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 addresses 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 EIS.

1. Project title: SP 1406-66, I-94/TH 75 Interchange Modification

2.	Proposer: MnDOT, Distr	ct 4	3. RGU:	MnDOT, District 4

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4.	Reason	for EAW	Preparation:	(check one)
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Required:	<u>Discretionary:</u>
☐ EIS Scoping	☐ Citizen petition
	☐ RGU discretion
	☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

Minnesota Rules 4410.4300, subpart 22, B: Highway Projects

5. Project Location:

(see Figure 1, County Location Map and Figure 2, Topographic Map in Appendix A)

County: Clay

City/Township: City of Moorhead

PLS Location (1/4, 1/4, Section, Township, Range): S17, S20, S21, T139N, R48W

Watershed (81 major watershed scale): Red River of the North

GPS Coordinates: NA Tax Parcel Number: NA

6. Project Description:

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

The Minnesota Department of Transportation is planning to reconstruct the TH 75/I-94 interchange in the City of Moorhead, including the construction of auxiliary lanes on I-94 between Hwy 75 and 20th Street. TH 75 would also be resurfaced and widened from 24th Avenue South to 35th Avenue South.

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, 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.

This project (SP 1406-66, TH 75 / I-94) would consist of reconstructing the TH 75 / I-94 interchange in Moorhead, to include a Diverging Diamond Interchange (DDI). Auxiliary lanes would be added to I-94 for eastbound and westbound traffic from the TH 75 interchange east to the 20th Street interchange. The four interchange ramps would be reconstructed and new signals would be provided. To accommodate the DDI, TH 75 would be widened to provide additional southbound through lanes from 24th Avenue South through the interchange to 30th Avenue South and northbound lanes from 30th Avenue South to the interchange bridges (Bridge No. 14813 & Bridge No. 14814). Additionally, within the segment being widened, the entire TH 75 roadway would be milled and resurfaced. See Figure 3, Preferred Alternative Layout in Appendix A.

The project also includes new overhead lighting and construction of a pedestrian trail/sidewalk along TH 75 and across I-94. The trail is planned to cross the eastern interchange ramps via proposed pedestrian underpasses. Trail and sidewalk curb ramps would be provided at 24th Avenue South, 30th Avenue South, 32nd Avenue South and the north side of 35th Avenue South. There may be some tree removal and replacement along TH 75.

The current proposed schedule includes five construction stages. Construction is anticipated to be substantially complete in one construction season with work commencing in spring 2016.

In the first stage of construction, the temporary signals would be installed and the road would be widened north of 24th Avenue and south of 30th Avenue. Lane closures on TH 75 would be required to complete the widening work north of 24th Avenue and south of 30th Avenue. The auxiliary lane would be constructed on I-94 between TH 75 and 20th Street, which would also require a lane closure. To minimize impact to I-94 traffic, work would likely only be allowed at night between the hours 7:00 PM and 5:00 AM. Stage 1 construction work is not anticipated to impact any business or residential access.

Stage 2 and Stage 3 construction would involve closing the TH 75 Bridge over I-94 for approximately 12-weeks. A detour would be in place to assist drivers in navigating around the construction. Each of the I-94 ramps would be closed at some point during construction. Traffic wanting to utilize these ramps would be detoured to alternative interchanges.

In Stage 2, construction would begin on TH 75 from 30th Avenue to 24th Avenue and the I-94 eastbound entrance (southeast ramp) and I-94 westbound exit ramp (northeast ramp) would be constructed. Stage 2 also includes construction of the multi-use trail. Right-in access points along TH 75 in the northeast corner of the interchange would be impacted during this Stage. The Frontage Road/Holiday Drive access road would be closed for the duration of Stage 2. The eastern side of the TH 75 and 30th Avenue would be closed for a portion of this stage in order to reconstruct the intersection. Businesses access would be detoured to 32nd and 35th Avenues.

Stage 3A construction would continue between 30th Avenue South and 24th Avenue South. The bridge over I-94 would remain closed. Stage 3A includes construction of the I-94 eastbound exit ramp (southwest ramp). The other three ramps, Northwest, Southeast and Northeast, would be open to traffic but only right-in and right-out movements would be allowed since the bridge over I-94 is closed. The western side of the TH 75 and 30th Avenue would be closed for a portion of this stage in order to reconstruct the intersection. Businesses access would be detoured to 32nd and 35th Avenues.

Stage 3B construction would continue between 30th Avenue South and 24th Avenue South. The bridge over I-94 would remain closed. Stage 3B includes construction of the I-94 westbound entrance ramp (northwest ramp). The other three ramps, Southwest, Northeast and Southeast, would be open to traffic but only right-in and right-out movements would be allowed since the bridge over I-94 is closed. Traffic using right-in driveways on southbound TH 75 to access the commercial development located in the northwest corner of the interchange would be impacted; this access road would be closed for the duration of Stage 3B. The alternative access to this commercial development is at the 24th Avenue intersection.

Stage 4 includes median and mill and overlay work north of 24th Avenue and South of 30th Avenue. Traffic impacts would be minimal in Stage 4. TH 75 Bridge over I-94 would be open to traffic. Lane closures on TH 75 would be required to complete miscellaneous tasks and to mill/overlay roadway segments.

Construction operations would follow the National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Construction Stormwater General Permit. As part of the application for this permit, a stormwater pollution prevention plan (SWPPP) would be created, explaining how stormwater would be controlled using Best Management Practices.

c. Project magnitude:

Table 1 – Project Magnitude	
Total Project Acreage	39 Acres
Linear project length	5156 feet – TH 75
	5852 feet – I-94
Number and type of residential units	NA
Commercial building area (in square	NA
feet)	
Industrial building area (in square feet)	NA
Institutional building area (in square	NA
feet)	
Other uses – specify (in square feet)	NA
Structure height(s)	NA

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 transportation mobility and safety in the TH75/I-94 interchange area. By improving transportation mobility in the interchange area, the project will accommodate existing and future traffic demands and support the City of Moorhead's development goals.

TH 75 is a heavily used arterial through the City of Moorhead serving regional and local motorists. The current Fargo-Moorhead Council of Governments Regional Travel Demand Model shows there are currently 80,000 vehicles per day (2015) that use the interchange and future forecasts increase that to 130,000 vehicles per day (2040).

Additionally, the City of Moorhead's Gateway Overlay Plan and Neighborhood Development Plan determined that the TH 75 corridor is intended to act as a gateway to the City. Capacity and operational issues that impair the function of the TH 75 and I-94 interchange are inconsistent with the goals of the development plan.

e.	Are future stages of	this develop	oment including	g development o	n any other p	property plani	ned or
	likely to happen?	☐ Yes	⊠ No				

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

The Moorhead metropolitan area is developing rapidly and several plans and studies have been created to prepare for anticipated growth relative to the existing infrastructure as discussed in EAW Item No. 6d above.

Additionally, the TH 75 and 20th Street South Corridor Study was completed in 2008 by the Fargo-Moorhead Metropolitan Council of Governments (FMCOG) to identify the future improvement needs along TH 75 from 20th Avenue South to 60th Avenue South and along 20th Street South from SE Main Avenue to 60th Avenue South.

As recommended in the FMCOG study, TH 75 is being widened from two to four lanes south of this project, from 40th Avenue, where it currently begins to taper down to two lanes, to 46th Avenue.

No additional improvements are planned relative to the interchange improvements included in this project.

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

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

Table 3 –Estimated Cover Types							
	Before	After		Before	After		
Wetlands	0	0	Lawn/landscaping	16.79 AC	13.34 AC		
Deep water/streams	0	0	Impervious surface	10.57 AC	13.37 AC		
Wooded/forest	1.21 AC	1.21 AC	Stormwater Pond	0	0.55 AC		
Brush/Grassland	0	0	Other (describe)	0	0		
Cropland	0	0					
			TOTAL	28.57 AC	28.57 AC		

The net increase of 2.8 acres of impervious surface is due to the new auxiliary lanes on I-94 and the widening of TH 75 to accommodate the new DDI interchange between I-94 and TH 75. The new impervious surface is primarily being converted from urban lawn/landscaping, which is currently used as boulevard in the existing I-94 and TH 75 interchange.

Two ponds totaling 0.55 acres would be constructed within the reconstructed interchange to accommodate the new impervious surface. The ponds would also be converted from lawn/landscaping in the existing interchange area.

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 4 - Permits and Appro	Table 4 - Permits and Approvals						
Unit of government	Type of application	<u>Status</u>					
FHWA	National Environmental Policy Act (NEPA) review and decision	Categorical Exclusion is being completed for the NEPA requirements					
FHWA	Section 7 Determination (threatened and endangered species)	Completed – Finding of No Effect Determination					
FHWA	Section 106 (Historic/Archeological)	Completed - Finding of No Historic Properties Affected					
Geometric Layout Review	MnDOT	Approved					
Contaminated Properties	MnDOT	Completed - Level 1 Completed - Level 2 Environmental Site Assessment (ESA)					
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System (NPDES) Permit (Construction Runoff)	Applied for 4-18-2015					
Buffalo – Red River Watershed District	Permit	Conditional Approval given on 4-27-2015					
City of Moorhead	Municipal Consent	Pending					

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, prime or unique farmlands.

The Clay County land use map shows the land around the interchange as urban and industrial. The area is occupied by multi and single family housing, small and large commercial businesses.

No parks are identified within the project study area or the vicinity of the project area. A bituminous trail is located within the right-of-way of TH 75 through the project. The area is urban/suburban; no farmland is within the project area.

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

The City of Moorhead Comprehensive Plan (2009) shows the future land use within the project area will mostly be commercial, residential, and public/semi-public/institutional. The existing agricultural and vacant land is planned to be fully-developed into mostly commercial usage. No permanent right-of-way will be acquired for this project. An agreement will be signed (a Commissioner's Order)

between MnDOT and the City of Moorhead for temporary construction impacts to City road right-of-way.

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

Floodplain

The current Federal Emergency Management Agency (FEMA) maps show that the project study area falls within the western limits of the Red River of the North (Red River) 100-year floodplain. A floodplain assessment was completed for this project and is documented through a *floodplain assessment memo, attached in Appendix D*. The floodplain memo reviewed the FEMA Flood Insurance Rate Maps (FIRMs) (Panels 2027C0459E and 2027C0457E, effective date 4/17/2012) and the Flood Insurance Study (FIS) for Clay County.

The floodplain assessment determined that the project will have three longitudinal encroachments located at the northwest I-94 entrance ramp, the southwest I-94 exit ramp, and the most southwest portion of the project along TH 75. The project does not include any alterations to major hydraulic structures within the encroachment locations.

The City of Moorhead recently completed construction of a levee along the eastern edge of the Red River. The FEMA floodplain maps are undergoing revisions to incorporate this new elevation; formal adoption is expected sometime in 2015. The *Floodplain Assessment Memo in Appendix D* contains the City's Topographic Working Map, which shows the post levee floodplain limits.

Based on mapping completed by Houston Engineering, the completed levee project will remove most areas of impact to the 100-year floodplain for the proposed project, just leaving an area on the northwest ramp. The project includes installation of guardrail on the northwest ramp and installation of a concrete lined ditch between the guardrail and an existing 48" culvert. These project additions will provide greater than or equal to existing flow capacity. See Figure 4, FEMA Map, in Appendix A for the proposed 100 year floodplain limits and the project area.

No potential conflicts are anticipated between the project and existing surrounding land uses.

Wild and Scenic Rivers

The National Wild and Scenic River System map and the Minnesota Department of Natural Resources Wild and Scenic River Program maps were reviewed, and there are no wild and scenic rivers within or directly adjacent to the project area.

Critical Area

There are no wild, scenic, and recreational river districts, Mississippi River Critical Areas or special districts within the project area.

Shorelands

Clay County and the City of Moorhead do not have shoreland ordinances or shoreland management areas within the project area.

Agricultural Districts

A review of the City of Moorhead Land Use maps and Clay County zoning maps show that no agricultural preserves are located within the project area.

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 current land use conditions adjacent to the project area include commercial, public/semi-public/institutional, residential, agricultural and vacant. No significant change in land use is anticipated as a result of construction of this project.

The project does not create new access to the floodplain; therefore the project will not cause incompatible floodplain development.

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

The proposed project is compatible with the existing local plans. No mitigation is needed.

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.

The TH 75/I-94 Interchange generally lies in an area covered by alluvium; sediment deposited by streams and glaciers. The alluvial unit defined on the County Atlas Series Atlas map C-29, part A, Clay County (2014) shows that the surficial geology within the project is comprised of channel and overbank sediments, which generally consists of sand, with some gravel. It is moderately well sorted and typically cross-bedded. The organic component is chiefly large, woody debris.

The bedrock in Clay County is covered by glacial sediment varying in thickness from approximately 100 to 700 feet thick. The thickest glacial sediment occurs in the southeastern part of Clay County, on the edge of the project area. The increased thickness is caused by the great accumulation of glacial debris in the Alexandria Moraine. The average depth to bedrock near the project is 600 feet. The bedrock consists of granite to granodiorite, a variably magnetic, low density rock.

The MPCA Minnesota Karst Land map and County Atlas Series Maps were reviewed. No sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions were identified within the project area.

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 soils limitations, such as steep slopes, 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.

The soils within the project limits are classified as Partially Hydric Soils from the NRCS Soil Survey Data. Project area soils consist of three complexes; Urban Land-Aquerts complex, with 0 to 2 percent slopes; Urban Land-Aquerts, with 0 to 2 percent slopes and Orthents-Aquents-Urban Land, highway complex, with 0 to 35 percent slopes. See Figure 5, NRCS Soil Survey Data, in Appendix A for the soil type locations.

The construction operations include filling along the new roadway segment to create the new roadway widening and some excavation in areas where the proposed ponds and pedestrian underpasses will be constructed. Approximately 28.6 acres will be disturbed by this project. Estimated excavation quantities are not available at this time. Stabilization and soil corrections are not anticipated to be needed for this project.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. Water resources:

- Describe surface water and groundwater features on or near the site in a.i. and a.ii. 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 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

No surface water is located within the project area. The Red River is located approximately one mile west of the project and is a DNR Protected Water. The Red River is a Minnesota Public Water Course (H-026). The segment of the Red River near the project is listed on the Minnesota Pollution Control Agency's (MPCA) impaired waters list for mercury and PCBs in fish tissues and turbidity.

See Figure 6, Water Resources Map in Appendix A.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 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.

The project is not located within a MDH wellhead protection area. The Phase 1 Environmental Site Assessment (ESA) identified three well locations within the project limits. These included Well Number 215474, 221825 and 221912. Wells were identified within the project study area. All three of these wells are sealed. Locations of these wells are shown in Figure 7, Well Location Map, in Appendix A. No additional wells are being constructed as part of this project.

A review of the DNR's 1989 Ground water contamination susceptibility in Minnesota Map shows the project area as having a medium susceptibility for groundwater contamination. Based on the nature of the proposed roadway project, the potential for a chemical spill is low. No groundwater impacts are anticipated.

- b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.
 - i. Wastewater For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced 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.
 - If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.
 - 3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

The proposed project will not impact any existing wastewater treatment systems.

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.

This project will result in some potential for erosion as existing ground cover will be disturbed. A NPDES Construction Stormwater Permit will be required for this project and a Stormwater Pollution Prevention (SWPP) Plan will be developed. Erosion prevention and sediment control requirements will be followed in accordance with the NPDES permit, which includes both temporary and permanent erosion and sediment control plans as well as other Best Management practices (BMP's) to protect the resource waters. BMP's contained in MnDOT's standard specifications, details, and special provisions will also be used.

Runoff from the TH 75/I-94 interchange is routed to two stormwater ponds located in the southwest and northwest quadrants of the interchange.

The pond located in the northwest interchange quadrant outlets to a secondary filtration pond prior to ultimately discharging into the ditch along the north side of I-94. The pond serves as a pretreatment cell prior to stormwater entering the filtration pond. The filtration pond will provide volume control to meet NPDES permit requirements. The filtration pond is sized for a 1" onsite volume retention over the new 2.8 acres of impervious area created with the project and will drawdown within 48 hours. The filtration pond will be constructed with perforated underdrains due to existing site soils not being conducive to infiltration. The filtration pond outlets the stormwater to the south into an existing ditch along I-94. There is an existing manhole at the southwest ramp that will provide the inlet for the ditch flow. This serves as an existing low point. Once entering the storm sewer, the water routes through Horn Park and ultimately discharges into the Red River.

In the southwest quadrant of the interchange is a wet pond designed for a permanent pool volume equal to 1800 cu ft/acre of drainage area to meet NPDES permit standards. This pond outlets the stormwater to the west into a proposed ditch that is located along the south side of the southwest ramp. The ditch runs along the ramp to the west and outlets into an existing storm sewer system that is located approximately 600' downstream. The existing stormwater system flows west and water outlets through a pipe under 3rd Street South into Horn Park. The system routes the stormwater through Horn Park and ultimately discharges it into the Red River.

The TH 75 northwest entrance ramp to I-94 currently has a storm pipe/grass lined ditch system on its north side that has been designed to accommodate upstream flood events before it outlets to the Red River. Stormwater travels through a concrete lined ditch from 20th Street west to an outlet control structure at TH 75. Due to site restrictions, most notably the northwest ramp widening, the existing northwest ramp ditch cannot be reconstructed to meet existing needs. A concrete lined ditch will be constructed in lieu of the existing ditch for this stretch. The proposed concrete lined ditch will meet the capacity needs of the existing grass lined ditch while allowing existing drainage patterns to be maintained.

The southeast ramp drainage will be generally handled as it is today using the existing infield drainage area on the north side and by a proposed ditch on the south side. Catch basins will be constructed at the end of the urban section and will outlet into the infield area. Runoff will sheet flow to either side of the ramp in the rural section.

The northeast ramp drainage will be generally handled as it is today, sheet flowing to the county ditch on the north side and draining to the infield area and TH 94 ditch on the south side. Minor culverts will address drainage low points created between the realigned trail and TH 75 in the northeast ramp area. These culverts will outlet under the trail to the east to match existing drainage patterns.

Runoff from TH 75 north of the interchange is not able to be routed through a stormwater treatment pond prior to discharge. This stormwater will be collected and routed to an existing structure in the southeast quadrant of TH 75 and 24th Avenue. From this structure, storm water outlets through a pipe into a storm sewer main that runs east to west under 24th Avenue South and ultimately outlets into the Red River.

Drainage from the auxiliary lane construction and shoulder widening on I-94 will continue to be handled by the existing ditches and/or reconstructed ditches. Ditch profiles will see minor corrections to better perpetuate drainage to match the existing drainage patterns.

This project does not introduce any significant changes in grade or profile elevation. Impacts to water quality will be mitigated through the installation of two stormwater ponds to provide detention, sedimentation and infiltration.

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.

Based on the nature of the work performed to construct this project, no water appropriation is anticipated.

iv. Surface Waters

a) 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.

A level 1 wetland field review was completed by the MnDOT, District 4 Wetlands Coordinator in August 2014. Potential wetlands within the project area were scoped through review of National Wetlands Inventory (NWI) maps, DNR Public Waters Inventory (PWI) maps, aerial photography (2012), site topography, Clay County GIS mapping, and the soil survey for Clay County.

The level 1 review determined no wetlands were present within the project and/or study area. *The Wetland Field Review Report is attached as Appendix C.*

b) 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.

Surface waters such as lakes and ponds are not anticipated to be impacted, altered, or indirectly impacted with the proposed roadway improvements.

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 ground water 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.

An email is included in Appendix B from MnDOT's Office of Environmental Stewardship (OES), which documents a search by the Contaminated Materials Management Team

(CMMT) of the Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Agriculture (MDA) databases to check for known contaminated sites in the project area.

The presence of potentially contaminated properties (defined as properties where soil and/or groundwater is impacted with pollutants, contaminants or hazardous wastes) is a concern in the development of highway projects because of potential liabilities associated with the ownership of such properties, potential cleanup costs, and safety concerns associated with construction personnel encountering unsuspected waste or contaminated soil or groundwater. Contaminated materials encountered during highway construction projects must be properly handled and treated in accordance with state and federal regulations. Improper handling of contaminated materials can worsen their impact on the environment. Contaminated materials also cause adverse impacts to highway projects by increasing construction costs and causing construction delays, which also can increase project costs.

A Phase I Environmental Site Assessment (ESA) provides information on potentially contaminated properties (defined as properties where soil and/or groundwater is impacted with pollutants, contaminants or hazardous wastes). These properties are identified through review of historic land use records and air photos, Federal Environmental Protection Agency (EPA), State Minnesota Pollution Control Agency (MPCA), State Minnesota Department of Agriculture (MDA), county/city records, personal interviews, as well as current property condition.

A Phase I ESA of the project area was completed in January 2015. A complete copy of the Phase I ESA is available from MnDOT by the MnDOT Project Manager listed on page 1 of this EAW.

Based on the results of the Phase I ESA, a Phase II Investigation was completed in February 2015. A copy of the Phase II Investigation is available from MnDOT by the MnDOT Project Manager listed on page 1 of this EAW.

The results of the Phase II Investigation indicated that isolated petroleum and/or debris impacts are present in the project corridor. Special provisions will be developed for properly handling contaminated soil and/or groundwater encountered during construction in accordance with all applicable state and federal regulations.

Management of soil and groundwater impacts not identified during the Phase II Investigation, if encountered during construction, will be addressed through MnDOT Standard Specification 1717.

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

Materials anticipated to be present on-site during construction are those normally associated with the operation or maintenance of construction equipment including petroleum products such as gasoline and other engine fluids. Toxic or hazardous materials, such as fuel for construction equipment, and materials used in the construction of roads (paint, contaminated rags, acids, bases, herbicides, and pesticides) will likely be used during site preparation and road construction. Although spills of these materials are not planned, any spills of reportable quantities that occur will be reported to the Minnesota Duty Officer and the contractor will clean up spilled material according to state requirements.

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 spill or release 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 other toxic or hazardous materials are anticipated during construction and none will be present following construction. No above- or below- ground storage tanks are planned for permanent use in conjunction with the highway project. Temporary storage tanks for petroleum products may be located in the project area for refueling construction equipment during roadway construction activities. Appropriate measures will be taken during construction to avoid spills that could contaminate groundwater and/or surface water in the project area. In the event that a leak or spill occurs during construction, appropriate action to remedy the situation will be taken immediately in accordance with MPCA guidelines and regulations.

If a spill of hazardous/toxic substances should occur during or after the proposed project, it is the responsibility of MnDOT and their contractor(s) to notify the Department of Public Safety, Division of Emergency Services, to arrange for corrective measures to be taken pursuant to 6 MCAR 4.9005E. Any contaminated spills or leaks that occur during construction are the responsibility of the contractor and would be responded to according to MPCA containment and remedial action procedures.

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 waste including source reduction and recycling.

Any hazardous waste materials generated or encountered during construction would be disposed of in the manner specified by local or state regulation or by the manufacturer. Whenever possible, vehicle refueling and maintenance should not be performed on the construction site. However, any vehicle refueling or maintenance that must take place on the construction site must have proper spill prevention controls in place prior to commencing work. The Contractor's personnel shall be instructed in these practices and the Contractor's Erosion Control Supervisor shall be responsible for seeing that these practices are followed.

- 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 in near the site.

Wildlife within the project is likely limited to species tolerant of habitat types found in residential or commercial areas, including various birds, and small mammals such as mice and squirrels. Due to the proximity to the surrounding agricultural areas, wildlife species may also include deer, coyote, fox, rabbit, raccoon, muskrat or pheasant. The proximity of this project to agricultural lands provides similar or higher quality adjacent habitat for wildlife. Therefore, impacts to wildlife habitat are anticipated to be negligible.

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 N/A) 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 the results.

The Minnesota DNR reviewed the project in the Minnesota Natural Heritage Information System (NHIS) and rare features have been documented within a one-mile radius of the project limits.

However, given the nature and location of the proposed project, MnDNR does not believe the project will negatively affect any known occurrences of rare features. *An e-mail response from MnDNR is included in Appendix B, Correspondence.*

Consultation with the U.S. Fish and Wildlife Service (USFWS) was completed to determine whether the project may affect threatened, endangered, proposed species or listed critical habitat. According to MnDOT's discussions with the USFWS, projects that are minor in scope and with limited potential for impacts (as is the case for this project) are not likely to jeopardize the continued existence of these species. *This consultation is*

documented in an e-mail from MnDOT Wildlife Ecologist, OES, which is included in Appendix B, Correspondence.

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.

Fish and Wildlife

No impacts to fish or wildlife species are anticipated from this project.

Vegetation

Minor vegetation loss is anticipated along the boundaries of the project area, including the widened roadway areas and the proposed ponds. Some tree/shrub removal and turf disruption are anticipated. However, no significant adverse impacts to natural/native plant communities, landscape and ornamental plantings, vegetation providing an engineering function, or vegetation of exceptional visual quality is anticipated.

Rare Features and Ecosystems

The MN DNR NHIS database search did find features within one mile of the project location; however, given the nature and location of the proposed project, the Mn DNR does not believe it will negatively affect any known occurrences of these features. A copy of the DNR review response is located in Appendix B, Correspondence.

Invasive Species

It is anticipated that some of the more common noxious weeds may be encountered within the area of this project. Mitigation will be needed to prevent the spread of these invasive species.

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

Wildlife

As defined in EAW Item 13 a-c, potential impacts to wildlife habitat from the proposed project are anticipated to be minimal and no mitigation is required.

Invasive Species

Re-vegetation within the project area after construction will be done with consideration given to controlling invasive species. Construction specifications will require the contractor to control the state listed noxious weeds.

The following guidelines will help to limit the spread of noxious weeds during the construction phase:

- Identify and prioritize areas for weed control before construction begins
- Prevent movement of soil harboring a strong seed bank (soil under a weed infestation)
- Prevent the spread of reproductive weed parts (seed and roots) by cleaning equipment before it is moved from one site to another
- Post construction monitoring for noxious weeds and control as necessary
- Prevent mixing of soil from weed infested areas with soil from weed-free areas
- Prevent the use of infested soils to be used as top soil. Infested soils may be buried three feet under final grade.

Water quality

Water quality will be maintained or through the use of best management practices (BMPs) during construction (see EAW Item 11 b ii – Erosion and sedimentation for more information).

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.

MnDOT Cultural Resources Unit (CRU) determined that no historic properties are located within the project area. Also, CRU stated, because all work is anticipated to occur within areas previously disturbed by road construction, it is unlikely that the project area contains intact, significant archaeological resources. A letter of no historic properties affected by the project effect from the CRU is attached in Appendix B, Coordination.

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 I-94 State Entrance Monument (SEM) is located within the project area. Ramp widening is occurring at the SEM, but no work will be done with the monument and no adverse impact to the SEM is anticipated. *An email from MnDOT's State Entrance Monument Program Manager in included in Appendix B*.

The project is not located near any scenic views or vistas. Therefore the project will not create any adverse visual impacts during construction.

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 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.

The proposed project will not have stationary source air emissions concerns.

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 air borne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles and the congestion levels in a given area. 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, carbon monoxide, 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 air pollutants, the EPA also regulates air toxics. The Federal Highway Administration (FHWA) provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the National Environmental Policy Act (NEPA) process. A qualitative 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 and MPCA.

NAAQS Criteria Pollutants

Ozone

Ground-level ozone is a primary constituent of smog and is a pollution problem throughout many areas of the United States. Exposures to ozone can make people more susceptible to respiratory infection, result in lung inflammation, and aggravate preexisting respiratory diseases such as asthma. Ozone is not emitted directly from vehicles but is formed as volatile organic compounds (VOCs) and nitrogen oxides (NOx) react in the presence of sunlight. Transportation sources emit NOx and VOCs and can therefore affect ozone concentrations. However, due to the phenomenon of atmospheric formation of ozone from chemical precursors, concentrations are not expected to be elevated near a particular roadway.

The MPCA, in cooperation with various other agencies, industries, and groups, has encouraged voluntary control measures for ozone and has begun developing a regional ozone modeling effort. Ozone concentrations in the lower atmosphere are influenced by a complex relationship of precursor concentrations, meteorological conditions, and regional influences on background concentrations. MPCA states in *Air Quality in Minnesota: 2015 Report to the Legislature* (January, 2015) that:

"While all areas of the state currently meet federal air quality standards, the MPCS continues to focus on identifying new strategies to reduce ozone and

fine particle pollution in Minnesota. In November 2014, the EPA proposed to lower the existing ozone standard. Depending on the final number selected in October 2015, Minnesota may violate the ozone standard for the first time. In addition, as was described in previous chapters, current levels of ozone and fine particle pollution result in a large number of health impacts across Minnesota. Continuing to reduce the level of these pollutants will not only improve public health, but will also help our economy by avoiding air pollution-related health costs like medical expenses and productivity losses due to missed school or work".

The project is located in an area that has been designated as an unclassifiable/attainment area for ozone. This means that the project area has been identified as a geographic area that meets the national health-based standards for ozone levels, and, therefore, is exempt from performing further ozone analyses.

Particulate Matter

Particulate matter (PM) is the term for particles and liquid droplets suspended in the air. Particles come in a wide variety of sizes and have been historically assessed based on size, typically measured by the diameter of the particle in micrometers. PM2.5 or fine particulate matter refers to particles that are 2.5 micrometers or less in diameter. PM10 refers to particulate matter that is 10 micrometers or less in diameter.

Motor vehicles (i.e., cars, trucks, and buses) emit direct PM from their tail pipes, as well as from normal brake and tire wear. Vehicle dust from paved and unpaved roads may be re-entrained, or re-suspended, in the atmosphere. In addition, PM2.5 can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs. PM2.5 can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- Premature death in people with heart or lung disease
- Nonfatal heart attacks
- Irregular heartbeat
- Aggravated asthma
- Decreased lung function
- Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing¹

On December 14, 2012, the EPA issued a final rule revising the annual health NAAQS for fine particles (PM2.5). The EPA website states:²

With regard to primary (health-based) standards for fine particles (generally referring to particles less than or equal to 2.5 micrometers (mm) in diameter, PM2.5), the EPA is strengthening the annual PM2.5 standard by lowering the level to 12.0 micrograms per cubic meter (μ g/m³). The existing annual standard, 15.0 μ g/m³, was set in 1997. The EPA is revising the annual PM2.5 standard to 12.0 μ g/m³ so as to provide increased protection against health effects

http://www.epa.gov/air/particlepollution/health.html

² http://www.epa.gov/pm/actions.html

associated with long- and short-term exposures (including premature mortality, increased hospital admissions and emergency department visits, and development of chronic respiratory disease), and to retain the 24-hour PM2.5 standard at a level of 35 $\mu g/m^3$ (the EPA issued the 24-hour standard in 2006). The EPA is revising the Air Quality Index (AQI) for PM2.5 to be consistent with the revised primary PM2.5 standards. The EPA also retained the existing standards for coarse particle pollution (PM10). The NAAQS 24-hour standard for PM10 is 150 $\mu g/m^3$, which is not to be exceeded more than once per year on average over three years.

The Clean Air Act conformity requirements include the assessment of localized air quality impacts of federally-funded or federally-approved transportation projects that are located within PM2.5 nonattainment and maintenance areas and deemed to be projects of air quality concern. The project is located in an area that has been designated as an unclassifiable/attainment area for PM. This means that the project area has been identified as a geographic area that meets the national health-based standards for PM levels, and therefore is exempt from performing PM analyses.

Nitrogen Dioxide (Nitrogen Oxides)

Nitrogen oxides, or NOx, are the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. The MPCA's *Air Quality in Minnesota: 2015 Report to the Legislature* (January 2015) indicates that:

"On-road vehicles include passenger cars and trucks, semi-trucks, and buses. These sources contribute to nearly 30 percent of statewide arid pollution emissions."

Nitrogen dioxide (NO2), which is a form of nitrogen oxide (NOx), is regularly monitored. Minnesota currently meets federal nitrogen dioxide standards, according to the *2015 Annual Air Monitoring Network Plan* (September 2014). A monitoring site meets the annual NAAQS for NO2 if the annual average is less than or equal to 53 parts per billion (ppb). The 2011 Minnesota NO2 monitoring site averages ranged from 5 ppb to 9 ppb; therefore, Minnesota currently meets the annual NAAQS for NO2."

The EPA's regulatory announcement, EPA 420-F-99-051 (December 1999), describes the Tier 2 standards for tailpipe emissions, and states:

"The new tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. Vehicles weighing less than 6000 pounds will be phased-in to this standard between 2004 and 2007".

"As newer, cleaner cars enter the national fleet, the new tailpipe standards will significantly reduce emissions of nitrogen oxides from vehicles by about 74 percent by 2030. The standards also will reduce emissions by more than 2 million tons per year by 2020 and nearly 3 million tons annually by 2030."

Within the project area, it is unlikely that NO2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO2 in Minnesota and on the long-term trend toward reduction of NOx emissions. Because of these factors, a specific analysis of NO2 was not conducted for this project.

Sulfur Dioxide

Sulfur dioxide (SO2) and other sulfur oxide gases (SOx) are formed when fuel containing sulfur, such as coal, oil, and diesel fuel is burned. Sulfur dioxide is a heavy, pungent, colorless gas. Elevated levels can impair breathing, lead to other respiratory symptoms, and at very high levels aggravate heart disease. People with asthma are most at risk when SO2 levels increase. Once emitted into the atmosphere, SO2 can be further oxidized to sulfuric acid, a component of acid rain. Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels.

MPCA monitoring shows ambient SO2 concentrations at 19 percent of federal standards in 2013, consistently below state and federal standards³. MPCA also states that about 70 percent of SO2 released into the air comes from electric power generation. Therefore a much smaller proportion is attributable to on-road mobile sources. The MPCA has concluded that long-term trends in both ambient air concentrations and total SO2 emissions in Minnesota indicate steady improvement.

In the Annual Air Monitoring Network Plan for Minnesota (2015), it states the following with regard to SO2:

"On June 2, 2010, the EPA finalized revisions to the primary SO2 NAAQS. EPA established a new 1-hour standard which is met if the three-year average of the annual 99th percentile daily maximum 1-hour SO2 concentration is less than 75 ppb. In addition to creating the new 1-hour standard, the EPA revoked the existing 24-hour and annual standards. Figure 26 describes the 2011 -2013 average 99th percentile 1-hour SO2 concentration and compares them to the 1-hour standard. Minnesota averages ranged from 2 ppb at FHR 443 to 14 ppb at FHR 420; therefore, all Minnesota sites currently meet the1-hour NAAQS for SO2."

Because of these factors, an analysis for sulfur dioxide was not conducted for this project.

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³ Air Quality in Minnesota: 2015 Report to the Legislature, January 2015

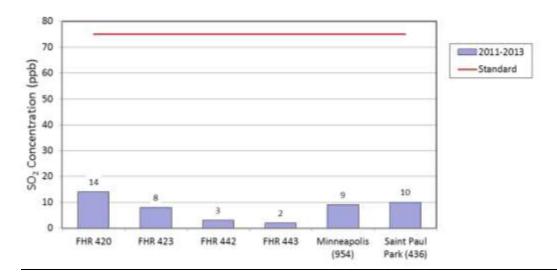


Figure i: 1-hour SO2 concentrations compared to the NAAQS*

Lead

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions.

Carbon Monoxide

This project is not located in an area where conformity requirements apply, and the scope of the project does not indicate that air quality impacts would be expected. The results of the screening procedure demonstrate that intersection traffic volumes are below the threshold of 79,400 ADT and do not require a detailed hotspot analysis. Therefore, no further air quality analysis is necessary.

Improvements in vehicle technology and in motor fuel regulations continue to result in reductions in vehicle emission rates. The EPA MOVES2010b emissions model estimates that emission rates will continue to fall from existing rates through year 2030. Consequently, year 2030 vehicle-related CO concentrations in the study area are likely to be lower than existing concentrations even considering any increase in development-related and background traffic.

Mobile Source Air Toxics⁴

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 Risk Information System (IRIS).⁵ In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and

⁴ Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA, December 6, 2012

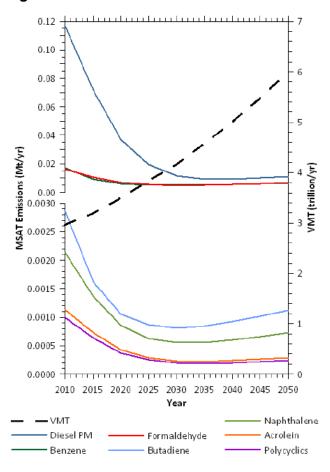
⁵ http://www.epa.gov/iris/

regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA).⁶ 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 maybe adjusted in consideration of future EPA rules.

Motor Vehicle Emissions Simulator (MOVES)

Based on an FHWA analysis using EPA's MOVES2010b model, as shown in Figure ii, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Figure ii. National MSAT Emission Trends 1999- 2050 for Vehicles Operating on Roadways Using EPA's MOVES2010b Model⁷



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.

⁶ http://www.epa.gov/ttn/atw/nata1999/

⁷ EPA MOVES2010b model runs conducted during May-June 2012 by FHWA. http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/nmsatetrends.cfm

Incomplete or Unavailable Information for Project Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the projectspecific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects." Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations⁹ or in the future as vehicle emissions substantially decrease.¹⁰

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually

⁸ EPA, http://www.epa.gov/iris/

⁹ HEI, http://pubs.healtheffects.org/view.php?id=282

¹⁰ HEI, http://pubs.healtheffects.org/view.php?id=306

exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable. There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI.¹¹ As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA¹² and the HEI¹³ have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Qualitative MSAT Analysis

For the Build Alternative in this EAW, the amount of MSAT emitted would be proportional to the average daily traffic, or ADT, assuming that other variables such as fleet mix are the same. The ADT estimated for the Build Alternative does not differ from that for the No Build Alternative. Since no change in ADT is expected through the project corridor, or along parallel routes, no changes in MSAT emissions are expected compared to the No Build Alternative. There is a potential for lower MSAT emission rates due to increased

¹¹ http://pubs.healtheffects.org/view.php?id=282

¹² http://www.epa.gov/risk/basicinformation.htm

http://pubs.healtheffects.org/view.php?id=282

speeds; according to EPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases.

Also, 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. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA- projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

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.

There will be noise and dust associated with the construction activities. Standard noise and dust specifications will be followed, in addition to adherence to local ordinances. After construction is complete, dust levels are anticipated to be minimal because all soil surfaces exposed during construction would be in permanent cover.

No long-term odors will be generated by the proposed project. Odors may be generated by exhaust from diesel engines engaged in construction activities and fuel storage areas. All machinery will be properly equipped to control emissions.

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.

Construction Noise

Construction activities associated with the implementation of the proposed project may result in increased noise levels relative to existing conditions. These impacts would primarily be due to construction equipment. Mitigation measures to lessen construction noise impacts include muffler requirements, equipment maintenance and operational requirement. MnDOT and its contractor(s) are exempt from local noise ordinances; it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that it is reasonable. Public notices and outreach will be conducted to any areas that may experience abnormally loud construction activity. It is anticipated that night construction will be required for work on I-94. Construction will be limited to daytime hours as much as possible. The project is anticipated to under construction for only one construction season which will minimize the duration of construction noise impacts to nearby developments.

Traffic Noise Analysis

A noise analysis and report has been completed for this project. The noise analysis is consistent with MnDOT and FHWA requirements and it includes the results of the monitoring of the existing noise levels as well as the modeling of the existing, no-build and build scenario noise levels. The analysis also includes a cost-reasonableness assessment of noise barrier mitigation. The following below summarizes the results from the noise analysis.

State of Minnesota Noise Regulations

Minnesota State noise standards have been established specifically for daytime and nighttime periods. The Minnesota Pollution Control Agency (MPCA) defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00 p.m. to 7:00 a.m. For residential land uses including apartments, churches, and schools (Noise Area Classification 1 or NAC-1), the Minnesota State standards for L10 are 65 dBA for daytime and 55 dBA for nighttime; the standards for L50 are 60 dBA for daytime and 50 dBA for nighttime. The daytime standards apply during the nighttime if no overnight lodging exists, such as at most churches and schools. For commercial land uses (NAC-2), the Minnesota State standards for L10 are 70 dBA for daytime and nighttime; the standards for L50 are 65 dBA for daytime and nighttime. Minnesota State Noise Standards are shown in Table 5.

Table 5: Minnesota State Noise Standards							
Land Use	Code	Day (7 a.m	Day (7 a.m. – 10 p.m.) dBA Night (10 p.m. – 7 a.m.)				
Residential	NAC-1	L ₁₀ of 65	L ₅₀ of 60	L ₁₀ of 55	L ₅₀ of 50		
Commercial	NAC-2	L ₁₀ of 70	L ₅₀ of 65	L ₁₀ of 70	L ₅₀ of 65		
Industrial	NAC-3	L ₁₀ of 80	L ₅₀ of 75	L ₁₀ of 80	L ₅₀ of 75		

Federal Noise Abatement Criteria (NAC)

The Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise is presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772). This regulation establishes the noise abatement criteria (NAC) for various land uses. Noise abatement measures will be considered when the predicted noise levels approach (within 1 dBA) or exceed those values shown for the appropriate activity category in Table 2, or when the predicted traffic noise levels substantially exceed the existing noise levels. MnDOT has defined an increase over existing noise levels of 5 dBA or greater as a substantial noise level increase. Federal Noise Abatement Criteria are shown in Table 6 on the following page.

Table 6: Fed	leral Noise Abate	ment Criteria	
Activity Category	Activity Criteria(1,2) L10(h) dBA	Evaluation Location	Activity Description
A	60	Exterior	Exterior Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(3)	70	Exterior	Residential
C(3)	70	Exterior	Exterior Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E(3)	75	Exterior	Exterior Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F			Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G			Undeveloped lands that are not permitted

measures.

(3) Includes undeveloped lands permitted for this activity category.

Notes
(1) L 10(h) shall be used for impact assessment.
(2) The L 10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement

Traffic noise levels were modeled for existing (2015), future (2035) no-build and future (2035) build scenarios using MINNOISEV3.1 analysis software. In addition to the noise modeling, noise monitoring was also conducted at locations along the project corridor. The monitoring was needed to confirm existing noise levels and to assist in validating the model results. Existing noise monitoring was conducted at three locations along the project corridor. The monitoring results were compared with existing model results to validate the noise model.

2015 no-build and 2035 no-build and build noise levels were modeled at receptor locations in the 8 different commercial and residential areas along the project corridor. Noise impacts were determined to exist, mitigation measures were analyzed (See Appendix E).

In order for a noise wall to be proposed as part of a project, it must be both feasible and reasonable. MnDOT's policies and procedures for evaluating noise barrier feasibility and reasonableness are set forth in Section 5.2 (Feasibility) and Section 5.3 (Reasonableness) of MnDOT Highway Noise Policy. Feasibility refers to physical constraints and engineering considerations (i.e., can a noise wall be constructed at this location). Noise barrier reasonableness decisions are based on a consideration of three reasonableness factors: 1) noise reduction design goal, 2) cost effectiveness, and 3) the viewpoint of benefited residents and property owners.

Noise barriers were found to meet the MnDOT/FHWA cost-reasonableness requirements for three locations along the TH 75 corridor and will potentially be proposed for this project. Table 7 shows the location, length, and cost of each barrier (See Appendix E).

Table 7 – Noise Barriers Meeting Cost-Reasonableness Requirements						
Area	Location	Length (feet) ¹	Estimated Cost			
Α	East of TH 75, North of 24 th Avenue	638	\$253,360			
В	West of TH 75, North of 24 th Avenue	630	\$240,480			
J	North side of I-94, East of TH 75	2866	\$1,133,280			

All walls are 20 feet high and taper down to 6 feet in height at each end.

Only those benefited property owners and residents, including individual units of multi-family residential buildings that are considered to be benefited receptors, regardless of floor location (e.g., first floor, second floor, etc.), have a vote. Non-benefitted receptors do not receive points. A simple majority (greater than 50 percent) of all possible voting points for each of the proposed noise barriers must vote "down" the proposed abatement measure in order for it to be removed from further consideration.

Statement of Likelihood

The traffic noise analysis for the three potentially proposed noise barriers described above is based upon preliminary design studies completed to date. Final mitigation decisions will be subject to final design considerations and the viewpoint of benefited residents and property owners. If it subsequently develops during final design that conditions have substantially

changed, noise abatement measures will need to be reconsidered. Affected benefited receptors and local officials will be notified of plans to eliminate or modify a noise abatement measure prior to the completion of the final design process. This notification will explain changes in site conditions (if any), additional site information, any design changes implemented during the final design process, and an explanation of noise barrier feasibility and reasonableness. A final decision regarding installation of the proposed abatement measure will be made upon completion of the project's final design and the public involvement process.

A noise mitigation public meeting was held to discuss results from noise analysis and allow the benefitted residents and property owners an opportunity to provide their preference for a noise barrier. Final voting resulted in no noise walls being constructed within the project limits. The final noise wall voting is shown in Table 8.

Table 8: Summary of Noise Wall Preference						
	Area	Α	Area B		Area J	
Neighborhood	Number	%	Number	%	Number	%
Preference	of votes	votes	of votes	votes	of votes	votes
Yes	3	4%	2	8%	42	18%
No	53	64%	18	75%	164	69%
No Response	27	33%	4	17%	31	13%
Total	83	100%	24	100%	237	100%

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) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Parking spaces (if project involves expansion): 0
Estimated total average daily traffic generated: NA
Estimated maximum peak hour traffic generated and time of occurrence: NA

An Intersection Control Evaluation (ICE) report was completed in early 2014 which reviewed the Level of Service (LOS) at the TH 75 intersections with 24th Avenue, the I-94 ramps, and 30th Avenue. LOS is an indicator of how well an intersection is operating. The LOS results at an intersection are based on average delay per vehicle. The LOS system rates the intersection using the letters A through F, with LOS A being least congested and LOS F being most congested. At LOS C, roads remain safely below but efficiently close to capacity, and posted speed is often maintained. LOS D is a common design goal for urban streets during peak hours. While LOS E is a common design goal in larger urban areas, where some roadway congestion is inevitable, the threshold for acceptable traffic operations used in this analysis was LOS D.

A summary of the LOS thresholds given in the Highway Capacity Manual is shown in Table 9.

Table 9 – Highway Capacity Manual Levels of Service and Control Delay						
Signaliz	ed Intersection	Unsignalized Intersection				
Level of Service	Control Delay per Vehicle (sec)	Level of Service	Control Delay per Vehicle (sec)			
А	< 10	Α	< 10			
В	> 10 and < 20	В	> 10 and < 15			
С	> 20 and < 35	С	> 15 and < 25			
D	> 35 and < 55	D	> 25 and < 35			
Е	> 55 and < 80	E	> 35 and < 50			
F	> 80	F	> 50			

The ICE report determined that under existing traffic conditions the study intersections are experiencing operational concerns. Nine individual turning movements operate at unacceptable levels of LOS E or F during either the a.m. or p.m. peak hours. In addition, traffic observations at the TH 75 and 24th Avenue South intersection during the p.m. peak hour indicated a backup of traffic in the exterior southbound through lane with little use of the interior through lane. The heavy use of the exterior lane was due to the demand for traffic to make a right turn onto westbound I-94. These existing operational concerns are only magnified under forecast traffic projections.

The ICE report determined the existing intersection configuration would not be able to accommodate future year traffic volumes. In addition, future conditions show significant safety concerns of traffic queuing onto the interstate for the eastbound exit ramp.

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 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,

The project will not generate new vehicle trips but is being constructed as a reaction to existing traffic levels on TH 75 and I-94. The project will improve corridor traffic operations and will reduce system vehicle delay time. There is an alternative transportation mode available in the City of Moorhead, including Metro Area Transit (MATBUS).

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

Traffic on both TH 75 and I-94 will be impacted by delays during construction. To minimize these traffic impacts, only night work is allowed on I-94. TH 75 traffic across I-94 bridge will be detoured for a significantly portion of the project. Each of the I-94 ramps at TH 75 will be closed at some stage during construction. The ramp traffic will be detoured to alternate I-94 interchanges. Access to adjacent developments will be maintained or alternative accesses will be provided during the construction stages.

- **19. Cumulative potential effects:** (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 impacts are defined as "impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or persons undertakes such actions". The geographic areas considered are those areas directly adjacent to and near the TH 75/I-94 Interchange. The project impacts described in this document for the TH 75/I-94 Interchange include impacts to noise, floodplain impacts, and increased stormwater runoff.

Past actions in the project vicinity include decades of agricultural, residential, institutional, industrial and commercial development and transportation infrastructure improvements. All these have resulted in the current built environment surrounding the I-94 and TH 75 Interchange, which is generally urban development. No future development opportunities in the surrounding area have been identified.

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 projects listed below that were considered as future actions in this analysis are consistent with the Minnesota State Supreme Court Ruling regarding cumulative potential effects. The projects: 1) are either existing, actually planned for, or for which a basis of expectation has been laid; 2) are located in the surrounding area; and 3) might reasonably be expected to affect the same natural resource.

MnDOT has several low impact projects that have been programmed including:

• I-94: Intelligent Transportation System (ITS) Travel Management System from Moorhead to Alexandria (2016)

I-94: Structural Painting of the bridges over the Red River (2017)

The City of Moorhead has several projects that have been programmed including:

- Main Avenue: Mill and overlay including sidewalk and signal improvements form 8th Street to 19th Street. (2015)
- TH 75: Extend the four lane section beyond 46th Avenue South including intersection improvements at 46th Avenue South. (2015)
- SE Main Avenue/12th Avenue South: Intersection geometric improvements, traffic signal replacement and railroad crossing improvements. (2015)
- 40th Avenue: Mill and overlay from 9th Street South to River Oaks Circle (2016)
- 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.

Only those issue areas which are directly or indirectly impacted by both the TH 75/I-94 Interchange project and past and/or other anticipated future projects are discussed below.

Floodplain

Existing Conditions

The Red River acts as a flood buffer and center of biological life. The river ecosystem provides habitats for many different plant and animal species. The river flows through several urban areas along its path, including Fargo-Moorhead, Grand Forks and Winnipeg. Over time, the floodplain has been affected directly and indirectly as a result of past human settlement/development.

The current FEMA maps show the 100-year floodplain of the Red River falls within the western limits of the project study area. Levees were recently installed along the Red River through the City of Moorhead. The FEMA maps are undergoing revisions to incorporate the new floodplain elevation.

Impacts from Proposed Action

As described in EAW Item 9.a.iii (Floodplain), the proposed floodplain maps show the northwest corner of the TH 75/I-94 Interchange within the floodplain; however no potential floodplain impacts are anticipated as a result of the proposed project and existing surrounding land uses. *A floodplain assessment memo was completed and is attached in Appendix D.* The memo also determined that no potential conflicts are anticipated between the project and existing surrounding land uses.

Impacts from Other Actions

The Red River floodplain is unlikely to be affected by the anticipated future transportation developments listed above. These improvements will identify any appropriate mitigation for floodplain impacts (habitat, wetlands, etc.) as part of their environmental review and permitting processes.

Cumulative Potential Effects

Presidential Executive Order 11988 and Minnesota Statute 103F.101-155 on floodplain management set the basis for consideration, evaluation, and mitigation of floodplain impacts. These federal and state requirements protect against substantial increases in flood risk, impacts to a floodplain's natural and beneficial values and prohibit incompatible floodplain development. Therefore, no substantial cumulative floodplain impacts are anticipated to result from the TH 75/I-94 Interchange Reconstruction Project in association with other foreseeable actions in the vicinity.

Surface Water Quality/Stormwater

Existing Conditions

Stormwater from the interchange is currently carried in roadway ditches and stored in stormwater ponds. The Red River is a MnDNR Protected Water located approximately one mile west of the project.

Impacts from Proposed Action

The completed project will have a total net increase of 2.8 acres of impervious surface across the entire project area. With the minor increase in impervious surfaces, there will be minimal increase in the amount of surface water run-off from the highway. The proposed project does not alter the overall existing drainage flow patterns.

Impacts of Past/Future Projects

Future highway and development projects could increase impervious area and increase stormwater runoff. Any increase in development or redevelopment activities around the interchange would likely include temporary soil disturbance and possible increases in impervious surfaces, which could indirectly affect water resources. However, these activities would be subject to current water quality regulations, and installation of required BMPs would protect water quality.

Cumulative Impacts/Mitigation

The identified past, present and future projects may incur some level of stormwater runoff which may affect nearby surface waters. A NPDES Construction Stormwater Permit will be required for this project. A Stormwater Pollution Prevention (SWPP) Plan will be developed for the project. Erosion prevention and sediment control requirements will be followed in accordance with the NPDES permit, which includes both temporary and permanent erosion and sediment control plans as well as

other Best Management practices (BMP's) to protect the resource waters. BMP's contained in MnDOT's standard specifications, details, and special provisions will also be used.

Stormwater for present and future development would be regulated, and mitigation would be completed on a project-by-project basis, as required by state and federal regulations. Therefore, there would be no cumulative impact on surface water quality and stormwater given that the impacts would be mitigated. The proposed project presents opportunities to improve existing conditions or mitigate potential impacts. Required stormwater management techniques will be implemented to reduce impacts of increased impervious surface and remove pollutants.

Noise

Existing Conditions

Traffic noise levels were modeled for existing and future levels within the project area. No-build and build noise levels were modeled at receptor locations in 8 different commercial and residential areas along the project corridor. Mitigation measures were then analyzed. A noise mitigation public meeting was held to discuss results from noise analysis and to have the benefitted residents and property owners provide their preference for a noise barrier. Final voting resulted in no noise walls being constructed within the project limits. Results of the noise wall vote are shown in Table 8 in Section 17, Noise.

Impacts of Past/Future Projects

Increased traffic associated with future development in combination with reasonably foreseeable future roadway projects could result in an increase of both people and traffic in the area. However, those potential impacts have already been accounted for in the future traffic forecasts used for the TH 75/I-94 Interchange traffic noise analysis (See Appendix E).

The MPCA regulates noise as per the requirements of Minnesota Rules, part 7030 and any large transportation projects would be required to assess noise per the FHWA rule 23 CFR § 772. Projects will be subject to relevant regulatory policies. If impacts are determined to exist, mitigation analysis will be required.

Cumulative Impacts/Mitigation

Noise impacts caused by development or future actions would be assessed for mitigation on a project-by-project basis. Also, identified future projects are far enough apart geographically that any increase in noise is not likely to affect the same receptors, resulting in minimal cumulative effects. No additional mitigation is required.

Conclusion

The potential impacts to resources identified can be avoided or minimized through existing regulatory controls, as described in each section above. During the development of this Interchange Environmental Assessment, no potentially significant cumulative impacts to the resources affected by the TH 75/I-94 project has been identified.

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.

Not Applicable

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	
Title		

APPENDICES

♦ Appendix A: Additional Maps

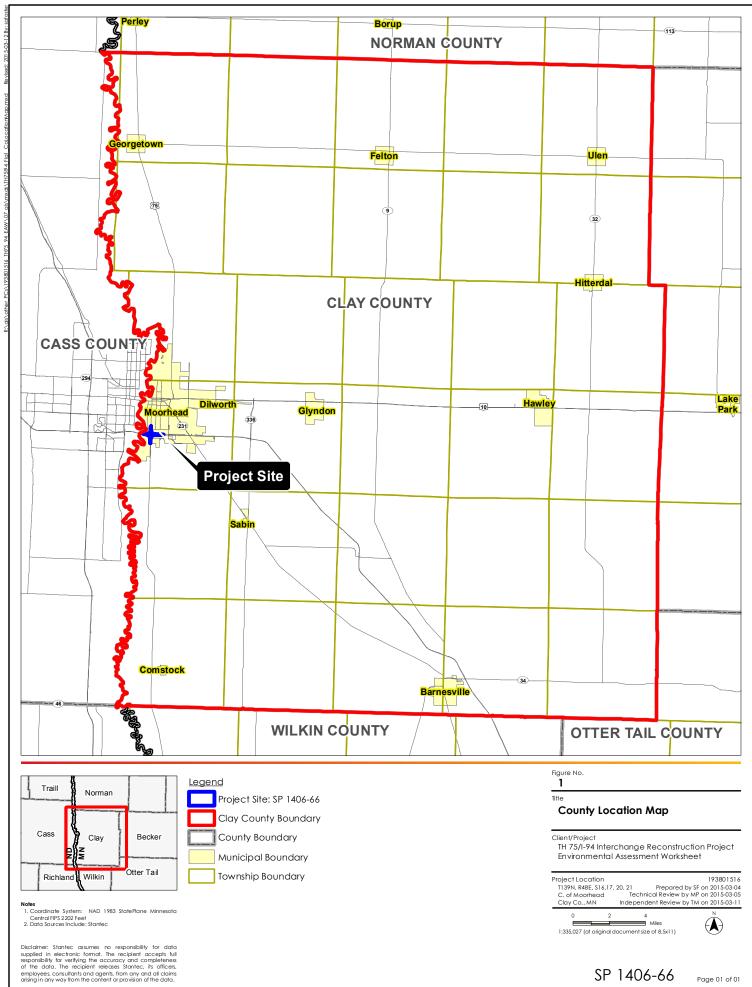
- Figure 1: County Location Map
- Figure 2: Topographic Map
- > Figure 3: Preferred Alternative Layout
- > Figure 4: FEMA Maps
- Figure 5: Soils Map
- > Figure 6: Water Resources Map
- > Figure 7: Well Location Map

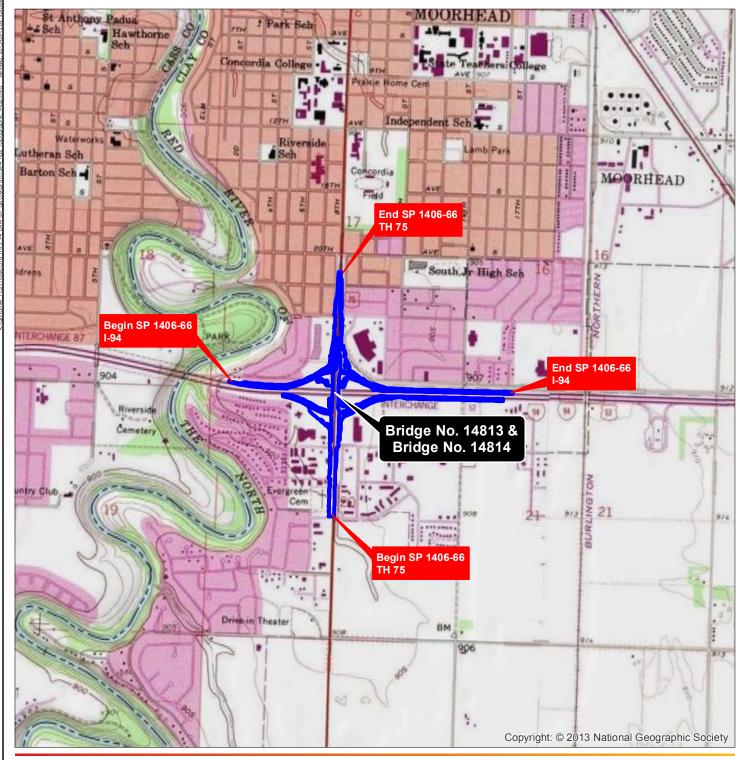
♦ Appendix B: Correspondence

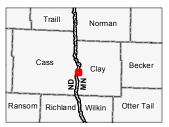
- MnDOT Office of Environmental Stewardship Contaminated Properties Letter
- > DNR NHIS and Rare Species Review Letter
- > MnDOT Office of Environmental Stewardship Section 7 Determination Letter
- ➤ MnDOT Cultural Resources Determination Letter
- > MnDOT State Entrance Monument Email
- **♦** Appendix C: Wetland Field Review Report
- ♦ Appendix D: Floodplain Assessment Memo
- **♦** Appendix E: Noise Analysis Report

Appendix A: Additional Maps

- > Figure 1: County Location Map
- > Figure 2: Topographic Map
- > Figure 3: Preferred Alternative Layout
- > Figure 4: FEMA Maps
- > Figure 5: Soils Map
- > Figure 6: Water Resources Map
- > Figure 7: Well Location Map







Legend

Project Site: SP 1406-66

Notes

1. Coordinate System: NAD 1983 StatePlane Minnesota
South FIPS 2203 Feet
2. Data Sources Include: Stantec, USGS
3. Base Data: 7.5' Topographic Quadrangle - Cokato

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data. Figure No. 2

Title

Topographic Map

Client/Project TH 75/I-94 Interchange Reconstruction Project Environmental Assessment Worksheet

 Project Location
 193801516

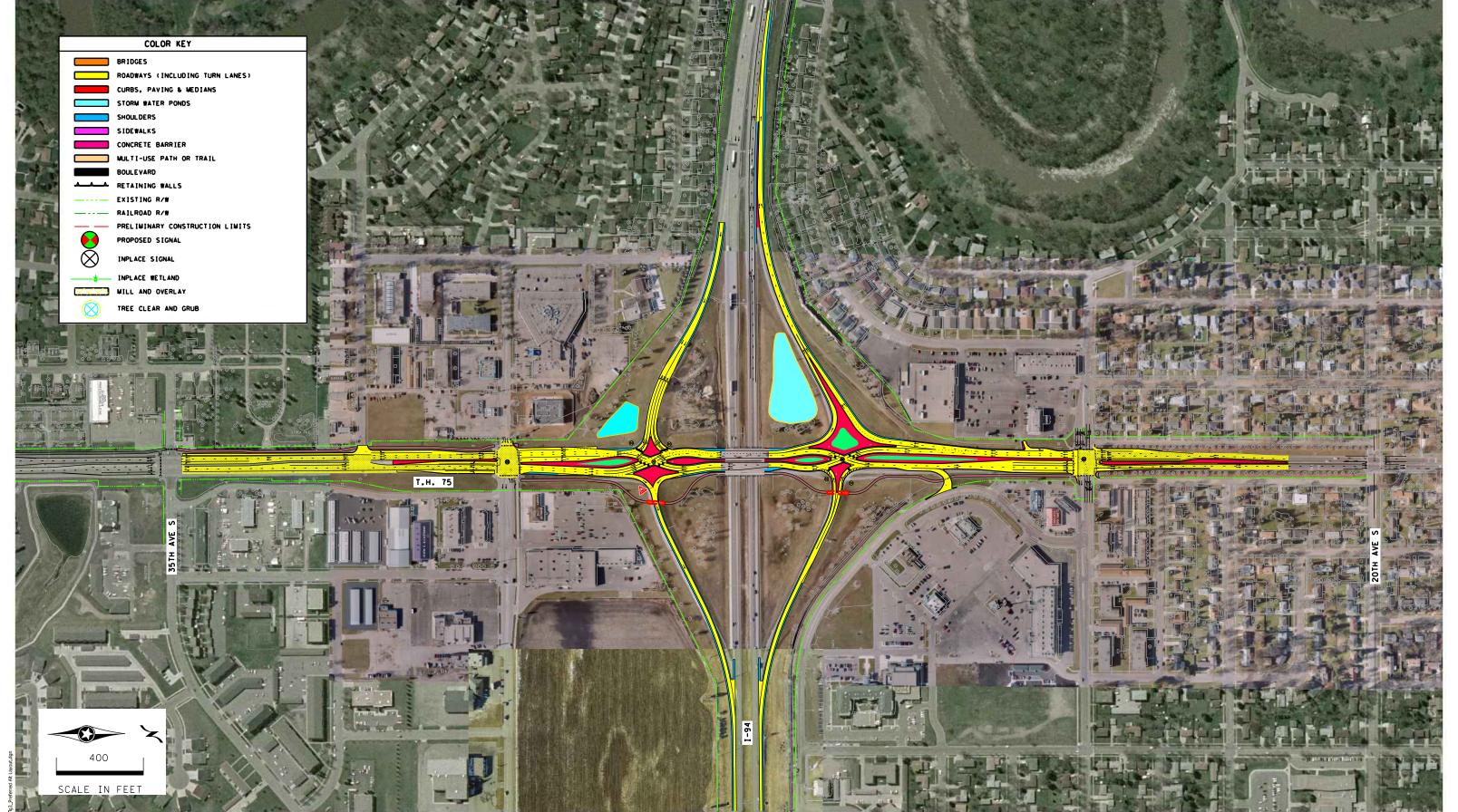
 T139N, R48E, \$16,17, 20, 21
 Prepared by \$F on 2015-03-04

 C. of Moorhead
 Technical Review by MP on 2015-03-05

 Clay Co., MN
 Independent Review by TM on 2015-03-11

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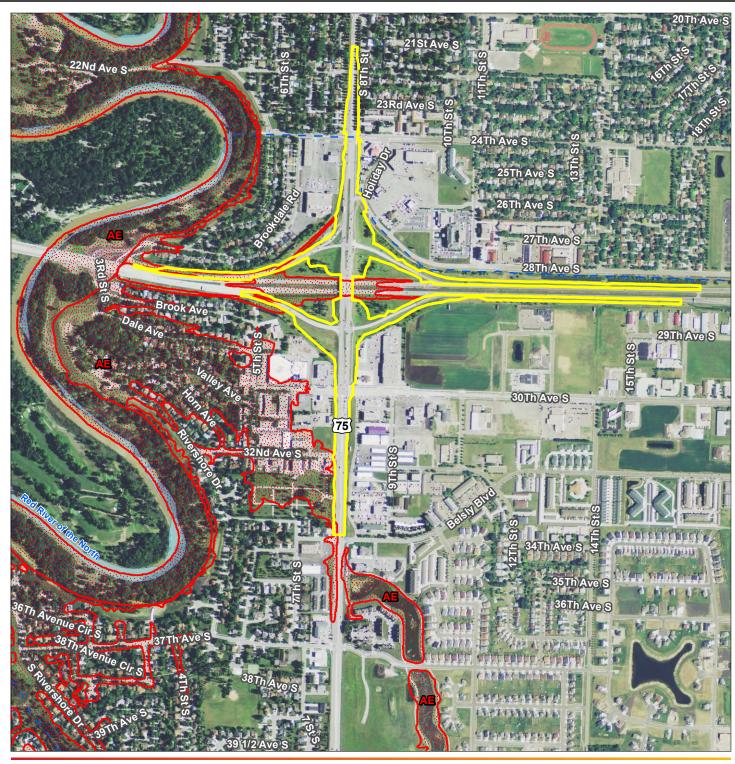




PREFERRED ALTERNATIVE LAYOUT

MOORHEAD, MINNESOTA TH 75/I-94 INTERCHANGE FIGURE 3

DATE: MAY 2015 PROJ. NO.: 193801516





Project Site: SP 1406-66 100-Year Flood Zone

National Hydrography Data Perennial Stream

Legend

Intermittent Stream

Waterbody

- Notes

 1. Coordinate System: NAD 1983 StatePlane Minnesota
 Central FIPS 2202 Feet
 2. Data Sources Include: Stantec, USGS, ESRL NRCS
 3. Orthophotography: 2013 NAIP

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Figure No. 4



FEMA Floodplain Map

Client/Project
TH 75/I-94 Interchange Reconstruction Project Environmental Assessment Worksheet

 Project Location
 193801516

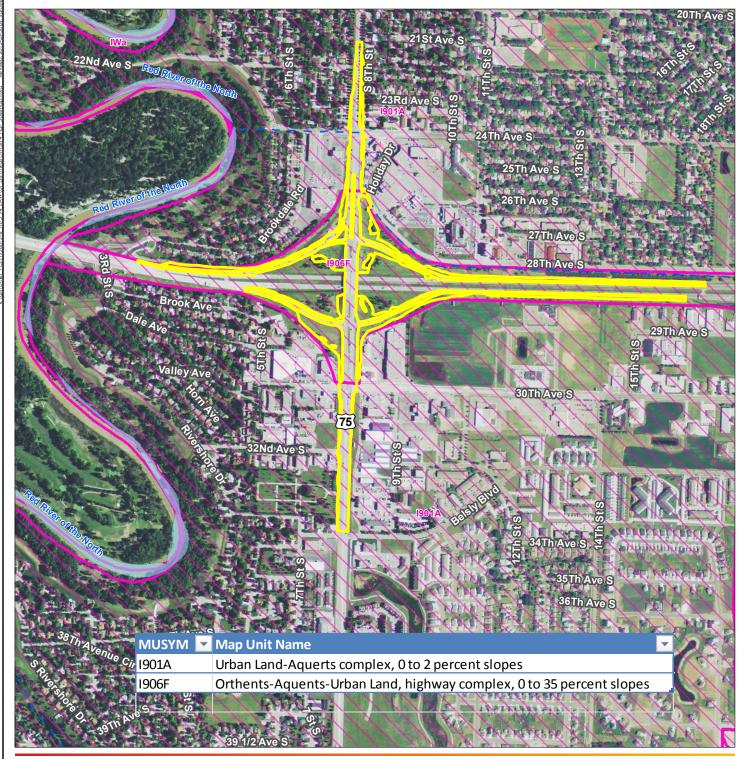
 T139N, R48E, \$16,17, 20, 21
 Prepared by \$F on 2015-03-04

 C. of Moorhead
 Technical Review by MP on 2015-03-05

 Clay Co., MN
 Independent Review by TM on 2015-03-11

1:12,016 (at original document size of 8.5x11)







Notes

1. Coordinate System: NAD 1983 StatePlane Minnesota
South FIPS 2203 Feet
2. Data Sources Include: Stantec, USGS, ESRL, NRCS
3. Orthophotography: 2013 NAIP

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Legend

Project Site: SP 1406-66

NRCS Hydric Soils

Predominantly Hydric Soils

Partially Hydric Soils

Non-Hydric Soils

National Hydrography Data

Perennial Stream

Intermittent Stream

Waterbody

Figure No.

NRCS Soil Survey Data

Client/Project
TH 75/I-94 Interchange Reconstruction Project Environmental Assessment Worksheet

 Project Location
 193801516

 T139N, R48E, \$16,17, 20, 21
 Prepared by \$F on 2015-03-04

 C. of Moorhead
 Technical Review by MP on 2015-03-05

 Clay Co., MN
 Independent Review by TM on 2015-03-30

1:12,000 (at original document size of 8.5x11)







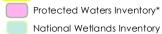
- Notes

 1. Coordinate System: NAD 1983 StatePlane Minnesota
 South FIPS 2203 Feet
 2. Data Sources Include: Stantec, USGS, ESRI
 3. Orthophotography: 2013 NAIP

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Legend

Project Site: SP 1406-66



National Hydrography Data

Perennial Stream

Intermittent Stream

Waterbody

*No PWI data in map extent

Figure No. 6

Title

Water Resources Map

Client/Project
TH 75/I-94 Interchange Reconstruction Project Environmental Assessment Worksheet

 Project Location
 193801516

 T139N, R48E, \$16.17, 20, 21
 Prepared by \$F on 2015-03-04

 C. of Moorhead
 Technical Review by MP on 2015-03-05

 Clay Co., MN
 Independent Review by TM on 2015-03-11

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Project Site: SP 1406-66

Well Location

National Hydrography Data

Perennial Stream

Intermittent Stream

Waterbody

- NOTES NOTE: NAD 1983 StatePlane Minnesota South FIPS 2203 Feet 2. Data Sources Include: Stantec, USGS, ESRI 3. Orthophotography: 2013 NAIP

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completenes of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data. Figure No.

Title

Well Location Map

Client/Project
TH 75/I-94 Interchange Reconstruction Project Environmental Assessment Worksheet

 Project Location
 193801516

 T139N, R48E, \$16.17, 20, 21
 Prepared by \$F on 2015-03-04

 C. of Moorhead
 Technical Review by MP on 2015-03-05

 Clay Co., MN
 Independent Review by TM on 2015-03-11

1:12,000 (at original document size of 8.5x11)



Appendix B: Correspondence

- > MnDOT Office of Environmental Stewardship Contaminated Properties Letter
- > DNR NHIS and Rare Species Review Letter
- > MnDOT Office of Environmental Stewardship Section 7 Determination Letter
- MnDOT Cultural Resources Determination Letter
- > MnDOT State Entrance Monument Email

Swenson, Jerilyn

From: Aufdencamp, Keri (DOT) <keri.aufdencamp@state.mn.us>

Sent: Friday, July 25, 2014 9:48 AM **To:** Munsterteiger, Paul (DOT)

Subject: S.P. 1406-66 Early Notification Memo

Paul,

The Contaminated Materials Management Team (CMMT) reviewed the Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Agriculture (MDA) databases to check for known contaminated sites in the project area. The databases searched included: leaking underground storage tank facilities, landfills, salvage yards, voluntary investigation and cleanup (VIC) sites, Superfund sites and dump sites. A review of these MPCA files is a component of a Phase I Environmental Site Assessment (Phase I ESA). A complete Phase I ESA includes at least two other components: research on historic land use, and site reconnaissance. It should be noted that the MPCA database files are continually being updated. Although this information is the most up-to-date available, some of the information may be incomplete or inaccurate. There is also a possibility that undiscovered contaminated and/or regulated materials exist in the project area.

Based on the database review, there are ten leaking underground storage tank sites and two VIC sites within approximately 500 feet of the project area. VIC sites are sites with known or potential releases of non-petroleum contamination.

Given the nature and location of the project area, and based on the HPDP threshold criteria as summarized below, this project has a medium to high risk of impacting potentially contaminated sites. Therefore, additional evaluation of the project area for potential contamination is necessary:

- 1. The project involves acquisition of new right of way in an urban, commercially developed area.
- 2. Project excavations will be extensive. Excavations will be taking place in a corridor where commercial properties are directly adjacent to the right of way. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way. Please provide the CMMT with additional project information as it becomes available regarding proposed excavation.
- 3. The project is in a commercial area. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way.
- 4. The project requires no groundwater dewatering.

A Phase I Environmental Site Assessment will need to be completed for this project. If the information obtained from the Phase I Environmental Site Assessment indicates a contaminated site may be impacted by the project, the property will be evaluated, and soil and groundwater testing completed, as appropriate. If necessary, a plan will be developed for properly handling and treating contaminated soil and/or groundwater during construction in accordance with all applicable state and federal requirements.

Keri B. Aufdencamp Hydrogeologist Office of Environmental Stewardship (MS 620) Minnesota Department of Transportation 395 John Ireland Blvd St. Paul, MN 55155 651-366-3627 keri.aufdencamp@state.mn.us

Swenson, Jerilyn

From: Maahs-Henderson, Theresa **Sent:** Friday, March 6, 2015 7:45 AM

To:Swenson, JerilynCc:McGraw, Pat

Subject: Fwd: DNR Comment on MnDOT Early Notification Memo, TH75 interchange

reconstruction at I-90 in Morehead (SP1406-66)

Attachments: 2015-02-09 Layout.pdf; ATT00001.htm; ENM SP1406-66, TH 75.doc; ATT00002.htm

Hi Jerilyn,

This is the response we were waiting for from the DNR coordinator.

Begin forwarded message:

From: "Leete, Peter (DOT)" < peter.leete@state.mn.us >

To: "Maahs-Henderson, Theresa" < Theresa. Maahs-Henderson@stantec.com >

Cc: "Munsterteiger, Paul (DOT)" < <u>paul.munsterteiger@state.mn.us</u>>, "Straumanis, Sarma (DOT)" < <u>sarma.straumanis@state.mn.us</u>>, "Joyal, Lisa (DNR)" < <u>Lisa.Joyal@state.mn.us</u>>, "Kestner, Nathan (DNR)" < <u>nathan.kestner@state.mn.us</u>>, "Olson, Nathan W (DNR)" < <u>nathan.olson@state.mn.us</u>>, "Hemphill, Rodger (DNR)" < <u>Rodger.Hemphill@state.mn.us</u>>

Subject: DNR Comment on MnDOT Early Notification Memo, TH75 interchange reconstruction at I-90 in Morehead (SP1406-66)

Theresa,

I recall talking to Paul Musterteiger (MnDOT D4 Environmental Coordinator) about this project previously. Though I do not find anything in my records. So here you go

This email is the DNR response for your project records. I have not sent this Early Notification Memo (ENM) out for full DNR review, however I've looked at the information in the submitted documents regarding the proposed reconstruction of the TH75 intersection with I-94 in Morehead. Please consider the following comments as final designs and special provisions are developed:

- 1. The Red River is the only DNR Public Waters within a mile of the project area. However the project limits do not extend to the river. Should plans change to include work at the I-94 Red River Crossing, please contact me as further review may be required.
- 2. 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

3. 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 identified their location. 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. 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..

This ENM has not been circulated to 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 Theresa, and myself.

Contact me if you have questions

Peter Leete

Transportation Hydrologist (DNR-MnDOT Liaison) DNR Ecological & Water Resources

Ph: 651-366-3634

From: Maahs-Henderson, Theresa [mailto:Theresa.Maahs-Henderson@stantec.com]

Sent: Thursday, March 05, 2015 7:56 AM

To: Leete, Peter (DOT)

Subject: SP1406-66 TH 75 ENM

Hi Peter.

I am checking on the status of the review request for this project. I am wondering how far down the queue we are sitting?

This project has an accelerated timeframe for the environmental document; we are doing a fast-track EAW. Is it possible to get an approximate timeframe for the review?

Thank you for your help -

Theresa Maahs, PE, LEED AP Senior Engineer

Phone: 651-604-4786 Cell: 612-749-9177

theresa.maahs@stantec.com<mailto:theresa.maahs@stantec.com>

From: Maahs-Henderson, Theresa

Sent: Friday, February 20, 2015 5:20 PM

To: peter.leete@state.mn.us<mailto:peter.leete@state.mn.us>

Subject: SP1406-66 TH 75 ENM

Hi Peter,

This is the ENM for the project in Moorhead, MN that referred to in my voicemail earlier this week. It is an interchange reconstruction project and is entirely within existing ROW. I have attached the current layout. Please let me know if there are any other maps that may be helpful to you in your review.

We are preparing a Categorical Exclusion and an EAW for the federal and state environmental documentation processes. You indicated in your message back that your review would include a NHIS search also so I will not send in a separate request for that.

Thank you for your help -

Theresa Maahs, PE, LEED AP Senior Engineer Stantec 2335 Highway 36 West St. Paul MN 55113 Phone: 651-604-4786

Cell: 612-749-9177 Fax: 651-636-1311

theresa.maahs@stantec.com<mailto:theresa.maahs@stantec.com>

Swenson, Jerilyn

From: Alcott, Jason (DOT) <jason.alcott@state.mn.us>

Sent: Wednesday, May 28, 2014 8:30 AM

To: Munsterteiger, Paul (DOT)
Cc: Moynihan, Debra (DOT)

Subject: S.P. 1406-66 - ESA (Section 7) - Determination of No Effect/No Jeopardy

No Effect Determination/No Jeopardy: S.P. 1406-66, Trunk Highway 75/Interstate 94 Interchange Reconstruction City of Moorhead, Clay County

Federally-Listed Species/Designated Critical Habitat in the Action Area

Section 7 of Endangered Species Act of 1973, as amended (Act), requires each Federal agency to review any action that it funds, authorizes or carries out to determine whether it may affect threatened, endangered, proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the U.S. Fish and Wildlife Service (Service) if any such effects may occur as a result of their actions. Consultation with the Service is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale. According to the official County Distribution of Minnesota's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species list (revised in May 2014), maintained by the

Service, the project county is within the distribution range of the following:

Clay	Northern long- eared bat Myotis septentrionalis	Proposed as Endangered	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
	Sprague's pipit (Anthus spragueii)	Candidate	Large (>350 acre) patches of grassland - prefer native grassland, but also use non-native planted grasslands.
	Dakota skipper (Hesperia dacotae)	Proposed as Threatened Proposed Critical Habitat - Maps	Native prairie habitat
	Poweshiek skipperling (Oarisma poweshiek)	Proposed as Endangered Proposed Critical Habitat - Maps	Native Prairie
	Western prairie fringed orchid (Platanthera praeclara)	Threatened	Wet prairies and sedge meadow

Based on the nature and location of the activities, a determination of no effect has been made.

Proposed Federal Species in the Action Area

Section 7(a)(4) requires Federal agencies to confer with the Services on any agency action that is likely to jeopardize the continued existence of any species proposed for listing or result in the adverse modification of critical habitat proposed to be designated. A conference may involve informal discussions between the Services, the action agency, and the applicant. Following informal conference, the Services issue a conference report containing recommendations for reducing adverse effects. These recommendations are discretionary, because an agency is not prohibited from jeopardizing the continued existence of a proposed species or from adversely modifying proposed critical habitat. However, as soon as a listing action is finalized, the prohibition against jeopardy or adverse modification applies, regardless of the stage of the action.

According to the official <u>County Distribution of Minnesota's Federally-Listed Threatened, Endangered, Proposed, and Candidate</u> Species list (revised in April 2014), maintained by the Service, there are several species proposed for listing in the project county. The

Service is currently working on developing consultation guidance for lead federal agencies to use in making determinations of effect for these species. Until this guidance is distributed and the species officially listed, the lead federal agency must assess the potential for jeopardy. According to discussions with the Service, projects that are minor in scope and with limited potential for impacts (as is the case for this project) are not likely to jeopardize the continued existence of these species. Please note: if the project has not been completed by the time the listing becomes official, further coordination and possible consultation with the Service may be necessary.

Jason Alcott Minnesota Department of Transportation Office of Environmental Stewardship 395 John Ireland Boulevard St. Paul, MN 55155 Phone: 651-366-3605

Email: Jason.alcott@state.mn.us

Min

Minnesota Department of Transportation

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

June 2, 2014

Re: S.P. 1406-66 (TH 75 / I-94 Interchange Reconstruction), Moorhead, Clay County

Office Tel: (651) 366-4291

Fax: (651) 366-3603

Paul Munsterteiger MnDOT District 4 1000 US Hwy 10 W. Detroit Lakes, MN 56501

Dear Mr. Munsterteiger:

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 applicable Programmatic Agreements 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), the Field Archaeology Act of Minnesota (MS 138.40); and the Private Cemeteries Act (MS 307.08, Subd. 9 and 10).

The project will consist of reconstructing the TH 75 / I-94 interchange in Moorhead to include a diverging diamond interchange. Extra auxiliary lanes will be added to I-94 eastbound and westbound from the interchange going east to 20th Street. All four ramps will be reconstructed. TH 75 will be milled and resurfaced from Bridge 14813 going north to 24th Avenue S. and south to 40th Avenue S. New signals for the ramps will be installed at 37th Avenue S., and overhead lighting will be added. A pedestrian trail and sidewalks will be added along TH 75 and across I-94 to include some curb ramps. Additionally, some tree removal and replacement will occur along TH 75.

Based on our existing programmatic agreements with various tribal groups, there are no tribes that want to be consulted on projects in this area of the state and/or projects with the proposed scope of work.

The area of potential effects (APE) for the project consists of the proposed construction area. Because all work will occur within areas previously disturbed by road construction, it is unlikely that the APE contains intact, significant archaeological resources. No historic structures are located within the APE.

The finding of this office is that there will be no historic properties affected by the project as currently proposed. If the project scope changes, please provide our office with the revised information and we will conduct an additional review.

Sincerely, Pence Hutte Beer

Renée Hutter Barnes, Historian

Cultural Resources Unit

cc: Mn/DOT CRU Project File

Maahs-Henderson, Theresa

From: Westrum Ostrom, Vera (DOT) < vera.westrum-ostrom@state.mn.us>

Sent: Wednesday, October 08, 2014 9:53 AM

To: Munsterteiger, Paul (DOT)

Subject: RE: ENM SP 1406-66, TH 75 / I-94

Paul.

Thanks so much for getting back to me about SP 1406-66, TH 75 / I-94.

Based on information you provided in ENM and the link to layout below, I see no adverse impact on the I-94 State Entrance Monument (SEM) in District 4- Moorhead from proposed project SP 1406-66.

Please keep me informed if there is any change or potential impact to the SEM as the project moves forward.

Thank you for the opportunity to review.

Sincerely,

Vera

Vera Westrum Ostrom, PLA | Landscape Architect Senior | MnDOT State Entrance Monument Program Manager | 651.366.4695 | vera.westrum-ostrom@state.mn.us

From: Munsterteiger, Paul (DOT)

Sent: Monday, September 29, 2014 11:56 AM

To: Westrum Ostrom, Vera (DOT)

Subject: RE: ENM SP 1406-66, TH 75 / I-94

Vera, I talked with the PM for this project and he says that we are not going to impact the monument. We will be widening the ramp near it, but no work to be done with the monument. Please see the following link for the latest layout. Thank you.

http://www.dot.state.mn.us/d4/projects/moorhead/documents/DDIIayout914.pdf

Paul Munsterteiger Mn/DOT - District 4 Environmental Coordinator 1000 US Hwy. 10 West Detroit Lakes, Mn 56501

Office: 218-846-7953 Fax: 218-846-7984 Cell: 218-849-0838

E-Mail: Paul.Munsterteiger@state.mn.us

From: Westrum Ostrom, Vera (DOT)

Sent: Monday, September 29, 2014 10:48 AM

To: Munsterteiger, Paul (DOT)

Subject: RE: ENM SP 1406-66, TH 75 / I-94

Paul,

My apologies; it does not appear that I responded to your request to review the ENM for SP 1406-66, TH 75 / I-94 interchange. Can you please forward current link or let me know how I can access the layout?

Do you have any further information as to how this may impact the Type I State Entrance Monument? Thank you,

Vera

Vera Westrum Ostrom, PLA | Landscape Architect Senior | MnDOT State Entrance Monument Program Manager | 651.366.4695 | vera.westrum-ostrom@state.mn.us

From: Munsterteiger, Paul (DOT) Sent: Tuesday, May 27, 2014 9:19 AM

To: Alcott, Jason (DOT); *DOT_CulturalResources; Aufdencamp, Keri (DOT); Vogel, Mark (DOT); Mitchell, Tim (DOT); Westrum-

Ostrom, Vera (DOT); Moynihan, Debra (DOT); Sorenson, Deb (DOT); Grugel, Todd (DOT); Roseen, Melvin (DOT)

Cc: Munsterteiger, Paul (DOT)

Subject: ENM SP 1406-66, TH 75 / I-94

Attached is a request for review and layout for SP 1406-66, TH 75 / I-94 interchange. This interchange is located in Moorhead and is a total reconstruct (excluding the bridges). This project has a September 26, 2015 letting date. Please go to the attached FTP site below to access the layout. If you have any questions or concerns, please call me. Thank you.

Automatic Login

FTP site link: ftp://s0527144233:7797895@ftptmp.stantec.com

By clicking on the link above (or pasting the link into Windows Explorer) you will be automatically logged into your FTP site.

Appendix C: Wetland Field Review Report

Minnesota Department of Transportation

TH 75 / I94 Diverging Diamond Interchange, including auxiliary lanes on I94 and lane/intersection revisions on TH 75.

S. P. 1406-66, TH 75

Wetland Field Review Report

Prepared by:

MnDOT c/o Paul Munsterteiger

1000 US Hwy 10 West

Detroit Lakes, Mn 56501

The project is located within the City of Moorhead in Clay County, Minnesota. The project area is within Interstate 94 right of way and along the Trunk Highway 75 corridor, which is comprised of commercial properties with parking lots, residential houses with manicured lawns and all served by curb and gutter or roadside ditches.

The proposed project site was visited in August, 2014. A level 1 wetland field review was completed by Mr. Paul Munsterteiger, MnDOT, District 4 Wetlands Coordinator.

Prior to field reconnaissance, potential wetlands within the project area were scoped through review of National Wetlands Inventory (NWI) mapping, review of aerial photography from 2012, review of site topography, review of the local Clay County GIS mapping, and the soil survey for Clay County.

NWI mapping, maintained by the United States Fish and Wildlife Service (USFWS), shows no wetlands within the project and/or study area.

The Minnesota Department of Natural Resources (DNR), Public Waters Inventory Map (PWI), was reviewed and showed no wetlands within the project and/or study area.

The project is located in Section 17 & 20, Township 139N, Range 48 & 49W; and is depicted on the Clay County, Minnesota 7.5-minute topographic map (U.S. Geological Survey). The project study area was identified on the USGS topographical map; however, no wetlands were identified on the map.

According to the Natural Resources Conservation Service's (NRCS) "Web Soil Survey", one soil mapping unit (841) is within the project area. The mapping unit (Urban Land-Fargo complex) consist of silty clay with slopes from 0-2%. This nearly level map unit is mostly on lake plains that have alluvial fans. The Urban land part of this map unit is mostly covered by residential developments. This soil is not assigned to a capability subclass.

Precipitation data for the project study area was looked at through an online data retrieval system, created and maintained by the Climatology Working Group at the University of Minnesota, to determine the wetness conditions in the surrounding area. Rainfall levels for the three months (May, June July) leading up to the August, 2014 field investigation were compared to historical data. The comparison indicated normal precipitation levels for the area.

Based on the following data, the project site visit and my best professional judgment, I've determined there are no wetlands located within the project limits.

Appendix D: Floodplain Assessment Memo

FLOODPLAIN ASSESSMENT

The TH 75/I-94 project consists of reconstruction of the existing interchange from a standard diamond to a diverging diamond. The project involves construction on TH 75, the interchange ramps, and the addition of eastbound and westbound auxiliary lanes on I-94 from the TH 75 interchange east to 20th Street. TH 75 (8th Street S) from 35th Avenue S to 24th Avenue S is proposed to be an urban roadway section implementing new storm sewer in combination with the use of the existing storm sewer system, where practical.

Federal Emergency Management Administration Flood Insurance Rate Maps (FEMA FIRMs) and the Flood Insurance Study (FIS) for Clay County, MN, were used as a reference for this assessment (Panels 2027C0459E and 2027C0457E, effective date 4/17/2012).

FLOODPLAIN ENCROACHMENT				
Floodplain	Type of Encroachment	Length, ft		
Red River	Longitudinal	1950′		

The project has three longitudinal encroachments located at the northwest I-94 entrance ramp, the southwest I-94 exit ramp, and the most southwest portion of the project along TH 75.

LONGITUDINAL ENCROACHMENT

The project will not result in any significant floodplain impacts for the following reason:

The areas of impact are called out as Special Flood Hazard Areas (SFHAs), which are subject to inundation by the 1% annual chance flood. However, all longitudinally encroached areas are outside of the floodway, the stream and floodplain areas that must be kept free of encroachment to prevent substantial increases in flood heights. See attached FEMA FIRMs.

The City of Moorhead recently completed construction on a levee project along the eastern edge of the Red River in Clay County. Based on mapping (completed by Houston Engineering), the completed levee project will remove all areas of impact to the 100-year floodplain for the proposed project. See attached Topographic Working Map.

I. No significant potential for interruption of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.

Northwest I-94 Entrance Ramp

a1. Is the roadway grade above the 100 year flood elevation?

YES Roadway elevation(s) 901.69 100 year flood elevation 903.0

NO Frequency of overtopping: 100 year flood event Reason(s) why roadway grade will not be raised:

<u>City of Moorhead levee construction will result in no overtopping for the 100 year event.</u>

Are there reasonable alternative routes available that are above the 100 year flood elevations? Yes

a2. Is the roadway grade above the 100 year flood elevation?

YES Roadway elevation(s) 903.98 100 year flood elevation 903.0

NO Frequency of overtopping

Reason(s) why roadway grade will not be raised:

Are there reasonable alternative routes available that are above the 100 year flood elevations?

Southwest TH75 Corner

a3. Is the roadway grade above the 100 year flood elevation?

YES Roadway elevation(s) 904.5 100 year flood elevation 904.0

NO Frequency of overtopping

Reason(s) why roadway grade will not be raised:

Are there reasonable alternative routes available that are above the 100 year flood elevations?

b. If the 100 year flood elevation is not known, does roadway have a history of overtopping?

NO Reference and length of record ______

YES Discuss correcting deficiency _____

c. Describe how emergency services will be maintained during construction:

All emergency services will be routed to an existing interchange one mile east of the project.

II. No significant impact on natural and beneficial floodplain values.

There will not be any significant impact on the natural or beneficial floodplain encroachment areas. The encroachment involves adding a limited amount of fill to construct widened roadway sections at each encroachment area. The project also includes additional storm sewer and ponding areas. Standard erosion and sediment control Best Management Practices (BMPs) will be utilized throughout the project. No threatened or endangered plants or animals have been identified in the floodplain areas.

III. No significant increased risk of flooding will result.

The project does not include changing cross sections within the areas of encroachment to the extent that the floodplain will be impacted. The FEMA FIRM maps show that the cross sections are not within the floodway and that slight changes will not significantly

increase the risk of flooding. The project does not include any alterations to major hydraulic structures within the encroachment locations.

IV. Project will not cause incompatible floodplain development

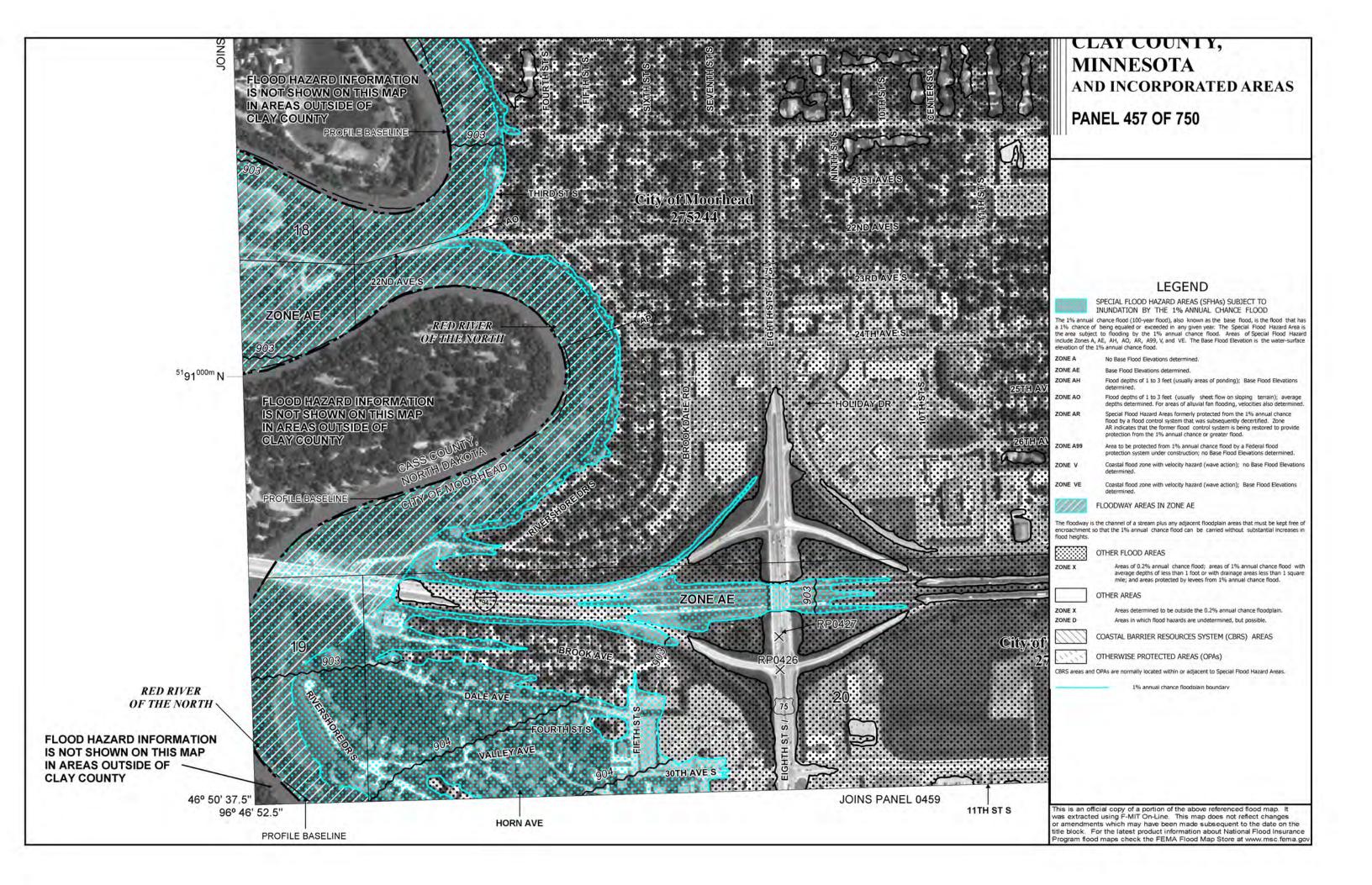
No new access to the floodplain is being created; therefore the project will not cause incompatible floodplain development.

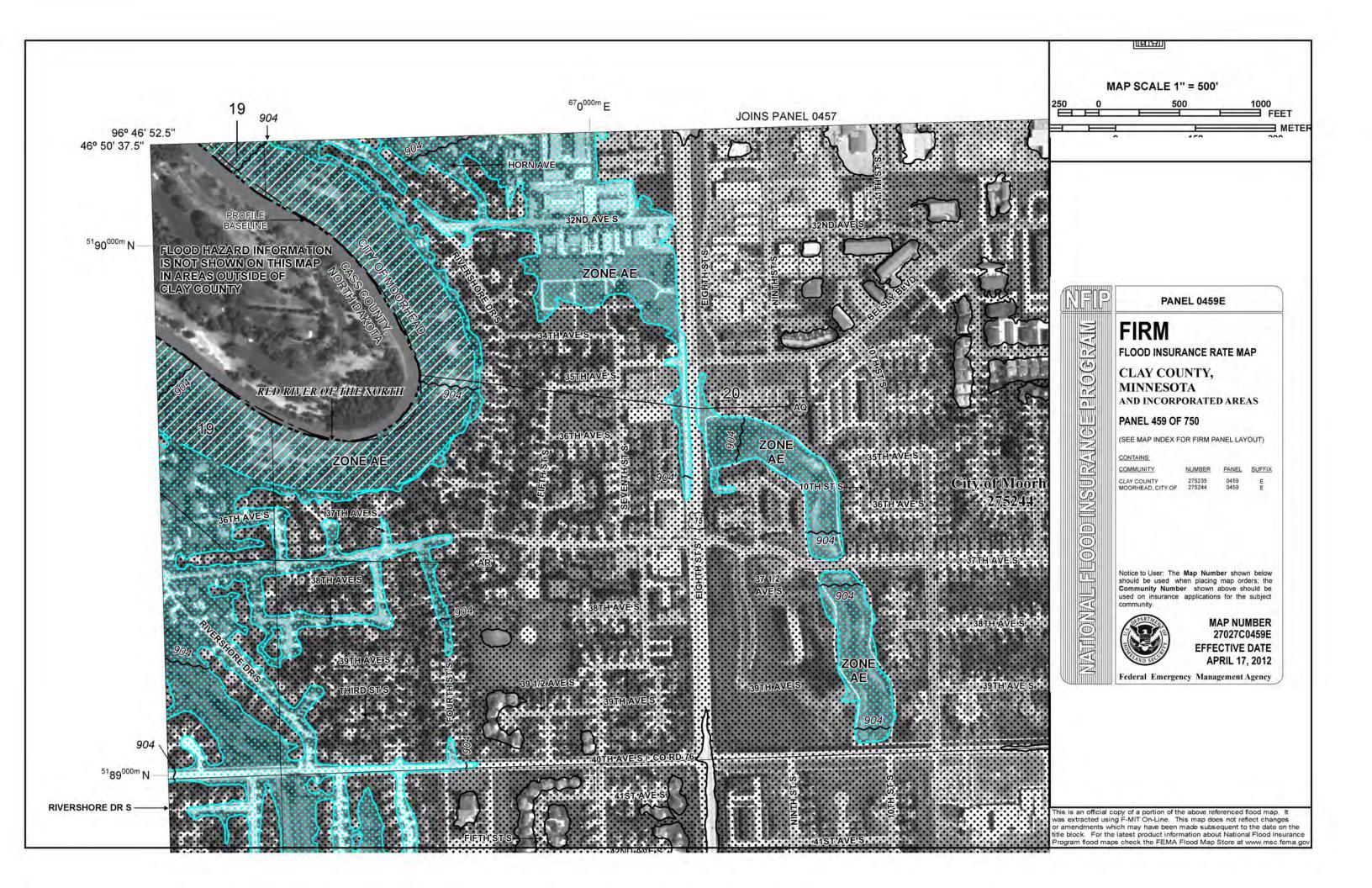
CONCLUDING STATEMENT

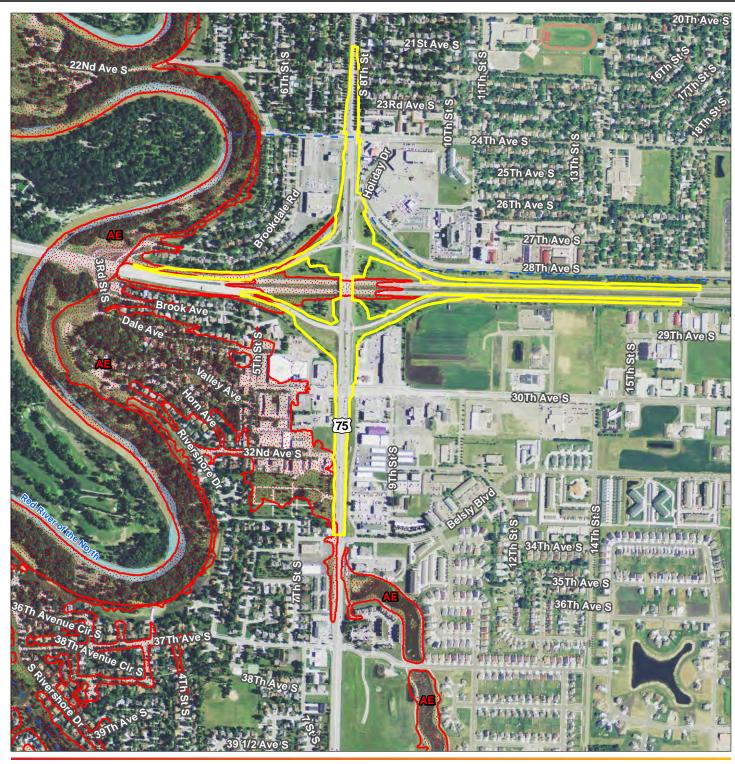
Based on the above assessment, no significant floodplain impacts are expected.

ATTACHMENTS

Federal Emergency Management Administration Flood Insurance Rate Maps (FEMA FIRMs) Floodplain and Project Boundary Map Topographic Work Map (Houston Engineering)









Notes

1. Coordinate System: NAD 1983 StatePlane Minnesota
Central FIPS 2202 Feet
2. Data Sources Include: Stantec, USGS, ESRI, NRCS
3. Orthophotography: 2013 NAIP

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Legend

Project Site: SP 1406-66 100-Year Flood Zone

National Hydrography Data

Perennial Stream

Intermittent Stream

Waterbody

Figure No. 4



FEMA Floodplain Map

Client/Project
TH 75/I-94 Interchange Reconstruction Project Environmental Assessment Worksheet

 Project Location
 193801516

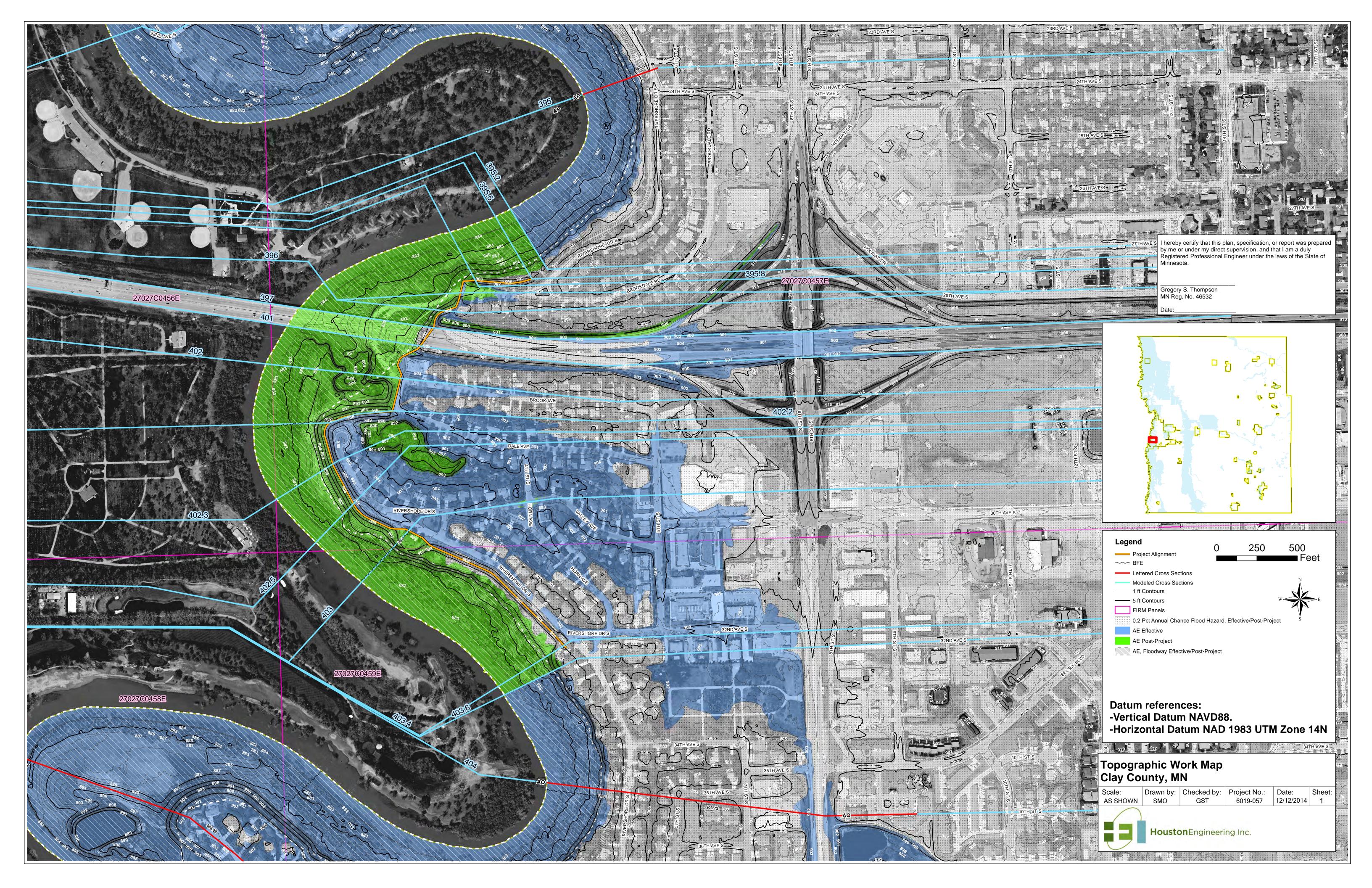
 T139N, R48E, \$16,17, 20, 21
 Prepared by \$F on 2015-03-04

 C. of Moorhead
 Technical Review by MP on 2015-03-05

 Clay Co., MN
 Independent Review by TM on 2015-03-11

1:12,016 (at original document size of 8.5x11)





Appendix E: Noise Analysis Report

TH 75 & I 94 Interchange Project

Noise Analysis Report

SBP Associates, Inc.

and



Prepared for:

Minnesota Department of Transportation

TH 75 & I 94 INTERCHANGE PROJECT NOISE ANALYSIS REPORT

Sign-off Sheet

This document entitled TH 75 & I 94 Interchange Project Noise Analysis Report was prepared by Stantec Consulting Services Inc. ("Stantec") in conjunction with SBP Associates, Inc. for the account of Minnesota Department of Transportation (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by

(signature)

Theresa M. Maahs

Reviewed by

(signature)

Pat M. McGraw

TH 75 & I 94 INTERCHANGE PROJECT **NOISE ANALYSIS REPORT**

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APPENDICIES

Appendix A - Maps

Figure 1 – Index Map
Figures 2a – 2d – Receptor and Wall Location Maps
Appendix B – Noise Level Impact Tables

Appendix C - Noise Wall Analysis Tables

A. INTRODUCTION

This report presents the noise analysis and mitigation assessment for the proposed modifications to the Highway 75 and I-94 interchange in Moorhead, Minnesota. The analysis has been completed consistent with MnDOT and FHWA requirements and includes results of the monitoring of the existing noise levels as well as the modeling of existing, no-build, and build scenario noise levels. The analysis also includes a cost-reasonableness assessment of noise barrier mitigation.

The proposed modifications involve segments of Trunk Highway 75 located between 24th Ave S and 35th Ave S. The TH 75 reconstruction includes lane reconfiguration, lane widening, and traffic control at the following intersections:

- Entrance and exit ramps of Interstate 94
- 24th Ave S.
- 30th Ave S.

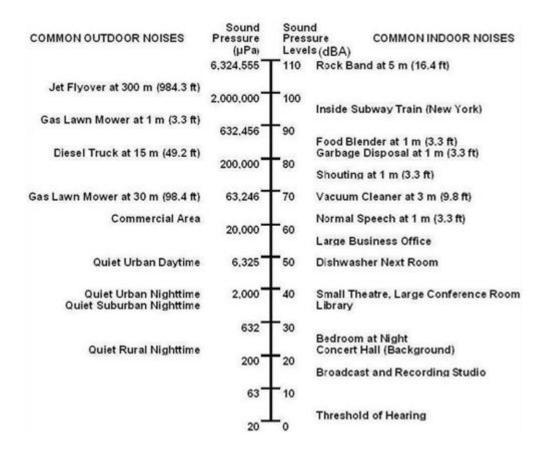
Modifications to Interstate 94 are proposed between 900' east of the Red River to 20th Street. Work on I-94 includes the addition of an auxiliary lane on the eastbound and westbound lanes between Trunk Highway 75 and 20th Street, reconstruction of all exit and entrance ramps for Interstate 94 and Trunk Highway 75, and minor modifications to the eastbound off ramp at 20th Street.

B. NOISE AND NOISE DESCRIPTORS

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic measure of sound energy relative to a reference energy level. For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of three dBA is barely perceptible to the human ear, a five dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a three dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dBA increase and it is heard as twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hour of the day and night that has the loudest traffic. These numbers are identified as the L_{10} and L_{50} levels. The L10 value is compared to both the MPCA and FHWA noise abatement criteria while the L50 value is just compared to the MPCA criteria.

The chart on the following page provides a rough comparison of the noise levels of some common noise sources.



Along with the volume of traffic and other factors (i.e., topography of the area and vehicle speed) that contribute to the loudness of traffic noise, the distance of a receptor from a sound's source is also an important factor. Sound levels decrease as distance from a source increases. The following rule of thumb regarding how sound decreases with distance is commonly used. Beyond approximately 50 feet, each time the distance between a line source (such as a road) and a receptor is doubled, sound levels decrease by three decibels over hard ground, such as pavement or water, and by four and one half decibels over vegetated areas (soft ground).

C. REGULATORY CONTEXT

1. State of Minnesota Noise Regulations

Minnesota State noise standards have been established specifically for daytime and nighttime periods. The Minnesota Pollution Control Agency (MPCA) defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00 p.m. to 7:00 a.m. For residential land uses including apartments, churches, and schools (Noise Area Classification 1 or NAC-1), the Minnesota State standards for L_{10} are 65 dBA for daytime and 55 dBA for nighttime; the standards for L_{50} are 60 dBA for daytime and 50 dBA for nighttime. The daytime standards apply during the nighttime if no overnight lodging exists, such as at most churches and schools. For commercial land uses (NAC-2), the Minnesota State standards for L_{10} are 70 dBA for daytime and nighttime; the standards for L_{50} are 65 dBA for daytime and nighttime. Minnesota State Noise Standards are shown in *Table 1*.

Table 1 - Minnesota State Noise Standards

MPCA State Noise Standards								
Land Use	Code Day (7 a.m. – 10 p.m.) dBA Night (10 p.m. – 7 a.m.) dBA							
Residential	NAC-1	L ₁₀ of 65	L ₅₀ of 60	L ₁₀ of 55	L ₅₀ of 50			
Commercial	NAC-2	L ₁₀ of 70	L ₅₀ of 65	L ₁₀ of 70	L ₅₀ of 65			
Industrial	NAC-3	L ₁₀ of 80	L ₅₀ of 75	L ₁₀ of 80	L ₅₀ of 75			

2. Federal Noise Abatement Criteria (NAC)

The Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise is presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772). This regulation establishes the noise abatement criteria (NAC) for various land uses. Noise abatement measures will be considered when the predicted noise levels approach (within 1 dBA) or exceed those values shown for the appropriate activity category in Table 2, or when the predicted traffic noise levels substantially exceed the existing noise levels. MnDOT has defined an increase over existing noise levels of 5 dBA or greater as a substantial noise level increase.

Table 2 - Federal Noise Abatement Criteria

Activity Category	Activity Criteria(1,2) L10(h) dBA	Evaluation Location	Activity Description
A	60	Exterior	Exterior Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(3)	70	Exterior	Residential
C(3)	70	Exterior	Exterior Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios

Activity Category	Activity Criteria(1,2) L10(h) dBA	Evaluation Location	Activity Description
E(3)	75	Exterior	Exterior Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F			Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G			Undeveloped lands that are not permitted

Notes

- (1) L 10(h) shall be used for impact assessment.
- (2) The L 10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement

measures.

(3) Includes undeveloped lands permitted for this activity category.

D. PROJECT IMPACTS ASSESSMENT - METHODOLOGY

Existing (2015) and future (2035) build and no-build noise levels were modeled using the noise analysis software MINNOISEV3.1, a modified version of the FHWA noise prediction model STAMINA 2.0.

Traffic noise impacts were assessed by modeling daytime and nighttime peak 2015 and 2035 build and no-build noise levels at receptor sites located within the project study area. Peak noise hour traffic was based on an analysis of hourly total traffic and heavy truck volumes.

In general, higher traffic speeds, higher traffic volumes, and higher numbers of heavy trucks, increase traffic noise impacts. The worst traffic noise hour typically occurs when traffic is free flowing and heavy truck volumes are at their highest.

In addition to the noise modeling, noise monitoring was also conducted at locations along the project corridor. The monitoring was conducted to confirm existing noise levels and to assist in validating the model results.

Noise modeling receptors were selected at commercial and residential sites along the corridor. Receptor locations were chosen based on guidance provided in Appendix B of the June 1, 2011 MnDOT Noise Policy. Receptor locations are shown in the figures in Appendix A. Residential receptor sites are classified within the definition of State of Minnesota NAC-1 and Federal Land Use Category B. Commercial receptor sites are classified within the definition of State of Minnesota NAC-2 and Federal Land Use Categories C and E.

The receptors along the project corridor were divided into 8 areas for analysis. The 8 areas and receptors are shown in Figures 2-A through 2-D in Appendix A.

E. NOISE MONITORING

Noise monitoring was conducted at three locations along the project corridor. The noise monitoring locations are also shown in Figures 2-A through 2-D in Appendix A. The monitoring results were compared with modeling results for traffic conditions encountered during the monitoring. The following table presents the results of this comparison.

Table 3 -Noise Monitoring Results Compared to Modeling Results

Monitoring	Date	Time	Monitored	d Noise	Modeled	Noise	Modeled	V.	
Point			F. T.		Level		Monitored		
			L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	
M1	5/27/14	1638- 1708	65.0	59.0	65.4	60.4	-0.4	-1.4	
M1	5/28/14	1028- 1043	65.0	60.0	65.4	60.4	-0.4	0.4	
M2	5/27/14	1552- 1622	64.5	60.0	68.7	64.5	4.2	4.5	
M2	5/28/14	758-828	70.5	67.5	69.1	65.3	-1.4	-2.2	
M3	5/28/14	1143- 1213	63.0	59.0	66.0	60.5	3.0	1.5	
M3	5/28/14	1700- 1730	65.0	59.0	66.0	60.5	1.0	1.5	
M7	5/28/14	1053- 1123	66.0	58.0	64.3	56.4	-1.7	-1.6	
M7	5/28/14	1450- 1520	66.0	60.0	64.3	56.4	-1.7	-3.6	

Each set of predicted and measured data was found to be within the acceptable + or – 3 dBA tolerance; therefore the model is considered to be validated.

Peak noise hour traffic was based on an analysis of level of service analysis, hourly vehicle classification data, and hourly traffic volumes for TH 75 and I-94.

In general, higher traffic speeds, higher traffic volumes, and higher numbers of heavy trucks, increase traffic noise impacts. The worst traffic noise hour typically occurs when traffic is free flowing and heavy truck volumes are high.

The peak daytime noise hour was determined to be the 2:00 pm to 3:00 pm hour for the portion of the project adjacent to TH 75 and north of I-94 and the 5:00 to 6:00 pm hour for the other project areas. The peak nighttime noise hour was determined to be the 6:00 am to 7:00 am hour for all project areas.

F. NOISE IMPACTS ASSESSMENT

2015 and 2035 no-build and build noise levels were modeled at receptor locations in 8 different areas along the project corridor. Following is a discussion of the modeling results for each of these areas.

Area A - East of TH 75, North of 24th Avenue

Receptors RE1-RE10

Land uses on the east side of TH 75 and north of 24th Avenue include single family and multifamily residences.

The modeled noise levels are above the State daytime L₁₀ and L₅₀ standards for the units closest to TH 75 and above the State nighttime standards at all receptors.

The difference between existing and future build noise levels range from (0.8 - 1.5 dBA) for daytime L_{10} and from (1.1 - 2.1 dBA) for L_{50} standards. Four of 18 receptors were determined to experience noise levels above daytime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} daytime standards.

The difference between existing and future build noise levels range from (1.3 – 2.3 dBA) for nighttime L10 and from (1.8 – 4.1 dBA) for L50 standards. Twelve of 18 receptors were determined to experience noise levels above nighttime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L10 and L50 nighttime standards.

Detailed model results are provided for the daytime and nighttime in Tables A-1 and A-2 in Appendix A.

Area B - West of TH 75, North of I-94

Receptors RW1 - RW15 and CW1 - CW3

Land uses on the south of I-94 and west of US-75 consist of residential and commercial uses.

The modeled noise levels are below the State daytime and nighttime L₁₀ and L₅₀ standards and below the Federal noise abatement criteria for Category E land uses for receptors CW1, CW2, and CW3.

The modeled noise levels are above the State daytime L₁₀ and L₅₀ standards for the residential units closest to TH 75 and above the State nighttime standards at all residential receptors.

The difference between existing and future build noise levels range from (0.9 - 2.4 dBA) for daytime L_{10} and from (1.2 - 1.9 dBA) for L_{50} standards. Eight of eighteen receptors were determined to experience noise levels above daytime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} daytime standards.

The difference between existing and future build noise levels range from (1.5 – 4.0 dBA) for nighttime L_{10} and from (2.5 – 4.5 dBA) for L_{50} standards. Fifteen of eighteen receptors were determined to experience noise levels above nighttime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} nighttime standards.

Detailed model results are provided for the daytime and nighttime in Tables A-3 and A-4 in Appendix A.

Area C - East of TH 75 and North of I-94

Receptors CE1- CE4

Land uses on the east side of TH 75 and north of I-94 are commercial.

Modeled noise levels are below the State daytime and nighttime standards and the Federal noise abatement criteria for Activity Category E at all receptors.

The difference between existing and future build noise levels range from (0.7 - 1.3 dBA) for daytime L_{10} and from (0.9 - 1.6 dBA) for L_{50} standards. No receptors were determined to experience noise levels above daytime standards. No impacts were determined in any of the existing, 2035 no build or 2035 build categories for either L_{10} and L_{50} daytime standards.

The difference between existing and future build noise levels range from (1.9 - 2.8 dBA) for nighttime L_{10} and from (3.1 - 3.7 dBA) for L_{50} standards. No receptors were determined to experience noise levels above nighttime standards. No impacts were determined in any of the existing, 2035 no build or 2035 build categories for either L_{10} and L_{50} nighttime standards.

Detailed model results are provided for the daytime and nighttime in Tables A-5 and A-6 in Appendix B.

Area D - West of TH 75, I-94 to 30th Avenue

Receptors CW4-CW9 and RW17, and RW18

Land uses on the west side of TH 75 between I-94 and 30th Avenue include commercial facilities and two multifamily buildings.

The modeled noise levels are above the State daytime and nighttime standards and below the Federal noise abatement criteria for Category B at the residential units.

The difference between existing and future build noise levels range from (1.3 - 2.6 dBA) for daytime L_{10} and from (1.5 - 3.6 dBA) for L_{50} standards. Three of eight receptors were determined to experience noise levels above daytime standards. Impacts were determined in both the 2035 no build and 2035 build categories for the L_{50} daytime standards.

The difference between existing and future build noise levels range from (3.0 - 4.4 dBA) for nighttime L_{10} and from (4.9 - 5.9 dBA) for L_{50} standards. Two of eight receptors were determined to experience noise levels above nighttime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} nighttime standards.

Detailed model results are provided for the daytime and nighttime in Tables A-7 and A-8 in Appendix B.

Area E - East of TH 75, 30th Avenue to 35th Avenue

Receptors CE 5 - CE 11

Land uses on the south side of TH 5 east of Olive Street consist of commercial uses.

The modeled noise levels are below the State daytime and nighttime L₁₀ and L₅₀ standards and below the Federal noise abatement criteria for Category E land uses.

The difference between existing and future build noise levels range from (1.1 - 2.8 dBA) for daytime L_{10} and from (1.4 - 3.9 dBA) for L50 standards. No receptors were determined to

experience noise levels above daytime standards. No impacts were determined in any of the existing, 2035 no build or 2035 build categories for either L_{10} and L_{50} daytime standards.

The difference between existing and future build noise levels range from (3.0 - 3.9 dBA) for nighttime L_{10} and from (4.0 - 5.5 dBA) for L_{50} standards. No receptors were determined to experience noise levels above nighttime standards. No impacts were determined in any of the existing, 2035 no build or 2035 build categories for either L_{10} and L_{50} nighttime standards.

Detailed model results are provided for the daytime and nighttime in Tables A-9 and A-10 in Appendix B.

Area F - West of TH 75, North of 35th Avenue

Receptors CW10, CW10A, and RW19-RW21

The land use for this location includes a cemetery and a row of units bordering 35th Avenue, including one commercial building and three residential units.

The difference between existing and future build noise levels range from (2.2 - 2.9 dBA) for daytime L_{10} and from (2.6 - 4.2 dBA) for L_{50} standards. Three of five receptors were determined to experience noise levels above daytime standards. Impacts were determined in both the 2035 no build and 2035 build categories for the L_{10} and L_{50} daytime standards.

The difference between existing and future build noise levels range from (3.8 - 4.3 dBA) for nighttime L_{10} and from (5.0 - 6.4 dBA) for L_{50} standards. Three of five receptors were determined to experience noise levels above nighttime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} nighttime standards.

The modeled noise levels are below the State daytime and nighttime L_{10} and L_{50} standards and below the Federal noise abatement criteria for Category E for the commercial building. The modeled noise levels are below the State daytime and nighttime L_{10} and L_{50} standards and below the Federal noise abatement criteria for Category C for the cemetery. The modeled noise levels are above the State daytime and nighttime standards land uses for the residential receptors at this location. Detailed model results are provided for the daytime and nighttime in Tables A-11 and A-12 in Appendix B.

Area J - North of I-94 and East of US 75

Receptors CE13, CE14, CE15, and RE20-RE44

Land uses in this area consist of commercial buildings, multifamily buildings, and single family homes.

The difference between existing and future build noise levels range from (0.6 – 0.9 dBA) for daytime L_{10} and from (0.9 – 1.3 dBA) for L_{50} standards. The difference between existing and future build noise levels range from (0.7 – 1.0 dBA) for nighttime L_{10} and from (1.1 – 1.7 dBA) for L_{50} standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L10 and L50 daytime standards.

The difference between existing and future build noise levels range from (0.7 - 1.5 dBA) for nighttime L_{10} and from (1.1 - 2.6 dBA) for L_{50} standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} nighttime standards.

Modeled noise levels are above the State daytime standards At 64 of 74 and approaching the Federal noise abatement criteria for Activity Category B at 31 of the 74 modeled residential locations. Modeled noise levels are above the State nighttime standards for all of the residential receptors.

Detailed model results are provided for the daytime and nighttime in Tables A-13 and A-14 in Appendix B.

Area K - South of I-94 and East of TH 75

Receptors CE16, CE17, and CE18

Land uses in this area consist of commercial buildings and undeveloped commercial land.

The difference between existing and future build noise levels are at 0.8 dBA for daytime L_{10} and range from (1.0 – 1.2 dBA) for L_{50} standards. All three receptors were determined to experience noise levels above daytime standards. Impacts were determined in each of the existing, 2035 no build and 2035 build categories for both L_{10} and L_{50} daytime standards.

The difference between existing and future build noise levels range from (0.8 – 0.9 dBA) for nighttime L_{10} and from (1.2 – 1.4 dBA) for L_{50} standards. None of the receptors were determined to experience noise levels above State nighttime standards for either L_{10} or L_{50} nighttime standards.

Modeled noise levels are above the State daytime standards at each of the receptor locations. Modeled noise levels are within the State nighttime standard at each location.

Detailed model results are provided for the daytime and nighttime in Tables A-15 and A-16 in Appendix B.

G. MITIGATION ASSESSMENT

Because the State standards would be exceeded at modeled receptor sites in Areas A, B, D, F, J, and K, mitigation measures have been analyzed.

This project is considered a Type I project for the purposes of traffic noise analysis. 23 CFR 775.15(c) describes noise abatement measures that are to be considered when a traffic noise impact has been identified with a Type I highway project. These noise abatement measures are described below.

- Construction of noise barriers, including acquisition of property rights, either within or outside the highway right of way. Landscaping is not a viable noise abatement measure.
- Traffic management measures, including, but not limited to, traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.
- Alteration of horizontal and vertical alignments.
- Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise.
- Noise insulation of certain facilities, including: auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.

Noise Barrier Evaluation

MnDOT's policies and procedures for evaluating noise barrier feasibility and reasonableness are set forth in Section 5.2 (Feasibility) and Section 5.3 (Reasonableness) of the MnDOT Highway Noise Policy. The factors for determining noise barrier feasibility and reasonableness as described in the MnDOT noise policy are summarized below.

Noise Barrier Feasibility

Noise barrier feasibility is determined based on a consideration of two factors: 1) acoustic feasibility and 2) engineering feasibility.

- Acoustic feasibility: For a noise barrier to be considered acoustically effective, it must achieve a noise reduction of at least 5 dBA at the impacted receptors for those receptors to be considered benefited by a noise barrier. Not every impacted receptor must receive this minimum 5 dBA reduction; however, at least one impacted receptor must meet the minimum 5 dBA reduction for a noise barrier to achieve acoustic feasibility.
- Engineering feasibility: Engineering feasibility addresses whether or not it is
 possible to design and construct a proposed noise abatement measure. A
 sample of potential constructability considerations includes safety,
 topography, drainage, utilities, and maintenance considerations.

Engineering considerations are also taken into consideration in determining noise barrier height. MnDOT has established a maximum noise barrier height of 20 feet above the finished ground line at the noise barrier. In addition, MnDOT has established a maximum noise barrier height of 10 feet above the bridge deck when it is necessary for a noise barrier to be attached to a bridge structure.

The feasibility of noise barrier construction is sometimes dependent on design details that are not known until the final design phase of the project. For the purpose of this traffic noise analysis, it was assumed that noise barriers were feasible with respect to engineering feasibility/constructability considerations. It was also assumed that utilities located within existing right of way could be relocated to accommodate modeled noise barriers, and existing and proposed drainage could be maintained. All modeled noise barriers were located within existing highway right of way limits.

Noise Barrier Reasonableness

Noise barrier reasonableness decisions are based on a consideration of three reasonableness factors: 1) noise reduction design goal, 2) cost effectiveness, and 3) the viewpoint of benefited residents and property owners.

- Noise reduction design goal: A minimum 7 dBA reduction must be achieved for at least one benefited receptor behind the noise barrier to meet noise reduction design goals.
- Cost effectiveness: To be considered cost-effective, the cost per individual benefited receptor (i.e., residence, commercial entity, industrial entity) should be equal to, or less than \$43,500. In order to assess cost effectiveness, at least one benefited receptor behind the noise barrier must meet the noise reduction design goal described above. The following formula is used to determine the cost-effectiveness of the barrier:

The cost-effectiveness index is equal to the cost of the noise barrier divided by the number of individual benefited receptors (i.e., residences, commercial entities, industrial entities) that are predicted to experience noise level reductions of 5 dBA or more. Only those receptors that experience a 5 dBA or greater decibel decrease are considered in this formula. The result is a cost per benefited receptor value (residence, commercial entity, or industrial entity represented by each modeled receptor). The cost of a noise barrier is calculated using \$20 per square foot of barrier, based on historical data over the five year period from 2005-2010. To be considered cost-effective, the cost per individual benefited receptor must be equal to or less than \$43,500 per receptor.

There are several steps to assessing the cost effectiveness of noise barriers. First, the cost-effective noise barrier height is determined for each segment of the project area, beginning with the evaluation of a 20-foot tall noise barrier (MnDOT's maximum height; see discussion of engineering feasibility above). If a 20-foot tall noise barrier meets the reasonableness criteria and is feasible, it would be proposed for construction. If the 20-foot tall barrier meets the noise reduction design goal but does not meet the cost effectiveness criteria, then noise barrier heights less than 20 feet are studied. If a noise barrier height less than 20 feet meets the reasonableness criteria and is feasible, it would then be proposed for construction. Noise barrier cost effectiveness is studied up to the point where a modeled barrier does not meet the noise reduction design goal of a minimum 7 dBA reduction for at least one benefited receptor.

• Viewpoint of benefited residents and property owners: The third criterion in determining noise barrier reasonableness is the viewpoint of benefited residents and property owners. A benefited property is defined as a receptor adjacent to a proposed noise abatement measure that receives a noise reduction equal to or greater than 5 dBA. If benefited residents and property owners indicate that a proposed noise barrier is not desired, then the noise barrier is removed from further consideration and would not be constructed with the project.

There are two steps in determining the desires of the benefited property owners and residents regarding the construction of proposed noise abatement measures. First, the viewpoint of benefited property owners and residents is solicited through a public involvement process (e.g., open house meeting, direct mailing of a solicitation form). Second, the input received from benefited property owners and residents through this public involvement process is expressed in a vote that is weighted as follows:

The owner of a benefited property immediately adjacent to the highway right of way for the proposed project (i.e., first-row properties) receives 4 points and the resident (owner or renter) receives 2 points. The owner/resident of a benefited property receives a total of 6 points.

The owner of a benefited property not immediately adjacent to the highway right of way for the proposed project (e.g., second-row properties, third-row properties) receives 2 points and the resident (owner or renter) receives 1 point. The owner/resident of a benefited property receives a total of 3 points.

When there is no outdoor area of frequent human use associated with a benefited property, the owner of the benefited property receives a total of 4 points if the property is located immediately adjacent to the highway right of way (i.e., first-row properties). If the property is not immediately adjacent to the highway right of way (i.e., second-row properties, third-row properties), the owner of the benefited property receives a total of 2 points.

Only those benefited property owners and residents, including individual units of multi-family residential buildings that are considered to be benefited receptors, regardless of floor location (e.g., first floor, second floor, etc.), have a vote according to the point system described above. Non-benefiting receptors do not receive points. A simple majority (greater than 50 percent) of all possible voting points for each of the proposed noise barriers must vote "down" the proposed abatement measure in order for it to be removed from further consideration.

In order for a noise wall to be proposed as part of a project, it must be both feasible and reasonable. Feasibility refers to physical constraints and engineering considerations (i.e., can a noise wall be constructed at this location). For noise barriers to be considered reasonable, it must meet the following three criteria:

- 1) It must be acoustically effective by providing a substantial reduction in noise, defined as a five decibel reduction or more. Additionally, one receiver must receive a seven decibel reduction or greater.
- 2) It must meet MnDOT's cost effectiveness criteria of \$43,500 per residence (based on a barrier construction cost of \$20/ square foot), and
- 3) It must consider the viewpoint of the benefited residences and owners.

The noise barriers analyzed for the project are shown in Figures 2-A through 2-D in Appendix A. Following is a description of the mitigation assessment for each of the Areas.

Area A - East of TH 75, North of 24th Avenue

Receptors RE1-RE10/Barrier A

Land uses on the east side of TH 75 and north of 24th Avenue include single family and multifamily residences.

Four of 18 receptors were determined to experience noise levels above State daytime standards. Twelve of 18 receptors were determined to experience noise levels above State nighttime standards.

The mitigation analysis demonstrated that a 20-foot high 638' barrier (Barrier A) would have a cost/benefited residence of \$13,076, meeting the MnDOT \$43,500/residence cost-effectiveness requirement. Therefore, Barrier A is proposed for this location.

Detailed mitigation analysis results for this location are provided in Table B-1 and B-2 in Appendix C.

Area B - West of TH 75, North of 1-94

Receptors RW1 - RW15 and CW1 - CW3/Barrier B

Land uses on the south of I-94 and west of US-75 consist of residential and commercial uses.

The modeled noise levels are below the State daytime and nighttime L_{10} and L_{50} standards and below the Federal noise abatement criteria for Category E land uses for receptors CW1, CW2, and CW3.

The modeled noise levels are above the State daytime L₁₀ and L₅₀ standards for the residential units closest to TH 75 and above the State nighttime standards at all residential receptors.

The mitigation analysis for the nighttime conditions demonstrated that a 20-foot high 630' barrier (Barrier B) would have a cost/benefited residence of \$33,810, meeting the MnDOT \$43,500/residence cost-effectiveness requirement. Therefore, Barrier B is proposed for this location.

Detailed mitigation analysis results for this location are provided in Table B-3 and B-4 in Appendix C.

Area D - West of TH 75, I-94 to 30th Avenue

Receptors CW4-CW9 and RW17, and RW18/Barrier D

Land uses on the west side of TH 75 between I-94 and 30th Avenue include commercial facilities and two multifamily buildings.

The modeled noise levels are above the State daytime and nighttime standards and below the Federal noise abatement criteria for Category B at the residential units.

The mitigation analysis demonstrated that a 505' barrier (Barrier D) would not reduce the noise levels at any receptor location by more than 2.5 dBA. This does not meet the minimum reduction of 7 dBA required for a barrier to be considered. Therefore, Barrier D is not proposed at this location.

Detailed mitigation analysis results for this location are provided in Table B-5 and B-6 in Appendix C.

Area F - West of TH 75, North of 35th Avenue

Receptors CW10 and RW19-RW21/Barrier F

The land use for this location includes a cemetery and a row of units bordering 35th Avenue, including one commercial building and three residential units.

The modeled noise levels are below the State daytime and nighttime L_{10} and L_{50} standards and below the Federal noise abatement criteria for Category E for the commercial building. The modeled noise levels are projected to be above the State daytime and nighttime standards land uses for the residential receptors at this location.

The mitigation analysis demonstrated that a 205' barrier (Barrier F) would not reduce the noise levels at any receptor location by more than 4.2 dBA. This does not meet the minimum reduction of 7 dBA required for a barrier to be considered. Therefore, Barrier F is not proposed at this location.

Detailed mitigation analysis results for this location are provided in Table B-7 and B-8 in Appendix C.

Area J - North of I-94 and East of TH 75

Receptors CE13, CE14, CE15, and RE20-RE44

Land uses in this area consist of commercial buildings, multifamily buildings, and single family homes.

Modeled noise levels are above the State daytime standards AT 64 of 74 modeled residential locations and approaching the Federal noise abatement criteria for Activity Category B at 31 of the 74 modeled residential locations. Modeled noise levels are above the State nighttime standards for all of the residential receptors.

The mitigation analysis demonstrated that a 20-foot high 2,866' barrier (Barrier J) (tapering down from 20 feet to 6 feet high at each end) would have a cost/benefited residence of \$14,911 under peak daytime noise hour traffic conditions, meeting the MnDOT \$43,500/residence cost-effectiveness requirement. Therefore, Barrier J is proposed for this location.

Detailed mitigation analysis results for this location are provided in Table B-9 and B-10 in Appendix C.

Area K - South of I-94 and East of TH 75

Receptors CE16, CE17, and CE18

Land uses in this area consist of commercial buildings and undeveloped commercial land.

Modeled noise levels are above the State daytime standards at each of the receptor locations. Modeled noise levels are within the State nighttime standard at each location.

The mitigation analysis demonstrated that a 20-foot high 2,270' barrier (Barrier K) would have a cost/benefited residence of \$227,000, not meeting the MnDOT \$43,500/residence cost-

effectiveness requirement. A 15-foot high barrier did not achieve a 7dBA reduction at any receptor location. Therefore, Barrier K is not proposed for this location.

Detailed mitigation analysis results for this location are provided in Tables B-11 and B-12 in Appendix C.

H. CONCLUSION

Existing (2015), 2035 build, and 2035 no-build exceed Minnesota daytime and nighttime standards at residential locations along the TH 75 and I-94 corridor in Moorhead.

Noise barriers were found to meet the MnDOT/FHWA cost-reasonableness requirements for three locations along the TH 75 corridor and will potentially be proposed for this project. Table 5 shows the location, length, and cost of each barrier.

Table 4 – Noise Barriers Meeting Cost-Reasonableness Requirements

Area	Location	Length (feet) ¹	Estimated Cost
Α	East of TH 75, North of 24th	638	\$253,360
	Avenue		
В	West of TH 75, North of 24th	630	\$240,480
	Avenue		
J	North side of I-94, East of TH 75	2866	\$1,133,280

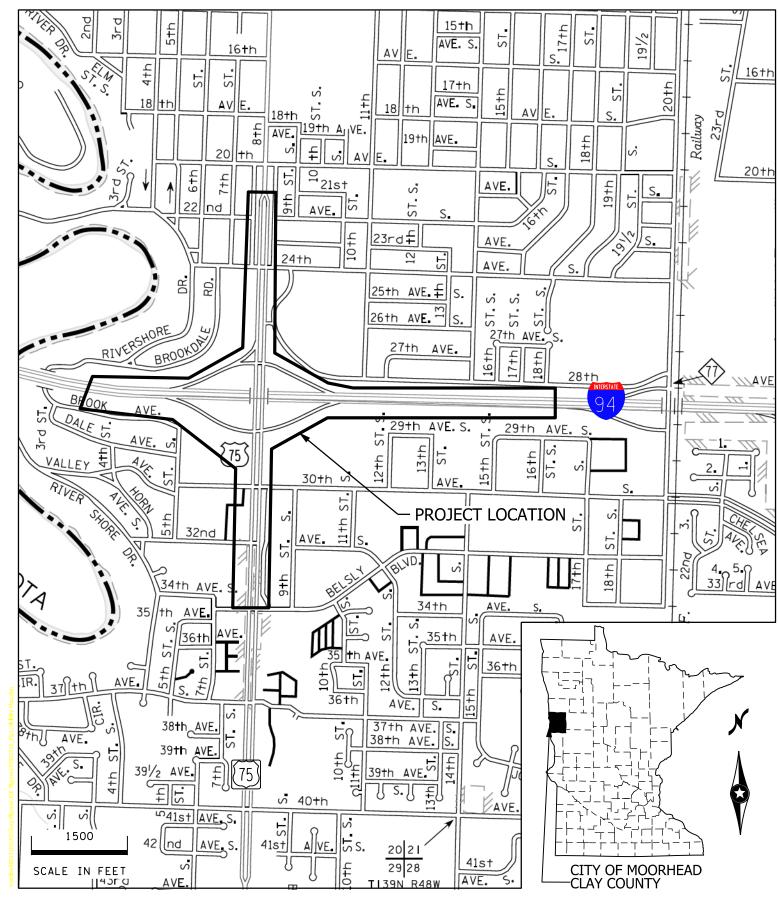
¹ All walls are 20 feet high and taper down to 6 feet in height at each end.

Statement of Likelihood

The traffic noise analysis for the three potentially proposed noise barriers described above is based upon preliminary design studies completed to date. Final mitigation decisions will be subject to final design considerations and the viewpoint of benefited residents and property owners. If it subsequently develops during final design that conditions have substantially changed, noise abatement measures may not be provided. Affected benefited receptors and local officials will be notified of plans to eliminate or substantially modify a noise abatement measure prior to the completion of the final design process. This notification will explain changes in site conditions (if any), additional site information, any design changes implemented during the final design process, and an explanation of noise barrier feasibility and reasonableness. A final decision regarding installation of the proposed abatement measure will be made upon completion of the project's final design and the public involvement process.

Appendix A - Maps

Figure 1 - Index Map Figures 2a - d - Receptor and Wall Location Maps



NOISE ANALYSIS PROJECT AREA MAP

I-94/TH 75 NORTH AND SOUTH RAMPS

MnDOT FIGURE:



1

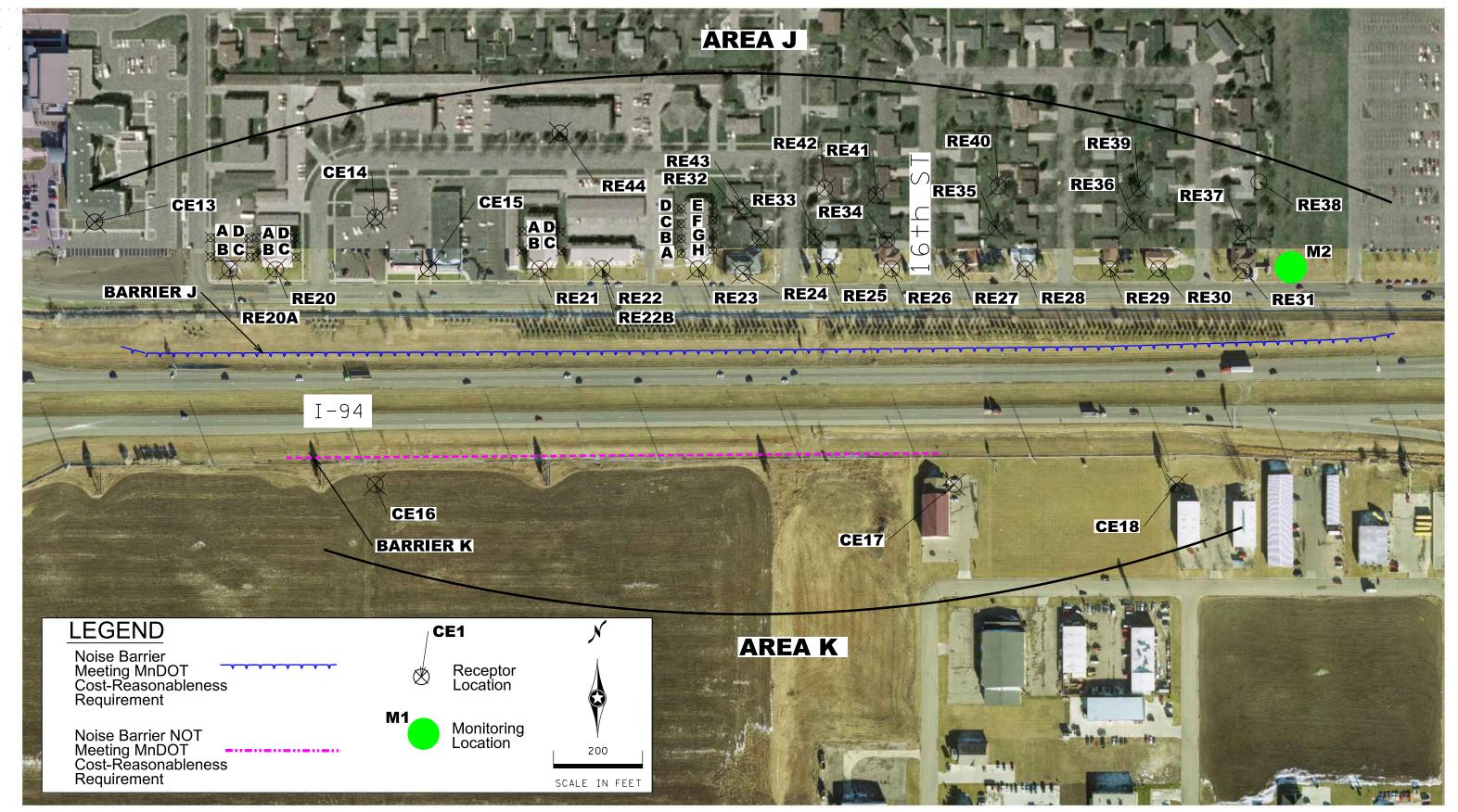
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TH 75/I-94 NORTH AND SOUTH RAMPS - NOISE ANALYSIS

FIGURE 2a

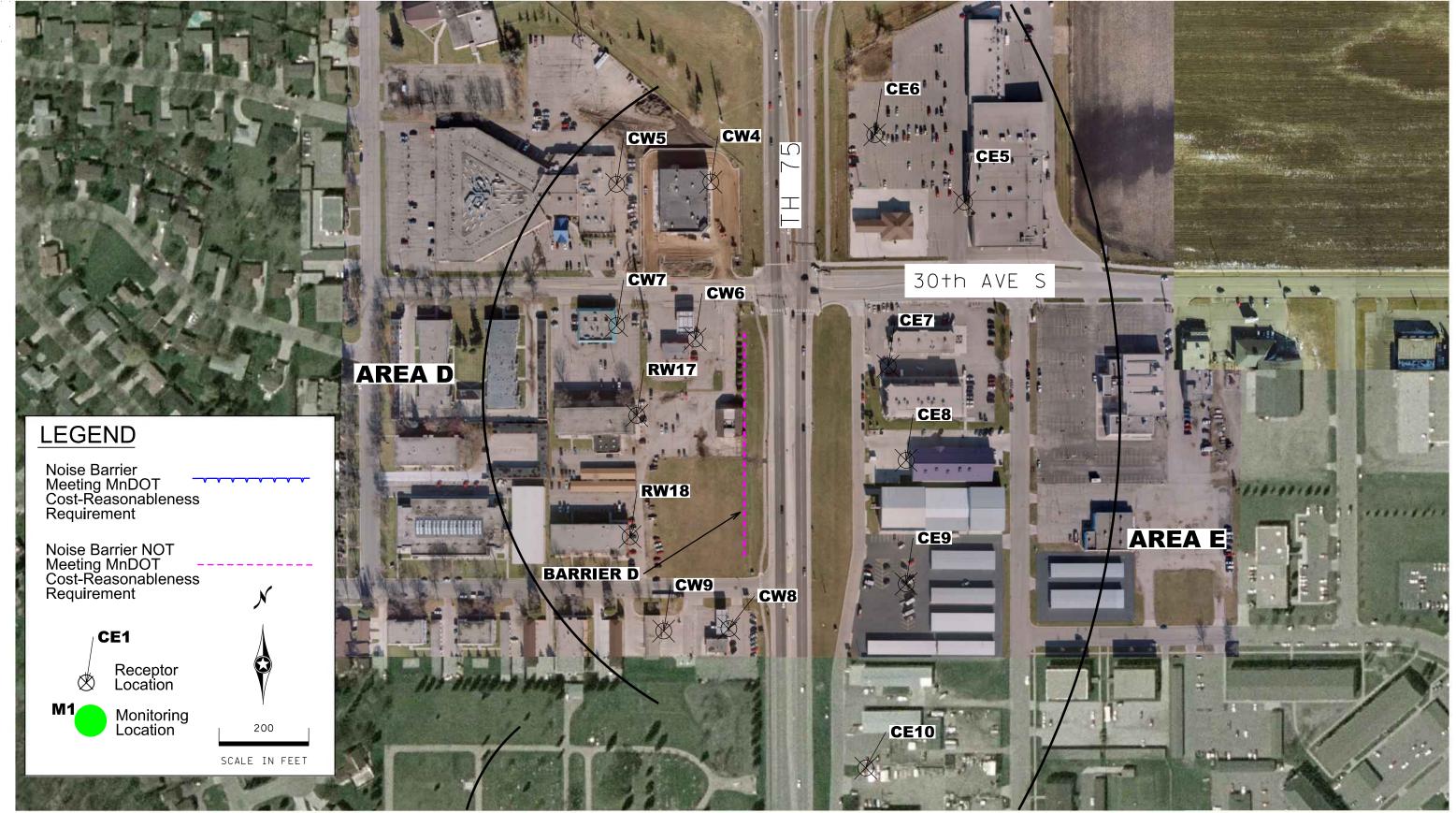




TH 75/I-94 NORTH AND SOUTH RAMPS - NOISE ANALYSIS

FIGURE 2b





TH 75/I-94 NORTH AND SOUTH RAMPS - NOISE ANALYSIS

FIGURE 2c





TH 75/I-94 NORTH AND SOUTH RAMPS - NOISE ANALYSIS

FIGURE 2d



Appendix B - Noise Level Impact Tables

Table A-1 – Area A – Predicted Noise Level Impacts - Daytime

	- / II ca		Р	redicted	d Noise	Level In Build	npacts			
Receptor ⁽¹⁾	Exis	ting	Bu	2035 No Build dBA		2035 No Build vs. Existing dBA ⁽²⁾		35 ild 3A	2035 Build vs. Existing dBA	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀
RE1(1) RE2(2)	64.0 64.4	59.0 59.3	65.1 65.4	60.4 60.8	1.1	1.4 1.5	65.3 65.5	60.9 61.1	1.3	1.9
RE3(1) RE3A(2)	64.7 62.5	59.6 56.6	65.7 63.6	61.2 58.3	1.0 1.1	1.6 1.7	65.8 63.7	61.3 58.5	1.1 1.2	1.7 1.9
RE3B(2) RE3C(2)	60.9 59.2	55.0 53.5	62.0 60.2	56.6 55.1	1.1 1.0	1.6 1.6	62.2 60.4	56.9 55.3	1.3 1.2	1.9 1.8
RE3D(2)	57.5	51.9	58.5	53.4	1.0	1.5 1.5	58.6 57.7	53.7	1.1	1.8 1.7
RE3E(1) RE4(2)	56.5 65.9	51.0 61.1	57.5 66.9	52.5 62.5	1.0 1.0	1.5	66.9	52.7 62.6	1.2 1.0	1.7
RE5(1) RE6(2)	60.5 59.2	56.1 54.6	61.5 60.0	57.4 55.8	1.0 0.8	1.3 1.2	61.9 60.1	58.2 55.9	1.4 0.9	2.1 1.3
RE7(1)	58.2	54.4	59.0	55.5	0.8	1.1	59.5	56.4	1.3	2.0
RE8(1) RE9(1)	57.1 54.3	53.3 49.1	57.9 55.2	54.3 50.5	0.8 0.9	1.0 1.4	57.9 55.5	54.4 50.9	0.8 1.2	1.1 1.8
RE9A(2) RE9B(2)	53.5 52.9	48.3 47.9	54.5 53.8	49.7 49.2	1.0 0.9	1.4 1.3	54.7 54.3	50.2 50.0	1.2 1.4	1.9 2.1
RE9C(2)	52.4	47.5	53.3	48.8	0.9	1.3	53.9	49.9	1.5	2.4
RE10(2)	61.6	56.3	62.4	57.6	0.8	1.3	62.4	57.7	0.8	1.4

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-2 – Area A – Predicted Noise Level Impacts - Nighttime

Table A-2	11100		Р	redicted	d Noise 2035 Noise (dB/	Level Ir o Build	npacts			
Receptor ⁽¹⁾	Exis	ting	Bu	2035 No Build dBA		5 No d vs. sting A ⁽²⁾	Bu	35 ild 3A	2035 Build vs. Existing dBA	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀
RE1(1) RE2(2)	60.2 60.4	53.6 53.8	61.7 62.0	55.8 56.2	1.5 1.6	2.2 2.4	61.7 62.0	55.8 56.2	1.5 1.6	2.2 2.4
RE3(1)	60.6	53.9	62.4	56.6	1.8	2.7	62.4	56.6	1.8	2.7
RE3A(2)	58.2	50.6	59.5	52.4	1.3	1.8	59.5	52.4	1.3	1.8
RE3B(2)	56.6	49.1	57.9	50.9	1.3	1.8	58.0	50.9	1.4	1.8
RE3C(2)	54.9	47.6	56.3	49.6	1.4	2.0	56.3	49.6	1.4	2.0
RE3D(2)	53.2	46.1	54.7	48.2	1.5	2.1	54.7	48.2	1.5	2.1
RE3E(1)	52.3	45.2	53.8	47.4	1.5	2.2	53.9	47.5	1.6	2.3
RE4(2)	61.8	55.3	63.4	57.9	1.6	2.6	63.5	58.0	1.7	2.7
RE5(1)	57.1	51.4	58.5	53.8	1.4	2.4	58.6	53.8	1.5	2.4
RE6(2)	55.4	49.4	57.5	52.9	2.1	3.5	57.5	53.0	2.1	3.6
RE7(1)	55.0	50.3	56.6	52.9	1.6	2.6	56.7	53.0	1.7	2.7
RE8(1)	53.6	48.7	55.8	52.4	2.2	3.7	55.9	52.5	2.3	3.8
RE9(1)	50.3	43.7	51.9	46.1	1.6	2.4	51.9	46.1	1.6	2.4
RE9A(2)	49.6	43.1	51.2	45.6	1.6	2.5	51.2	45.6	1.6	2.5
RE9B(2)	49.3	43.0	50.7	45.3	1.4	2.3	50.8	45.3	1.5	2.3
RE9C(2)	49.0	43.1	50.3	45.1	1.3	2.0	50.3	45.2	1.3	2.1
RE10(2)	57.3	50.7	59.5	54.7	2.2	4.0	59.5	54.8	2.2	4.1

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-3 – Area B – Predicted Noise Level Impacts - Daytime

Table A-3	- Ali Ca	D - 11			d Noise					
			Exis	ting vs.	2035 N		and Bu	uild		
Receptor ⁽¹⁾	Exis	ting	Bu	2035 No Build dBA		(dBA) 2035 No Build vs. Existing dBA ⁽²⁾		35 iild 3A	2035 Build vs. Existing dBA	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀
RW1(1) RW2(1)	64.9 65.0	59.6 59.8	66.0 66.1	61.3 61.4	1.1 1.1	1.7 1.6	66.1 66.1	61.4 61.4	1.2 1.1	1.8 1.6
RW3(1)	64.8	59.7	65.8	61.3	1.0	1.6	65.9	61.3	1.1	1.6
RW4(1)	64.8	59.7	65.8	61.3	1.0	1.6	65.8	61.3	1.0	1.6
RW5(2)	65.0	60.0	66.0	61.5	1.0	1.5	66.0	61.5	1.0	1.5
RW6(1)	65.1	60.2	66.1	61.7	1.0	1.5	66.1	61.7	1.0	1.5
RW7(1)	65.6	60.7	66.6	62.2	1.0	1.5	66.6	62.2	1.0	1.5
RW8(1)	66.1	61.0	67.1	62.5	1.0	1.5	67.1	62.5	1.0	1.5
RW9(1)	58.1	54.3	59.3	56.0	1.2	1.7	59.4	56.2	1.3	1.9
RW10(1)	57.2	53.8	58.3	55.3	1.1	1.5	58.4	55.5	1.2	1.7
RW11(1)	57.7	54.2	58.6	55.4	0.9	1.2	58.7	55.6	1.0	1.4
RW12(2)	58.2	54.9	59.0	56.0	0.8	1.1	59.1	56.1	0.9	1.2
RW13(1)	59.2	55.6	60.1	56.8	0.9	1.2	60.1	56.9	0.9	1.3
RW14(1)	60.7	56.4	61.5	57.6	0.8	1.2	61.6	57.7	0.9	1.3
RW15(1)	62.6	56.8	63.6	58.2	1.0	1.4	63.7	58.3	1.1	1.5
CW1(1)	65.8	61.4	66.9	62.8	1.1	1.4	66.9	62.9	1.1	1.5
CW2(1)	60.3	57.5	61.1	58.5	0.8	1.0	61.2	58.7	0.9	1.2
CW3(1)	63.3	60.5	64.2	61.6	0.9	1.1	65.7	62.3	2.4	1.8

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-4 – Area B – Predicted Noise Level Impacts - Nighttime

Predicted Noise Level Impacts - Nighttime Predicted Noise Level Impacts											
							•				
			EXIS	ting vs.	2035 No (dBA		anu bu	ilia			
Receptor(1)	Exis	tina	2035	. No	2035		20	35	2035	Ruild	
riocopio.	LAIG	9	Bu		Build		Bu		vs. Ex		
			dE		Exist			BA	dE		
					dB/	A ⁽²⁾					
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	
5)4/4/4)	co 4	- 2 c l	62.0		امدا	2 - 1	60.0	-64	ا مدا	2.5	
RW1(1)	60.4	53.6	62.0	56.1	1.6	2.5	62.0	56.1	1.6	2.5	
RW2(1)	60.5	53.7	62.1	56.2	1.6	2.5	62.1	56.3	1.6	2.6	
RW3(1)	60.3	53.6	61.8	56.1	1.5	2.5	61.8	56.1	1.5	2.5	
RW4(1)	60.3	53.7	61.9	56.4	1.6	2.7	61.9	56.4	1.6	2.7	
RW5(2)	60.5	53.9	62.1	56.5	1.6	2.6	62.1	56.6	1.6	2.7	
RW6(1)	60.7	54.2	62.3	57.0	1.6	2.8	62.3	57.0	1.6	2.8	
RW7(1)	61.1	54.7	62.8	57.5	1.7	2.8	62.8	57.6	1.7	2.9	
RW8(1)	61.5	54.9	63.3	57.9	1.8	3.0	63.4	58.0	1.9	3.1	
RW9(1)	54.7	49.8	56.8	53.5	2.1	3.7	56.9	53.6	2.2	3.8	
RW10(1)	53.9	49.6	56.2	53.5	2.3	3.9	56.3	53.6	2.4	4.0	
RW11(1)	54.2	49.7	56.6	53.8	2.4	4.1	56.7	53.9	2.5	4.2	
RW12(2)	54.6	50.3	57.1	54.4	2.5	4.1	57.1	54.5	2.5	4.2	
RW13(1)	55.4	50.9	57.9	55.0	2.5	4.1	58.0	55.1	2.6	4.2	
RW14(1)	56.7	51.3	59.1	55.4	2.4	4.1	59.2	55.5	2.5	4.2	
RW15(1)	58.1	51.1	60.8	55.3	2.7	4.2	60.8	55.4	2.7	4.3	
CW1(1)	61.9	55.7	63.8	59.1	1.9	3.4	63.9	59.2	2.0	3.5	
CW2(1)	56.7	53.2	59.7	57.5	3.0	4.3	59.8	57.6	3.1	4.4	
CW3(1)	59.9	56.1	62.6	60.2	2.7	4.1	63.9	60.6	4.0	4.5	

Bold numbers are above State nighttime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church * Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each

modeled receptor location.

Table A-5 – Area C – Predicted Noise Level Impacts - Daytime

Receptor ⁽¹⁾	Exis	Predicted Noise Level Impacts Existing vs. 2035 No Build and Build (dBA) Existing 2035 No 2035 2035 Build Build Build vs. Build vs. Existing dBA Existing dBA dBA dBA									
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	
CE1(1) CE2(1)	63.6 65.4	59.4 61.1	64.5 66.5	60.7 62.5	0.9 1.1	1.3 1.4	64.5 66.7	60.8 62.7	0.9 1.3	1.4 1.6	
CE3(1)	62.0	59.6	62.8	60.5	0.8	0.9	63.2	60.9	1.2	1.3	
CE4(1)	61.7	59.6	62.1	60.3	0.4	0.7	62.4	60.5	0.7	0.9	

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

Table A-6 – Area C – Predicted Noise Level Impacts - Nighttime

Receptor ⁽¹⁾		Predicted Noise Level Impacts Existing vs. 2035 No Build and Build (dBA) Existing 2035 No 2035 No 2035 Build Build Build vs. Build vs. Existing dBA Existing dBA dBA dBA ⁽²⁾										
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀		
CE1(1) CE2(1) CE3(1) CE4(1)	59.7 61.5 58.7 58.7	54.1 55.8 55.5 55.9	61.5 63.4 61.2 61.4	57.4 58.8 58.9 59.3	1.8 1.9 2.5 2.7	3.3 3.0 3.4 3.4	61.6 63.7 61.5 61.5	57.6 58.9 59.2 59.5	1.9 2.2 2.8 2.8	3.5 3.1 3.7 3.6		

Bold numbers are above State nighttime standards. $\underline{\text{Underlined}}$ numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-7 – Area D – Predicted Noise Level Impacts - Daytime

Receptor(1)	Exis		Exis	redicted ting vs. 5 No ild	d Noise 2035 No (dB/ 2035 Build	Level Ir o Build	npacts and Bu 20 Bu	;	2035 Build vs. Existing dBA	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	dB. L ₁₀	A ⁽²⁾ L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀
CW4(1)	67.4	63.6	68.8	65.4	1.4	1.8	68.9	65.5	1.5	1.9
CW5(1)	63.3	61.3	64.5	62.7	1.2	1.4	64.6	62.8	1.3	1.5
CW6(1)	65.6	61.6	67.4	64.0	1.8	2.4	67.4	64.0	1.8	2.4
CW7(1)	64.2	58.9	66.0	61.2	1.8	2.3	66.0	61.2	1.8	2.3
CW8(1)	66.7	61.0	69.3	64.6	2.6	3.6	69.3	64.6	2.6	3.6
CW9(1)	61.8	58.0	64.1	61.0	2.3	3.0	64.1	61.0	2.3	3.0
RW17(2)	61.7	59.0	63.5	61.1	1.8	2.1	63.5	61.1	1.8	2.1
RW18(2)	60.7	57.7	62.7	60.2	2.0	2.5	62.7	60.2	2.0	2.5

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

Table A-8 – Area D – Predicted Noise Level Impacts - Nighttime

Table A-o	8 – Area D – Predicted Noise Level Impacts - Nighttime											
					l Noise 2035 No dB/	o Build	•					
Receptor ⁽¹⁾	Exis	Existing		ild BA	ld Build vs. A Existing		2035 Build dBA		2035 Build vs. Existing dBA			
					dB.	A ⁽²⁾						
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀		
	1				i	Ī	Ī	Ī				
CW4(1)	62.5	57.4	65.5	62.3	3.0	4.9	65.5	62.3	3.0	4.9		
CW5(1)	59.4	56.4	63.8	61.7	4.4	5.3	63.8	61.7	4.4	5.3		
CW6(1)	60.7	55.3	64.3	60.3	3.6	5.0	64.3	60.3	3.6	5.0		
CW7(1)	59.4	53.0	63.4	58.9	4.0	5.9	63.4	58.9	4.0	5.9		
CW8(1)	60.9	53.6	65.3	58.9	4.4	5.3	65.3	58.9	4.4	5.3		
CW9(1)	57.2			57.2	4.0	5.1	61.2	57.2	4.0	5.1		
RW17(2)	57.4	53.6	61.3	58.6	3.9	5.0	61.3	58.6	3.9	5.0		
RW18(2)	56.3	52.3	60.3	57.4	4.0	5.1	60.3	57.4	4.0	5.1		

Bold numbers are above State nighttime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-9 – Area E – Predicted Noise Level Impacts - Daytime

Receptor ⁽¹⁾	Exis	ting		ting vs. 5 No ild	d Noise 2035 No (dB/ 2035 Build Exis dB/	o Build A) 5 No d vs. sting	and Bu	uild 35 ild	2035 vs. Ex dE	isting
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀
CE5(1)	63.0 66.8	60.8 63.4	64.1 68.1	62.4 65.1	1.1 1.3	1.6 1.7	64.1 68.6	62.2 65.3	1.1 1.8	1.4 1.9
CE6(1) CE7(1)	65.0	61.3	66.7	63.5	1.7	2.2	66.7	63.5	1.7	2.2
CE8(1) CE9(1)	62.9 62.5	59.4 58.6	65.0 64.8	62.0 61.6	2.1 2.3	2.6 3.0	65.1 64.9	62.0 61.6	2.2 2.4	2.6 3.0
CE10(1)	65.2	59.8	67.9	63.6	2.7	3.8	67.9	63.6	2.7	3.8
CE11(1)	63.7	58.5	66.5	62.4	2.8	3.9	66.5	62.4	2.8	3.9

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

Table A-10 - Area E - Predicted Noise Level Impacts - Nighttime

	10 - Area E - Fredicted Noise Level Impacts - Nightume													
					d Noise		•							
			Exis	ting vs.	2035 N		and Bเ	ıild						
_		_	· _		(dB/	•	-		ı _					
Receptor ⁽¹⁾	Exis	ting	2035		203		2035		2035 Build					
		Build Build vs. Build vs. Existing dBA dBA												
		dBA Existing dBA dBA dBA												
	L ₁₀													
	- 10	└ 50	- 10	- 50	► 10	- 50	└ 10	∟ 50	► 10	- 50				
CE5(1)	59.3	55.8	62.2	59.8	2.9	4.0	62.3	59.8	3.0	4.0				
CE6(1)	62.9	57.8	65.6	62.1	2.7	4.3	66.1	62.2	3.2	4.4				
CE7(1)	61.0	55.5	64.3	60.1	3.3	4.6	64.3	60.1	3.3	4.6				
CE8(1)	59.1	53.8	62.5	58.6	3.4	4.8	62.5	58.6	3.4	4.8				
CE9(1)	58.6	52.8	62.2	57.9	3.6	5.1	62.2	57.9	3.6	5.1				
CE10(1)	61.1	53.7	65.0	59.2	3.9	5.5	65.0	59.2	3.9	5.5				
CE11(1)	60.1	53.0	63.9	58.4	3.8	5.4	63.9	58.4	3.8	5.4				

Bold numbers are above State nighttime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-11 – Area F – Predicted Noise Level Impacts - Daytime

Receptor ⁽¹⁾		Predicted Noise Level Impacts											
	L ₁₀												
01440(4)	67.4	64.0	70.0	65.0	۱ ۵۰	۱ ، ۱			1 20				
CW10(1)	67.4	61.0	70.3	65.2	2.9	4.2	70.3	65.2	2.9	4.2			
RW19(1)	63.9	58.5	66.6	62.4	2.7	3.9	66.6	62.4	2.7	3.9			
CW10A(1)	58.0	55.3	60.2	57.9	2.2	2.6	60.2	57.9	2.2	2.6			
RW20(2)	61.0	.0 56.7 63.5 60.1 2.5 3.4 63.5 60.1 2.5 3.4											
RW21(2)	61.5	56.0	63.9	59.9	2.4	3.9	63.9	59.9	2.4	3.9			

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

Table A-12 - Area F - Predicted Noise Level Impacts - Nighttime

Receptor ⁽¹⁾		Predicted Noise Level Impacts Existing vs. 2035 No Build and Build (dBA) Existing 2035 No 2035 No 2035 Build Build Build vs. Build vs. Existing dBA Existing dBA dBA dBA ⁽²⁾											
	L ₁₀												
CW10(1)	62.6	54.7	66.9	60.3	4.3	5.6	66.9	60.3	4.3	5.6			
CW10A(1)	54.1	50.2	57.9	55.2	3.8	5.0	57.9	55.2	3.8	5.0			
RW19(1)	59.7	52.4	63.7	58.1	4.0	5.7	63.7	58.1	4.0	5.7			
RW20(2)	57.0	7.0 51.1 60.8 56.4 3.8 5.3 60.8 56.4 3.8 5.3											
RW21(2)	57.5	49.5	61.4	55.9	3.9	6.4	61.4	55.9	3.9	6.4			

Bold numbers are above State nighttime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Table A-13 – Area J – Predicted Noise Level Impacts - Daytime

	-13 – Area J – Predicted Noise Level Impacts - Daytime Predicted Noise Level Impacts									
			Exis	ting vs.		o Build	and Bu	ııld		
D ((*)		I	0001	- 11-	(dB/			0.5		D
Receptor®	Exis	tıng	2035			5 No		35		Build
			Bu			d vs.		ild	vs. Ex	
			aE	BA		sting A ⁽²⁾	at	3A	at	BA
	. 1							l .		
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀
CE13(1)	66.1	63.2	66.7	64.0	0.6	0.8	66.8	64.1	0.7	0.9
CE13(1)	65.7	62.5	66.3	63.3	0.6	0.8	66.4	63.6	0.7	1.1
CE15(2)	68.6	65.1	69.1	65.9	0.5	0.8	69.3	66.2	0.7	1.1
RE22(4)	68.7	65.2	69.2	65.9	0.5	0.7	69.4	66.2	0.7	1.0
` '		70.0	73.6	70.7	0.5	0.7		71.1	0.7	1.1
RE22-2(4)	<u>73.1</u>						73.8			
RE24(2)	<u>69.1</u>	65.4	<u>69.6</u>	66.1	0.5	0.7	<u>69.8</u>	66.5	0.7	1.1
RE25(1)	68.7	65.1	<u>69.2</u>	65.8	0.5	0.7	<u>69.4</u>	66.2	0.7	1.1
RE26(1)	68.8	65.2	<u>69.3</u>	66.0	0.5	0.8	<u>69.6</u>	66.4	0.8	1.2
RE27(1)	68.9	65.3	<u>69.4</u>	66.0	0.5	0.7	<u>69.6</u>	66.4	0.7	1.1
RE28(1)	68.9	65.3	<u>69.4</u>	66.0	0.5	0.7	<u>69.6</u>	66.4	0.7	1.1
RE29(1)	68.9	65.3	<u>69.4</u>	66.0	0.5	0.7	<u>69.7</u>	66.3	0.8	1.0
RE30(1)	68.9	65.3	<u>69.5</u>	66.0	0.6	0.7	<u>69.7</u>	66.3	0.8	1.0
RE31(1)	<u>69.1</u>	65.3	<u>69.6</u>	66.0	0.5	0.7	<u>69.7</u>	66.3	0.6	1.0
RE32(1)	66.9	63.5	67.4	64.2	0.5	0.7	67.6	64.6	0.7	1.1
RE33(1)	67.0	63.8	67.5	64.5	0.5	0.7	67.8	64.8	0.8	1.0
RE34(1)	67.2	63.9	67.7	64.6	0.5	0.7	67.9	65.0	0.7	1.1
RE35(2)	66.7	63.5	67.2	64.2	0.5	0.7	67.4	64.5	0.7	1.0
RE36(2)	66.4	63.2	66.9	63.9	0.5	0.7	67.1	64.2	0.7	1.0
RE37(1)	66.9	63.5	67.4	64.2	0.5	0.7	67.5	64.4	0.6	0.9
RE38(1)	64.6	61.5	65.1	62.2	0.5	0.7	65.2	62.4	0.6	0.9
RE39(2)	64.9	61.9	65.4	62.6	0.5	0.7	65.6	62.9	0.7	1.0
RE40(2)	64.8	61.9	65.3	62.6	0.5	0.7	65.5	62.9	0.7	1.0
RE41(1)	65.1	62.1	65.6	62.8	0.5	0.7	65.8	63.1	0.7	1.0
	64.7	61.6	65.2	62.3	0.5	0.7	65.4	62.7	0.7	1.1
RE42(1)	64.7	61.2	65.3	61.9		0.7	65.5		0.7	
RE43(2)					0.6			62.3		1.1
RE44(4)	60.5	57.7	61.0	58.5	0.5	0.8	61.2	58.8	0.7	1.1
RE23A-1(1)	67.2	63.2	67.7	63.9	0.5	0.7	67.9	64.3	0.7	1.1
RE23B-1(1)	64.3	59.5	64.8	60.3	0.5	0.8	65.1	60.8	0.8	1.3
RE23C-1(1)	62.7	58.0	63.3	58.8	0.6	0.8	63.5	59.2	0.8	1.2
RE23D-1(1)	61.5	56.8	62.0	57.7	0.5	0.9	62.3	58.1	0.8	1.3
RE23E-1(1)	63.5	59.5	64.0	60.2	0.5 0.5	0.7 0.8	64.2 65.1	60.6	0.7	1.1
RE23F-1(1) RE23G-1(1)	64.3 65.3	60.2 61.0	64.8 65.8	61.0 61.8	0.5	0.8	66.0	61.4 62.2	0.8 0.7	1.2 1.2
RE23H-1(1)	67.3	63.4	67.8	64.2	0.5	0.8	68.1	64.6	0.7	1.2
RE23A-2(1)	71.8	68.2	72.3	69.0	0.5	0.8	72.5	69.3	0.8	1.2
RE23B-2(1)	69.7	65.6	<u>72.3</u> 70.2	66.4	0.5	0.8	<u>72.3</u> 70.4	66.8	0.7	1.2
RE23C-2(1)	67.3	62.7	67.8	63.5	0.5	0.8	68.1	63.9	0.7	1.2
RE23D-2(1)	65.7	61.0	66.3	61.8	0.6	0.8	66.5	62.2	0.8	1.2
RE23E-2(1)	68.5	64.9	69.1	65.6	0.6	0.7	69.3	66.0	0.8	1.1

RE23F-2(1)	69.2	65.4	69.7	66.1	0.5	0.7	70.0	66.5	0.8	1.1
RE23G-2(1)	69.9	66.0	70.4	66.7	0.5	0.7	70.7	67.2	0.8	1.2
RE23H-2(1)	71.7	68.1	72.2	68.8	0.5	0.7	72.5	69.2	0.8	1.1
RE21A-1(2)	60.4	54.4	61.0	55.2	0.6	0.8	61.3	55.6	0.9	1.2
RE21B-1(1)	64.4	59.1	64.9	59.9	0.5	0.8	65.2	60.3	0.8	1.2
RE21C-1(1)	64.9	59.8	65.4	60.6	0.5	0.8	65.7	61.1	0.8	1.3
RE21D-1(2)	61.1	55.2	61.6	56.0	0.5	0.8	61.9	56.4	0.8	1.2
RE21A-2(2)	63.3	59.2	63.8	60.0	0.5	0.8	64.0	60.3	0.7	1.1
RE21B-2(1)	65.4	60.9	65.9	61.7	0.5	0.8	66.1	62.1	0.7	1.2
RE21C-2(1)	65.0	60.0	65.5	60.8	0.5	0.8	65.8	61.2	0.8	1.2
RE21D-2(2)	61.8	56.5	62.3	57.3	0.5	0.8	62.6	57.8	0.8	1.3
RE21A-3(2)	<u>69.2</u>	65.6	<u>69.7</u>	66.4	0.5	0.8	<u>69.9</u>	66.6	0.7	1.0
RE21B-3(1)	<u>70.4</u>	66.7	<u>71.0</u>	67.5	0.6	0.8	<u>71.2</u>	67.8	0.8	1.1
RE21C-3(1)	<u>69.4</u>	64.8	<u>70.0</u>	65.5	0.6	0.7	<u>70.2</u>	66.0	0.8	1.2
RE21D-3(2)	66.2	61.0	66.8	61.8	0.6	0.8	67.0	62.3	0.8	1.3
RE20A-1(1)	63.3	58.2	63.9	59.1	0.6	0.9	64.0	59.2	0.7	1.0
RE20B-1(1)	68.2	64.8	68.7	65.6	0.5	0.8	68.9	65.8	0.7	1.0
RE20C-1(1)	68.2	64.8	68.7	65.6	0.5	0.8	68.9	65.8	0.7	1.0
RE20D-1(1)	64.8	60.7	65.3	61.5	0.5	0.8	65.5	61.8	0.7	1.1
RE20A-2(1)	67.7	62.5	68.3	63.5	0.6	1.0	68.4	63.6	0.7	1.1
RE20B-2(1)	<u>72.7</u>	69.6	<u>73.2</u>	70.4	0.5	0.8	<u>73.3</u>	70.6	0.6	1.0
RE20C-2(1)	<u>72.7</u>	69.6	<u>73.2</u>	70.4	0.5	0.8	<u>73.4</u>	70.6	0.7	1.0
RE20D-2(1)	<u>69.6</u>	65.9	<u>70.1</u>	66.6	0.5	0.7	<u>70.4</u>	67.0	0.8	1.1
RE20A-3(1)	68.1	63.3	68.7	64.2	0.6	0.9	68.8	64.4	0.7	1.1
RE20B-3(1)	<u>72.8</u>	69.8	<u>73.3</u>	70.6	0.5	0.8	<u>73.5</u>	70.8	0.7	1.0
RE20C-3(1)	<u>72.8</u>	69.8	<u>73.3</u>	70.6	0.5	0.8	<u>73.4</u>	70.8	0.6	1.0
RE20D-3(1)	<u>69.7</u>	66.0	<u>70.2</u>	66.8	0.5	0.8	<u>70.4</u>	67.1	0.7	1.1
RE20AA-2(1)	68.9	65.3	<u>69.6</u>	66.2	0.7	0.9	<u>69.6</u>	66.3	0.7	1.0
RE20AB-2(1)	<u>70.1</u>	66.4	<u>70.7</u>	67.3	0.6	0.9	<u>70.8</u>	67.4	0.7	1.0
RE20AC-2(1)	68.8	63.8	<u>69.3</u>	64.6	0.5	0.8	<u>69.5</u>	65.0	0.7	1.2
RE20AD-2(2)	66.3	61.1	66.9	61.9	0.6	0.8	67.1	62.3	0.8	1.2
RE20AA-3(1)	<u>69.6</u>	66.6	<u>70.2</u>	67.4	0.6	0.8	<u>70.3</u>	67.5	0.7	0.9
RE20AB-3(1)	<u>70.7</u>	67.5	<u>71.3</u>	68.4	0.6	0.9	<u>71.4</u>	68.5	0.7	1.0
RE20AC-3(1)	<u>69.7</u>	65.7	<u>70.2</u>	66.5	0.5	0.8	<u>70.4</u>	66.8	0.7	1.1
RE20AD-3(2)	67.6	63.7	68.2	64.5	0.6	0.8	68.4	64.8	0.8	1.1
D.11				1 1 77				1.5	1 137	

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church * Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location. The number after a dash represents a deck on that floor. For example Receptor RE20AD-3(2) represents two third floor decks on the multi-family building at Receptor RE20A, location D.

Table A-14 – Area J – Predicted Noise Level Impacts - Nighttime

1 abie A-14	A-14 – Area J – Predicted Noise Level Impacts - Nighttime Predicted Noise Level Impacts											
					ed Noise Level Impacts s. 2035 No Build and Build							
			EXIS	ting vs.			and Bu	ılla				
Receptor ^(*)	Exis	tina	2021	5 No	(dB/	4) 5 No	20	35	2025	Build		
Receptor	EXIS	ung		ild		d vs.		ild		isting		
				BA		ting		BA		BA		
			~-	-, \	dB	A ⁽²⁾		., .	4 2	,,		
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀		
		00	.0									
CE13(1)	63.0	58.7	64.0	60.4	1.0	1.7	64.1	60.5	1.1	1.8		
CE14(1)	62.6	57.9	63.2	58.9	0.6	1.0	63.4	59.2	0.8	1.3		
CE15(2)	65.5	60.5	66.1	61.5	0.6	1.0	66.3	61.8	0.8	1.3		
RE22(4)	65.5	60.5	66.1	61.4	0.6	0.9	66.4	61.8	0.9	1.3		
RE22-2(4)	<u>70.0</u>	65.4	<u>70.6</u>	66.5	0.6	1.1	<u>70.9</u>	66.8	0.9	1.4		
RE24(2)	65.9	60.7	66.5	61.6	0.6	0.9	66.7	62.1	0.8	1.4		
RE25(1)	65.5	60.4	66.1	61.3	0.6	0.9	66.3	61.8	0.8	1.4		
RE26(1)	65.7	60.5	66.2	61.4	0.5	0.9	66.5	61.9	0.8	1.4		
RE27(1)	65.7	60.6	66.3	61.4	0.6	0.8	66.5	61.9	0.8	1.3		
RE28(1)	65.7	60.6	66.3	61.4	0.6	0.8	66.5	61.8	0.8	1.2		
RE29(1)	65.7	60.6	66.3	61.4	0.6	0.8	66.6	61.8	0.9	1.2		
RE30(1)	65.7	60.5	66.3	61.4	0.6	0.9	66.5	61.8	0.8	1.3		
RE31(1)	65.9	60.6	66.4	61.4	0.5	0.8	66.6	61.7	0.7	1.1		
RE32(1)	63.7	58.9	64.3	59.7	0.6	0.8	64.5	60.1	0.8	1.2		
RE33(1)	63.9	59.2	64.4	60.0	0.5	0.8	64.7	60.4	0.8	1.2		
RE34(1)	64.0	59.3	64.6	60.2	0.6	0.9	64.9	60.6	0.9	1.3		
RE35(2)	63.5	58.9	64.1	59.7	0.6	0.8	64.3	60.2	0.8	1.3		
RE36(2)	63.2	58.6	63.8	59.4	0.6	0.8	64.0	59.8	0.8	1.2		
RE37(1)	63.7	58.9	64.3	59.7	0.6	0.8	64.4	60.0	0.7	1.1		
RE38(1)	61.5	57.0	62.0	57.9	0.5	0.9	62.2	58.1	0.7	1.1		
RE39(2)	61.8	57.4	62.4	58.3	0.6	0.9	62.6	58.6	0.8	1.2		
RE40(2)	61.7	57.4	62.3	58.3	0.6	0.9	62.5	58.6	0.8	1.2		
RE41(1)	62.0	57.5	62.5	58.4	0.5	0.9	62.8	58.8	0.8	1.3		
RE42(1)	61.5	57.0	62.1	57.9	0.6	0.9	62.4	58.3	0.9	1.3		
RE43(2)	61.6	56.5	62.1	57.3	0.5	0.8	62.4	57.8	0.8	1.3		
RE44(4)	57.4	53.3	58.3	54.7	0.9	1.4	58.5	55.0	1.1	1.7		
RE23A-1(1)	63.9	58.3	64.6	59.3	0.7	1.0	64.8	59.7	0.9	1.4		
RE23B-1(1)	60.9	54.5	61.6	55.6	0.7	1.1	61.9	56.1	1.0	1.6		
RE23C-1(1)	59.3	52.9	60.1	54.2	0.8	1.3	60.4	54.6	1.1	1.7		
RE23D-1(1)	58.1	51.8	58.9	53.2	0.8	1.4	59.2	53.6	1.1	1.8		
RE23E-1(1)	60.2	54.7	60.8	55.5	0.6	0.8	61.1	56.0	0.9	1.3		
RE23F-1(1)	61.0	55.3	61.6	56.2	0.6	0.9	61.9	56.7	0.9	1.4		
RE23G-1(1)	62.0	56.1	62.5	57.0	0.5	0.9	62.8	57.5	0.8	1.4		
RE23H-1(1)	64.1	58.6	64.7	59.5	0.6	0.9	64.9	59.9	0.8	1.3		
RE23A-2(1)	68.6	63.5	<u>69.3</u>	64.6	0.7	1.1	<u>69.5</u>	64.9	0.9	1.4		
RE23B-2(1)	66.4	60.7	67.1	61.8	0.7	1.1	67.3	62.2	0.9	1.5		
RE23C-2(1)	63.9	57.6	64.6	58.8	0.7	1.2	64.9	59.2	1.0	1.6		
RE23D-2(1)	62.3	55.8 60.1	63.1	57.2	0.8	1.4	63.4	57.6 61.2	1.1	1.8		
RE23E-2(1)	65.4	60.1	65.9	60.9	0.5	0.8	66.2	61.3	0.8	1.2		

RE23F-2(1)	66.0	60.6	66.5	61.4	0.5	0.8	66.8	61.8	0.8	1.2
RE23G-2(1)	66.7	61.2	67.3	62.0	0.6	0.8	67.5	62.5	0.8	1.3
RE23H-2(1)	68.5	63.4	69.1	64.2	0.6	0.8	69.4	64.6	0.9	1.2
RE21A-1(2)	56.7	49.0	57.5	50.1	0.8	1.1	57.8	50.6	1.1	1.6
RE21B-1(1)	60.8	53.8	61.5	54.8	0.7	1.0	61.8	55.3	1.0	1.5
RE21C-1 (1)	61.4	54.7	62.0	55.6	0.6	0.9	62.3	56.1	0.9	1.4
RE21D-1(2)	57.4	49.8	58.1	50.8	0.7	1.0	58.4	51.3	1.0	1.5
RE21A-2(2)	60.0	54.3	60.9	55.8	0.9	1.5	61.1	56.1	1.1	1.8
RE21B-2(1)	62.0	56.0	62.8	57.3	0.8	1.3	63.1	57.6	1.1	1.6
RE21C-2(1)	61.5	54.9	62.1	55.8	0.6	0.9	62.4	56.3	0.9	1.4
RE21D-2(2)	58.3	51.3	58.9	52.3	0.6	1.0	59.2	52.8	0.9	1.5
RE21A-3(2)	66.0	60.8	66.9	62.3	0.9	1.5	67.0	62.6	1.0	1.8
RE21B-3(1)	67.2	61.9	68.1	63.4	0.9	1.5	68.3	63.7	1.1	1.8
RE21C-3(1)	66.0	59.7	66.6	60.6	0.6	0.9	66.9	61.1	0.9	1.4
RE21D-3(2)	62.7	55.8	63.3	56.7	0.6	0.9	63.6	57.2	0.9	1.4
RE20A-1(1)	59.9	53.0	60.6	54.1	0.7	1.1	60.6	54.2	0.7	1.2
RE20B-1(1)	65.0	60.2	65.8	61.4	0.8	1.2	65.9	61.6	0.9	1.4
RE20C-1(1)	65.0	60.2	65.8	61.4	0.8	1.2	65.9	61.6	0.9	1.4
RE20D-1(1)	61.5	55.8	62.1	56.7	0.6	0.9	62.3	57.1	0.8	1.3
RE20A-2(1)	64.2	57.4	64.9	58.5	0.7	1.1	65.0	58.6	0.8	1.2
RE20B-2(1)	<u>69.6</u>	65.1	<u>70.4</u>	66.5	0.8	1.4	<u>70.5</u>	66.7	0.9	1.6
RE20C-2(1)	<u>69.6</u>	65.1	<u>70.4</u>	66.4	0.8	1.3	<u>70.5</u>	66.6	0.9	1.5
RE20D-2(1)	66.4	61.1	67.0	61.9	0.6	0.8	67.2	62.3	0.8	1.2
RE20A-3(1)	64.7	58.2	65.5	59.6	0.8	1.4	65.6	59.8	0.9	1.6
RE20B-3(1)	<u>69.7</u>	65.3	<u>70.6</u>	66.9	0.9	1.6	<u>70.7</u>	67.1	1.0	1.8
RE20C-3(1)	<u>69.7</u>	65.3	<u>70.6</u>	66.8	0.9	1.5	<u>70.7</u>	67.0	1.0	1.7
RE20D-3(1)	66.5	61.3	67.1	62.1	0.6	0.8	67.3	62.5	0.8	1.2
RE20AA-2(1)	65.7	60.5	67.1	63.0	1.4	2.5	67.2	63.0	1.5	2.5
RE20AB-2(1)	66.9	61.6	68.3	64.1	1.4	2.5	68.3	64.1	1.4	2.5
RE20AC-2(1)	65.3	58.7	65.9	59.6	0.6	0.9	66.2	60.0	0.9	1.3
RE20AD-2(2)	62.8	55.9	63.4	56.8	0.6	0.9	63.7	57.2	0.9	1.3
RE20AA-3(1)	66.5	61.9	67.9	64.4	1.4	2.5	67.9	64.5	1.4	2.6
RE20AB-3(1)	67.5	62.8	68.8	65.1	1.3	2.3	68.9	65.2	1.4	2.4
RE20AC-3(1)	66.5	60.8	67.3	62.1	0.8	1.3	67.4	62.4	0.9	1.6
RE20AD-3(2)	64.4	58.9	65.3	60.4	0.9	1.5	65.5	60.7	1.1	1.8
D.11 1								/ 11		

Bold numbers are above State nighttime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (Ch) – Church * Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location. The number after a dash represents a deck on that floor. For example Receptor RE20AD-3(2) represents two third floor decks on the multi-family building at Receptor RE20A, location D.

Table A-15 – Area K – Predicted Noise Level Impacts - Daytime

		Predicted Noise Level Impacts Predicted Noise Level Impacts																		
					2035 No		•													
			_,		(dB/															
Receptor(1)	Exis	tina	2035	No No	2035	•	20	35	2035	Build										
•		•	Bu		Build	_	_	ild	vs. Ex											
		dBA Existing dBA dBA																		
		dBA ⁽²⁾																		
	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L ₅₀										
CE16(1)	<u>72.1</u>	67.7	<u>72.7</u>	68.5	0.6	0.8	<u>72.9</u>	68.9	0.8	1.2										
CE17(1)	<u>71.5</u>																			
CE18(2)	<u>71.3</u>	67.1	<u>71.9</u>	67.8	0.6	0.7	<u>72.1</u>	68.1	0.8											

Bold numbers are above State daytime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (m) – Medical Facility

Table A-16 – Area K – Predicted Noise Level Impacts - Nighttime

		Tired it Tredicted Floige Devel Impacts Trighttime											
		Predicted Noise Level Impacts Existing vs. 2035 No Build and Build											
					(dB/								
Receptor ⁽¹⁾	Exis	Existing 2035 No 2035 No 2035 Build											
		Build Build vs. Build vs. Existing											
		dBA Existing dBA dBA dBA											
					aB.	Α` ′							
	L ₁₀	L_{50}	L ₁₀	L ₅₀	L ₁₀	L ₅₀	L ₁₀	L_{50}	L ₁₀	L_{50}			
			•	•			•		•				
CE16(1)	68.8	62.5	<u>69.4</u>	63.5	0.6	1.0	<u>69.7</u>	63.9	0.9	1.4			
CE17(1)	68.2	2 62.1 68.8 63.0 0.6 0.9 <u>69.1</u> 63.4 0.9 1.3											
CE18(2)	68.0	8.0 61.9 68.6 62.8 0.6 0.9 68.8 63.1 0.8 1.2											

Bold numbers are above State nighttime standards. <u>Underlined</u> numbers approach/exceed Federal Noise Abatement Criteria. (R) – Residential; (C) – Commercial; (I) – Industrial; (P) – Park/Trail; (S) – School; (M) – Medical facility

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

^{*} Number in "receptor" column is the number of residences, commercial, or industrial establishments represented by each modeled receptor location.

Appendix C - Noise Wall Analysis Tables

Table B-1 Area A Noise Wall Analysis US 75 – Moorhead - Daytime

Noise wa	Noise Wall Analysis US 75 – Moorhead - Daytime										
		L ₁₀ Daytime Peak-Hour Levels dBA									
		20' Wall	Analysis 15' Wall Analysis ¹			10' Wall	Analysis ¹				
Receptor	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction				
RE1(1)	65.3	56.4	8.9	15 VVali	Reduction	10 vvaii	reduction				
RE2(2)	65.5	55.8	9.7								
RE3(1)	65.8	56.9	8.9								
RE3A(2)	63.7	52.5	11.2								
RE3B(2)	62.2	52.3	9.9								
RE3C(2)	60.4	51.5	9.9 8.9								
		50.9	7.7								
RE3D(2)	58.6										
RE3E(1)	57.7	50.6	7.1								
RE4(2)	66.9	65.9	1.0								
RE5(1)	61.9	56.8	5.1								
RE6(2)	60.1	54.7	5.4								
RE7(1)	59.5	56.2	3.3								
RE8(1)	57.9	54.3	3.6								
RE9(1)	55.5	50	5.5								
RE9A(2)	54.7	49.5	5.2								
RE9B(2)	54.3	49.8	4.5								
RE9C(2)	53.9	50.1	3.8								
RE10(2)	62.4	61.8	0.6								
	chieve a 7 dBA		Yes								
	Number of Residences/Commercial with ≥ 5 dBA reduction.		19								
	Length of Wall (feet)		638								
	Wall Area (square feet) ³		11,768								
Total Wall Cost (\$20/square foot)			\$235,360								
Cost of Wall	per 5 dBA rec	eiver=	\$12,387								
<u></u>											

¹ 10' and 15' walls were not analyzed because the 20' wall achieved the minimum \$43,500 cost/residence.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor . ³Wall tapers from 6' high to 20' high over 56' at each end.

Table B-2 Area A Noise Wall Analysis US 75 – Moorhead - Nighttime

		L ₁₀ Daytime Peak-Hour Levels dBA								
		20' Wall	Analysis	Analysis 15' Wall Analysis ¹		10' Wall	Analysis ¹			
Receptor	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction			
RE1(1)	61.7	53.7	8.0							
RE2(2)	62.0	53.8	8.2							
RE3(1)	62.4	55.0	7.4							
RE3A(2)	59.5	49.3	10.2							
RE3B(2)	58.0	49.0	9.0							
RE3C(2)	56.3	48.5	7.8							
RE3D(2)	54.7	48.0	6.7							
RE3E(1)	53.9	47.7	6.2							
RE4(2)	63.5	62.6	0.9							
RE5(1)	58.6	53.8	4.8							
RE6(2)	57.5	53.7	3.8							
RE7(1)	56.7	53.8	2.9							
RE8(1)	55.9	53.6	2.3							
RE9(1)	51.9	47.2	4.7							
RE9A(2)	51.2	46.8	4.4							
RE9B(2)	50.8	46.6	4.2							
RE9C(2)	50.3	46.5	3.8							
RE10(2)	59.5	59.1	0.4							
Does wall ac	Does wall achieve a 7 dBA reduction?		Yes							
Number of Residences/Commercial		13								
with ≥ 5 dBA reduction. Length of Wall (feet)		638								
Wall Area (square feet) ³		11,768								
Total Wall Cost (\$20/square foot)		\$235,360								
Cost of Wall	per 5 dBA rec	eiver=	\$18,105							

¹ 10' and 15' walls were not analyzed because the 20' wall achieved the minimum \$43,500 cost/residence.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor. ³Wall tapers from 6' high to 20' high over 56' at each end.

Table B-3 Area B Noise Wall Analysis US 75 – Moorhead - Daytime

Noise Wall Analysis US 75 – Moorhead - Daytime										
			L ₁₀ Daytin	ne Peak-Ho	ur Levels					
				dBA	1					
3			Analysis			10' Wall Analysis ¹				
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction			
RW1(1)	66.1	58.7	7.4							
RW2(1)	66.1	56.8	9.3							
RW3(1)	65.9	56.2	9.7							
RW4(1)	65.8	56.4	9.4							
RW5(2)	66.0	57.1	8.9							
RW6(1)	66.1	59.0	7.1							
RW7(1)	66.6	61.6	5.0							
RW8(1)	67.1	65.9	1.2							
RW9(1)	59.4	57.8	1.6							
RW10(1)	58.4	56.6	1.8							
RW11(1)	58.7	56.2	2.5							
RW12(2)	59.1	57.1	2.0							
RW13(1)	60.1	59.0	1.1							
RW14(1)	61.6	60.9	0.7							
RW15(1)	63.7	63.2	0.5							
Does wall ac	hieve a 7 dBA	reduction?	Yes							
	Number of Residences/Commercial		8							
	with ≥ 5 dBA reduction.		630							
Length of Wall (feet) Wall Area (square feet) ³		12,024								
Total Wall Cost (\$20/square foot)		\$240,480								
Street Light Moving Costs		\$30,000								
Cost of Wall	per 5 dBA rec	eiver=	\$33,810							

¹ 10' and 15' walls were not analyzed because the 20' wall achieved the minimum \$43,500 cost/residence.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor . ³Wall tapers from 6' high to 20' high over 56' at each end.

Table B-4 Area B Noise Wall Analysis US 75 – Moorhead - Nighttime

110150 114	I I I I I I I I I I I I I I I I I I I	25 70 111	L ₁₀ Nightti	me Peak-Ho	ur Levels		
			-10	dBA	=0.0.0		
		20' Wal	l Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction
RW1(1)	61.7	54.7	7.0				
RW2(1)	61.9	54.0	7.9				
RW3(1)	61.7	54.0	7.7				
RW4(1)	61.8	54.6	7.2				
RW5(2)	62.0	55.3	6.7				
RW6(1)	62.3	56.8	5.5				
RW7(1)	62.8	59.0	3.8				
RW8(1)	63.4	62.4	1.0				
RW9(1)	56.3	55.1	1.2				
RW10(1)	55.9	54.6	1.3				
RW11(1)	56.5	55.1	1.4				
RW12(2)	57.1	55.9	1.2				
RW13(1)	57.9	57.3	0.6				
RW14(1)	59.1	58.7	0.4				
RW15(1)	60.8	60.5	0.3				
	hieve a 7 dBA		Yes				
	Number of Residences/Commercial		7				
with ≥ 5 dBA reduction. Length of Wall (feet)		630					
Wall Area (square feet) ³		12,024					
Total Wall Cost (\$20/square foot)		\$240,480					
	Street Light Moving Costs		\$30,000				
Cost of Wall	per 5 dBA rec	eiver=	\$38,640				

¹ 10' and 15' walls were not analyzed because the 20' wall achieved the minimum \$43,500 cost/residence.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor . ³Wall tapers from 6' high to 20' high over 56' at each end.

Table B-5 Area D Noise Wall Analysis US 75 – Moorhead - Daytime

Noise Wall Analysis 65 75 - Woothead - Daytine									
	L ₁₀ Daytime Peak-Hour Levels dBA								
		20' Wall	Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹		
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction		
CW4(1)	68.9	68.9	0.0						
CW5(1)	64.6	64.5	0.1						
CW6(1)	67.4	65.9	1.5						
CW7(1)	66.0	65.5	0.5						
CW8(1)	69.3	69.2	0.1						
CW9(1)	64.1	63.6	0.5						
RW17(2)	63.5	61.0	2.5						
RW18(2)	62.7	60.8	1.9						
Does wall achieve a 7 dBA reduction?			No						
Length of Wall = 505 feet									
Cost of Wall	per 5 dBA red	eiver=	NA						

¹ 10' and 15' walls were not analyzed because the 20' wall did not achieve a 7 dBA reduction. ²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor.

Table B-6 Area D Noise Wall Analysis US 75 – Moorhead - Nighttime

1 tolse vian finalysis ob 15 – Wootheau - Tighteline											
		L ₁₀ Nighttime Peak-Hour Levels dBA									
		20' Wall	Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹				
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction				
CW4(1)	65.6	65.5	0.1								
CW5(1)	63.8	63.7	0.1								
CW6(1)	64.3	63.1	1.2								
CW7(1)	63.5	63.2	0.3								
CW8(1)	65.3	65.2	0.1								
CW9(1)	61.2	60.8	0.4								
RW17(2)	61.3	59.6	1.7								
RW18(2)	60.3	59	1.3								
Does wall achieve a 7 dBA reduction?			No								
Length of Wall = 505 feet											
Cost of Wall	per 5 dBA rec	eiver=	NA								

¹ 10' and 15' walls were not analyzed because the 20' wall did not achieve a 7 dBA reduction. ²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor.

Table B-7 Area F Noise Wall Analysis US 75 – Moorhead - Daytime

Noise Wan Analysis CB 75 - Wootheau - Daytine												
		L ₁₀ Daytime Peak-Hour Levels										
		dBA										
		20' Wall	Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹					
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction					
CW10(1)	70.3	66.1	4.2									
RW19(1)	66.6	64.1	2.5									
RW20(2)	63.5	61.6	1.9									
RW21(2)	63.9	62.4	1.5									
Does wall achieve a 7 dBA reduction?			No									
Length of Wall = 205 feet												
Cost of Wall per 5 dBA receiver=			NA									
		·										

¹ 10' and 15' walls were not analyzed because the 20' wall did not achieve a 7 dBA reduction. ²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor.

Table B-8 Area F Noise Wall Analysis US 75 – Moorhead - Nighttime

Troise training bis es to triothead Trightenie											
	L₁₀ Nighttime Peak-Hour Levels dBA										
		20' Wall	Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹				
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction				
CW10(1)	66.9	63.4	3.5								
RW19(1)	63.7	61.7	2.0								
RW20(2)	60.8	59.2	1.6								
RW21(2)	61.4	60.1	1.3								
Does wall achieve a 7 dBA reduction?		No									
Length of Wall = 205 feet											
Cost of Wall per 5 dBA receiver=			NA								

¹ 10' and 15' walls were not analyzed because the 20' wall did not achieve a 7 dBA reduction. ²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor.

Table B-9 Area J Noise Wall Analysis US 75 – Moorhead - Daytime

Noise Wall Analysis US 75 – Moorhead - Daytime										
	L ₁₀ Daytime Peak-Hour Levels dBA									
		20, Wall	Analysis		Analysis ¹	الد/۱۸ '10	Analysis ¹			
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction			
CE13(1)	66.8	65.8	1.0	10 VVali	1 COGGGGGGT	10 VVali	reduction			
CE13(1) CE14(1)	66.4	60.7	5.7							
CE15(2)	69.3	62.4	6.9							
RE22(4)	69.4	62.6	6.8							
RE22-2(4)	73.8	65.5	8.3							
RE24(2)	69.8	62.3	7.5							
RE25(1)	69.4	62.1	7.3							
RE26(1)	69.6	62.1	7.5							
RE27(1)	69.6	62.0	7.5							
RE28(1)	69.6	61.9	7.7							
RE29(1)	69.7	61.9	7.7							
RE30(1)	69.7	61.9	7.8							
RE31(1)	69.7	62.3	7.8							
RE32(1)	67.6	60.8	6.8							
RE33(1)	67.8	61.1	6.7							
RE34(1)	67.9	61.3	6.6							
RE35(2)	67.4	60.9	6.5							
RE36(2)	67.1	60.8	6.3							
RE37(1)	67.5	61.6	5.9							
RE38(1)	65.2	60.8	4.4							
RE39(2)	65.6	60.1	5.5							
RE40(2)	65.5	59.8	5.7							
RE41(1)	65.8	59.9	5.9							
RE42(1)	65.4	59.5	5.9							
RE43(2)	65.5	59.2	6.3							
RE44(4)	61.2	58.5	2.7							
RE23A-1(1)	67.9	61.6	6.3							
RE23B-1(1)	65.1	60.0	5.1							
RE23C-1(1)	63.5	59.3	4.2							
RE23D-1(1)	62.3	58.6	3.7							
RE23E-1(1)	64.2	59.0	5.2							
RE23F-1(1)	65.1	59.6	5.5							
RE23G-1(1)	66.0	60.2	5.8							
RE23H-1(1)	68.1	61.6	6.5							
RE23A-2(1)	72.5	64.1	8.4							
RE23B-2(1)	70.4	62.5	7.9							
RE23C-2(1)	68.1	61.8	6.3							
RE23D-2(1)	66.5	61.1	5.4							
RE23E-2(1)	69.3	60.7	8.6							
RE23F-2(1)	70.0	61.3	8.7							
RE23G-2(1)	70.7	62.1	8.6							

		L₁₀ Daytime Peak-Hour Levels dBA							
		20' Wall	Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹		
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction		
RE23H-2(1)	72.5	63.7	8.8						
RE21A-1(2)	61.3	56.1	5.2						
RE21B-1(1)	65.2	57.4	7.8						
RE21C-1(1)	65.7	57.4	8.3						
RE21D-1(2)	61.9	56.2	5.7						
RE21A-2(2)	64.0	60.2	3.8						
RE21B-2(1)	66.1	61.2	4.9						
RE21C-2(1)	65.8	59.5	6.3						
RE21D-2(2)	62.6	58.9	3.7						
RE21A-3(2)	69.9	63.0	6.9						
RE21B-3(1)	71.2	64.0	7.2						
RE21C-3(1)	70.2	62.8	7.4						
RE21D-3(2)	67.0	61.6	5.4						
RE20A-1(1)	64.0	58.2	5.8						
RE20B-1(1)	68.9	63.6	5.3						
RE20C-1(1)	68.9	63.2	5.7						
RE20D-1(1)	65.5	59.7	5.8						
RE20A-2(1)	68.4	60.3	8.1						
RE20B-2(1)	73.3	66.9	6.4						
RE20C-2(1)	73.4	66.4	7.0						
RE20D-2(1)	70.4	61.7	8.7						
RE20A-3(1)	68.8	63.6	5.2						
RE20B-3(1)	73.5	68.5	5.0						
RE20C-3(1)	73.4	68.0	5.4						
RE20D-3(1)	70.4	63.7	6.7						
RE20AA-2(1)	69.6	67.1	2.5						
RE20AB-2(1)	70.8	67.7	3.1						
RE20AC-2(1)	69.5	62.0	7.5						
RE20AD-2(2)	67.1	60.4	6.7						
RE20AA-3(1)	70.3	68.6	1.7						
RE20AB-3(1)	71.4	69.2	2.2						
RE20AC-3(1)	70.4	66.2	4.2						
RE20AD-3(2)	68.4	64.9	3.5						
Does wall achi			Yes						
Number of Residences/Commercial with ≥ 5 dBA reduction.		76							
with ≥ 5 dBA reduction. Length of Wall (feet)			2,866						
Wall Area (square feet) ³			56,664						
Total Wall Cos		•	\$1,133,280						
Cost of Wall pe	er 5 dBA rec	eiver=	\$14,911						

¹ 10' and 15' walls were not analyzed because the 20' wall achieved the minimum \$43,500 cost/residence.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented

by the receptor. The number after a dash represents a deck on that floor. For example Receptor RE20AD-3(2) represents two third floor decks on the multi-family building at Receptor RE20A, location D. ³Wall tapers from 6' high to 20' high over 56' at each end. ⁴Receptor R22B represents four second floor decks.

Table B-10 Area J Noise Wall Analysis US 75 – Moorhead - Nighttime

THOISE WAIT	L ₁₀ Nighttime Peak-Hour Levels							
				dBA	4		4	
- 2			Analysis		Analysis ¹		Analysis ¹	
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction	
CE13(1)	64.1	63.2	0.9					
CE14(1)	63.4	57.9	5.5					
CE15(2)	66.3	59.9	6.4					
RE22(4)	66.4	59.9	6.5					
RE22-2(4)	70.9	63.2	7.7					
RE24(2)	66.7	59.5	7.2					
RE25(1)	66.3	59.3	7.0					
RE26(1)	66.5	59.3	7.2					
RE27(1)	66.5	59.2	7.3					
RE28(1)	66.5	59.1	7.4					
RE29(1)	66.6	59.0	7.6					
RE30(1)	66.5	59.0	7.5					
RE31(1)	66.6	59.4	7.2					
RE32(1)	64.5	57.9	6.6					
RE33(1)	64.7	58.3	6.4					
RE34(1)	64.9	58.5	6.4					
RE35(2)	64.3	58.1	6.2					
RE36(2)	64.0	58.0	6.0					
RE37(1)	64.4	58.8	5.6					
RE38(1)	62.2	57.9	4.3					
RE39(2)	62.6	57.3	5.3					
RE40(2)	62.5	57.1	5.4					
RE41(1)	62.8	57.1	5.7					
RE42(1)	62.4	56.8	5.6					
RE43(2)	62.4	56.3	6.1					
RE44(4)	58.5	56.0	2.5					
RE23A-1(1)	64.8	58.8	6.0					
RE23B-1(1)	61.9	57.3	4.6					
RE23C-1(1)	60.4	56.6	3.8					
RE23D-1(1)	59.2	56.0	3.2					
RE23E-1(1)	61.1	56.1	5.0					
RE23F-1(1)	61.9	56.6	5.3					
RE23G-1(1)	62.8	57.2	5.6					
RE23H-1(1)	64.9	58.6	6.3					
RE23A-2(1)	69.5	61.8	7.7					
RE23B-2(1)	67.3	59.8	7.5					

		L ₁₀ Nighttime Peak-Hour Levels dBA							
		20' Wall	Analysis	15' Wall	Analysis ¹	10' Wall	Analysis ¹		
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction		
RE23C-2(1)	64.9	59.2	5.7						
RE23D-2(1)	63.4	58.5	4.9						
RE23E-2(1)	66.2	57.7	8.5						
RE23F-2(1)	66.8	58.4	8.4						
RE23G-2(1)	67.5	59.1	8.4						
RE23H-2(1)	69.4	60.8	8.6						
RE21A-1(2)	61.1	57.8	3.3						
RE21B-1(1)	63.1	58.6	4.5						
RE21C-1(1)	62.4	56.4	6.0						
RE21D-1(2)	59.2	55.9	3.3						
RE21A-2(2)	57.8	53.2	4.6						
RE21B-2(1)	61.8	54.4	7.4						
RE21C-2(1)	62.3	54.3	8.0						
RE21D-2(2)	58.4	53.2	5.2						
RE21A-3(2)	67.0	61.1	5.9						
RE21B-3(1)	68.3	62.2	6.1						
RE21C-3(1)	66.9	59.9	7.0						
RE21D-3(2)	63.6	58.6	5.0						
RE20A-1(1)	60.6	55.2	5.4						
RE20B-1(1)	65.9	61.1	4.8						
RE20C-1(1)	65.9	60.7	5.2						
RE20D-1(1)	62.3	56.8	5.5						
RE20A-2(1)	65.0	57.3	7.7						
RE20B-2(1)	70.5	64.8	5.7						
RE20C-2(1)	70.5	64.3	6.2						
RE20D-2(1)	67.2	58.7	8.5						
RE20A-3(1)	65.6	61.0	4.6						
RE20B-3(1)	70.7	66.4	4.3						
RE20C-3(1)	70.7	65.9	4.8						
RE20D-3(1)	67.3	60.8	6.5						
RE20AA-2(1)	67.2	65.1	2.1						
RE20AB-2(1)	68.3	65.8	2.5						
RE20AC-2(1)	66.2	58.8	7.4						
RE20AD-2(2)	63.7	57.3	6.4						
RE20AA-3(1)	67.9	66.5	1.4						
RE20AB-3(1)	68.9	67.0	1.9						
RE20AC-3(1)	67.4	63.6	3.8						
RE20AD-3(2)	65.5	62.4	3.1						
Does wall achi			Yes						
Number of Res		mmercial	68						
with ≥ 5 dBA re Length of Wall			2,866						
Longar or wall	(1001)		2,000		j l				

	L ₁₀ Nighttime Peak-Hour Levels dBA							
		20' Wal	l Analysis	15' Wall Analysis ¹		10' Wall Analysis ¹		
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction	
Wall Area (square feet) ³			56,664					
Total Wall Cost (\$20/square foot)			\$1,133,280					
Cost of Wall per 5 dBA receiver=			\$16,665					

¹ 10' and 15' walls were not analyzed because the 20' wall achieved the minimum \$43,500 cost/residence.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor. The number after a dash represents a deck on that floor. For example Receptor RE20AD-3(2) represents two third floor decks on the multi-family building at Receptor RE20A, location D. ³Wall tapers from 6' high to 20' high over 56' at each end. ⁴Receptor R22B represents four second floor decks.

Table B-11 Area K Noise Wall Analysis US 75 – Moorhead - Daytime

Indise wan Analysis OS 75 – Woothead - Daytine									
	L ₁₀ Daytime Peak-Hour Levels								
		dBA							
		20' Wall Analysis		15' Wall	Analysis	10' Wall Analysis ¹			
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction		
CE16(1)	72.9	63.9	9.0	67.1	5.8				
CE17(1)	72.3	63.3	9.0	66.9	5.4				
CE18(2)	72.1	64.1	8.0	67.9	4.2				
Does wall ac	Does wall achieve a 7 dBA reduction?				No				
Number of Residences/Commercial with ≥ 5 dBA reduction.			4		2				
Length of Wall (feet)			2,270		2,270				
Wall Area (square feet) ³			45,400		34,050				
Total Wall Cost (\$20/square foot)			\$908,000		\$681,000				
Cost of Wall per 5 dBA receiver=			\$227,000		NA				

¹ A 10' wall was not analyzed because the 15' wall did not achieve the 7 dBA minimum reduction at any receptor.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor.

Table B-12 Area K Noise Wall Analysis US 75 – Moorhead - Nighttime

Noise wan Analysis OS 75 – Wool nead - Nightline								
	L ₁₀ Nighttime Peak-Hour Levels dBA							
		20' Wall	l Analysis	15' Wall	Analysis 10' Wall Analysis		Analysis¹	
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction	
CE16(1)	68.8	61.3	7.5	64.3	4.5			
CE17(1)	68.2	60.5	7.7	64.0	4.2			
CE18(2)	68.0	61.2	6.8	64.9	3.1			
Does wall achieve a 7 dBA reduction?			Yes		No			
Number of Residences/Commercial			4		2			

	L ₁₀ Nighttime Peak-Hour Levels dBA							
		20' Wal	l Analysis	15' Wall	Analysis 10' Wall Analysis			
Receptor ²	No Wall	Level	Reduction	15' Wall	Reduction	10' Wall	Reduction	
with ≥ 5 dBA reduction. Length of Wall (feet)			2,270		2,270			
Wall Area (square feet) ³			45,400		34,050			
Total Wall Cost (\$20/square foot)			\$908,000		\$681,000			
Cost of Wall per 5 dBA receiver=			\$227,000		NA			

¹ A 10' wall was not analyzed because the 15' wall did not achieve the 7 dBA minimum reduction at any receptor.

²Receptors beginning with the letter "R" are residential receptors, receptors beginning with the letter "C" are commercial receptors, and the number in parentheses is the number of residences/commercial facilities represented by the receptor.