65				1-8-9-10-11-17	17-28-33	33-37-48a-52-57-60-65	Pass				
85	LXXXV		1	8	9	10	11	17	28	33	37	49	52	57	60	65				1-8-9-10-11-17	17-28-33	33-37-49-52-57-60-65	Pass				

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Sub-Network	Sub-Route Component Sub-Sections	Sub-Route String	Pass/Fail	Failure Code	Failure Rationale	Failure Likelihood	Passing Rationale
CUS-Grand Crossing Sub-Network	1 12 15 18 23 27	1-12-15-18-23-27	Pass				• Provides the opportunity to operate on a dedicated double track passenger main from Chicago Union Station • The Metra Southwest Service (30 trains/day) will be diverted to the LaSalle Street Station with the planned CREATE P2/P3/EW2/GS 519 projects • Minimal freight traffic north of CP 518 • CREATE P1/P4 projects will segregate freight and passenger traffic south of CP 518 and eliminate freight conflicts at CP 518 • Potential opportunity to take advantage of relatively open ComEd Utility corridor east of Englewood.
	1 12 15 19 22 27	1-12-15-19-22-27	Fail	**Failure Code 1**	Metra Rock Island District (RID) (subsection 22) currently serves 69 commuter trains per day on a double track railroad. Metra has proposed to transfer its Southwest Service to the RID to consolidate its operation to the LaSalle Street Station. Moving Metra Southwest Service on this line will add 30 commuter trains per day and fill available capacity. Transferring between the NS Chicago Line (subsection 15) and Metra RID (subsection 22) would require a backing move to get on and off the CRL/41st Street connection (subsection 19) at NS. To eliminate the backing move, a new connection would be needed between CRL and NS. The new connection would require the acquisition of industrial property along W. Pershing Road and a minimum curve of 5° 30' that will allow a maximum speed of 51 mph assuming 5" cant deficiency and 5" superelevation. However, the maximum speed through this area will be determined by the #10 turnouts that will be needed at the CRL connection which will restrict speed to 20 mph or less. It is assumed a #10 turnout will be needed as it is likely that the standard #20 turnouts will be too large to be constructed in this area. Speed will also be restricted along the existing 10° curve between Metra RID and CRL that would allow a maximum speed of 38 mph. Again, this connection presents operational issues from a route perspective in that it will involve leaving the relatively tangent Amtrak/NS alignment, accessing the congested Metra RID commuter corridor via a geometrically challenging Chicago Rail Link connection then presumably returning to the Amtrak/NS alignment via another physically and geometrically challenging connection at Englewood. There is currently no connection at node S between subsections 22 and 27. A new elevated connection would be required. The construction of a new connection would pose significant impacts to the freight yard operations, and the curve geometry of a new connection would limit top speeds to 47 mph. The proximity of the NS Park Manor Yard severely limits the room available for an elevated structure between RID and NS. The structure would span approximately 820 feet, resulting in an undesirable 6° 30' curve at an elevation over 3 percent with a top speed of approximately 47 mph assuming 5" cant deficiency and 5" superelevation. Subject to further engineering analysis, impacts to Park Manor Yard are likely and may involve the loss of one or more yard tracks. This connection presents operational issues from a route perspective. The use of this connection as a route from Chicago Union Station will require the construction of major improvements to the St. Charles Air Line (SCAL) or the Chicago Rail Link (CRL) connection to provide connectivity between Metra RID and Chicago Union Station. Both of these connections have challenging geometrics that will reduce top speeds. Either connection also requires moving 56 trains per day onto the RID that currently carries 69 trains per day. Metra has also proposed transferring its Southwest Service to the RID that would add another 30 trains per day.With this level of commuter/intercity passenger rail congestion, top speeds of 110 mph cannot be maintained. In summary these constraints do not allow operations through this connection at the 110 mph speeds called for in the purpose and need statement for the corridor.	**High**	
	1 8 9 16a 16 22 27	1-8-9-16a-16-22-27	Fail	**Failure Code 2**	Metra Rock Island District (RID) (subsection 22) currently serves 69 commuter trains per day on a double track railroad. Metra has proposed to transfer its Southwest Service to the RID to consolidate its operation to the LaSalle Street Station. Moving Metra Southwest Service on this line will add 30 commuter trains per day and fill available capacity. There is currently no connection at node S between subsections 22 and 27. A new elevated connection would be required. The construction of a new connection would pose significant impacts to the freight yard operations, and the curve geometry of a new connection would limit top speeds to 47 mph. The proximity of the NS Park Manor Yard severely limits the room available for an elevated structure between RID and NS. The structure would span approximately 820 feet, resulting in an undesirable 6° 30' curve at an elevation over 3 percent with a top speed of approximately 47 mph assuming 5" cant deficiency and 5" superelevation. Subject to further engineering analysis, impacts to Park Manor Yard are likely and may involve the loss of one or more yard tracks. This connection presents operational issues from a route perspective. The use of this connection as a route from Chicago Union Station will require the construction of major improvements to the St. Charles Air Line (SCAL) or the Chicago Rail Link (CRL) connection to provide connectivity between Metra RID and Chicago Union Station. Both of these connections have challenging geometrics that will reduce top speeds. Either connection also requires moving 56 trains per day onto the RID that currently carries 69 trains per day. Metra has also proposed transferring its Southwest Service to the RID that would add another 30 trains per day. With this level of commuter/intercity passenger rail congestion, top speeds of 110 mph cannot be maintained. In summary these constraints do not allow operations through this connection at the 110 mph speeds called for in the purpose and need statement for the corridor.	**High**	

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Sub-Network	Sub-Route Component Sub-Sections	Sub-Route String	Pass/Fail	Failure Code	Failure Rationale	Failure Likelihood	Passing Rationale
Grand Crossing to Buffington Harbor/Kensington Junction Sub-Network	1 8 9 16a 16 19 18 23 27	1-8-9-16a-16-19-18-23-27	Fail	**Failure Code 3**	Metra Rock Island District (RID) (subsections 16 and 16a) currently serves 69 commuter trains per day on a double track railroad. Metra has proposed to transfer its Southwest Service to the RID to consolidate its operation to the LaSalle Street Station. Moving Metra Southwest Service on this line will add 30 commuter trains per day and fill available capacity. Transferring between the Metra RID (subsection 16) and the NS Chicago Line (subsection 18) would require a backing move to get on and off the CRL/41st Street connection (subsection 19) at NS. To eliminate the backing move, a new 1,600 foot elevated connection would be needed between CRL and NS. The new connection would require the acquisition of industrial property along W. 40th Place and W. Root Street and a minimum curve of 5° 30′ that will allow a maximum speed of 51 mph assuming 5″ cant deficiency and 5″ superelevation. However, the maximum speed through this area will be determined by the #10 turnouts that will be needed at the CRL connection which will restrict speeds to 20 mph or less. It is assumed a #10 turnout will be needed as it is likely that the standard #20 turnouts will be too large to be constructed in this area. In addition, the existing CRL structure connecting to the Metra Rock Island District would have to be rebuilt from a one track structure to a two track structure. Speed will also be restricted if the existing single track connection is rebuilt at the existing 10° curve that would allow a maximum speed of 38 mph. The use of this connection presents operational issues from a route perspective in that it will involve leaving the relatively tangent Amtrak/NS alignment, accessing the St. Charles Air Line (SCAL) with very challenging vertical and horizontal geometrics, joining a congested Metra RID commuter corridor and then returning to the Amtrak/NS alignment via a geometrically challenging Chicago Rail Link connection. The use of the SCAL would also require the construction of major improvements to provide connectivity to Chicago Union Station. There is currently no connection at node S between subsections 22 and 27. A new elevated connection would be required. The construction of a new connection would pose significant impacts to the freight yard operations, and the curve geometry of a new connection would limit top speeds to 47 mph. The proximity of the NS Park Manor Yard severely limits the room available for an elevated structure between RID and NS. The structure would span approximately 820 feet, resulting in an undesirable 6° 30′ curve at an elevation over 3 percent with a top speed of approximately 47 mph assuming 5″ cant deficiency and 5″ superelevation. Subject to further engineering analysis, impacts to Park Manor Yard are likely and may involve the loss of one or more yard tracks. This connection presents operational issues from a route perspective. The use of this connection as a route from Chicago Union Station will require the construction of major improvements to the St. Charles Air Line (SCAL) or the Chicago Rail Link (CRL) connection to provide connectivity between Metra RID and Chicago Union Station. Both of these connections have challenging geometrics that will reduce top speeds. Either connection also requires moving 56 trains per day onto the RID that currently carries 69 trains per day. Metra has also proposed transferring its Southwest Service to the RID that would add another 30 trains per day. With this level of commuter/intercity passenger rail congestion, top speeds of 110 mph cannot be maintained. In summary these constraints do not allow operations through this connection at the 110 mph speeds called for in the purpose and need statement for the corridor.	**High**	
	1 8 9 10 11 17	1-8-9-10-11-17	Pass				• Provides alternative access into CUS without impacting several constraints on the existing route (CP518, 21st Street Bridge, etc.). Recommended for further analysis to better determine the ability to construct an improved SCAL connection to the Amtrak owned trackage that leads to Chicago Union Station. • Available ROW in CN Chicago Subdivision corridor for two new tracks
	27 29 35	27-29-35	Pass				• Available ROW for two dedicated passenger tracks is available on ComEd ROW. • Alternatively, lightly used CSX ROW could potentially be purchased east of the Calumet River Bridge. • NS ROW has heavy freight traffic
	27 28 33	27-28-33	Fail	**Failure Code 4**	Providing a connection between the ComEd Utility Corridor (subsection 27) and the CN Chicago Subdivision (subsection 28) would require a new elevated structure greater than 3,000 feet in length. From the ComEd Utility Corridor, the new structure would elevate approximately 30 feet to cross over the NS Chicago Line and potentially elevate higher to clear the Chicago Skyway (Interstate 90) before dropping 60 feet or greater to the CN Chicago Subdivision while crossing the Metra Electric District. Construction of the structure would require the acquisition of commercial property to the south of the Chicago Skyway and potential acquisition of residential property to the east of the CN line. Modifications to the NS Chicago Line and the Chicago Skyway bridge may be required to accommodate the new structure. From an operational and route continuity perspective this connection involves leaving the ComEd double track corridor available for passenger rail service at Grand Crossing (Node T) with approximately thirteen continuous miles remaining for double track passenger rail operations.	**High**	
	17 29 35	17-29-35	Fail	**Failure Code 5**	Providing this connection would require the construction of a new elevated structure that will connect the Metra Electric District (MED)/CN embankment (subsection 17) to the ComEd Utility corridor (subsection 29) that is elevated approximately 25 to 30 feet above the CN embankment. The structure would run approximately 2,500 feet in length and cross over E. 75th St., S. Chicago Ave., and E. 76th Street. It would result in the taking of a number of commercial buildings at various points along the structure. Utilizing this connection would also require major improvements to the St. Charles Air Line to make the connection between the CN Chicago Subdivision and Chicago Union Station. From an operational route continuity perspective this connection would require the construction of major improvements to the St. Charles Air Line (SCAL) to provide connectivity to Chicago Union Station and result in reduced speeds because of the resulting geometry. In addition, after following nearly nine miles of the double track CN corridor from the SCAL, it leaves the corridor with an additional five miles remaining for passenger rail use.	**High**	
	17 28 33	17-28-33	Pass				• Available ROW in CN corridor for two new tracks.
	35 45a 45b 58	35-45a-45b-58	Pass				• 100' ROW with the potential to provide five tracks (2 passenger, 3 freight) along the NS Chicago Line • Heavy freight volumes on NS Chicago Line • Freight/commuter volumes will require sophisticated scheduling along NICTD • Heavy environmental constraints (T&E and Section 4(f), floodplains)
	35 45a 45b 59 65	35-45a-45b-59-65	Pass				• 100' ROW with the potential to provide five tracks (2 passenger, 3 freight) • Heavy freight volumes • Heavy environmental constraints (T&E and Section 4(f), floodplains)

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Sub-Network	Sub-Route Component Sub-Sections	Sub-Route String	Pass/Fail	Failure Code	Failure Rationale	Failure Likelihood	Passing Rationale
Ab-Ao Sub-Network	35 46 55a 55b 58	35-46-55a-55b-58	Pass				• 100' ROW with the potential to provide five tracks (2 passenger, 3 freight) on CSX Barr Subdivision • Heavy freight volumes on CSX Barr Subdivision • Freight/commuter volumes will require sophisticated scheduling along NICTD • Heavy environmental constraints (T&E and Section 4(f), floodplains)
	35 46 55a 55b 59 65	35-46-55a-55b-59-65	Pass				• 100' ROW with the potential to provide five tracks (2 passenger, 3 freight) on CSX Barr Subdivision and NS Chicago Line • Heavy freight volumes on CSX Barr Subdivision and NS Chicago Line • Freight/commuter volumes will require sophisticated scheduling along NICTD
	35 46 56 60 65	35-46-56-60-65	Fail	**Failure Code 6**	Providing a high-speed double track connection with a 1° 30' curve between the CSX Barr Subdivision (subsection 56) and the CSX Porter Subdivision (subsection 60) at Willow Creek (Node Al) would require land takings within the boundaries of Woodland Park, a section 4(f) property. As outlined in Section 4(f) of the Department of Transportation Act (DOT Act) of 1966, federal law prohibits the use of land of significant publicly owned parks, recreation areas, wildlife and waterfowl refuges, or land of a historic site for transportation projects, unless the following conditions apply: 1) there is no feasible and prudent alternative to the use of the land, and 2) the actions includes all possible planning to minimize harm to the property resulting from use. A 4° curve or greater is needed to avoid the park property which would require train speeds of approximately 60 mph or less assuming 5" cant deficiency and 5" superelevation. The speed reductions associated with the use of the 4° curve geometry will not support the goal of 110 mph top speeds called for in the purpose and need statement for the corridor.	**High**	
	35 42 47 55a 55b 58	35-42-47-55a-55b-58	Fail	**Failure Code 7**	Traveling from the NS Sugar Track/CSX Fort Wayne Line (subsection 42) to NICTD (subsection 47) (which is constructed on a 25 to 30 foot high embankment) will require a 2,500 foot structure that will require takings of industrial property and structures. Building the connection will likely require takings of industrial property and structures including buildings and industrial track leads. Other potential impacts include water quality impacts and impacts to the residences located to the east of the industrial facility and south of the Grand Calumet River. From an operational and route perspective, this connection involves moving from the lightly used NS Sugar Track or the inactive CSX Fort Wayne Line connecting to the CSX Porter Line, both with capacity for a double track 110 mph intercity passenger operation, to the intensively used NICTD commuter line with limited right of way available for additional intercity passenger service and the potential for reduced speeds and reliability. Any resulting speed reductions associated with this connection will not support the goal of 110 mph top speeds called for in the purpose and need statement for the corridor.	**Medium**	
	35 42 47 55a 55b 59 65	35-42-47-55a-55b-59-65	Pass			**Medium**	
	35 42 47 56 60 65	35-42-47-56-60-65	Fail	**Failure Code 8**	Traveling from the NS Sugar Track/CSX Fort Wayne Line (subsection 42) to NICTD (subsection 47) (which is constructed on a 25 to 30 foot high embankment) will require a 2,500 foot structure that will require takings of industrial property and structures. Building the connection will likely require takings of industrial property and structures including buildings and industrial track leads. Other potential impacts include water quality impacts and impacts to the residences located to the east of the industrial facility and south of the Grand Calumet River. From an operational and route perspective, this connection involves moving from the lightly used NS Sugar Track or the inactive CSX Fort Wayne Line connecting to the CSX Porter Line, both with capacity for a double track 110 mph intercity passenger operation, to the intensively used NICTD commuter line with limited right of way available for additional intercity passenger service and the potential for reduced speeds and reliability. Any resulting speed reductions associated with this connection will not support the goal of 110 mph top speeds called for in the purpose and need statement for the corridor. A single track connection from NICTD (subsection 47) to the CSX Barr Subdivision (subsection 56) currently exists in Miller, Ind. (node Aj) , however the connection is an s-curve consisting of a 4 and 13 degree curve that would require slow speeds. Reconfiguration of this connection would likely require the acquisition of residential and commercial property. Providing a high-speed double track connection with a 1° 30' curve between the CSX Barr Subdivision (subsection 56) and the CSX Porter Subdivision (subsection 60) at Willow Creek (Node Al) would require land takings within the boundaries of Woodland Park, a section 4(f) property. As outlined in Section 4(f) of the Department of Transportation Act (DOT Act) of 1966, federal law prohibits the use of land of significant publicly owned parks, recreation areas, wildlife and waterfowl refuges, or land of a historic site for transportation projects, unless the following conditions apply: 1) there is no feasible and prudent alternative to the use of the land, and 2) the actions includes all possible planning to minimize harm to the property resulting from use. A 4° curve or greater is needed to avoid the park property which would require train speeds of approximately 60 mph or less assuming 5" cant deficiency and 5" superelevation. The speed reductions associated with the use of the 4° curve geometry will not support the goal of 110 mph top speeds called for in the purpose and need statement for the corridor.	**Medium**	
or/Kensington Junction-Michigan City Sub-Network	35 42 43 48a 52 57 60 65	35-42-43-48a-52-57-60-65	Pass				• Open ROW along the NS Sugar Track or CSX Fort Wayne Line to provide a dedicated double track main. • The low volume single track along the CSX Porter Subdivision within a 100' ROW provides opportunity to add two dedicated passenger tracks. • Potential floodplain and T&E impacts need to be evaluated further if additional ROW is required.
	35 42 43 49 52 57 60 65	35-42-43-49-52-57-60-65	Pass				• Open ROW along the NS Sugar Track or CSX Fort Wayne Line to provide a dedicated double track main. • The low volume single track along the CSX Porter Subdivision within a 100' ROW provides opportunity to add two dedicated passenger tracks. • Potential floodplain and T&E impacts need to be evaluated further if additional ROW is required.

Edit ONLY Blue Shaded Cells

Sub-Network		Sub-Route Component Sub-Sections	Sub-Route String	Pass/Fail	Failure Code	Failure Rationale	Failure Likelihood	Passing Rationale
Buffington Harbor	Y-Ac-Ao Sub-Network	33 36 39 41 47 55a 55b 58	33-36-39-41-47-55a-55b-58	Pass				• Existing passenger corridor (NICTD) • Heavier local freight volumes to the east of Gary, Ind. • Freight/commuter volumes will require sophisticated scheduling • Heavy environmental constraints (T&E and Section 4(f), floodplains)
		33 36 39 41 47 55a 55b 59 65	33-36-39-41-47-55a-55b-59-65	Pass				• Existing passenger corridor (NICTD & Amtrak) • 100' ROW with the potential to provide five tracks (2 passenger, 3 freight) along the NS Chicago Line • Heavier local freight volumes on NICTD to the east of Gary, Ind. • Freight/commuter volumes will require sophisticated scheduling • Heavy freight volumes on NS Chicago Line • Heavy environmental constraints (T&E and Section 4(f), floodplains)
		33 36 39 41 47 56 60 65	33-36-39-41-47-56-60-65	Fail	**Failure Code 9**	Providing a high-speed double track connection with a 1° 30' curve between the CSX Barr Subdivision (subsection 56) and the CSX Porter Subdivision (subsection 60) at Willow Creek (Node Al) would require land takings within the boundaries of Woodland Park, a section 4(f) property. As outlined in Section 4(f) of the Department of Transportation Act (DOT Act) of 1966, federal law prohibits the use of land of significant publicly owned parks, recreation areas, wildlife and waterfowl refuges, or land of a historic site for transportation projects, unless the following conditions apply: 1) there is no feasible and prudent alternative to the use of the land, and 2) the actions includes all possible planning to minimize harm to the property resulting from use. A 4° curve or greater is needed to avoid the park property which would require train speeds of approximately 60 mph or less assuming 5" cant deficiency and 5" superelevation. The speed reductions associated with the use of the 4° curve geometry will not support the goal of 110 mph top speeds called for in the purpose and need statement for the corridor. A single track connection from NICTD (subsection 47) to the CSX Barr Subdivision (subsection 56) currently exists in Miller, Ind. (node Aj) , however the connection is an s-curve consisting of a 4 and 13 degree curve that would require slow speeds. Reconfiguration of this connection would likely require the acquisition of residential and commercial property. In summary, these environmental constraints and slower speeds would not allow operations through this connection at the 110 mph speeds called for in the purpose and need statement for the corridor.	**High**	
		33 36 39 41 43 48a 52 57 60 65	33-36-39-41-43-48a-52-57-60-65	Fail	**Failure Code 10**	Providing a connection from NICTD (subsection 41) to the CSX Fort Wayne Line (subsection 43) in Gary, Ind. (node Ac) is geometrically infeasible due to the locations of W. 3rd Avenue and W. 4th Avenue. The linear distance between W. 3rd Ave. and W. 4th Ave. along the 1° 30' curve is approximately 1,400 feet. This distance does not provide enough space to cross W. 3rd Avenue above grade and cross under W. 4th Avenue at a 1 percent grade or less without severing W. 3rd Ave. or reconstructing the bridge at W. 4th Ave. A tighter 7° 30' curve built at a 4 percent grade could be constructed to avoid the crossings, however the geometry is also considered undesirable. Assuming 5" cant deficiency and 5" superelevation, train speed would have to be reduced to approximately 44 mph to travel along a 7° 30' curve. From an operational and route perspective, this connection involves moving from the lightly used NS Sugar Track or the inactive CSX Fort Wayne Line connecting to the CSX Porter Line, both with capacity for a double track 110 mph intercity passenger operation, to the intensively used NICTD commuter line with limited right of way available for additional intercity passenger service and the potential for reduced speeds and reliability. Speed reductions associated with the 7° 30' curve built on a 4 percent grade would not allow operations through this connection at the 110 mph speeds called for in the purpose and need statement for the corridor.	**Medium**	
		33 36 39 41 43 49 52 57 60 65	33-36-39-41-43-49-52-57-60-65	Fail	**Failure Code 11**	Providing a connection from NICTD (subsection 41) to the CSX Fort Wayne Line (subsection 43) in Gary, Ind. (node Ac) is geometrically infeasible due to the locations of W. 3rd Avenue and W. 4th Avenue. The linear distance between W. 3rd Ave. and W. 4th Ave. along the 1° 30' curve is approximately 1,400 feet. This distance does not provide enough space to cross W. 3rd Avenue above grade and cross under W. 4th Avenue at a 1 percent grade or less without severing W. 3rd Ave. or reconstructing the bridge at W. 4th Ave. A tighter 7° 30' curve built at a 4 percent grade could be constructed to avoid the crossings, however the geometry is also considered undesirable. Assuming 5" cant deficiency and 5" superelevation, train speed would have to be reduced to approximately 44 mph to travel along a 7° 30' curve. From an operational and route perspective, this connection involves moving from the lightly used NS Sugar Track or the inactive CSX Fort Wayne Line connecting to the CSX Porter Line, both with capacity for a double track 110 mph intercity passenger operation, to the intensively used NICTD commuter line with limited right of way available for additional intercity passenger service and the potential for reduced speeds and reliability. Speed reductions associated with the 7° 30' curve built on a 4 percent grade would not allow operations through this connection at the 110 mph speeds called for in the purpose and need statement for the corridor.	**Medium**	
	Y-Ac-Ao Sub-Network	33 37 48a 52 57 60 65	33-37-48a-52-57-60-65	Pass				• The entire corridor, less a two mile stretch, carries low freight volumes. • The majority of the corridor consists of a single freight track within a 100' ROW, providing opportunity to construct a new dedicated double track passenger main. • Potential Section 4(f), T&E species, and floodplain impacts needs to be evaluated further if additional ROW is needed.
		33 37 49 52 57 60 65	33-37-49-52-57-60-65	Pass				• The entire corridor, less a two mile stretch, carries low freight volumes. • The majority of the corridor consists of a single freight track within a 100' ROW, providing opportunity to construct a new dedicated double track passenger main. • Potential Section 4(f), T&E species, and floodplain impacts needs to be evaluated further if additional ROW is needed.

APPENDIX 2: SCHEMATICS FOR LEVEL 1B COARSE SCREENING

This section contains schematics of each of the 85 hybrid routes color coded to indicate whether the route was recommended to pass (green) or fail (red).

South of the Lake Route Schematic

Level 1B Coarse Screening - Legend

Sub-Section	Node	to	Node	Operator
1	A) Chicago Union Station	to	G) St. Charles Air Line at Amtrak	Amtrak
8	G) St. Charles Air Line at Amtrak	to	H) St. Charles Air Line at B&O	CN
9	H) St. Charles Air Line at B&O	to	I) St. Charles Air Line at Metra Rock Island District	CN
10	I) St. Charles Air Line at Metra Rock Island District	to	J) St. Charles Air Line at Grand Trunk Western/ Wabash	CN
11	J) St. Charles Air Line at Grand Trunk Western/ Wabash	to	K) St. Charles Air Line at Metra Electric District	CN
12	G) St. Charles Air Line at Amtrak	to	L) 23rd Street Crossing	Amtrak to NS
15	L) 23rd Street Crossing	to	N) 41st Street/Rail Link Connection at NS	NS
16	M) 21st Street Crossing	to	O) 41st Street/Rail Link Connection at Metra Rock Island District	Metra
16a	I) St. Charles Air Line at Metra Rock Island District	to	M) 21st Street Crossing	Metra
17	K) St. Charles Air Line at Metra Electric District	to	T) Grand Crossing	Metra or CN
18	N) 41st Street/Rail Link Connection at NS	to	P) CP 518	NS
19	O) 41st Street/Rail Link Connection at Metra Rock Island District	to	N) 41st Street /Rail Link Connection at NS	CRL
22	O) 41st Street/Rail Link Connection at Metra Rock Island District	to	S) Englewood Crossover	Metra
23	P) CP 518	to	S) Englewood Crossover	NS
27	S) Englewood Crossover	to	T) Grand Crossing	NS or ComEd (NYC)
28	T) Grand Crossing	to	V) Burnside Crossing	Metra or CN
29	T) Grand Crossing	to	X) Rock Island Junction	NS or ComEd (NYC)
33	V) Burnside Crossing	to	Y) Kensington Junction	Metra or CN

Sub-Section	Node	to	Node	Operator
35	X) Rock Island Junction	to	Ab) Buffington Harbor	NS or ComEd (NYC) or CSX
36	Y) Kensington Junction	to	Z) Torrence Avenue Crossing	NICTD
37	Y) Kensington Junction	to	Ad) Tolleston, Ind.	IHB to CSX
39	Z) Torrence Avenue Crossing	to	Aa) North Hammond	NICTD
41	Aa) North Hammond	to	Ac) Gary, Ind.	NICTD
42	Ab) Buffington Harbor	to	Ac) Gary, Ind.	NS or CSX
43	Ac) Gary, Ind.	to	Ad) Tolleston, Ind.	NS or CSX
45a	Ab) Buffington Harbor	to	Am_1) Indiana Dunes at NS	NS
45b	Am_1) Indiana Dunes at NS	to	Am) Burns Harbor, Ind.	NS
46	Ab) Buffington Harbor	to	Aj) Miller, Ind.	CSX
47	Ac) Gary, Ind.	to	Aj) Miller, Ind.	NICTD
48a	Ad) Tolleston, Ind.	to	Ag) Gary Greenfield Connection	Abandoned (IHB)
49	Ad) Tolleston, Ind.	to	Ag) Gary Greenfield Connection	CSX
52	Ag) Gary Greenfield Connection	to	Ai) Lake Station, Ind.	CSX
55a	Aj) Miller, Ind.	to	Am_2) Indiana Dunes at NICTD	NICTD
55b	Am_2) Indiana Dunes at NICTD	to	Am) Burns Harbor, Ind.	NICTD
56	Aj) Miller, Ind.	to	Al) Willow Creek, Ind.	CSX
57	Ai) Lake Station, Ind.	to	Al) Willow Creek, Ind.	CSX
58	Am) Burns Harbor, Ind.	to	Ao) Michigan City, Ind.	NICTD
59	Am) Burns Harbor, Ind.	to	An) Porter, Ind.	NS
60	Al) Willow Creek, Ind.	to	An) Porter, Ind.	CSX
65	An) Porter, Ind.	to	Ao) Michigan City, Ind.	Amtrak

South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

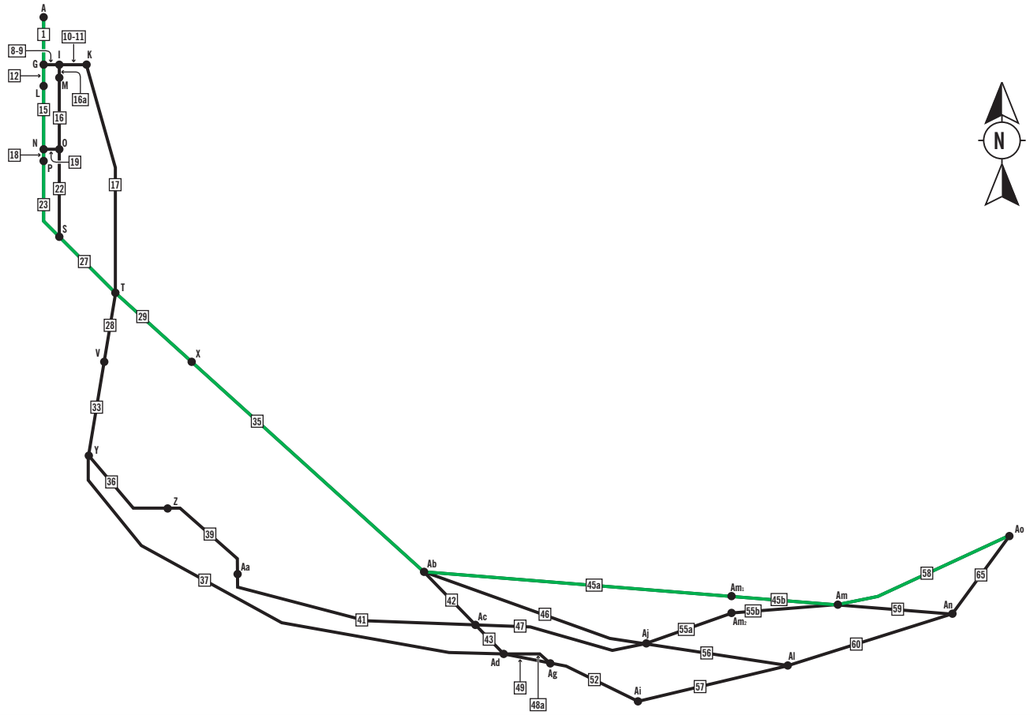
- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

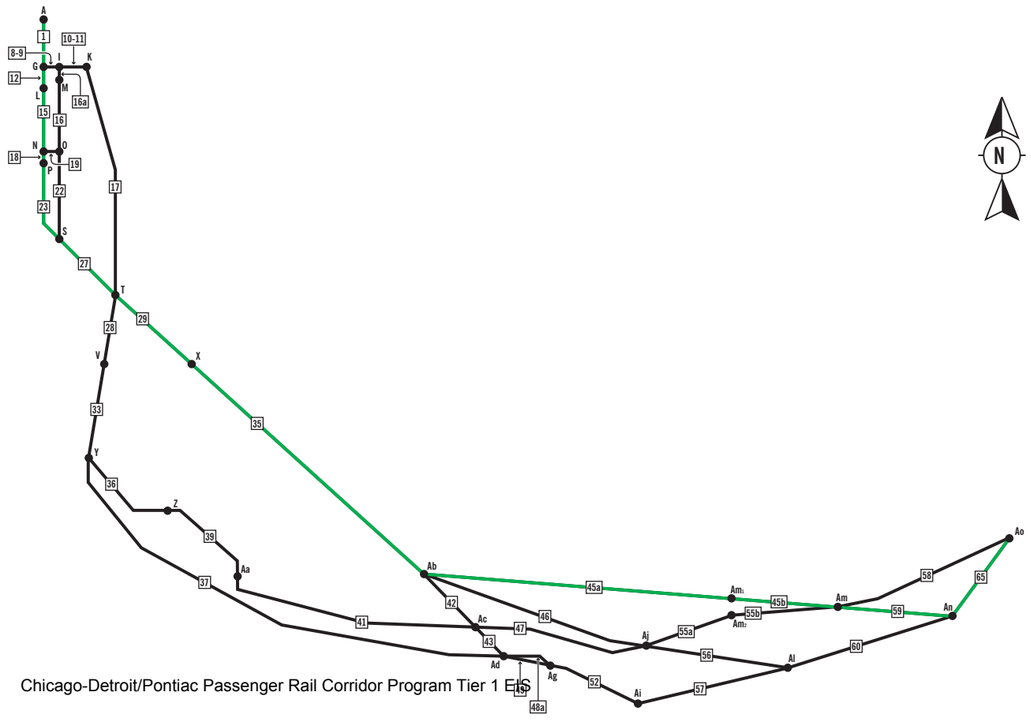
Route I

Route String: 1-12-15-18-23-27-29-35-45a-45b-58



Route II

Route String: 1-12-15-18-23-27-29-35-45a-45b-59-65



Route III

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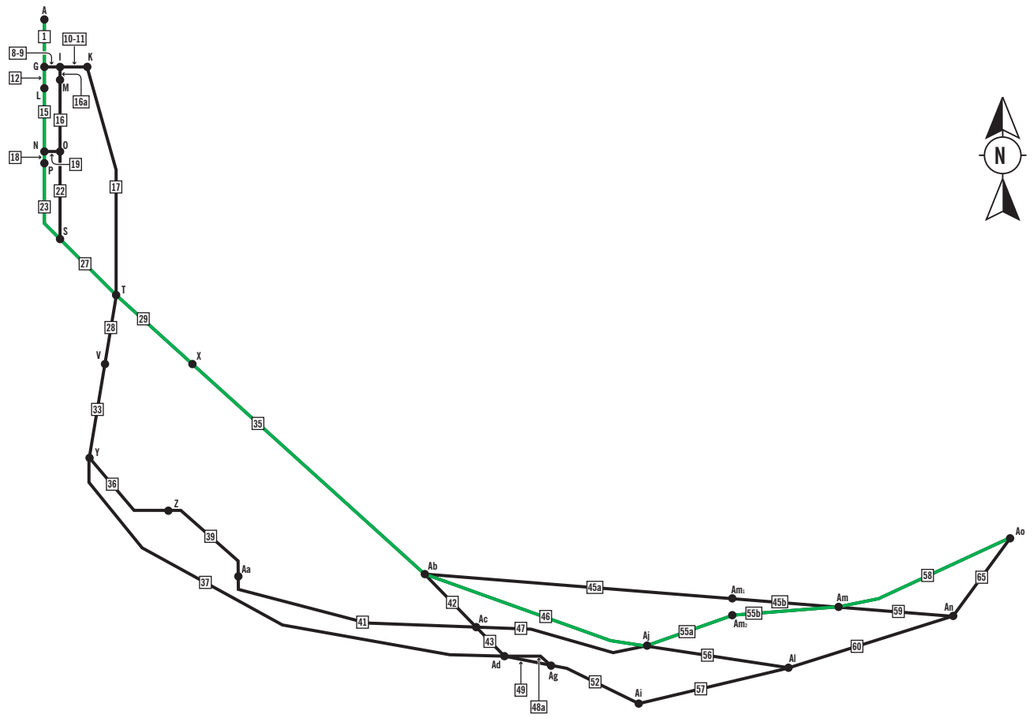
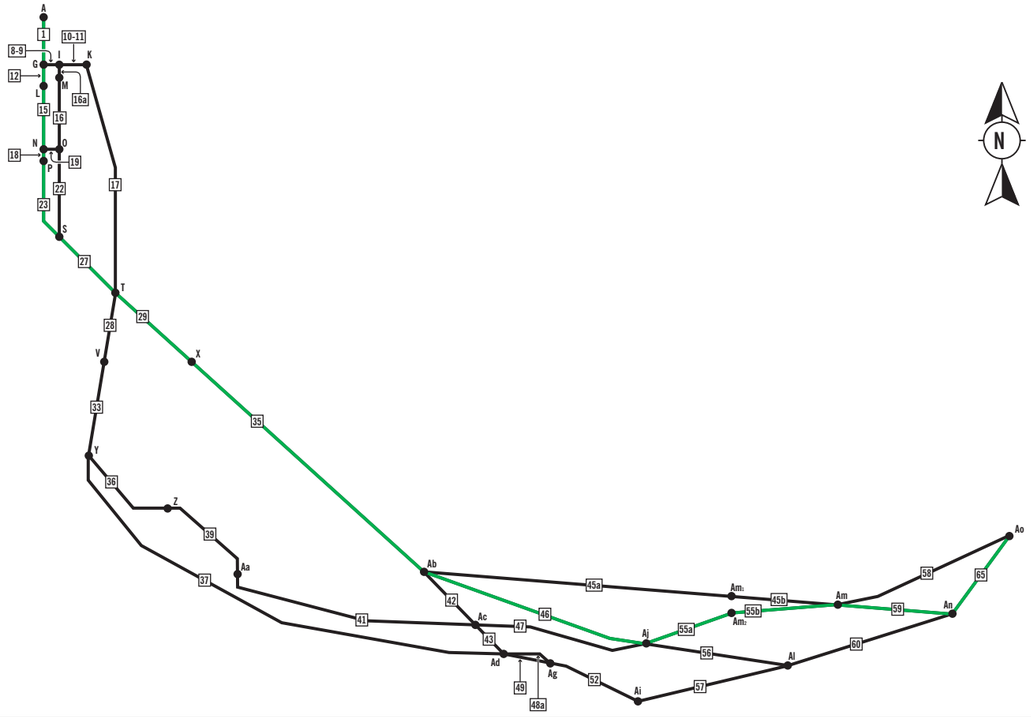


South of the Lake Route Schematic

Level 1B Coarse Screening

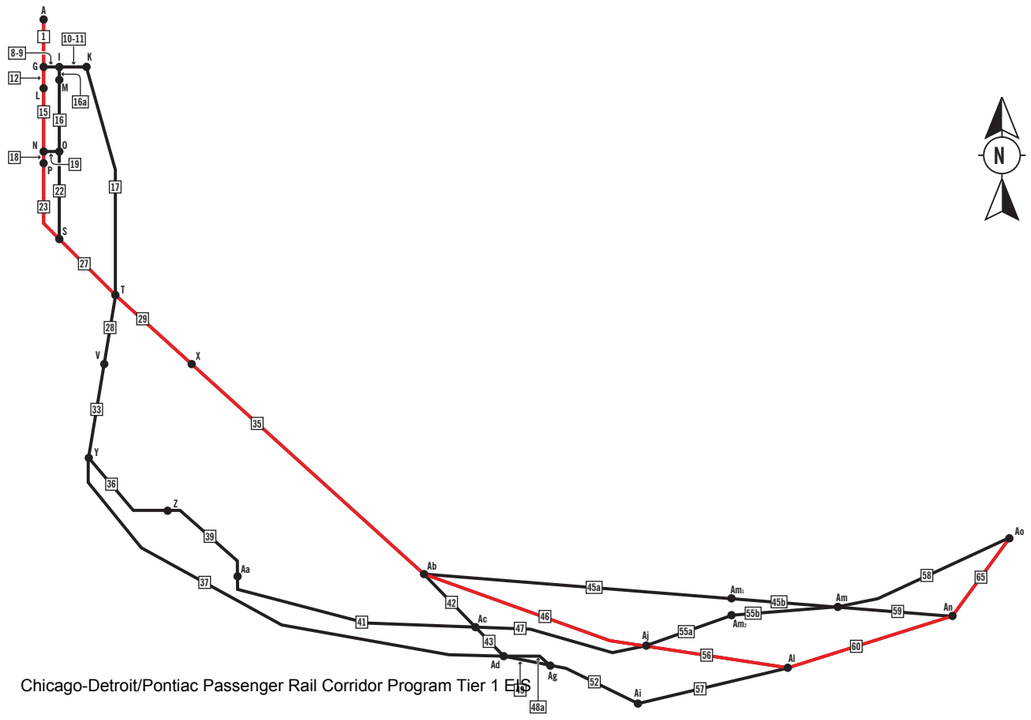
Route IV

Route String: 1-12-15-18-23-27-29-35-46-55a-55b-59-65



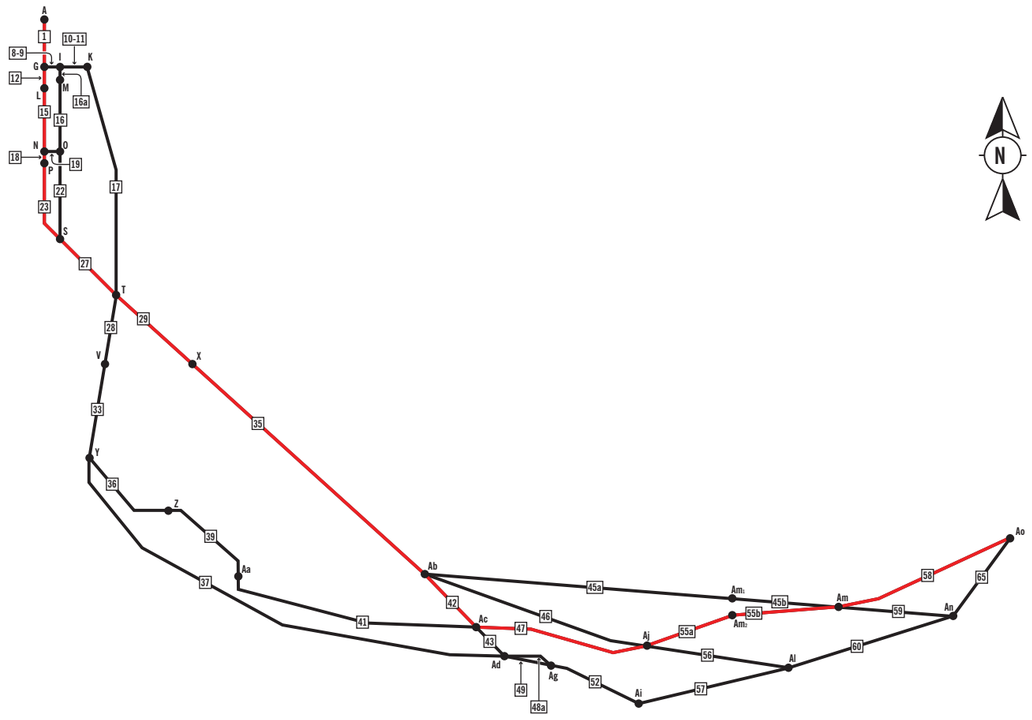
Route V

Route String: 1-12-15-18-23-27-29-35-46-56-60-65



Route VI

Route String: 1-12-15-18-23-27-29-35-42-47-55a-55b-58



LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
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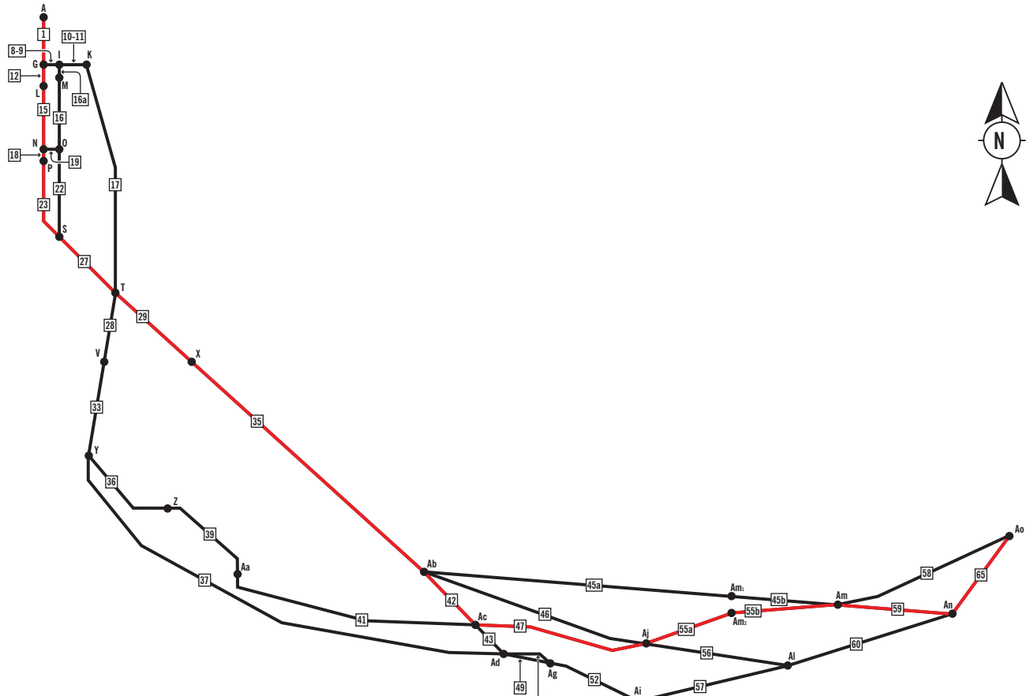
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

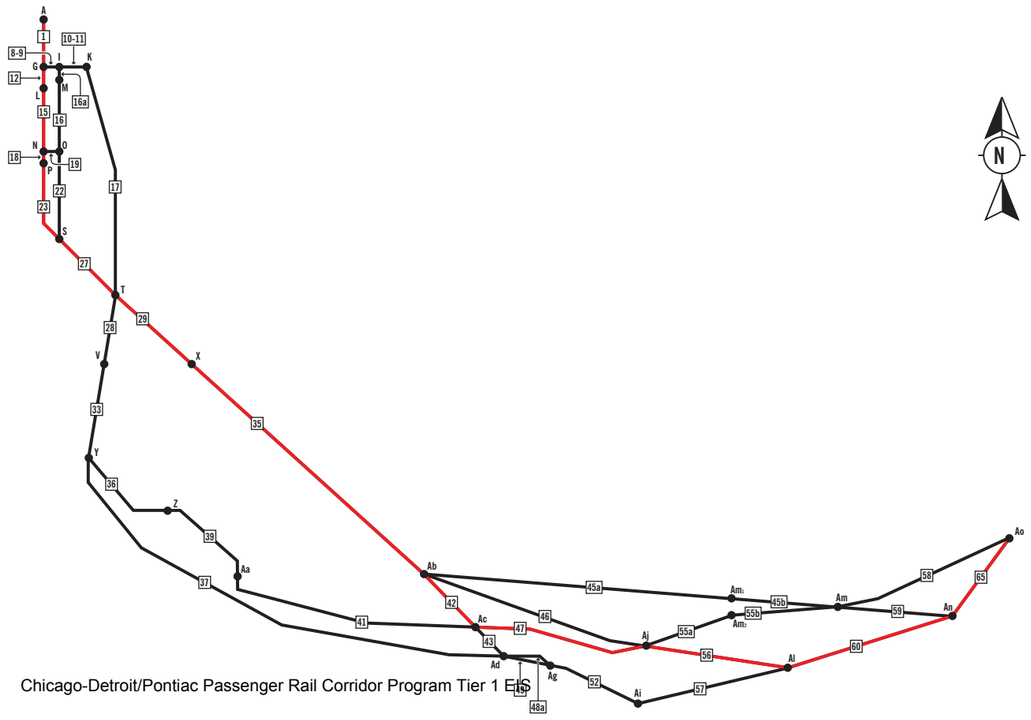
Route VII

Route String: 1-12-15-18-23-27-29-35-42-47-55a-55b-59-65



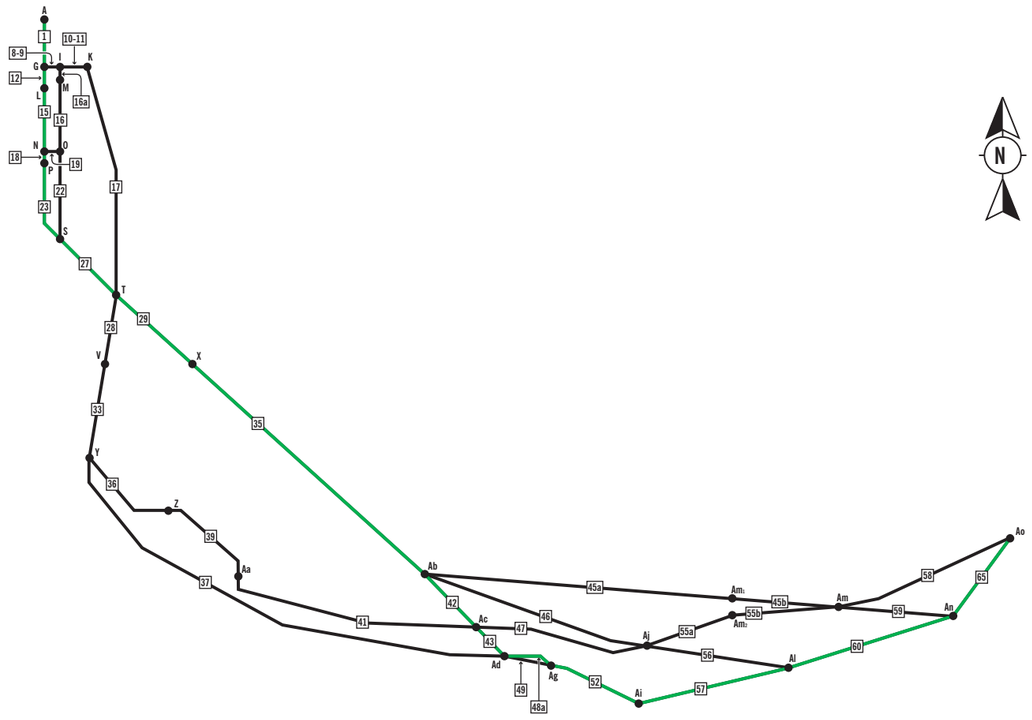
Route VIII

Route String: 1-12-15-18-23-27-29-35-42-47-56-60-65



Route IX

Route String: 1-12-15-18-23-27-29-35-42-43-48a-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

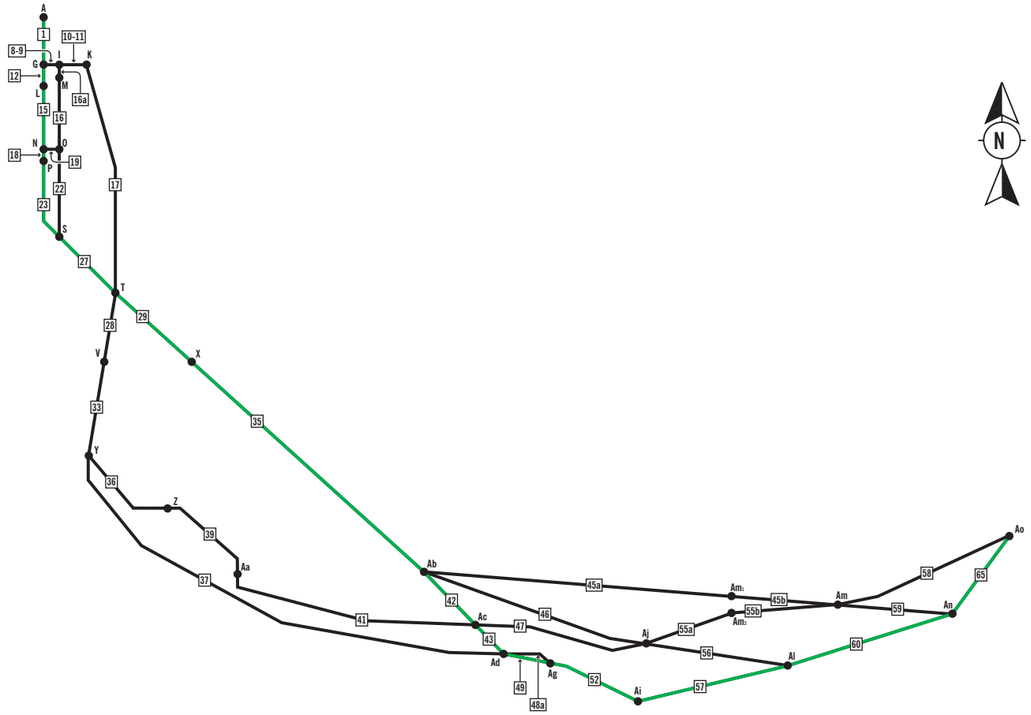
X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

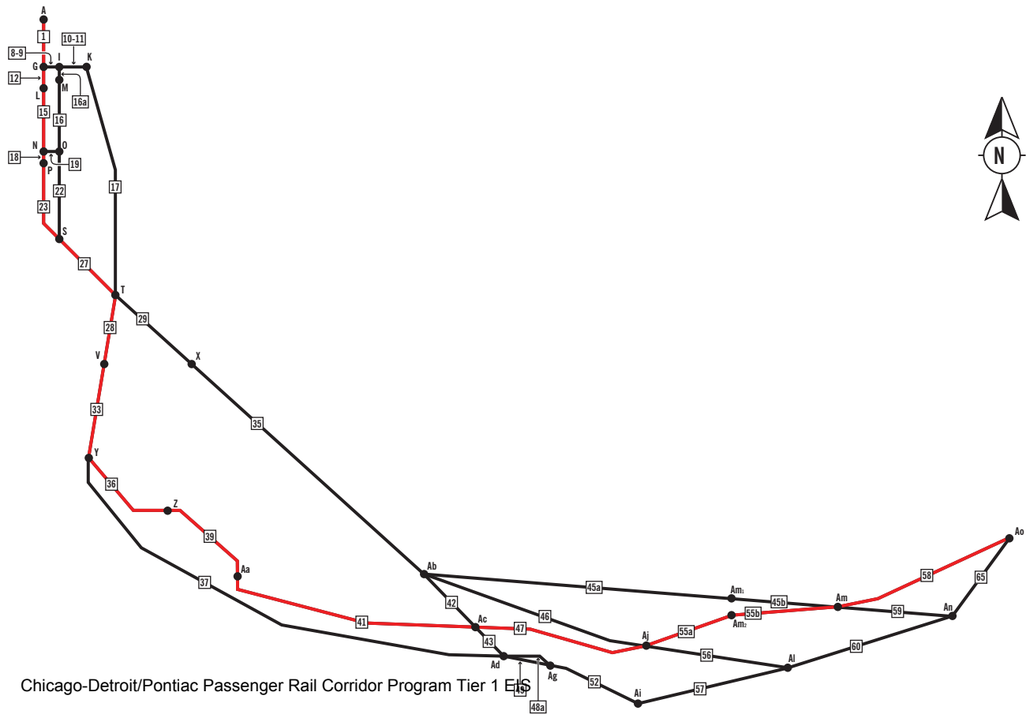
Route X

Route String: 1-12-15-18-23-27-29-35-42-43-49-52-57-60-65



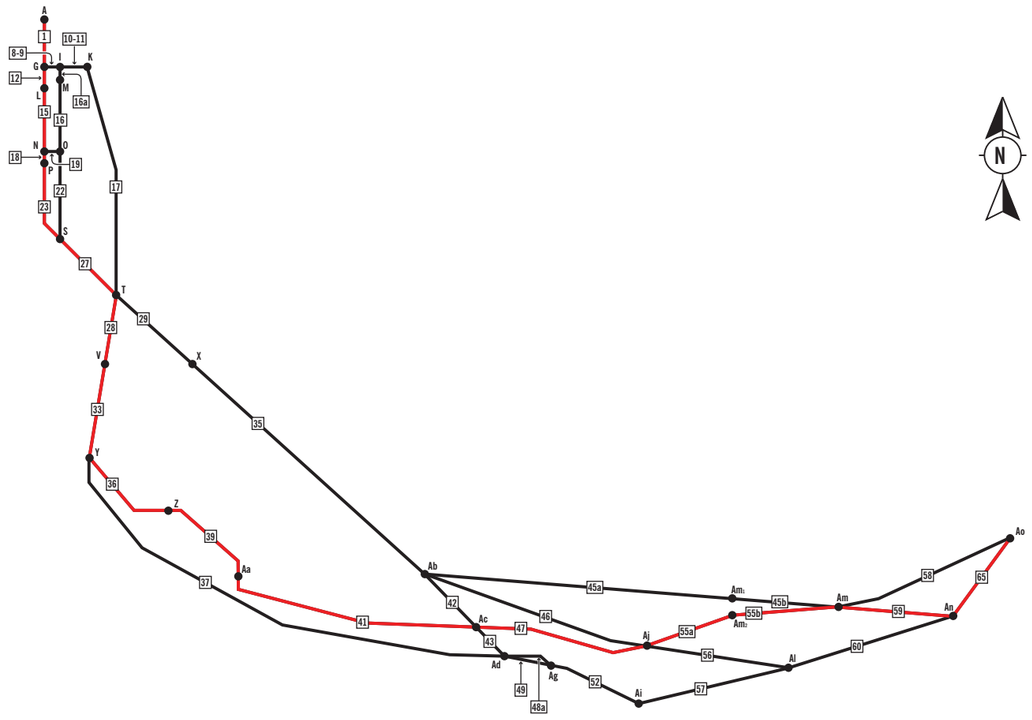
Route XI

Route String: 1-12-15-18-23-27-28-33-36-39-41-47-55a-55b-58



Route XII

Route String: 1-12-15-18-23-27-28-33-36-39-41-47-55a-55b-59-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
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O - 41st Street / Rail Link Connection (Metra)
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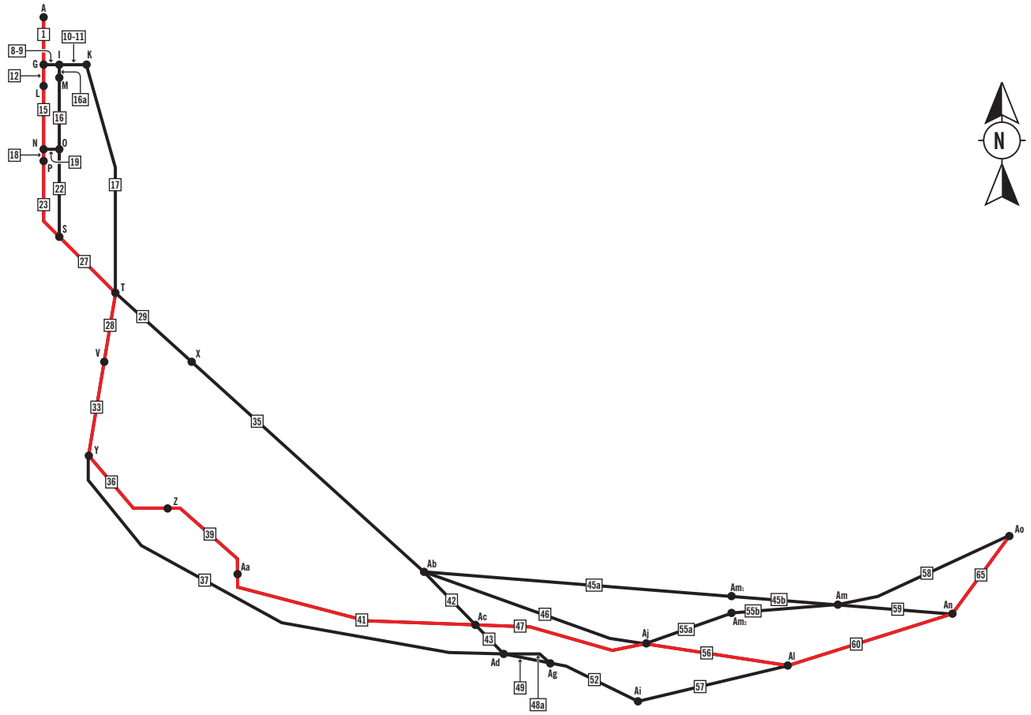
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

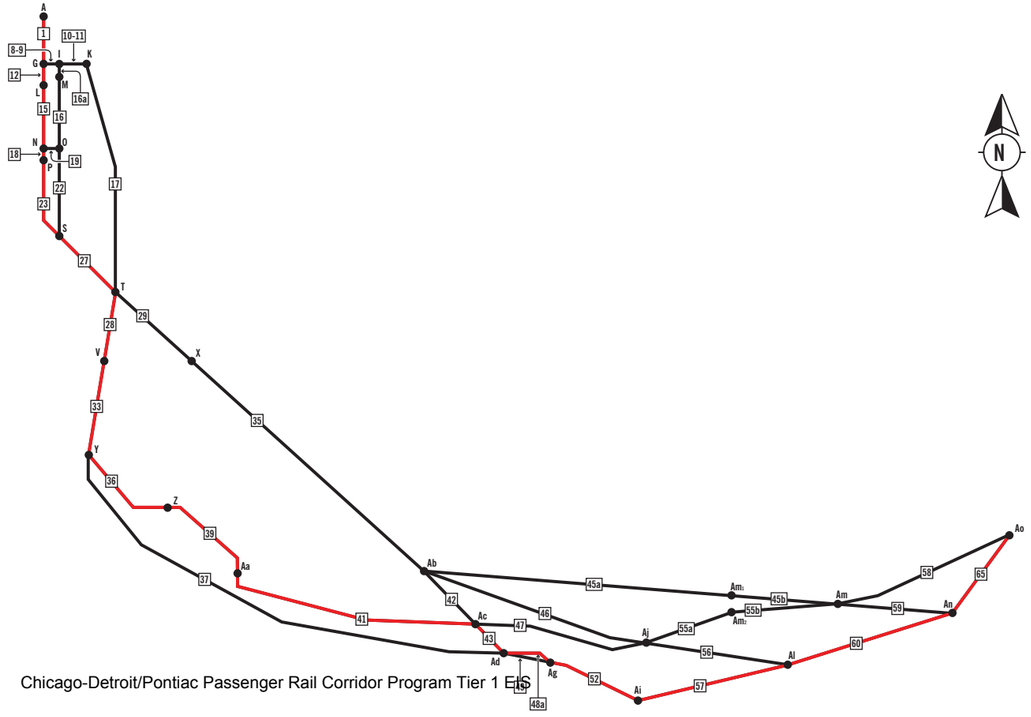
Route XIII

Route String: 1-12-15-18-23-27-28-33-36-39-41-47-56-60-65



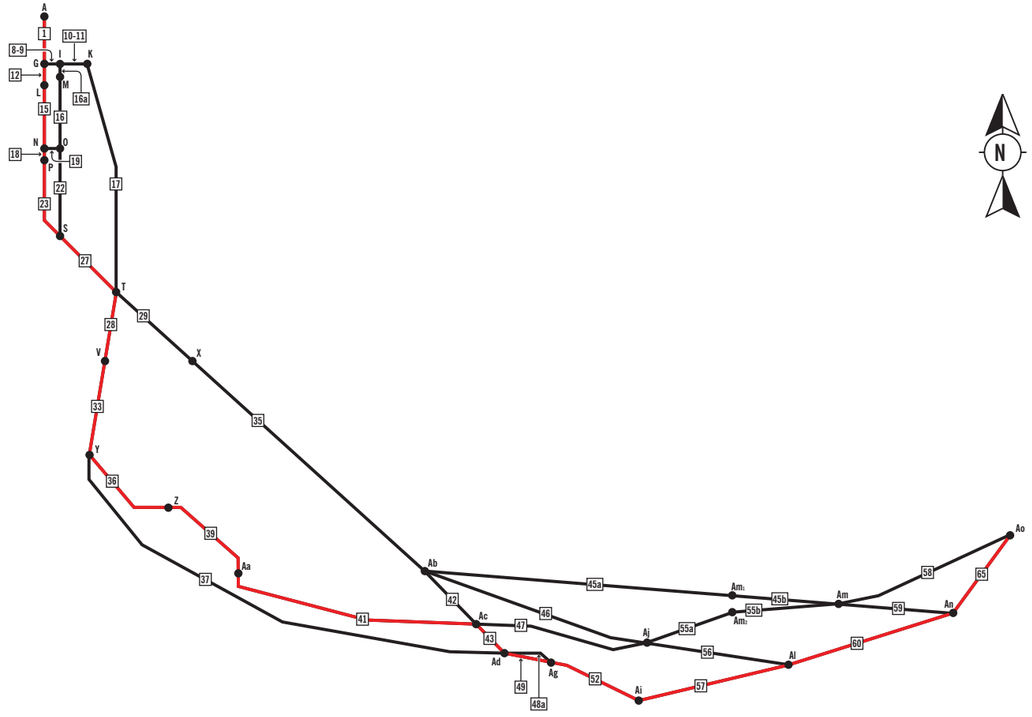
Route XIV

Route String: 1-12-15-18-23-27-28-33-36-39-41-43-48a-52-57-60-65



Route XV

Route String: 1-12-15-18-23-27-28-33-36-39-41-43-49-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

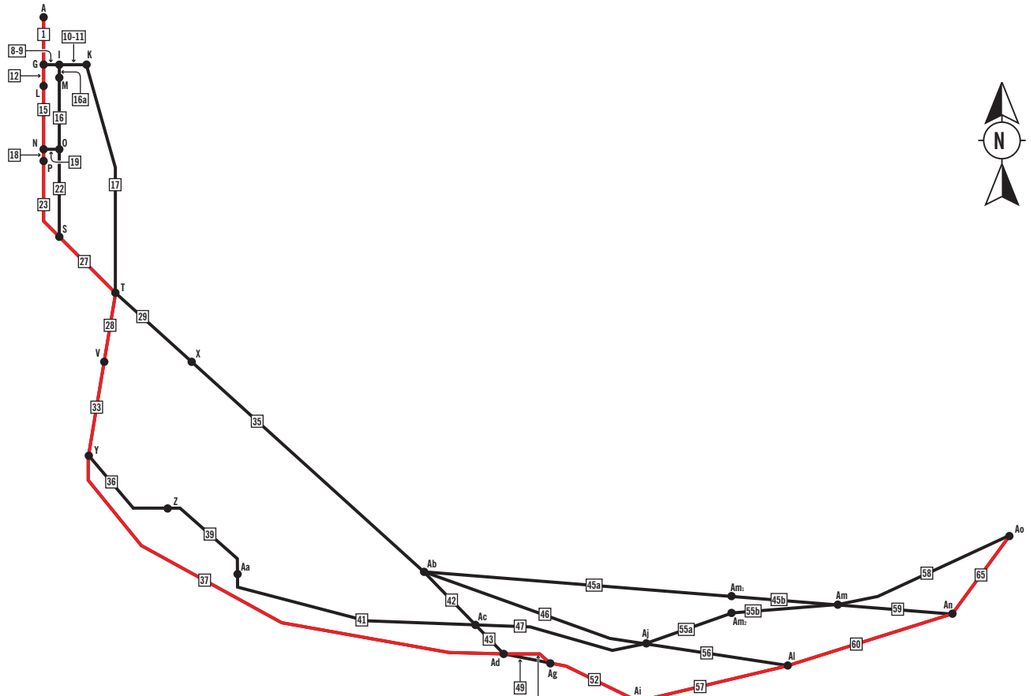
- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

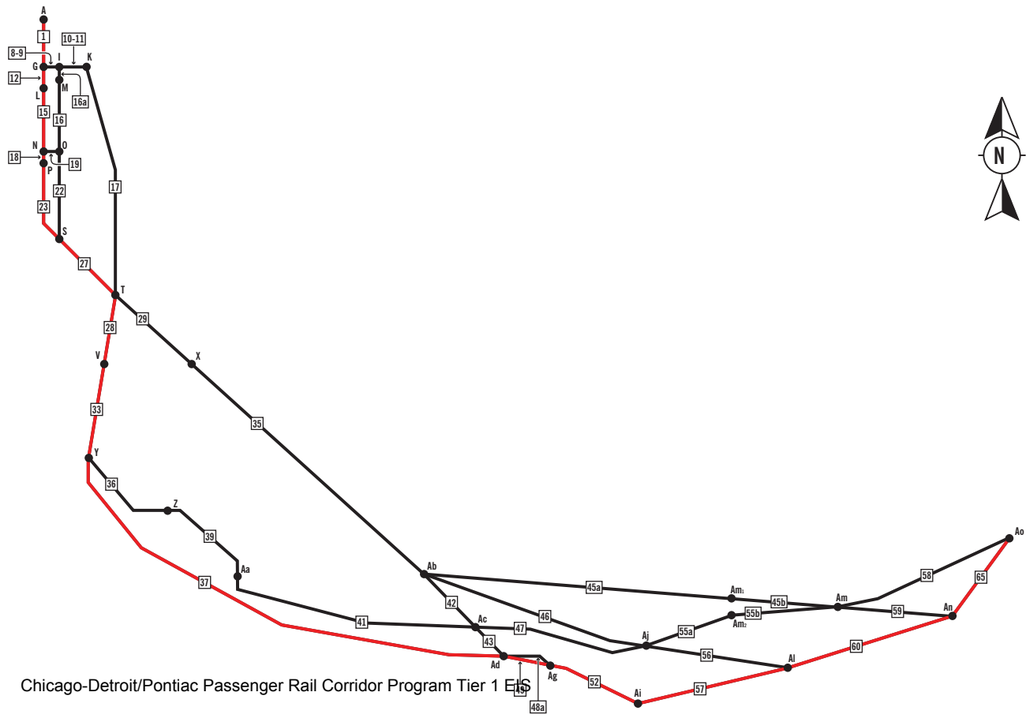
Route XVI

Route String: 1-12-15-18-23-27-28-33-37-48a-52-57-60-65



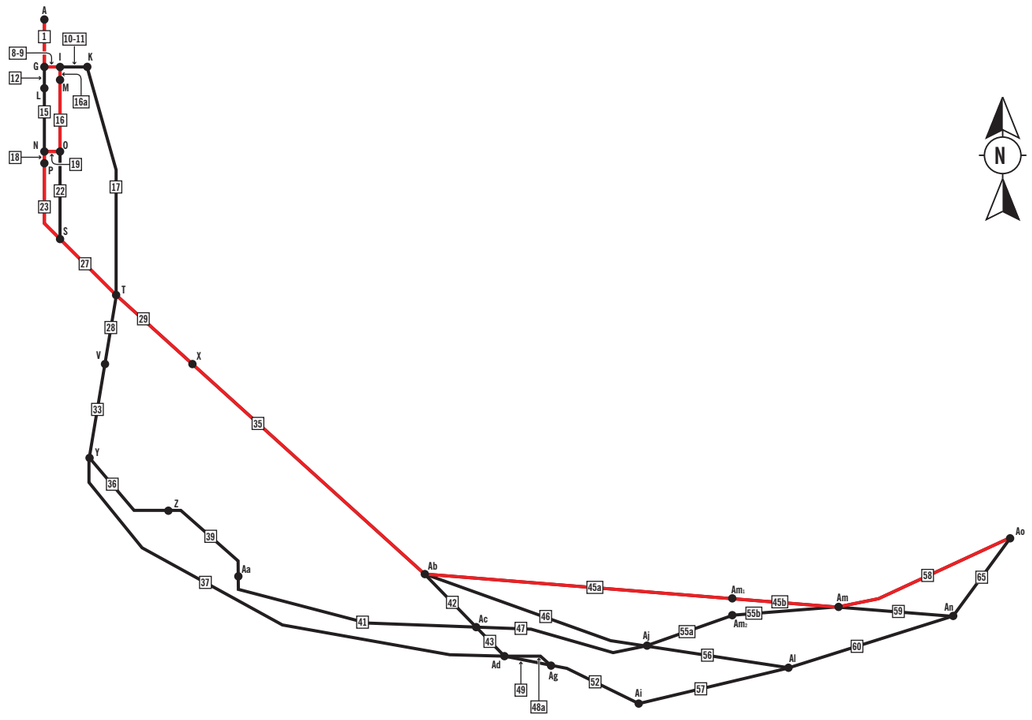
Route XVII

Route String: 1-12-15-18-23-27-28-33-37-49-52-57-60-65



Route XVIII

Route String: 1-8-9-16a-16-19-18-23-27-29-35-45a-45b-58



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
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O - 41st Street / Rail Link Connection (Metra)
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Am - Burns Harbor, Ind.
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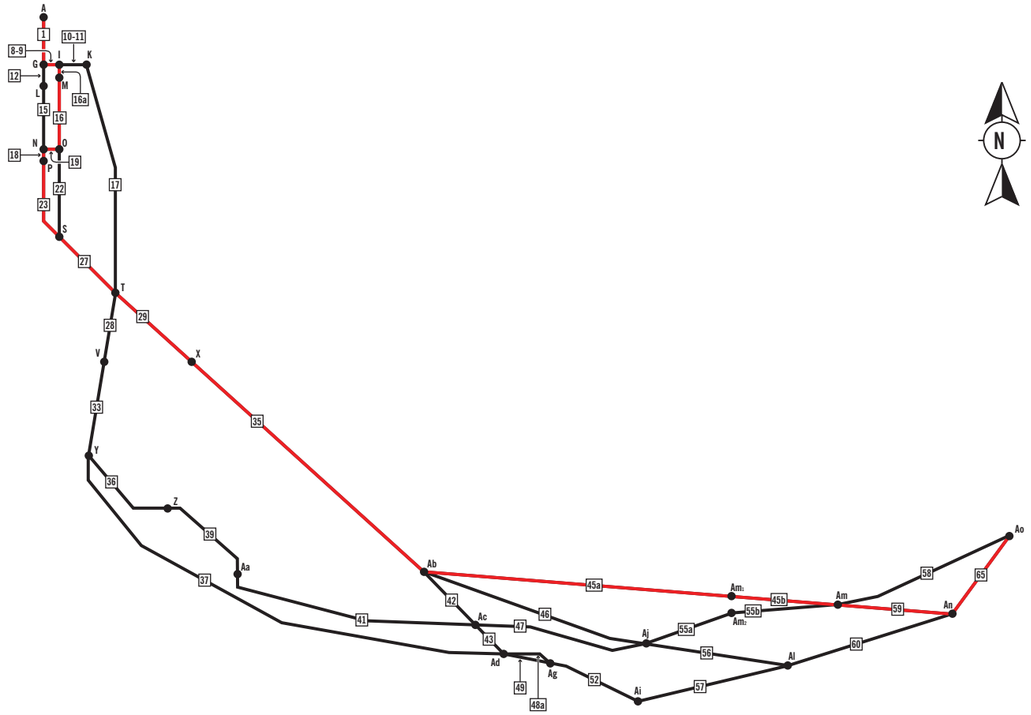
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

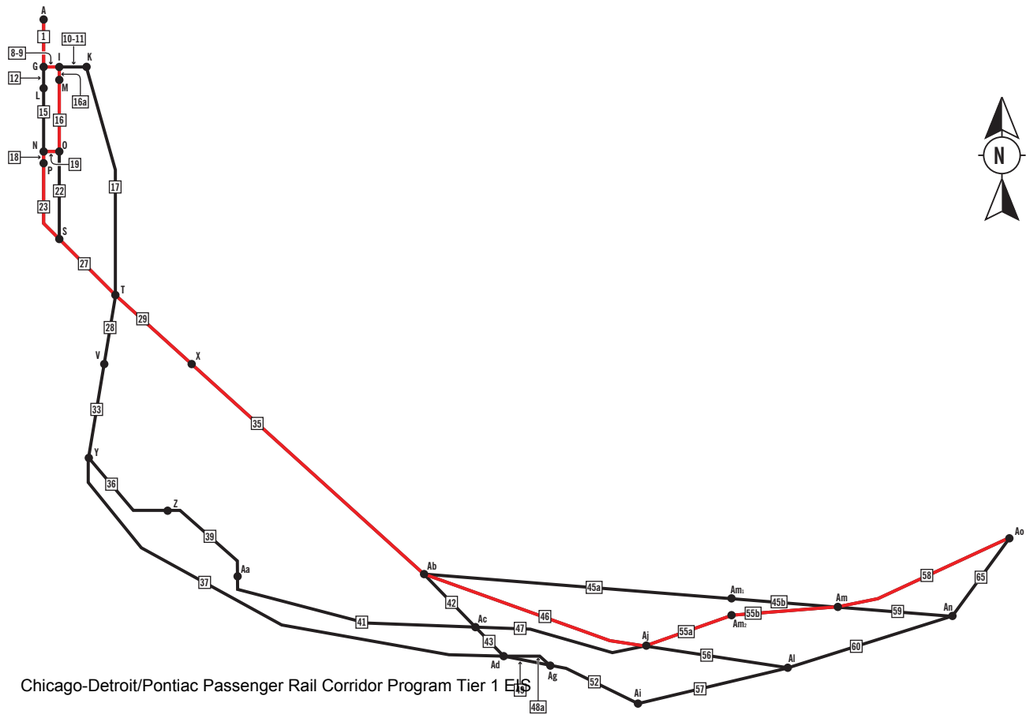
Route XIX

Route String: 1-8-9-16a-16-19-18-23-27-29-35-45a-45b-59-65



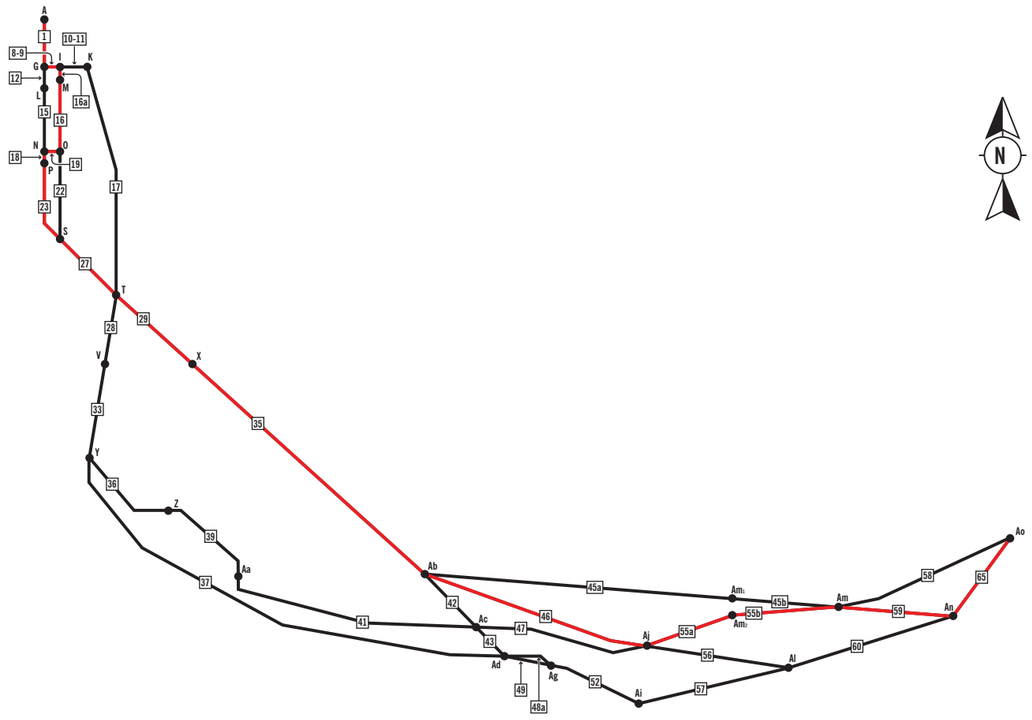
Route XX

Route String: 1-8-9-16a-16-19-18-23-27-29-35-46-55a-55b-58



Route XXI

Route String: 1-8-9-16a-16-19-18-23-27-29-35-46-55a-55b-59-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

Subsection

Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
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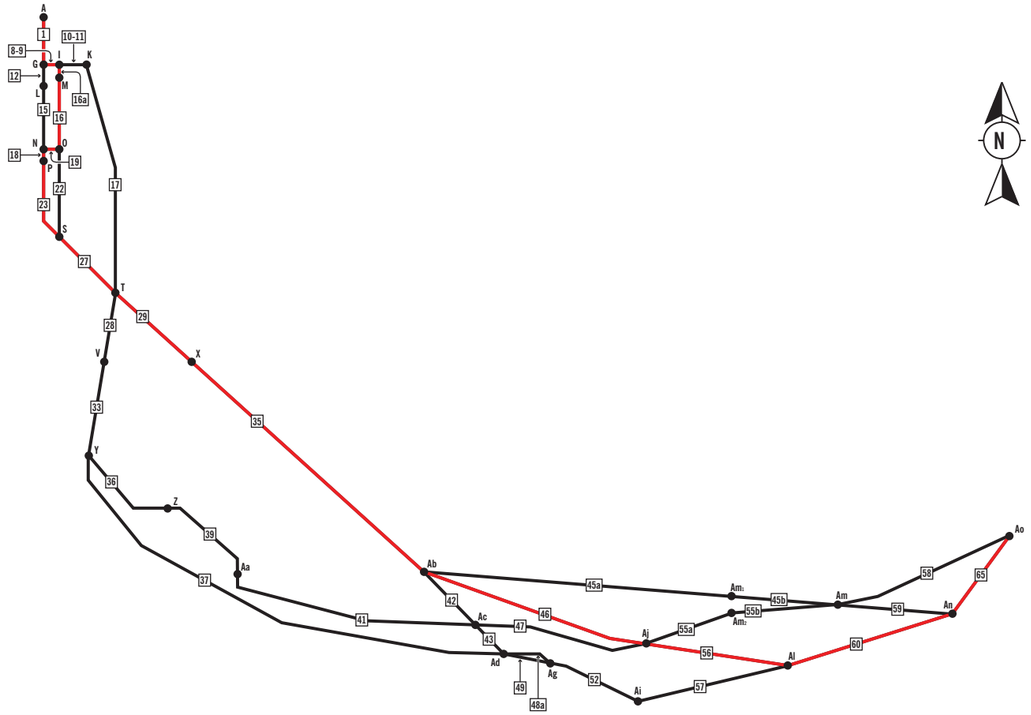
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

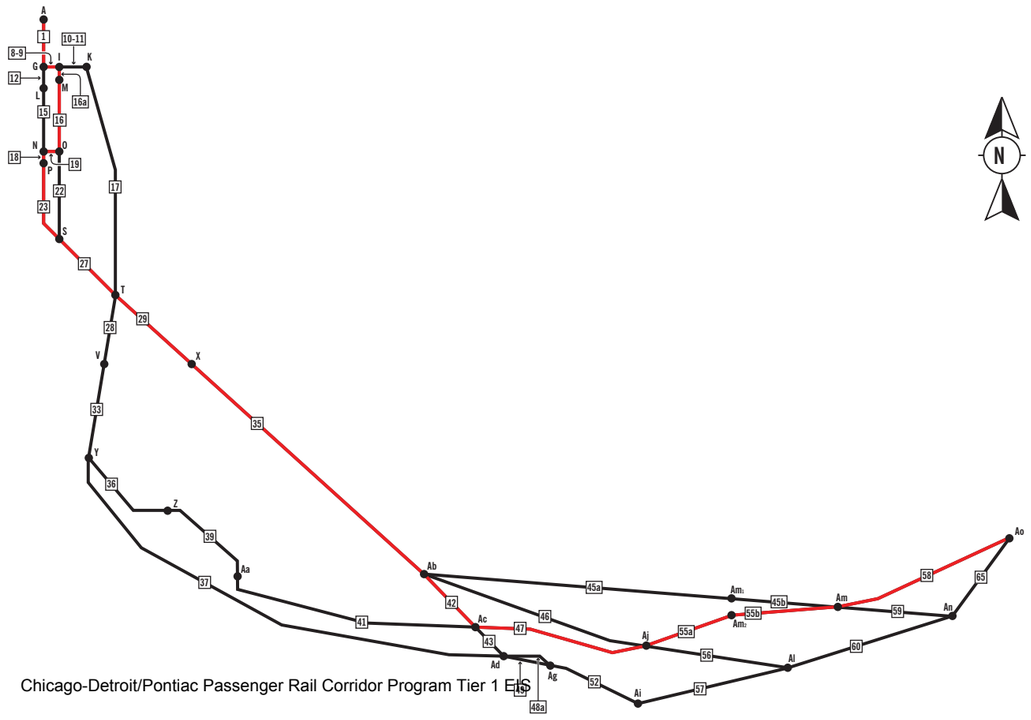
Route XXII

Route String: 1-8-9-16a-16-19-18-23-27-29-35-46-56-60-65



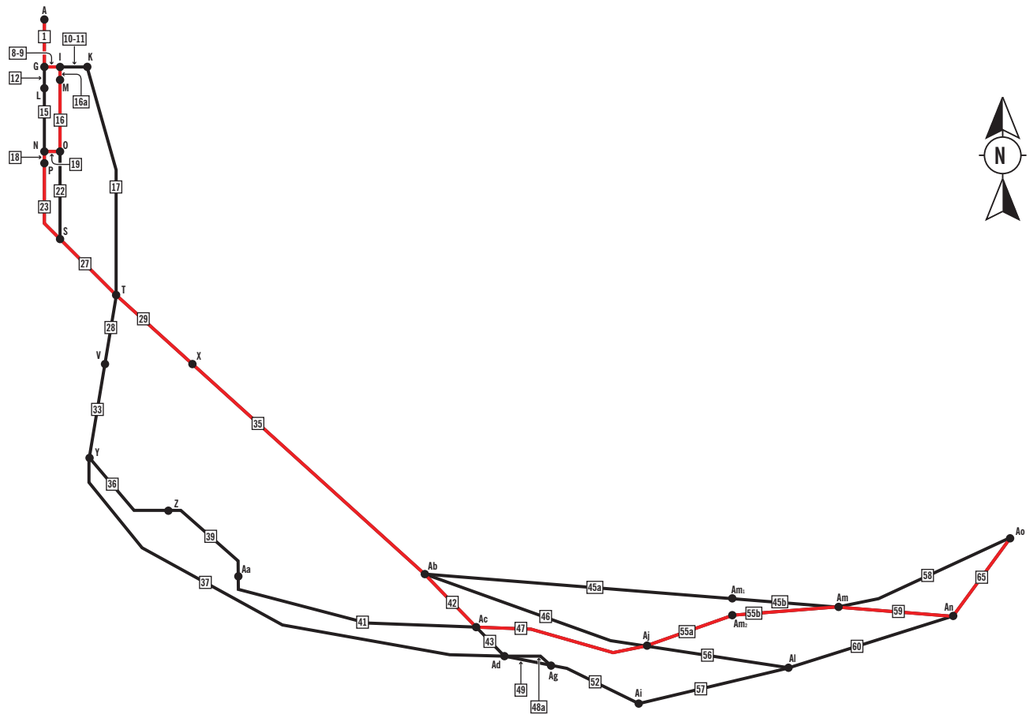
Route XXIII

Route String: 1-8-9-16a-16-19-18-23-27-29-35-42-47-55a-55b-58



Route XXIV

Route String: 1-8-9-16a-16-19-18-23-27-29-35-42-47-55a-55b-59-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
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Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
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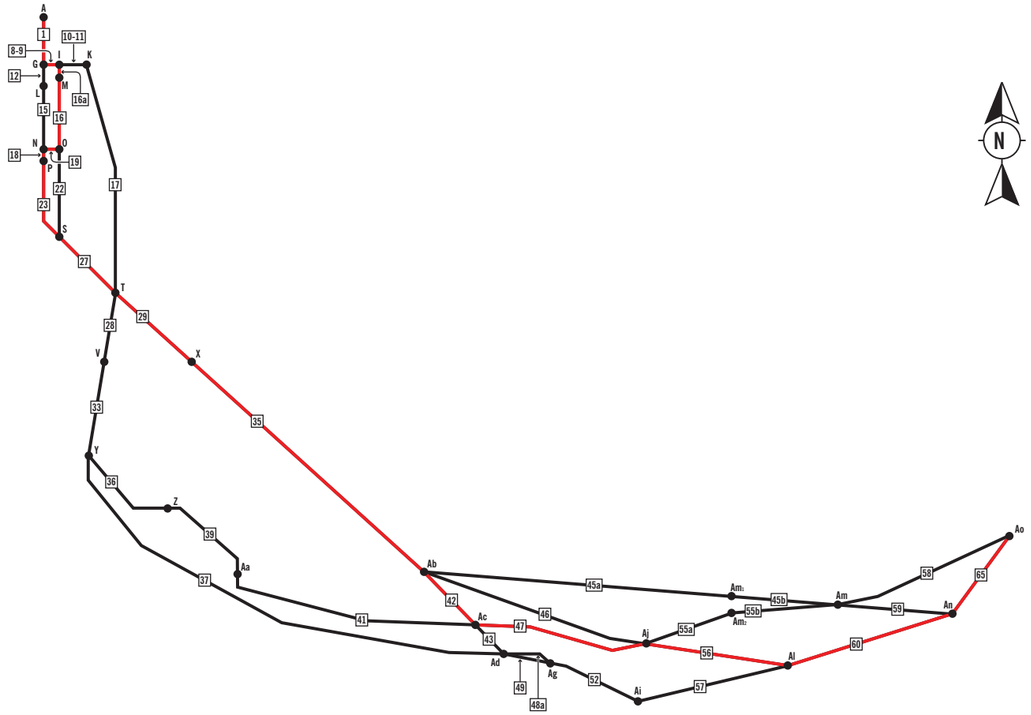
An - Porter, Ind.
Ao - Michigan City, Ind.

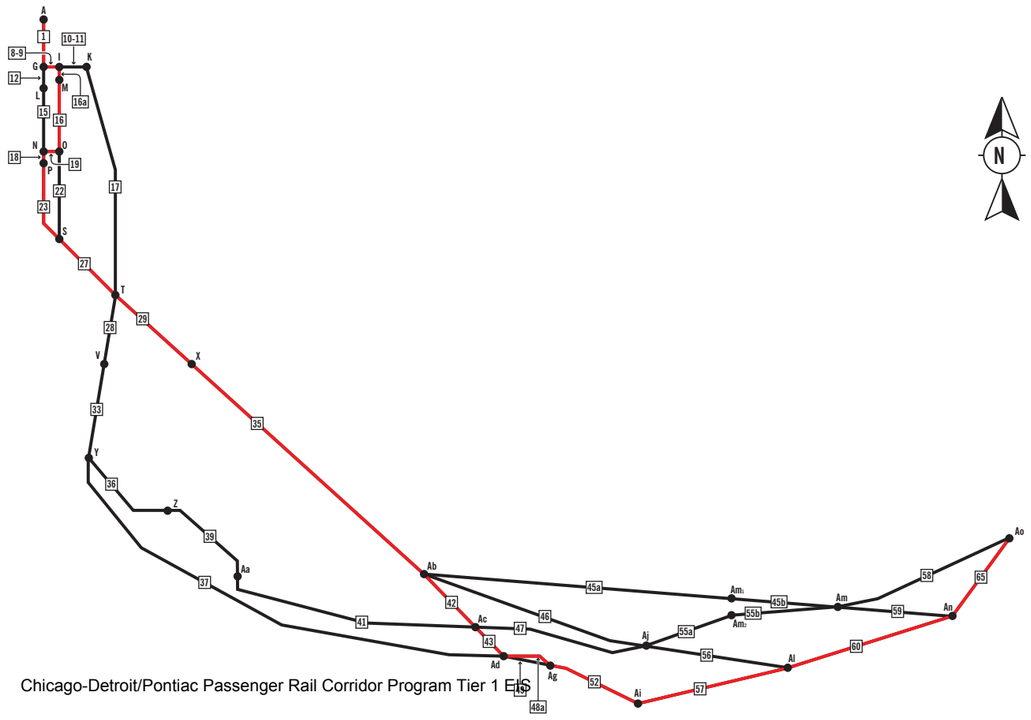
Route XXV

Route String: 1-8-9-16a-16-19-18-23-27-29-35-42-47-56-60-65



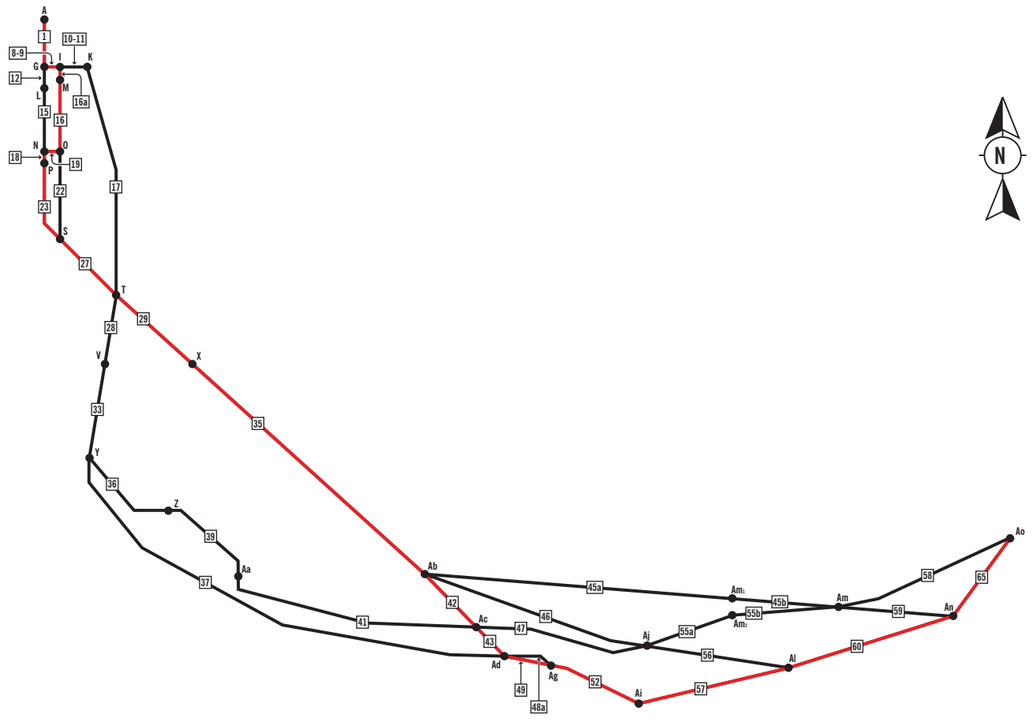
Route XXVI

Route String: 1-8-9-16a-16-19-18-23-27-29-35-42-43-48a-52-57-60-65



Route XXVII

Route String: 1-8-9-16a-16-19-18-23-27-29-35-42-43-49-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
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M - 21st Street Crossing
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Aj - Miller, Ind.
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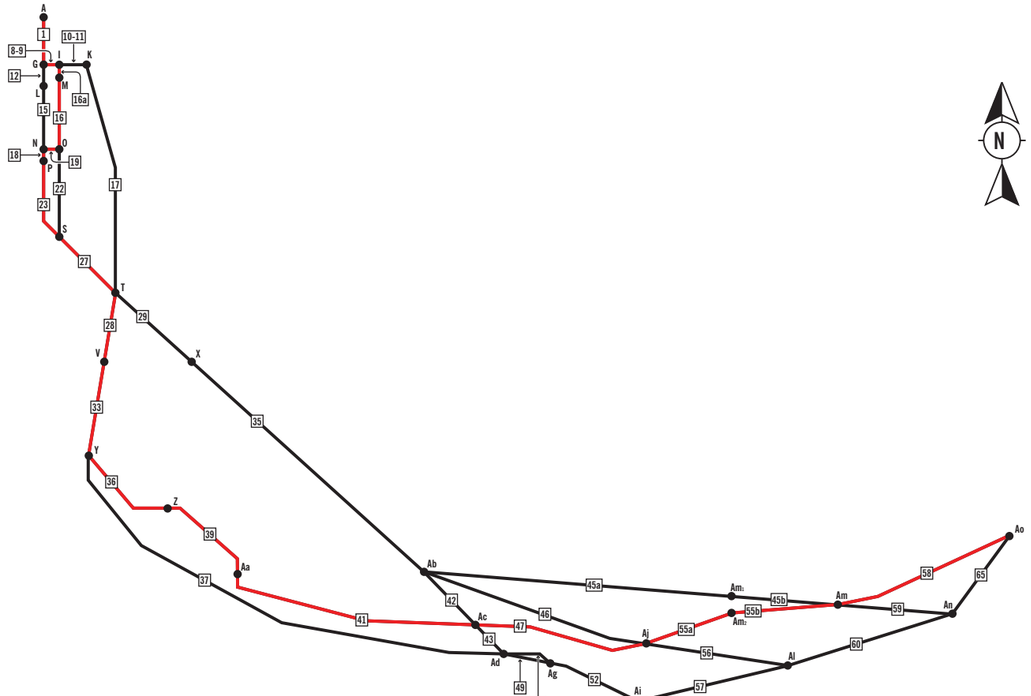
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

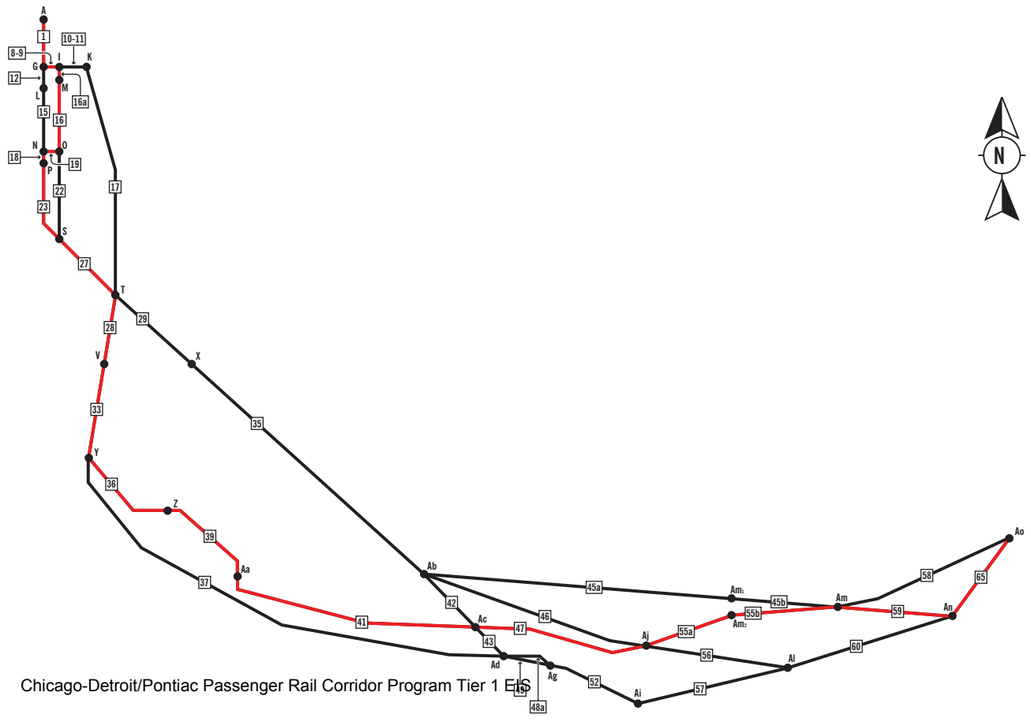
Route XXVIII

Route String: 1-8-9-16a-16-19-18-23-27-28-33-36-39-41-47-55a-55b-58



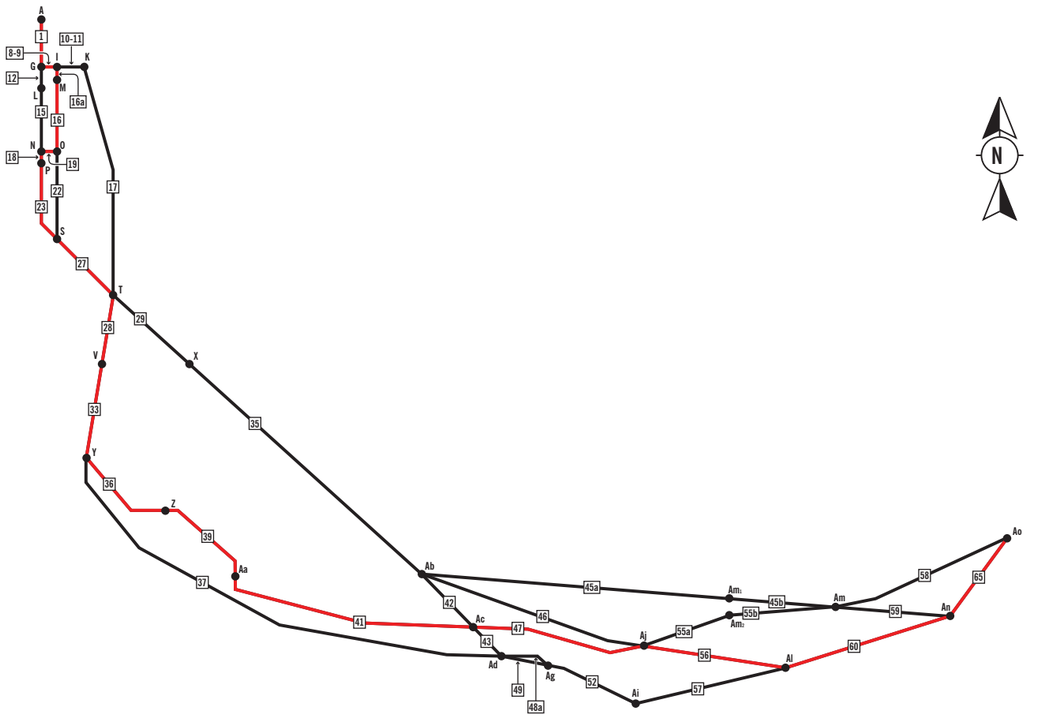
Route XXIX

Route String: 1-8-9-16a-16-19-18-23-27-28-33-36-39-41-47-55a-55b-59-65



Route XXX

Route String: 1-8-9-16a-16-19-18-23-27-28-33-36-39-41-47-56-60-65



South of the Lake Route Schematic
Level 1B Coarse Screening

LEGEND

Project Area Network
Passed Route
Failed Route
Subsection
Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
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Am2 - Indiana Dunes (NICTD)
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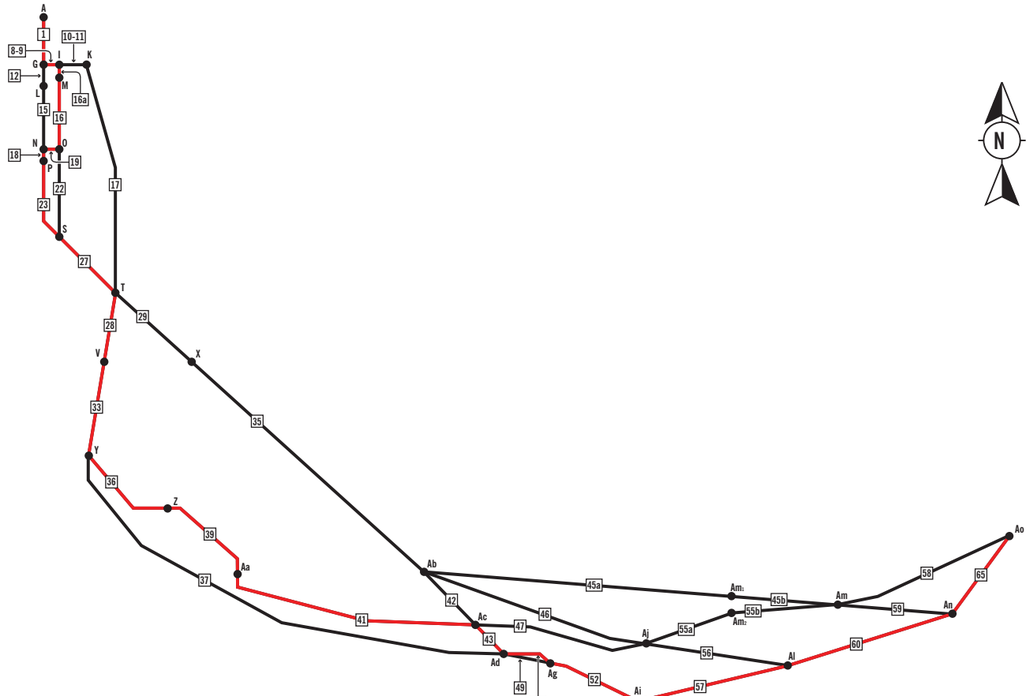
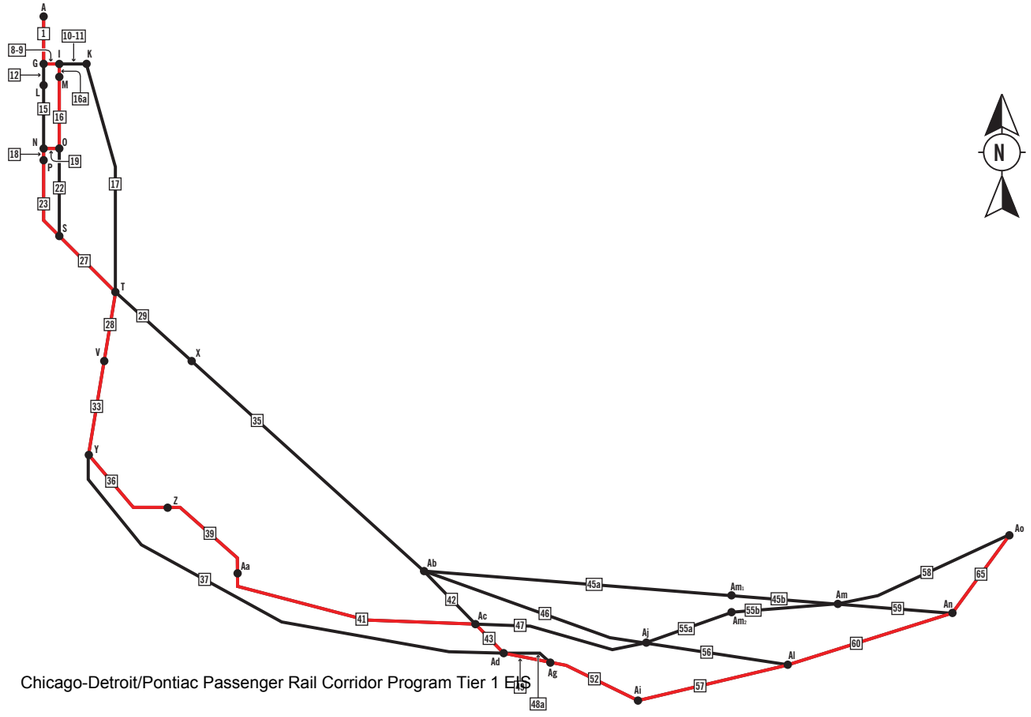
Ao - Michigan City, Ind.

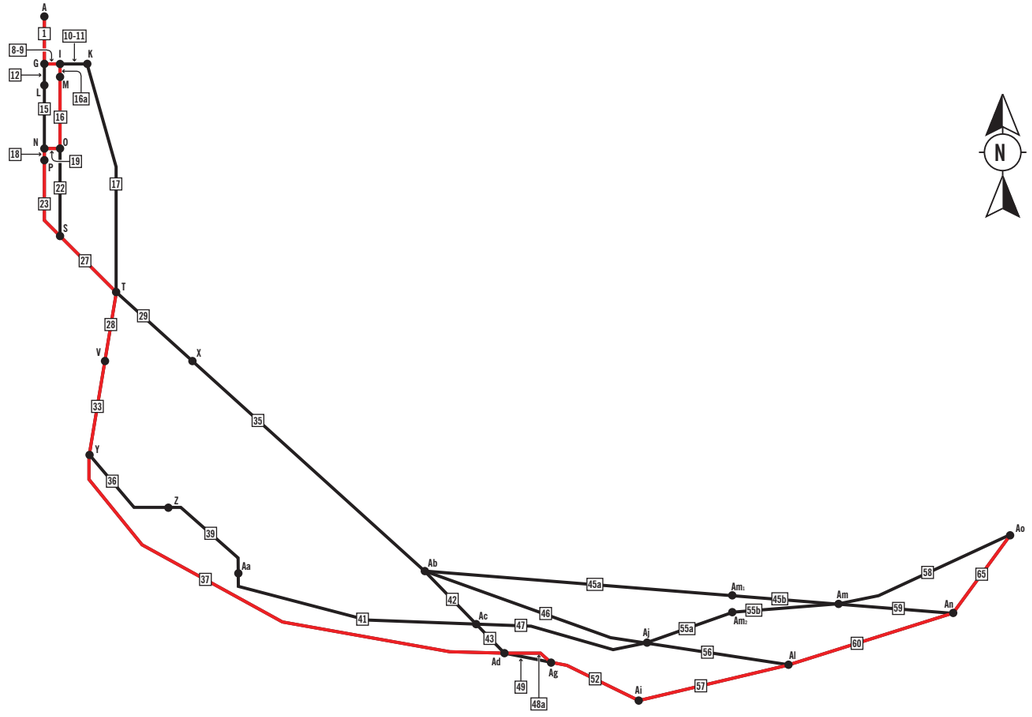
Route XXXI
Route String: 1-8-9-16a-16-19-18-23-27-28-33-36-39-41-43-48a-52-57-60-65



Route XXXII
Route String: 1-8-9-16a-16-19-18-23-27-28-33-36-39-41-43-49-52-57-60-65



Route XXXIII
Route String: 1-8-9-16a-16-19-18-23-27-28-33-37-48a-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

Subsection

Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
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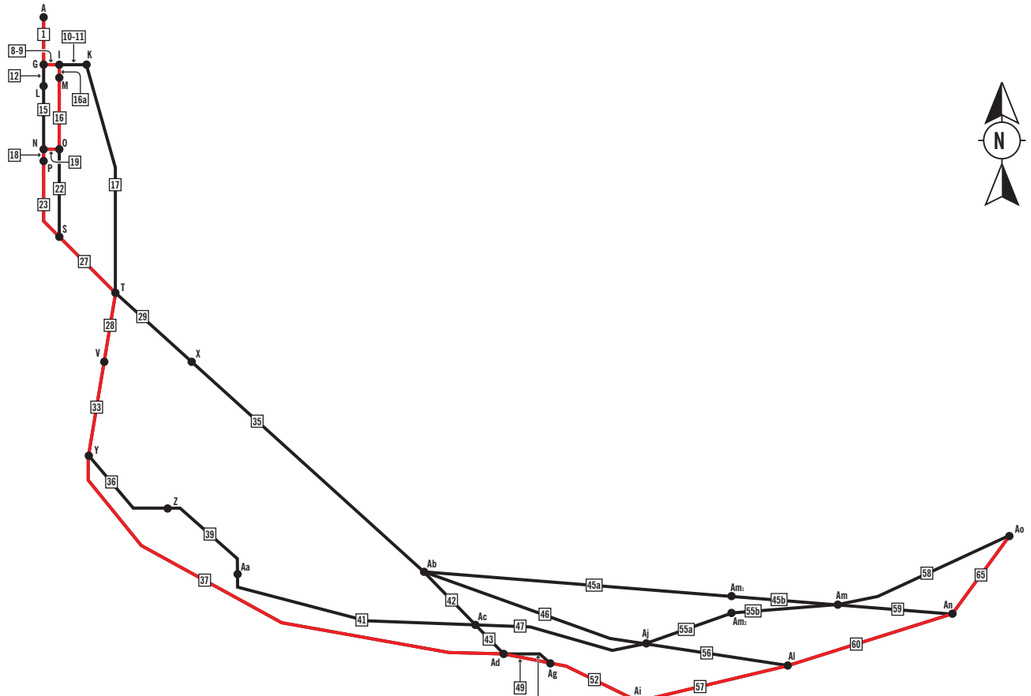
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

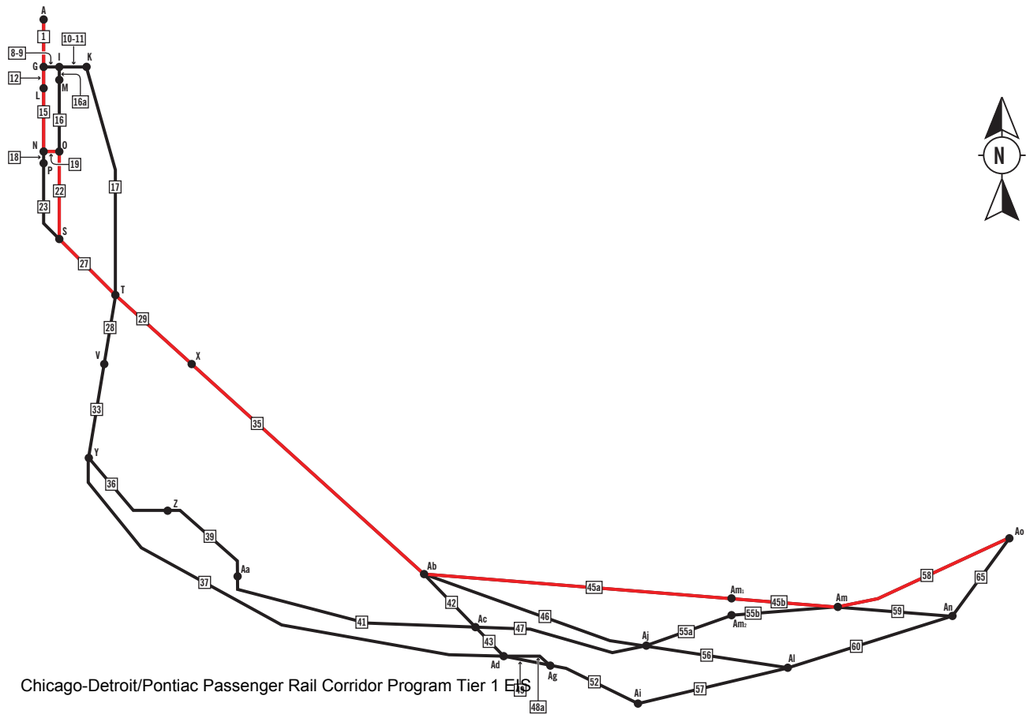
Route XXXIV

Route String: 1-8-9-16a-16-19-18-23-27-28-33-37-49-52-57-60-65



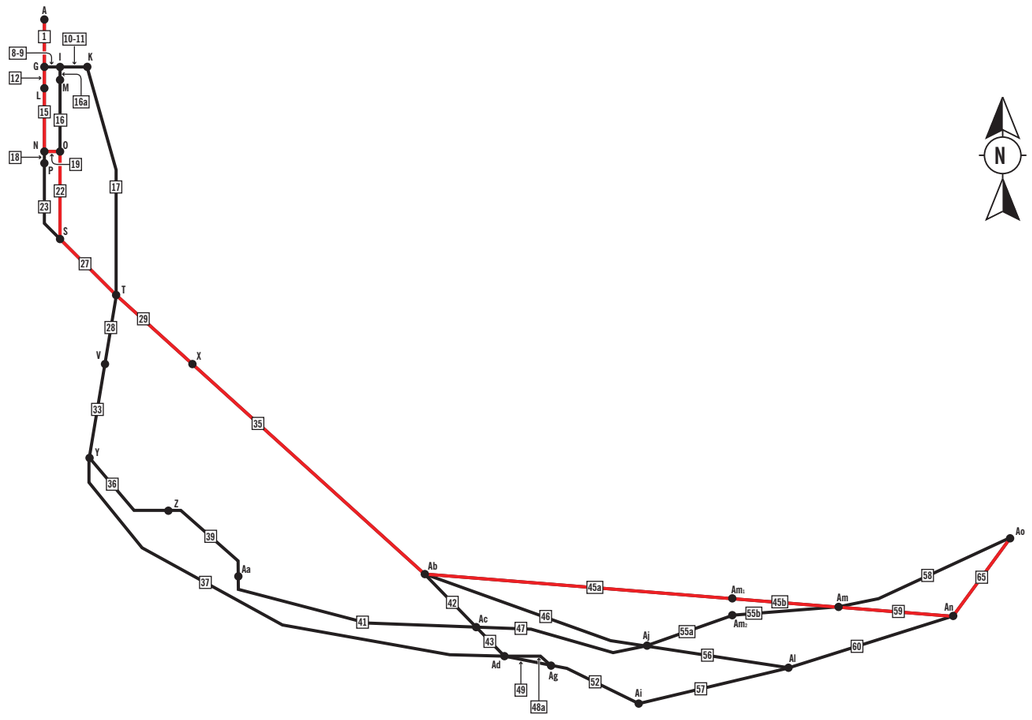
Route XXXV

Route String: 1-12-15-19-22-27-29-35-45a-45b-58



Route XXXVI

Route String: 1-12-15-19-22-27-29-35-45a-45b-59-65

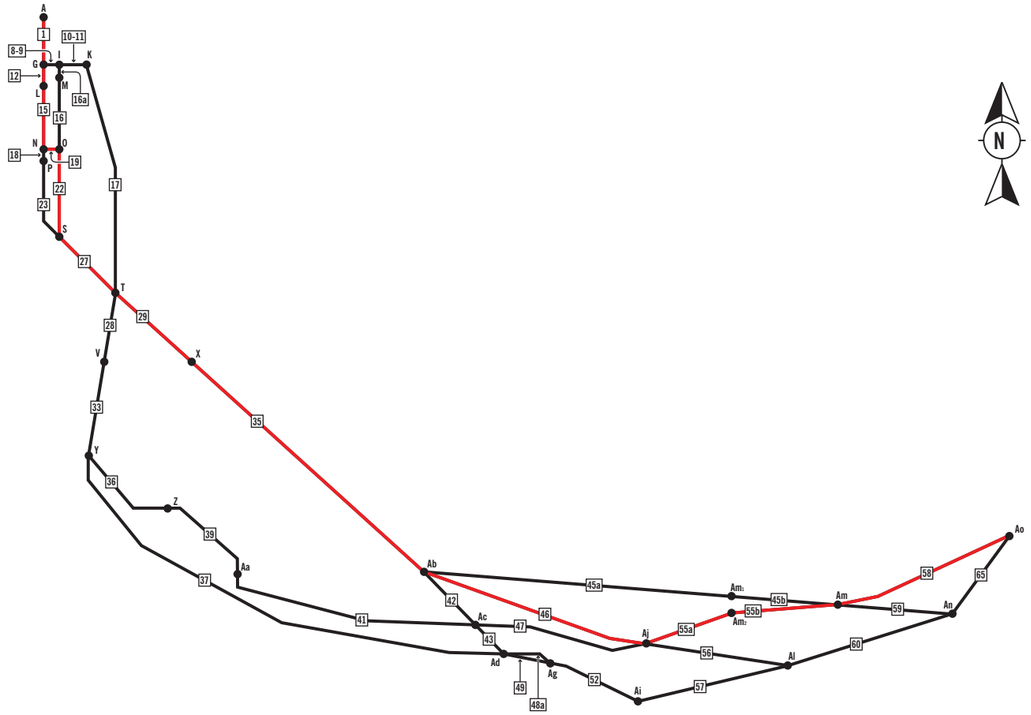


South of the Lake Route Schematic

Level 1B Coarse Screening

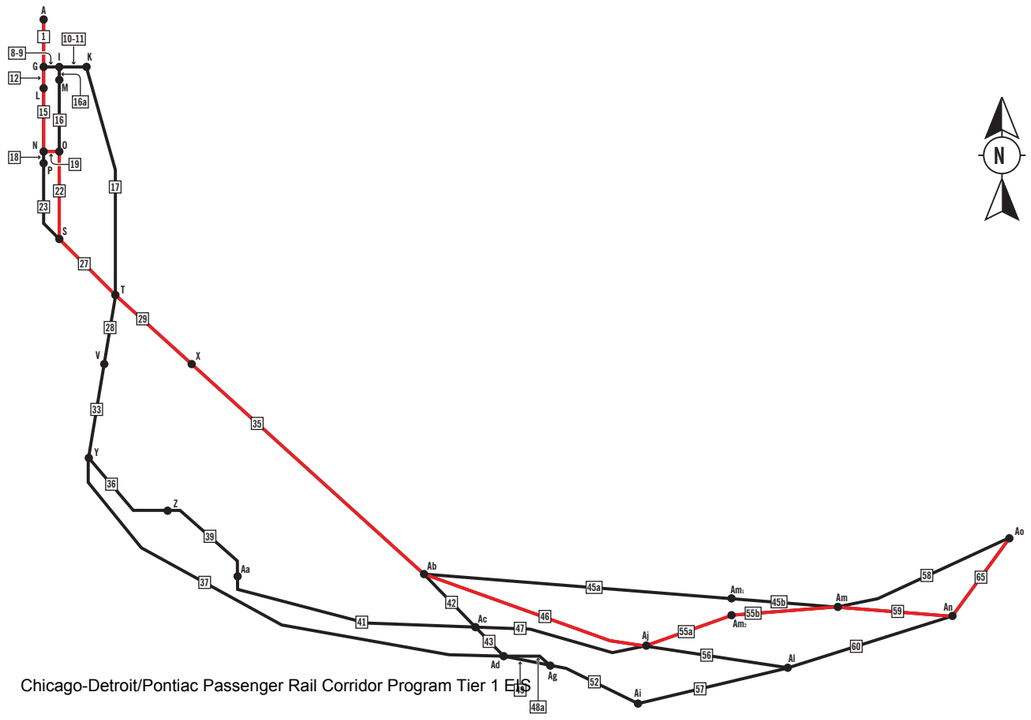
Route XXXVII

Route String: 1-12-15-19-22-27-29-35-46-55a-55b-58



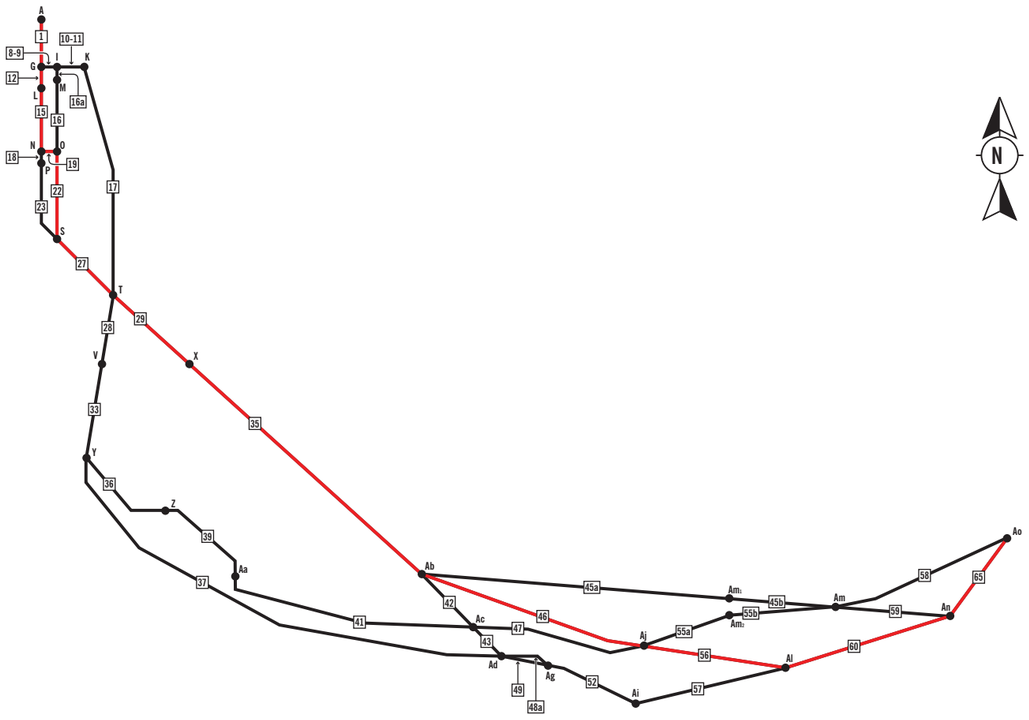
Route XXXVIII

Route String: 1-12-15-19-22-27-29-35-46-55a-55b-59-65



Route XXXIX

Route String: 1-12-15-19-22-27-29-35-46-56-60-65



LEGEND

- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

NODES

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Aj - Miller, Ind.
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Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

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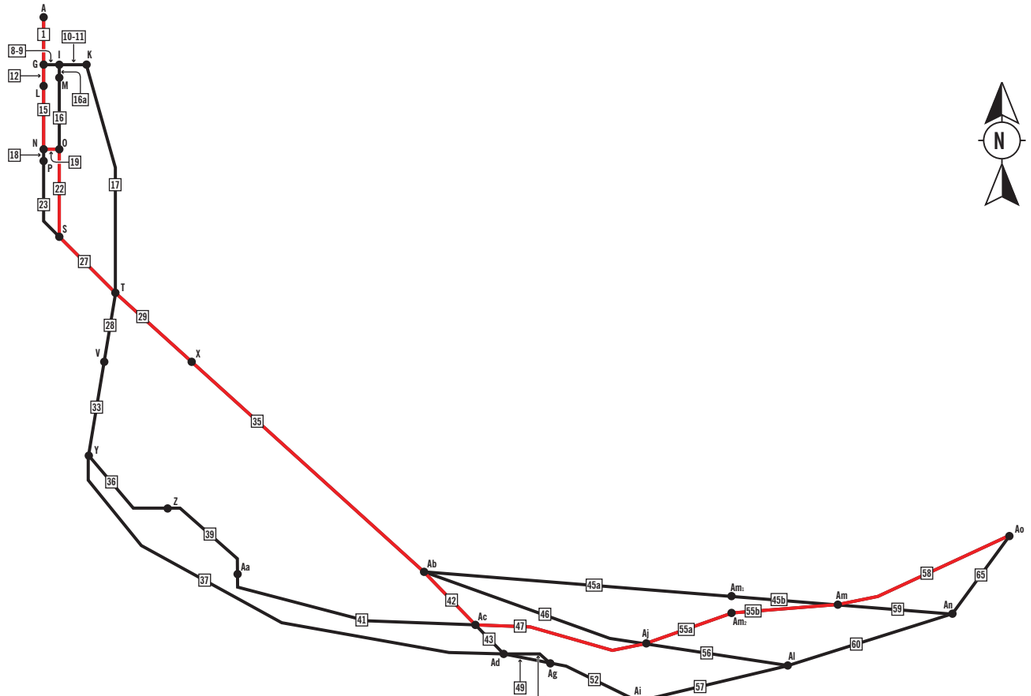
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

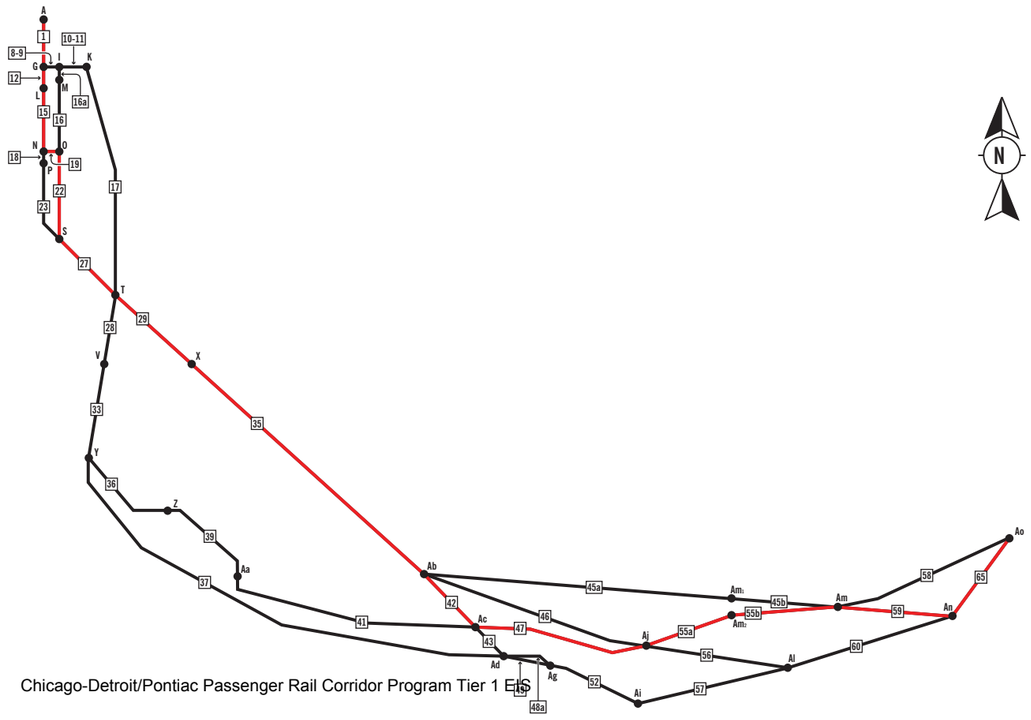
Route XL

Route String: 1-12-15-19-22-27-29-35-42-47-55a-55b-58



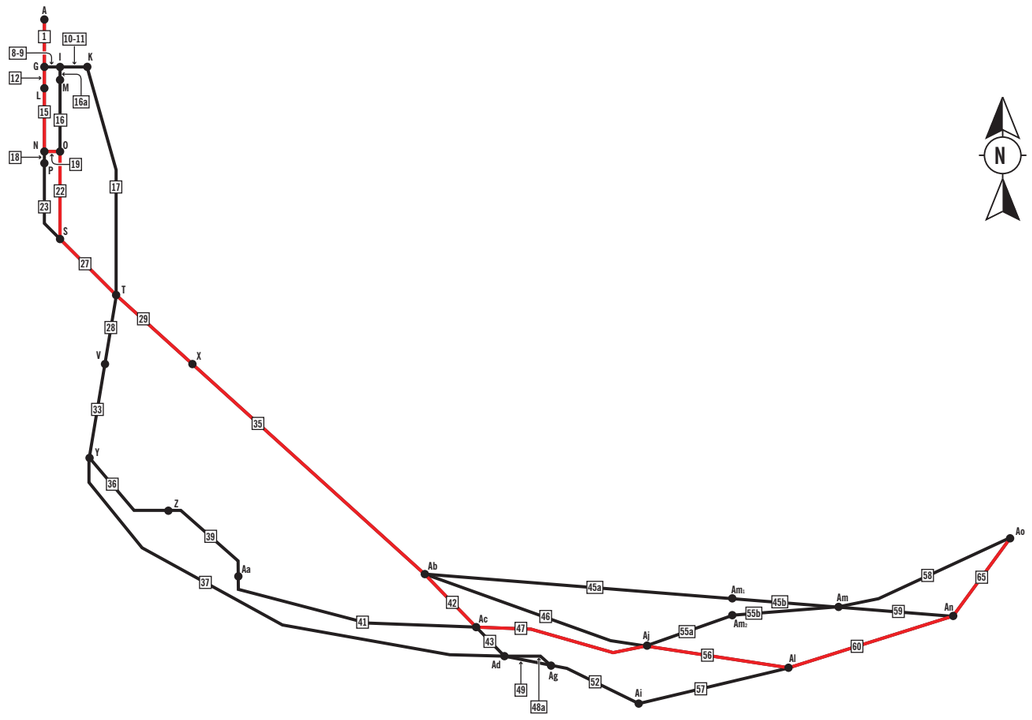
Route XLI

Route String: 1-12-15-19-22-27-29-35-42-47-55a-55b-59-65



Route XLII

Route String: 1-12-15-19-22-27-29-35-42-47-56-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
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L - 23rd Street Crossing
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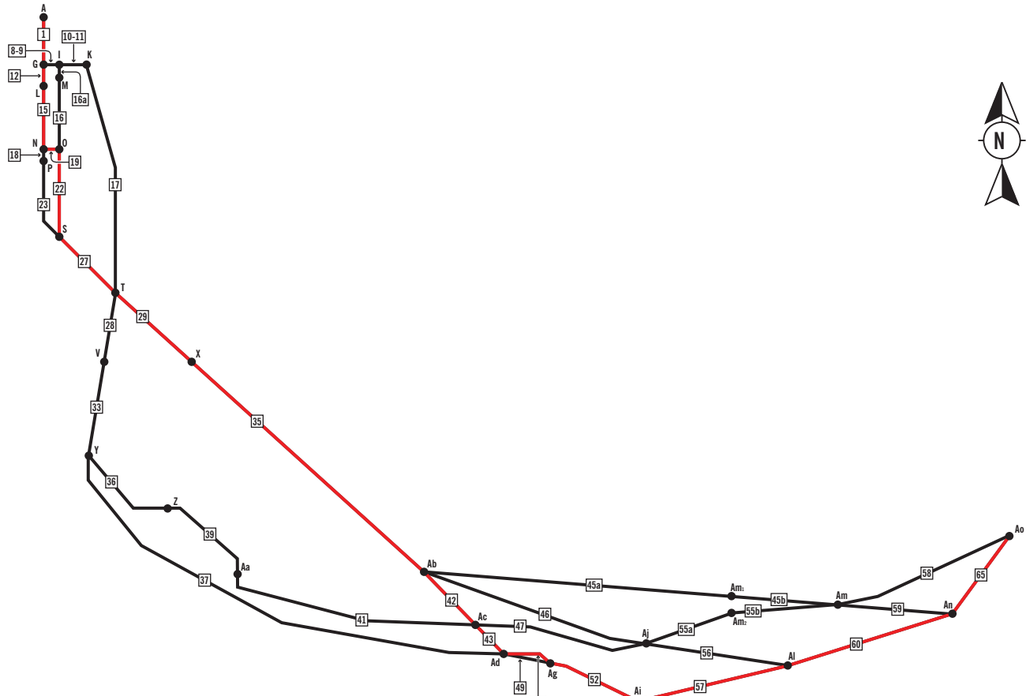
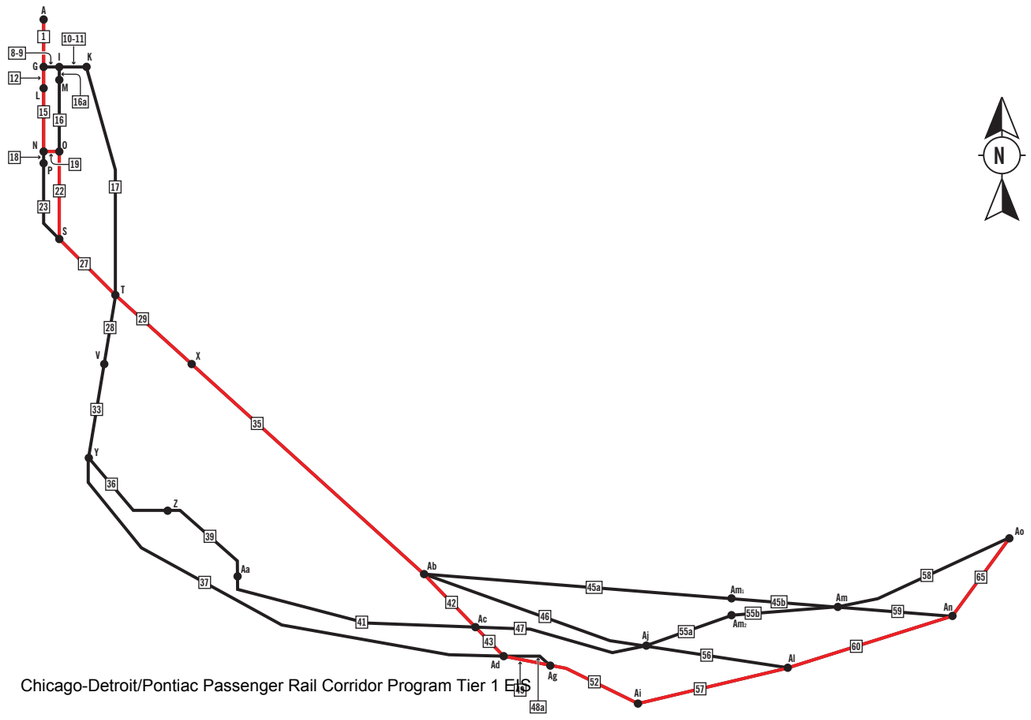
Route XLIII

Route String: 1-12-15-19-22-27-29-35-42-43-48a-52-57-60-65



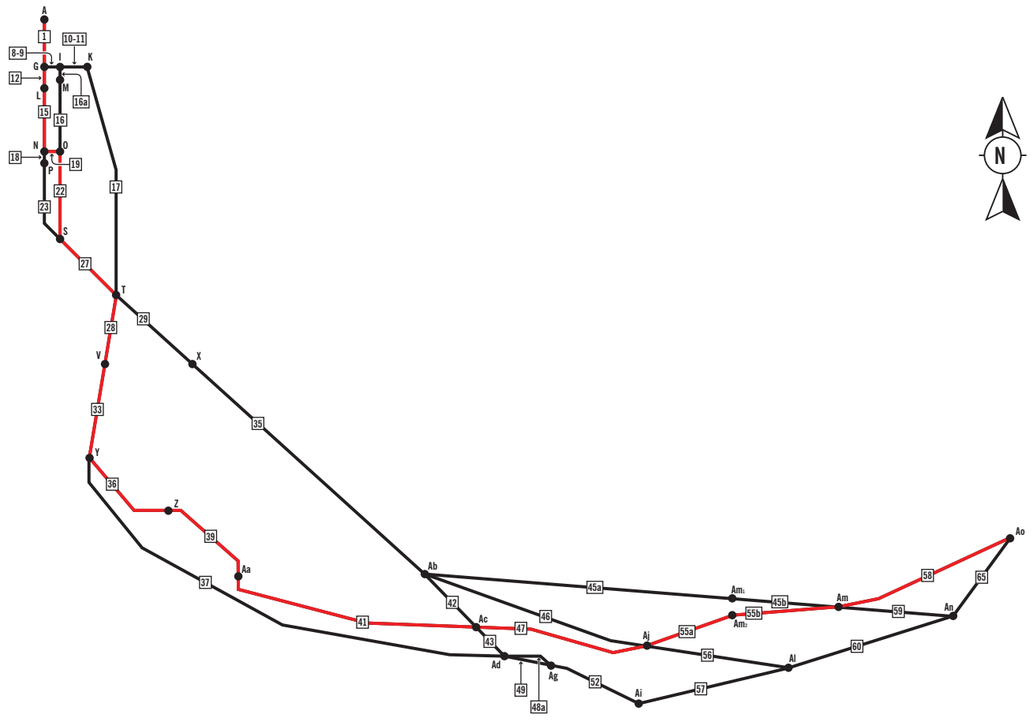
Route XLIV

Route String: 1-12-15-19-22-27-29-35-42-43-49-52-57-60-65



Route XLV

Route String: 1-12-15-19-22-27-28-33-36-39-41-47-55a-55b-58



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

Subsection

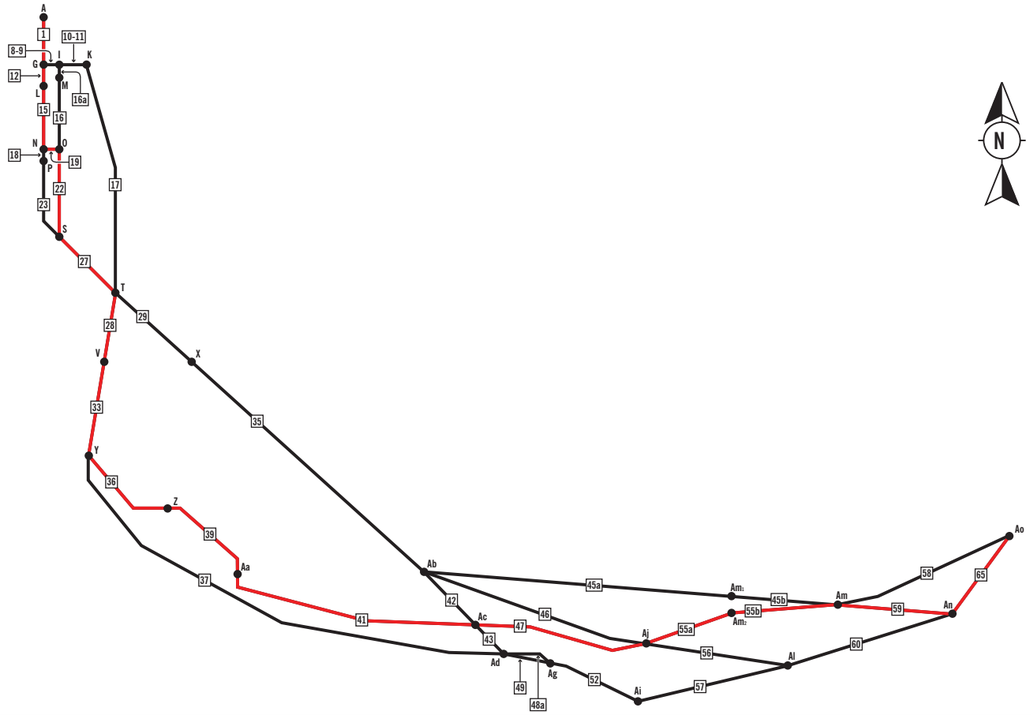
Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

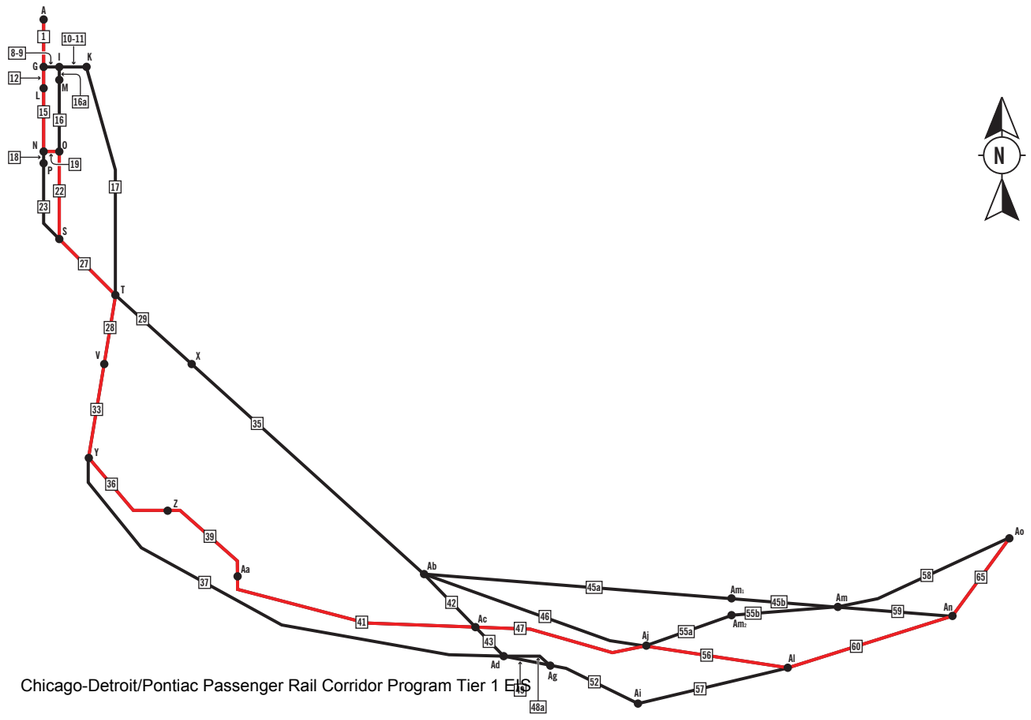
Route XLVI

Route String: 1-12-15-19-22-27-28-33-36-39-41-47-55a-55b-59-65



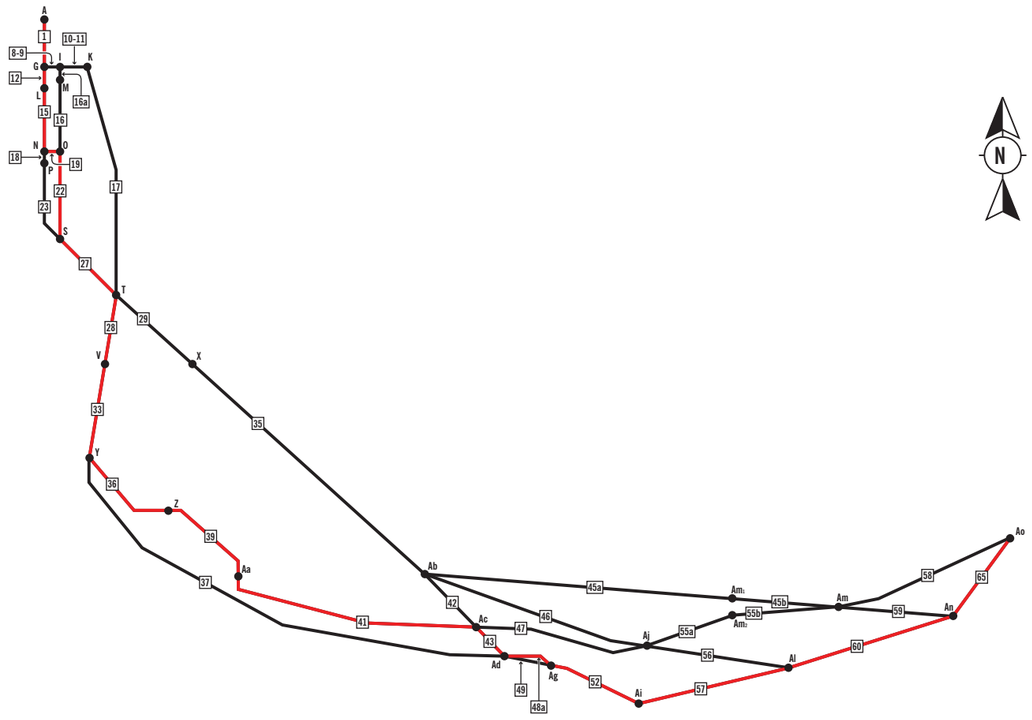
Route XLVII

Route String: 1-12-15-19-22-27-28-33-36-39-41-47-56-60-65



Route XLVIII

Route String: 1-12-15-19-22-27-28-33-36-39-41-43-48a-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

Subsection

Node

NODES

A - Chicago Union Station
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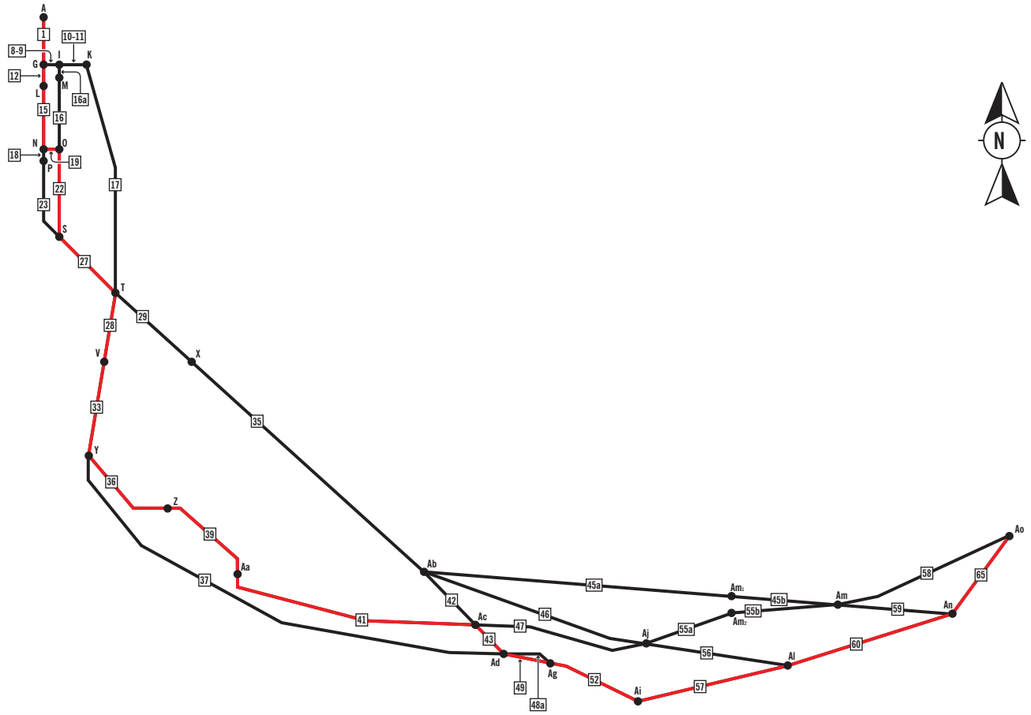
An - Porter, Ind.
Ao - Michigan City, Ind.

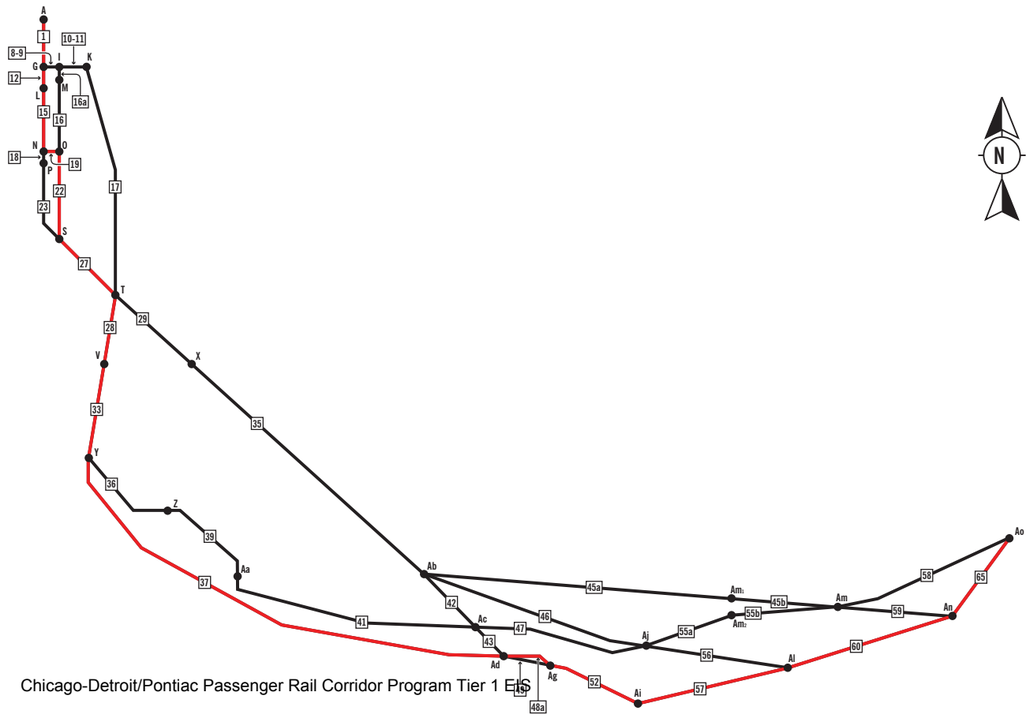
Route XLIX

Route String: 1-12-15-19-22-27-28-33-36-39-41-43-49-52-57-60-65



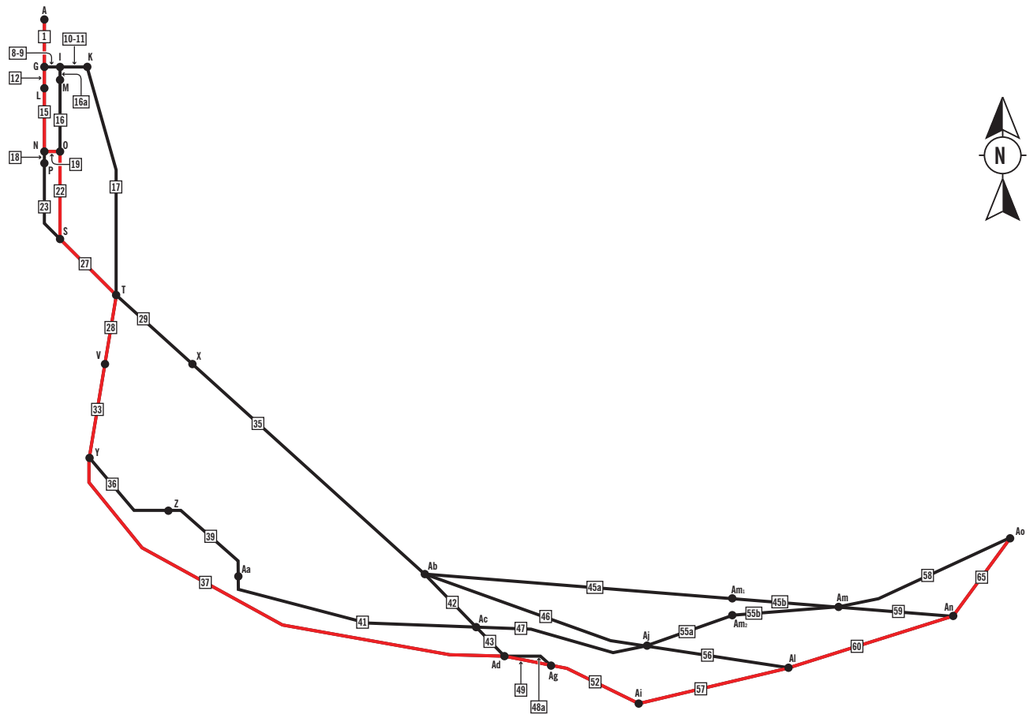
Route L

Route String: 1-12-15-19-22-27-28-33-37-48a-52-57-60-65



Route LI

Route String: 1-12-15-19-22-27-28-33-37-49-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

Subsection

Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
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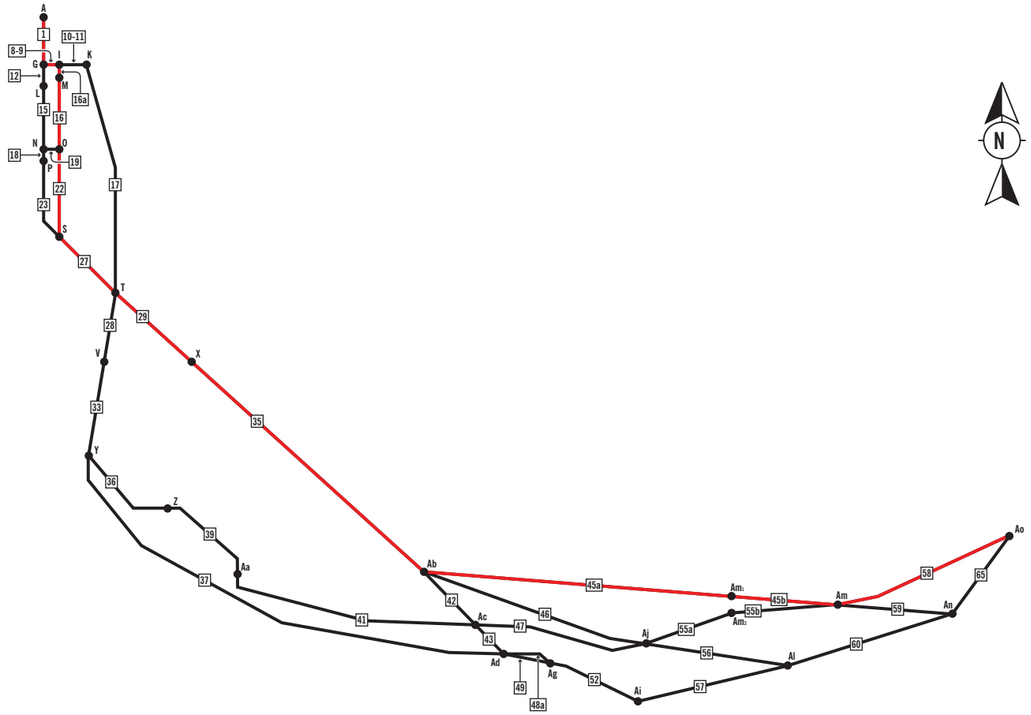
An - Porter, Ind.
Ao - Michigan City, Ind.

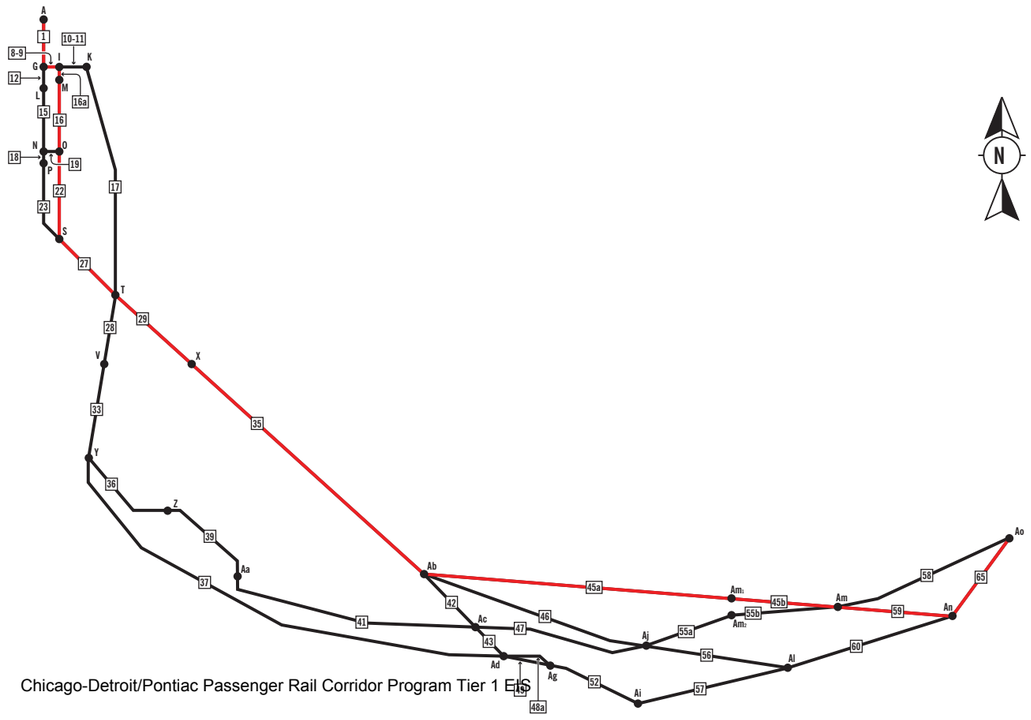
Route LII

Route String: 1-8-9-16a-16-22-27-29-35-45a-45b-58



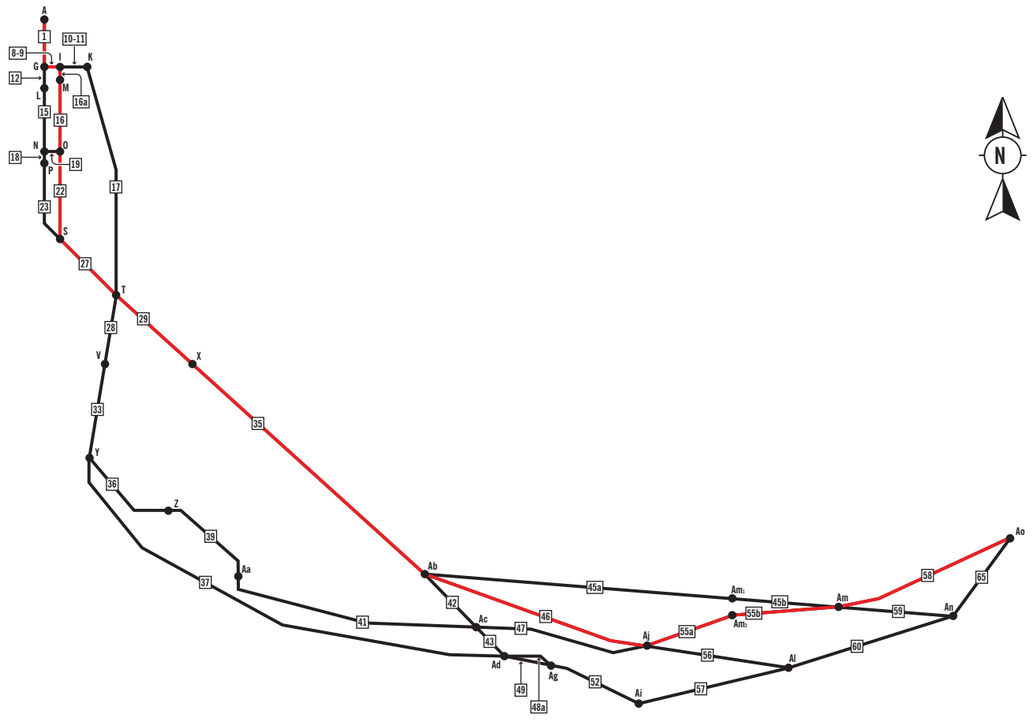
Route LIII

Route String: 1-8-9-16a-16-22-27-29-35-45a-45b-59-65



Route LIV

Route String: 1-8-9-16a-16-22-27-29-35-46-55a-55b-58



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
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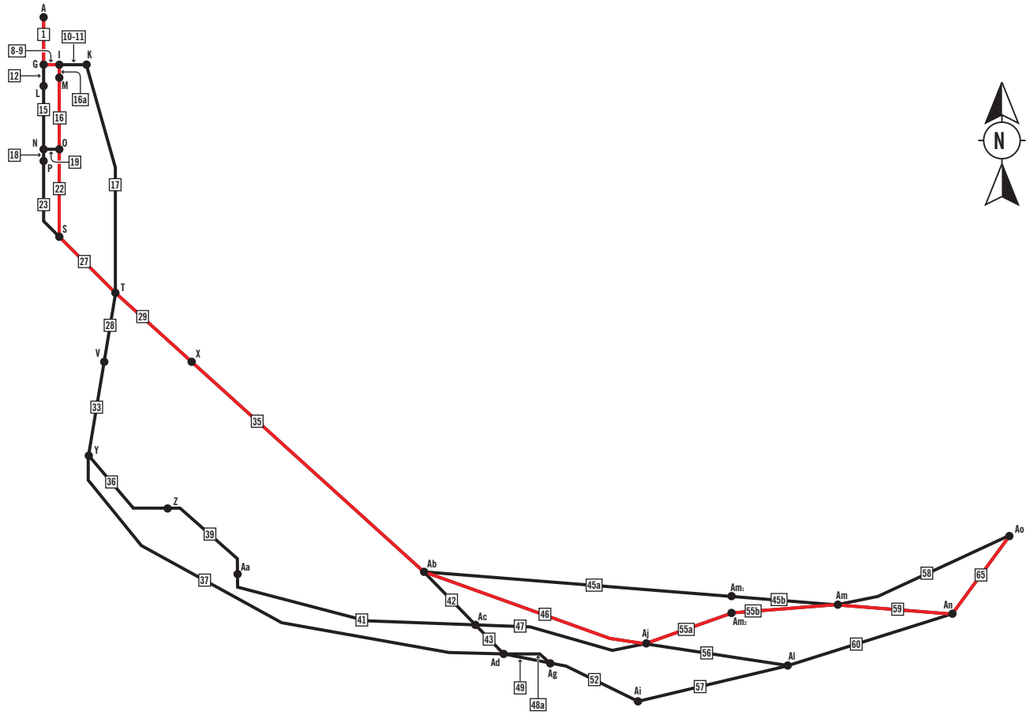
An - Porter, Ind.
Ao - Michigan City, Ind.

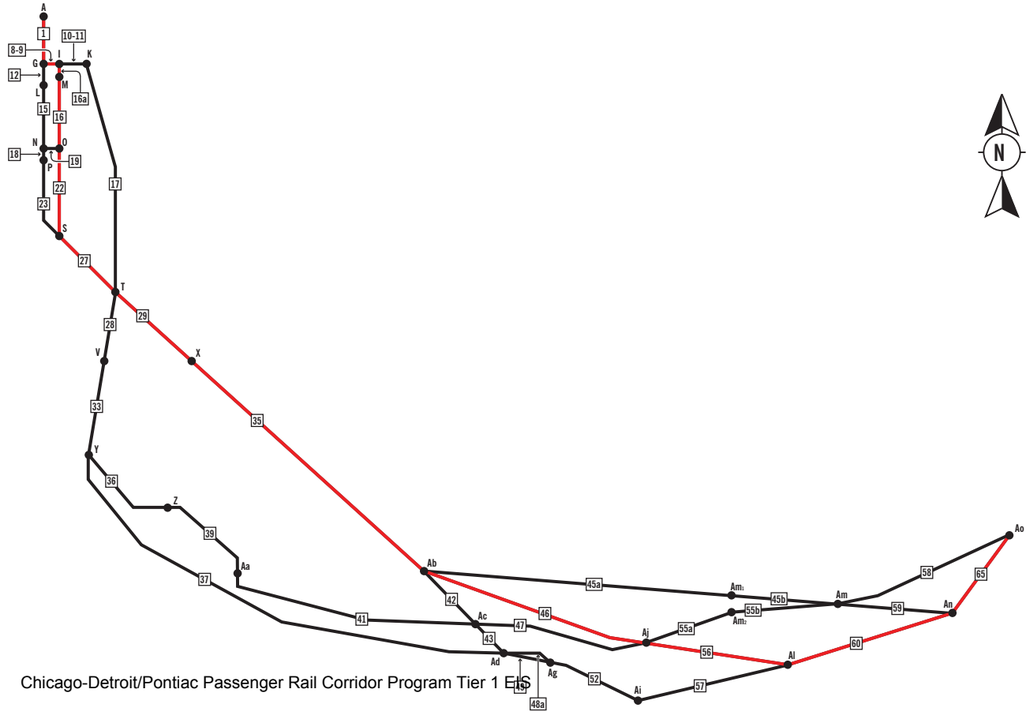
Route LV

Route String: 1-8-9-16a-16-22-27-29-35-46-55a-55b-59-65



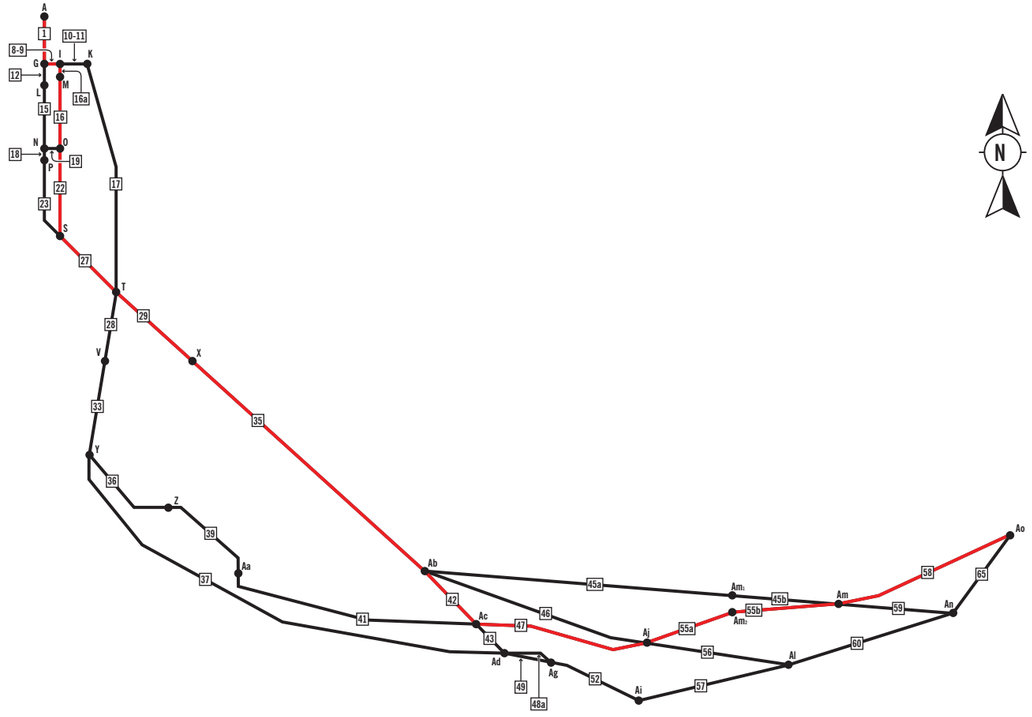
Route LVI

Route String: 1-8-9-16a-16-22-27-29-35-46-56-60-65



Route LVII

Route String: 1-8-9-16a-16-22-27-29-35-42-47-55a-55b-58



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
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Aj - Miller, Ind.
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Am - Burns Harbor, Ind.
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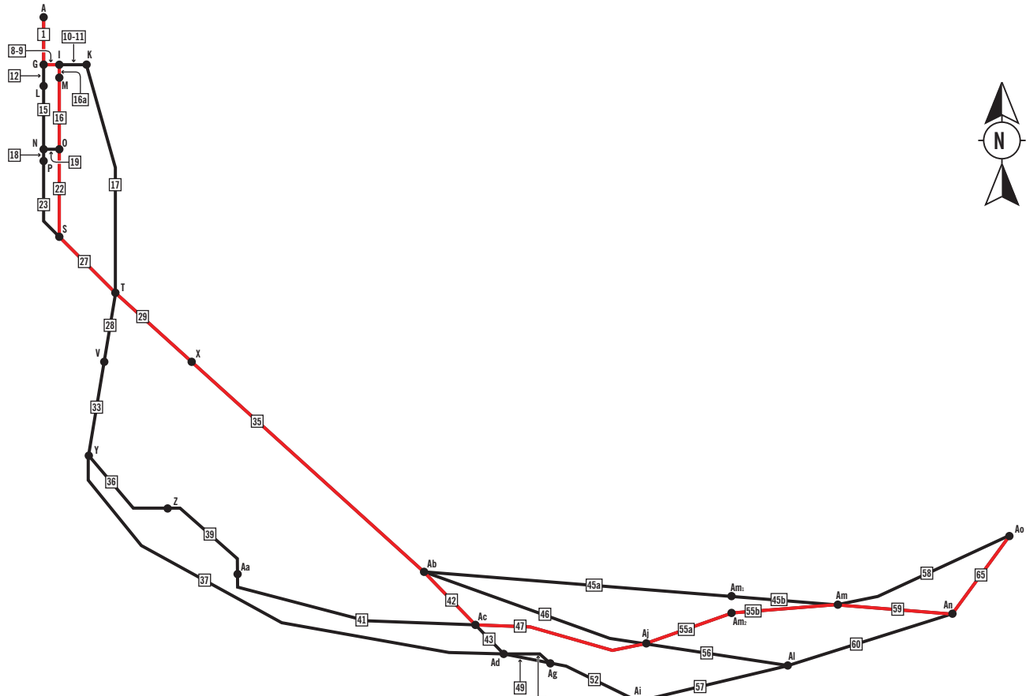
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

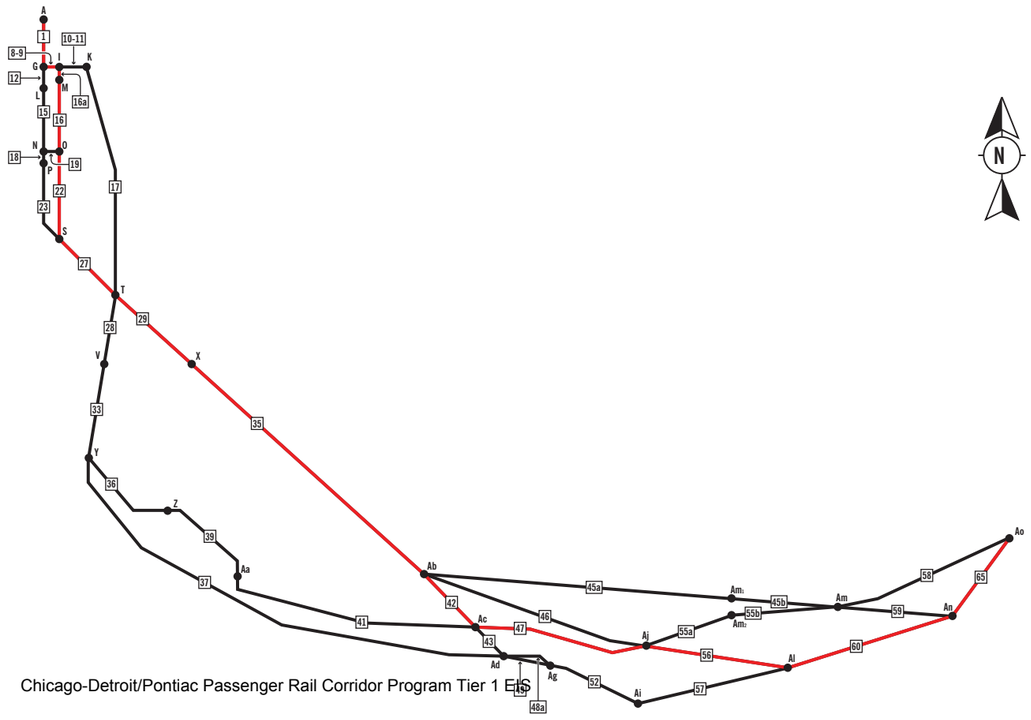
Route LVIII

Route String: 1-8-9-16a-16-22-27-29-35-42-47-55a-55b-59-65



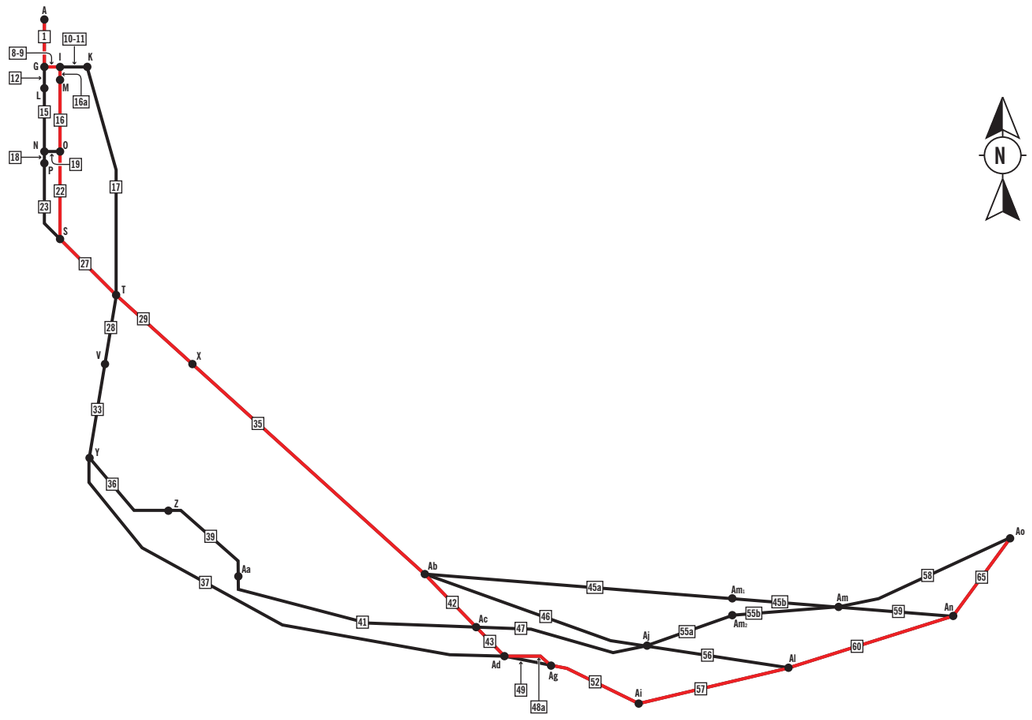
Route LIX

Route String: 1-8-9-16a-16-22-27-29-35-42-47-56-60-65



Route LX

Route String: 1-8-9-16a-16-22-27-29-35-42-43-48a-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
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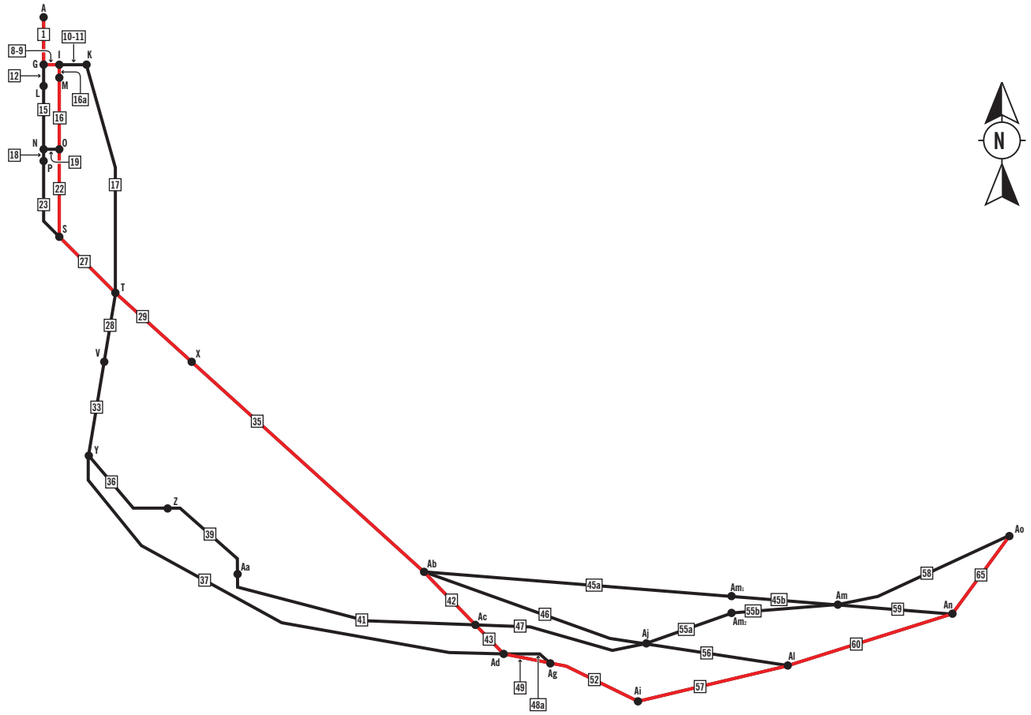
Ao - Michigan City, Ind.

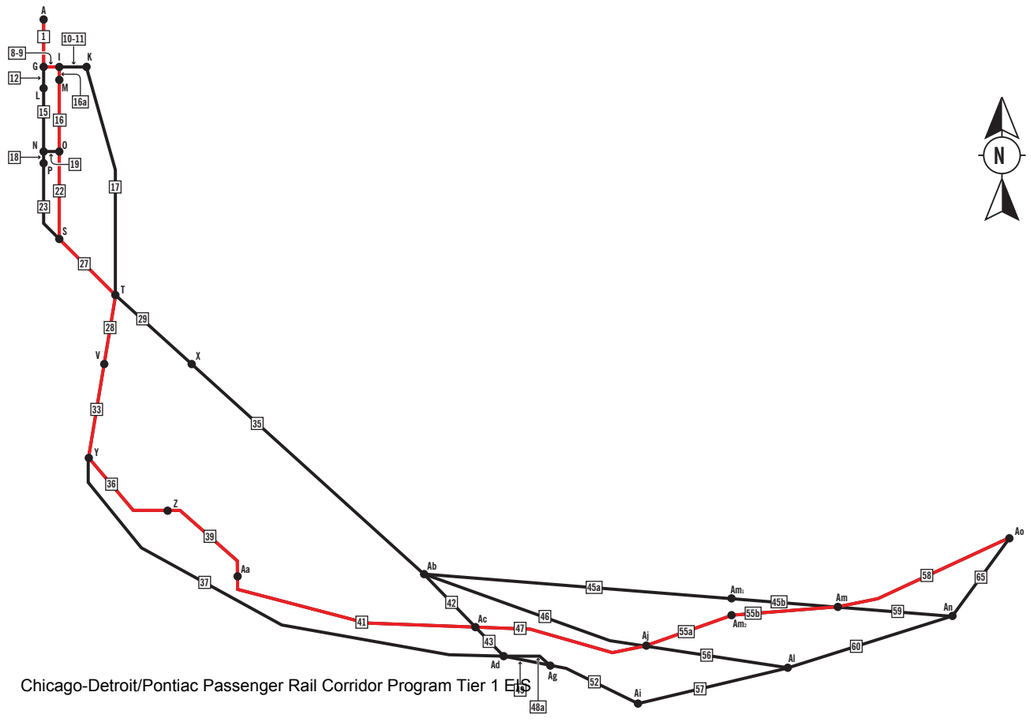
Route LXI

Route String: 1-8-9-16a-16-22-27-29-35-42-43-49-52-57-60-65



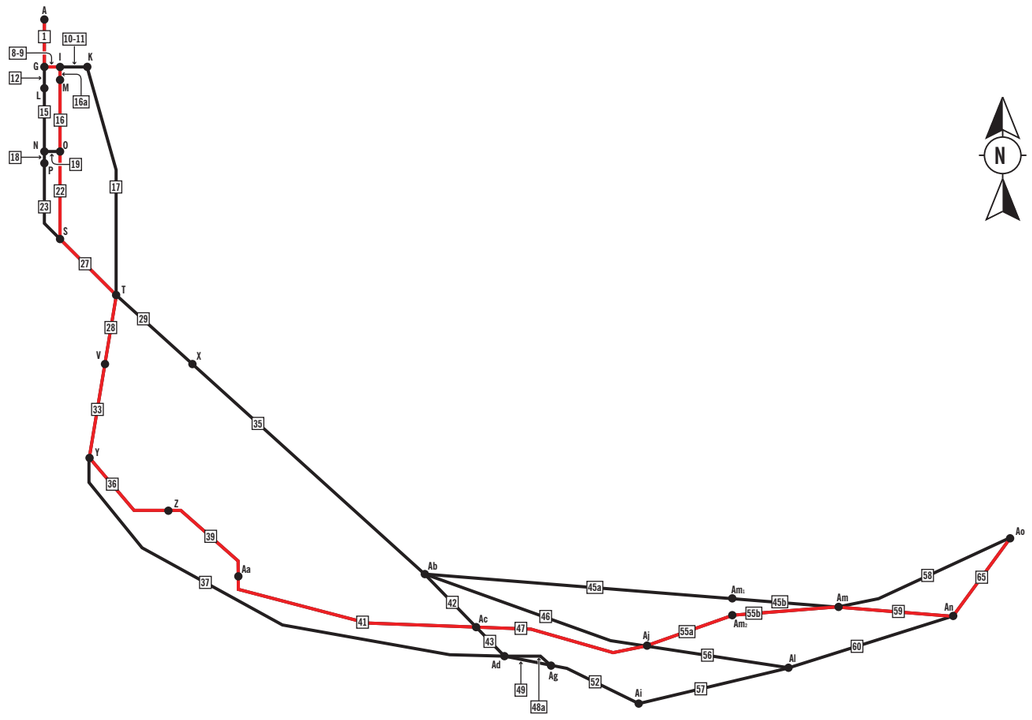
Route LXII

Route String: 1-8-9-16a-16-22-27-28-33-36-39-41-47-55a-55b-58



Route LXIII

Route String: 1-8-9-16a-16-22-27-28-33-36-39-41-47-55a-55b-59-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

Subsection

Node

NODES

A - Chicago Union Station
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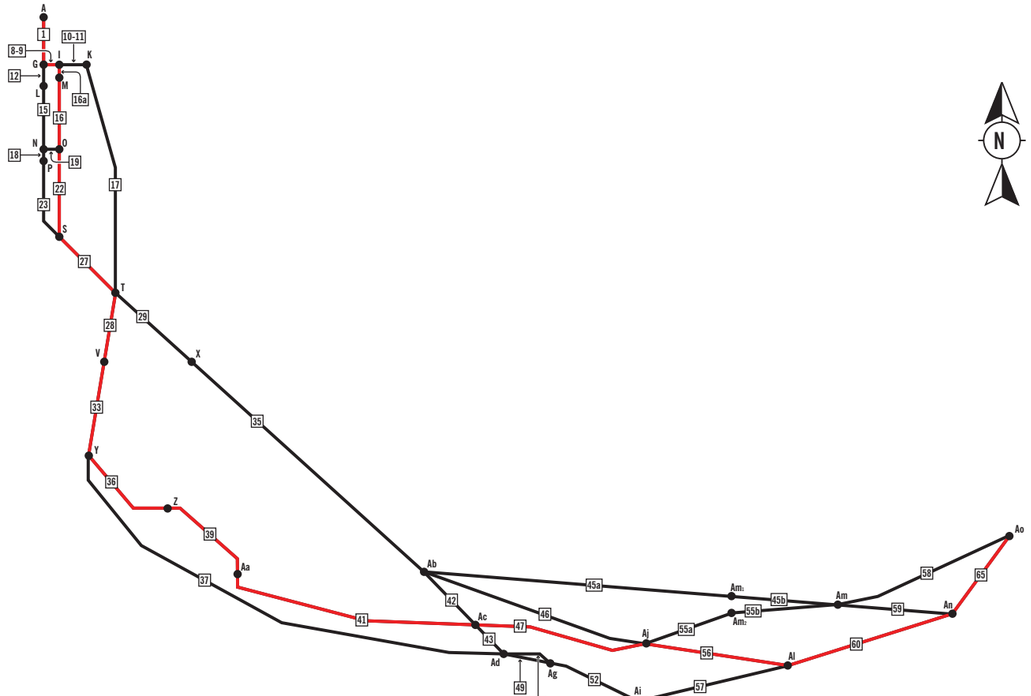
Ao - Michigan City, Ind.

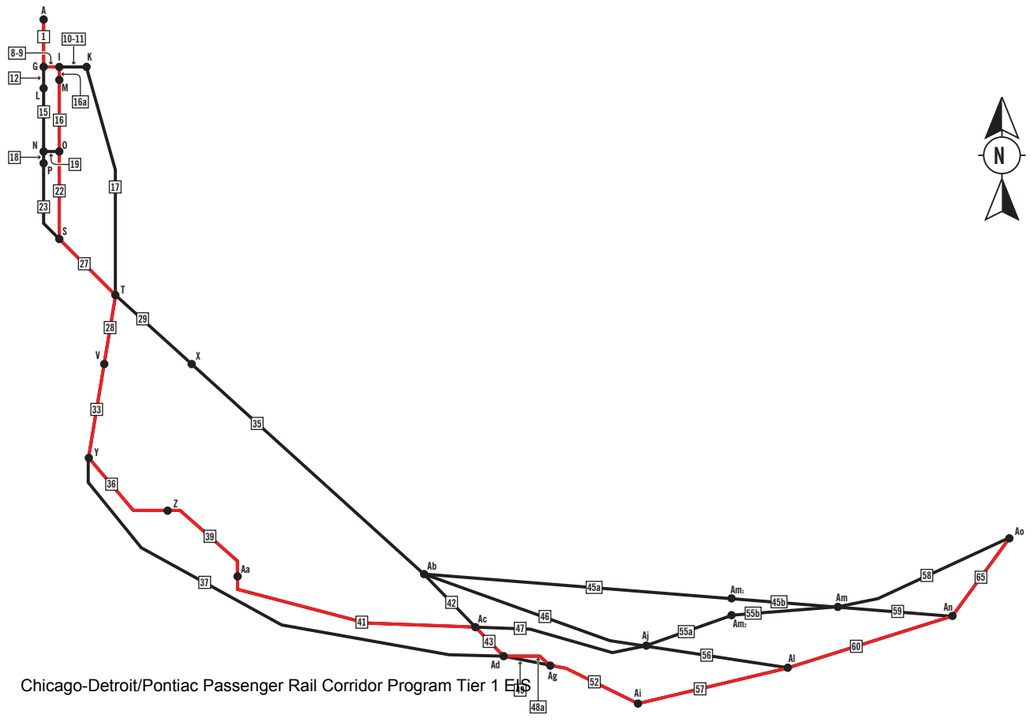
Route LXIV

Route String: 1-8-9-16a-16-22-27-28-33-36-39-41-47-56-60-65



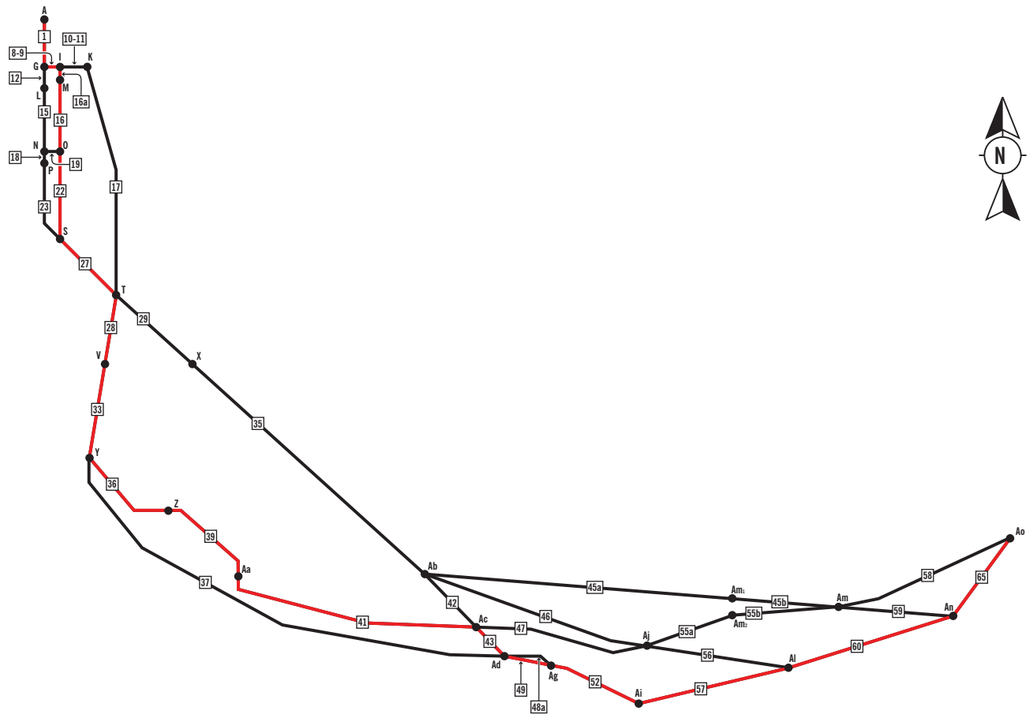
Route LXV

Route String: 1-8-9-16a-16-22-27-28-33-36-39-41-43-48a-52-57-60-65



Route LXVI

Route String: 1-8-9-16a-16-22-27-28-33-36-39-41-43-49-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
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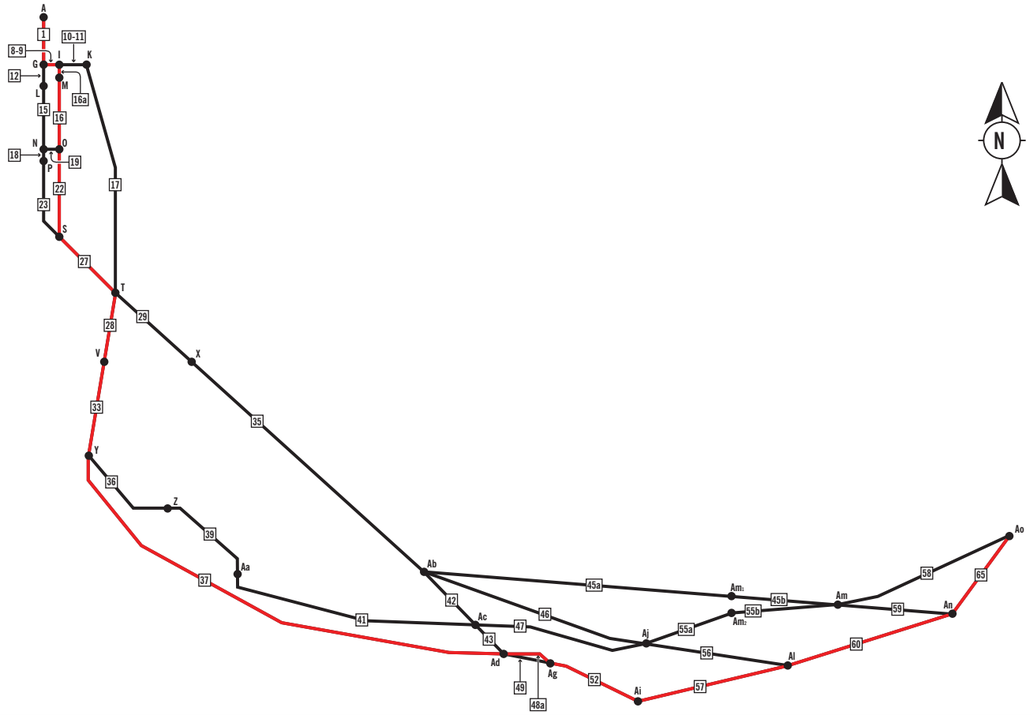
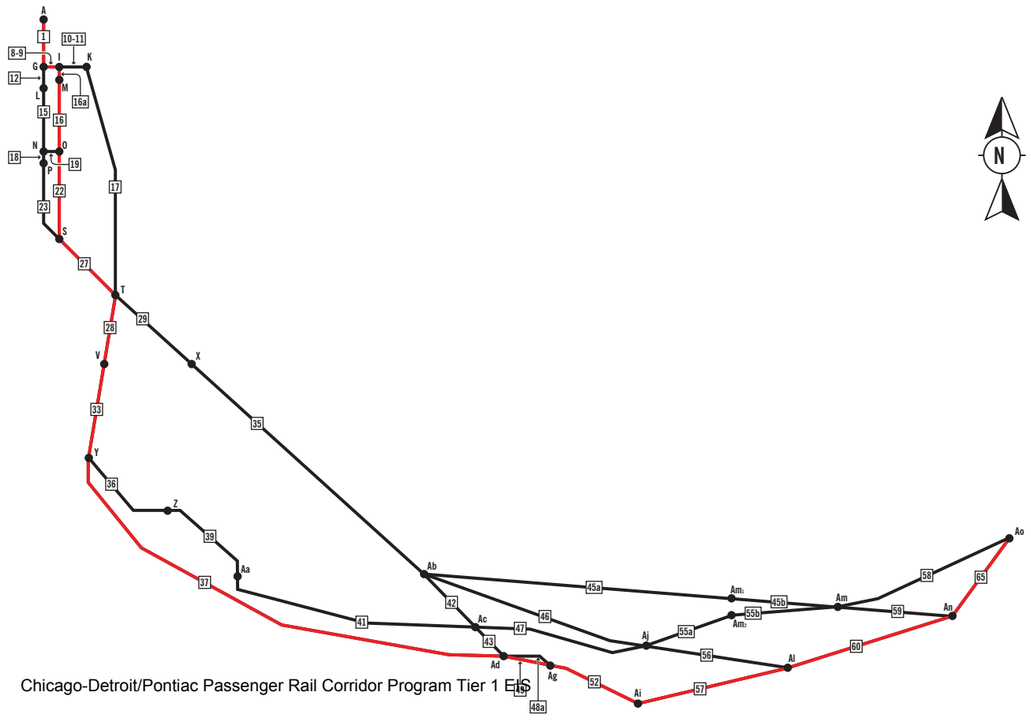
Route LXVII

Route String: 1-8-9-16a-16-22-27-28-33-37-48a-52-57-60-65



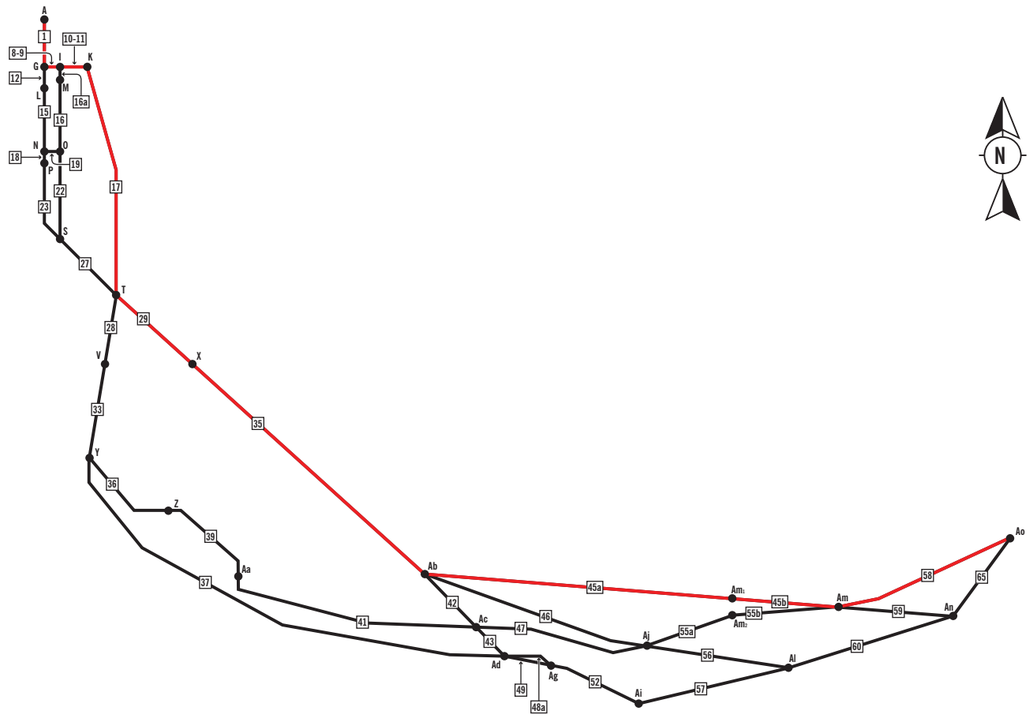
Route LXVIII

Route String: 1-8-9-16a-16-22-27-28-33-37-49-52-57-60-65



Route LXIX

Route String: 1-8-9-10-11-17-29-35-45a-45b-58



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

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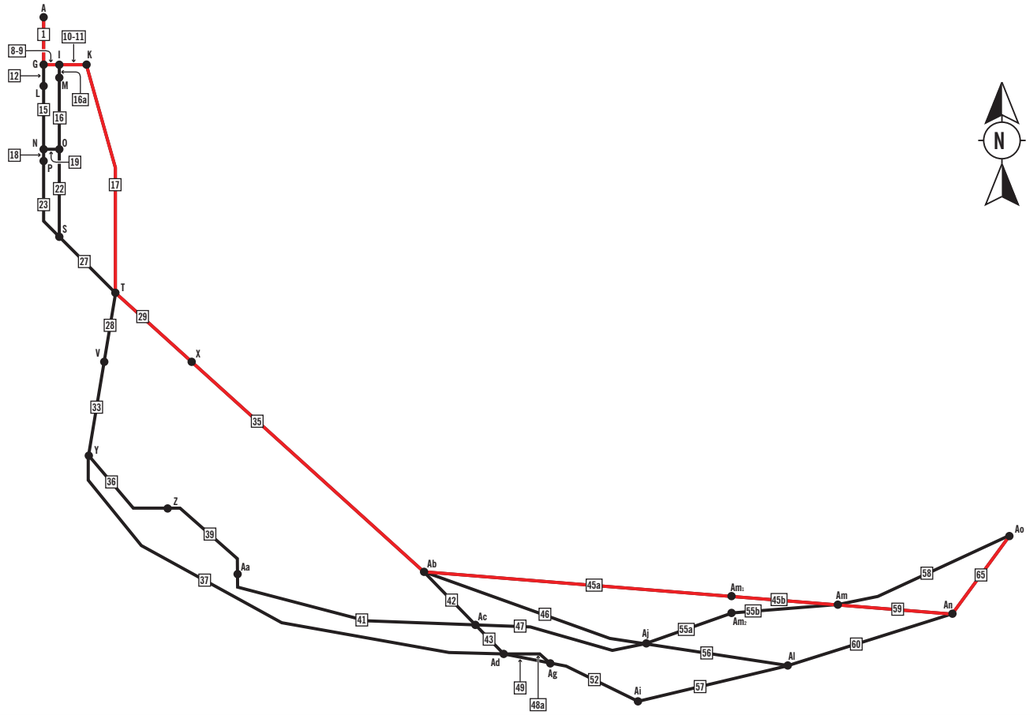
An - Porter, Ind.
Ao - Michigan City, Ind.

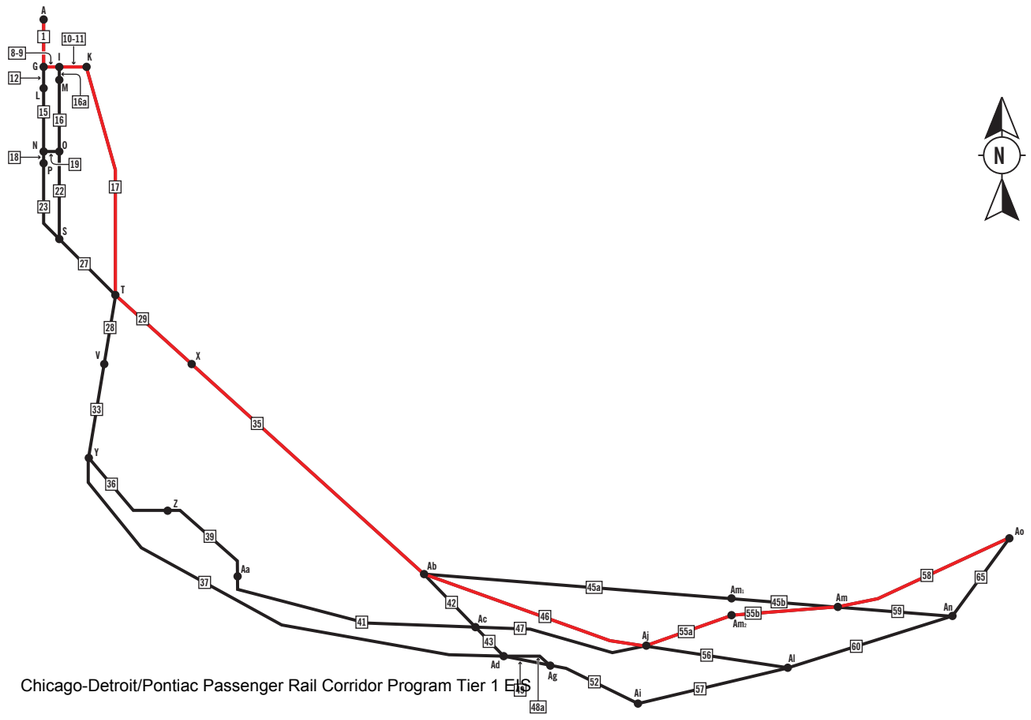
Route LXX

Route String: 1-8-9-10-11-17-29-35-45a-45b-59-65



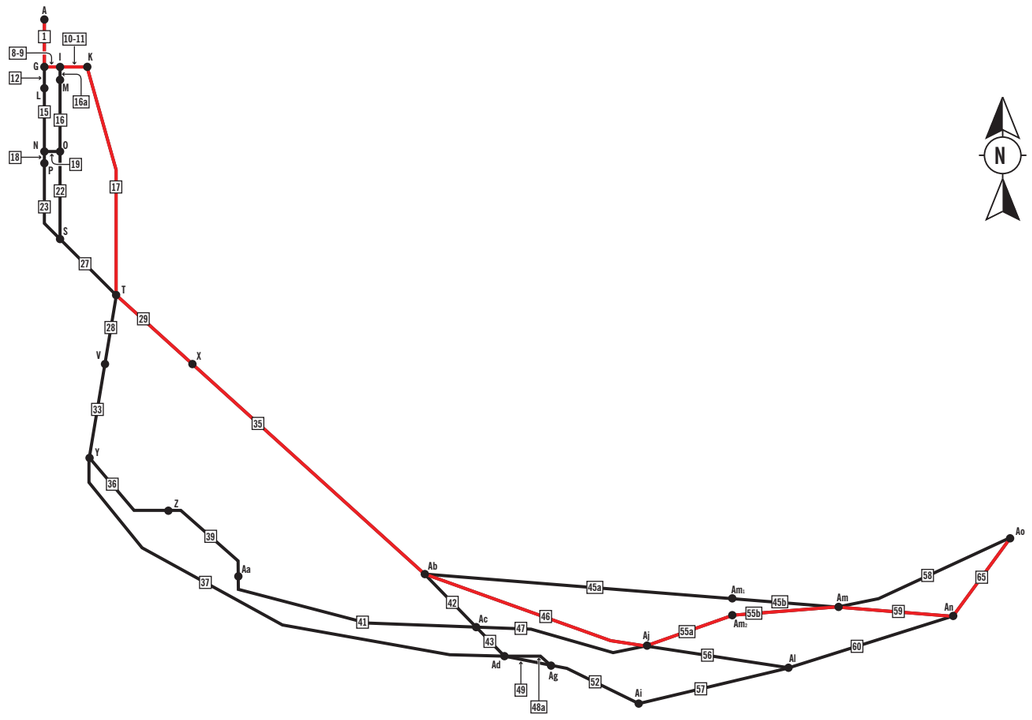
Route LXXI

Route String: 1-8-9-10-11-17-29-35-46-55a-55b-58



Route LXXII

Route String: 1-8-9-10-11-17-29-35-46-55a-55b-59-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
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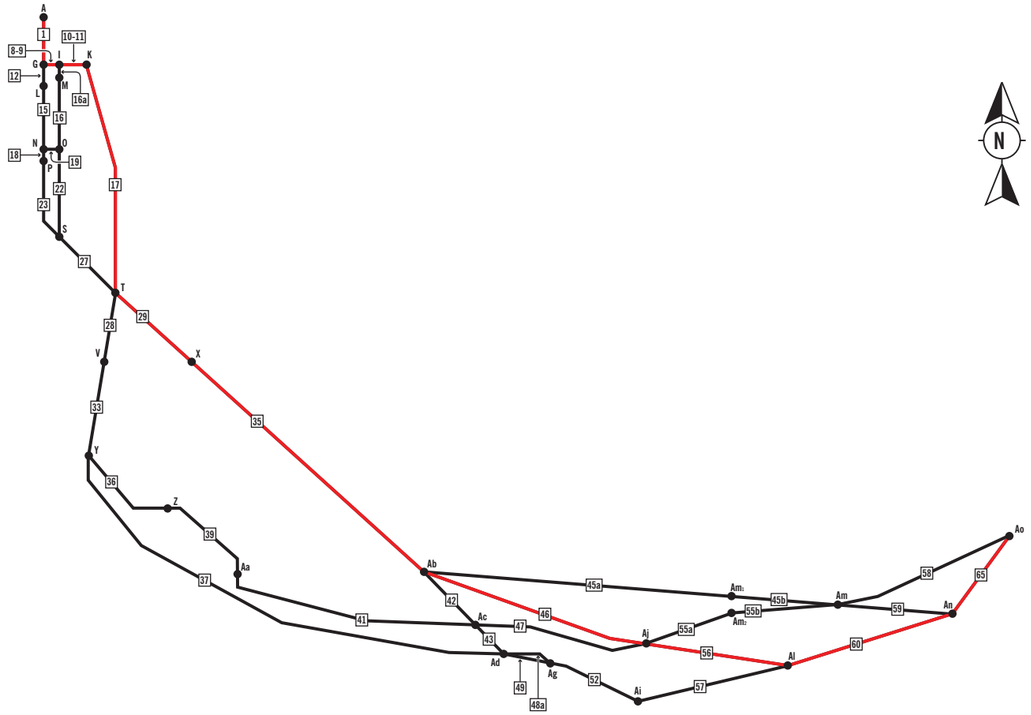
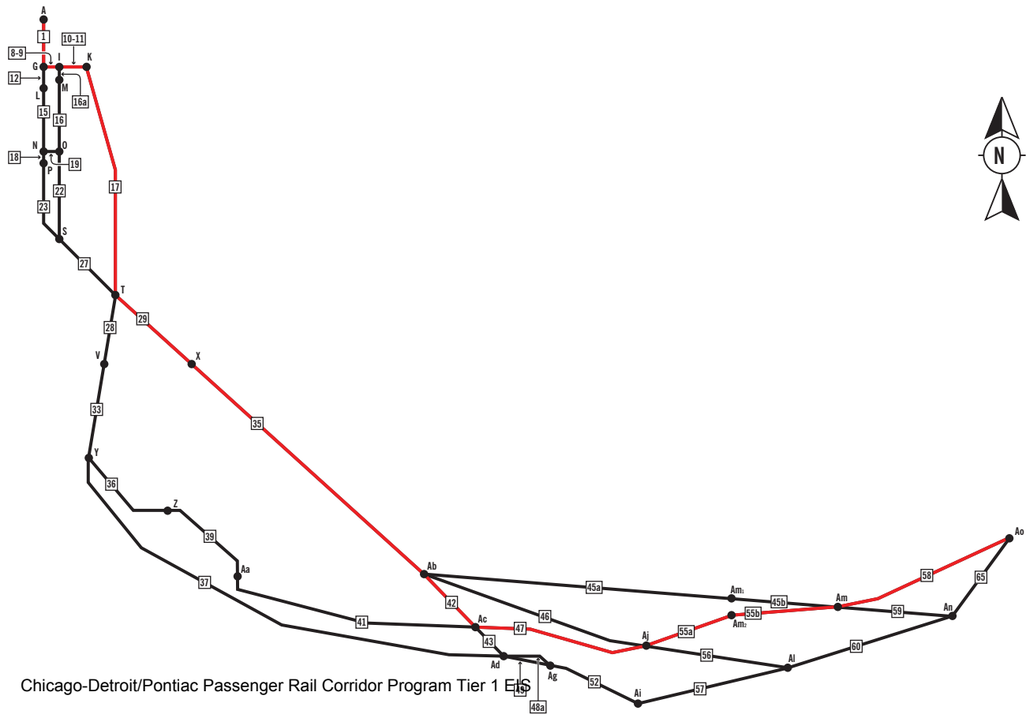
Route LXXIII

Route String: 1-8-9-10-11-17-29-35-46-56-60-65



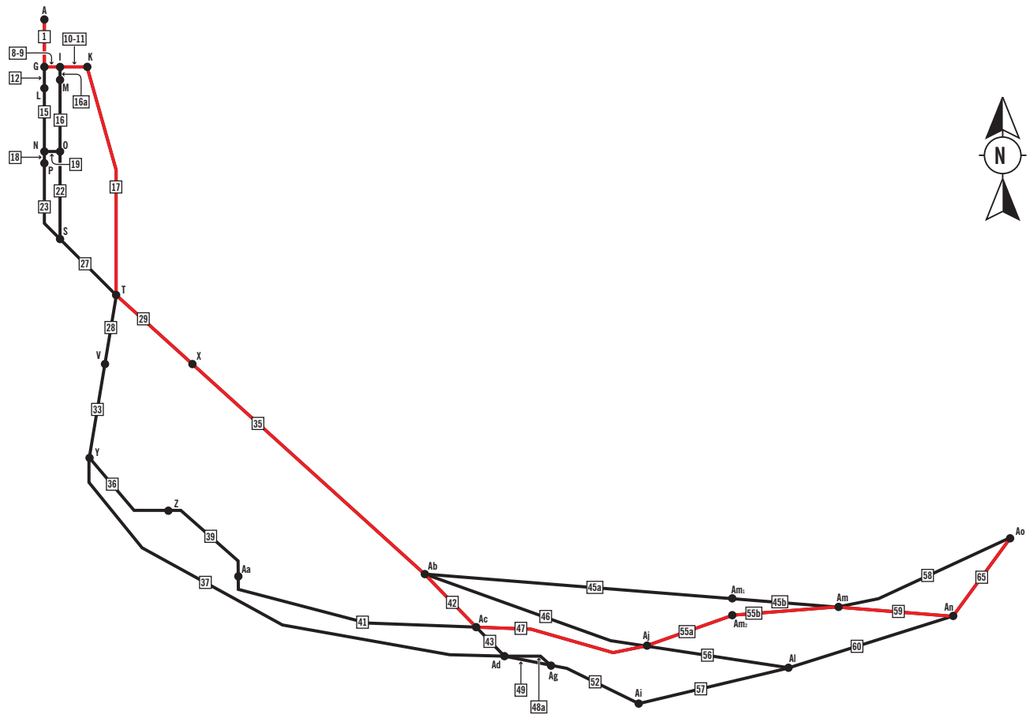
Route LXXIV

Route String: 1-8-9-10-11-17-29-35-42-47-55a-55b-58



Route LXXV

Route String: 1-8-9-10-11-17-29-35-42-47-55a-55b-59-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

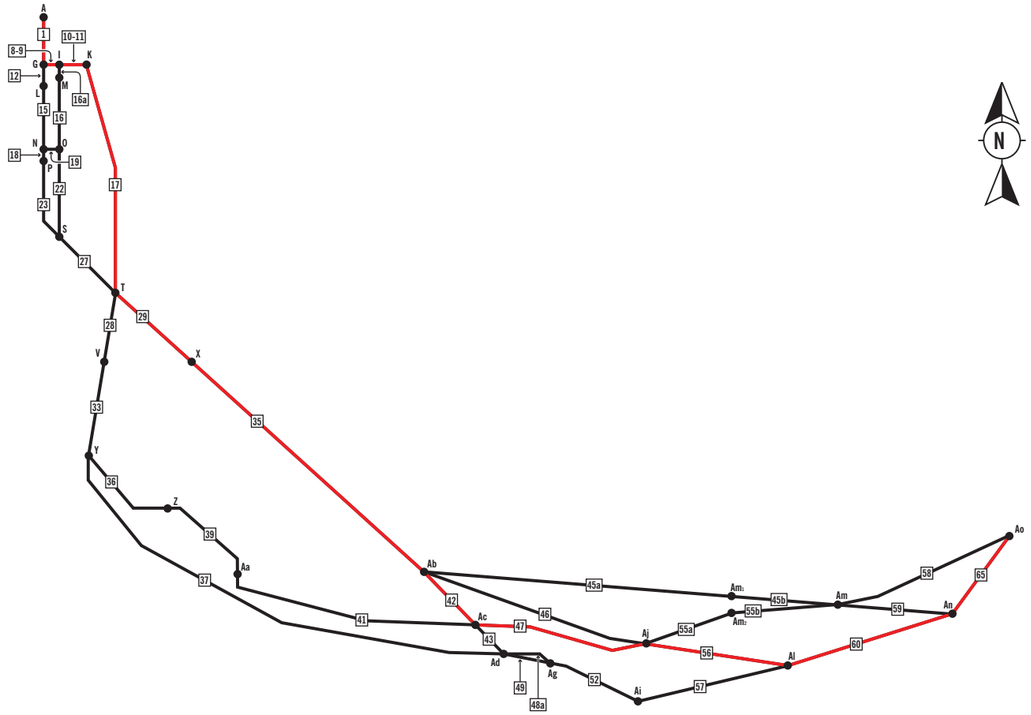
X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

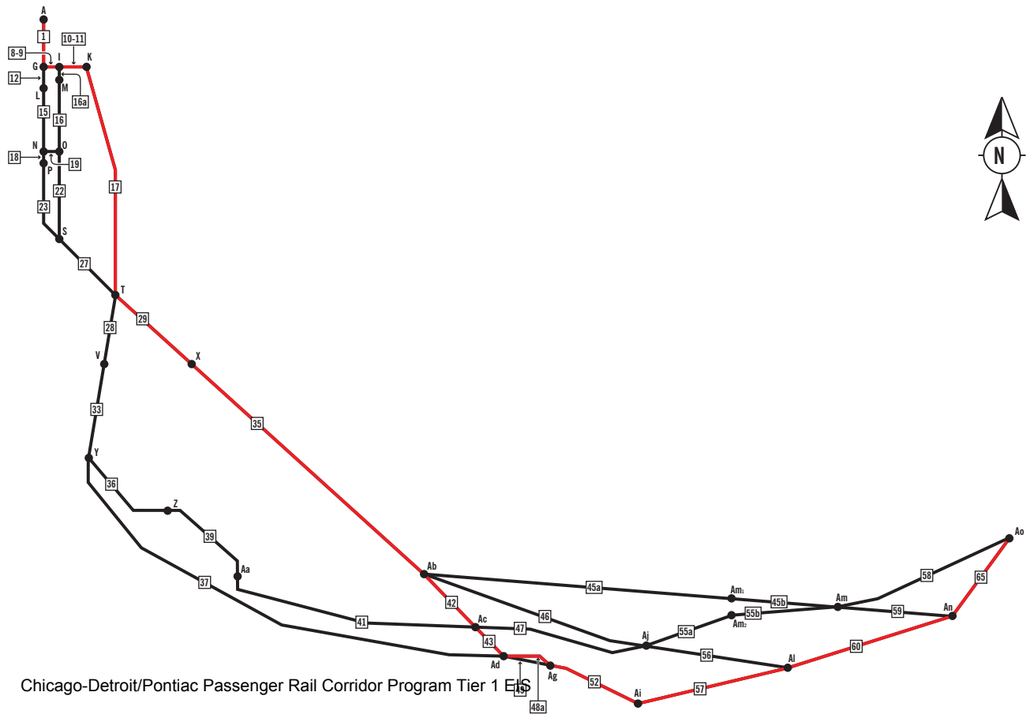
Route LXXVI

Route String: 1-8-9-10-11-17-29-35-42-47-56-60-65



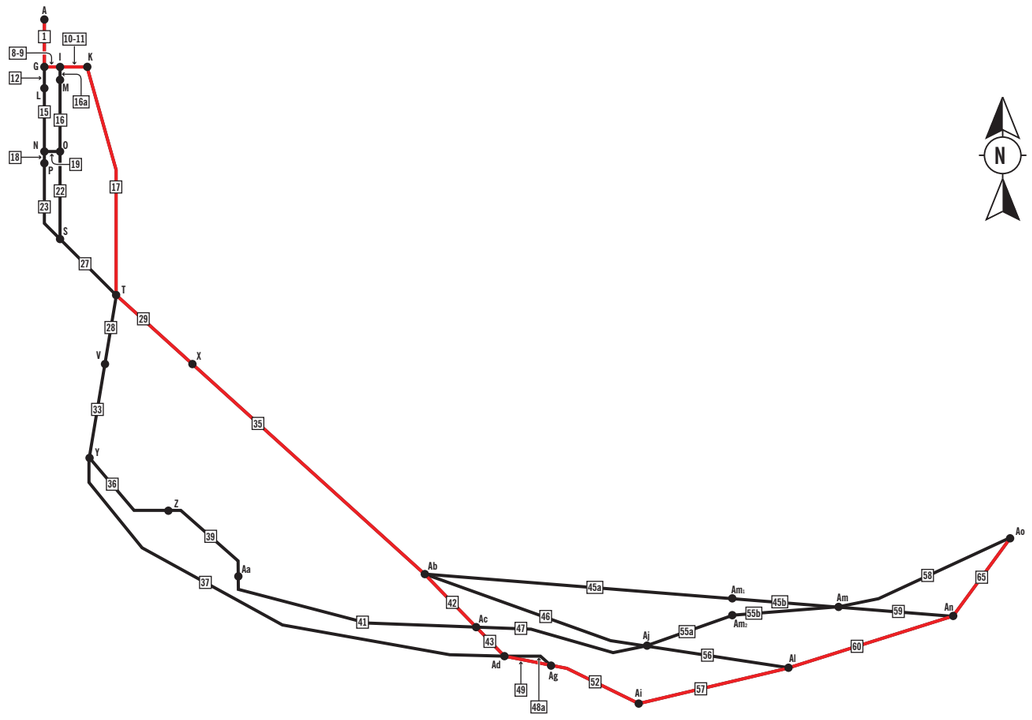
Route LXXVII

Route String: 1-8-9-10-11-17-29-35-42-43-48a-52-57-60-65



Route LXXVIII

Route String: 1-8-9-10-11-17-29-35-42-43-49-52-57-60-65



South of the Lake Route Schematic

Level 1B Coarse Screening

LEGEND

Project Area Network

Passed Route

Failed Route

[#] Subsection

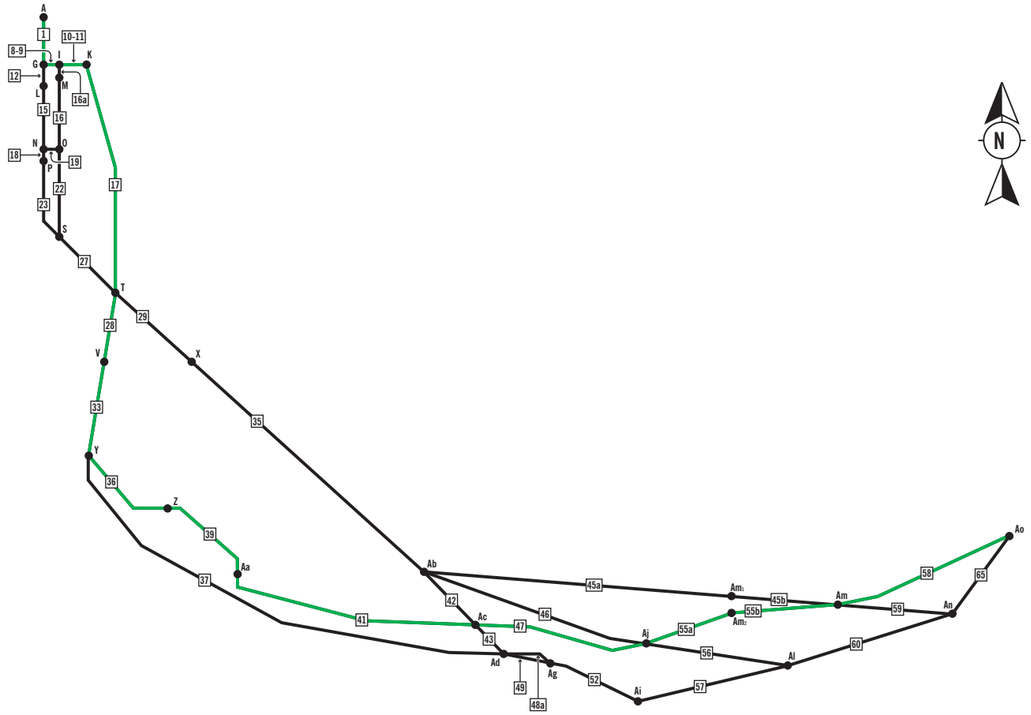
X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

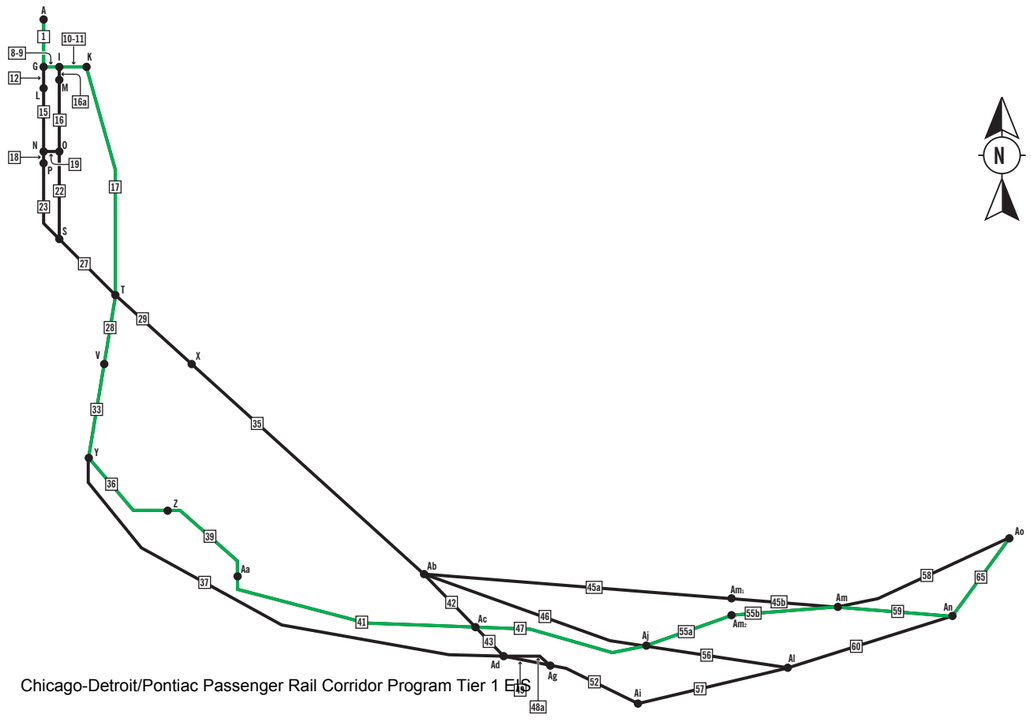
Route LXXIX

Route String: 1-8-9-10-11-17-28-33-36-39-41-47-55a-55b-58



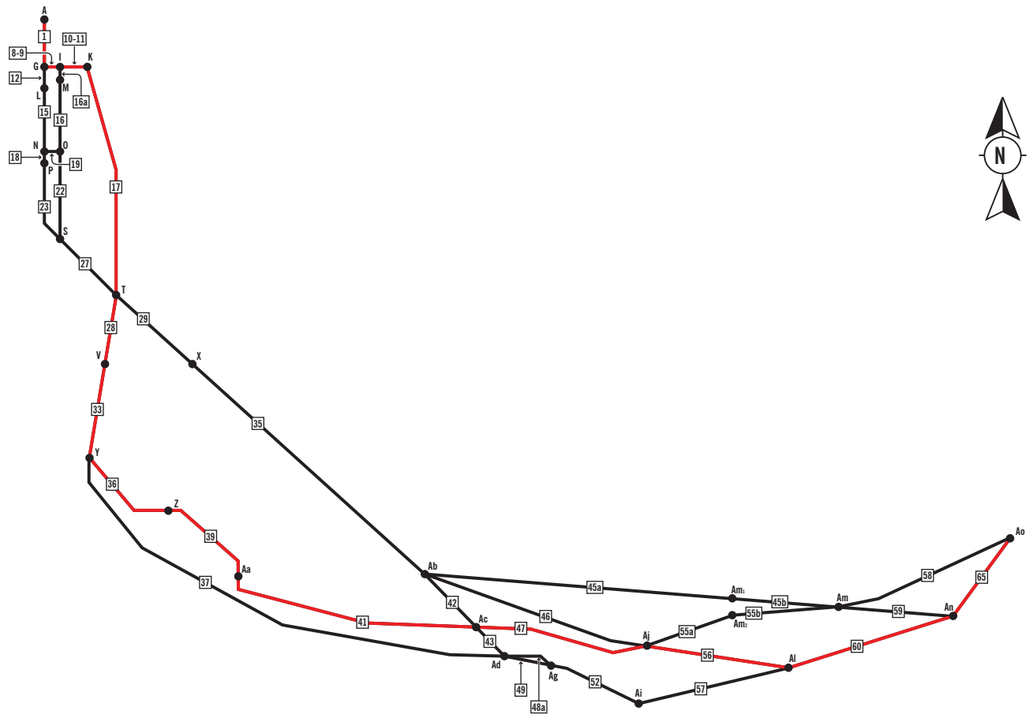
Route LXXX

Route String: 1-8-9-10-11-17-28-33-36-39-41-47-55a-55b-59-65



Route LXXXI

Route String: 1-8-9-10-11-17-28-33-36-39-41-47-56-60-65

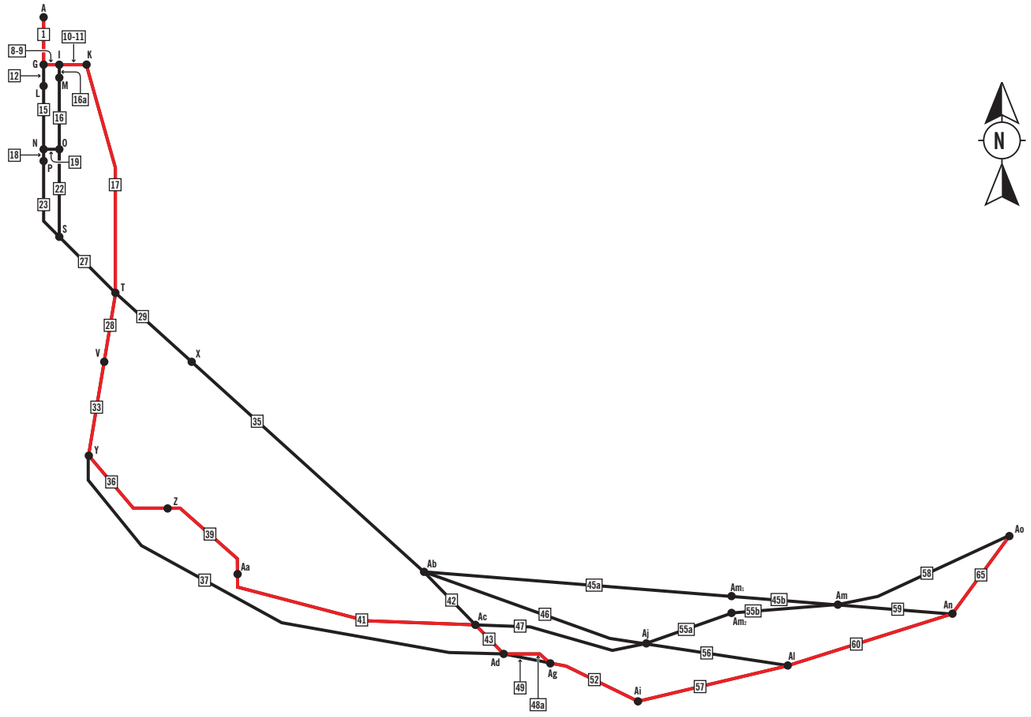


South of the Lake Route Schematic

Level 1B Coarse Screening

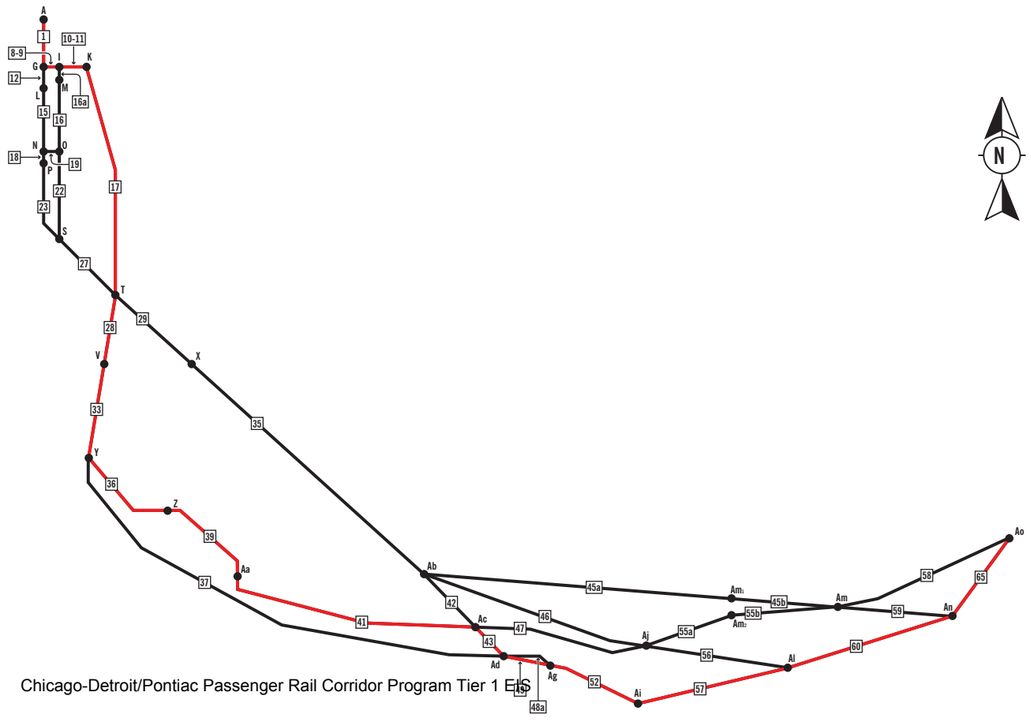
Route LXXXII

Route String: 1-8-9-10-11-17-28-33-36-39-41-43-48a-52-57-60-65



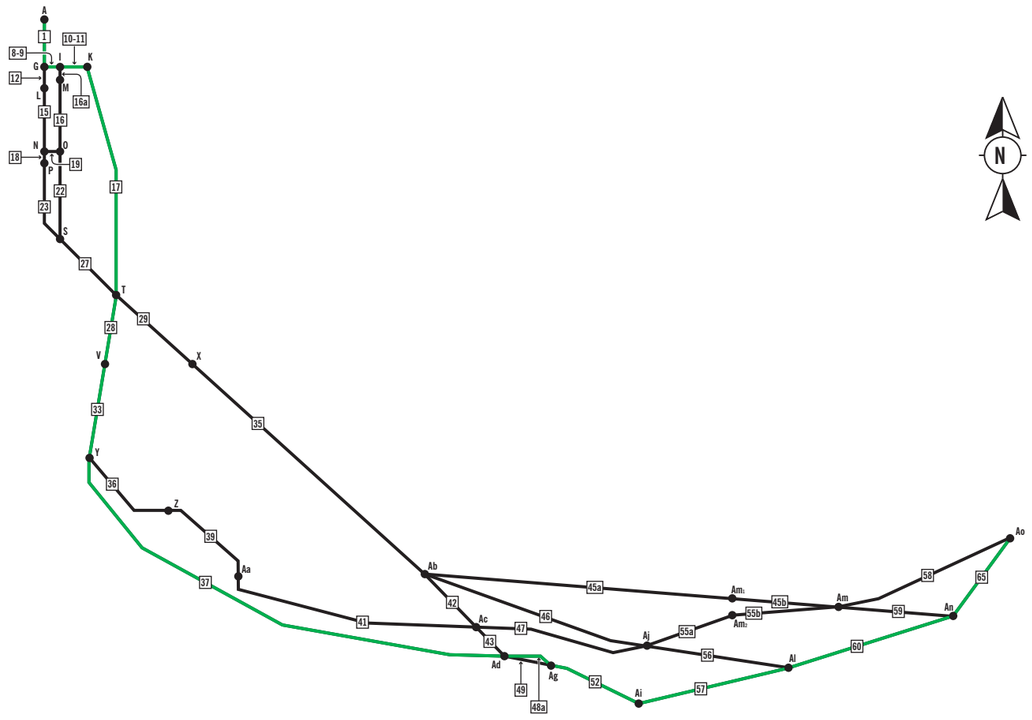
Route LXXXIII

Route String: 1-8-9-10-11-17-28-33-36-39-41-43-49-52-57-60-65



Route LXXXIV

Route String: 1-8-9-10-11-17-28-33-37-48a-52-57-60-65



LEGEND

- Project Area Network
- Passed Route
- Failed Route
- [#] Subsection
- X Node

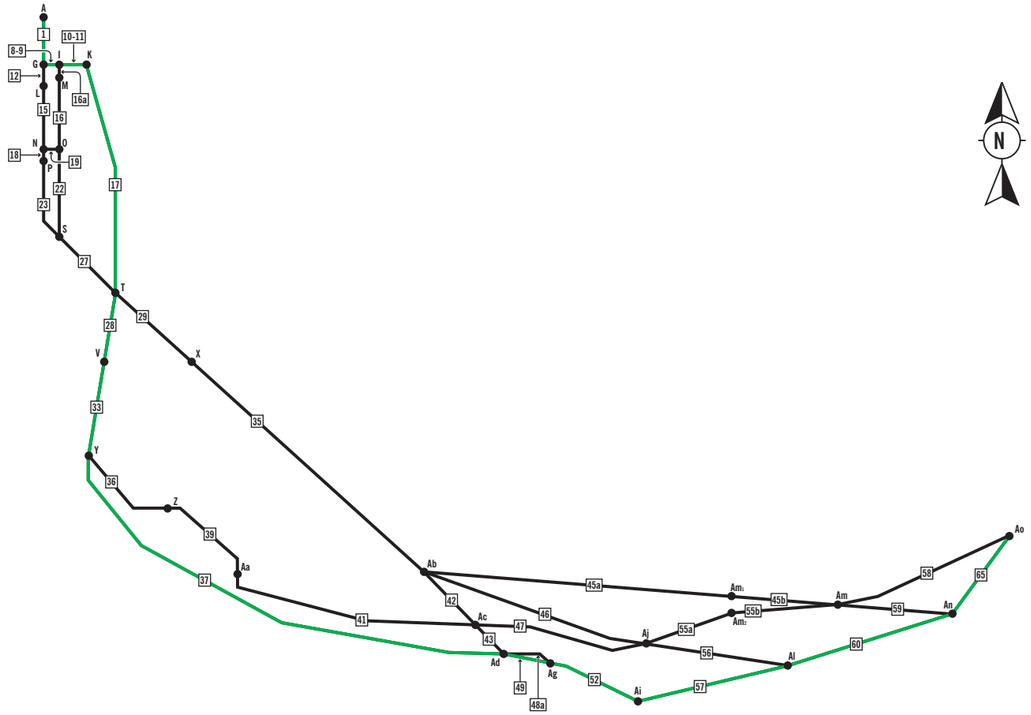
NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
O - 41st Street / Rail Link Connection (Metra)
P - CP 518
S - Englewood Interlocking
T - Grand Crossing
V - Burnside Crossing
X - Rock Island Junction
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ab - Buffington Harbor
Ac - Gary , Ind.
Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

South of the Lake Route Schematic

Level 1B Coarse Screening

Route LXXXV
Route String: 1-8-9-10-11-17-28-33-37-49-52-57-60-65



LEGEND

- Project Area Network
- Passed Route
- Failed Route
- # Subsection
- X Node

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
I - St. Charles Air Line (Metra Rock Island)
K - St. Charles Air Line (Metra Electric)
L - 23rd Street Crossing
M - 21st Street Crossing
N - 41st Street / Rail Link Connection (NS)
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Ad - Tolleston
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Aj - Miller, Ind.
Al - Willow Creek
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind.

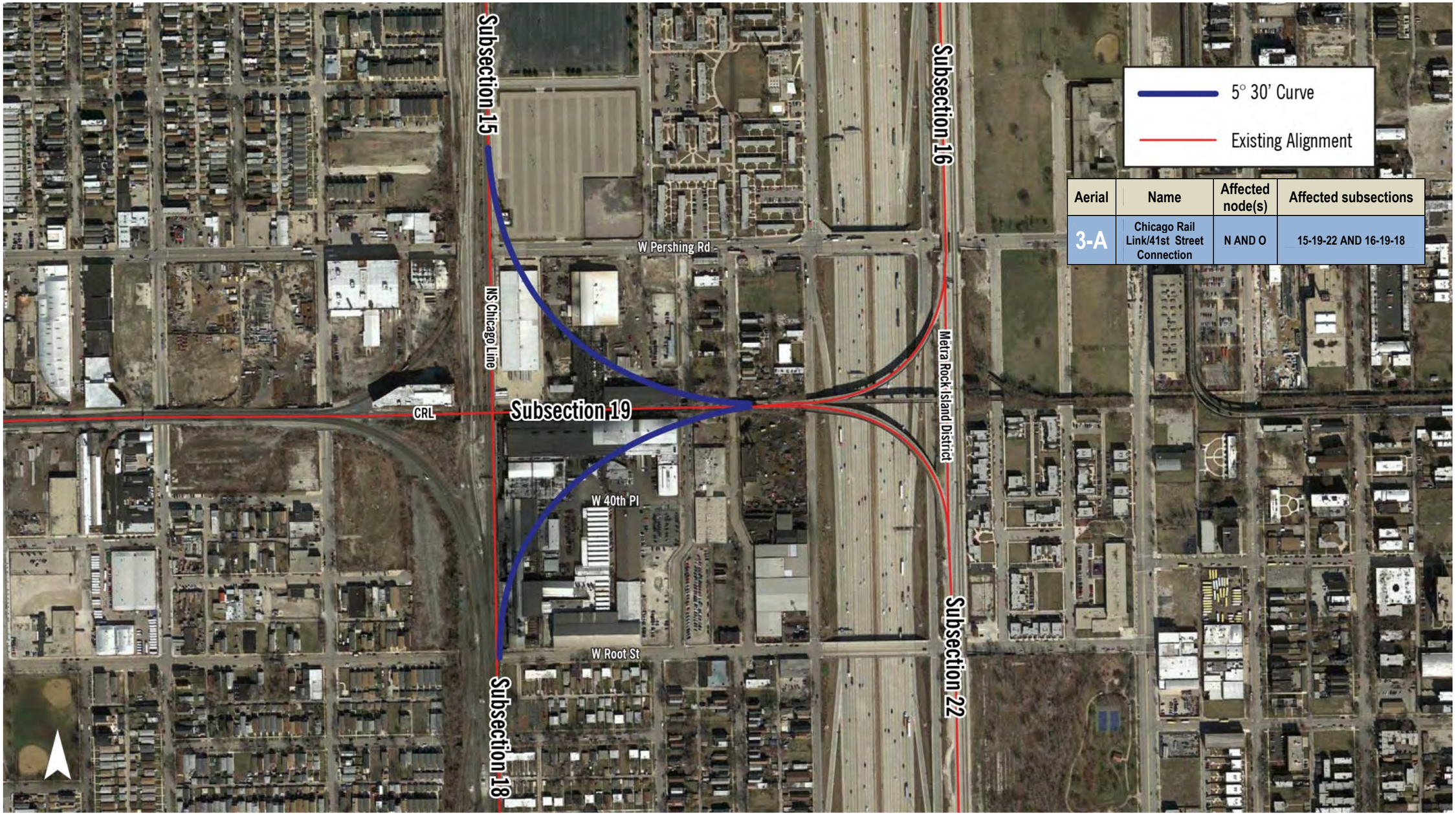
APPENDIX 3: AERIAL VIEWS FOR LEVEL 1B COARSE SCREENING

This section explains the failure code rationale and includes aerial views showing details of the node connections between various subsections that are identified as infeasible.

Aerial	Failure Code(s)	Appendix 3 Page #
A	1, 3	2
B	2	4
C	4, 5	6
D	6, 9	8
E	7, 8, 9, 11, 12	10

Aerial	Name	Affected node(s)	Affected subsections	
3-A	**Chicago Rail Link/41st Street Connection**	**N AND O**	**15-19-22 AND 16-19-18**	
Failure Codes (FC) Node: Subsections	**Purpose and Need**	**Physical Constraints**	**Operational Constraints**	**Environmental Constraints**
FC1 N-O: 15-19-22	Speeds of 110 mph cannot be reached through nodes N and O due to physical and operational constraints. Therefore, the subroute containing subsections 15-19-22 and all associated route hybrids are infeasible due to the fact that travel through these nodes will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need.	Route hybrids using these subsections will require access to Chicago Union Station via the St. Charles Airline (SCAL, nodes G,H,I). The infrastructure through SCAL does not allow for 56 passenger trains at speeds up to 110 mph and there are significant capacity issues (see Operational constraints). Route hybrids containing these subsections are therefore infeasible due to lack of physical infrastructure able to accommodate 56 trains at speeds up to 110 mph.	Trains cannot transfer from subsection 15 to 22 without a backing move to get on and off subsection 19. To eliminate this move, a new elevated connection is required. This new connection would require the acquisition of industrial property in the surrounding area. Use of subsection 22 would likely result in reduced speeds and reliability due to capacity* issues resulting from the addition of 56 trains to the existing 69 trains already on this route. Further complications will result as Metra Southwest Service is expected to move 30 trains per day and fill capacity on this line. **The AAR report for freight corridors indicates that a double track corridor with CTC has a maximum practical capacity of 100 trains per day.*	Building a new connection at nodes N and O would require the acquisition of industrial property in this area.
FC3 N-O: 16-19-18			Trains cannot transfer from subsection 16 to 18 without a backing move to get on and off subsection 19. To eliminate this move, a new elevated connection is required. This new connection would require the acquisition of industrial property in the surrounding area. Use of subsection 16 would likely result in reduced speeds and reliability due to capacity* issues resulting from the addition of 56 trains to the existing 69 trains already on this route. Further complications will result as Metra Southwest Service is expected to move 30 trains per day and fill capacity on this line . **The AAR report for freight corridors indicates that a double track corridor with CTC has a maximum practical capacity of 100 trains per day.*	Building a new connection at nodes N and O would require the acquisition of industrial property in this area.

ADDITIONAL DETAIL CAN BE FOUND IN APPENDIX 1.2 – FAILURE CODE RATIONALE



Aerial	Name	Affected node(s)	Affected subsections
3-A	Chicago Rail Link/41st Street Connection	N AND O	15-19-22 AND 16-19-18

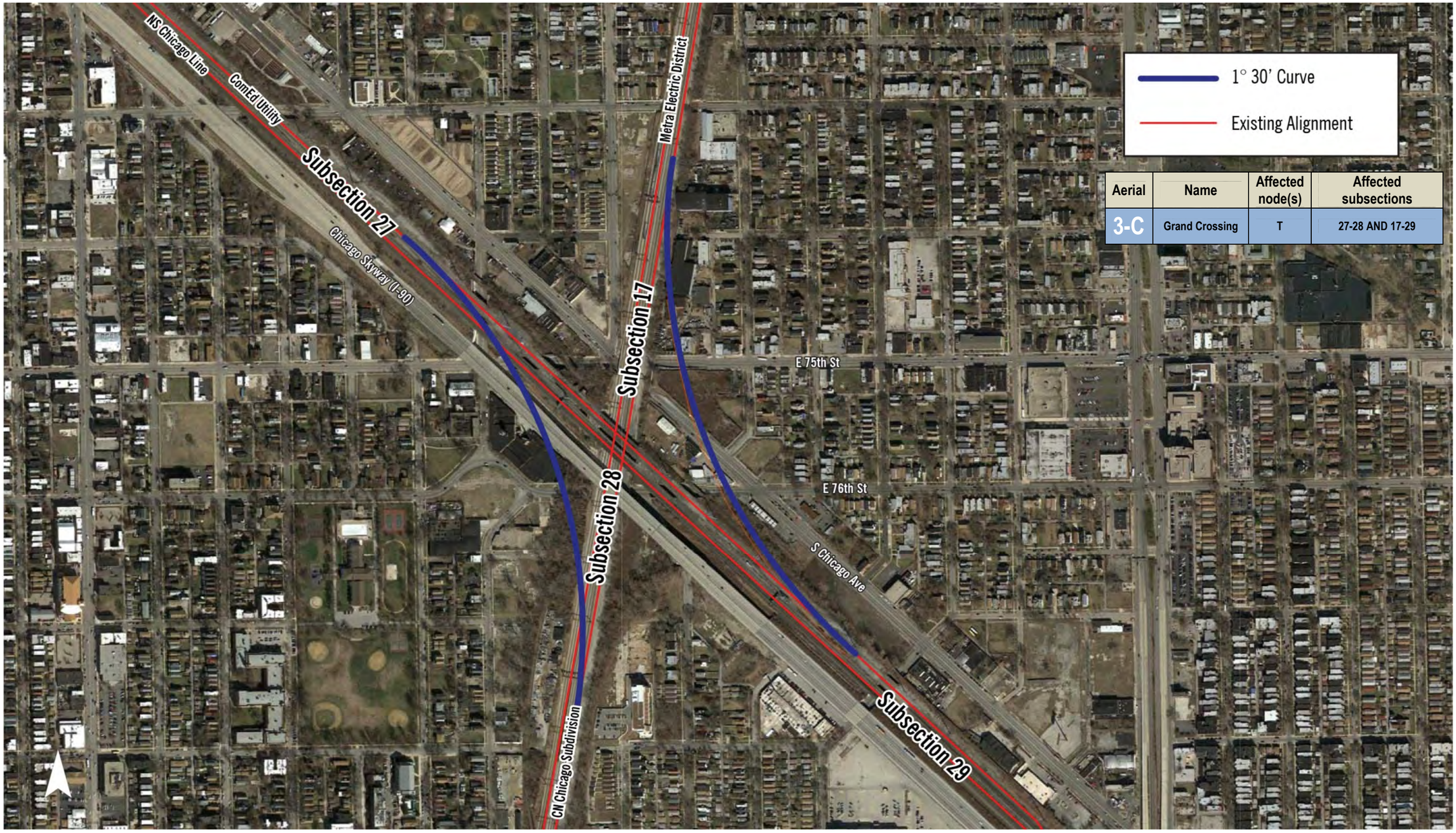
Aerial	Name	Affected node(s)	Affected subsections	
3-B	Englewood Flyover	S	22-27	
Failure Codes (FC) **Node: Subsections**	**Purpose and Need**	**Physical Constraints**	**Operational Constraints**	**Environmental Constraints**
FC2 S: 22-27	Speeds of 110 mph cannot be reached through node S due to physical and operational constraints. Therefore, the subroute containing subsections 22-27 and all associated route hybrids are infeasible as passenger trains traveling through this node will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need.	There is currently no connection at node S between subsections 22 and 27. A new elevated connection would be required. The construction of a new connection would pose significant impacts to the freight yard operations, and the curve geometry of a new connection would limit top speeds to 47 mph.	Use of subsection 22 would likely result in reduced speeds and reliability due to capacity* issues resulting from the addition of 56 trains to the existing 69 trains already on this route. Further complications will result as Metra Southwest Service is expected to move 30 trains per day and fill available capacity on this line. **The AAR report for freight corridors indicates that a double track corridor with CTC has a maximum practical capacity of 100 trains per day.*	Building a new connection near node S would likely require the loss of one or more freight yard tracks at the NS Park Manor Yard.

ADDITIONAL DETAIL CAN BE FOUND IN APPENDIX 1.2 – FAILURE CODE RATIONALE

Aerial	Name	Affected node(s)	Affected subsections
3-B	Englewood Flyover	S	22-27

Aerial	Name	Affected node(s)	Affected subsections	
3-C	Grand Crossing	T	27-28 AND 17-29	
Failure Codes (FC) Node: Subsections	**Purpose and Need**	**Physical Constraints**	**Operational Constraints**	**Environmental Constraints**
FC4 T: 27-28	Speeds of 110 mph cannot be reached through node T without causing significant environmental impacts. Therefore, the subroute containing subsections 27-28 and all associated route hybrids are infeasible as passenger trains traveling through this node will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need without a connection.	There is currently no connection at node T to allow for the transition from subsection 27 to 28 at speeds up to 110 mph. In addition, the Chicago Skyway presents a major physical challenge. A new elevated connection would be required. Construction would impact commercial and residential property.	Rerouting service off of subsection 27 onto subsection 28 would result in the underutilization of 13 miles of capacity available along subsection 29 especially since the ComEd Utility corridor offers capacity for two dedicated passenger tracks along subsections 27 and 29 and provides for route continuity.	Construction of a new elevated connection between subsections 27-28 would require acquisition of surrounding commercial and residential property with potential adverse social and economic impacts.
FC5 T: 17-29	Speeds of 110 mph cannot be reached through node T without causing significant environmental impacts. Therefore, the subroute containing subsections 17-29 and all associated route hybrids are infeasible as passenger trains traveling through this node will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need without a connection.	There is currently no connection at node T to allow for the transition from subsection 17 to 29 at speeds up to 110 mph. A new elevated connection would be required. Construction would impact commercial and residential property.	Passenger trains dependent upon subsection 17 require the use of SCAL to provide a connection to Chicago Union Station. The infrastructure through SCAL does not allow for 56 passenger trains at speeds up to 110 mph.	Construction of a new elevated connection between subsections 17-29 would require acquisition of surrounding commercial and residential property with potential adverse social and economic impacts.

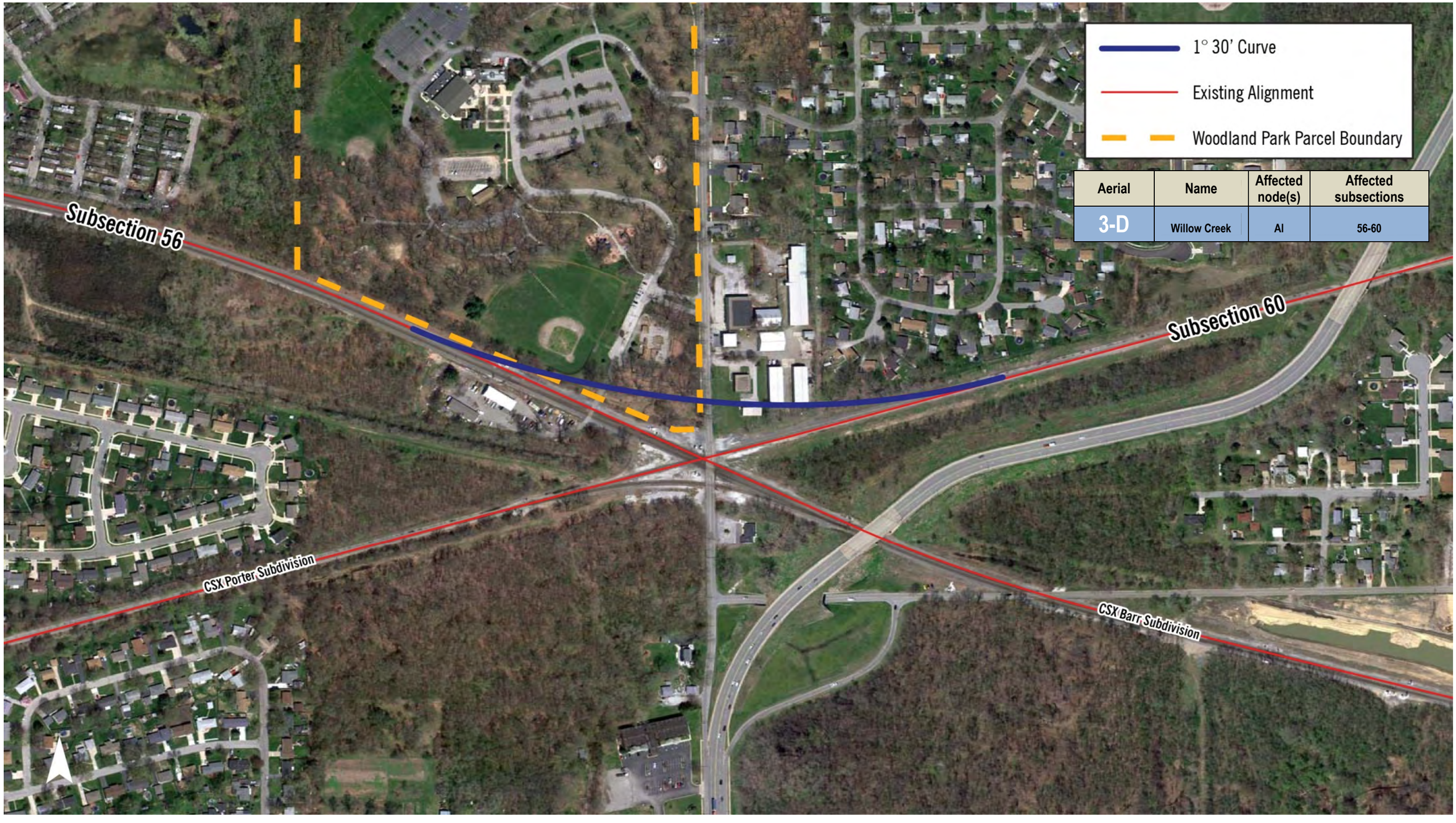
ADDITIONAL DETAIL CAN BE FOUND IN APPENDIX 1.2 – FAILURE CODE RATIONALE



Aerial	Name	Affected node(s)	Affected subsections
3-C	Grand Crossing	T	27-28 AND 17-29

Aerial	Name	Affected node(s)	Affected subsections	
3-D	Willow Creek	Al	56-60	
Failure Codes (FC) Node: Subsections	Purpose and Need	Physical Constraints	Operational Constraints	Environmental Constraints
FC6 Al: 56-60 FC9 Al: 56-60	Speeds of 110 mph cannot be reached through node Al without causing significant environmental impacts. Therefore, the subroute containing subsections 56-60 and all associated route hybrids are infeasible as passenger trains traveling through this node will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need.	There is no connection at node Al to allow for the transfer of passenger trains from subsection 56 to 60 at speeds up to 110 mph. Construction of a curve sufficient to accommodate speeds up to 110 mph would impact nearby 4(f) property. The curve geometry required to avoid the 4(f) property would limit speeds to 60 mph or less.	There is no connection at node Al to allow for the transfer of passenger trains from subsection 56 to 60 at speeds up to 110 mph.	Construction of infrastructure necessary to maintain speeds up to 110 mph would require acquisition of 4(f) property with potential adverse social and economic impacts. In addition to 4(f) property there is also a daycare, regional gymnastic center, and dense area of residential homes.

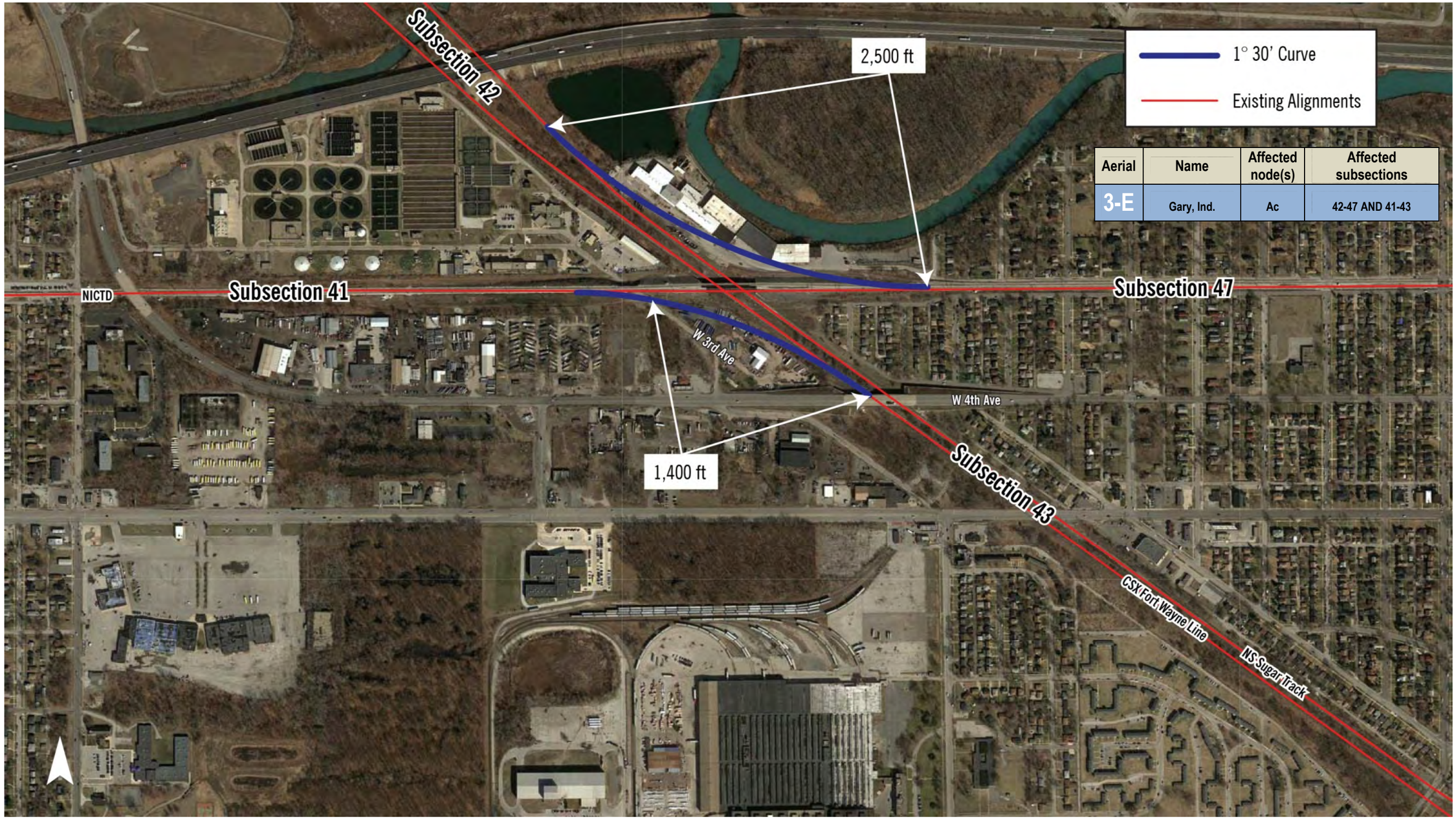
ADDITIONAL DETAIL CAN BE FOUND IN APPENDIX 1.2 – FAILURE CODE RATIONALE



Aerial	Name	Affected node(s)	Affected subsections
3-D	Willow Creek	AI	56-60

Aerial	Name	Affected node(s)	Affected subsections	
3-E	Gary, Ind.	Ac	42-47 AND 41-43	
Failure Codes (FC) Node: Subsections	**Purpose and Need**	**Physical Constraints**	**Operational Constraints**	**Environmental Constraints**
FC7 Ac: 42-47	Speeds of 110 mph cannot be reached through node Ac without causing significant environmental impacts. Therefore, the subroute containing subsections 42-47 and all associated route hybrids are infeasible as passenger trains traveling through this node will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need.	There is no connection at node Ac to allow for the transfer of passenger trains from subsection 42 to 47 at speeds up to 110 mph. Construction of a curve sufficient to accommodate speeds up to 110 mph would impact nearby industrial and residential property. There is also a water body present in the area which could result in water quality impacts. The curve geometry required to avoid the impacts will require speed reductions making 110 mph unattainable.	Routing trains from subsection 42 to 47 requires leaving an alignment with excess capacity and going to the highly used NICTD commuter line where there is limited right of way available for intercity passenger rail service and the potential for reduced speeds and reliability.	Construction of a curve sufficient to accommodate speeds up to 110 mph would impact nearby industrial and residential property with potential adverse social and economic impacts. There is also a water body present in the area which could result in water quality impacts.
FC8 Ac: 42-47				
FC9 Ac: 42-47				
FC11 Ac: 41-43	Speeds of 110 mph cannot be reached through node Ac due to physical and operational constraints. Therefore, the subroute containing subsections 41-43 and all associated route hybrids are infeasible as passenger trains traveling through this node will not meet the goal of reaching up to 110 mph speeds stated in the Program's Purpose and Need.	There is no connection at node Ac to allow for the transfer of passenger trains from subsection 41 to 43 at speeds up to 110 mph. Construction of a curve sufficient to accommodate speeds up to 110 mph will impact local transportation routes and potentially require the reconstruction of the bridge at W. 4th Ave. The required geometry to avoid these transportation impacts would reduce speeds to approximately 44 mph and not allow 110 mph operations.	Routing trains from subsection 41 to 43 requires leaving an alignment with excess capacity and going to the intensively used NICTD commuter line with limited right of way available for intercity passenger rail service and the potential reduced speeds and reliability.	Impacts to local transportation routes would be affected by severing W. 3rd Ave and potential reconstruction the bridge at W. 4th Ave would be required with potential adverse social and economic impacts.
FC12 Ac: 41-43				

ADDITIONAL DETAIL CAN BE FOUND IN APPENDIX 1.2 – FAILURE CODE RATIONALE


Subsection 42
2,500 ft
1° 30' Curve
Existing Alignments
Aerial
Name
Affected node(s)
Affected subsections
3-E
Gary, Ind.
Ac
42-47 AND 41-43
NICTD
Subsection 41
Subsection 47
W 3rd Ave
W 4th Ave
1,400 ft
Subsection 43
CSX Fort Wayne Line
NS Sugar Track

APPENDIX 4: MAPS FOR LEVEL 1B COARSE SCREENING

This section contains maps created for each of the hybrid routes recommended to pass and be carried forward into level 1B Fine screening.

SOUTH OF THE LAKE PROJECT AREA - ROUTE 1

LEVEL 1B COARSE SCREENING (Coarse Screening Route I)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX Transportationl
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
L - 23rd Street Crossing
N - 41st Street / Rail Link Connection (NS)
P - CP 518
S - Englewood Crossover
T - Grand Crossing
X - Rock Island Junction
Ab - Buffington Harbor
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
Ao - Michigan City, Ind. (Not Shown)

NOTES

27 29 35 Multiple alignment options exist between Englewood Crossover (Node S) and Buffington Harbor (Node Ab). The preferred alignment could include a combination of the following potential opportunities:

- NS between Englewood Crossover and Buffington Harbor
- ComEd Utility Corridor between Englewood Crossover and just east of Hick Drawbridge
- CSX between the Calumet River Bridge and Hick Drawbridge

LAKE MICHIGAN

Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 2

LEVEL 1B COARSE SCREENING (Coarse Screening Route II)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX TransportationI
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
L - 23rd Street Crossing
N - 41st Street / Rail Link Connection (NS)
P - CP 518
S - Englewood Crossover
T - Grand Crossing
X - Rock Island Junction
Ab - Buffington Harbor
Am - Burns Harbor, Ind.
Am1 - Indiana Dunes (NS)
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)

NOTES

27 29 35 Multiple alignment options exist between Englewood Crossover (Node S) and Buffington Harbor (Node Ab). The preferred alignment could include a combination of the following potential opportunities:

- NS between Englewood Crossover and Buffington Harbor
- ComEd Utility Corridor between Englewood Crossover and just east of Hick Drawbridge
- CSX between the Calumet River Bridge and Hick Drawbridge

LAKE MICHIGAN

Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 3

LEVEL 1B COARSE SCREENING (Coarse Screening Route III)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX Transportationl
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
L - 23rd Street Crossing
N - 41st Street / Rail Link Connection (NS)
P - CP 518
S - Englewood Crossover
T - Grand Crossing
X - Rock Island Junction
Ab - Buffington Harbor
Aj - Miller, Ind.
Am - Burns Harbor, Ind.
Am2 - Indiana Dunes (NICTD)
Ao - Michigan City, Ind. (Not Shown)

NOTES

27 29 35 Multiple alignment options exist between Englewood Crossover (Node S) and Buffington Harbor (Node Ab). The preferred alignment could include a combination of the following potential opportunities:

- NS between Englewood Crossover and Buffington Harbor
- ComEd Utility Corridor between Englewood Crossover and just east of Hick Drawbridge
- CSX between the Calumet River Bridge and Hick Drawbridge

LAKE MICHIGAN

Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 4

LEVEL 1B COARSE SCREENING (Coarse Screening Route IV)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX Transportationl
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
L - 23rd Street Crossing
N - 41st Street / Rail Link Connection (NS)
P - CP 518
S - Englewood Crossover
T - Grand Crossing
X - Rock Island Junction
Ab - Buffington Harbor
Aj - Miller, Ind.
Am - Burns Harbor, Ind.
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)

NOTES

27 29 35 Multiple alignment options exist between Englewood Crossover (Node S) and Buffington Harbor (Node Ab). The preferred alignment could include a combination of the following potential opportunities:

- NS between Englewood Crossover and Buffington Harbor
- ComEd Utility Corridor between Englewood Crossover and just east of Hick Drawbridge
- CSX between the Calumet River Bridge and Hick Drawbridge

LAKE MICHIGAN

Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 5

LEVEL 1B COARSE SCREENING (Coarse Screening Route IX)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX TransportationI
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NOTES

27 29 35 Multiple alignment options exist between Englewood Crossover (Node S) and Buffington Harbor (Node Ab).

The preferred alignment could include a combination of the following potential opportunities:

- NS between Englewood Crossover and Buffington Harbor
- ComEd Utility Corridor between Englewood Crossover and just east of Hick Drawbridge
- CSX between the Calumet River Bridge and Hick Drawbridge

42 43 Two alignment options exist between Buffington Harbor (Node Ab) and Tolleston (Node Ad).

- NS Sugar Track
- CSX Fort Wayne Line

48a Two alignment options exist between Tolleston (Node Ad) and the Gary Greenfield Connection (Ag). Route 5 utilizes the IHB Dune Branch instead of the CSX Porter Subdivision.

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
L - 23rd Street Crossing
N - 41st Street / Rail Link Connection (NS)
P - CP 518
S - Englewood Crossover
T - Grand Crossing
X - Rock Island Junction
Ab - Buffington Harbor
Ac - Gary, Ind.
Ad - Tolleston, Ind.
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Al - Willow Creek, Ind.
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)

LAKE MICHIGAN

Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 6

LEVEL 1B COARSE SCREENING (Coarse Screening Route X)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX TransportationI
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NOTES

27 29 35 Multiple alignment options exist between Englewood Crossover (Node S) and Buffington Harbor (Node Ab).

The preferred alignment could include a combination of the following potential opportunities:

- NS between Englewood Crossover and Buffington Harbor
- ComEd Utility Corridor between Englewood Crossover and just east of Hick Drawbridge
- CSX between the Calumet River Bridge and Hick Drawbridge

42 43 Two alignment options exist between Buffington Harbor (Node Ab) and Tolleston (Node Ad).

- NS Sugar Track
- CSX Fort Wayne Line

49 Two alignment options exist between Tolleston (Node Ad) and the Gary Greenfield Connection (Ag). Route 6 utilizes the CSX Porter Subdivision instead of the IHB Dune Branch.

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
L - 23rd Street Crossing
N - 41st Street / Rail Link Connection (NS)
P - CP 518
S - Englewood Crossover
T - Grand Crossing
X - Rock Island Junction
Ab - Buffington Harbor
Ac - Gary, Ind.
Ad - Tolleston, Ind.
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Al - Willow Creek, Ind.
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)

LAKE MICHIGAN

Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 7

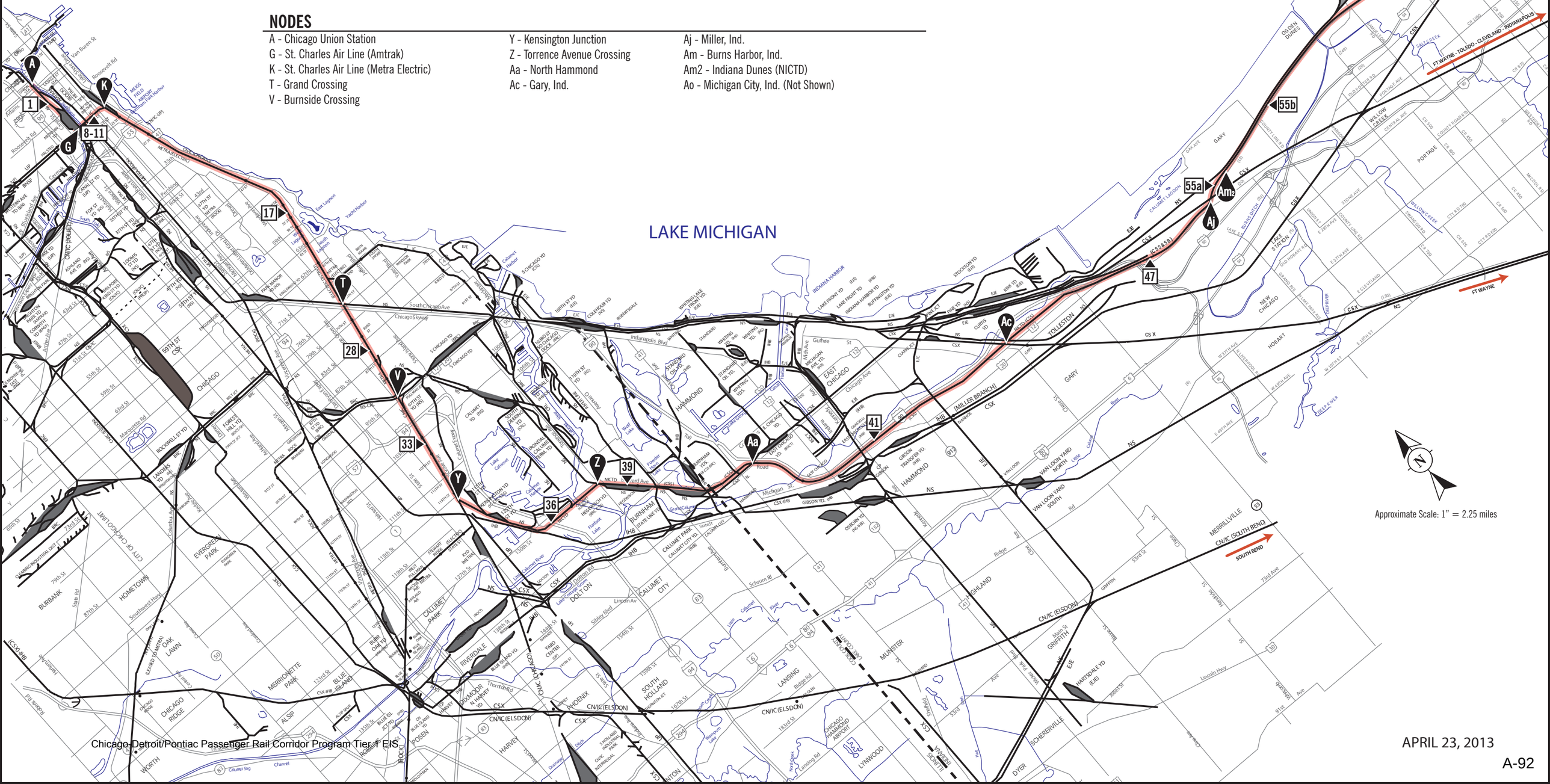
LEVEL 1B COARSE SCREENING (Coarse Screening Route LXXIX)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX TransportationI
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
K - St. Charles Air Line (Metra Electric)
T - Grand Crossing
V - Burnside Crossing
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ac - Gary, Ind.
Aj - Miller, Ind.
Am - Burns Harbor, Ind.
Am2 - Indiana Dunes (NICTD)
Ao - Michigan City, Ind. (Not Shown)



SOUTH OF THE LAKE PROJECT AREA - ROUTE 8

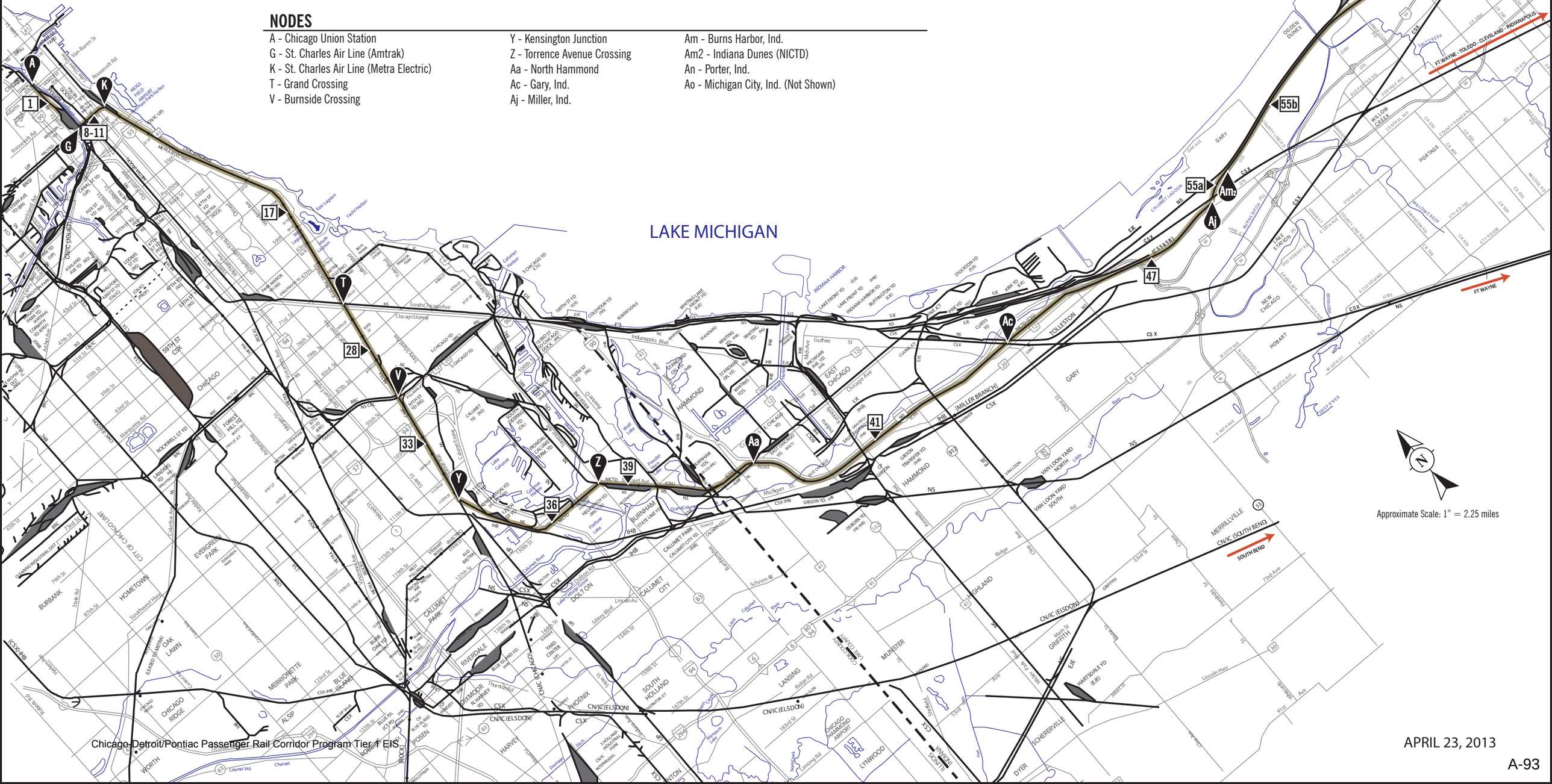
LEVEL 1B COARSE SCREENING (Coarse Screening Route LXXX)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX TransportationI
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
K - St. Charles Air Line (Metra Electric)
T - Grand Crossing
V - Burnside Crossing
Y - Kensington Junction
Z - Torrence Avenue Crossing
Aa - North Hammond
Ac - Gary, Ind.
Aj - Miller, Ind.
Am - Burns Harbor, Ind.
Am2 - Indiana Dunes (NICTD)
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)



SOUTH OF THE LAKE PROJECT AREA - ROUTE 9

LEVEL 1B COARSE SCREENING (Coarse Screening Route LXXXIV)

RAILROAD NETWORK

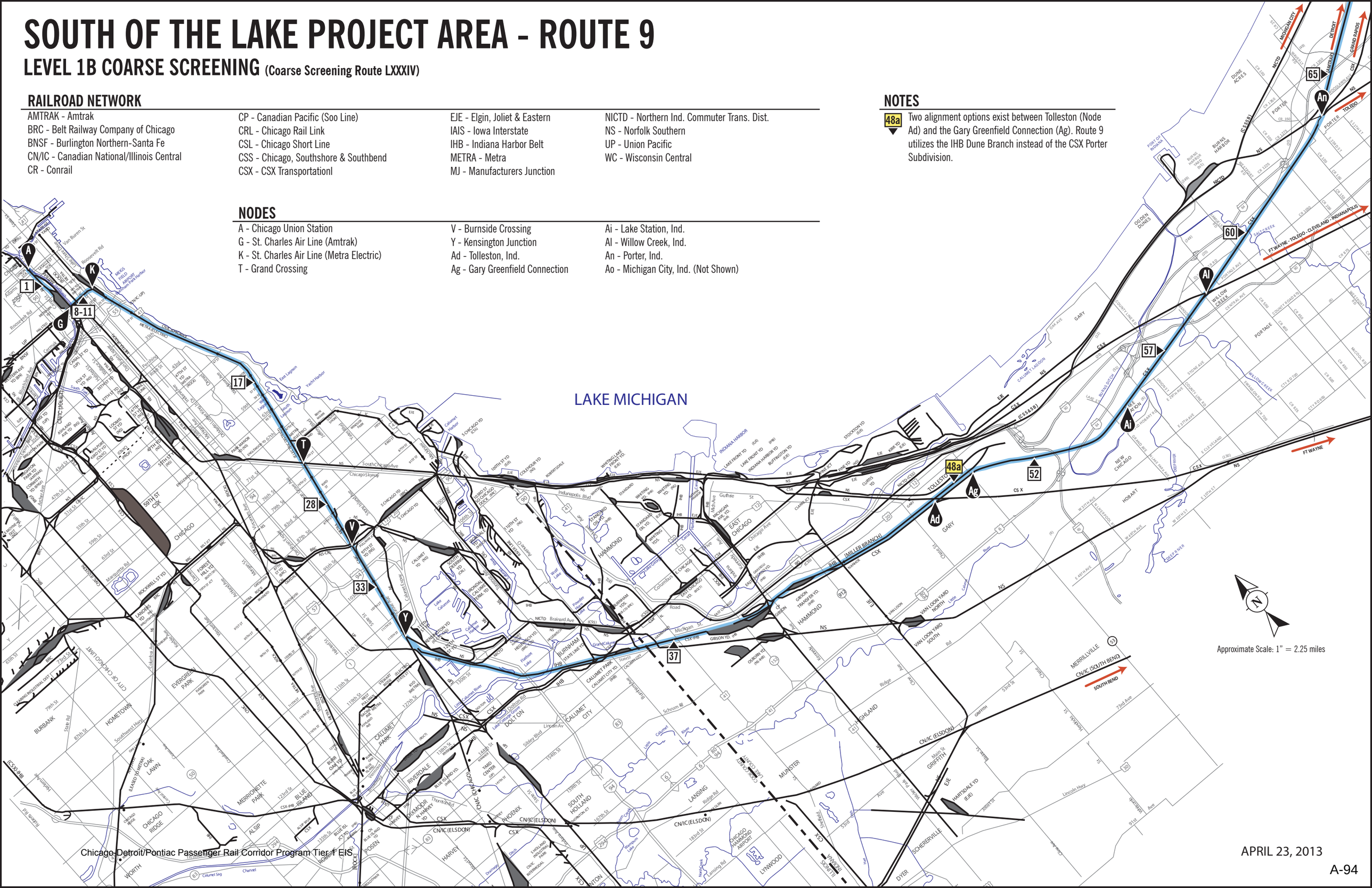
AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX Transportationl
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
K - St. Charles Air Line (Metra Electric)
T - Grand Crossing
V - Burnside Crossing
Y - Kensington Junction
Ad - Tolleston, Ind.
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Al - Willow Creek, Ind.
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)

NOTES

48a Two alignment options exist between Tolleston (Node Ad) and the Gary Greenfield Connection (Ag). Route 9 utilizes the IHB Dune Branch instead of the CSX Porter Subdivision.



Approximate Scale: 1" = 2.25 miles

SOUTH OF THE LAKE PROJECT AREA - ROUTE 10

LEVEL 1B COARSE SCREENING (Coarse Screening Route LXXXV)

RAILROAD NETWORK

AMTRAK - Amtrak
BRC - Belt Railway Company of Chicago
BNSF - Burlington Northern-Santa Fe
CN/IC - Canadian National/Illinois Central
CR - Conrail
CP - Canadian Pacific (Soo Line)
CRL - Chicago Rail Link
CSL - Chicago Short Line
CSS - Chicago, Southshore & Southbend
CSX - CSX Transportationl
EJE - Elgin, Joliet & Eastern
IAIS - Iowa Interstate
IHB - Indiana Harbor Belt
METRA - Metra
MJ - Manufacturers Junction
NICTD - Northern Ind. Commuter Trans. Dist.
NS - Norfolk Southern
UP - Union Pacific
WC - Wisconsin Central

NODES

A - Chicago Union Station
G - St. Charles Air Line (Amtrak)
K - St. Charles Air Line (Metra Electric)
T - Grand Crossing
V - Burnside Crossing
Y - Kensington Junction
Ad - Tolleston, Ind.
Ag - Gary Greenfield Connection
Ai - Lake Station, Ind.
Al - Willow Creek, Ind.
An - Porter, Ind.
Ao - Michigan City, Ind. (Not Shown)

NOTES

49 Two alignment options exist between Tolleston (Node Ad) and the Gary Greenfield Connection (Ag). Route 10 utilizes the CSX Porter Subdivision instead of the IHB Dune Branch.