DEPARTMENT OF TRANSPORTATION

Twin Ports Interchange Reconstruction Project

Environmental Assessment Worksheet

OCTOBER 2018

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July 2013 Version

Environmental Assessment Worksheet

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addressed collectively under EAW Item 19.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation, and the need for an Environmental Impact Statement (EIS).

1. Project Title

Twin Ports Interchange (TPI) Reconstruction Project

2. Proposer

Proposer: Minnesota Department of Transportation
Contact Person: Duane Hill
Title: District Engineer
Address: 1123 Mesaba Avenue
City, State, ZIP: Duluth, MN 55811
Phone: 218-725-2704
Email: duane.hill@state.mn.us

3. RGU

RGU: Minnesota Department of Transportation
Contact Person: Roberta Dwyer
Title: Project Manager
Address: 1123 Mesaba Avenue
City, State, ZIP: Duluth, MN 55811
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Email: roberta.dwyer@state.mn.us

4. Reason for EAW Preparation

Check one:

Required:
☐ EIS Scoping
☒ Mandatory EAW

Discretionary:
☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory, give EQB rule category subpart number(s) and name(s):
Minnesota Rules, part 4410.4300, subpart 26 – Stream Diversion

5. Project Location

County: St. Louis
City/Township: Duluth
PLS Location: Section 33 and 34, Township 50N, Range 14W; Section 3 and 4, Township 49N, Range 14W
Watershed (81 major watershed scale): St. Louis River (#3)
At a minimum, attach each of the following to the EAW:

- **County map showing the general location of the project** (see **Figure 2**)
- **US Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries** (see **Figure 3**)
- **Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan** (see **Figure 4**)

6. Project Description

a. Provide the brief project summary to be published in the *EQB Monitor* (approximately 50 words).

The Minnesota Department of Transportation (MnDOT) is proposing to reconstruct the I-35/I-535/US 53 interchange, US 53 between I-35 and W 3rd Street, and I-535/Garfield Avenue interchange located in Duluth, St. Louis County. The project will also include modifications to local roads and stormwater infrastructure.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion, include a description of the existing facility. Emphasize 1) construction and operation methods and features that will cause physical manipulation of the environment or will produce wastes; 2) modifications to existing equipment or industrial processes; 3) significant demolition, removal, or remodeling of existing structures; and 4) timing and duration of construction activities.

There are 35 existing bridges within the TPI Reconstruction Project, most of which were built in 1969. These structures are nearly 50 years old and are approaching the end of their design and service life.

The TPI Reconstruction Project includes several improvements to address and correct freight and safety issues caused by structural and geometric deficiencies, as described in the following sections and shown on **Figure 5.**

Component 1: I-35/I-535/US 53 Interchange Reconstruction

I-35 is the region's central artery and is a four-lane divided highway. It was constructed in 1969 and includes eight mainline bridges. Over 250,000 square feet of the I-35 mainline surface area (roughly 2,200 linear feet) is currently built on bridge structure between approximately Miller Creek and the Garfield Avenue overpass. These bridges were constructed due to poor soils in the area. The ramps that make the interchange connections from I-35 to I-535 and US 53 include an additional 16 bridges. Of these 16 bridges, 12 are weight restricted[1] and seven are non-redundant.[2]

The eight mainline bridges have experienced significant corrosion to the piling and have required emergency repairs, frequent inspections, and an extended emergency closure of I-35 southbound immediately adjacent to the project location, which lacks any alternate route. Due to changes in freight vehicle sizes, traffic volumes and patterns, interstate geometrics, and bridge conditions, reconstruction of the interchange is required. The I-35/I-535/US 53 interchange also has a number of geometric deficiencies that make it the interchange with the fourth highest crash rate in the state, accounting for more than one crash per week. These deficiencies include left exits and blind merge points with short weave distances.

The reconstructed interchange will accommodate existing and anticipated future traffic volumes and patterns, replace up to eight bridges with an at-grade and divided interstate roadway, replace the remaining weight-restricted ramp bridges that connect I-35, I-535, and US 53, and address geometric deficiencies to reduce crashes.

Additionally, the 27th Avenue West (W) bridge (Bridge 69834) is a continuous steel beam bridge that will be reconstructed with the TPI Reconstruction Project. The new bridge will be reconfigured to accommodate pedestrian access.

Component 2: US 53 Reconstruction

US 53 is a critical freight route to northern Minnesota for the timber industry and taconite (iron) mines and intersects I-35 as the west approach to the interchange. The part of US 53 within the TPI Reconstruction Project between I-35 and W 3rd Street consists of six concrete box girder bridges constructed in 1972. The US 53 bridges provide access and connectivity for local, regional, and international traffic.

One US 53 mainline bridge is in poor condition (with a National Bridge Inventory (NBI) rating of 4[3]) due to several shear cracks near an abutment and throughout the length of the concrete box girders near the piers. These cracks are a major concern for the future capacity of this bridge. This bridge also has cracking of the bottom and sides of the box girder near the abutment, which is causing significant spalling and delamination. Two associated bridges on the 21st Avenue W ramps have similar issues and are in fair condition (NBI ratings of 5). The other US 53 mainline bridge is in similar overall condition

[1] Federal Highway Administration defines a weight restriction as a bridge that cannot safely support all legal vehicles and must be weight restricted.
[2] AASHTO Bridge Design Specifications defines redundancy as the quality of a bridge that enables it to perform its design function in a damaged state.
[3] The NBI rating system includes a structural evaluation of deck, superstructure, substructure, and culvert on a 0-9 scale, with 9 meaning a superior to present desirable criteria and 0 meaning the bridge is closed.

and has an NBI rating of 5. The deck has map cracking on the surface and cracking and delamination with rust staining on the bottom side and top of the interior of the box girder.

The six US 53 bridges will be load-rated in 2018 due to the growing shear cracks in the webs of the cast-in-place concrete box structures at several locations. Additionally, there has been increasing deterioration at several locations that needs to be further studied to determine if any short-term repairs or weight restrictions are needed prior to full replacement of these bridges.

The US 53 bridges will be reconstructed as part of the TPI Reconstruction Project to maintain and enhance local and regional connectivity and safety.

Component 3: I-535/Garfield Avenue Interchange Reconstruction

The I-535/Garfield Avenue interchange is the primary access point for the Port of Duluth-Superior. The interchange was constructed in 1969, and it has two weight restricted bridges that restrict access to I-535, I-35, and US 53 for oversize and overweight (OSOW) loads to and from the Port of Duluth-Superior. OSOW loads must travel several miles on local streets to reach the next interstate access, adding an estimated three hours to each move and resulting in increased costs for shippers and inconvenience for the local community. Reconstructing these bridges will allow overweight permit loads to more efficiently reach the interstate. It will also eliminate the short weave distances at these ramps.

I-535 also spans over a BNSF Railway spur track (Bridge 69810). This bridge is a continuous steel beam type bridge that is planned to be rehabilitated with the TPI Reconstruction Project. Preliminary analysis indicates that the beams at the outer edges of the bridge deck could be modified by adding additional steel bracing (diaphragms) at the piers to provide lateral support to the fascia beams. This work will increase the bridge capacity to carry American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) HL-93 Design Loads and MnDOT LRFD Permit Vehicles.

Proposed 2019 Traffic Mitigation Improvements

Pavement improvements will be implemented on a number of local city streets that are expected to see higher traffic volumes during construction of the TPI Reconstruction project (see **Figure 7**). These improvements will generally consist of pavement repair and/or restriping of lanes and include the following roadway segments and intersections:

- Garfield Avenue from the east end of the bridge over the railyard and I-35 (about 250 feet west of Railroad Street) to Nelson Street
- 27th Avenue W from southbound I-35 on/off ramp to Michigan Street W
- 46th Avenue W from southbound I-35 off ramp to Grand Avenue
- Railroad Street from Garfield Avenue to 5th Avenue W
- Intersection improvement at the Superior Street W and Michigan Street W intersection

- Intersection improvements at the 27th Avenue W/Michigan Street W and Garfield Avenue/Railroad Street intersections will be made to provide for clearer channelization of traffic
- 22nd Avenue W from Michigan Street W to 1st Street W will be reconstructed to accommodate the relocation of Coffee Creek from 1st Street W to Michigan Street W

No pavement widening is required for any of these improvements. All work is being conducted within the existing curb line except for the Americans with Disabilities Act (ADA) compliant ramps that will be reconstructed at the intersections. ADA improvements on 27th Avenue W will be done with the reconstruction of the 27th Avenue W bridge.

Railroad Street Connection

MnDOT identified a route on the west side of I-35 that could provide an alternate parallel route to I-35 and enhance local access between the Lincoln Park neighborhood and downtown Duluth during construction. This route could follow 27th Avenue W to Michigan Street W/Lower Michigan Street W until Superior Street W where there would be a new intersection control (roundabout or signal) that would allow for easy turning for vehicles that want to access Railroad Street via the existing Garfield Avenue overpass. Additionally, the 27th Avenue W bridge over I-35 would be restriped to three lanes, but no other improvements would be made to Michigan Street W between 27th Avenue W and just south of the Michigan/Superior Street W intersection. The proposed improvements are shown in **Figure 7.**

An additional option was considered that added a fourth leg to the intersection described above that would cross over I-35 and touched down at Railroad Street, where vehicles could turn left and continue toward the Canal Park/Duluth Entertainment Convention Center (DECC)/downtown area or turn right to get to Garfield Avenue and the freight related business and the port terminals. The estimated cost of a bridge over I-35 is approximately $10 million, which makes this option unlikely; however, further evaluation is looking at modifications to reduce cost and/or enhance benefits of this option.

Creek Realignment Options

Miller and Coffee Creeks are designated trout streams that outlet to the St. Louis Bay within close proximity to each other after crossing in separate culverts under I-35. Both creeks are contained within culvert structures through the entire project area. Given their proximity to each other, MnDOT is considering combining the creeks into a common culvert or bridge under I-35 in addition to the alternative of maintaining their respective crossing locations.

If combined, Miller and Coffee Creeks would merge before crossing under I-35. This would allow for a cost-effective crossing (one location versus two) and less impact to rail operations during construction. It also provides opportunity for some creek channel improvements. Soil contamination in the realigned channel area will be investigated in preliminary design. The minimum structure width is estimated at 50 feet, based on a

height of 6 feet and a length of more than 300. Given the size of this structure, a bridge for the creek crossing is also being considered. The proposed alignment is shown in **Attachment A**. The portion of Coffee Creek under US 53 between 1st and Michigan Streets W would be realigned with the 2019 road improvements. The downstream portion of Coffee Creek would be realigned and combined with Miller Creek during the 2020 to 2023 construction.

If combining the creeks is not feasible, the default option would be to design independent culverts for each creek after confirming appropriate pipe sizes. This determination is dependent on contamination in the soil and Minnesota Department of Natural Resources (DNR) and US Army Corps of Engineers (USACE) input.

Railroad Realignment Options

Two options are being considered for temporary track realignments (shoofly) that may be required during construction of the I-535 ramps to/from I-35 and the creek crossing(s) under I-35 and the railroad tracks. These options include:

- Construct a shoofly in the area of the creek crossing to maintain Canadian National (CN) and BNSF track operations during construction of the new creek crossing and bridge removals
- Construct a new CN/BNSF crossover south of the ore docks near 37th Avenue W to allow CN to temporarily use BNSF trackage through the construction zone to minimize the extent of shoofly construction needed near Miller and Coffee Creek outfalls

The general location of the CN/BNSF crossover is shown on **Figure 6.**

Construction Phasing

The project is using the alternative delivery method of Construction Manager/General Contractor (CMGC), with the goal of completing all of the work within a single work package. Traffic mitigation work on local streets will begin in spring 2019 under a separate contract and work on the I-35/I-535/US 53 interchange is scheduled to begin in 2020 and take three to four construction seasons.

I-35 will remain open to traffic during construction; however, temporary lane and ramp closures will occur during construction. The local street improvements will be constructed while maintaining traffic. The specific bridge construction methods will not be known until design has been finalized; however, associated construction activities will likely involve pile driving for pier construction and concrete pavement demolition for bridge removal.

c. Project magnitude

Table 6-1: Project Magnitude

Measure	Magnitude
Total Project Acreage	92.19 acres

Measure	Magnitude
Linear Project Length	I-35 Segment: Approximately 8,570 feet US 53 Segment: Approximately 3,788 feet I-535: Approximately 1,000 feet 46th Street W: Approximately 1,400 feet Railroad Street: Approximately 6,000 feet Garfield Avenue: Approximately 4,100 feet 27th Avenue W: Approximately 700 feet 22nd Avenue W: Approximately 600 feet
Number and Type of Residential Units	N/A
Commercial Building Area (square feet)	N/A
Industrial Building Area (square feet)	N/A
Institutional Building Area (square feet)	N/A
Other Uses – specify (square feet)	N/A
Structure Height(s)	N/A

d. Explain the project purpose. If the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of the project is to improve the functionality (structural and geometric deficiencies) of the I-35/I-535/US 53 interchange, US 53 approach to the I-35/I-535/US 53 interchange, and I-535/Garfield Avenue interchange to improve the safety and flow of traffic and freight between the Port of Duluth-Superior and local, regional, and international destinations.

The project has three primary needs:

- The infrastructure included in the TPI Reconstruction Project has structural deficiencies, including seven non-redundant and 14 weight restricted bridges, that need to be addressed to accommodate OSOW loads and meet legislative directive
- The I-35/I-535/US 53 interchange has geometric deficiencies, including two left exits, five blind merges, and short weave distances, that need to be addressed to improve safety and mobility
- Weight restrictions prevent access to the I-35/I-535/US 53 and I-535/Garfield Avenue interchanges for the majority of freight loads forcing the loads onto the local street system

e. Are future stages of this development, including development on any other property, planned or likely to happen? ☐ Yes ☒ No

If yes, briefly describe future stages, relationship to present project, timeline, and plans for environmental review.

Not applicable.

f. Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No

If yes, briefly describe the past development, timeline, and past environmental review.

Not applicable.

7. Cover Types

Estimate the acreage of the site with each of the following cover types before and after development.

Table 7-1: Cover Types

Cover Type	Before (Acres)	After (Acres)
Wetlands	2.86	0.77
Deep Water/Streams	0.38	0.38
Wooded/Forest	0.88	0
Brush/Grassland	20.41	19.64
Cropland	0	0
Lawn/Landscaping	19.26	16.51
Impervious Surface	48.40	52.32
Stormwater Pond	0	2.57
Other (describe)	0	0
Total	**92.19**	**92.19**

8. Permits and Approvals Required

List all known local, state, and federal permits, approvals, certifications, and financial assistance for the project. Include modifications of any existing permits, governmental review of plans, and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing, and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules Chapter 4410.3100.*

Table 8-1: Permits and Approvals Required

Unit of Government	Type of Application	Status
LOCAL		
City of Duluth	Municipal Consent for 2019 local road improvements	Will be on November 2018 city council agenda for approval
City of Duluth	Municipal Consent for 2020-2023 interchange reconstruction	Fall 2019 city council agenda for approval; engagement with City is ongoing
MnDOT as Local Governmental Unit under the Wetland Conservation Act	Wetland Replacement Plan, if needed	Application to be submitted December 2018, if needed
STATE		
Minnesota State Historic Preservation Office (MnSHPO)	Section 106 Determination and Programmatic Agreement (PA)	Draft findings were submitted in September 2018. MnSHPO's Determination is expected by November 2018.
MnDOT Office of Environmental Stewardship (OES) on behalf of the Federal Highway Administration (FHWA)	Endangered Species Act Section 7 Determination	Complete
MnDOT	Right-of-way agreements	In process

Unit of Government	Type of Application	Status
MnDOT	Environmental Assessment Worksheet	Complete
MnDOT	EIS Need Decision	To be requested
DNR	Public Waters Work Permit	Applications to be submitted separately for 2019 and 2020 projects
DNR	Groundwater Appropriation Permit (if necessary)	To be requested by contractor if needed
Minnesota Pollution Control Agency (MPCA)	National Pollution Discharge Elimination System	Preliminary drainage plans complete and will be used to obtain high-level permit approval; specific construction SWPPPs will be prepared by designer for each construction year
MPCA	Response Action Plan (RAP)	To be completed
FEDERAL		
USACE	Section 404 Wetland Impact Permit	Applications to be submitted separately for 2019 and 2020 projects
USACE	Section 408 Permit	Review complete – USACE determined permit is not necessary
FHWA	Categorical Exclusion	In process
FHWA	Interchange Access Request (IAR)	In process
OTHER - PRIVATE		
BNSF Railway and CN Railway	Flagging Agreement	Ongoing meetings to be held with BNSF Railway; modifications have been incorporated into design; right-of-way agreement is in process
BNSF Railway and CN Railway	Temporary Construction Easements	Same as above

9. Land Use

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, and prime or unique farmlands.

Existing Land Use

According to the City of Duluth's Planning and Land Use map,[4] the I-35 and I-535 sections of the project area are entirely within industrial land use. The project area along US 53 where it meets the I-35/I-535 interchange is within mixed use commercial, and transitions to the east to mid-rise community shopping and

[4] City of Duluth Planning and Land Use Map; available at: http://duluthmn.maps.arcgis.com/apps/Viewer/index.html?appid=1f3a2c6f9a234ca9b4c63a99dfd45e4e

office, mixed use business park, and mixed-use neighborhood. The St. Louis Bay is located southeast of the project area. Two trout streams (Miller Creek and Coffee Creek) cross beneath I-35 and US 53 and empty into the bay. Buckingham Creek also crosses the project on the north end of Railroad Street. Merritt Creek crosses the BNSF/CN track near the BNSF/CN crossover area. Five railroads operate through the project area: Canadian Pacific (CP), the North Shore Scenic Railway, CN, Union Pacific, and BNSF. BNSF's Rice's Point Rail Yard is located in a large portion of Rice's Point.

Parkland and Trails

Enger Park is located northwest of the project, and the Cross City Trail follows portions of I-35 by permit (see **Figure 4**). There is a skate park under US 53 near 20th Avenue W that is located within MnDOT right-of-way but currently functions without a permit.

The project will not affect Enger Park. Impacts to the Cross City Trail will be temporary during construction as the trail is realigned outside the construction zone for user safety. The anticipated route will shift from Michigan/Lower Michigan Street W to Superior Street W. The skate park similarly will be closed to users during construction of that portion of US 53. A Limited Use Permit will be coordinated with the City to operate the skate park in its current location post-construction.

Prime/Unique Farmlands

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, of the six soil types within the construction limits, none are classified as prime farmland or farmland of statewide importance.

ii. Planned land use as identified in comprehensive plans (if available) and any other applicable plan for land use, water, or resource management by a local, regional, state, or federal agency.

According to the City of Duluth's Planning and Land Use map, the land within the project area is planned as transportation and utilities, and mixed use with business, commercial, and residential. The project will not require any change in land use.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

According to the City of Duluth's zoning map, the project area along the shoreline of the St. Louis Bay falls within the City of Duluth's General Development Shoreland Management Zone and Flood Boundary (**Figure 4**). The creek outfalls and a portion of the I-535 ramp bridges fall within the shoreland zone. The project changes in these areas will be minimal from the existing condition with respect to the shoreland zone.

The project limits along I-535 are within the boundary of the St. Louis Bay floodplain (shown on **Figure 8**), which is at an elevation of 605 feet. The floodplain boundary is based on Federal Emergency Management Agency (FEMA) 100-year

floodplain and floodway data. There will be a minimal amount of fill within the floodplain for new bridge piers, and existing bridge piers will be removed; therefore, there is not expected to be any net floodplain storage impact and no further floodplain mitigation required.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The proposed improvements are consistent with Duluth's local zoning and planned land use within the project area.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Not applicable.

10. Geology, Soils, and Topography/Land Forms

a. Geology – Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

Geology

The project area lies between the steep hills of Duluth and St. Louis Bay of Lake Superior. The lakeshore in this area has been modified with fill over the past 150 years. Based on 1969-era construction borings and geologic data, it is expected that the majority of the project area is underlain by soft organic and clay soils, with sand layers and pockets.

According to the Phase I Environmental Site Assessment (ESA) completed in 2018, the surficial geology of the project area consists of the Barnum Formation of the Superior Lobe (Minnesota Geological Survey, 2009 and 2016). The Barnum Formation has a loam to clay texture, reddish colored, bedded sediments, ranging from laminated silt and clay to sand and gravel.

The bedrock in the project corridor is as shallow as 5 feet below ground surface and as deep as 150 feet below ground surface. Bedrock consists of Duluth Complex.

Karst Conditions

There are no known karst features present within or near the project construction limits based on the Karst Feature Inventory Points from the DNR - Division of Waters database.

Topography

According to the Phase I ESA, the elevation of the project area ranges from approximately 600 feet above mean sea level (amsl) to approximately 670 feet amsl. The majority of the project area is relatively flat, with elevation increasing further from the bay.

b. Soils and Topography – Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability, or other soil limitations, such as steep

slopes or highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections, or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

Soil data was obtained from the NRCS Web Soil Survey. There are six soil types within the construction limits. The two soil types that make up the largest portions of the project limits are variations of Urban land-Udorthents-Aquents complex (77.90 percent) and Urban land-Cuttre-Rock outcrop complex (15.70 percent). **Table 10-1** provides details on the soil types found within the construction limits.

The NRCS Erosion Hazard Ratings indicate the hazard of soil loss from off-road areas after disturbance activities that expose soil surface. Within the construction limits, almost all the soils have a "not rated" ranking since they are classified as urban land, and 0.30 percent of the construction limits have a severe ranking, meaning that significant erosion is expected. This area is concentrated near I-35 where Superior and Michigan Streets W meet and has very steep slopes.

To determine existing soil conditions, MnDOT is in the process of completing dozens of soil borings to inform design requirements. With this data, a specific geotechnical report will be prepared for each structure to specify the appropriate construction type and methods that should be used to minimize the amount of excavation or soil correction needed. To address specific soil conditions, special design considerations will be made for the roadbed, bridge foundations, overhead sign supports and light towers, as well as culverts and other large utilities to ensure stability of all construction components.

Table 10-1: Soil Types within the Project Construction Limits

Map Unit Symbol	Map Unit Name	Erosion Hazard Rating	Percent of Construction Limits
1028A	Urban land-Udorthents-Aquents complex, 0 to 8 percent slopes	Not rated	77.90%
E18A	Urban land-Cuttre-Rock outcrop complex, 0 to 3 percent slopes	Not rated	15.70%
E18B	Urban land-Cuttre-Rock outcrop complex, 0 to 8 percent slopes	Not rated	2.40%
F160F	Rock outcrop-Mesaba-Barto complex, 18 to 60 percent slopes	Severe	0.30%
F163D	Urban land-Mesaba-Rock outcrop complex, 1 to 18 percent slopes	Not rated	3.40%
W	Water	Not rated	0.30%

A Stormwater Pollution Prevention Plan (SWPPP) will be developed for this project. All areas disturbed during construction would be revegetated in accordance with the SWPPP and related permitting requirements. In areas with steep slopes, special consideration will be given to prevent erosion during construction, such as erosion control blankets and soil reinforcement. No impacts to soils or topography are anticipated once construction of this project is complete.

11. Water Resources

a. Describe surface water and groundwater features on or near the site below.

i. Surface Water – lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within one mile of the project. Include DNR Public Waters Inventory number(s), if any.

The project is located near the western tip of Lake Superior (DNR#16-1P), specifically along the northwest shore of St. Louis Bay. Lake Superior is classified as a restricted outstanding resource value water (ORVW). Four creeks (Miller, Coffee, Merritt, and Buckingham) enter the bay after crossing I-35 within the project area. All of these creeks except Merritt Creek are DNR public waters and all four are DNR designated trout streams. Miller Creek, Merritt Creek, and St. Louis Bay are listed as impaired waters. St. Louis Bay is impaired for mercury and polychlorinated biphenyls (PCBs). Miller Creek is impaired for temperature, E. coli, macroinvertebrates, and chlorides. Merritt Creek is impaired for aquatic recreation due to E. coli.

A wetland delineation was conducted in 2017 and updated in 2018 for the main interchange area.[5] Additional areas have since been delineated to cover all areas within the preliminary project limits. **Attachment B** lists the identified wetlands, showing their types and sizes. Wetland locations are shown on **Figure 8**.

ii. Groundwater – aquifers, springs, and seeps. Include 1) depth to groundwater; 2) if project is within a MDH well protection area; and 3) identification of any onsite and/or nearby wells, including unique numbers and well logs, if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Depth to Groundwater

The Minnesota Department of Health (MDH) County Well Index[6] was reviewed to determine the depth to and flow of groundwater in the project area. Generally, groundwater flows east toward the St. Louis Bay. The groundwater level varies between 0 to 10 feet in the project area.

Wellhead Protection Area

The project is not located within the vicinity of a Wellhead Protection Area or a Drinking Water Supply Management Area.

Onsite or Adjacent Wells

Review of the MDH County Well Index shows several wells along the I-35 corridor but that are located outside the proposed right-of-way limits. The wells range in depth from 6 to 20 feet. Four wells were identified during surveys of the project

[5] A copy of the wetland delineation report is on file and available for review at the MnDOT District 1 Office at 1123 Mesaba Avenue in Duluth, Minnesota.
[6] Minnesota Department of Health County Well Index, available at https://apps.health.state.mn.us/cwi/

area. If additional wells are encountered during construction, they will be sealed in accordance with MDH regulations.

MnDOT is in the process of completing dozens of soil borings that will provide additional groundwater level information.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects below.

i. Wastewater – For each of the following, describe the sources, quantities, and composition of all sanitary, municipal/domestic, and industrial wastewaters projected or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Not applicable.

2) If the wastewater discharge is to a subsurface sewage treatment system (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

Not applicable.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods, discharge points, and proposed effluent limitations to mitigation impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Not applicable.

ii. Stormwater – Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control, or stabilization measures to address soil limitations during and after project construction.

The current drainage infrastructure was constructed in 1969. Significant development upstream of the drainage outfalls since has greatly increased runoff to the system, and new published rainfall data from Atlas 14 indicates that the in-place drainage facilities are undersized.

Much of the lower end of the drainage system sits at or below lake level, making full inspection and assessment of the system's condition extremely difficult. Inspections that have been conducted have shown several pipes to be in poor condition, especially those that are continually wet. The existing drainage under

the bridges is slow due to rough grading and limited slopes, which has contributed to corrosion of the piling under the bridges.

The TPI Reconstruction Project would improve drainage and stormwater runoff by updating the drainage system to meet current standards. The new storm sewer system will provide capacity for the 10-year storm event with 50-year capacity from major low points to outfalls. In locations where significant ponding may occur, flanking inlets will be placed on each side of the low point for safety.

Coffee Creek, currently contained within an old stone/brick tunnel and culvert through the interchange will be replaced with a new culvert from 1st Street W to Michigan Street W, which will then daylight to a new constructed channel which may ultimately be combined with Miller Creek. The new open channel will significantly improve conditions for fish passage, provide for riparian areas, and would enhance visual quality. In addition, new stormwater treatment systems are being planned with a treatment goal of infiltrating and/or filtrating the first 1-inch of runoff from the new impervious surfaces and providing 70% removal of total suspended solids (TSS) and 60% removal of total phosphorus (TP). Filtrating runoff will provide cooling of runoff prior to discharging to Coffee and Miller Creeks, both of which are designated as trout streams. In locations where ponding is not feasible, alternative methods of stormwater treatment are being planned which include structural stormwater treatment systems.

Miller Creek currently flows through the interchange through dual 10-foot by 6-foot box culverts. During the 50-year design storm event, the dual box culverts flow under a significant amount of head pressure with high exit velocities which lead to scour. A new bridge or culvert structure is being planned with an approximate 50-foot width with an open channel bottom to allow for the combining of Miller and Coffee Creeks and provide for easier fish passage. The wider opening would result in channel flow through the structure during the 100-year storm event with no head pressure and low exit velocities, reducing the potential for scour at the outlet.

The impervious surface within the project construction limits is estimated to increase by 3.92 acres with the proposed reconstruction. Three wet ponds are being designed to meet water quality treatment requirements in the I-35/I-535/US 53 interchange area (see **Attachment B** for locations). The ponds will be designed as large as possible within the constraints of existing right-of-way to meet requirements. Grit chambers or similar best management practices (BMPs) may be designed in addition to the wet ponds to provide additional TSS removal. The proposed pond near the I-535/Garfield Avenue interchange area, is shown oversized and would accommodate future treatment needs for portions of the future Blatnik Bridge project.

Temporary and permanent erosion control measures will be defined in the SWPPP, which will be updated with each phase of construction.

iii. Water Appropriation – Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use,

and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

There are four known wells within the project construction limits according to the MDH County Well Index database. The project will not remove or relocate any known wells.

Construction dewatering is anticipated to be necessary due to the high water table in the area and proximity of the lake. However, due to the high potential for groundwater contamination from historic uses, MnDOT is investigating construction methods that would minimize or avoid the need to dewater for bridge piers, retaining walls, and other structures requiring below grade excavation.

Dewatering best management practices (BMPs) will be identified in the SWPPP, and a project dewatering plan will be attached to the construction documents. All locations that are determined to require dewatering would be included in the dewatering plan. If dewatering rates during construction exceed 10,000 gallons per day or one million gallons per year, a DNR water appropriation permit would be required for these activities.

iv. Surface Waters

1) Wetlands – Describe any anticipated physical effects or alterations to wetland features, such as draining, filling, permanent inundation, dredging, and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

It was not feasible to completely avoid all wetland impacts resulting from the TPI Reconstruction Project. Wetland impacts that are unavoidable have been minimized to the extent practicable without compromising safety. Alternatives considered are described in the Alternatives Development Report (2018)[7] and will be outlined for the permit application review process and coordination with the permit agencies.

In total, 2.09 acres of permanent impact is anticipated at eight wetlands (shown in **Attachment B**). Of those impacts, 0.17 acres are to wetlands

[7] Report is available from MnDOT District 1 upon request.

located at the bottom of roadside ditches (wet ditches). Wetlands 1, 2, 3, 8, 10, 11, and 13 are located in wet ditches and basins underneath, between, or adjacent to the existing I-35 southbound lanes (Wetlands 1, 2, 3, 8, 11, and 13) or the existing I-535 northbound lane (Wetland 10). They contain stormwater infrastructure such as culverts and drains. These impacted wetlands appear to function as stormwater catchment that flows either indirectly or directly toward St. Louis Bay. Based on the historic review of photos from 1902 and 1905, the wetlands appear to be within an industrial port with largely developed, upland conditions. Furthermore, history of drainage infrastructure designed/constructed at the time of the interchange (circa 1968 plan set from MnDOT) show constructed ditches for road runoff/catchment between the north and southbound I-35 lanes. Based on this historic aerial and plan review, it is anticipated that these wetland resources may not be regulated and, therefore, minimization efforts were not focused in these areas.

Portions of permanent impacts to Wetland 9 are located underneath existing bridge structure. The preliminary bridge design minimized new impact by extending the new bridges over portions of Wetland 9. As design continues, further reduction in impact may be made depending on the final location of the bridge abutment. The extent of minimization will be dependent on soil conditions, water table, and contamination.

USACE Regulated Wetlands

Preliminary coordination with the USACE is ongoing to determine wetland impact that is regulated by the agency. A Jurisdictional Determination (JD) will be coordinated with the USACE to determine which wetland impacts require mitigation. As the project design progresses, wetland types and impacts will be refined in accordance with USACE permitting requirements. Wetland impacts would be mitigated by purchasing USACE approved bank credits at a 1:1 replacement ratio within Bank Service Area (BSA) 1, the same BSA as proposed impacts.

Wetland Conservation Act (WCA) Regulated Wetlands

All wetland impacts are located within right-of-way owned by MnDOT; thus, MnDOT is the Local Government Unit (LGU) for all wetland impacts of this project. Some of the wetlands within the corridor were created in uplands when I-35 was constructed. These wetlands are considered "incidental" and are not under WCA jurisdiction; thus, they do not require compensatory mitigation. Incidental determination will be made during the permit review process.

The assumed replacement ratio for this project per WCA requirements is 1:1 for impacts requiring replacement. The mitigation would be provided by purchasing approved wetland bank credits within the same BSA.

DNR Regulated Waters

Miller and Coffee Creeks are DNR trout streams; however, the lower reach of both creeks is not known to provide much trout habitat in their current condition. New channel construction, whether open or via culvert, will be

constructed in new location south of Miller Creek to minimize work in flowing channel.

2) **Other surface waters – Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal, and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.**

   The project will not affect watercraft usage. Based on the impairments listed for the St. Louis Bay, Merritt Creek, and Miller Creek, no further impairment will result from this project. Erosion control will be implemented to minimize any sedimentation during construction. Applicable precautions will be implemented to prevent the spread of aquatic invasive species when working in or near the infested waters of the bay.

   The project will impact approximately 664 linear feet of Miller Creek to reconstruct its crossing of I-35. If Coffee Creek is realigned to cross I-35 with Miller Creek, 868 linear feet of Coffee Creek would be created in an open channel rather than reconstructing the entire culvert that currently extends to the bay. MnDOT is working with the DNR to find ways to improve stream habitat through the project area.

12. Contamination/Hazardous Materials/Wastes

a. Pre-project Site Conditions – Describe existing contamination or potential environmental hazards on or in close proximity to the project site, such as soil or groundwater contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize, or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

A Phase I Environmental Site Assessment (ESA) was completed in January 2018.[8] The purpose of the Phase I ESA was to identify all known or potentially contaminated properties in the project area.

During the Phase I ESA, potentially contaminated properties were identified through review of historic land use records and aerial photographs; US Environmental Protection

[8] A copy of the entire Phase I ESA report (and Phase II ESA reports, when completed) are on file and available for review at the MnDOT District 1 Office at 1123 Mesaba Avenue in Duluth, Minnesota.

Agency (EPA), MPCA, and county/city records; and reconnaissance of current property conditions. Sites identified by the Phase I ESA have been classified into high, medium, and low environmental risk levels (criteria established by MnDOT).

- High Risk - Sites with high potentials for contamination include all active and inactive Voluntary Investigation and Cleanup (VIC) and Minnesota Environmental Response and Liability Act (MERLA)/Superfund sites, all active and inactive dump sites, all active leaking underground storage tank (LUST) sites, all dry cleaners (with on-site or unknown chemical processing), all bulk chemical/petroleum facilities, all active agricultural release sites, railroad facilities (fueling, yards or maintenance), clandestine chemical/drug laboratory, and all historic industrial sites with likely chemical use (printing, photography, blacksmithing, plating) on the premises.
- Medium Risk - Sites with medium potential for contamination will include all closed LUST sites, all sites with underground storage tanks (USTs) or aboveground storage tanks (ASTs), machine shops, all sites with historic vehicle repair activities, all bulk grain/feed storage, all historical lumber yards, all closed agricultural release sites, historic USTs in roadway, graveyards, and all sites with detections of non-petroleum chemicals.
- Low Risk - All sites with low potential for contamination will include hazardous waste generators, railroad lines, current lumber yards, golf courses and possibly some farmsteads, residences, or commercial properties with poor housekeeping practices.
- De miminis - Properties that do not qualify by definition as low, medium, or high ranked sites are to be considered unlikely for contamination (ranked "de minimis").
- Contractor will obtain approval from State's Project Manager for ranking of any types of sites not included in this summary.

The TPI Reconstruction Project is located in an area of long-term industrial, commercial, residential, and railroad use, and much of the area was created on fill material of unknown origin. The Phase I ESA identified 42 high, 66 medium, and 22 low risk sites for the project area, and numerous of these high and medium sites have potential or are known to have released chemicals into the environment (see **Figure 9**). Based on the results of the Phase I ESA, a Phase II ESA investigation is currently in progress. The purpose of the Phase II ESA is to verify the presence of contamination and to characterize the extent and magnitude of contamination where appropriate. The Phase II ESA also identifies any restrictions in potential soil reuse, based on MPCA guidance. Impacts from contaminated properties established during the investigation will be mitigated by modifying the project design where warranted, avoiding purchasing a contaminated property if possible, and/or avoiding encountering contaminated materials during construction. If contaminated materials cannot be avoided, a plan will be developed to properly handle and treat any contaminated materials encountered during project construction in accordance with applicable state and federal regulations. Liability protections will be

obtained from the regulatory agencies to protect MnDOT from being named as a responsible party to any release.

Drilling work plans are currently being completed for investigations of the soil and groundwater to establish the presence of and the magnitude of chemical impacts to the environment. This information will be used in conjunction with the construction design plans to write specific contract special provisions and a Response Action Plan (RAP) for known contamination and how to manage known soils and groundwater that will be encountered during construction.

Unknown materials may also be encountered during construction that were not identified during the initial site investigations. A Construction Contingency Plan (CCP) will be written and incorporated within the RAP, and it will discuss how to handle the unknowns that are encountered. If necessary, MnDOT may enroll documents summarizing the investigations and the material handling into the MPCA Brownfield Program to obtain regulatory assurances for property acquisition and to obtain approvals for the management and clean-up plans. MnDOT will hire an environmental construction oversight contractor, if necessary, to help manage contaminated and regulated materials and to make sure that these materials are handled in accordance with all appropriate federal, state, and local regulations.

b. Project Related Generation/Storage of Solid Wastes – Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage, and disposal. Identify measures to avoid, minimize, or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

All solid wastes generated by construction of the proposed project would be disposed of properly in a permitted, licensed solid waste facility. Project demolition of concrete, steel, asphalt, and other potentially recyclable construction materials would be directed to the appropriate storage, crushing, or renovation facility for recycling.

c. Project Related Use/Storage of Hazardous Materials – Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location, and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spills or releases of hazardous materials. Identify measures to avoid, minimize, or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

No aboveground or belowground storage tanks are planned for permanent use in conjunction with this project. Temporary storage tanks for petroleum products may be located in the project area for refueling construction equipment during construction. Other chemicals used during construction will be stored as required by state law.

Appropriate measures would be taken during construction to avoid spills that could contaminate groundwater or surface water in the project area. If a spill of hazardous or toxic substances should occur during or after construction of the proposed project, it is the responsibility of the contractor (during construction) or transport company to notify

the Minnesota Department of Public Safety, Division of Emergency Services, to report corrective actions. Any contaminated spills or leaks that occur during construction are the responsibility of the contractor, who will immediately implement containment procedures, notify the Minnesota Duty Officer, and work with the MPCA to contain and remediate contaminated soil/materials in accordance with state and federal standards.

d. Project Related Generation/Storage of Hazardous Wastes – Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize, or mitigate adverse effects from the generation/storage of hazardous wastes including source reduction and recycling.

Regulated materials such as asbestos or PCB caulk will be removed from the bridges and any buildings prior to demolition. A demolition plan will be prepared for these materials and removals will be monitored by an oversight consultant.

13. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features)

a. Describe fish and wildlife resources as well as habitats and vegetation on or near the site.

A majority of the land within the project limits has experienced some level of previous disturbance. Residential, commercial, industrial, and infrastructure development have substantially altered much of the land within the project area. In general, wildlife species found in the project area are those species generally adapted to live in areas of mixed development and fragmented or partially fragmented habitats.

Coffee Creek

Coffee Creek is a DNR designated trout stream that flows through the project under a portion of US 53. This small creek begins in the Duluth Heights area of Duluth and meanders through part of the Enger Park golf course and then flows via a culvert under US 53, crosses under I-35, and empties into the St. Louis Bay. The culvert is known to be undersized based on current storm volume calculations.

Miller Creek

Miller Creek is also a designated trout stream that flows through the project area from Lincoln Park to I-35. Miller Creek has a highly impacted watershed and has been listed by the MPCA as impaired (see Section 11). The creek begins northeast of the Duluth International Airport and enters the St. Louis Bay at about 26th Avenue W. Miller Creek encounters three box culverts as it flows downstream: a 10-foot wide box culvert under the Duluth Transit Authority building, a 16-foot wide by 6.5-foot tall box culvert beneath the abandoned rail embankment, and a double 10-foot wide by 6-foot tall box that crosses under I-35 and the BNSF mainline and outlets to the bay.

Both Miller and Coffee Creeks are urban trout streams and, according to the DNR, have relatively low fish value currently at the lower reach; however, trout are known to still use portions of these creeks. Opportunities to enhance the lower reaches of these creeks is being discussed with the DNR. Currently, a harbor habitat restoration project is underway at the outlet of these streams.

There are no Scientific and Natural Areas identified in the general project vicinity.

b. Describe rare features such as state-listed (endangered, threatened, or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-___) and/or correspondence number (ERDB) from which the data were obtained, and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe results.

Natural Heritage Information System (NHIS) Review and State Listed Species

MnDOT has a liaison with the DNR who performs reviews internally; therefore, is no applicable LA or ERDB number. Correspondence from the DNR is included in **Attachment C**.

A search of the NHIS database was conducted to identify rare features within the project area. The NHIS database is comprised of locational records of rare plants, rare animals, and other rare features including native plant communities, geologic features, and animal aggregations (such as nesting colonies). In order to ensure future protection of these sensitive resources, the location information is not provided in this document. Instead, this document generally identifies the sensitive resources in the project area and describes measures to avoid, minimize, or mitigate impacts to those resources.

Rare features identified during the NHIS review include:

- Two wildlife management areas (WMAs) located in the St. Louis Bay Estuary near the project area (Interstate Island WMA and Hearding Island WMA)
- Piping plover (*Charadrius melodus*), listed as endangered on both the state and federal threatened and endangered species lists
- Northern long-eared bat (*Myotis septentrionalis*), federally listed as threatened and state-listed as special concern
- The St. Louis Bay Estuary, which has been designated as Infested with Aquatic Invasive Species (AIS)

Federally Listed Species

The northern long-eared bat is a federally listed species identified within the project study area. Northern long-eared bats typically hibernate in caves and mines, swarming in surrounding wooded areas in autumn and roosting and foraging in upland forests during spring and summer. During the active season (approximately April to October) it roosts underneath bark, in cavities, or in crevices of both live and dead trees. Pup rearing is during June and July. The species distribution range covers all of Minnesota; however, there is no designated critical habitat for the species within the state.

c. Discuss how the identified fish, wildlife, plant communities, rare features, and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Wildlife Management Areas

Two WMAs are located in the St. Louis Bay Estuary near the project area (Interstate Island WMA and Hearding Island WMA). Both of these facilities contain colonial waterbird nesting areas and are managed for the common tern (*Sterna hirundo*), a state-listed species (threatened). Work proposed will not directly impact these areas, but the contractor should be made aware of these nearby areas.

Wildlife Resources

The piping plover (*Charadrius melodus*), listed as endangered on both the state and federal threatened and endangered species lists, have been known to utilize the WMAs; however, no entries exist in the NHIS since 2000.

The northern long-eared bat (*Myotis septentrionalis*), federally listed as threatened and state-listed as special concern, can be found throughout Minnesota. Activities that may impact this species include, but are not limited to, any disturbance to hibernacula and destruction/degradation of habitat (including tree removal). All tree clearing will follow federal regulations and MnDOT's Tree Clearing Timing Requirements Technical Memorandum.

Aquatic Invasive Species (AIS)

The St. Louis Bay Estuary has been designated as infested with AIS due to the presence of New Zealand mudsnail, round goby, ruffe, spiny waterflea, viral hemorrhagic septicemia (VHS), white perch, and zebra mussel. No work should be allowed in the bay if avoidable (including pumping water for construction purposes). Where work is required, the contractor will follow best practices that have been developed for construction equipment to prevent their spread (see **Attachment C**).

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Wildlife Management Areas

Given the nature and location of the proposed project and the WMAs, the implementation of this project will not result in direct or indirect impact to the WMAs.

Wildlife Resources

The NHIS does not contain any known occurrences of northern long-eared bat roosts or hibernacula within an approximate one-mile radius of the proposed project. Additionally, there are no listings of the Piping Plover in the project area since 2000. Therefore, the project is not anticipated to result in a direct or indirect impact to these species.

There is less than 1.0 acre of trees within the project construction limits that will be removed as part of this project. No tree removal will occur between June 1 and August 15. Tree clearing timing will be in accordance with federal laws and MnDOT's internal tree clearing guidance. The DNR recommends that MnDOT complete a bat survey within existing Coffee Creek culvert tunnels during the winter months to ensure bats impacts will be avoided during the relocation of Coffee Creek.

Fishery Resources

MnDOT will incorporate special provisions as needed to address specific design and mitigation requirements as determined through the Public Waters Permit review process. At a minimum, special provisions will include the following:

- Coffee Creek, Miller Creek, and the St. Louis Bay are DNR Public Waters; as such, a DNR Public Waters Work Permit will be required for the components impacting their course, current, or cross-section. The DNR noted that work in these areas or adjacent to these areas needs to include the re-establishment of native vegetation suitable to the local habitat in open areas.
- Construction work within Coffee Creek and Miller Creek will be restricted to allow for undisturbed fish migration and spawning. MnDOT will coordinate construction activities with the DNR and incorporate the applicable spawning restriction timeframes into the construction schedule (typically no in-water work from September 15 to June 30). MnDOT will follow the provisions of the National Pollutant Discharge Elimination System (NPDES) permit including erosion prevention, stabilization, and revegetation requirements.
- The DNR also noted that the MPCA NPDES general permit for authorization to discharge stormwater associated with construction activities (permit MN R10001) recognizes the DNR "work in water restrictions" during specified fish migration and spawning timeframes for areas adjacent to water. During the restriction period, all exposed soil areas that are within 200 feet of the water's edge and drain to these waters must have erosion prevention and stabilization activities initiated immediately after construction activity has ceased (and be completed within 24 hours).

Aquatic Invasive Species

The DNR noted that the St. Louis Bay is designated as infested with aquatic invasive species. MnDOT will follow the DNR's best practices guidance for preventing the spread of aquatic invasive species during construction (see **Attachment C**).

14. Historic Properties

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include 1) historic designations; 2) known artifact areas; and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

Archaeology

MnDOT's Cultural Resource Unit (CRU) completed an Archaeological Investigation within the defined archaeological Area of Potential Effect (APE). The APE encompasses:

- Reconstruction of the I-535 and Garfield Avenue interchange
- Reconstruction of the main interchange of I-35/I-535/US 53 and the I-35 mainline from Garfield Avenue to 27th Avenue W, including new structures and relocation of Coffee and Miller Creeks
- Reconstruction of US 53 from approximately 2nd Street W to the junction of I-35
- Other ancillary segments, including 46th Avenue W

The majority of the project activities will occur within existing MnDOT right-of-way; therefore, the investigation focused on areas of potential project disturbance that had minimal prior disturbance and within areas of known archaeological sites, including the original Lake Superior shoreline, original creek channels (Coffee and Miller Creeks), an old trading post, and a cemetery that was reportedly relocated. Areas of ground created by fill material beyond the historic shoreline, prior disturbance, inundation, or other low archaeological potential were excluded from the survey.

The archaeological fieldwork consisted of a visual inspection of the project areas with moderate to high archaeological potential within the APE. Monitoring of MnDOT's soil boring project was the primary method used, supplemented with mechanical and/or geoprobe testing and guided by the literature search, to assess the potential for suspected subsurface resources or intact soils.

The Archaeological Investigation report found while the project area would generally be considered an area of moderate to high archaeological potential given its proximity to the St. Louis River and the mouths of Coffee and Miller Creeks, much of the project area was historically wet and thus consists of created land or has been disturbed by the construction of railyards, the existing interchange, and city utilities. As a result, the archaeological potential of the area has been significantly moderated.

Monitoring of borings are ongoing and will continue into fall 2018. Borings thus far have been typical of an urban environment, where either intact soils have been completely removed or deeply-buried by fill events. Recommendations regarding next steps are pending the completion of the environmental borings, but based on the information gathered to date, limited areas of intact archaeological deposits may be present within the project area but will not be able to be sampled due to their depth and the presence of existing infrastructure. Therefore, in-person construction monitoring may be used to evaluate potential for archaeological resources in the APE.

Historic Resources

MnDOT CRU has also completed a Phase I-II Assessment of history/architecture resources. A total of 185 pre-1976 resources are located within in the APE, of which six were carried forward for Phase II investigation, including a proposed historic district. The APE included the interstate highway system and 44 bridges (see **Figure 10**).

Three properties in the APE were previously determined eligible for listing on the National Register of Historic Places (NRHP):

- Great Northern Power Company Substation (SL-DUL-3386) at 1424 W Superior Street (previously identified as SL-DUL-0191, with an incorrect address of 30 W Superior Street)
- Lake Superior and Mississippi (LS&M) Railroad (SL-DUL-2500)
- Duluth, Missabe & Iron Range (DM&IR) Railroad (SL-DUL-2499)

Based on an evaluation as part of this study, the LS&M Railroad was determined as non-contributing due to loss of integrity. The Phase II evaluation identified one additional property that has been determined eligible for the NRHP: the Goldfine's By the Bridge building

(Goodwill) located at 700 Garfield Avenue. **Table 14-1** lists the resources evaluated in the Phase II report.

In 2005, the Advisory Council on Historic Preservation issued the Interstate Highway Exemption, which relieves federal agencies from considering the vast majority of the Interstate Highway System as an historic resource under Section 106 of the National Historic Preservation Act and Section 4(f) of the US Department of Transportation Act[9]. The portion of I-35 and I-535 within the APE are covered by this exemption and, therefore, a Section 106 and Section 4(f) evaluation is not required for the interstate segments within the project area.

The Phase I-II architecture/history report has been submitted to MnSHPO for concurrence (see **Attachment C** for MnDOT CRU's letter). Although potential effects to eligible properties are not anticipated, discussion is ongoing with the MnSHPO. If any effects are identified, or effects cannot be determined, an agreement document would be prepared to address effects.

Table 14-1: History/Architecture Resources Evaluated in Phase II Investigation

Resource	ID	Status	Recommendation	Potential Effects
Duluth, Missabe & Iron Range Railroad (DM&IR)	SL-DUL-2499	Eligible		There is a very short segment of the DM & IR Railroad within the APE at the CN/BNSF crossover. Addition of this crossover is a typical operational activity that will have no adverse effect on this history property.
Lake Superior & Mississippi/ Northern Pacific Railroad (LS&M)	SL-DUL-2500	Eligible	Noncontributing, due to a loss of integrity (segment from West Duluth Jct. (67th Avenue S) to Lake Avenue S)	As a noncontributing segment of the railroad corridor, these proposed changes to enable continuation of operations during the construction period would have no adverse effect on the historic property.
Great Northern Power Company Substation	SL-DUL-3386	Eligible		The proposed project construction would have no adverse effect on the Great Northern property.
Chicago, St. Paul, Minneapolis, & Omaha Railroad	SL-DUL-3512		Not eligible	
Madison School/ Seaway Building	SL-DUL-0022		Not eligible	
Midtowne Manor	SL-DUL-3491		Not eligible	
LS&M/St.P&D/NP/ BNSF Railroad Yard	SL-DUL-3513		Not eligible	

[9] Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59, Aug. 10, 2005

Resource	ID	Status	Recommendation	Potential Effects
Trunk Highway 53	XX-ROD-023		Not eligible	
West Superior Commercial Historic District	SL-DUL-3514		Not eligible	
Goldfine's By the Bridge	SL-DUL-0025		Eligible for the NRHP under Criterion C and Criterion A	The proposed street improvements are relatively minor activities and will be limited to Garfield Avenue; there will be no adverse effect on the Goldfine's building

15. Visual

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The project area is an existing highway corridor that does not include any scenic views or vistas. The proposed project will reconstruct the existing roadway within the current right-of-way limits.

Minor changes in bridge elevations will occur and, as a result, the viewshed to the TPI Reconstruction Project may be modified. MnDOT has established a visual quality committee to produce a Visual Quality Manual that will identify aesthetic requirements for the project.

16. Air

a. **Stationary Source Emissions – Describe the type, sources, quantities, and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health, or applicable regulatory criteria. Include a discussion of any methods used to assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.**

   Not applicable.

b. **Vehicle Emissions – Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g., traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.**

   Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles in an area and the congestion levels. The air quality impacts from the project are analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the EPA on the basis of criteria (information on health and/or environmental

effects of pollution). The criteria pollutants identified by the EPA are ozone, particulate matter (PM), carbon monoxide (CO), nitrogen dioxide, lead, and sulfur dioxide. Potential impacts resulting from these pollutants are assessed by comparing projected concentrations to National Ambient Air Quality Standards (NAAQS).

In addition to the criteria pollutants, the EPA also regulates a category of pollutants known as mobile source air toxics (MSATs), which are generated by emissions from mobile sources. FHWA provides guidance for the assessment of MSAT effects for transportation projects in the National Environmental Policy Act (NEPA) process. A quantitative evaluation of MSATs has been performed for this project, as documented below. The scope and methods of the analysis performed were developed in collaboration with MnDOT, MPCA, and FHWA.

The following air quality elements are addressed: conformity to Minnesota's State Implementation Plan (SIP), a CO analysis, and a MSAT analysis.

Conformity

The project area is designated by EPA as in attainment (or complying) with the NAAQS for all air pollutants. Therefore, the project is not located in an area in which conformity requirements apply, and the scope of the project does not indicate that air quality impacts would be expected. Therefore, no quantitative air quality analysis is necessary.

Motor Vehicle Emissions Simulator (MOVES)[10]

According to the EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide,[11] EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

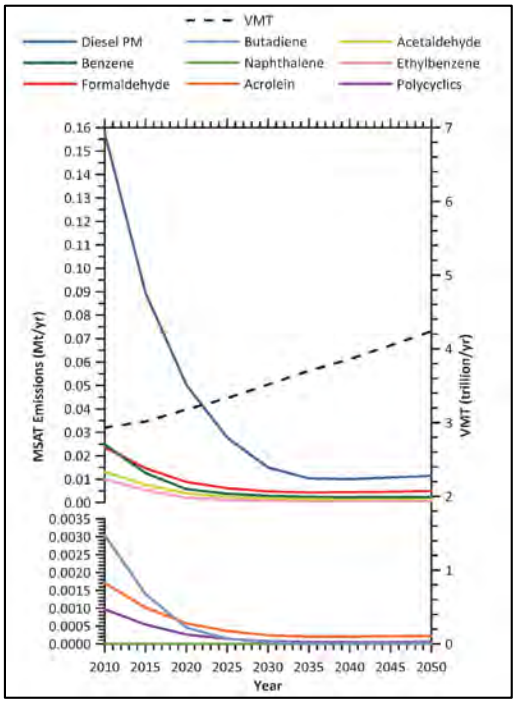
[10] FHWA. October 18, 2016. *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* available at http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm.

[11] Available at https://www.epa.gov/moves/moves2014a-latest-version-motor-vehicle-emission-simulator-moves

Using EPA's MOVES2014a model, as shown in **Figure 1**, FHWA estimates that even if VMT increases from 2010 to 2050, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and reflects the latest federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

Figure 1: FHWA Projected National MSAT Emission Trends 2010-2050 For Vehicles Operating on Roadways Using EPA's MOVES2014a Model[12]



Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated

[12] Source: EPA MOVES2014a model runs conducted by FHWA, September 2016. Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Risk Information System (IRIS).[13] In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA).[14] These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

MSAT Analysis

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled "A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives."[15]

FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

1. No analysis for projects without potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential for MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential for MSAT effects

According to FHWA guidance for MSAT analysis, in order for a project to fall into category three (quantitative MSAT analysis), the project should:

1. Create new capacity or add significant capacity to urban highways (such as interstates, urban arterials, or urban collector-distributor routes) and have traffic volumes where the annual average daily traffic (AADT) is projected to range from 140,000 to 150,000 or greater by the design year; and
2. Be located in proximity of populated areas

The TPI Reconstruction Project does not create new capacity or add significant capacity and thus a quantitative analysis is not warranted. Based on the anticipated growth, the Design Year 2020 AADT is 31,500 for US 53, 53,500 for I-35 south of the interchange, 67,900 for I-35 north of the interchange, and 44,000 for I-535. The projected AADTs are well below 140,000 in the affected freeway segments, but the proposed project is in the city of Duluth. This project meets the criteria for the second category; therefore, a qualitative

[13] US Environmental Protection Agency, Limited Risk Information System; available at http://www.epa.gov/iris/ (accessed April 2018)
[14] US Environmental Protection Agency, Technical Air Pollution Resources; available at http://www.epa.gov/ttn/atw/nata1999/ (accessed April 2018)
[15] Available at https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm

assessment of MSAT emissions has been conducted. The MSAT compounds evaluated in this analysis include:

- Acrolein
- Benzene
- 1,3-Butadiene
- Diesel Particulate Matter (Diesel PM)
- Formaldehyde
- Naphthalene
- Polycyclic Organic Matter (POM)

Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Better fuel efficiency, improvements in vehicle technology, and strict regulation dramatically decrease the total MSAT emissions, even with increased vehicle activities.

The project area is currently meeting all NAAQS for the criteria air pollutants, and is currently classified as in attainment. For the foreseeable future, the trend of lower per vehicle emissions is expected to at least offset growth in vehicle volumes. Therefore, the project area is expected to continue meeting NAAQS, without or with implementation of the proposed project. Based on the proposed build volumes, which forecast range between 31,500 to 67,900 vehicles per day (vpd), the project does not exceed the FHWA recommended upper threshold of 150,000 vpd in which FHWA recommends a quantitative MSAT analysis; therefore, the project is not expected to adversely affect air quality.

c. Dust and Odors – Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under Item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Dust generated during construction will be minimized through standard dust control measures such as applying water to exposed soils and limiting the extent and duration of exposed soil conditions. Construction contractors will be required to control dust and other airborne particulates in accordance with MnDOT specifications in place at the time of project construction. After construction is complete, dust levels are anticipated to be minimal because all soil surfaces exposed during construction would be in permanent cover (i.e., paved or re-vegetated).

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area; 2) nearby sensitive receptors; 3)

conformance to state noise standards; and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Noise is defined as any unwanted sound. Sound is a minute fluctuation in pressure that travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithm of the ratio of a measured sound energy relative to a reference sound energy. For noise that humans hear, an adjustment, or weighting, of the high- and low-pitched sound is made to approximate the way that an average person hears sound (this is called A-weighting). The adjusted sound levels are stated in units of A-weighted decibels (dBA). A change (increase or decrease) in sound of 3 dBA is barely noticeable by the human ear, a 5 dBA change is clearly noticeable, and a 10 dBA change is heard as twice or one half as loud.

The following section summarizes the findings from the TPI Traffic Noise Analysis Report provided in **Attachment E**.

Construction Noise

The construction activities associated with implementation of the proposed project will result in increased noise levels relative to existing conditions. These impacts will primarily be associated with construction equipment and pile driving.

Table 17-1 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Table 17-1: Typical Construction Equipment Noise Levels at 50 Feet[16]

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA) Equipment Type	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractors to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction may be required to expedite construction, minimize traffic impacts, and improve safety. However, construction will be limited to daytime hours as much as possible.

[16] EPA and FHWA

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. High-impact noise construction activities will be limited in duration to the greatest extent possible. The use of pile drives, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours.

Traffic Noise Analysis

The project includes significant changes to the vertical and horizontal alignment of the project area roadways. As such, this project is considered a federal Type I project[17] requiring a traffic noise analysis. The following is a summary of the TPI Traffic Noise Analysis Report. The complete TPI Traffic Noise Analysis Report is included in **Attachment E**. This report includes background information on noise, information regarding federal traffic noise regulations and MPCA state noise standards, a discussion of the traffic noise analysis methodology, documentation of the potential traffic noise impacts associated with the proposed project, and an evaluation of noise abatement measures.

Federal Requirements

The FHWA's traffic noise regulation is located in 23 Code of Federal Regulations (CFR) Part 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise). 23 CFR 772 requires the identification of highway traffic noise impacts and the evaluation of noise abatement measures, along with other considerations, in conjunction with the planning and design of a federal-aid highway project (i.e., projects funded or approved through the FHWA).

Under federal rules, traffic noise impacts are determined based on land use activities and predicted loudest hourly Leq[18] noise levels under future conditions. For example, for residential land uses (Activity Category B), the federal Noise Abatement Criterion (NAC) is 67 dBA (Leq). The term receptor is used to refer to land uses that receive traffic noise. Receptor locations where modeled traffic noise levels are "approaching" or exceeding the NAC must be evaluated for noise abatement feasibility and reasonableness. In Minnesota, "approaching" is defined as 1 dBA or less below the federal NAC. A noise impact is also defined when traffic receivers are projected to experience a "substantial increase" in the future traffic noise levels over the existing modeled noise levels. A "substantial increase" is defined as an increase of 5 dBA or greater from existing to future conditions.

State Requirements

The Minnesota state noise standards are located in Minnesota Rules Chapter 7030. The MPCA is the state agency responsible for enforcing state noise rules. In 2016, the Commissioners of the MPCA and MnDOT agreed that the traffic noise regulations and mitigation requirements from the FHWA are sufficient to determine reasonable mitigation measures for highway noise. By this agreement, existing and newly constructed segments of

[17] Federal Highway Administration, 23 CFR 772.5 and Type I Projects; more information available at https://www.fhwa.dot.gov/Environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/polguide02.cfm

[18] Measured traffic noise levels are characterized as a function of time. The equivalent steady-state sound level which in a stated period contains the same acoustic energy as the time-varying sound level during the same period, with Leq(h) being the hourly value of Leq. In effect, it's analogous to the "average" sound level over a given period.

highway projects under MnDOT's jurisdiction are statutorily exempt from the Minnesota State Noise Standard (Minnesota Rules Chapter 7030) if the project applies the FHWA traffic noise requirements. As a result, any required noise analysis will follow FHWA criteria and regulations only, as has been completed for this project. This project is not required to address Minnesota Rules Chapter 7030.

Methodology

Field measurements of existing noise levels were measured at nine locations within the project area. These locations were identified because they are representative of the surrounding area and the typical cross section for that section of highway. Field measurements were tested against model results. Noise levels from the field measurements were within 3 dBA (L10) of modeled noise levels, validating the model.

Traffic noise modeling was completed using the FHWA approved Traffic Noise Model 2.5 (TNM 2.5). Traffic noise levels were modeled for existing conditions (2016), the future (2040) No Build Alternative, and the future (2040) Build Alternative.

Because hourly traffic volumes and vehicle mix was not available, the loudest noise hour was determined by using the highest traffic volume on each roadway segment from the provided AM and PM peaks for each segment. This creates a conservatively high hybrid peak noise hour for modeling.

Traffic noise levels were modeled at a total of 374 receptor locations representing residential, recreational, commercial, and industrial land uses within the TPI project corridor. Additional details regarding the noise modeling methodology are described in **Attachment E**.

Findings

Detailed analysis results for each modeled receptor location can be found in the Traffic Noise Analysis Report in **Attachment E**. The analysis results are summarized below:

- The existing L_{eq} noise levels at modeled receptors varied between 45.9 dBA and 73.5 dBA
- Future 2040 No Build daytime L_{eq} noise levels were predicted to range between 46.5 dBA and 74.2 dBA
- Future 2040 Build daytime L_{eq} noise levels were predicted to range between 45.9 dBA and 76.1 dBA, exceeding state noise standards at 52 receptors

The analysis shows that under future No Build Alternative conditions, traffic noise levels are projected to increase by 0.4 dBA to 1.5 dBA (L_{eq}) compared to existing conditions for most modeled receptors. Modeled traffic noise levels under the future Build Alternative are projected to vary by -11.1 dBA below, to 3.0 dBA (L_{eq}) greater compared to existing conditions.

Potential Noise Abatement

Noise abatement measures (i.e., noise walls) were evaluated along the project area at receptor locations where modeled noise levels were projected to approach or exceed federal NAC, or result in a substantial increase (i.e., increase by 5 dBA or greater from existing to future Build Alternative conditions).

The noise wall analysis was completed on a total of five walls along the corridor. Of the five walls analyzed, none could meet MnDOT requirements and are not proposed as part of the project. Additional details of the noise wall analysis are also included in **Attachment E**.

The traffic noise analysis for the project area noise walls is based upon preliminary design studies completed at the time the noise analysis was performed. Final noise mitigation decisions will be subject to final design considerations and the viewpoint of benefited residents and property owners. If conditions substantially change by the time the project reaches the final design stage, the analyzed noise abatement measures will be reconsidered.

If that occurs, receptors that would have received benefits from noise walls, and local officials will be notified of plans to add a noise abatement measure prior to the final design process. This notification will explain any changes in site conditions, additional site information, any design changes implemented during the final design process, and noise wall feasibility and reasonableness. A final decision on noise abatement measures will be determined during final design.

18. Transportation

a. Describe traffic-related aspects of project construction and operation. Include 1) existing and proposed additional parking spaces; 2) estimated total average daily traffic generated; 3) estimated maximum peak hour traffic generated and time of occurrence; 4) source of trip generation rates used in the estimates; and 5) availability of transit and/or other alternative transportation modes.

According to MnDOT's 2017 traffic data[19], the current AADT along I-35 ranges from 44,500 vehicles south of the interchange to 57,000 vehicles north of the interchange. I-535 has 32,500 AADT and US 53 has 22,500 AADT.

Based on a review of historical traffic growth trends and projected volumes from the Metropolitan Interstate Council's Duluth-Superior Long-Range Transportation Plan, the project corridor is anticipated to experience 0.76% annual growth rate through the Design Year 2070. Based on the anticipated growth, the Design Year 2040 AADT is 31,500 for US 53, 53,500 for I-35 south of the interchange, 67,900 for I-35 north of the interchange, and 44,000 for I-535.

According to the Duluth Transit Authority[20] route map, there are no transit routes that travel on US 53, I-35, or I-535 in the project area.

Existing surface parking spaces are located between N 22nd Avenue W and N 21st Avenue W under US 53. These parking spaces will be reconstructed as part of the project adjacent to US 53.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total*

[19] MnDOT Traffic Data. Available at: http://mndotgis.dot.state.mn.us/tfa/Map
[20] Available at: http://www.duluthtransit.com/

***daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.**

A traffic analysis was conducted for the proposed project to identify traffic congestion in Build Year 2020 and 2040 for the project corridor. The analysis that found that Vehicle Hours of Delay (VHD) was reduced by 9% by 2020 and 6% by 2040 when compared to the No Build Alternative. This is mostly due to the eastbound lane addition on US 53 at the weaving segment before the I-35/I-535/US 53 interchange.

A memorandum summarizing the traffic analysis can be found in **Attachment D.**

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

The purpose of the TPI Reconstruction Project is to improve the traffic mobility and safety of US 53 and the I-35/I-535/US 53 interchange. As a result, mitigation is not necessary or required.

19. Cumulative Potential Effects

Note: Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items.

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Cumulative effects result from the incremental impact of the proposed project added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The geographic area considered for cumulative potential effects is the area proximate to the project limits. The projects considered are planned for construction between 2019 and 2023. Project related environmental effects that could combine with other environmental effects and the geographic extent of the anticipated impacts are summarized in **Table 19-1**.

Table 19-1: Project Related Environmental Effects and Geographic Extent

Reference (Section in EAW)	Topic/Issue	Project-Related Environmental Effects	Geographic Extent	Mitigation Plan
Section 10	Soils and Topography (Erosion and Sedimentation Control)	Disturbed ground/soils during project construction	Throughout project area	NPDES permit and SWPPP specified

Reference (Section in EAW)	Topic/Issue	Project-Related Environmental Effects	Geographic Extent	Mitigation Plan
Section 11	Water Resources (Stormwater and Aquatic Resources)	• Increase in impervious surface area (3.92 acres) • Impacts to aquatic resources (2.77 acres)	Throughout project area	• Addressed via permit and stormwater mitigation measures • Addressed via permit
Section 12	Existing Contamination or Potential Environmental Hazards	Total of 42 high, 66 medium, and 22 low risk sites identified within project area	Throughout project area	Addressed via agency approvals
Section 13	Fish, Wildlife, Plant Communities	Construction activities within Coffee and Miller Creek will be restricted to allow undisturbed fish migration and spawning (typically no in-water work from September 15 to June 30)	Coffee and Miller Creek	Addressed via DNR permit
Section 14	Historic Properties	• In-person monitoring of archaeological sites will continue into fall 2018 during borings • Total of 185 pre-1976 resources are located within the APE, of which six were carried forward for Phase II investigation • Study found that the project will have no adverse effect on the NRHP eligible resources	Within the APE	Addressed via agency approvals

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

The 2018-2021 State Transportation Improvement Program (STIP)[21] and the St. Louis County and City of Duluth websites were reviewed to identify present and other reasonably foreseeable future projects near the limits of the TPI Reconstruction Project. **Table 19-2** lists the present and reasonably foreseeable future projects identified in the study area.

[21] STIP. Available at: http://www.dot.state.mn.us/planning/program/stip.html

Table 19-2: Present and Reasonably Foreseeable Future Projects in the Study Area

Project Name	Agency	Description	Timeframe
27th Avenue W	City of Duluth	Sidewalk work on the north side	2019
Cross City Trail from Carlton Avenue to Grassy Point Trail	City of Duluth	Shared use path construction	2019
24th Avenue W from 3rd Street W to 7th Street W	City of Duluth	Watermain/road restoration	2019
Railroad Street from 5th Avenue W to Canal Park Drive	City of Duluth	Mill and overlay of segment north of pavement improvements constructed by MnDOT (Garfield to 5th Avenue W)	2021
Aerial Lift Bridge	City of Duluth	Painting/rehab	Unfunded and not scheduled; will complete the project when funded
3rd Street - Mesaba to 12th Avenue E	City of Duluth	Mill and Overlay	2020
Canal Park Drive/Harbor Drive/Railroad Street	City of Duluth	Reconfiguration of flow/lanes	To be determined
Superior Street Reconstruction / Phase 2	City of Duluth	Reconstruction of roadway from 1st Avenue E to 4th Avenue E	2019
Superior Street Reconstruction / Phase 3	City of Duluth	Reconstruction of roadway from 3rd Avenue W to 1st Ave East including Lake Avenue intersection	2020
Michigan Street	City of Duluth	Addition of 12-inch gas main from 1st Avenue W to 3rd Avenue E including work under Lake Avenue Bridge Overpass	2021-2022
Blatnik Bridge Replacement	MnDOT	MnDOT is developing a plan to schedule appropriate maintenance, preservation, rehabilitation and, ultimately, replacement of this structure	2027

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

Environmental effects resulting from the proposed TPI Reconstruction Project are summarized in **Table 19-1**. Other present and reasonably foreseeable future projects may also impact these same resources. Future development is taken into consideration in the traffic analysis, and the cumulative impact of these projects should result in improved traffic conditions. All other impacts from the projects listed in **Table 19-2** will be addressed via regulatory permitting and approval processes; therefore, they will be individually mitigated to ensure minimal cumulative impacts occur.

Because the corridor is already largely developed, considering the types of transportation projects listed in **Table 19-2,** and considering regulatory permitting and approval processes, the proposed project will have a minimal cumulative impact upon the environment.

20. Other Potential Environmental Effects

If the project may cause any additional environmental effects not addressed by Items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

Utilities

MnDOT conducted a subsurface utility engineering (SUE) report in 2016 for the majority of the project area. A supplemental investigation and report is in process for areas within the estimated project limits that were not investigated in the original report. Storm sewer and culverts were surveyed and documented in a separate report (Preliminary Drainage Report Twin Ports Interchange, 2018). The different utility types within the corridor and owners are listed in **Table 20-1** lists the known utilities and utility owners and the primary areas of potential impact.

Table 20-1: Utility Ownership within the Project

Utility Owner	Utility Type	Potential Conflict Points
Western Lake Superior Sanitary District	Sanitary Sewer	Crossings of I-35 at 26th Avenue W and about 550 feet further north; and under US 53 along Michigan, Superior and 1st Street W, and 22nd Avenue W; and following US 53 between 1st Street W and the lift station

Utility Owner	Utility Type	Potential Conflict Points
City of Duluth	Water / Storm Sewer/ Sanitary Sewer/Gas	• A gas main runs along Lower Michigan Street W and crosses I-35 near 26th Avenue W, Garfield Avenue, and US 53 at Michigan and 1st Streets W • A sanitary lift station at Lower Michigan Street W and US 53 bridge • Coffee Creek storm tunnel follows US 53 from 1st Street W to Michigan Street W and though interchange to bay • Water mains and services were designated throughout the project limits
CenturyLink	Telecommunications	No conflicts identified to date
Charter	Telecommunications	No conflicts identified to date
Consolidated Communications	Telecommunications	There are numerous fiber optic and telephone installations, both overhead and underground, located throughout the project corridor
Northeast Service Corp.	Telecommunications	No conflicts identified to date
Zayo	Telecommunications	No conflicts identified to date
Minnesota Power	Power	Several overhead and buried power installations were mapped throughout the project corridor
MnDOT	TMS	To be reinstalled throughout the project corridor
MnDOT	Illumination and Traffic	Power to traffic signal, cameras, and lighting

MnDOT will be responsible for removing and relocating power and fiber it needs for traffic management systems, and the storm sewer management system serving the project components. The project design will avoid the existing sanitary sewer, gas, and water crossings to the extent possible. This will be achieved primarily by matching existing storm inverts to avoid utilities. Special design details will be identified to protect and preserve the City's lift station. In the Coffee Creek realignment area, a number of small gas, sanitary, and water lines may need to be adjusted and new storm connections made. Power and fiber in most areas will need to be relocated. MnDOT is coordinating with these utility owners regarding potential impacts, construction schedule and how impacts can be minimized.

RGU Certification

*The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages, or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively,
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date 9-21-18

Title ASSISTANT DIVISION DIRECTOR

Figures

Figure 2: County Map

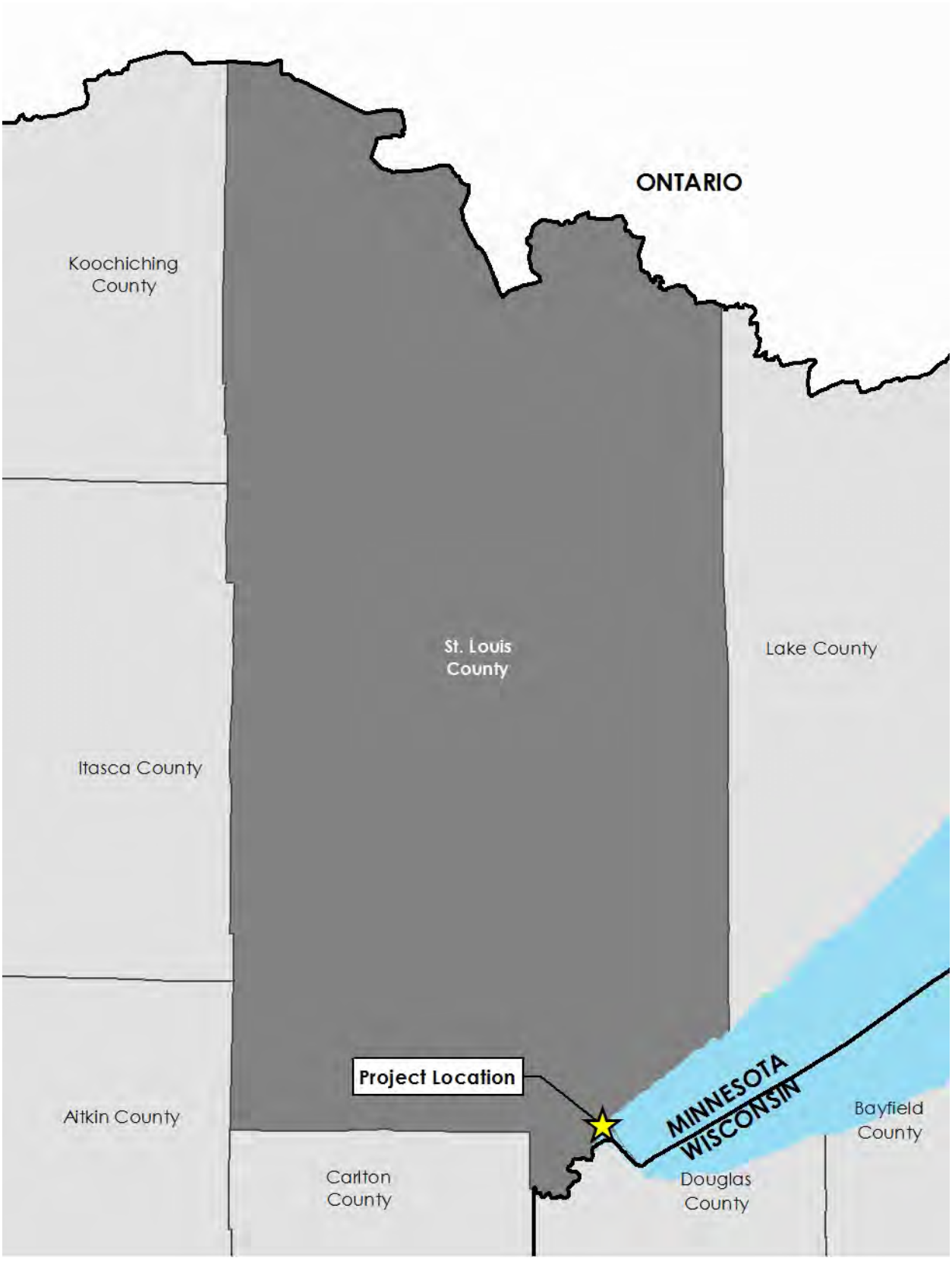


Figure 3: USGS Map

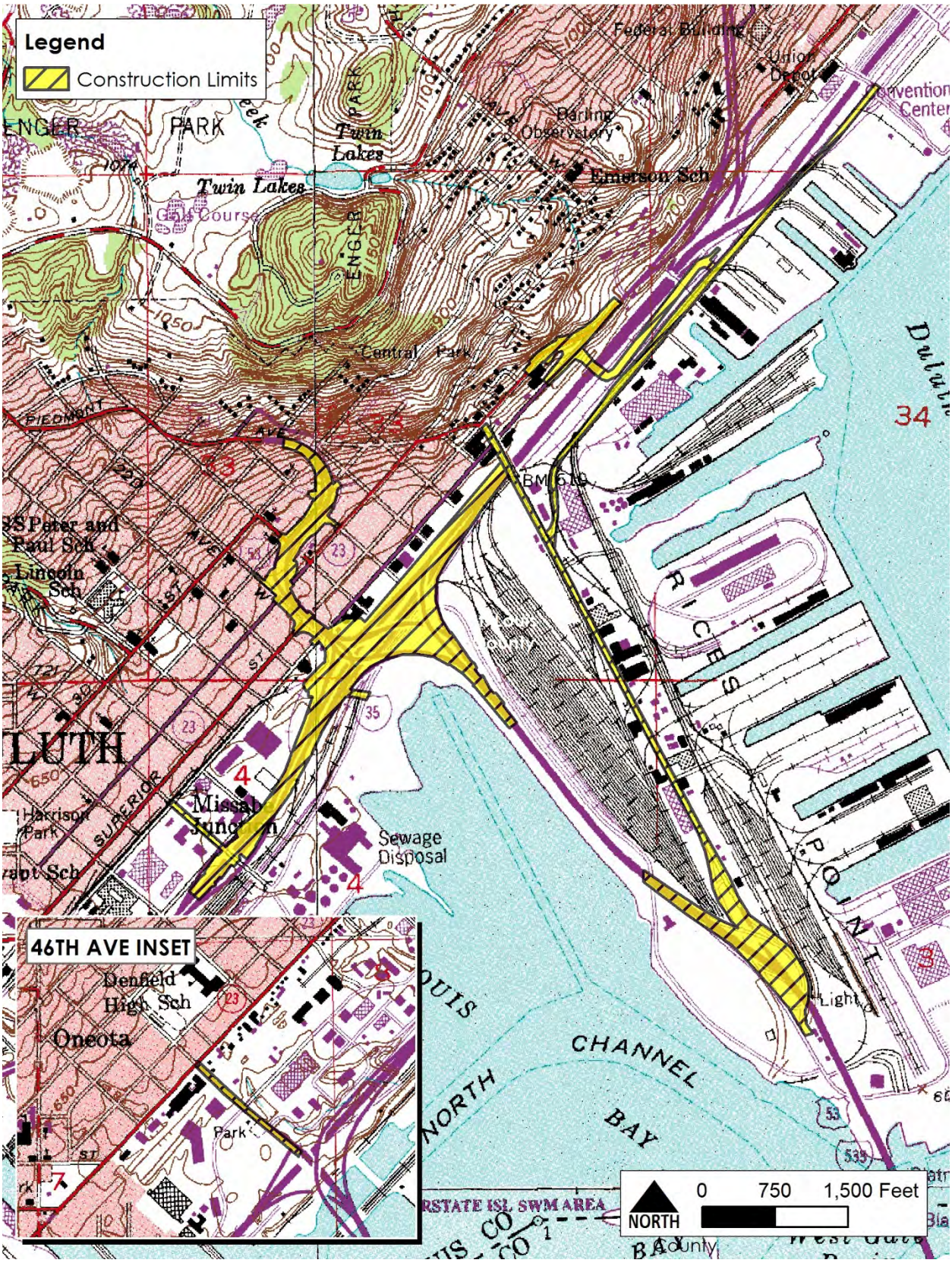


Figure 4: Site Map

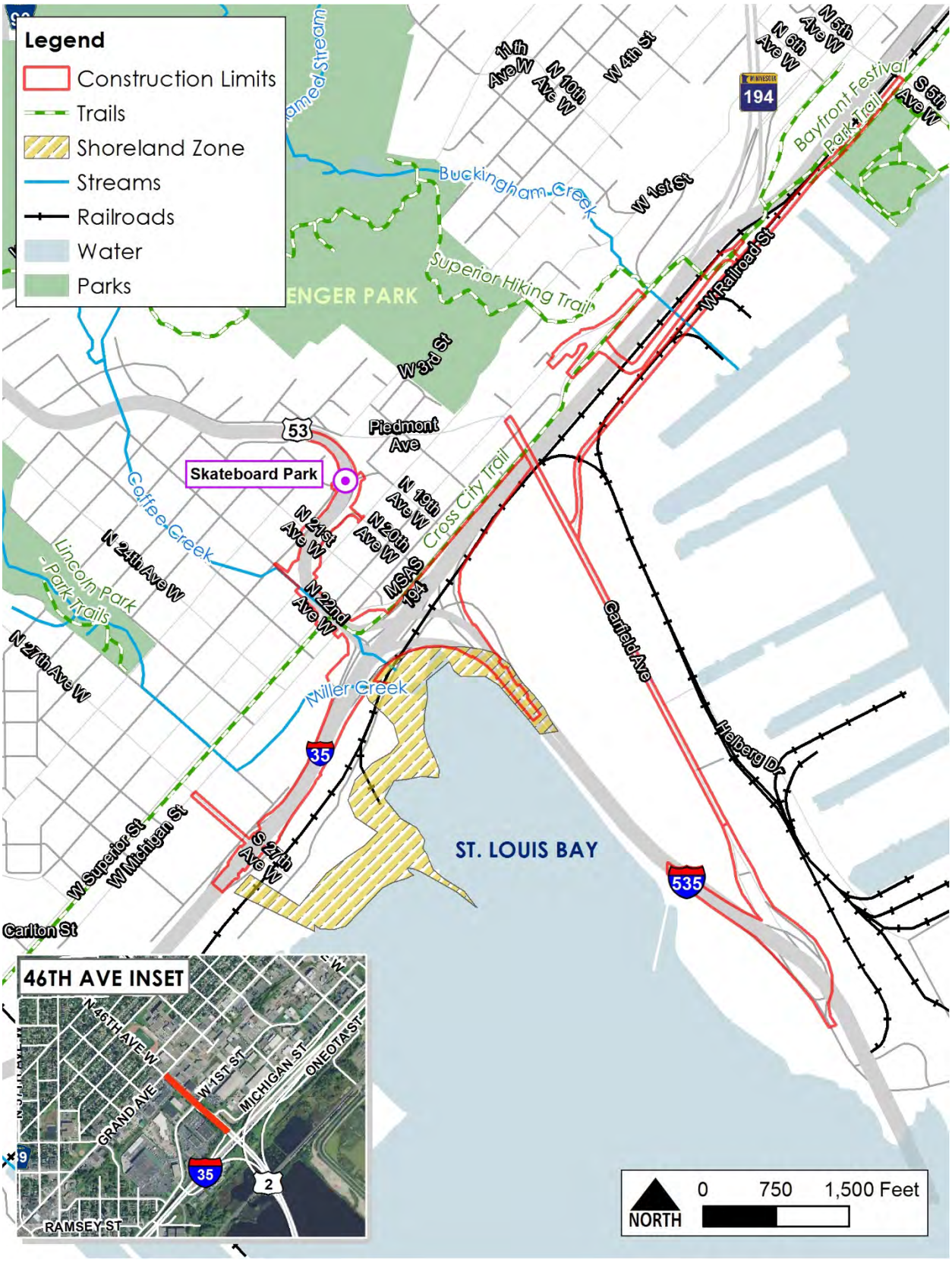


Figure 5: Project Components

Figure 6: CN/BNSF Crossover Location

Figure 7: Proposed 2019 Improvements

Figure 8: Water Resources

Figure 9: Contaminated Properties

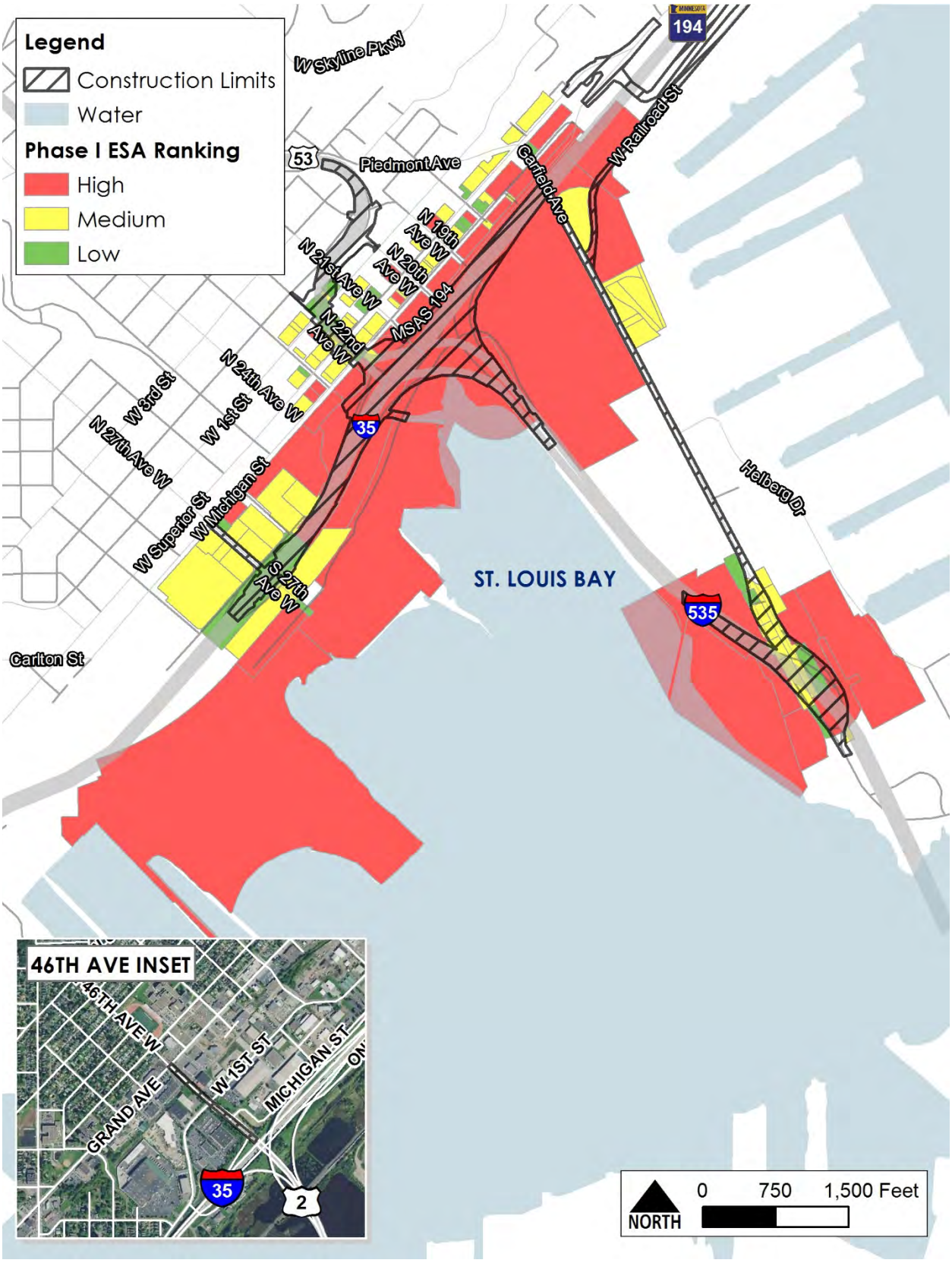
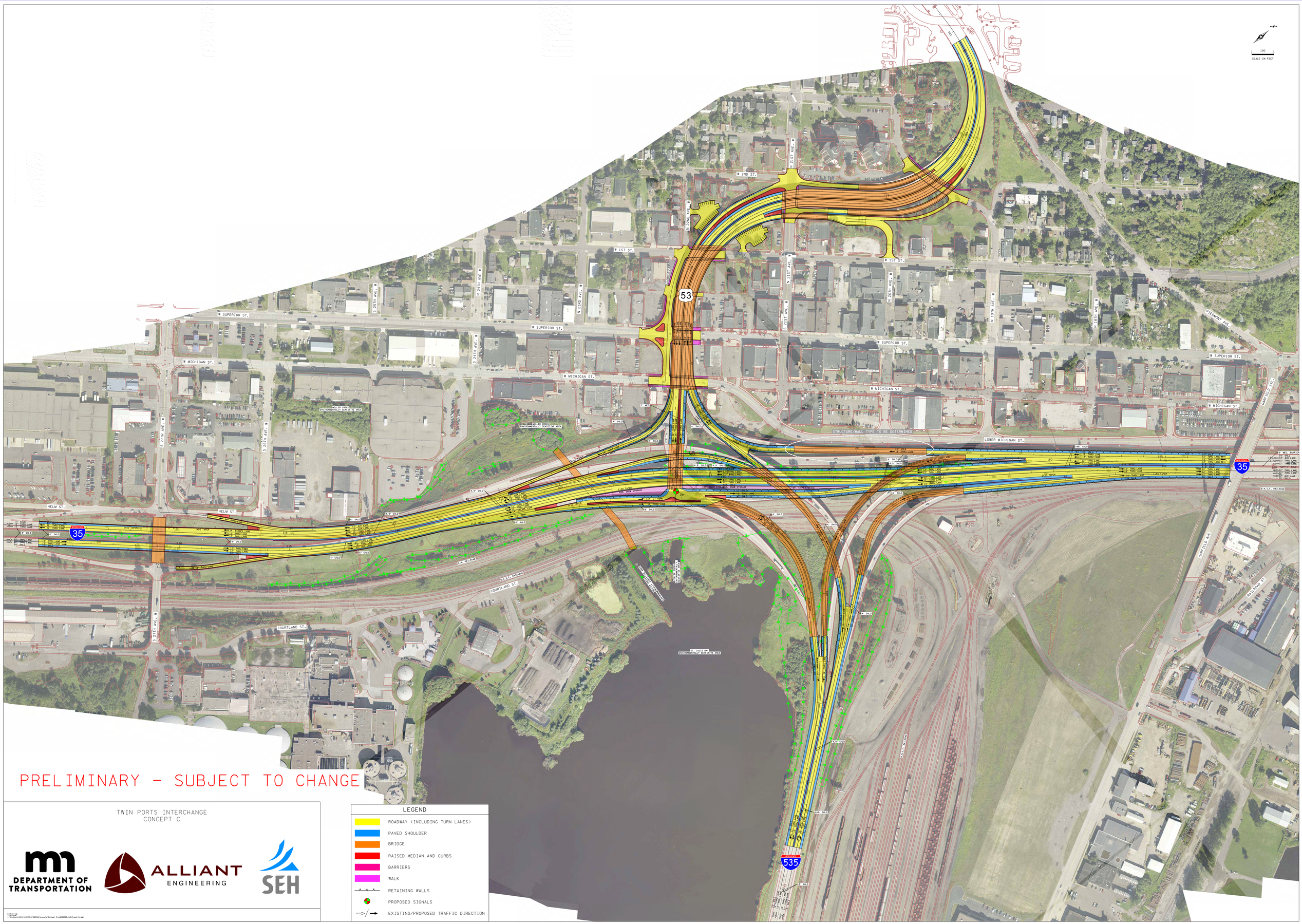


Figure 10: Historic Resources

Appendix A
Project Layouts



PRELIMINARY - SUBJECT TO CHANGE

TWIN PORTS INTERCHANGE
CONCEPT C

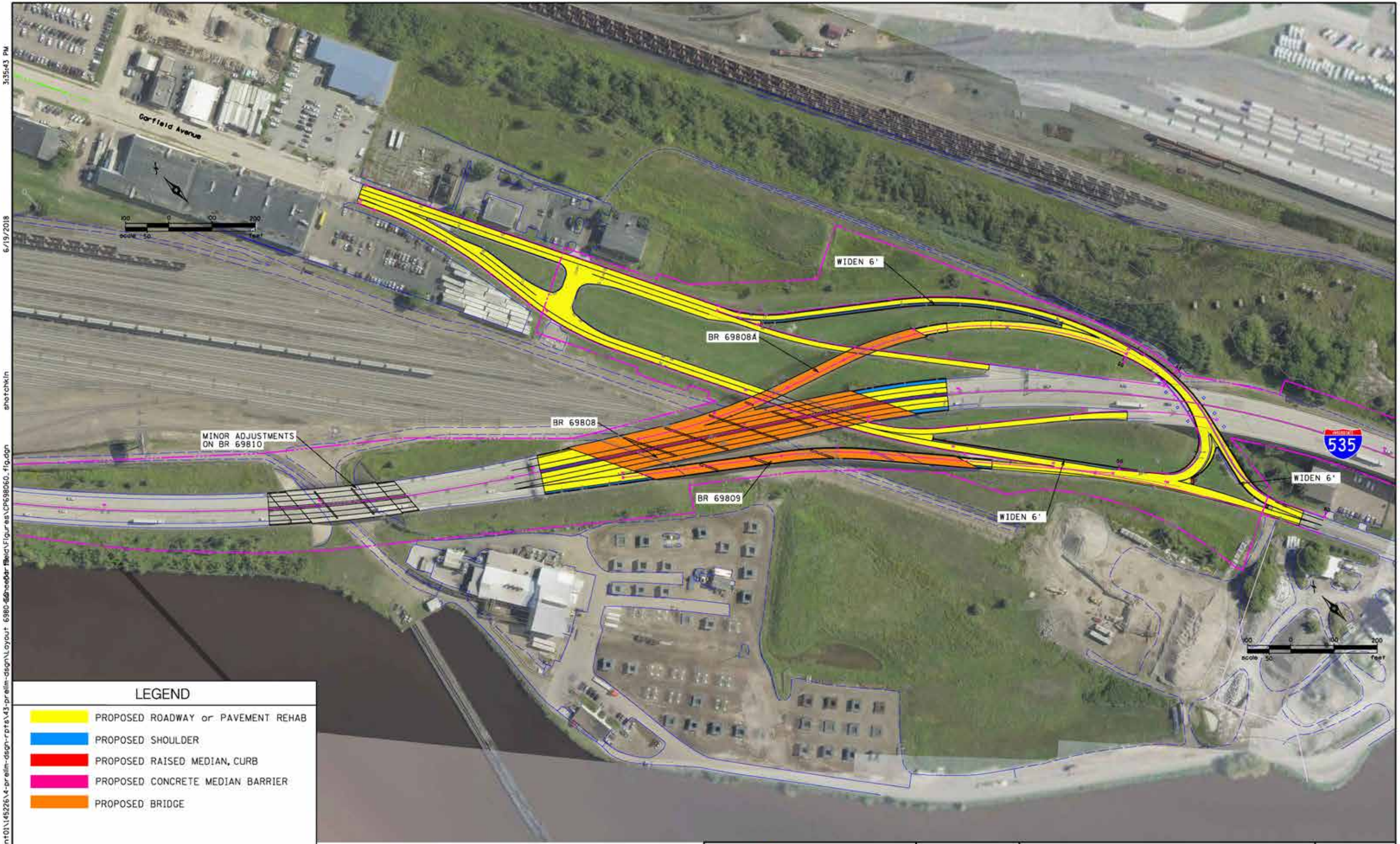
DEPARTMENT OF TRANSPORTATION

ALLIANT ENGINEERING

SEH

LEGEND

- ROADWAY (INCLUDING TURN LANES)
- PAVED SHOULDER
- BRIDGE
- RAISED MEDIAN AND CURBS
- BARRIERS
- WALK
- RETAINING WALLS
- PROPOSED SIGNALS
- EXISTING/PROPOSED TRAFFIC DIRECTION



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6/19/2018 3:35:43 PM shotchkin

SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

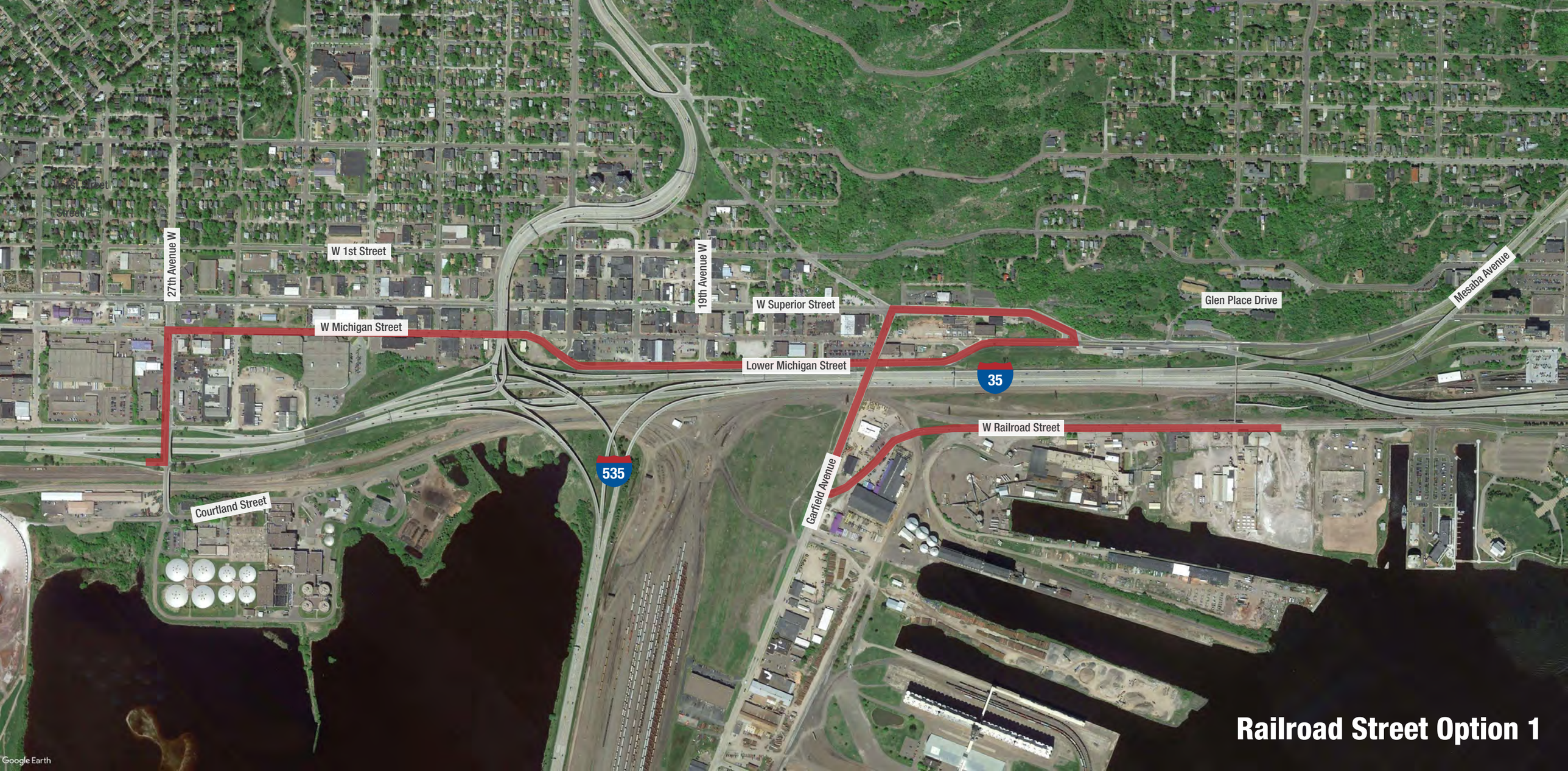
145226

DATE:
6/19/2018

I–535 /Garfield Ave.
Interchange Alternatives
Replace Existing Bridges

FIGURE No. 2


Proposed Miller Creek and Coffee Creek Alignment
W 1st Street
W Superior Street
W Michigan Street
Coffee Creek
2019 construction
21st Avenue W
20th Avenue W
19th Avenue W
2020-2023 construction
Miller Creek



Railroad Street Option 1

Appendix B
Wetland Documentation

TWIN PORTS INTERCHANGE DRAINAGE OVERVIEW MAP (DOM) CONCEPT C

8/30/2018

IMPERVIOUS SURFACE SUMMARY

EXISTING IMPERVIOUS SURFACE = 19.19 AC

PROPOSED IMPERVIOUS SURFACE = 23.11 AC

NEW IMPERVIOUS SURFACE = 3.92 AC

POTENTIAL ISSUES

Ⓐ TREATMENT POND LOCATIONS IN RELATION TO CONTAMINATED SOILS (POND LINER, EXCAVATION ALLOWED?).

Ⓑ RETAINING WALLS CONSTRUCTED OVER EXISTING PIPES (CASING, REPLACEMENT, RELOCATE, LINE).

Ⓒ EXISTING/PROPOSED STORM SEWER IN RELATION TO INFLUENCE ZONE OF RETAINING WALLS.

Ⓓ STORM SEWER IN RELATION TO PROPOSED ABUTMENTS AND PIERS.

DESIGNER NOTES:

- PRELIMINARY POND SIZING
- PROPOSED PIPE SIZING
- EVALUATE PROPOSED STORM SEWER FOR CONSTRUCTION STAGING.
- IDENTIFY PIPES TO BE CASED OR JACKED.
- EVALUATE FEASIBILITY OF PROPOSED PIPE ALIGNMENT TAKING INTO ACCOUNT WALLS AND GRADE CHANGES.

SPECIFIC NOTES:

① CONNECT TO EXISTING STORM SEWER.

② CONNECT INTO EXISTING DRAINAGE STRUCTURE.

③ ADJUST FRAME AND RING CASTING

LEGEND

- ROADWAY (INCLUDING TURN LANES)
- PAVED SHOULDER
- BRIDGE
- RAISED MEDIAN AND CURBS
- BARRIERS
- SIDEWALK
- PROPOSED TREATMENT POND
- PROPOSED STORM SEWER
- PROPOSE CATCH BASIN / MANHOLE / APRON
- PROPOSED GRIT CHAMBER
- INPLACE STORM SEWER
- INPLACE CATCH BASIN / MANHOLE / APRON
- REMOVE OR ABANDON INPLACE STORM SEWER
- SURFACE FLOW DIRECTION
- MAJOR DISCHARGE POINT
- EXISTING R/W
- DELINEATED WETLANDS

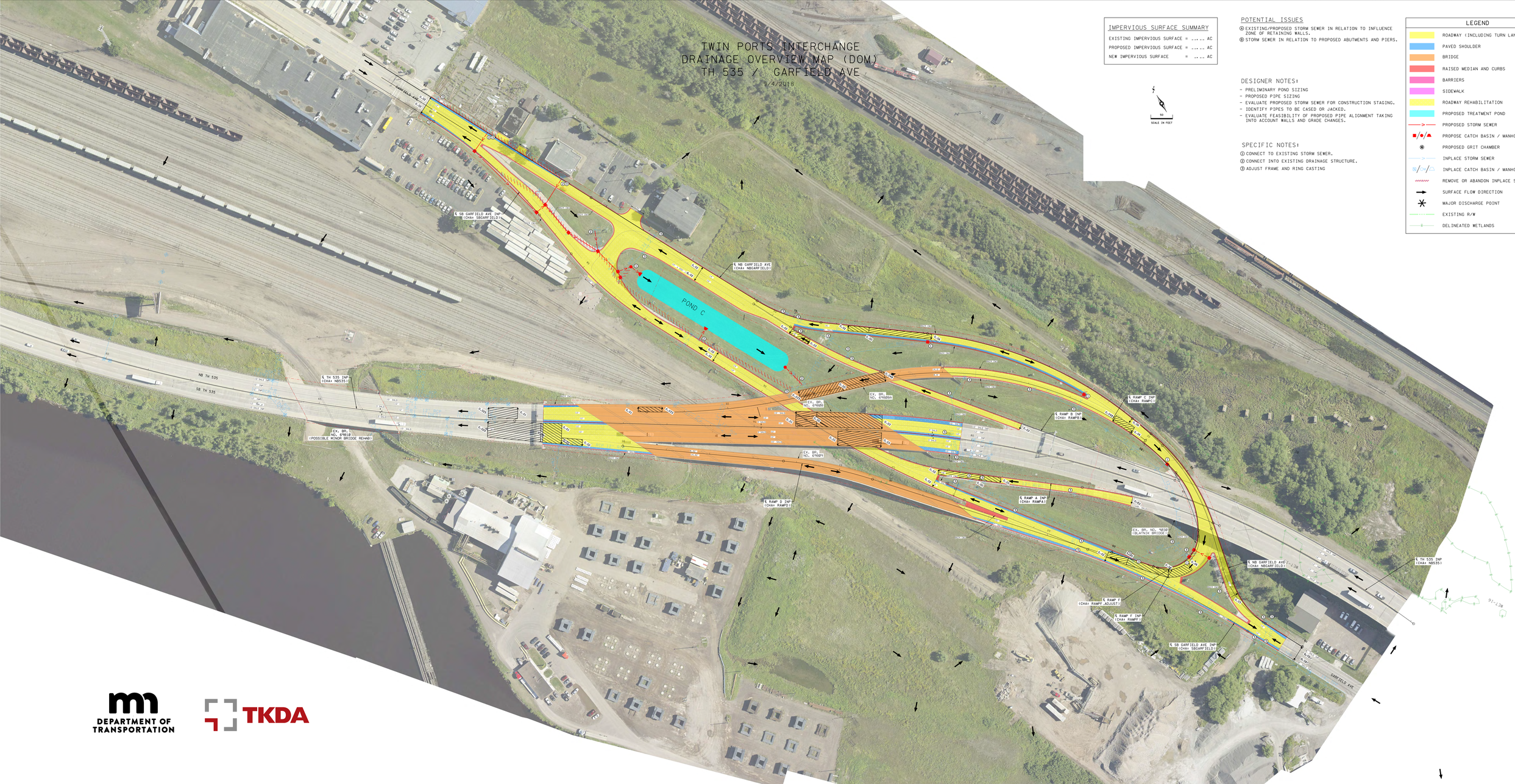
100 SCALE IN FEET

DEPARTMENT OF TRANSPORTATION

TKDA

TWIN PORTS INTERCHANGE
DRAINAGE OVERVIEW MAP (DOM)
TH 535 / GARFIELD AVE

9/4/2018



IMPERVIOUS SURFACE SUMMARY

EXISTING IMPERVIOUS SURFACE	=	... AC
PROPOSED IMPERVIOUS SURFACE	=	... AC
NEW IMPERVIOUS SURFACE	=	... AC

POTENTIAL ISSUES

Ⓐ EXISTING/PROPOSED STORM SEWER IN RELATION TO INFLUENCE ZONE OF RETAINING WALLS.
Ⓑ STORM SEWER IN RELATION TO PROPOSED ABUTMENTS AND PIERS.

DESIGNER NOTES:

- PRELIMINARY POND SIZING
- PROPOSED PIPE SIZING
- EVALUATE PROPOSED STORM SEWER FOR CONSTRUCTION STAGING.
- IDENTIFY PIPES TO BE CASED OR JACKED.
- EVALUATE FEASIBILITY OF PROPOSED PIPE ALIGNMENT TAKING INTO ACCOUNT WALLS AND GRADE CHANGES.

SPECIFIC NOTES:

① CONNECT TO EXISTING STORM SEWER.
② CONNECT INTO EXISTING DRAINAGE STRUCTURE.
③ ADJUST FRAME AND RING CASTING

50
SCALE IN FEET

LEGEND

- ROADWAY (INCLUDING TURN LANES)
- PAVED SHOULDER
- BRIDGE
- RAISED MEDIAN AND CURBS
- BARRIERS
- SIDEWALK
- ROADWAY REHABILITATION
- PROPOSED TREATMENT POND
- PROPOSED STORM SEWER
- PROPOSE CATCH BASIN / MANHOLE / APRON
- PROPOSED GRIT CHAMBER
- INPLACE STORM SEWER
- INPLACE CATCH BASIN / MANHOLE / APRON
- REMOVE OR ABANDON INPLACE STORM SEWER
- SURFACE FLOW DIRECTION
- MAJOR DISCHARGE POINT
- EXISTING R/W
- DELINEATED WETLANDS

DEPARTMENT OF TRANSPORTATION

TKDA

Twin Ports Interchange

Updated 7/12/2018

Aquatic Resource ID (as noted on plan view)	Sheet #	Aquatic Resource Type (wetland, lake, tributary, etc)	Wetland Basin Impact						Wetland Circ. 39 Type / Existing Plant Community Type(s) in impact area	County, Major Watershed #, and Bank Service Area # of impact area	Permitting Jurisdiction (COE, DNR, WCA)	Description of Impact/Notes
			Permanent				Temporary					
			fill area (ac)	fill vol. (cy)	cut area (ac)	cut vol (cy)	fill (ac) (duration)	cut (ac) (duration)				
WET-0 (Miller Creek)	2	Tributary					0.201		R3RB2	St. Louis, 3, X		Public Water/Trout Stream
WET-1	3	Wetland Basin	1.31						Type 2/3 |Fresh Wet Meadow/ Shallow Marsh	St. Louis, 2, X		New Roadway Construction
WET-2	2	Wetland Basin	0.04						Type 2 |Fresh Wet Meadow	St. Louis, 3, X		New Roadway Construction
WET-3	3	Wetland Basin	0.14						Type 2 |Fresh Wet Meadow	St. Louis, 2, X		New Roadway Construction
WET-4	2	Wetland Basin							Type 2/3 |Fresh Wet Meadow/ Shallow Marsh	St. Louis, 3, X		No Impacts
WET-5	2	Wetland Basin							Type 2/3/7 /| Fresh Wet Meadow/Shallow Marsh/Hardwood Swamp	St. Louis, 3, X		No Impacts
WET-6	1	Wetland Basin							Type 3 |Shallow Marsh	St. Louis, 3, X		
WET-7	2	Wetland Basin							Type 3 |Shallow Marsh	St. Louis, 3, X		No Impacts
WET-8	1	Wetland Basin	0.06						Type 3 |Shallow Marsh	St. Louis, 3, X		Shoulder fill
WET-9	2/3/8	Wetland Basin	0.43				0.561		Type 2/6/7 /| Fresh Wet Meadow/Shrub-Carr/Hardwood Swamp	St. Louis, 2, X		New Miller Creek Crossing\Removal of Existing Miller Creek Box Culverts
WET-10	3/8	Wetland Basin	0.04				0.004		Type 3 |Shallow Marsh	St. Louis, 2, X		New Roadway Construction
WET-11	2	Wetland Basin			0.05				Type 3 |Shallow Marsh	St. Louis, 3, X		Proposed Stormwater Pond
WET-12	5	Wetland Basin							Type 2/3/7 /| Fresh Wet Meadow/Shallow Marsh/Hardwood Swamp	St. Louis, 2, X		
WET-13	5/6	Wetland Basin	0.02						Type 2 |Fresh Wet Meadow	St. Louis, 2, X		New Roadway Construction
WET-14	5	Wetland Basin							Type 2 |Fresh Wet Meadow	St. Louis, 2, X		
WET-15	5	Wetland Basin							Type 2 |Fresh Wet Meadow	St. Louis, 2, X		
WET-16	5	Wetland Basin							Type 2 |Fresh Wet Meadow	St. Louis, 2, X		
WET-17		Wetland Basin							Type 2 |Fresh Wet Meadow	St. Louis, 3, X		Need Delineation Linework
WET-18		Wetland Basin							Type 6 | Shrub-Carr	St. Louis, 3, X		Need Delineation Linework
		Total (ac)	**2.04**		**0.05**		**0.766**					
		Total Cut and Fill (ac)	**2.0900**									

DELINEATED WETLAND WET-8
TYPE PEM1C
PERMANENT IMPACT = 0.06 AC

DELINEATED WETLAND WET-6
TYPE PEM1C
NO IMPACT

27TH AVE

26TH AVE

℄ 27TH OFF RAMP

℄ TH 35 SB

℄ TH 35 NB

℄ 27TH ON RAMP

WET-8

WET-6

SCALE IN FEET
0 25 50 100

WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

DATE: 7/11/2018 TIME: 3:43:42 PM
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DRAWN BY: CEH CHECKED BY: MAW	I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.	SIGNATURE: PRINTED NAME: DATE: LIC. NO.	TKDA	DEPARTMENT OF TRANSPORTATION	WETLAND IMPACTS	STATE PROJ. NO. 6982-322 (TH 35) Sheet No. 1 of 10 Sheets

WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

MILLER CREEK
TYPE R3RB2
TEMPORARY IMPACT = 0.20 AC

DELINEATED WETLAND WET-2
TYPE PEM1B
PERMANENT IMPACT = 0.04 AC

DELINEATED WETLAND WET-11
TYPE PEM1C
PERMANENT IMPACT = 0.05 AC

DELINEATED WETLAND WET-4
TYPE PEM1B/C
NO IMPACTS

DELINEATED WETLAND WET-5
TYPE PEM1B/C, PF01B
NO IMPACTS

DELINEATED WETLAND WET-7
TYPE PEM1B
NO IMPACTS

DELINEATED WETLAND WET-9
TYPE PEM1B/PSS1B/PF01E
TEMPORARY IMPACT = 0.09 AC

℄ TH 53

℄ TH 53 SB TO TH 35 SB RAMP

℄ TH 35 SB TO TH 53 NB RAMP

℄ TH 35 SB

℄ TH 35 NB

℄ TH 35 NB OFF RAMP

WET-0 WET-2 WET-3 WET-5 WET-7 WET-9 WET-11

BR. NO. 91109 16' X 6' DUAL BARREL BOX CULVERT

BR. NO. 91108 DUAL 8' X 8' BOX

30" RCP 15" RCP 60" RCP 72" CMP

ST. LOUIS BAY

SCALE IN FEET
0 25 50 100

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DELINEATED WETLAND WET-3
TYPE PEM1B
PERMANENT IMPACT = 0.14 AC

DELINEATED WETLAND WET-1
TYPE PEM1B/C
PERMANENT IMPACT = 1.31 AC

MICHIGAN ST

LOWER MICHIGAN ST

21ST AVE

20TH AVE

19TH AVE

36" BRICK

SCALE IN FEET
0 25 50 100

℄ TH 35 SB TO
TH 53 NB RAMP

℄ TH 35 SB

℄ TH 35 NB

℄ TH 53 SB TO
TH 35 NB RAMP

℄ TH 35 NB TO
TH 535 SB RAMP

℄ TH 35 SB TO
TH 535 SB RAMP

DELINEATED WETLAND WET-10
TYPE PEM1C
TEMPORARY IMPACT = 0.004 AC

℄ TH 535 NB TO
TH 35 NB RAMP

℄ TH 535 NB TO
TH 35 SB RAMP

DELINEATED WETLAND WET-9
TYPE PEM1B/PSS1B/PF01E
TEMPORARY IMPACT = 0.47 AC

ST. LOUIS BAY

WET-3 WET-1 WET-9 WET-10

60" RCP 36" RCP 30" CMP 72" CMP 42" RCP

WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

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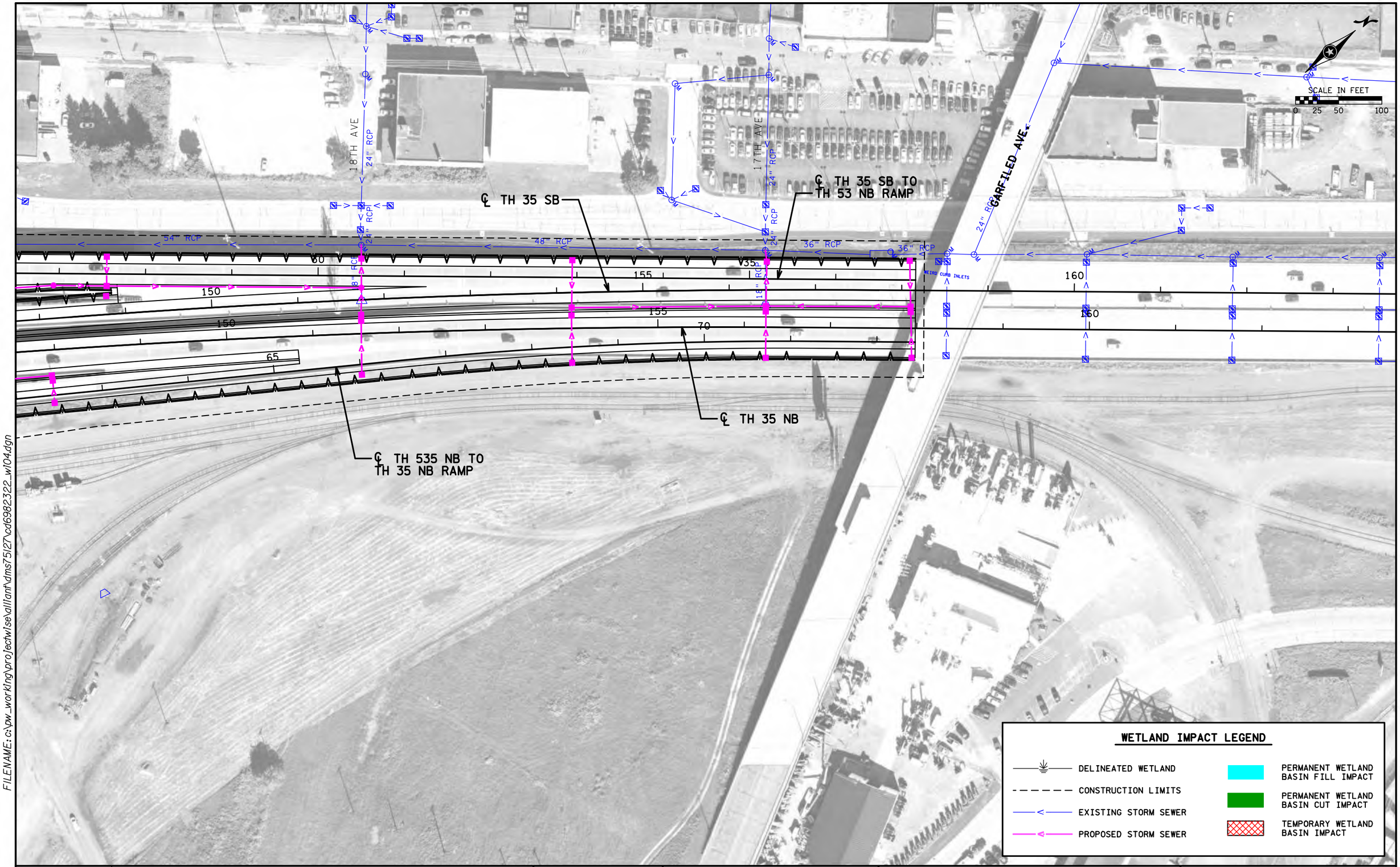

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WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

SCALE IN FEET
0 25 50 100

DELINEATED WETLAND WET-13
TYPE PEM1B
PERMANENT IMPACT = 0.02 AC

DELINEATED WETLAND WET-14
TYPE PEM1B
NO IMPACT

DELINEATED WETLAND WET-16
TYPE PEM1B
NO IMPACT

DELINEATED WETLAND WET-15
TYPE PEM1B
NO IMPACT

DELINEATED WETLAND WET-12
TYPE PEM1B/C, PF01B
NO IMPACT

WET-13
WET-14
WET-15
WET-16
WET-12

GARFILED AVE.
INPLACE I-535

DATE: 7/12/2018 TIME: 10:49:35 AM
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WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

SCALE IN FEET
0 25 50 100

DELINEATED WETLAND WET-13
TYPE PEM1B
PERMANENT IMPACT = 0.02 AC

WET-13

ST. LOUIS BAY

INPLACE I-535

GARFILED AVE.

DATE: 7/12/2018 TIME: 10:50:46 AM
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WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

SCALE IN FEET
0 25 50 100

ST. LOUIS BAY

INPLACE I-535

09

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WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

SCALE IN FEET
0 25 50 100

DELINEATED WETLAND WET-9
TYPE PEM1B/PSS1B/PFO1E
PERMANENT IMPACT = 0.43 AC

DELINEATED WETLAND WET-10
TYPE PEM1C
PERMANENT IMPACT = 0.04 AC

ST. LOUIS BAY

WET-9

WET-10

℄ TH 35 NB TO TH 535 SB RAMP

℄ TH 35 SB TO TH 535 SB RAMP

℄ TH 535 SB

℄ TH 535 NB

℄ TH 535 NB TO TH 35 SB RAMP

℄ TH 535 NB TO TH 35 NB RAMP

500 INPLACE I-535

620 505 615 610 515 510 50

2-8" RCP

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WETLAND IMPACT LEGEND

- DELINEATED WETLAND
- CONSTRUCTION LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PERMANENT WETLAND BASIN FILL IMPACT
- PERMANENT WETLAND BASIN CUT IMPACT
- TEMPORARY WETLAND BASIN IMPACT

SCALE IN FEET
0 25 50 100

MICHIGAN ST
SUPERIOR ST
1ST ST
2ND ST
℄ TH 53
22ND AVE
21ST AVE
21ST AVE
60" RCP
5' X 7' STONE/BRICK
5' X 7' STONE/BRICK
4' X 6'
15" RCP
12" RCP
36"
36" RCP
36" RCP
50
100
105
110
OI

DATE: 7/11/2018 TIME: 3:54:02 PM
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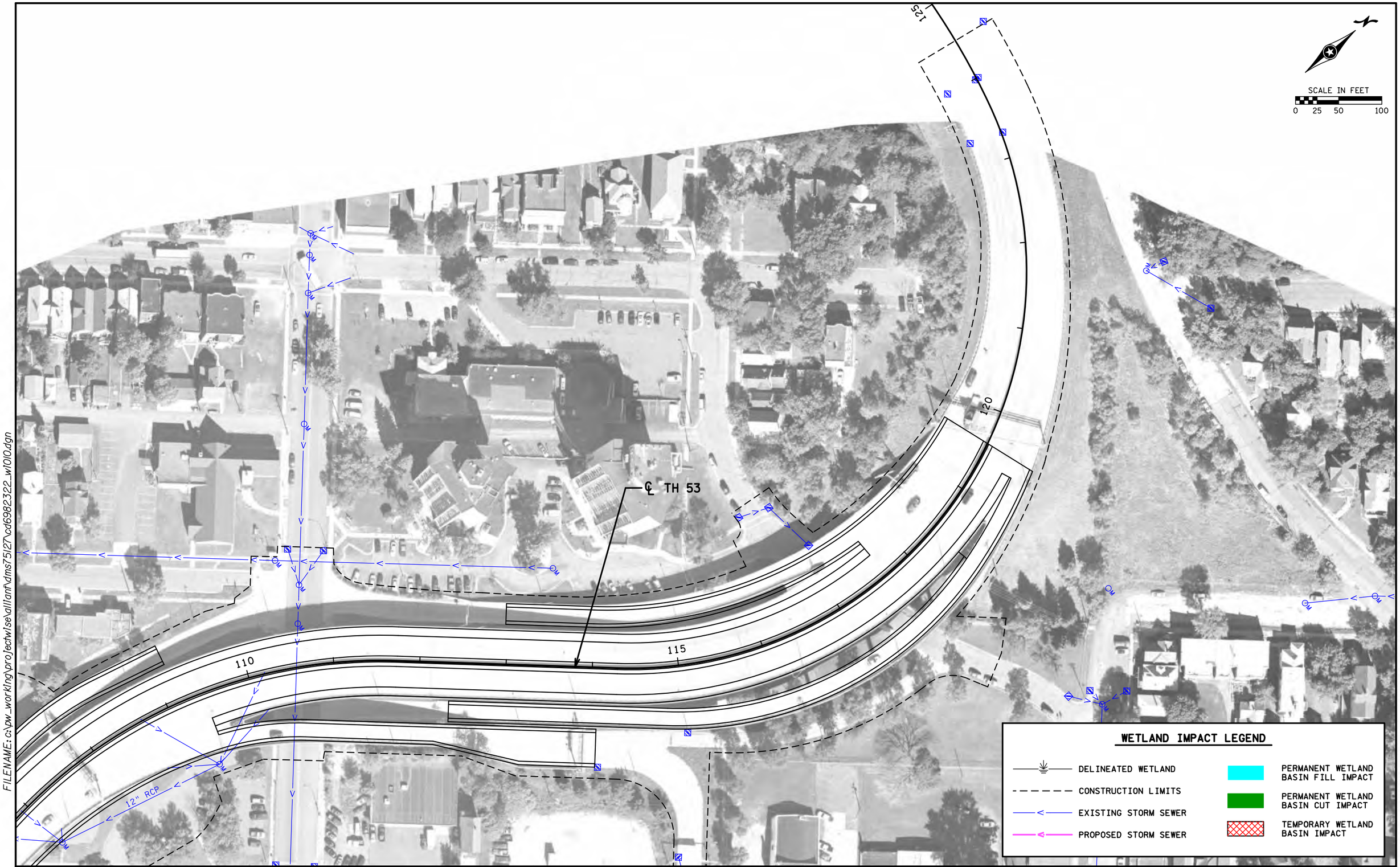

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Appendix C
Correspondence

From:	Leete, Peter (DOT)
To:	Jason.Alcott@kimley-horn.com; Dwyer, Roberta (DOT)
Cc:	Meyer, Matthew (DOT); Straumanis, Sarma (DOT); Smith, Christopher E (DOT); Joyal, Lisa (DNR); Orne, Benjamin G MVP; Coyle, Margi (Anne) (DNR); Hendrickson, Deserae L (DNR); Kovacovich, Mark H (DNR); Fowler, Patricia L (DNR)
Subject:	DNR Comments on MnDOT Early Notification Memo for the I-35/TH53/I-535 Interchange Reconstruction project in Duluth (SP 6982-322)
Date:	Tuesday, March 14, 2017 2:46:00 PM
Attachments:	17_2_13, 6982-322 ENM.pdf DNRbasemap.pdf DNR GP2004-0001copy.pdf AIS (from Chapter 1).pdf

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Jason,

This email is the DNR response for your project records. I have not sent this Early Notification Memo (ENM) out for full DNR review. The following comments are based on information provided in the submitted documents regarding the proposed reconstruction of the bridges connecting I-35, TH53, and I-535 in the City of Duluth. Please incorporate the following comments into final designs and special provisions as they are developed:

1. For MnDOT planning purposes, attached to this email is a map of the project area (DNRbasemap.pdf) showing nearby locations of DNR areas concern (if they exist), such as Public Waters (in blue), waterbodies designated as infested with aquatic invasive species (AIS), snowmobile Trails (in pink), and various green shaded polygons for Sites of Biodiversity Significance. This map may be shared or included in project documentation, as all information is from publically available data layers. The Natural Heritage Information System (NHIS) database has been reviewed, though in order to prevent the inadvertent release of a rare features location, those details are not shown on the map. Comments on potential impacts to rare features listed in the NHIS comments are below. If you have questions regarding proposed work near any of the data shown, please give me a call.

2. Overall there is very little impact of direct DNR concern. Except for this little piece: Identified under phase 1 is a new road to connect local roads on the waterfront (between Courtland Street and Railroad Street). The construction of this road is slated to have Miller and Coffee creeks daylighted. The ENM states:

   > COMPONENT 5 (COURTLAND STREET CONNECTION):
   > This connection will also serve as a multi-use corridor for bicycle and pedestrian access to the waterfront and provide a direct pedestrian/bicycle access for neighborhoods to the downtown/waterfront. The pathway will be fenced through the railyard for added safety and security. Another benefit of this connection is the daylighting of Miller Creek and Coffee Creek, both environmentally sensitive urban trout streams. Currently, a harbor habitat restoration project is underway at the outlet of these streams.

   No further details have been provided for this, though I recognize that there might not be any yet. I am also not sure how this plays into the gap between the Munger and Gitchi-Gami state trails. The DNR supports the prospect for recreational enhancement and aquatic restoration efforts and offer to work with project managers as designs are developed. A Public Waters permit will be required for the daylighting (most likely with the GP to MnDOT, see #3 below). If not being done already, please include DNR during design coordination of these components as early as is prudent.

3. Coffee Creek, Miller Creek and the St. Louis River Estuary are DNR Public Waters, as such a DNR Public Waters Work Permit will be required for the components impacting their course, current, or cross-section (including the daylighting of Coffee and Miller Creek mentioned in #2 above). Authorization for the project under the DNR General Permit (GP2004-0001) will require final review

at a later date. A copy of GP2004-0001 is attached, please review all the conditions of this permit and integrate their requirements into project design. Please contact me if you have questions on any of its requirements. Specific items to incorporate into design and construction are:

a. As the project moves forward, design of the crossing should meet the conditions listed in GP 2004-0001: http://files.dnr.state.mn.us/waters/watermgmt_section/pwpermits/General_Permit_2004-0001.pdf. Additional information, including options on how to meet the conditions of the GP are presented in the collection of ' Best Practices for Meeting GP 2004-0001', at http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/gp_2004_0001_manual.html

b. We typically limit work in the water (Work Exclusion dates) to allow for undisturbed fish migration and spawning. These dates are Sept 15 through June 30. While we may revise these dates for a particular project, there may still be limitations on the types of work during this time.

c. Please be aware that the MPCA NPDES general permit for authorization to discharge stormwater associated with construction activities (permit MN R10001) recognizes the DNR "work in water restrictions" during specified fish migration and spawning time frames for areas adjacent to water. During the restriction period, all exposed soil areas that are within 200 feet of the water's edge and drain to these waters, must have erosion prevention stabilization activities initiated immediately after soil disturbing activity has ceased (and be completed within 24 hours).

d. Construction and demolition methods shall be submitted for review and approval at a later date. See the GP2004-0001 condition 'TEMPORARY IMPACTS DURING CONSTRUCTION' and items 'A' though 'L' for subjected conditions. This is normal procedure for bridge or culvert projects as we recognize that construction methods are not finalized until a contractor is chosen. Construction contractors shall be made aware of this condition as they may be held responsible for compliance.

e. Revegetation of disturbed soils should include native mixes in areas that are not proposed for mowed turf grass. Please utilize the native recommendations developed by BWSR (http://www.bwsr.state.mn.us/native_vegetation/) or MnDOT' in the 'Vegetation Establishment Recommendations' – dated November 13, 2015 (http://www.dot.state.mn.us/environment/erosion/seedmixes.html). In addition, for meeting DNR concerns, revegetation may include woody vegetation (trees and shrubs) in addition to grasses and/or forbs. Please contact your Districts representatives for the Erosion Control & Stormwater Management Unit, Roadside Vegetation Management Unit, and the Districts Maintenance staff to help determine appropriate permanent revegetation plans. Additionally, any use of Category 3 or 4 erosion control blanket shall be limited to 'bio-netting' or 'naturalnetting' types (category 3N or 4N), and specifically not allow plastic mesh netting.

4. Please remind contractors that a separate water use permit is required for withdrawal of more than 10,000 gallons of water per day or 1 million gallons per year from surface water or ground water. GP1997-0005 (temporary water appropriations) covers a variety of activities associated with road construction and should be applied of if applicable. An individual appropriations permit may be required for projects lasting longer than one year or exceeding 50 million gallons. Information is located at: http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

5. The Minnesota Natural Heritage Information System (NHIS) has been queried to determine if any

rare plant or animal species, native plant communities, or other significant natural features are known to occur within an approximate one-mile radius of the project area. Based on this query, rare features have been documented within the search area . In order to prevent the inadvertent release of the location of specific listed or rare species contained in the NHIS, we have not provided species or location information on the attached 'DNRbasemap.pdf'. For details or questions, please contact me. However, given the nature and location of the proposed project, we do not believe the project will negatively affect any known occurrences of rare features.

a. Two Wildlife Management Areas (WMA) are located in the St. Louis River Estuary near the project area (Interstate Island WMA and Hearding Island WMA). Both of these facilities contain Colonial Waterbird Nesting Areas and are managed for the Common Tern (Sterna hirundo), a state listed species (Threatened). Work proposed will not directly impact these areas, though folks should be aware of these nearby areas. The Piping Plover (Charadrius melodus), listed as Endangered on both the state and federal T & E Species lists, have been known to utilize these areas. Though no entries exist in the NHIS since 2000.

The NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. If information becomes available indicating additional listed species or other rare features, further review may be necessary.

6. The northern long-eared bat (Myotis septentrionalis), federally listed as threatened and state-listed as special concern, can be found throughout Minnesota. During the winter this species hibernates in caves and mines, and during the active season (approximately April-October) it roosts underneath bark, in cavities, or in crevices of both live and dead trees. Pup rearing is during June and July. Activities that may impact this species include, but are not limited to, any disturbance to hibernacula and destruction/degradation of habitat (including tree removal).

   The U.S. Fish and Wildlife Service (USFWS) has published a final 4(d) rule that identifies prohibited take. To determine whether you need to contact the USFWS, please refer to the USFWS Key to the Northern Long-Eared Bat 4(d) Rule (see links below). Please note that the NHIS does not contain any known occurrences of northern long-eared bat roosts or hibernacula within an approximate one-mile radius of the proposed project.

   Links: USFWS Key to the Northern Long-Eared Bat 4(d) Rule for Non-Federal Activities
   http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEB.html
   USFWS Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions

   http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEBFedProjects.html
   USFWS Northern Long-eared Bat Website
   http://www.fws.gov/midwest/endangered/mammals/nleb/index.html
   USFWS Northern Long-eared Bat Fact Sheet
   http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html

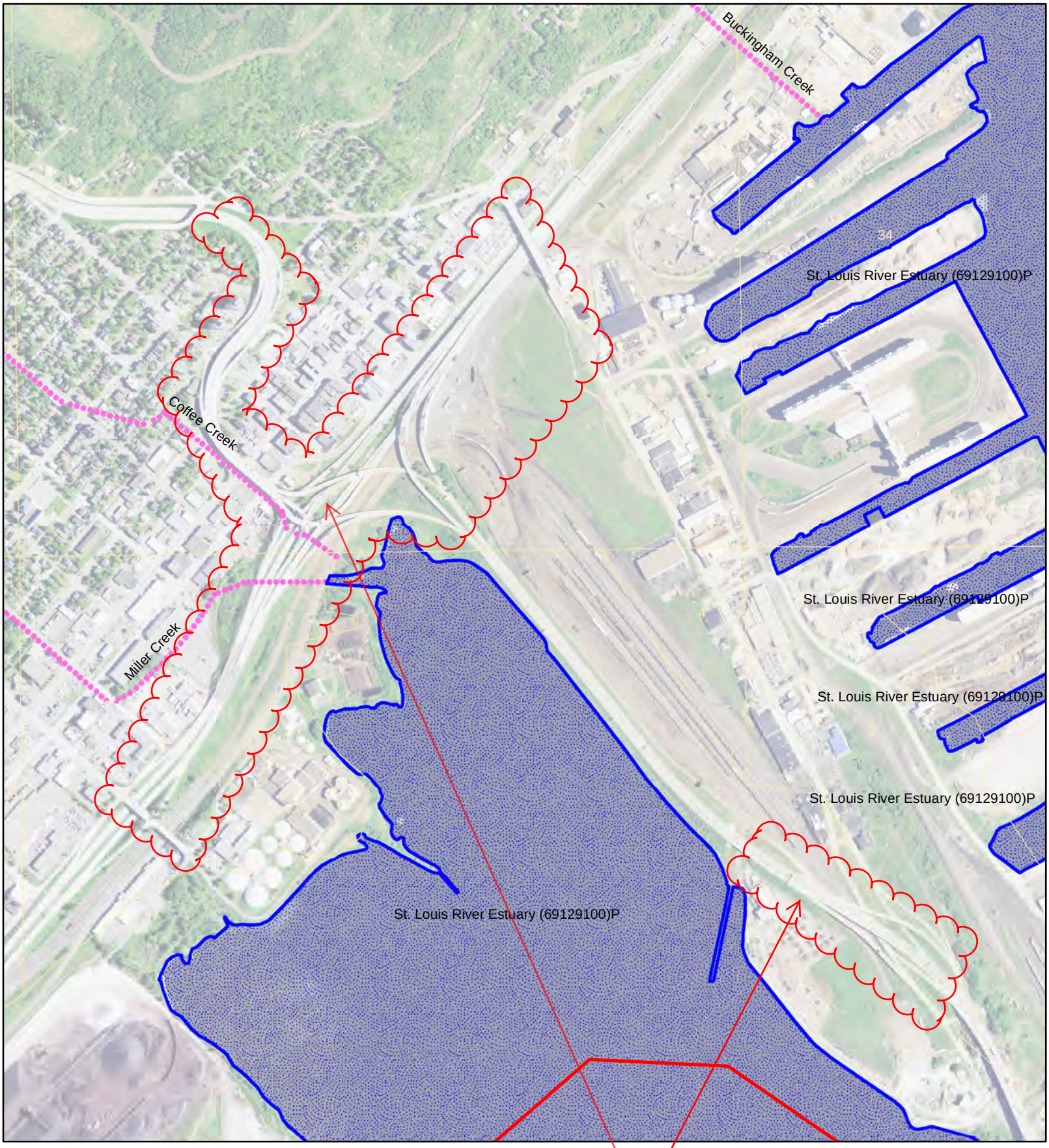
7. The St. Louis River Estuary has been designated as Infested with Aquatic Invasive Species (AIS) due to the presence of New Zealand Mudsnail, Round Goby, Ruffe, Spiny waterflea, VHS, White Perch, and Zebra Mussel. The river water should be identified as infested on project plans and provisions. No work should be allowed in them if avoidable (including pumping water for construction purposes). Where work is required, I have attached best practices that have been developed for construction equipment to prevent their spread.

This ENM has not been circulated to all DNR field staff for comment. I will let you know if any additional comments on design requirements are returned to me due to this email.

DNR folks, if I've missed anything, or have any suggestions for MnDOT to consider, please respond ASAP to Roberta, Jason, and myself.

Contact me if you have questions

Peter Leete
Transportation Hydrologist (DNR-MnDOT Liaison)
DNR Ecological & Water Resources
Ph: 651-366-3634



Peter Leete, Transportation Hydrologist
(MnDNR-MnDOT Liaison)
Date: 3/14/2017

Best Practices for Preventing the Spread of Aquatic Invasive Species

All equipment[1] being transported on roads or placed in Waters of the State shall be free of prohibited and regulated invasive species and unlisted non-native species (any other species not native to Minnesota)

1. **Project plans or documents should identify Designated Infested Waters**[2] located in or near the project area.

2. **Prior to transportation along roads into or out of any worksite, or between water bodies within a project area, all equipment** must be free of any aquatic plants, water, and prohibited invasive species.
   A. **Drain** all water from equipment where water may be trapped, such as tanks, pumps, hoses, silt curtains, and water-retaining components of boats/barges (see Figures 5 & 6) **AND**
   B. **Remove** all visible aquatic remnants (plants, seeds and animals). Removal of mud & soil is not required at all sites, though is encouraged as a Best Practice. Removal of mud and soil may be required on sites designated as infested (see #4).

3. **Prior to placing equipment into any waters,** all equipment must be free of aquatic plants and non-native animals.

4. **Additional measures are required on *Designated Infested Waters* to remove and kill prohibited species such as zebra mussels, quagga mussels, New Zealand mudsnails, faucet snails, or spiny waterfleas.**
   Note: The DNR is available to train site inspectors and/or assist in these inspections. Contact the appropriate Regional Invasive Species Specialist: www.mndnr.gov/invasives/ais/contacts.html
   A. For day use equipment (in contact with the water for 24 hours or less); Perform #2 above or,
   B. For in-water exposure greater than 24 hours: Perform #2 above, and inspect all equipment for the prohibited invasive species present (see Figure 1).

   Then choose one of the following three: **on-site treatment, off-site treatment**, or **customized alternative.**

Figure 1. Invasive species may not be readily visible on equipment. Some species are less than 1/4 inch in size.
Photo credit: Brent Wilber, Lunda Construction

On-Site Treatment

Remove by handscraping or powerwashing (minimum 3000 psi) all accessible areas (Figures 1 and 2) **AND**

Kill Prohibited Aquatic Invasive Species in non-accessible areas using one or more of the following four techniques:

- **Hot Water (minimum 140°F) for ten seconds** (Figure 2) for zebra mussels, quagga mussels, New Zealand mudsnails, faucet snails **OR**
- **Air Dry** (Figures 3 & 4)
  Spiny waterfleas – air dry for a minimum of 2 days
  New Zealand mudsnails – air dry for a minimum of 7 days
  zebra or quagga mussels, faucet snails – air dry for a minimum of 21 days **OR**
- **Freezing Temperatures**
  zebra mussels - expose to continuous temperature below 32°F for 2 days **OR**
- **Crush**
  Crush rock, concrete, or other debris by running it through a crushing plant to kill prohibited species

Figure 2. Removal of aquatic remnants is required before transporting.
Photo credit: Peter Leete, DNR

Off-Site Treatment

Under certain conditions, the DNR will allow transportation of equipment off-site after partial removal of prohibited species (for example, after "removal" has been done and equipment will be taken to a facility to complete final treatment [i.e., "kill"]) This is a 'one-way pass' to allow transport to a storage area or disposal facility. This option can only be utilized if the receiving site is at least 300 feet from riparian areas, wetlands, ditches, stormwater inlets or treatment facilities, seasonally-flooded areas, or other waters of the state. To be allowed to use the off-site treatment option you must do the following:

- Read, complete, and comply with the appropriate authorization form for transportation of Prohibited Invasive Species at www.mndnr.gov/invasives/ais_transport.html (Note that a completed form is required to be in every vehicle that is transporting equipment containing infested species) **AND**
- Complete on-site treatment described in 4B above prior to re-use in or adjacent to water.

Best Practices for Preventing the Spread of Aquatic Invasive Species

Contact a DNR Invasive Species Specialist for authorization of a customized alternative

There may be situations due to time of year, length of exposure, type of equipment, or site conditions that a DNR Invasive Species Specialist could approve alternative methods or requirements for treatment. Contact the appropriate Regional Invasive Species Specialist: www.mndnr.gov/invasives/contacts.html

5. **Temporary appropriations of water from Designated Invested Waters to utilize elsewhere (such as for dust control, landscaping, bridge washing, etc.) is not allowed except by permit, thus should be avoided.**

If use of Designated Infested Waters is unavoidable, permit information is located at www.mndnr.gov/waters/watermgmt_section/appropriations/permits.html

Figure 3. Drying will also kill aquatic organisms. Lay out materials to dry in the proper time. Drying times vary by species. Inspect after drying period is over.
Photo credit: Dwayne Stenlund, MnDOT

Figure 4. Drying techniques must not trap water. This equipment will not dry adequately.
Photo credit: Peter Leete, DNR

Figure 5. Pumping from designated infested waters for use elsewhere on the project is prohibited without a permit.
Photo credit: Peter Leete, DNR

Figure 6. Drain all water from equipment where water may be trapped. Remove drain plugs and drain hoses prior to transport.
Photo Credit: Peter Leete, DNR

Document Information
www.mndnr.gov/waters/watermgmt_section/pwpermits/gp_2004_0001_manual.html
Best Practices for Meeting DNR GP 2004-0001 (published 5/11, updated 12/12) – Chapter 1/Page 8

More on the DNR Invasives Species Program can be found at: www.mndnr.gov/AIS

[1] **'Equipment'** is defined as any implement utilized in construction. This includes boats, barges, heavy machinery, light machinery, or other material that may be moved on-site or off-site, including but not limited to rock (riprap) or timber for temporary workpads, backhoes, pumps, hoses, worksite isolation materials (eg, sheet pile or jersey barriers), boats, barges, temporary staging materials, erosion prevention products, sediment control products (eg, silt curtain), water trucks that take water from open bodies of water (eg, dust control), or dewatering components.
[2] **List of Designated Infested Waters:** http://files.dnr.state.mn.us/eco/invasives/infested_waters.pdf

DNR Contact Information

DNR Ecological and Water Resources lists area office staff at www.mndnr.gov/waters

DNR Ecological and Water Resources
500 Lafayette Road, Box 32, St. Paul, MN 55155-4032, (651)259-5700 or 5100

DNR Ecological and Water Resources website provides information at www.mndnr.gov or by calling (651) 259-5700 or 5100.

DNR Information Center

This information is available in an alternative format on request

Twin Cities: (651) 296-6157
Minnesota toll free: 1-888-646-6367
Telecommunication device for the deaf (TDD): (651) 296-5484
TDD toll free: 1-800-657-3929

Office of Environmental Stewardship
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155-1899

Office Tel: (651) 366-3615
Fax: (651) 366-3603

September 12, 2018

Sarah J. Beimers, Environmental Review Manager
State Historic Preservation Office
Administration Building #203
50 Sherburne Avenue
St. Paul, MN 55155

RE: SP 6982-322 (TH 35) and SP 6980-60 (TH 535), Twin Ports Initiative (TPI) reconstruction of interchange, I-35 and I-535 and TH 53; Duluth, St. Louis County

Associated SP Nos.: SP 6982-328 (Local Roadways) and SP 6915-136 (US 53), improvements related to Twin Ports Initiative (TPI) reconstruction of interchange, I-35 and I-535 and TH 53; Duluth, St. Louis County

SHPO Number: 2018-2036

Dear Ms. Beimers:

We have reviewed the above-referenced undertaking pursuant to our FHWA-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800), and as per the terms of the 2005 Section 106 Programmatic Agreement between the FHWA and the Minnesota State Historic Preservation Office (SHPO). The Section 106 review fulfills MnDOT's responsibilities under the Minnesota Historic Sites Act (MS 138.665-.666).

Background

We last corresponded with your office in our letter of May 23, 2018 in which we described the project undertaking, described the tribal consultation that had occurred, presented an area of potential effect (APE) and described the various resources that would be considered as part of the Phase I-II architecture/history study. We noted that the archaeology component of this study was being conducted by Dr. Tim Tumberg, archaeologist with our unit, and that work is still underway and will be submitted separately. At that time, we also identified a potential need for a Programmatic Agreement because of concerns that effects could not be determined in time to accommodate the NEPA document schedule. Your response of June 22nd, 2018 concurred with the APE dated April 27, 2018 as appropriate to account for direct and indirect effects from the proposed project. Your letter further supported use of a Programmatic Agreement as needed for the project.

Our May 23rd letter indicated that tribal consultation letters were sent on April 20, 2018 to the Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Lake Superior Chippewa, Santee Sioux Nation, Turtle Mountain Band of Chippewa and the Upper Sioux Community. Consultation with MIAC was sent on April 16, 2018. Although no written responses were received in regard to this project,

ongoing meetings and verbal consultation have continued since that time; Dr. Tumberg has provided additional TPI Project mapping to Minnesota Indian Affairs Council (MIAC), the State Archaeologist, and the Fond du Lac Band in May and June 2018, and more recently for road improvements added later. In addition, District 1 Project Manager Roberta Dwyer met informally with the State Archaeologist, MIAC, and representatives from the Fond du Lac Band on April 26, 2018, to discuss Project activities, share information and ensure that communication continues as this Project proceeds. Our office also contacted the Duluth Planning Department prior to Phase I survey and has included them in submissions to your office.

Architecture/History Report Submittal

Enclosed with this submittal is the *Phase I Architecture/History Survey and Phase II Evaluation for Twin Ports Interchange (TPI) at Interstate Highway 35 (I-35) and I-535, Duluth, Saint Louis County, Minnesota* (Mead & Hunt, Inc., September 2018). This report evaluated the APE as submitted to your office in our May 23 letter (see APE map dated April 27, 2018—Appendix A in report).

The Phase I survey, completed in January 2018, identified 185 historic-age properties constructed prior to 1976 within the APE. Phase II evaluations were conducted on six properties and a proposed historic district. One property previously determined eligible was assessed for integrity.

Three properties in the APE were previously determined eligible:

- Great Northern Power Company Substation (SL-DUL-3386) 1424 West Superior Street (previously identified as SL-DUL-0191, with an incorrect address of 30 W. Superior Street)
- Lake Superior and Mississippi Railroad (SL-DUL-2500) (see table 4 and figure 3 in report)
- Duluth, Missabe & Iron Range Railroad (SL-DUL-2499) (see table 4 and figure 3 in report)

The APE included the interstate highway system and 44 bridges.

- In 2005, the Advisory Council on Historic Preservation issued the Interstate Highway Exemption, which relieves Federal agencies from considering the vast majority of the Interstate Highway System as an historic resource under Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act SAFETEA-LU, Public Law 109-59, Aug. 10, 2005. Certain elements of the Interstate that have been deemed exceptional under National Register criteria have been compiled on a comprehensive list for Minnesota, and must still be considered through the normal historic preservation review process. However, this project does not include work on any of those properties (https://www.environment.fhwa.dot.gov/histpres/highways_list.asp).

  Since the proposed project includes work on non-exempt elements of the Interstate highway, and does not include any exempted portions of the Interstate as per the above-referenced link, the interstate highway itself is exempt from Section 106 evaluation.

- In addition to pre-1976 architecture/history properties, 44 bridges were identified in the APE. The project will replace or reconstruct 36 of these bridges; the other 8 are located within the APE but have no work scheduled. The majority of these bridges carry or cross I-35 and I-535 and construction dates range from 1966 to 1997. These bridges are covered by the ACHP's *Exemption Regarding Historic Preservation Review Process for Effects to the Interstate Highway System* and/or *Program Comment for Common Post-1945 Concrete and Steel Bridges.* Table 3 in the report identifies these bridges, and no further work is required.

The following is a summary of the Phase II evaluations.

Madison School/Seaway Building (SL-DUL-0022); 802 Garfield Avenue

The Madison School was constructed in 1907 and served the largely immigrant population on Rice's Point until it was closed in 1940; it is the last vestige of the mixed residential and industrial neighborhood along Garfield Avenue. Although a representative example of an early twentieth century primary school under Criterion C, Madison School has been converted to an office building and has lost integrity to an extent that it cannot convey its significance under Criterion C. The Madison School/Seaway Building was determined **not eligible** for the NRHP.

Goldfine's by the Bridge (SL-DUL-0025); 700 Garfield Avenue

Goldfine's was constructed in 1962 and represents a mid-century Modern discount retail building that is **eligible for the NRHP under Criterion C and Criterion A**. Goldfine's exhibits typical features of mid-century commercial architecture, with a flat roof, concrete construction, fixed metal windows and minimal orientation. The building's interior was constructed with a modern aesthetic, including its Bridge Room and atrium, built to take advantage of the view of the new Blatnik bridge, as well as stamped-concrete block walls, terrazzo floors and a wide window band. The Goldfine's building represented the effort by the long-time hometown Duluth business owners, the Goldfine family, to update their family business in a way that reflected the new suburbanized consumer model. Although they had long operated a store on Rice's Point, the new Goldfine's represented a dramatic shift in commerce, and represented a local business that expanded into a small chain within Minnesota. The period of significance begins with construction of the building in 1962 and extends to its merger with a larger consumer operation in 1970.

Midtowne Manor (SL-DUL-3491):

- **Midtowne Manor I (SL-DUL-3516); 2021 West 2nd Street**
- **Midtowne Manor II (SL-DUL-3517) and dining hall (SL-DUL-3519) 2011 West 2nd Street**
- **Community Center (SL-DUL-3518) 2014 West 3rd Street**

The Midtowne Manor complex occupies a full block and encompasses two high rise apartment buildings for senior citizens and incorporated an existing elementary school as a community center. Midtowne Manor I, a 14-story apartment building, was constructed in 1971 as part of the Duluth Housing and Redevelopment Authority's (HRA) efforts to provide adequate housing for the city's low income elderly population. Midtowne Manor II was built in 1982 as part of an expansion project that included construction of a dining hall and annexation of a former school to serve as the community center. The Midtowne Manor complex did not pioneer a new method of architecture or service delivery by the HRA, and the complex was determined **not eligible** for the NRHP**.**

Chicago, St. Paul, Minneapolis & Omaha Railroad (Omaha Road) (SL-DUL-3512)

In Duluth, the Omaha Road entered the city at the southwestern tip of Rice's Point and extended approximately 2.5 miles to 5th Avenue West where it served a freight house and passenger depot (both non-extant). As a late entrant to Duluth in 1886, the Omaha Road was limited in its access and amount of trackage. The Omaha Road was evaluated under the Railroads in Minnesota MPDF under Criterion A and Criterion C. The Omaha Road was determined **not eligible under Criterion A** because it did not open a region to settlement, did not serve as a primary or dominant shipper of a significant resource, was not an influential component of a rail network, and did not provide a critical link or juncture between two corridors. The Omaha Road was determined **not eligible under Criterion C**; by 1886 advancements in railroad technology were limited, and the railroad did not embody distinctive characteristics of a type, method or period of construction necessary to qualify for the NRHP under Criterion C.

Lake Superior & Mississippi/St. Paul & Duluth/Northern Pacific/ Burlington/Northern/Burlington Northern Santa Fe Railroad Yard (SL-DUL-3513); Rice's Point

The rail yard (hereafter referred to as the NP Railroad Yard) was originally developed to serve the Lake Superior & Mississippi Railroad after its arrival in Duluth in 1870. The yard is approximately 127 acres on Rice's Point, south of Garfield Avenue. Although it once contained two roundhouses and multiple support buildings, many buildings and tracks were removed in the mid-1970s, and only about one-third of the NP yard infrastructure remains from the period prior to 1975. The NP Railroad Yard was evaluated using the Railroads in Minnesota MPDF for a Railroad Yard Historic District, for its association with the LS&M/StP&D/NP main line (determined eligible as the first railroad to connect St. Paul and Duluth). However, the NP Railroad Yard no longer contains an engine house or the other support buildings necessary to be considered part of a Railroad Yard Historic District, and is determined **not eligible** due to a loss of historic integrity.

Trunk Highway 53 (XX-ROD-023) Duluth to International Falls, MN

TH 53 was evaluated in a Phase II analysis, including the current TH 53 (constructed in 1968) and pre-1968 segments along Garfield and Piedmont Avenue. Because the Garfield and Piedmont segments were not found to possess significance separate from the entire route, they were not assigned a separate inventory number and were evaluated as part of TH 53. In keeping with SHPO and CRU's ongoing trunk highway studies and methodology, the entire extent of TH 53 from Duluth to International Falls was evaluated as part of this project and included in its entirety (see Appendix D). TH 53 was recommended **not eligible** for listing in the NRHP.

West Superior Street Commercial District (SL-DUL-3514); focused on Superior Street west from the intersection with Garfield to east side of 22nd Ave. West

The West Superior Street Commercial District was previously surveyed in 2017 as part of the Historic Resources Inventory for the Lincoln Park Neighborhood, which was sponsored by the City of Duluth. The proposed District was located outside of, but adjacent to the proposed TPI construction of TH 53 from I-35 west adjacent to Michigan, Superior and West 1st streets and curving to the northwest (see APE map). In consultation with the SHPO, it was decided that the TPI project would complete a Phase II Evaluation to reassess the District and its boundaries identified in the Lincoln Park study and determine whether it met NRHP guidelines. Because the TPI Project ran adjacent and did not anticipate any work within the previously proposed District, the TPI work focused on evaluating the District as a whole and did not examine eligibility of individual buildings.

The District was a commercial center serving working class residents who lived and worked in the nearby railroads or industries on Rice's Point. Disconnected both physically and culturally from Downtown Duluth, the commercial district was the heart of the community from its early days when it was associated with the immigrant population, until after World War II when it remained one of the largest shopping areas in the region. From the 1920s on, the area was readily accessible from the intersection of Garfield and Piedmont (TH 53 prior to 1968) and from TH 61, which ran along Superior Avenue and brought traffic from the south into Duluth before construction of the interstate system. The District was found to be **significant under Criterion A in the area of commerce** as a local commercial district that served the workers and residents of the West End community. The period of significance is 1886, date of the oldest building, to 1968, when plan for the TH 53 elevated expressway led to the bypass of the District by regional traffic.

Although the District was evaluated for significance in the area of social history, no intact buildings remain to convey that history and it is not eligible under Criterion A in the area of social history. The District was evaluated for significance under Criterion B for association with persons who have made a significant contribution to the

community; no individuals were identified that would meet this criteria and the District is **not eligible under Criterion B**.

Buildings in the District are examples of utilitarian commercial architecture from late nineteenth and early twentieth centuries, predominantly one-, two-, and three-story brick-clad structures with commercial space on the first floor and flats, offices, or meeting spaces on the floors above. Alterations to most buildings in the District, particularly on the first-floor storefronts, detract from the ability of these buildings to convey their historic features or to represent the historic district from the period of significance. The District is **not eligible under Criterion C.**

The District was found significant under Criterion A and retains integrity of location, feeling and association as a traditional business district. However, its overall setting in the community has been altered because the surrounding economic activities have been removed with the loss of jobs and removal of the railroads that were once adjacent to the District. Physical connections to the railroad areas and Rice's Point to the east have been severed with the construction of I-35/I535 providing a barrier. Although street connections along Superior Street continue west underneath TH 53, it also provides an edge to the commercial district from the more industrial properties to the west. The alterations to most buildings within the District hampers their ability to convey the period of significance. Alterations have obscured original materials and as a result buildings do not retain integrity of design, materials and workmanship. The number of alterations present on buildings reduces the ability of the District as a whole to convey a cohesive design or to identify character-defining features.

Although the West Superior Street Commercial District was found significant under Criterion A, it is recommended **Not Eligible for the National Register** due to a loss of integrity of setting, design, materials, and workmanship. Because the District was found not eligible due to loss of integrity, no individual eligibility analysis of buildings or identification of contributing or non-contributing buildings was performed. To ensure that no potentially eligible properties might be affected by project activities, the 12 properties in the far southwest portion of the proposed District (the block west of Superior Street and south of 21st Avenue, as well as the properties on West 1st from 20th Avenue to 22nd Avenue), were reviewed because of their proximity to the TH 53 roadway and anticipated construction. Based on the information available and visual survey, no Phase II evaluation appeared to be justified for any of those properties.

Lake Superior & Mississippi/St. Paul & Duluth/Northern Pacific Mainline Corridor (SL-DUL-2500)

The corridor of the Lake Superior & Mississippi Railroad and its successor lines was determined eligible for the NRHP in 2004 and included the entirety of the line from St. Paul to Duluth. The line was significant in the railroad history of the state as the first to connect the railroad city of St. Paul with the port of Duluth. For this study, the period of significance was identified as 1870, the date construction was completed to Duluth, to 1956, which indicates the line's ongoing use into the twentieth century and is in keeping with requirements in the Railroads in Minnesota MPDF.

An integrity assessment of the entire main line from St. Paul to Duluth was beyond the scope of this project. However, to provide an adequate distance for consideration, this study looked at a segment larger than the APE; from West Duluth Junction (approximately South 67th Ave. West) to the termini at Lake Avenue, a distance of approximately 5.85 miles.

The assessment overlaid the historic alignment on current aerial maps and found that a substantial portion of the corridor was obliterated by road and building construction (see Figure 47 in report). Although there are some locations where a corridor may be visible, tracks have been removed or relocated throughout the corridor.

Construction of the I-35/I535 interchange obliterated the former alignment, although the modern BNSF railroad follows an alignment farther east in the same vicinity. The large number of tracks that once existed in the area north of Garfield to Union Depot were removed for interstate highway construction in the 1970s. Railroads continue to operate in the same vicinity as the original alignments, but there are only one or two tracks for current operations, as opposed to the multiple tracks that previously characterized the area north of Garfield.

The corridor was evaluated using guidance from the Railroads in Minnesota MPDF. Based on the overall loss of the historic alignment, this segment of the railroad from West Duluth Junction to Lake Avenue no longer retains integrity of location, and consequently integrity of design, materials, feeling and association. The integrity of setting is lost by the construction of the interstate and by loss of railroad elements. Due to loss of historic integrity, the LS&M/StP&D/NP railroad corridor from West Duluth Junction to South Lake Avenue is determined to be a **noncontributing element of the eligible LS&M/St P&D/NP Mainline Corridor.**

Assessment of Effects

Goldfine's by the Bridge

As part of traffic mitigation improvements, the TPI Project will complete pavement repair and/or lane re-striping along Garfield Avenue (see attached Figure 1 and Figure 2). No pavement widening is planned. Existing ADA ramps will be replaced to accommodate current ADA standards. Goldfine's By the Bridge (Goodwill) is adjacent to Garfield Avenue, with no windows and a blank wall on the Garfield elevation. The building's entry is located off Garfield, facing east, on what was once Nelson Street. The parking lot is located east of the building, and accessed off Garfield as well. No work is proposed that would affect Goldfine's view of the Blatnik Bridge, which was important in its history. Because the proposed street improvements work are relatively minor activities and will be limited to Garfield Avenue, there will be **no adverse effect** on the Goldfine's building.

LS&M/StP&D/NP Railroad

Work proposed within the LS&M/SP&D/NP rail corridor will consist of track relocation or construction of a shoofly within the existing BNSF rail corridor near Coffee Creek to accommodate adjustment of bridge piers for the various interstate bridges being constructed. Crossovers between tracks may be required to enable the railroads to continue operations during and after the construction.

The segment of the LS&M/StP&D/NP Railroad from West Duluth Jct. (approximately 67th Ave. West) to 5th Avenue West downtown has been identified as noncontributing to the eligible LS&M rail corridor from St. Paul to Duluth. As a noncontributing segment of the railroad corridor, these proposed changes to enable continuation of operations during the construction period would have **no adverse effect** on the historic property.

Duluth, Missabe & Iron Range Railroad

There is a very short segment of the DM & IR Railroad within the APE for this report; no project activities are planned within the APE (see additional discussion of segment near 37th Ave. W. below).

The Great Northern Power Company Substation (SL-DUL-3386) 1424 West Superior Street

As part of traffic mitigation improvements, the TPI Project has proposed construction of a roundabout at the intersection of Superior and Michigan streets, approximately 300 feet north of the Great Northern Company building (see attached Figure 3). The roundabout would replace an intersection where Superior and Michigan currently come together in a "Y" as one roadway through the Point of Rocks area, continuing north into downtown Duluth where they again split into Michigan and Superior streets. Other traffic improvements have previously occurred nearby: Michigan Street on the east side of the Great Northern property has been previously altered from its original east/west configuration and now has a "Y" where it splits into Michigan and Lower

Michigan. The roundabout is separated from Great Northern property, and would continue to funnel traffic on either Michigan/Lower Michigan or to Superior. Views of the building from I-35 or adjacent streets would remain the same, and views from the Great Northern property would not be affected by the roundabout. A proposal has also been considered by the TPI Project to build a bridge west over I-35 from the roundabout. Although the cost benefit makes bridge construction unlikely, if the bridge were constructed, it would be located far enough away that it would not block views either toward or from the building. The proposed project construction would have **no adverse effect** on the Great Northern property.

It is the determination of this office that there is **no adverse effect on any architecture/history properties** within the APE identified in the *Phase I-II Architecture/History Report* for the TPI Project.

Project Additions After the Phase I/II Architecture/History Report

While the *Phase I-II Architecture/History Report* included a large APE (see Appendix A) that encompassed the primary work for the reconstruction of interchange I-35 and I-535, and included the area for many associated roadway improvements, the TPI has added two outlying improvements that were non-contiguous to the APE previously identified. These two outlying improvements were added to the project after work was completed on the primary report, and thus are reviewed separately within this letter.

--46th Avenue West Roadway Improvement

SP 6982-328 will include pavement rehabilitation throughout the project area already included within the previously identified APE. Outside the APE of the larger project within Duluth, this work will include roadway improvements on 46th Ave. West, from the southbound I-35 off ramps to Grand Avenue (see inset map on attached Figure 2). This segment of road connects to the US 2 Bong Bridge roadway to Wisconsin and is expected to receive increased traffic while work occurs on the I-35/I-535 interchange. Proposed work consists of a thin bituminous overlay of the existing pavement and reconstruction of ADA sidewalk ramps.

The APE for this work is limited to the construction limits, which includes the existing roadway, curb to curb, and the reconstructed ADA ramps. A site file search from SHPO database indicated no identified historic properties in the area, which was confirmed with a Google street view of these blocks. This improvement will have **no adverse effect** on any historic properties.

--Railroad Realignment Option

In addition to the temporary railroad realignment options already evaluated within the primary project APE, a second option was added in the area south of the DM&IR ore docks and north of 37th Ave. W. (see attached Figure 4). A Canadian National (CN)/Burlington Northern Santa Fe (BNSF) track crossover is proposed to allow CN to temporarily use BN trackage through the construction zone, potentially minimizing the extent of shoofly construction near the Coffee Creek and Miller Creek outfalls (elsewhere within the overall project APE).

The APE for this crossover work is limited to the BN/CN railroad corridors, from Merritt Creek to the southern DM&IR ore dock. The DM&IR ore docks (SL-DUL-0014) have been determined eligible for the NRHP, but bridge over the BN and CN rail corridors and are outside the APE for this improvement. As noted in table 4 and figure 3 in the *Phase I-II report*, the BN line (historic Duluth Transfer line, SL-XRR-005) has been determined not eligible. The CN line, the historic DM&IR Railroad (SL-DUL-2499), has been determined eligible for the NRHP.

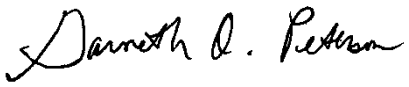
The addition of this crossover is a typical operational activity that will have **no adverse effect** on the characteristics of the historic railroad corridor. The construction of the crossover enhances the ability of the railroad to continue its primary operations within the historic corridor, and would be an efficient solution for the need to maintain operations during the project.

Need for PA

Based on the information prepared for the TPI Project at this time, no PA is required for architecture/history identification or determinations. Should the project make design changes that affect the APE or cause additional areas to be surveyed, we would undertake Section 106 review to address those areas and determine whether there are eligible properties that may be affected. As noted, the archaeology report for the TPI Project will be submitted separately. Our office will continue to communicate with you on this undertaking, and re-evaluate any need for an agreement document when archaeology survey work has been completed.

We look forward to your comment on the report provided with this letter and our determination. Please contact me at (651)366-3615 or at garneth.peterson@state.mn.us if you have any questions or need additional information.

Sincerely,



Garneth O. Peterson, AICP
Historian, Cultural Resources Unit

Enclosures

CC: Joe Campbell, FHWA
Phil Forst, FHWA
Roberta Dwyer, District 1
Melissa Cerda, MIAC
Amanda Gronhovd, OSA
Jill Hoppe, THPO, Fond du Lac Band of Lake Superior Chippewa
Adam Fulton, City of Duluth Planning Manager
Jenn Moses, Duluth HPC

Appendix D
Traffic Analysis

ALLIANT
ENGINEERING

MEMORANDUM

DATE: May 7, 2018

TO: Roberta Dwyer, PE

FROM: Yilun Xu, PE
Bob Green, PE, PTOE

SUBJECT: Twin Ports Interchange (TPI) Final Alternative VISSIM Traffic Analysis Memo

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This memorandum updated the "TPI Final Alternatives Preliminary VISSIM Traffic Analysis Memo" dated December 6, 2017 and documents VISSIM analysis results for the final alternative (Alt C) and No Build scenarios for Forecast Years 2020 and 2040. The geometric layouts assumed in the traffic analysis are shown in Appendix A.

A comparison of Vehicle Hours of Delay (VHD) for Alt C and No Build scenarios is shown in Table 1 below and Appendix B. VHD is a systematic measurement of traffic operation, which allows a fair comparison across alternatives from the traffic user standpoint.

Table 1: 2020 and 2040 AM/PM Peak Vehicle Hours of Delay (VHD) for No Build and Alt C

		AM		PM	
		VHD	% Increase compared to No Build	VHD	% Increase compared to No Build
2020	No Build	9.0	-	19.5	-
	Alt C	8.2	-9%	16.4	-16%
2040	No Build	14.1	-	52.7	-
	Alt C	13.2	-6%	33.0	-37%

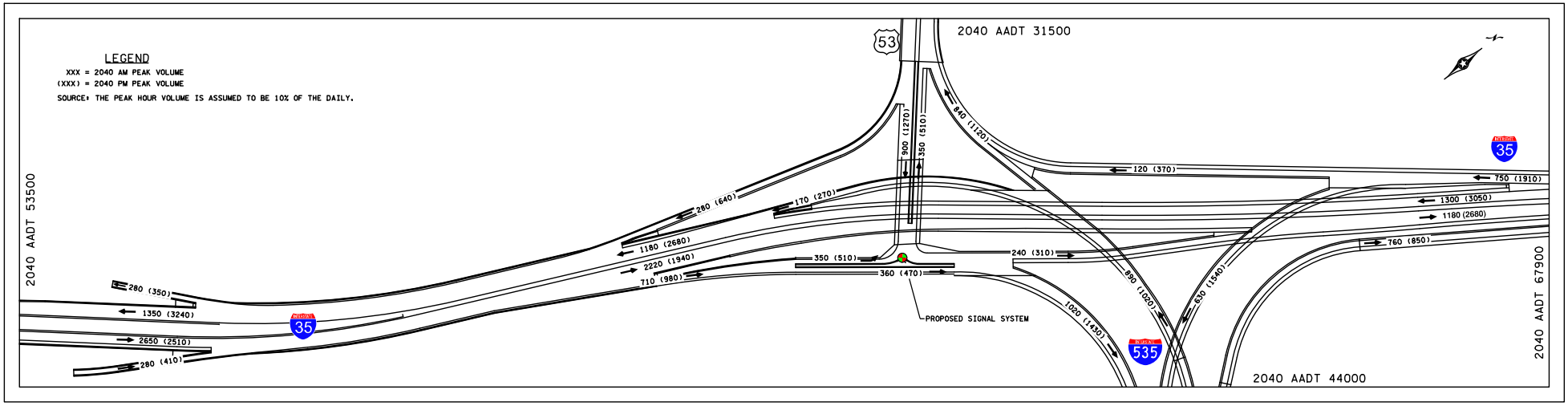
* VHD details for alternatives are shown in Appendix B

Additionally, Appendix C illustrates the 2020 and 2040 AM/PM peak hour Level of Services (LOS) under Alt C and No Build scenarios. LOS measures traffic operation performance from the facility standpoint.

In conclusion, the VISSIM modeling results reveal that Alt C reduces VHD from No Build scenario, mostly due to the eastbound lane addition on US-53 at the weaving segment before TPI.

Appendix A: Assumed Geometric Layout (Alt C) for Traffic Analysis

Layout Assumption for VISSIM Modeling - Alt C



Appendix B: Detailed 2020/2040 AM/PM Peak VHD along Routes under Alt C and No Build Scenarios

2020 Alt C

Vehicle Hours Delay (VHD) - AM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	1.6	0.3	-	-	0.5	1.0	0.1
	I-35 NB Onramp	0.2	0.0	-	-	0.0	0.1	0.0
	I-35 SB	-	-	0.3	0.0	0.3	0.0	0.0
	I-35 SB Onramp	-	-	0.1	0.1	0.1	0.0	0.0
	I-535 WB	0.7	0.2	0.0	0.0	-	0.2	0.0
	US-53 EB	0.5	0.1	0.0	0.0	1.3	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.1	-	-
Total		**8.2**						

Vehicle Hours Delay (VHD) - PM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	1.4	0.1	-	-	0.4	1.9	0.1
	I-35 NB Onramp	0.1	0.1	-	-	0.1	0.3	0.1
	I-35 SB	-	-	2.8	0.2	1.9	0.1	0.0
	I-35 SB Onramp	-	-	0.6	0.1	0.7	0.1	0.0
	I-535 WB	0.8	0.2	0.1	0.0	-	0.4	0.1
	US-53 EB	0.6	0.2	0.2	0.0	2.4	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.2	-	-
Total		**16.4**						

2020 Alt C Relative to 2020 No Build

Vehicle Hours Delay (VHD) Difference - AM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	-0.2	-0.1	-	-	0.0	-0.1	0.0
	I-35 NB Onramp	0.1	0.0	-	-	0.0	0.0	0.0
	I-35 SB	-	-	-0.1	0.0	0.0	-0.1	0.0
	I-35 SB Onramp	-	-	0.0	0.0	0.0	0.0	0.0
	I-535 WB	0.3	0.1	-0.1	0.0	-	0.0	0.0
	US-53 EB	0.0	0.0	-0.2	0.0	0.0	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.0	-	-
Total		**-0.8**						

Vehicle Hours Delay (VHD) Difference - PM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	-0.3	0.0	-	-	0.0	-0.2	0.0
	I-35 NB Onramp	0.0	0.0	-	-	0.0	-0.1	0.0
	I-35 SB	-	-	-0.7	-0.1	0.3	-0.2	0.0
	I-35 SB Onramp	-	-	-0.1	-0.1	0.0	-0.3	0.0
	I-535 WB	0.3	0.1	-0.2	0.0	-	-0.1	-0.1
	US-53 EB	-0.1	0.0	-0.7	0.0	-0.2	-	-
	US-53 EB Onramp	0.0	0.0	-0.1	0.0	0.0	-	-
Total		**-3.1**						

2040 Alt C

Vehicle Hours Delay (VHD) - AM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	2.8	0.4	-	-	0.9	1.9	0.1
	I-35 NB Onramp	0.3	0.0	-	-	0.0	0.2	0.1
	I-35 SB	-	-	0.3	0.0	0.4	0.0	0.0
	I-35 SB Onramp	-	-	0.1	0.1	0.2	0.0	0.0
	I-535 WB	0.8	0.2	0.1	0.0	-	0.5	0.1
	US-53 EB	0.6	0.1	0.1	0.0	2.7	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.1	-	-
Total		**13.2**						

Vehicle Hours Delay (VHD) - PM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	2.0	0.2	-	-	1.3	4.0	0.1
	I-35 NB Onramp	0.2	0.1	-	-	0.3	0.6	0.1
	I-35 SB	-	-	5.1	0.5	4.5	0.3	0.0
	I-35 SB Onramp	-	-	1.4	0.4	1.3	0.4	0.0
	I-535 WB	0.9	0.2	0.1	0.0	-	0.6	0.1
	US-53 EB	0.8	0.2	0.4	0.0	6.4	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.4	-	-
Total		**33.0**						

2040 Alt C Relative to 2040 No Build

Vehicle Hours Delay (VHD) Difference - AM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	-0.1	0.0	-	-	0.0	0.1	0.0
	I-35 NB Onramp	0.1	0.0	-	-	0.0	0.0	0.0
	I-35 SB	-	-	-0.1	0.0	0.0	-0.1	0.0
	I-35 SB Onramp	-	-	0.0	0.0	0.0	0.0	0.0
	I-535 WB	0.3	0.1	-0.1	0.0	-	-0.1	0.0
	US-53 EB	-0.1	0.0	-0.3	-0.1	-0.3	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.0	-	-
Total		**-1.0**						

Vehicle Hours Delay (VHD) Difference - PM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	-0.3	0.0	-	-	0.0	0.5	0.0
	I-35 NB Onramp	0.1	0.0	-	-	0.0	0.0	0.0
	I-35 SB	-	-	0.4	-0.2	1.6	-0.2	0.0
	I-35 SB Onramp	-	-	0.3	-0.1	0.4	-0.4	-0.1
	I-535 WB	0.3	0.1	-0.5	0.0	-	-0.4	-0.1
	US-53 EB	-1.1	-0.3	-7.5	-0.1	-10.3	-	-
	US-53 EB Onramp	-0.1	-0.1	-1.0	-0.1	-0.6	-	-
Total		**-19.8**						

2020 No Build

Vehicle Hours Delay (VHD) - AM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	1.8	0.3	-	-	0.5	1.1	0.1
	I-35 NB Onramp	0.1	0.0	-	-	0.0	0.2	0.1
	I-35 SB	-	-	0.3	0.0	0.3	0.1	0.0
	I-35 SB Onramp	-	-	0.1	0.1	0.2	0.1	0.0
	I-535 WB	0.4	0.1	0.1	0.0	-	0.3	0.1
	US-53 EB	0.5	0.1	0.2	0.1	1.3	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.1	-	-
Total		**9.0**						

Vehicle Hours Delay (VHD) - PM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	1.7	0.2	-	-	0.4	2.0	0.1
	I-35 NB Onramp	0.1	0.0	-	-	0.1	0.4	0.1
	I-35 SB	-	-	3.5	0.4	1.6	0.3	0.0
	I-35 SB Onramp	-	-	0.7	0.2	0.6	0.5	0.0
	I-535 WB	0.5	0.1	0.3	0.0	-	0.5	0.1
	US-53 EB	0.7	0.2	0.9	0.0	2.6	-	-
	US-53 EB Onramp	0.0	0.1	0.1	0.0	0.3	-	-
Total		**19.5**						

2040 No Build

Vehicle Hours Delay (VHD) - AM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	2.9	0.4	-	-	0.8	1.8	0.1
	I-35 NB Onramp	0.2	0.0	-	-	0.0	0.2	0.1
	I-35 SB	-	-	0.4	0.0	0.4	0.1	0.0
	I-35 SB Onramp	-	-	0.1	0.1	0.2	0.1	0.0
	I-535 WB	0.5	0.1	0.2	0.0	-	0.6	0.1
	US-53 EB	0.7	0.2	0.4	0.1	3.0	-	-
	US-53 EB Onramp	0.0	0.0	0.0	0.0	0.1	-	-
Total		**14.1**						

Vehicle Hours Delay (VHD) - PM

OD MATRIX		OUTBOUND						
		I-35 NB	I-35 NB Offramp	I-35 SB	I-35 SB Offramp	I-535 EB	US-53 WB	US-53 WB Offramp
INBOUND	I-35 NB	2.3	0.2	-	-	1.3	3.5	0.1
	I-35 NB Onramp	0.2	0.1	-	-	0.3	0.7	0.1
	I-35 SB	-	-	4.7	0.7	2.8	0.5	0.0
	I-35 SB Onramp	-	-	1.1	0.5	0.9	0.7	0.1
	I-535 WB	0.6	0.2	0.6	0.0	-	1.0	0.2
	US-53 EB	1.9	0.5	7.9	0.1	16.6	-	-
	US-53 EB Onramp	0.1	0.1	1.0	0.1	1.1	-	-
Total		**52.7**						

Appendix C: 2020/2040 AM/PM Peak Level of Services (LOS) under Alt C and No Build Scenarios

Twin Ports Interchange Level of Services (LOS) *2020 Alt C AM Peak*

ALLIANT ENGINEERING

Date: 12/4/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2020 Alt C PM Peak*

ALLIANT ENGINEERING

Date: 12/4/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2040 Alt C AM Peak*

ALLIANT ENGINEERING

Date: 11/2/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2040 Alt C PM Peak*

ALLIANT ENGINEERING

Date: 11/2/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2020 No Build AM Peak*

ALLIANT ENGINEERING

Date: 11/6/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2020 No Build PM Peak*

ALLIANT ENGINEERING

Date: 11/6/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2040 No Build AM Peak*

ALLIANT ENGINEERING

Date: 11/6/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

Twin Ports Interchange Level of Services (LOS) *2040 No Build PM Peak*

ALLIANT ENGINEERING

Date: 11/6/2017
Analyzing Program: VISSIM 8

0 0.1 0.2 0.4 Miles

ALLIANT
ENGINEERING

MEMORANDUM

DATE: February 22, 2017

TO: Jim Miles, PE, MnDOT District Traffic Engineer

FROM: Bob Green, PE, PTOE
Yilun Xu, PE

SUBJECT: SP 6982-322 (I35) Twin Ports Interchange Layouts and Modeling
Traffic Forecast Assumptions

This memorandum summarizes the assumptions used when developing forecasts and adjustment factors for the Twin Ports Layout and Modeling project. The project scope requires development of forecasts for the following:

- Year 2020 (year of opening)
- Year 2040 (20 years after construction)
- Year 2070 (because of the amount of structures on the project, this will be used as a high-level sensitivity analysis of the preferred alternative)

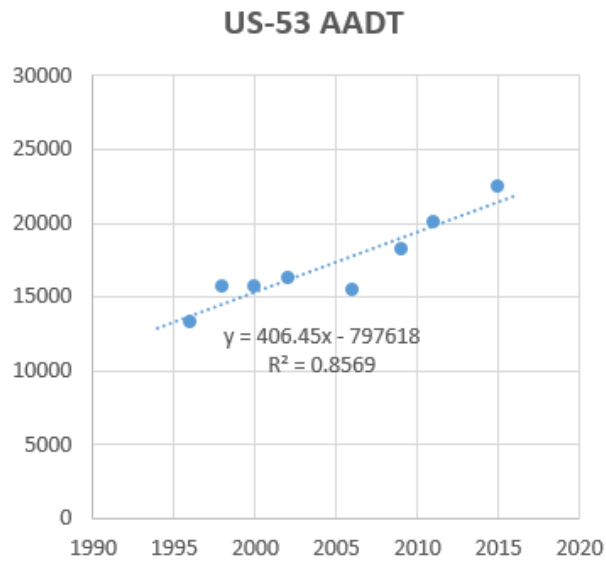
Traffic data was collected in August 2016. Freeway traffic volumes were collected by setting up eight portable trailers with Wavetronix detectors. The Wavetronix units provide a breakdown by speed, class, and lane utilization. In addition, video for turning movement counts was collected during the same time period for the ramps at I-35/27th Avenue and the US-53/21st Avenue ramps. This data will be factored as appropriate for growth in traffic and adjustment of 30th highest hourly volume to develop the design hour volumes for the scenarios listed above.

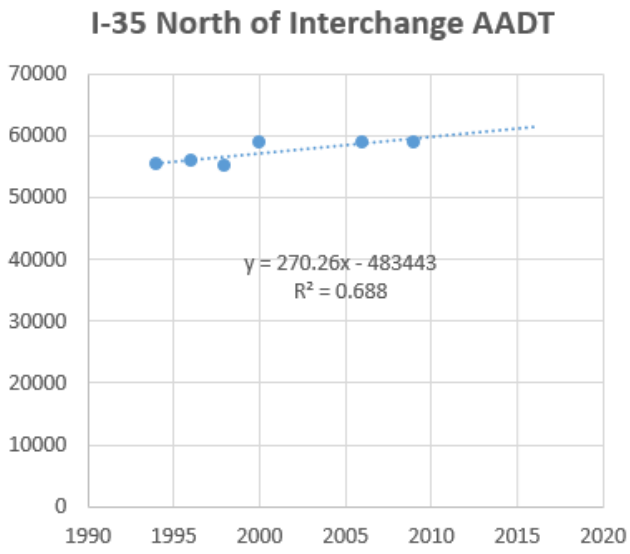
A review of the Average Annual Daily Traffic (AADT) volumes was conducted to determine historic growth trends. Data was available back to 1994. Four locations were reviewed:

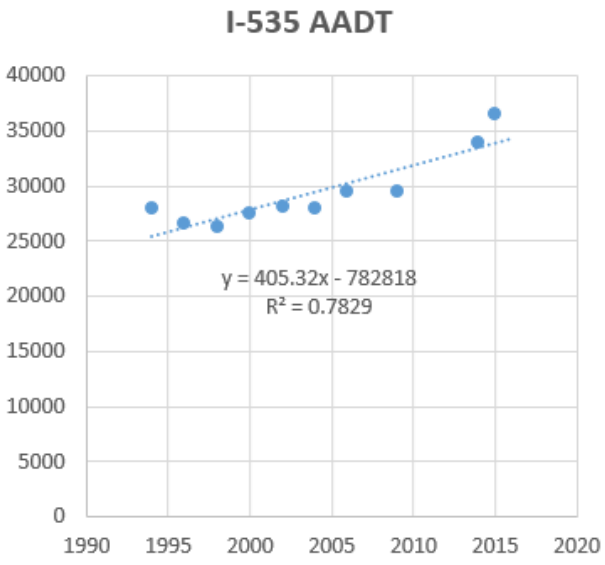
- US-53 west of I-35
- I-35 south of interchange near Central Avenue
- I-535 east of I-35
- I-35 north of interchange near Garfield overpass

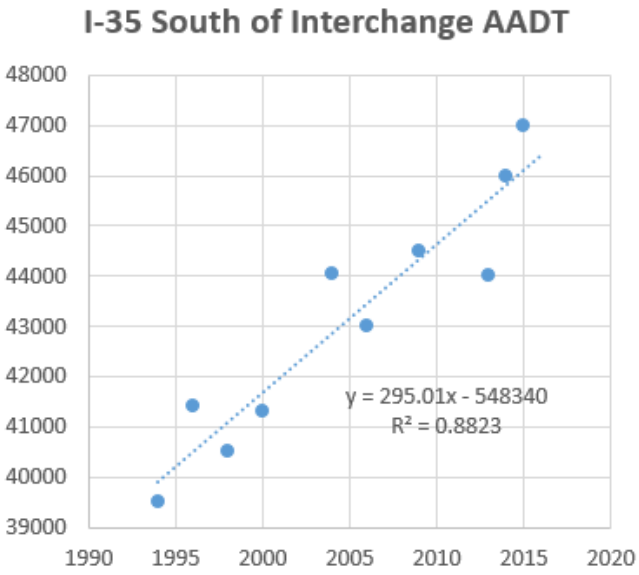
Table 1 on the next page documents the linear growth trends for each of the four segments.

Table 1
Historical Growth of AADT









Forecast traffic volumes based on the historical growth trends are shown in Table 2. For Year 2070, a growth factor of 0.25% per year was used between 2040 and 2070, so that the forecast is not overly conservative.

Table 2
Forecast Traffic Volumes

Segments	Forecast Year AADT (1, 2)			Annual Growth Rate (3)
	2020	2040	2070	Based on Linear Model
US 53	23,400	31,500	34,000	1.50%
I-35 South of Interchange	47,600	53,500	57,700	0.59%
I-35 North of Interchange	62,500	67,900	73,200	0.42%
I-535	35,900	44,000	47,400	1.02%
SUM/AVG	**169,400**	**196,900**	**212,300**	**0.76%**

1. 2020 and 2040 AADT forecast by linear model
2. 2070 AADT developed based on 2040 AADT and 0.25% annual growth rate
3. Annual growth rate developed based on 2040 and 2070 AADTs forecast by linear model

The "Duluth – Superior Long Range Transportation Plan" developed by Metropolitan Interstate Council in 2014 has forecast traffic volumes at the Twin Ports interchange for the year of 2040. It was understood that its model forecast traffic volumes based on area development projections. However, for the purpose of design alternative comparison in this project, traffic volume forecasts developed by AADT data counted immediately adjacent to the interchange are more appropriate due to their close proximities. These forecast results are shown in Table 2.

30th Highest Hourly Volume Adjustments

Since the 30th highest hourly volume is commonly used as the roadway design volume, another set of adjustment factors was developed to simulate the peak hour volumes in modeling as the 30th highest hourly volume.

Known from MnDOT ATR along I-35 mainline, the 30th highest hourly volume accounts for 11% of AADT. Since PM peak is heavier than AM peak, PM peak hour volume will be adjusted to simulate the 30th highest hourly volume while AM peak hour volume will be adjusted proportionally based on actual count difference between AM and PM hours.

The 30th highest hourly volume adjustment factors were developed for the four segments and three target years in Table 2. As a result, the PM peak volumes in modeling will be at 11% of the forecast AADTs (simulating the 30th highest hourly volume) and the AM peak volumes will be at 7.5% at the four segments.

Routings through the Interchange

A total of 36 routes through the Twin Ports interchange were discovered from/to the ramps and mainlines of US-53, I-35 South, I-35 North and I-535. Traffic volumes for these routes in 2020, 2040 and 2070 were individually forecast based on the growth and adjustment methodology discussed above. The forecast traffic volumes for 2020, 2040 and 2070 based on No Build scenario are shown in Appendix A.

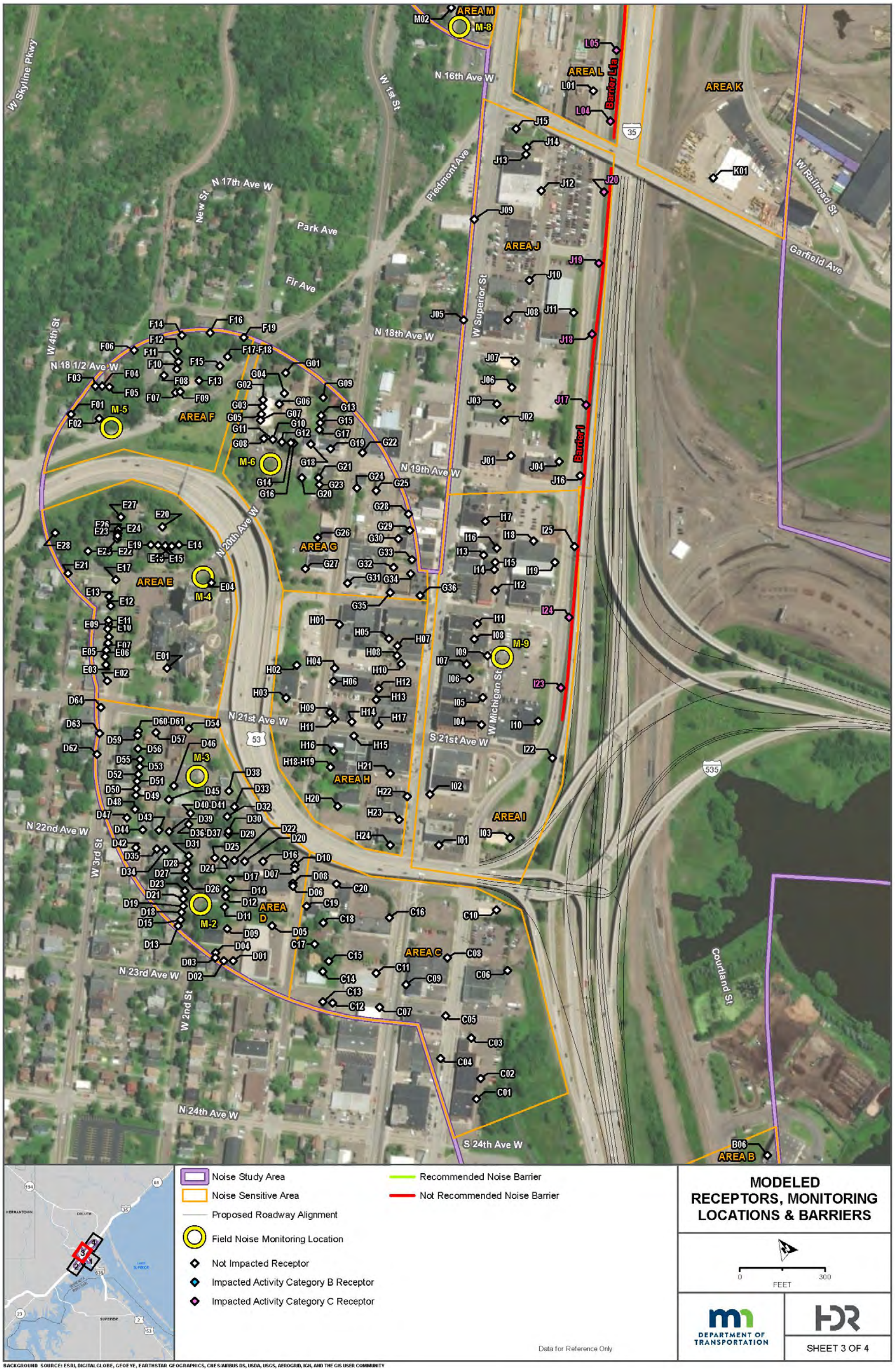
Conclusions

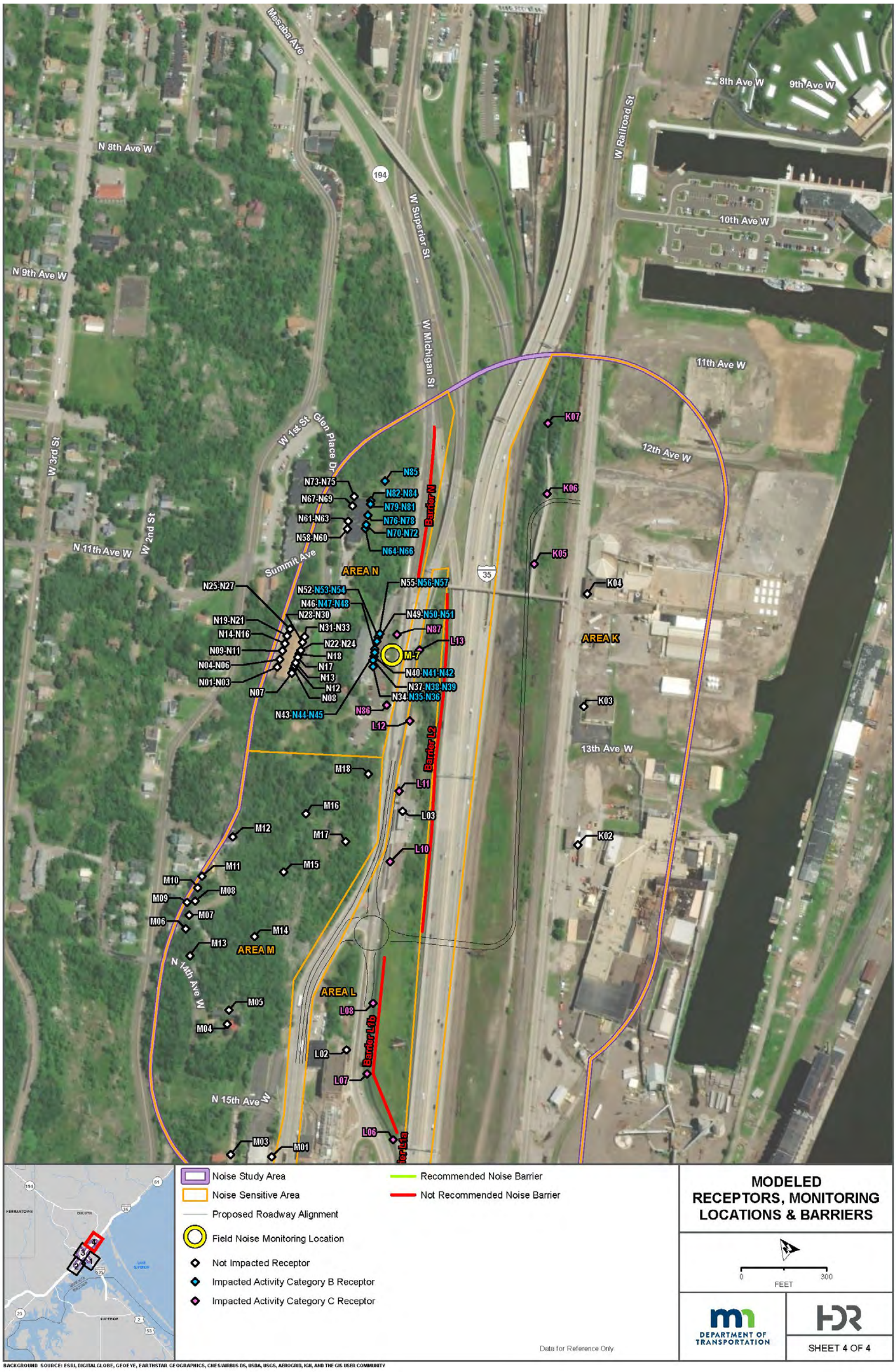
This memo documents the development of AADT forecasts (Table 2) and the 30th highest hourly volume factors of 11% and 7.5% (for PM and AM peak hours). Traffic volumes of the 36 individual routes through the interchange were further adjusted based on these forecasts and factors in order to simulate the roadway design volume for the purpose of interchange alternatives comparison.

Appendix E
Noise Analysis

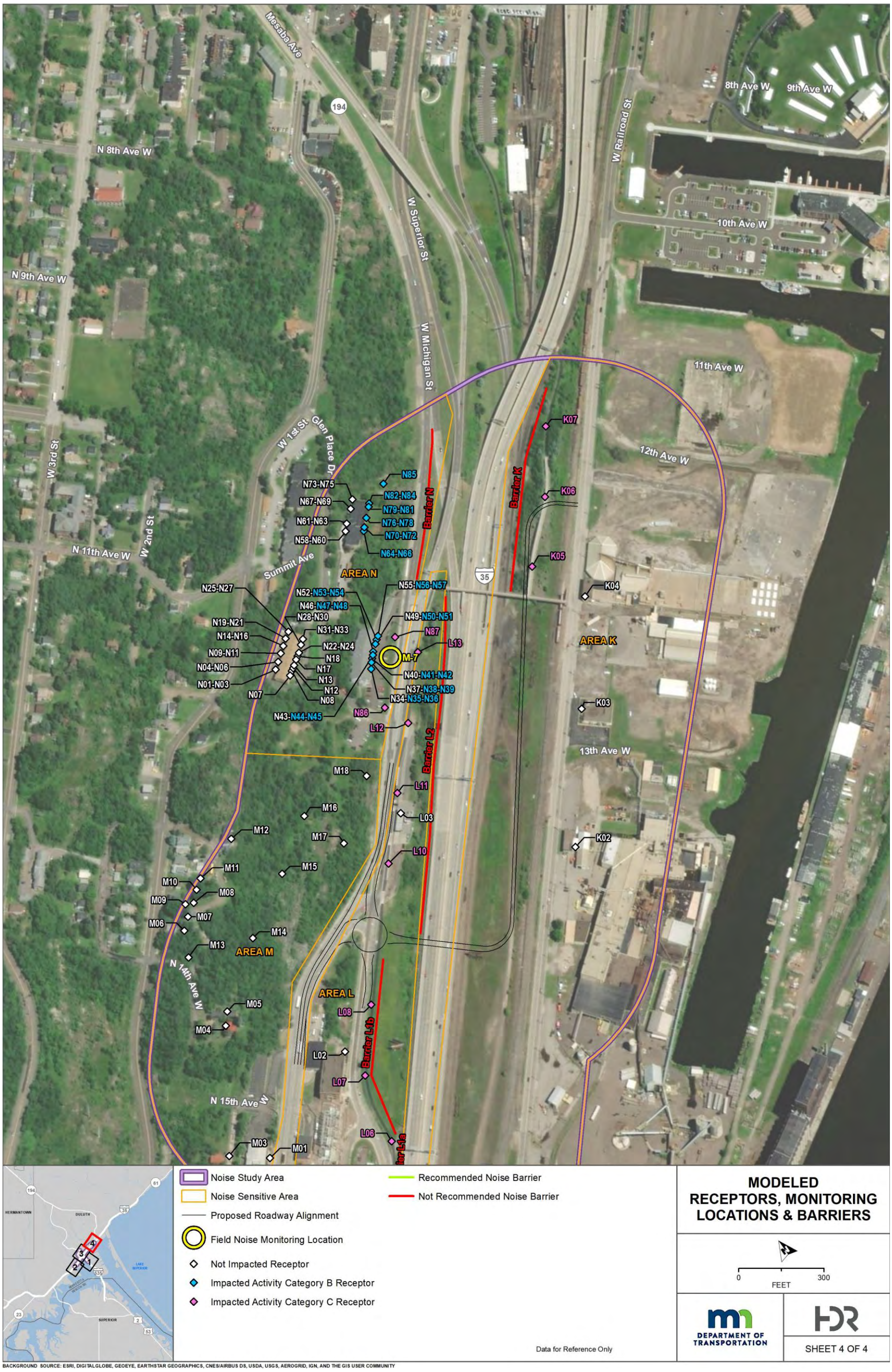

Garfield Ave
Mill Ave
E Birch Ave
Birch Ave
E Nelson St
53
535
Noise Study Area
Noise Sensitive Area
Proposed Roadway Alignment
Field Noise Monitoring Location
Not Impacted Receptor
Impacted Activity Category B Receptor
Impacted Activity Category C Receptor
Recommended Noise Barrier
Not Recommended Noise Barrier
Data for Reference Only
MODELED RECEPTORS, MONITORING LOCATIONS & BARRIERS
0
300
FEET
DEPARTMENT OF TRANSPORTATION
SHEET 1 OF 4
BACKGROUND SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY

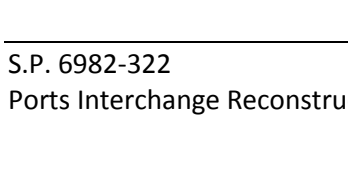

A10
N 25th Ave W
B05
A09
B04
A08
Lincoln Pkwy
S 26th Ave W
W 1st St
M-1
A07
AREA B
B03
A06
A05
N 27th Ave W
AREA A
B02
S 27th Ave W
A04
A03
N 28th Ave W
W Michigan St
W Superior St
Helm St
Railroad St W
B01
A02
35
N 29th Ave W
S 29th Ave W
A01
Courtland St
N 30th Ave W
N 30 1/2 Ave W
Carlton St
33rd Ave W
Noise Study Area
Noise Sensitive Area
Proposed Roadway Alignment
Field Noise Monitoring Location
Not Impacted Receptor
Impacted Activity Category B Receptor
Impacted Activity Category C Receptor
Recommended Noise Barrier
Not Recommended Noise Barrier
Data for Reference Only
MODELED RECEPTORS, MONITORING LOCATIONS & BARRIERS
0
300
FEET
DEPARTMENT OF TRANSPORTATION
SHEET 2 OF 4
BACKGROUND SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY


AREA M
M-8
M02
L05
AREA L
L01
L04
Barrier L1a
AREA K
K01
J15
J14
J13
J12
J20
J09
AREA J
J19
J10
J05
J08
J11
J18
J07
J06
J03
J17
J02
J01
J04
J16
Barrier J
W Skyline Pkwy
N 16th Ave W
W 1st St
Piedmont Ave
N 17th Ave W
New St
Park Ave
Fir Ave
W 4th St
N 18th Ave W
W Superior St
W Railroad St
Garfield Ave
N 18 1/2 Ave W
F14
F16
F19
F12
F06
F11
F17-F18
F10
F15
G01
F03
F04
F08
F13
G04
G09
G02
F05
F07
F09
G06
G03
G13
F01
M-5
AREA F
G07
G05
G15
F02
G10
G11
G12
G17
G08
G19
G22
M-6
G18
G21
N 19th Ave W
G14
G23
G24
G25
G16
G20
G28
G29
G26
G30
AREA G
G33
G27
G32
G31
G34
G36
G35
H01
H05
H07
H08
H04
H10
H02
H06
H12
H03
H13
H09
H14
H17
H11
H16
H15
H18-H19
H21
AREA H
H22
H20
H23
H24
I17
I25
I16
I18
I13
I15
I14
I19
I12
I24
I11
I08
M-9
I09
I07
I06
I23
I05
I04
I10
S 21st Ave W
I22
I02
AREA I
I03
I01
535
E27
E20
E24
E28
E19
E14
E15
E21
E17
AREA E
M-4
E04
E13
E12
E09
E11
E10
E07
E05
E06
E01
E03
E02
N 20th Ave W
D64
D63
D60-D61
D54
D59
D57
D46
D62
D56
M-3
D55
D53
D38
D52
D51
D50
D49
D45
D33
D48
D40-D41
D32
D47
D43
D39
D30
N 22nd Ave W
D44
D36-D37
D29
D22
D20
D42
D31
D25
D35
D28
D16
D10
D34
D27
D24
D17
D07
D08
C20
D23
D26
D14
D06
D21
C19
D19
D12
AREA D
C16
C10
D18
D11
C18
D15
M-2
D09
D05
D13
D04
C17
C15
AREA C
C08
D03
D01
C11
C09
C06
N 23rd Ave W
D02
C14
C13
C12
C07
C05
W 3rd St
W 2nd St
C03
C04
C02
C01
N 24th Ave W
S 24th Ave W
B06
AREA B
Courtland St
W Michigan St
Noise Study Area
Noise Sensitive Area
Proposed Roadway Alignment
Field Noise Monitoring Location
Not Impacted Receptor
Impacted Activity Category B Receptor
Impacted Activity Category C Receptor
Recommended Noise Barrier
Not Recommended Noise Barrier
Data for Reference Only
MODELED RECEPTORS, MONITORING LOCATIONS & BARRIERS
0
300
FEET
DEPARTMENT OF TRANSPORTATION
SHEET 3 OF 4
BACKGROUND SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY


Mesaba Ave
N 8th Ave W
N 9th Ave W
W Superior St
W Michigan St
W Railroad St
8th Ave W
9th Ave W
10th Ave W
11th Ave W
12th Ave W
13th Ave W
194
35
W 1st St
Glen Place Dr
W 2nd St
W 3rd St
N 11th Ave W
N 14th Ave W
N 15th Ave W
Summit Ave
Barrier N
Barrier L2
Barrier L1b
Barrier L1a
AREA N
AREA K
AREA M
AREA L
N85
N73-N75
N67-N69
N61-N63
N58-N60
N82-N84
N79-N81
N76-N78
N70-N72
N64-N66
N25-N27
N19-N21
N14-N16
N09-N11
N04-N06
N01-N03
N07
N28-N30
N31-N33
N22-N24
N18
N17
N13
N12
N08
N43-N44-N45
N52-N53-N54
N46-N47-N48
N55-N56-N57
N49-N50-N51
N87
L13
M-7
N40-N41-N42
N37-N38-N39
N34-N35-N36
N86
L12
K07
K06
K05
K04
K03
K02
M18
M16
M17
M12
M15
M11
M10
M08
M09
M07
M06
M14
M13
M05
M04
M03
M01
L11
L03
L10
L08
L02
L07
L06
Noise Study Area
Noise Sensitive Area
Proposed Roadway Alignment
Field Noise Monitoring Location
Not Impacted Receptor
Impacted Activity Category B Receptor
Impacted Activity Category C Receptor
Recommended Noise Barrier
Not Recommended Noise Barrier
MODELED RECEPTORS, MONITORING LOCATIONS & BARRIERS
0
300
FEET
DEPARTMENT OF TRANSPORTATION
SHEET 4 OF 4
Data for Reference Only
BACKGROUND SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY

1 inch = 300 feet





Noise Study Area
Noise Sensitive Area
Proposed Roadway Alignment
Field Noise Monitoring Location
Not Impacted Receptor
Impacted Activity Category B Receptor
Impacted Activity Category C Receptor
Recommended Noise Barrier
Not Recommended Noise Barrier

Data for Reference Only

MODELED RECEPTORS, MONITORING LOCATIONS & BARRIERS

0 FEET 300

DEPARTMENT OF TRANSPORTATION

HDR

SHEET 4 OF 4

BACKGROUND SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY

Appendix B

Noise Modeling Results

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
NSA A:							
A01	E		56.1	56.7	0.6	57.1	1.0
A02	F		61.6	62.2	0.6	62.7	1.1
A03	E		68.2	68.9	0.7	69.3	1.1
A04	F		58.2	58.8	0.6	58.6	0.4
A05	E		66.4	67	0.6	66.9	0.5
A06	E		59.1	59.7	0.6	59.2	0.1
A07	E	67.7	66.1	66.7	0.6	67.5	1.4
A08	F		69.2	69.8	0.6	71.4	2.2
A09	F		73.1	73.7	0.6	76.1	3
A10	F		64.6	65.2	0.6	63.3	-1.3
NSA B:							
B01	F		58	58.7	0.7	58.7	0.7
B02	E		60.5	61.1	0.6	61.4	0.9
B03	F		55.2	55.8	0.6	55.3	0.1
B04	F		59.9	60.6	0.7	60.3	0.4
B05	F		60.7	61.3	0.6	60.6	-0.1
B06	F		60.8	61.4	0.6	60	-0.8
NSA C:							
C01	E		61.9	62.5	0.6	59.8	-2.1

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
C02	F		62.4	62.9	0.5	60.2	-2.2
C03	E		62.1	62.6	0.5	60.3	-1.8
C04	F		58.7	59.2	0.5	57.2	-1.5
C05	E		61.2	61.7	0.5	59.5	-1.7
C06	F		64.8	65.3	0.5	61.2	-3.6
C07	F		59.3	59.8	0.5	57.6	-1.7
C08	E		64.3	64.8	0.5	59.7	-4.6
C09	E		55.9	56.5	0.6	56.0	0.1
C10	F		67.1	67.6	0.5	61.4	-5.7
C11	F		61.2	61.8	0.6	58.9	-2.3
C12	B		58.6	59.2	0.6	56.9	-1.7
C13	B		58.3	58.8	0.5	56.9	-1.4
C14	F		58.7	59.2	0.5	56.8	-1.9
C15	B		59.7	60.2	0.5	57.8	-1.9
C16	C		64.1	64.7	0.6	62.6	-1.5
C17	B		57.4	57.9	0.5	55.3	-2.1
C18	B		57.9	58.4	0.5	57.2	-0.7
C19	B		55.3	55.8	0.5	56.1	0.8
C20	F		63.4	63.9	0.5	61.8	-1.6
NSA D:							

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
D01	B		53.2	53.7	0.5	53.7	0.5
D02	B		53.6	54.1	0.5	53.9	0.3
D03	B		51.8	52.4	0.6	51.7	-0.1
D04	B		50.6	51.2	0.6	50.6	0.0
D05	F		56.5	57.0	0.5	55.7	-0.8
D06	B		60.4	60.9	0.5	59.7	-0.7
D07	E		61.2	61.7	0.5	60.4	-0.8
D08	E		59.4	60.0	0.6	58.7	-0.7
D09	E		56.0	56.5	0.5	56.3	0.3
D10	B		62.9	63.5	0.6	62.6	-0.3
D11	B		55.9	56.4	0.5	56.0	0.1
D12	B		56.3	56.8	0.5	56.3	0.0
D13	B		55.2	55.8	0.6	55.1	-0.1
D14	B		56.1	56.6	0.5	56.3	0.2
D15	B		55.4	56.0	0.6	55.4	0.0
D16	B		60.3	60.8	0.5	60.9	0.6
D17	B		55.5	56.0	0.5	56.0	0.5
D18	B		55.6	56.2	0.6	55.5	-0.1
D19	B	51.3	55.8	56.3	0.5	55.6	-0.2
D20	B		59.1	59.6	0.5	59.8	0.7

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
D21	B		55.9	56.4	0.5	55.7	-0.2
D22	B		58.7	59.2	0.5	59.2	0.5
D23	B		56.1	56.7	0.6	55.9	-0.2
D24	B		58	58.6	0.6	58.5	0.5
D25	B		56.7	57.2	0.5	56.9	0.2
D26	B		56.6	57.1	0.5	56.4	-0.2
D27	B		56.5	57.1	0.6	56.5	0.0
D28	B		56.4	57.0	0.6	56.4	0.0
D29	E		59.7	60.2	0.5	60.1	0.4
D30	B		61.4	61.9	0.5	62.0	0.6
D31	B		56.7	57.2	0.5	56.5	-0.2
D32	B		58.6	59.1	0.5	59.0	0.4
D33	B		61.5	62	0.5	62.4	0.9
D34	B		55.1	55.7	0.6	54.8	-0.3
D35	B		55.2	55.8	0.6	54.7	-0.5
D36	B		57.2	57.7	0.5	57.6	0.4
D37	B		59.5	60.0	0.5	59.8	0.3
D38	B		64.0	64.5	0.5	64.7	0.7
D39	B		52.3	52.9	0.6	51.7	-0.6
D40	B		58.2	58.7	0.5	58.6	0.4

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
D41	B		60.6	61.1	0.5	60.8	0.2
D42	C		55.2	55.7	0.5	54.6	-0.6
D43	B		53.2	53.8	0.6	52.4	-0.8
D44	B		54.4	54.9	0.5	53.7	-0.7
D45	B		50.1	50.7	0.6	50.6	0.5
D46	B	57.0	54.1	54.6	0.5	54.5	0.4
D47	F		54.1	54.6	0.5	53.7	-0.4
D48	B		54.3	54.8	0.5	54.2	-0.1
D49	B		54.2	54.8	0.6	54.5	0.3
D50	B		54.0	54.6	0.6	54.5	0.5
D51	B		54.7	55.3	0.6	55.3	0.6
D52	B		54.7	55.3	0.6	55.4	0.7
D53	B		54.8	55.4	0.6	55.2	0.4
D54	C		60.5	61.0	0.5	60.9	0.4
D55	B		55.3	55.8	0.5	55.4	0.1
D56	B		55.5	56.1	0.6	55.7	0.2
D57	B		53.5	54.1	0.6	54.0	0.5
D58	B		55.7	56.3	0.6	56.0	0.3
D59	B		57.3	57.8	0.5	57.4	0.1
D60	B		55.4	55.9	0.5	55.6	0.2

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
D61	B		56.8	57.4	0.6	56.9	0.1
D62	B		55.3	55.9	0.6	55.3	0.0
D63	B		55.9	56.4	0.5	55.9	0.0
D64	E		55.9	56.5	0.6	55.8	-0.1
NSA E:							
E01	C		57.7	58.2	0.5	57.8	0.1
E02	B		55.7	56.3	0.6	55.6	-0.1
E03	B		56.2	56.7	0.5	56	-0.2
E04	B	60.1	63.8	64.3	0.5	64.3	0.5
E05	B		56.3	56.8	0.5	56.2	-0.1
E06	B		56.4	56.9	0.5	56.4	0.0
E07	B		56.3	56.9	0.6	56.5	0.2
E08	B		56.5	57.1	0.6	56.9	0.4
E09	B		56.8	57.4	0.6	57.1	0.3
E10	B		56.6	57.1	0.5	56.9	0.3
E11	B		56.2	56.8	0.6	56.6	0.4
E12	B		56.9	57.4	0.5	57.2	0.3
E13	B		57.3	57.9	0.6	57.5	0.2
E14	B		63.1	63.6	0.5	63.5	0.4
E15	B		62.5	63.1	0.6	62.9	0.4

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
E16	B		61.6	62.2	0.6	62.1	0.5
E17	B		58.3	58.8	0.5	58.5	0.2
E18	B		61	61.6	0.6	61.4	0.4
E19	B		60.8	61.3	0.5	61.2	0.4
E20	B		62.3	62.9	0.6	62.6	0.3
E21	B		57.1	57.7	0.6	57.2	0.1
E22	B		59.6	60.2	0.6	59.9	0.3
E23	B		59.7	60.3	0.6	60.1	0.4
E24	B		59.9	60.4	0.5	60.2	0.3
E25	B		56.2	56.8	0.6	55.8	-0.4
E26	B		59.9	60.5	0.6	60.2	0.3
E27	B		62	62.6	0.6	62.4	0.4
E28	B		61.9	62.5	0.6	62.2	0.3
NSA F:							
F01	B		62.6	63.2	0.6	62.8	0.2
F02	B	62.5	63.5	64.1	0.6	63.7	0.2
F03	B		61.3	61.9	0.6	61.4	0.1
F04	B		61.7	62.2	0.5	61.7	0.0
F05	B		62	62.6	0.6	62.0	0.0
F06	B		60.1	60.6	0.5	59.5	-0.6

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
F07	B		60.8	61.3	0.5	60.5	-0.3
F08	B		59.3	59.8	0.5	59.5	0.2
F09	B		60.9	61.5	0.6	60.6	-0.3
F10	B		58.2	58.7	0.5	57.4	-0.8
F11	B		58.9	59.4	0.5	58.3	-0.6
F12	B		58.8	59.3	0.5	58.2	-0.6
F13	B		60.4	60.9	0.5	59.9	-0.5
F14	B		58.3	58.9	0.6	57.6	-0.7
F15	B		59.2	59.8	0.6	58.3	-0.9
F16	B		57.2	57.7	0.5	56.3	-0.9
F17	B		59.3	59.8	0.5	58.4	-0.9
F18	B		60	60.5	0.5	59.0	-1.0
F19	B		59.3	59.9	0.6	58.5	-0.8
NSA G:							
G01	B		58.4	58.9	0.5	56.8	-1.6
G02	B		55.3	55.8	0.5	55.8	0.5
G03	B		55.6	56.1	0.5	56.1	0.5
G04	B		54.8	55.4	0.6	54.1	-0.7
G05	B		56.1	56.6	0.5	56.6	0.5
G06	B		57.8	58.4	0.6	57.0	-0.8

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
G07	B		56.9	57.4	0.5	57.1	0.2
G08	B		59.4	59.9	0.5	59.1	-0.3
G09	B		59.3	59.8	0.5	58.1	-1.2
G10	B	57.3	59.3	59.8	0.5	59.0	-0.3
G11	B		60.9	61.5	0.6	60.4	-0.5
G12	B		59.1	59.7	0.6	58.9	-0.2
G13	B		59.0	59.5	0.5	58.1	-0.9
G14	B		58.7	59.3	0.6	58.6	-0.1
G15	B		58.8	59.3	0.5	58.1	-0.7
G16	B		58.4	59.0	0.6	58.3	-0.1
G17	B		57.8	58.4	0.6	57.1	-0.7
G18	F		56.9	57.5	0.6	57.0	0.1
G19	F		56.5	57.1	0.6	56.1	-0.4
G20	B		59.3	59.8	0.5	59.0	-0.3
G21	B		57.1	57.6	0.5	57.4	0.3
G22	F		58.0	58.6	0.6	58.3	0.3
G23	B		58.2	58.8	0.6	58.4	0.2
G24	F		57.0	57.5	0.5	57.4	0.4
G25	F		56.9	57.4	0.5	56.9	0
G26	E		58.4	58.9	0.5	58.9	0.5

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
G27	E		61.2	61.6	0.4	61.5	0.3
G28	E		57.0	57.6	0.6	56.1	-0.9
G29	B		53.5	54.0	0.5	53.6	0.1
G30	E		53.8	54.4	0.6	53.8	0.0
G31	F		59.0	59.5	0.5	59.3	0.3
G32	F		53.1	53.7	0.6	54.1	1.0
G33	B		55.9	56.4	0.5	56.2	0.3
G34	E		54.1	54.8	0.7	55.0	0.9
G35	B		59.0	59.6	0.6	58.7	-0.3
G36	E		57.1	57.7	0.6	57.4	0.3
NSA H:							
H01	F		59.2	59.7	0.5	59.7	0.5
H02	B		61.6	62.1	0.5	62.1	0.5
H03	F		62.4	62.9	0.5	62.9	0.5
H04	F		59.8	60.3	0.5	60.3	0.5
H05	B		58.6	59.2	0.6	58.6	0.0
H06	F		59.2	59.7	0.5	59.9	0.7
H07	F		55.8	56.3	0.5	56.3	0.5
H08	E		55.8	56.4	0.6	56.1	0.3
H09	B		60.5	61.0	0.5	61.0	0.5

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
H10	B		59.3	59.8	0.5	59.4	0.1
H11	F		58.6	59.1	0.5	59.1	0.5
H12	E		50.0	50.6	0.6	50.3	0.3
H13	F		53.4	53.9	0.5	53.9	0.5
H14	E		56.3	56.8	0.5	56.4	0.1
H15	E		55.3	55.9	0.6	55.9	0.6
H16	B		60.1	60.6	0.5	60.5	0.4
H17	B		55.9	56.5	0.6	55.3	-0.6
H18	B		62.2	62.7	0.5	62.8	0.6
H19	E		62.2	62.7	0.5	62.5	0.3
H20	C		64.3	64.8	0.5	64.0	-0.3
H21	F		60.4	60.9	0.5	58.9	-1.5
H22	E		60.6	61.1	0.5	58.2	-2.4
H23	F		62.6	63.1	0.5	61.7	-0.9
H24	E		63.7	64.3	0.6	61.2	-2.5
NSA I:							
I01	E		64.5	65.0	0.5	61.7	-2.8
I02	F		62.3	62.8	0.5	59.8	-2.5
I03	F		68.5	69.0	0.5	58.1	-10.4
I04	F		64.1	64.7	0.6	61.5	-2.6

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
I05	C		64.6	65.1	0.5	62.6	-2.0
I06	E		64.1	64.6	0.5	62.4	-1.7
I07	E		64.0	64.5	0.5	62.4	-1.6
I08	E		64.2	64.7	0.5	62.6	-1.6
I09	F	62.0	65.4	65.9	0.5	63.5	-1.9
I10	E		68.9	69.4	0.5	63.8	-5.1
I11	E		63.8	64.3	0.5	62.1	-1.7
I12	E		60.0	60.5	0.5	59.2	-0.8
I13	F		60.0	60.5	0.5	58.0	-2.0
I14	F		58.6	59.1	0.5	57.9	-0.7
I15	F		58.8	59.3	0.5	58.8	0.0
I16	F		61.2	61.8	0.6	60.0	-1.2
I17	E		63.2	63.7	0.5	61.4	-1.8
I18	F		65.8	66.3	0.5	62.6	-3.2
I19	E		69.5	70.1	0.6	65.7	-3.8
I22	C		**70.6**	**71.1**	0.5	59.5	-11.1
I23	C		**70.1**	**70.6**	0.5	**66.4**	-3.7
I24	C		**70.5**	**71.0**	0.5	**67.2**	-3.3
I25	C		**70.3**	**70.9**	0.6	60.1	-10.2
NSA J:							

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
J01	F		64.2	64.7	0.5	64.6	0.4
J02	E		64	64.6	0.6	64.9	0.9
J03	F		63.8	64.3	0.5	64.7	0.9
J04	E		69.3	69.9	0.6	67.4	-1.9
J05	B		59.3	59.9	0.6	60.4	1.1
J06	E		64.8	65.3	0.5	65.6	0.8
J07	F		64.4	65.0	0.6	65.3	0.9
J08	E		61.7	62.3	0.6	62.5	0.8
J09	F		58.6	59.2	0.6	58.8	0.2
J10	E		64.1	64.7	0.6	64.1	0
J11	F		69.7	70.3	0.6	69.2	-0.5
J12	F		55.5	56.1	0.6	55.8	0.3
J13	F		61.2	61.9	0.7	62.1	0.9
J14	F		62.4	63.0	0.6	63.1	0.7
J15	F		61.8	62.7	0.9	61.8	0
J16	C		**70.0**	**70.5**	0.5	64.4	-5.6
J17	C		**68.8**	**69.5**	0.7	**67.2**	-1.6
J18	C		**69.9**	**70.5**	0.6	**66.9**	-3
J19	C		**70.9**	**71.5**	0.6	**68.2**	-2.7
J20	C		**70.9**	**71.6**	0.7	**68.9**	-2

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
NSA K:							
K01	F		66.1	66.7	0.6	64.1	-2
K02	F		63.6	64.2	0.6	59.9	-3.7
K03	E		64.7	65.3	0.6	62.9	-1.8
K04	F		66.0	66.6	0.6	66.4	0.4
K05	C		**69.8**	**70.4**	0.6	**69.6**	-0.2
K06	C		**69**.0	**69.7**	0.7	**69.9**	0.9
K07	C		**69.6**	**70.3**	0.7	**70.2**	0.6
L01	F		67.8	68.5	0.7	68.0	0.2
L02	F		68.7	69.3	0.6	69.4	0.7
L03	E		67.6	68.2	0.6	67.8	0.2
L04	C		**70.8**	**71.4**	0.6	**71.2**	0.4
L05	C		**70.7**	**71.3**	0.6	**71.2**	0.5
L06	C		**72**.0	**72.6**	0.6	**72.6**	0.6
L07	C		**71.2**	**71.8**	0.6	**72.5**	1.3
L08	C		**72**.0	**72.6**	0.6	**72.6**	0.6
L10	C		**73.1**	**73.6**	0.5	**69.8**	-3.3
L11	C		**70.2**	**70.7**	0.5	**70.8**	0.6
L12	C		**73**.0	**73.6**	0.6	**73.7**	0.7
L13	C		**73.5**	**74.2**	0.7	**74.3**	0.8

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
NSA M:							
M01	C		64.2	65.7	1.5	64.2	0
M02	B	60.8	60.6	61.2	0.6	60.7	0.1
M03	B		60.0	60.7	0.7	60.1	0.1
M04	B		63.3	64	0.7	63.6	0.3
M05	B		63.5	64.2	0.7	63.8	0.3
M06	B		59.5	60.2	0.7	59.9	0.4
M07	B		56.7	57.3	0.6	56.6	-0.1
M08	B		46.9	47.6	0.7	46.0	-0.9
M09	B		49.3	49.9	0.6	48.9	-0.4
M10	B		55.9	56.5	0.6	55.9	0
M11	B		55.2	55.8	0.6	55.2	0
M12	B		61.4	62.0	0.6	61.8	0.4
M13	C		60.8	61.4	0.6	61.3	0.5
M14	C		63.4	64.1	0.7	63.9	0.5
M15	C		62.4	63.0	0.6	62.9	0.5
M16	C		61.6	62.2	0.6	61.8	0.2
M17	C		65.4	**66**.0	0.6	65.6	0.2
M18	C		64.2	64.8	0.6	64.8	0.6
NSA N:							

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
N01	B		48.0	48.6	0.6	47.8	-0.2
N02	B		51.7	52.3	0.6	51.9	0.2
N03	B		54.4	55.0	0.6	54.8	0.4
N04	B		45.9	46.5	0.6	45.9	0.0
N05	B		48.7	49.3	0.6	49.0	0.3
N06	B		51.2	51.9	0.7	51.6	0.4
N07	B		57.9	58.6	0.7	58.6	0.7
N08	B		63.0	63.6	0.6	63.6	0.6
N09	B		47.1	47.7	0.6	47.5	0.4
N10	B		49.2	49.8	0.6	49.5	0.3
N11	B		51.6	52.2	0.6	52.1	0.5
N12	B		63.1	63.7	0.6	63.7	0.6
N13	B		58.0	58.6	0.6	58.6	0.6
N14	B		49.0	49.6	0.6	49.5	0.5
N15	B		51.1	51.8	0.7	51.6	0.5
N16	B		53.5	54.2	0.7	54.1	0.6
N17	B		58.0	58.6	0.6	58.6	0.6
N18	B		63.5	64.1	0.6	64.1	0.6
N19	B		50.3	51.0	0.7	50.9	0.6
N20	B		54.9	55.5	0.6	55.5	0.6

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
N21	B		56.3	57.0	0.7	57.0	0.7
N22	B		58.2	58.9	0.7	58.8	0.6
N23	B		63.6	64.3	0.7	64.2	0.6
N24	B		61.9	62.5	0.6	62.4	0.5
N25	B		51.5	52.1	0.6	52.1	0.6
N26	B		57.0	57.7	0.7	57.7	0.7
N27	B		58.6	59.2	0.6	59.2	0.6
N28	B		57.8	58.5	0.7	58.4	0.6
N29	B		61.9	62.5	0.6	62.4	0.5
N30	B		63.7	64.3	0.6	64.3	0.6
N31	B		58.3	58.9	0.6	58.8	0.5
N32	B		62.2	62.8	0.6	62.7	0.5
N33	B		63.9	64.5	0.6	64.4	0.5
N34	B		63.5	64.0	0.5	64.2	0.7
N35	B		**66.1**	**66.7**	0.6	**66.8**	0.7
N36	B		**68.1**	**68.7**	0.6	**68.7**	0.6
N37	B		63.5	64.1	0.6	64.2	0.7
N38	B		**66.2**	**66.8**	0.6	**66.8**	0.6
N39	B		**68.1**	**68.7**	0.6	**68.7**	0.6
N40	B		63.6	64.2	0.6	64.4	0.8

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
N41	B		**66.2**	**66.8**	0.6	**66.9**	0.7
N42	B		**68.1**	**68.8**	0.7	**68.8**	0.7
N43	B		63.8	64.4	0.6	64.5	0.7
N44	B		**66.4**	**67**.0	0.6	**67**.0	0.6
N45	B		**68.2**	**68.9**	0.7	68.9	0.7
N46	B		63.9	64.4	0.5	64.6	0.7
N47	B		**66.4**	**67**.0	0.6	67.1	0.7
N48	B		**68.3**	**68.9**	0.6	**68.9**	0.6
N49	B		64.3	64.9	0.6	65.0	0.7
N50	B		**66.7**	**67.3**	0.6	**67.4**	0.7
N51	B		**68.5**	**69.2**	0.7	**69.2**	0.7
N52	B		64.6	65.2	0.6	65.3	0.7
N53	B		**67**.0	**67.6**	0.6	**67.7**	0.7
N54	B		**68.7**	**69.3**	0.6	**69.3**	0.6
N55	B		64.8	65.4	0.6	65.5	0.7
N56	B		**67.2**	**67.8**	0.6	**67.9**	0.7
N57	B		**68.9**	**69.5**	0.6	**69.5**	0.6
N58	B		59.9	60.5	0.6	60.1	0.2
N59	B		58.4	59.0	0.6	58.6	0.2
N60	B		56.5	57.1	0.6	56.5	0

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
N61	B		54.4	55	0.6	54.0	-0.4
N62	B		56.1	56.7	0.6	55.8	-0.3
N63	B		58.0	58.6	0.6	58.0	0
N64	B		65.9	**66.6**	0.7	**66.5**	0.6
N65	B		**67.3**	**68**.0	0.7	**67.9**	0.6
N66	B		**68.2**	**68.8**	0.6	**68.7**	0.5
N67	B		58.6	59.2	0.6	58.8	0.2
N68	B		54.7	55.3	0.6	54.8	0.1
N69	B		52.8	53.4	0.6	52.9	0.1
N70	B		**66.1**	**66.7**	0.6	**66.7**	0.6
N71	B		**67.4**	**68.1**	0.7	**68**.0	0.6
N72	B		**68.2**	**68.8**	0.6	**68.8**	0.6
N73	B		59.4	60.0	0.6	60.0	0.6
N74	B		60.1	60.8	0.7	60.7	0.6
N75	B		62.1	62.7	0.6	62.5	0.4
N76	B		**66.2**	**66.9**	0.7	**66.8**	0.6
N77	B		**67.6**	**68.2**	0.6	**68.1**	0.5
N78	B		**68.2**	**68.8**	0.6	**68.8**	0.6
N79	B		**66.2**	**66.8**	0.6	**66.8**	0.6
N80	B		**67.7**	**68.3**	0.6	**68.3**	0.6

Table B-1 Twin ports interchange reconstruction project noise model results

Receptor ID	FHWA Noise Abatement Criteria (NAC) Activity Category	Monitored (June 2018)	Modeled Existing (2016)	Modeled No Build (2040)	Difference between Existing (2016) and No Build (2040)	Modeled Build (2040)	Difference between Existing (2016) and Build (2040)
		$L_{eq(30min)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$	$L_{eq(h)}$
BOLD numbers are those exceeding or approaching the FHWA noise standards.							
N81	B		**68.2**	**68.8**	0.6	**68.8**	0.6
N82	B		**66.1**	**66.8**	0.7	**66.7**	0.6
N83	B		**67.7**	**68.3**	0.6	**68.3**	0.6
N84	B		**68.2**	**68.8**	0.6	**68.7**	0.5
N85	B		**67.9**	**68.5**	0.6	**68.5**	0.6
N86	C		65.2	65.8	0.6	**66**.0	0.8
N87	C	66.7	**66.2**	**66.8**	0.6	**67**.0	0.8

Appendix C

Noise Barrier Cost Effectiveness Results

Noise Barrier Cost-Effectiveness Results

Tables

Table C-1. Noise Mitigation Cost Effectiveness Results Modeled Barrier I (20-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier I											
I01	Commercial	E	61.7	61.7	0.0	1					
I02	Industrial	F	59.8	59.7	0.1	1					
I03	Industrial	F	58.2	58.0	0.2	1					
I04	Industrial	F	61.0	59.0	2.0	1					
I05	Recreational	C	62.2	59.4	2.8	1					
I06	Commercial	E	62.0	59.0	3.0	1					
I07	Commercial	E	62.0	59.1	2.9	1					
I08	Commercial	E	62.2	59.2	3.0	1					
I09	Industrial	F	63.1	60.1	3.0	1					
I10	Commercial	E	64.0	61.5	2.5	1					
I11	Commercial	E	61.8	58.6	3.2	1					
I12	Commercial	E	59.1	56.9	2.2	1					
I13	Industrial	F	57.7	57.4	0.3	1		1,800	36,000	\$1,295,964	\$185,138
I14	Industrial	F	57.8	56.6	1.2	1					
I15	Industrial	F	58.5	57.0	1.5	1					
I16	Industrial	F	59.1	57.9	1.2	1					
I17	Commercial	E	60.7	59.4	1.3	1					
I18	Industrial	F	61.5	59.8	1.7	1					
I19	Commercial	E	65.9	62.5	3.4	1					
I22	Recreational	C	59.5	59.3	0.2	1					
I23	Recreational	C	**66.5**	57.9	**8.6**	1	1				
I24	Recreational	C	**67.2**	56.4	**10.8**	1	1				
I25	Recreational	C	60.0	55.6	4.4	1					
J01	Industrial	F	63.6	59.7	3.9	1					
J02	Commercial	E	63.9	60.1	3.8	1					

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier I											
J03	Industrial	F	63.9	60.4	3.5	1					
J04	Commercial	E	66.2	63.2	3.0	1					
J05	Residential	B	60.0	58.6	1.4	1					
J06	Commercial	E	64.5	60.6	3.9	1					
J07	Industrial	F	64.3	60.6	3.7	1					
J08	Commercial	E	61.9	59.7	2.2	1					
J09	Industrial	F	58.7	58.2	0.5	1					
J10	Commercial	E	63.7	61.4	2.3	1					
J11	Industrial	F	68.5	63.1	**5.4**	1	1				
J12	Industrial	F	55.5	55.0	0.5	1					
J13	Industrial	F	62.1	62.1	0.0	1					
J14	Industrial	F	63.1	63.0	0.1	1					
J15	Industrial	F	61.7	61.3	0.4	1					
J16	Recreational	C	64.4	57.9	**6.5**	1	1				
J17	Recreational	C	**67.3**	58.4	**8.9**	1	1				
J18	Recreational	C	**67.0**	58.8	**8.2**	1	1				
J19	Recreational	C	**68.4**	59.6	**8.8**	1	1				
J20	Recreational	C	**69.0**	68.7	0.3	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-2. Noise Mitigation Cost Effectiveness Results Modeled Barrier I (15-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier $36/$ft^2$	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
15-foot tall modeled barrier I											
I01	Commercial	E	61.7	61.8	-0.1	1					
I02	Industrial	F	59.8	59.8	0.0	1					
I03	Industrial	F	58.2	58.1	0.1	1					
I04	Industrial	F	61.0	59.8	1.2	1					
I05	Recreational	C	62.2	60.4	1.8	1					
I06	Commercial	E	62.0	60.1	1.9	1					
I07	Commercial	E	62.0	60.1	1.9	1					
I08	Commercial	E	62.2	60.1	2.1	1					
I09	Industrial	F	63.1	61.1	2.0	1					
I10	Commercial	E	64.0	62.1	1.9	1					
I11	Commercial	E	61.8	59.5	2.3	1					
I12	Commercial	E	59.1	57.6	1.5	1					
I13	Industrial	F	57.7	57.6	0.1	1		1,800	27,000	$971,964	$161,994
I14	Industrial	F	57.8	57.5	0.3	1					
I15	Industrial	F	58.5	58.2	0.3	1					
I16	Industrial	F	59.1	58.9	0.2	1					
I17	Commercial	E	60.7	60.4	0.3	1					
I18	Industrial	F	61.5	61.0	0.5	1					
I19	Commercial	E	65.9	63.4	2.5	1					
I22	Recreational	C	59.5	59.3	0.2	1					
I23	Recreational	C	**66.5**	58.7	**7.8**	1	1				
I24	Recreational	C	**67.2**	58.2	**9.0**	1	1				
I25	Recreational	C	60.0	58.4	1.6	1					
J01	Industrial	F	63.6	62.2	1.4	1					
J02	Commercial	E	63.9	62.5	1.4	1					

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
15-foot tall modeled barrier I											
J03	Industrial	F	63.9	62.6	1.3	1					
J04	Commercial	E	66.2	65.3	0.9	1					
J05	Residential	B	60.0	59.8	0.2	1					
J06	Commercial	E	64.5	63.1	1.4	1					
J07	Industrial	F	64.3	63.1	1.2	1					
J08	Commercial	E	61.9	61.2	0.7	1					
J09	Industrial	F	58.7	58.6	0.1	1					
J10	Commercial	E	63.7	62.8	0.9	1					
J11	Industrial	F	68.5	66.9	1.6	1					
J12	Industrial	F	55.5	55.4	0.1	1					
J13	Industrial	F	62.1	62.1	0.0	1					
J14	Industrial	F	63.1	63.1	0.0	1					
J15	Industrial	F	61.7	61.5	0.2	1					
J16	Recreational	C	64.4	58.9	**5.5**	1	1				
J17	Recreational	C	**67.3**	60.0	**7.3**	1	1				
J18	Recreational	C	**67.0**	59.9	**7.1**	1	1				
J19	Recreational	C	**68.4**	61.7	**6.7**	1	1				
J20	Recreational	C	**69.0**	68.7	0.3	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-3. Noise Mitigation Cost Effectiveness Results Modeled Barrier I (10-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier $36/$ft^2$	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
10-foot tall modeled barrier I											
I01	Commercial	E	61.7	61.7	0.0	1					
I02	Industrial	F	59.8	59.8	0.0	1					
I03	Industrial	F	58.2	58.2	0.0	1					
I04	Industrial	F	61.0	60.8	0.2	1					
I05	Recreational	C	62.2	61.7	0.5	1					
I06	Commercial	E	62.0	61.5	0.5	1					
I07	Commercial	E	62.0	61.5	0.5	1					
I08	Commercial	E	62.2	61.6	0.6	1					
I09	Industrial	F	63.1	62.5	0.6	1					
I10	Commercial	E	64.0	63.4	0.6	1					
I11	Commercial	E	61.8	61.1	0.7	1					
I12	Commercial	E	59.1	58.6	0.5	1					
I13	Industrial	F	57.7	57.8	-0.1	1		1,800	18,000	$647,964	$129,953
I14	Industrial	F	57.8	57.9	-0.1	1					
I15	Industrial	F	58.5	58.5	0.0	1					
I16	Industrial	F	59.1	59.1	0.0	1					
I17	Commercial	E	60.7	60.7	0.0	1					
I18	Industrial	F	61.5	61.5	0.0	1					
I19	Commercial	E	65.9	64.9	1.0	1					
I22	Recreational	C	59.5	59.4	0.1	1					
I23	Recreational	C	**66.5**	60.5	**6.0**	1	1				
I24	Recreational	C	**67.2**	60.7	**6.5**	1	1				
I25	Recreational	C	60.0	59.2	0.8	1					
J01	Industrial	F	63.6	63.6	0.0	1					
J02	Commercial	E	63.9	63.9	0.0	1					

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
10-foot tall modeled barrier I											
J03	Industrial	F	63.9	63.9	0.0	1					
J04	Commercial	E	66.2	66.2	0.0	1					
J05	Residential	B	60.0	60.0	0.0	1					
J06	Commercial	E	64.5	64.5	0.0	1					
J07	Industrial	F	64.3	64.3	0.0	1					
J08	Commercial	E	61.9	61.9	0.0	1					
J09	Industrial	F	58.7	58.7	0.0	1					
J10	Commercial	E	63.7	63.7	0.0	1					
J11	Industrial	F	68.5	68.5	0.0	1					
J12	Industrial	F	55.5	55.5	0.0	1					
J13	Industrial	F	62.1	62.1	0.0	1					
J14	Industrial	F	63.1	63.1	0.0	1					
J15	Industrial	F	61.7	61.7	0.0	1					
J16	Recreational	C	64.4	63.9	0.5	1					
J17	Recreational	C	**67.3**	61.8	**5.5**	1	1				
J18	Recreational	C	**67.0**	61.4	**5.6**	1	1				
J19	Recreational	C	**68.4**	63.0	**5.4**	1	1				
J20	Recreational	C	**69.0**	68.8	0.2	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-4. Noise Mitigation Cost Effectiveness Results Modeled Barrier K (20-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier K											
K04	Industrial	F	66.3	65.8	0.5	1		724	14,494	\$521,784	N/A (no benefits)
K05	Recreational	C	**69.6**	66.4	3.2	1					
K06	Recreational	C	**69.4**	66.7	2.7	1					
K07	Recreational	C	**70.1**	65.7	4.4	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-5. Noise Mitigation Cost Effectiveness Results Modeled Barrier L1a/L1b (20-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier L1a/L2b											
L01	Industrial	F	68.1	63.0	**5.1**	1	1	1,174	23,474	\$845,064	\$281,688
L02	Industrial	F	69.5	65.7	3.8	1					
L04	Recreational	C	**71.3**	63.1	**8.2**	1	1				
L05	Recreational	C	**71.3**	60.8	**10.5**	1	1				
L06	Recreational	C	**72.7**	70.3	2.4	1					
L07	Recreational	C	**72.6**	70.2	2.4	1					
L08	Recreational	C	**72.6**	70.3	2.3	1					
M01	Recreational	C	64.3	63.3	1.0	1					
M02	Commercial	B	60.8	59.0	1.8	1					
M03	Commercial	B	60.1	58.6	1.5	1					
M04	Commercial	B	63.7	62.5	1.2	1					
M05	Residential	B	63.9	62.9	1.0	1					
M14	Recreational	C	63.9	63.6	0.3	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-6. Noise Mitigation Cost Effectiveness Results Modeled Barrier L1a/L1b (15-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
15-foot tall modeled barrier L1a/L2b											
L01	Industrial	F	68.1	64.0	4.1	1		1,174	17,605	$633,780	$316,890
L02	Industrial	F	69.5	67.7	1.8	1					
L04	Recreational	C	**71.3**	64.2	**7.1**	1	1				
L05	Recreational	C	**71.3**	62.7	**8.6**	1	1				
L06	Recreational	C	**72.7**	70.5	2.2	1					
L07	Recreational	C	**72.6**	70.4	2.2	1					
L08	Recreational	C	**72.6**	70.4	2.2	1					
M01	Recreational	C	64.3	63.8	0.5	1					
M02	Commercial	B	60.8	60.0	0.8	1					
M03	Commercial	B	60.1	59.5	0.6	1					
M04	Commercial	B	63.7	63.2	0.5	1					
M05	Residential	B	63.9	63.5	0.4	1					
M14	Recreational	C	63.9	63.8	0.1	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-7. Noise Mitigation Cost Effectiveness Results Modeled Barrier L1a/L1b (10-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
10-foot tall modeled barrier L1a/L2b											
L01	Industrial	F	68.1	66.7	1.4	1		1,174	11,737	$422,532	$211,266
L02	Industrial	F	69.5	69.1	0.4	1					
L04	Recreational	C	**71.3**	66.0	**5.3**	1	1				
L05	Recreational	C	**71.3**	65.3	**6.0**	1	1				
L06	Recreational	C	**72.7**	71.1	1.6	1					
L07	Recreational	C	**72.6**	70.7	1.9	1					
L08	Recreational	C	**72.6**	70.6	2.0	1					
M01	Recreational	C	64.3	64.1	0.2	1					
M02	Commercial	B	60.8	60.7	0.1	1					
M03	Commercial	B	60.1	60.0	0.1	1					
M04	Commercial	B	63.7	63.7	0.0	1					
M05	Residential	B	63.9	63.9	0.0	1					
M14	Recreational	C	63.9	63.9	0.0	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.

Table C-8.Noise Mitigation Cost Effectiveness Results Modeled Barrier L2 (20-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier \$36/ft^2	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier L2											
L03	Commercial	E	67.8	67.7	0.1	1					
L10	Recreational	C	**69.9**	69.4	0.5	1					
L11	Recreational	C	**70.8**	70.7	0.1	1					
L12	Recreational	C	**73.8**	72.3	1.5	1					
L13	Recreational	C	**74.6**	72.4	2.2	1					
M06	Residential	B	58.9	58.9	0.0	1					
M07	Residential	B	54.0	53.9	0.1	1					
M08	Residential	B	45.7	45.4	0.3	1					
M09	Residential	B	47.6	47.5	0.1	1					
M10	Residential	B	53.1	53.0	0.1	1					
M11	Residential	B	51.6	51.5	0.1	1					
M12	Residential	B	61.3	61.0	0.3	1					
M15	Recreational	C	62.7	62.0	0.7	1		1,186	23,711	\$853,596	N/A (no benefits)
M16	Recreational	C	61.6	61.4	0.2	1					
M17	Recreational	C	65.4	64.9	0.5	1					
M18	Recreational	C	64.9	64.3	0.6	1					
N01	Residential	B	47.4	47.4	0.0	1					
N02	Residential	B	51.6	51.5	0.1	1					
N03	Residential	B	54.4	54.4	0.0	1					
N04	Residential	B	45.1	44.9	0.2	1					
N05	Residential	B	47.9	47.7	0.2	1					
N06	Residential	B	50.6	50.4	0.2	1					
N07	Residential	B	58.5	58.2	0.3	1					
N08	Residential	B	63.5	62.9	0.6	1					
N09	Residential	B	47.4	47.3	0.1	1					

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier $36/$ft^2$	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier L2											
N10	Residential	B	49.6	49.5	0.1	1					
N11	Residential	B	51.9	51.8	0.1	1					
N12	Residential	B	63.6	63.0	0.6	1					
N13	Residential	B	58.5	58.1	0.4	1					
N14	Residential	B	49.5	49.4	0.1	1					
N15	Residential	B	51.7	51.6	0.1	1					
N16	Residential	B	54.0	53.9	0.1	1					
N17	Residential	B	58.5	58.1	0.4	1					
N18	Residential	B	64.0	63.4	0.6	1					
N19	Residential	B	50.9	50.8	0.1	1					
N20	Residential	B	55.5	55.5	0.0	1					
N21	Residential	B	56.9	56.8	0.1	1					
N22	Residential	B	58.7	58.3	0.4	1					
N23	Residential	B	64.2	63.5	0.7	1					
N24	Residential	B	62.3	62.0	0.3	1					
N25	Residential	B	52.1	52.0	0.1	1					
N26	Residential	B	57.7	57.6	0.1	1					
N27	Residential	B	59.2	59.1	0.1	1					
N28	Residential	B	58.3	57.9	0.4	1					
N29	Residential	B	62.3	62.1	0.2	1					
N30	Residential	B	64.2	63.6	0.6	1					
N31	Residential	B	58.7	58.3	0.4	1					
N32	Residential	B	62.6	62.4	0.2	1					
N33	Residential	B	64.4	63.8	0.6	1					
N34	Residential	B	64.3	63.7	0.6	1					
N35	Residential	B	**67.0**	66.1	0.9	1					

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier $36/$ft^2$	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier L2											
N36	Residential	B	**68.9**	67.4	1.5	1					
N37	Residential	B	64.4	63.7	0.7	1					
N38	Residential	B	**67.0**	66.1	0.9	1					
N39	Residential	B	**68.9**	67.5	1.4	1					
N40	Residential	B	64.5	63.8	0.7	1					
N41	Residential	B	**67.1**	66.2	0.9	1					
N42	Residential	B	**69.0**	67.5	1.5	1					
N43	Residential	B	64.7	63.9	0.8	1					
N44	Residential	B	**67.2**	66.3	0.9	1					
N45	Residential	B	**69.1**	67.6	1.5	1					
N46	Residential	B	64.7	64.0	0.7	1					
N47	Residential	B	**67.3**	66.3	1.0	1					
N48	Residential	B	**69.1**	67.7	1.4	1					
N49	Residential	B	65.2	64.4	0.8	1					
N50	Residential	B	**67.6**	66.6	1.0	1					
N51	Residential	B	**69.4**	67.9	1.5	1					
N52	Residential	B	65.4	64.7	0.7	1					
N53	Residential	B	**67.9**	66.8	1.1	1					
N54	Residential	B	**69.5**	68.1	1.4	1					
N55	Residential	B	65.7	64.9	0.8	1					
N56	Residential	B	**68.1**	67.0	1.1	1					
N57	Residential	B	**69.7**	68.3	1.4	1					
N86	Recreational	C	**66.0**	65.6	0.4	1					
N87	Recreational	C	**67.2**	66.5	0.7	1					

Table C-9. Noise Mitigation Cost Effectiveness Results Modeled Barrier N (20-Foot)

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier $36/$ft^2$	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier N											
N58	Residential	B	60.1	60.1	0.0	1					
N59	Residential	B	58.6	58.5	0.1	1					
N60	Residential	B	56.5	56.5	0.0	1					
N61	Residential	B	54.0	53.9	0.1	1					
N62	Residential	B	55.8	55.8	0.0	1					
N63	Residential	B	58.0	58.0	0.0	1					
N64	Residential	B	**66.6**	66.5	0.1	1					
N65	Residential	B	**68.0**	67.9	0.1	1					
N66	Residential	B	**68.7**	68.7	0.0	1					
N67	Residential	B	58.8	58.8	0.0	1					
N68	Residential	B	54.8	54.8	0.0	1					
N69	Residential	B	52.9	52.9	0.0	1					
N70	Residential	B	**66.7**	66.6	0.1	1		528	10,564	$380,304	N/A (no benefits)
N71	Residential	B	**68.1**	68.0	0.1	1					
N72	Residential	B	**68.8**	68.7	0.1	1					
N73	Residential	B	60.0	60.0	0.0	1					
N74	Residential	B	60.7	60.6	0.1	1					
N75	Residential	B	62.5	62.4	0.1	1					
N76	Residential	B	**66.9**	66.8	0.1	1					
N77	Residential	B	**68.2**	68.1	0.1	1					
N78	Residential	B	**68.8**	68.7	0.1	1					
N79	Residential	B	**66.9**	66.8	0.1	1					
N80	Residential	B	**68.3**	68.2	0.1	1					
N81	Residential	B	**68.8**	68.7	0.1	1					
N82	Residential	B	**66.8**	66.7	0.1	1					

Receptors	Type	NAC: Noise Area Classification	Noise Level (L_{eq}, dBA)		Reduction (in dBA) with Noise Barrier	Number of Receptors	Number of Benefited Receptors	Length of Barrier (feet)	Barrier Area (ft^2)	Total Cost of Barrier $36/$ft^2$	Cost/ Benefited Receptor
			Build year 2040 (no barrier)	Build year 2040 (with barrier)							
20-foot tall modeled barrier N											
N83	Residential	B	**68.3**	68.2	0.1	1					
N84	Residential	B	**68.7**	68.6	0.1	1					
N85	Residential	B	**68.6**	68.5	0.1	1					

Bold numbers above are L_{eq} values approaching/exceeding Federal noise abatement criteria.