Draft Traffic Noise Analysis Report

Hwy 10 & Hwy 23 Pavement and Interchange Reconstruction Project, East St. Cloud

Report Version 3.0

Minnesota Department of Transportation
District 3

Date: October 2020

State Project (SP) 0503-91

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Chapter 1 Introduction

The purpose of this noise analysis is to evaluate and document the effect of the proposed Hwy 10 ad Hwy 23 Pavement and Interchange Reconstruction Project (SP 0503-91) (hereafter referred to as "Hwy 10/23") on traffic generated noise levels. The proposed project includes Federal-aid funding sources; therefore, an environmental review under the National Environmental Policy Act (NEPA) is required. The project has been identified as a Class II action under NEPA. A Minnesota Department of Transportation (MnDOT) trunk highway Categorical Exclusion determination will be prepared for the project.

This traffic noise analysis was completed following the procedures and guidance described in the 2017 MnDOT Noise Requirements for Type I Federal-aid Projects as per 23 CFR 772 (effective July 10, 2017).[1] MnDOT's noise requirements apply to all projects administered by MnDOT that exceed mandatory Environmental Quality Board (EQB) thresholds for highway projects and/or Federal Highway Administration (FHWA) Title 23 Code of Federal Regulations (CFR) Part 772 impact criteria.

1.1 General Project Description

The Hwy 10/23 project is in the City of St. Cloud, Benton County, Minnesota. The project limits along Hwy 10 extend from the railroad tracks 0.2-mile north of East St. Germain Street to 15th Avenue Southeast (SE) and along Hwy 23 from 0.15-mile west of Lincoln Avenue SE to Edgemont Drive Northeast (NE). Figure 1.1 includes a state location map. Figure 1.2 includes a project area map. The total project length along Hwy 10 is approximately 1.2 miles and the project length along Hwy 23 is approximately 1.4 miles.

Within the project area, Hwy 10 is a divided four-lane, rural section expressway with traffic signals at 15th Avenue SE and East St. Germain Street. Hwy 23 east of Hwy 10 is a divided four-lane, rural section expressway with traffic signals at 14th Avenue SE and Edgemont Drive NE. West of Hwy 10, Hwy 23 is a divided four-lane, urban section expressway with a signal at Lincoln Avenue SE. The existing Hwy 10 and Hwy 23 interchange is a clover-leaf interchange with stop-controlled ramps on Hwy 10 and Hwy 23.

[1] The 2017 MnDOT noise requirements document is available online on the MnDOT Office of Environmental Stewardship webpage at http://www.dot.state.mn.us/environment/noise/pdf/2017-noise-requirements.pdf.

Figure 1.1 State Location Map

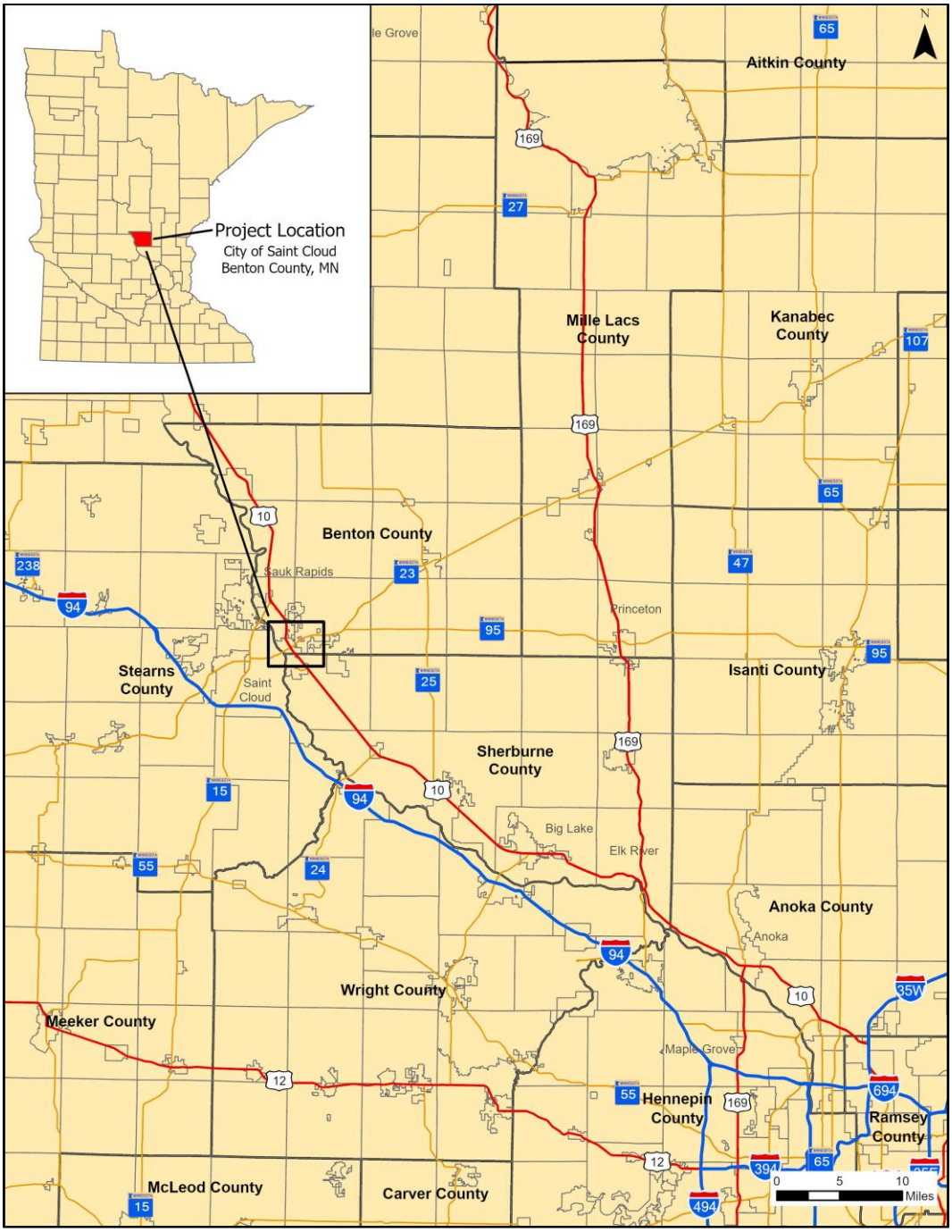


Figure 1.2 Project Location Map

The project includes reconstructing the Hwy 10/Hwy 23 interchange to a more traditional folded diamond interchange with the installation of traffic signals at the interchange termini. All elements of the original interchange will be removed or modified to accommodate the new interchange design. In addition to modifying the interchange Hwy 23 will shift north slightly to allow for proper ramp design to and from Hwy 10. A new roadway overpass will be constructed connecting 4th Street SE to the east frontage road along Hwy 10. In additional to the roadway modifications, paved trails will be added within the project area to better serve pedestrian access within the project area. Pavement rehabilitation will also occur along Hwy 23 from 14th Avenue SE to Edgemont Drive NE. Pavement rehabilitation will occur along Hwy 10 from Crescent Street NE to East St. Germain Street.

1.2 Background Information On Noise

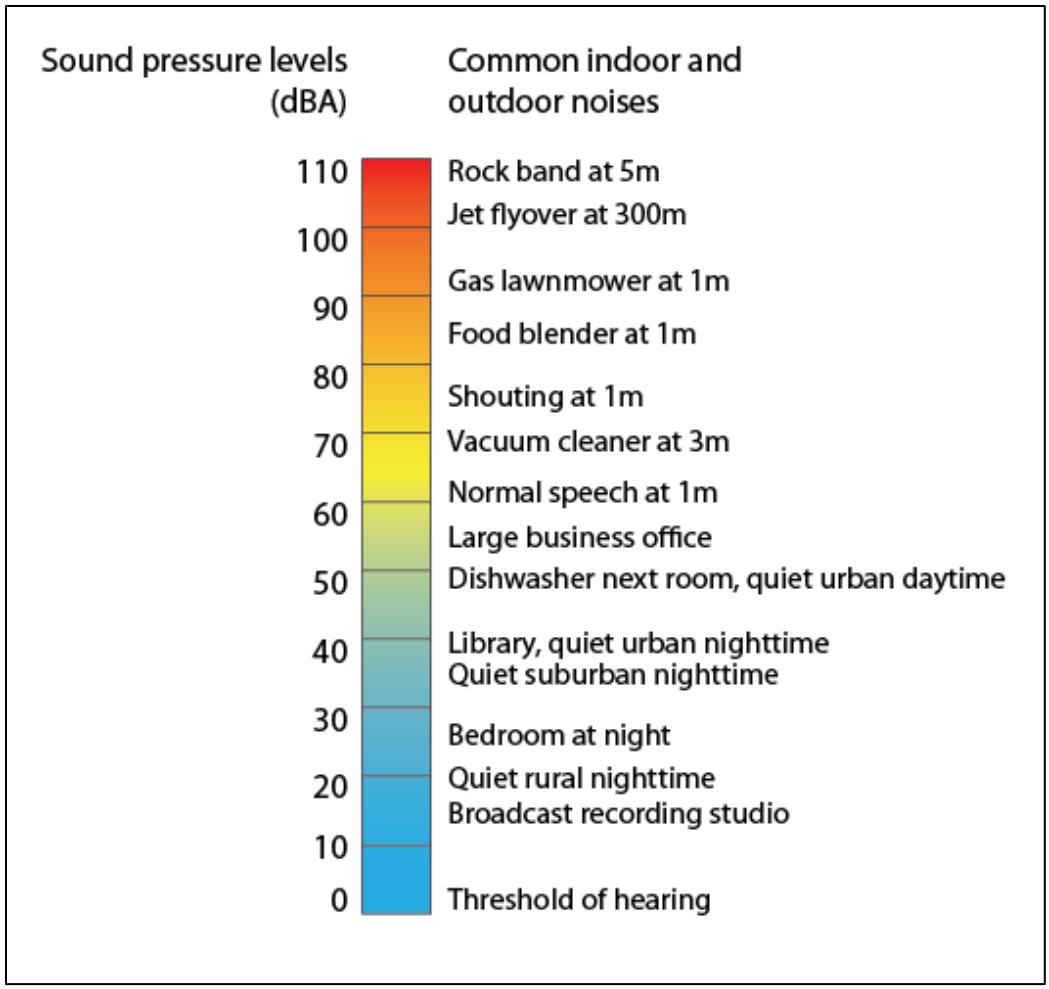
Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithm of the ratio of a sound energy relative to a reference sound energy. For highway traffic noise, an adjustment, or weighting, of the high- and low- pitched sound is made to approximate the way that an average person hears sound. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of 3 dBA is barely noticeable by the human ear, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases by a factor of ten times, the resulting sound level will increase by about 10 dBA and be heard to be twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the equivalent steady-state sound level. The equivalent steady-state sound level contains the same acoustic energy as the time-varying sound level over a stated period of time. This number is referred to as the Leq level, with Leq(h) being the hourly value of Leq. The Leq is analogous to the "average" sound level over a given period of time.

Along with the volume of traffic and other factors (e.g., 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 a key factor. Sound level decreases as distance from a source increases. A general rule regarding sound level decrease due to increasing distance from a line source (roadway) that is commonly used is: beyond approximately 50 feet from the sound source, each doubling of distance from the line source over hard ground (such as pavement or water) will reduce the sound level by 3 dBA, whereas each doubling of distance over soft ground (such as vegetated or grassy ground) results in a sound level decrease of 4.5 dBA.

Figure 1.3 provides a rough comparison of the noise levels of some common noise sources.

Figure 1.3 Decibel Level of Common Noise Sources



Source: Minnesota Pollution Control Agency. Noise Pollution accessed February 11, 2020 and available at https://www.pca.state.mn.us/air/noise-pollution.

1.3 Federal Traffic Noise Regulations

The FHWA's traffic noise regulation is described in 23 Code of Federal Regulations (CFR) Part 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise). 23 CFR 772 requires the identification of highway traffic noise impacts and the evaluation of potential noise abatement measures, along with other considerations, in conjunction with the planning and design of a Federal-aid highway project. The MnDOT requirements for implementation of the requirements of 23 CFR 772 is described in the *MnDOT Noise Requirements for Type I Federal-aid Projects* (effective July 10, 2017). The MnDOT noise requirements applies to all projects that receive Federal-aid funds or projects that are subject to FHWA approval.

A traffic noise impact analysis is required for all Type I Federal-aid projects. Type I projects are defined in 23 CFR 772.5. The Hwy 10 and Hwy 23 Pavement and Interchange Reconstruction Project meets the definition of a Type I project. The project includes the construction of a new roadway on a new location (i.e., construction of the proposed 4th Street SE overpass over Hwy 10). Therefore, a traffic noise analysis is required for the project.

1.3.1 Traffic Noise Impact Criteria

Federal Noise Abatement Criteria

Under FHWA criteria and regulations, traffic noise impacts are determined in two ways. First, future build worst hour noise levels are compared to FHWA Noise Abatement Criteria (NAC). Table 1.1 lists the FHWA noise abatement criteria by land use activity category. If a future build worst hour noise level approaches or exceeds the NAC noise level, then an impact exists. A noise level approaches NAC when it is within 1 dBA of the NAC noise level. For example, 66 dBA (Leq) is defined as "approaching" the noise abatement criterion for residential land uses (Activity Category B). Second, future build worst hour noise levels are compared with the existing no-build noise levels. If the future level is greater than the existing level by 5 dBA or more (i.e., substantial increase), an impact exists.

Table 1.1 23 CFR 772: Federal Noise Abatement Criteria

Activity Category	Activity Criteria Leq(h) (1)	Evaluation Location	Activity Descriptions
A	57	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	67	Exterior	Residential.
C	67	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.

(1) The Leq(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

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

(3) Hotels and motels that function as apartment buildings are classified under Activity Category B.

Table 1.1 continued 23 CFR 772: Federal Noise Abatement Criteria

Activity Category	Activity Criteria Leq(h) (1)	Evaluation Location	Activity Descriptions
D	52	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 (2) (3)	72	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.

(1) The Leq(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

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

(3) Hotels and motels that function as apartment buildings are classified under Activity Category B.

Minnesota State Noise Standards

In 2016, the Commissioners of the Minnesota Pollution Control Agency (MPCA) and MnDOT agreed that the traffic noise regulations and mitigation requirements from the FHWA are sufficient to determine reasonable mitigation measures for highway noise. By this agreement, existing and newly constructed segments of highway projects under MnDOT's jurisdiction are statutorily exempt from Minnesota State Noise Standard (Minnesota Rule 7030) if the project applies the FHWA traffic noise requirements. As a result, any required noise analysis will follow FHWA criteria and regulations only. Projects will no longer directly address Minnesota Rule 7030.

Chapter 2 Analysis Methodology

2.1 Affected Environment

The project is in the City of St. Cloud in Benton County, Minnesota. Existing land uses along the project segments of Hwy 10 and Hwy 23 include residential; retail and highway commercial; business office; schools; and industrial uses. There is one place of worship within the project area. There are no parks, recreational land uses, or existing trails in the project area.

2.2 Traffic Noise Monitoring

2.2.1 Noise Level Monitoring Results

Noise level monitoring is commonly performed during a noise study to document existing noise levels and to validate the noise model for the project (see discussion of "Field Measurements and Predicted Noise Levels" below). Existing noise levels were monitored at four representative locations in the project area along Hwy 10 and Hwy 23. Monitoring Site 1 (Site M1) is an apartment building in the northeast quadrant of the Hwy 10/Hwy 23 interchange (Lancaster Place Apartments, 1100 Division Street East, St. Cloud). Monitoring Site 2 (Site M2) is an apartment building on the south side of Hwy 23 at 14th Avenue SE (Benton Place Apartments, 200 14th Avenue SE, St. Cloud). Monitoring Site 3 (Site M3) is an office building in the southeast quadrant of the Hwy 10/Hwy 23 interchange along the east frontage road (350 Hwy 10, St. Cloud). Monitoring Site 4 (Site M4) is a hotel in the northwest quadrant of the Hwy 10/Hwy 23 interchange at the 7th Avenue SE cul-de-sac (120 7th Avenue SE, St. Cloud). Appendix B includes field measurement data sheets illustrating the field measurement locations.

Daytime noise levels were collected on November 15, 2019 at the four receptor locations described above. Noise levels were monitored at each location for 15 minutes. A trained noise monitoring technician was present at each session for the entire field measurement session to ensure correct operation of the sound level meter (SLM). Table 2.1 presents the field measurement results.

Table 2.1 Field Measurement Summary Results

Receptor ID	Location Description	Start Time	End Time	Measured Level, Leq, dBA
Site M1	Northeast quadrant of Hwy 10 and Hwy 23 (1100 Division Street East, St. Cloud	10:30 a.m.	10:45 a.m.	58.3
Site M2	South of Hwy 23 at 14th Avenue SE (200 14th Avenue SE, St. Cloud)	10:57 a.m.	11:12 a.m.	61.6
Site M3	Southeast quadrant of Hwy 10/Hwy 23 (350 Hwy 10, St. Cloud)	11:25 a.m.	11:40 a.m.	59.7
Site M4	Northwest quadrant of Hwy 10/Hwy 23 at 7th Avenue cul-de-sac (120 7th Avenue SE, St. Cloud)	11:48 a.m.	12:03 a.m.	54.3

Bold numbers approach or exceed the Federal noise abatement criterion (see Table 1.1).

2.2.2 Field Measurements and Predicted Noise Levels

Table 2.2 lists the field measurement results and computer modeling results for existing traffic noise levels. Computer modeling results are based on classified traffic counts for Hwy 10 and Hwy 23 during the field measurement period (i.e., cars, medium trucks, heavy trucks). The speed used for Hwy 10 was the existing posted speed (i.e., 50 miles per hour [mph] north of East St. Germain Street). The speed used for Hwy 23 was the existing posted speed (i.e., 45 mph west of 14th Avenue SE and 55 mph east of 14th Avenue SE).

Table 2.2 Field Measurements and Predicted Noise Levels

Receptor ID	Measured Level, Leq, dBA	Predicted Noise Level, Leq, dBA	Difference (Measured – Predicted) (Leq, dBA)	Difference ≤ 3.0 dBA, Leq
Site M1	58.3	60.2	-1.9	Yes
Site M2	61.6	63.7	-2.1	Yes
Site M3	59.7	61.2	-1.5	Yes
Site M4	54.3	53.2	1.1	Yes

Bold numbers approach or exceed the Federal noise abatement criterion (see Table 1.1).

A discrepancy equal to or less than 3.0 dBA between field measurements and predicted levels is considered acceptable for noise model validation. Field measurements at each of the four locations are within 3.0 dBA of predicted levels; therefore, no adjustments to the noise model input are necessary.

2.3 Worst Hourly Traffic Noise Analysis

In general, higher traffic volumes, vehicle speeds, and greater numbers of heavy trucks increase the loudness of highway traffic noise. The worst hourly traffic noise impact typically occurs when traffic is flowing more freely (e.g., level of service C conditions) and when heavy truck volumes are the greatest. For determining the worst-case traffic noise hour for the proposed project, traffic noise levels for three time periods were modeled at four representative receptor locations within the project area (morning, midday, afternoon). The worst hourly traffic noise analysis considered the appropriate classified traffic mix (cars, medium trucks, heavy trucks) and directional split (northbound and southbound on Hwy 10, eastbound and westbound on Hwy 23) in traffic during each analysis period. The speeds used for the model predictions were existing posted speeds for Hwy 10 and Hwy 23.

Table 2.3 summarizes the modeled Leq levels for each of the three time periods. Based on this analysis, it was determined that the 4:00 p.m. to 5:00 p.m. period represents the worst-case traffic noise hour. Modeled noise levels for representative receptor locations along Hwy 10 and Hwy 23 were the highest during the 4:00 p.m. to 5:00 p.m. period. The 4:00 p.m. to 5:00 p.m. hour represents a period of higher overall traffic volumes and higher heavy truck volumes at the start of the afternoon peak hour.

Table 2.3 Worst Hourly Traffic Noise Summary (Existing Modeled Noise Levels by Time Period)

Receptor ID	Activity Description	Federal Activity Category	7:00-8:00 a.m. dBA, Leq	12:00-1:00 p.m. dBA, Leq	4:00-5:00 p.m. dBA, Leq
Site M1	Residential	B	61.7	60.2	61.8
Site M2	Residential	B	65.5	63.7	**66.2**
Site M3	Office	E	62.2	61.2	62.0
Site M4	Hotel	E	53.9	53.2	54.0

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

2.4 Traffic Noise Modeling

Noise modeling was done using the FHWA's noise prediction program Traffic Noise Model (TNM), version 2.5. This model uses traffic volumes, speed, class of vehicle (e.g., cars, medium trucks, heavy trucks, buses, and motorcycles), and the typical characteristics of the roadway being analyzed (e.g., roadway width, horizontal alignment, vertical profile, etc.) to predict traffic noise levels.

Traffic data for noise model input files included existing and future (year 2040) No Build Alternative and Build Alternative forecast traffic volumes for the project segment of Hwy 10 and Hwy 23. Year 2040 was identified as the future year for analysis because this is the horizon year for travel demand forecasts prepared for the project. The modeled speed for Hwy 10 under existing conditions was 50 mph because this is the existing posted speed. The modeled speed for Hwy 23 under existing conditions was 45 mph west of 14th Avenue SE and 55 mph east of 14th Avenue SE because this is the existing posted speed. The modeled speed for Hwy 10 under the 2040 Build Alternative was 65 mph north of East St. Germain Street and 50 mph south of East St. Germain Street because this is the design speed for the project. The modeled speed for Hwy 23 under the 2040 Build alternative was 45 mph west of 14th Avenue SE and 55 mph east of 14th Avenue SE because this is the design speed for the project.

The hour of analysis was the 4:00 p.m. to 5:00 p.m. hour (see Worst Hourly Traffic Noise Analysis discussion above). The 4:00 p.m. to 5:00 p.m. hour was determined to represent approximately seven to nine percent of the daily traffic volumes within the project area. Table 2.4 includes the directional split and traffic characteristics on Hwy 10 and Hwy 23 during the worst noise hour for existing conditions and the future (year 2040) No Build and Build Alternatives.

Table 2.4 Hwy 10 and Hwy 23 Traffic Characteristics (Worst Traffic Noise Hour)

Roadway	Directional Split	Vehicle Mix (% Cars)	Vehicle Mix (% Medium Trucks)	Vehicle Mix (% Heavy Trucks)	Vehicle Mix (% Buses)	Vehicle Mix (% Motor cycles)
Southbound Hwy 10 North of Hwy 23	48%	95%	2%	3%	0%	0%
Northbound Hwy 10 North of Hwy 23	52%	95%	2%	3%	0%	0%
Southbound Hwy 10 South of Hwy 23	57%	95%	2%	3%	0%	0%
Northbound Hwy 10 South of Hwy 23	43%	95%	2%	3%	0%	0%
Eastbound Hwy 23 West of Hwy 10	50%	95%	2%	3%	0%	0%

Table 2.4 continued Hwy 10 and Hwy 23 Traffic Characteristics (Worst Traffic Noise Hour)

Roadway	Directional Split	Vehicle Mix (% Cars)	Vehicle Mix (% Medium Trucks)	Vehicle Mix (% Heavy Trucks)	Vehicle Mix (% Buses)	Vehicle Mix (% Motor cycles)
Westbound Hwy 23 West of Hwy 10	50%	95%	2%	3%	0%	0%
Eastbound Hwy 23 East of Hwy 10	60%	95%	2%	3%	0%	0%
Westbound Hwy 23 East of Hwy 10	40%	95%	2%	3%	0%	0%

Chapter 3 Predicted Noise Levels and Noise Impacts

3.1 Noise Receptors

Traffic noise impacts were assessed by modeling noise levels at receptor sites likely to be affected by the proposed project. Traffic noise levels were modeled at 367 receptor locations along Hwy 10 and Hwy 23 within the project limits under existing conditions and the 2040 No Build Alternative. Traffic noise level were modeled at 398 receptor locations within the project limits under the 2040 Build Alternative. Modeled receptors represent residences, restaurants/bars, business offices, retail commercial uses, industrial uses, schools, and proposed trails along Hwy 10 and Hwy 23.[2]

The layout figures in Appendix A illustrate modeled receptor locations. Table 3.1 identifies the land use and the Federal noise abatement criterion (NAC) for each modeled receptor location.

3.2 Noise Model Results

Table 3.1 tabulates the results of the noise modeling analysis for existing conditions, the 2040 No Build Alternative, and the 2040 Build Alternative. The results of the traffic noise modeling analysis are summarized below.

3.2.1 Existing Conditions

Existing Leq noise levels at modeled receptor locations within the project area range from 46.2 dBA to 70.6 dBA. Modeled Leq noise levels approach or exceed the Federal noise abatement criterion for Activity Category B at 13 receptor locations. Modeled Leq noise levels at all other receptor locations are below Federal noise abatement criteria.

[2] Minnesota Department of Transportation. July 10, 2017. *Noise Requirements for MnDOT and Other Type I Federal-aid Projects.* Appendix A, Guidance on Selection and Use of Noise Analysis Locations, Assigning Noise Receptors for Activity Category C.

Table 3.1 Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NE-1 (1)	Residential	B	64.5	**66.0**	1.5	65.7	1.2
NE-2 (1)	Residential	B	65.0	**66.5**	1.5	**66.1**	1.1
NE-3 (1)	Residential	B	62.3	63.8	1.5	63.5	1.2
NE-4 (1)	Residential	B	61.2	62.7	1.5	62.5	1.3
NE-5 (1)	Residential	B	64.1	65.6	1.5	65.1	1.0
NE-6 (1)	Residential	B	63.3	64.7	1.4	64.2	0.9
NE-7 (1)	Residential	B	60.6	62.1	1.5	61.7	1.1
NE-8 (1)	Residential	B	60.1	61.6	1.5	61.4	1.3
NE-9 (1)	Residential	B	57.0	58.5	1.5	58.3	1.3
NE-10 (1)	Residential	B	56.8	58.2	1.4	58.4	1.6
NE-11 (1)	Residential	B	57.4	58.9	1.5	58.7	1.3
NE-12 (1)	Residential	B	57.0	58.5	1.5	58.2	1.2
NE-13 (1)	Residential	B	56.9	58.3	1.4	58.2	1.3
NE-14 (1)	Residential	B	56.9	58.3	1.4	58.1	1.2
NE-15 (1)	Residential	B	56.2	57.5	1.3	57.3	1.1
NE-16 (1)	Retail Facility	F	64.1	65.6	1.5	65.2	1.1
NE-17 (1)	Residential	B	56.0	57.0	1.0	57.7	1.7
NE-18 (1)	Residential	B	58.7	59.5	0.8	60.3	1.6
NE-19 (1)	Residential	B	61.5	62.3	0.8	63.1	1.6

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NE-20 (1)	Residential	B	63.9	64.7	0.8	65.5	1.6
NE-21 (1)	Restaurant	E	60.5	62.1	1.6	62.7	2.2
NE-22 (1)	Restaurant	E	61.0	62.7	1.7	63.2	2.2
NE-23 (1)	Residential	B	55.3	57.2	1.9	57.4	2.1
NE-24 (1)	Residential	B	56.9	58.6	1.7	58.8	1.9
NE-25 (1)	Residential	B	63.6	65.4	1.8	65.9	2.3
NE-26-1 (1)	Residential	B	58.1	59.9	1.8	59.9	1.8
NE-26-2 (1)	Residential	B	61.8	63.6	1.8	63.2	1.4
NE-26-3 (1)	Residential	B	63.5	65.2	1.7	65.2	1.7
NE-27 (1)	Residential	B	57.1	58.8	1.7	59.2	2.1
NE-28 (1)	Residential	B	54.7	56.5	1.8	57.6	2.9
NE-29 (1)	Residential	B	51.7	53.5	1.8	54.7	3.0
NE-30 (1)	Residential	B	51.3	52.9	1.6	54.2	2.9
NE-31 (1)	Residential	B	52.5	54.0	1.5	54.5	2.0
NE-32 (1)	Residential	B	53.8	55.4	1.6	56.2	2.4
NE-33-1 (1)	Residential	B	55.2	56.7	1.5	57.2	2.0
NE-33-2 (1)	Residential	B	57.2	58.7	1.5	59.2	2.0
NE-33-3 (1)	Residential	B	64.0	65.5	1.5	**66.1**	2.1
NE-34 (1)	Residential	B	60.5	62.1	1.6	62.2	1.7

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NE-35 (1)	Residential	B	62.7	64.3	1.6	64.4	1.7
NE-36 (1)	Residential	B	61.0	62.7	1.7	62.8	1.8
NE-37 (1)	Place of Worship	C	51.4	53.0	1.6	53.7	2.3
NE-38 (1)	Residential	B	51.1	52.8	1.7	53.3	2.2
NE-39 (1)	Residential	B	52.4	54.3	1.9	54.9	2.5
NE-40 (1)	Residential	B	53.5	55.2	1.7	55.9	2.4
NE-41 (1)	Residential	B	52.7	53.7	1.0	54.4	1.7
NE-42 (1)	Residential	B	49.4	50.7	1.3	51.6	2.2
NE-43 (1)	Residential	B	52.0	52.8	0.8	53.9	1.9
NE-44 (1)	Residential	B	51.1	52.2	1.1	53.1	2.0
NE-45 (1)	Residential	B	51.5	52.1	0.6	53.0	1.5
NE-46 (1)	Residential	B	50.4	51.1	0.7	51.9	1.5
NE-47 (1)	Residential	B	50.2	51.0	0.8	51.5	1.3
NE-48 (1)	Residential	B	50.3	51.4	1.1	51.3	1.0
NE-49 (1)	Residential	B	47.4	48.8	1.4	49.7	2.3
NE-50 (1)	Residential	B	46.2	47.7	1.5	48.3	2.1
NE-51 (1)	Residential	B	47.3	48.7	1.4	49.1	1.8
NE-52 (1)	Residential	B	51.6	53.2	1.6	53.2	1.6
NE-53 (1)	Residential	B	53.4	54.9	1.5	54.8	1.4

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NE-54 (1)	Residential	B	56.5	58.0	1.5	57.8	1.3
NE-55 (1)	Residential	B	58.0	59.5	1.5	59.1	1.1
NE-56 (1)	Residential	B	60.5	62.1	1.6	61.8	1.3
NE-57 (1)	Retail Facility	F	62.7	64.2	1.5	63.6	0.9
NE-58 (1)	Motel	E	51.6	53.0	1.4	53.0	1.4
NE-59 (1)	Office	E	50.4	51.7	1.3	51.7	1.3
NE-60 (1)	Retail Facility	F	61.0	62.6	1.6	60.4	-0.6
NE-61 (1)	Retail Facility	F	65.3	66.8	1.5	66.4	1.1
NE-62 (1)	Residential	B	**67.9**	**69.4**	1.5	**67.7**	-0.2
NE-63 (1)	Residential	B	**66.6**	**68.0**	1.4	**67.2**	0.6
NE-64 (1)	Residential	B	64.6	**66.1**	1.5	65.2	0.6
NE-65 (1)	Residential	B	63.2	64.7	1.5	64.0	0.8
NE-66 (1)	Residential	B	62.0	63.5	1.5	62.5	0.5
NE-67 (1)	Residential	B	60.6	62.1	1.5	61.3	0.7
NE-68 (1)	Residential	B	59.3	60.8	1.5	60.3	1.0
NE-69 (1)	Residential	B	58.5	60.0	1.5	59.6	1.1
NE-70 (1)	Residential	B	57.9	59.4	1.5	59.0	1.1
NE-71 (1)	Residential	B	61.2	62.7	1.5	62.4	1.2
NE-72 (1)	Residential	B	59.1	60.6	1.5	60.4	1.3

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NE-73 (1)	Residential	B	58.0	59.5	1.5	59.2	1.2
NE-74 (1)	Residential	B	57.0	58.5	1.5	58.2	1.2
NW-1 (1)	Residential	B	52.5	53.5	1.0	53.6	1.1
NW-2 (1)	Residential	B	60.0	61.0	1.0	61.0	1.0
NW-3 (1)	Residential	B	52.5	53.5	1.0	53.5	1.0
NW-4 (1)	Residential	B	51.4	52.5	1.1	52.6	1.2
NW-5 (1)	Residential	B	49.1	50.2	1.1	50.3	1.2
NW-6 (1)	Residential	B	48.2	49.3	1.1	49.4	1.2
NW-7 (1)	Residential	B	54.4	55.4	1.0	55.4	1.0
NW-8 (1)	Residential	B	51.3	52.3	1.0	52.4	1.1
NW-9 (1)	Residential	B	52.3	53.4	1.1	53.4	1.1
NW-10 (1)	Residential	B	56.9	57.9	1.0	57.9	1.0
NW-11 (1)	Residential	B	52.6	53.6	1.0	53.7	1.1
NW-12 (1)	Retail Facility	F	60.2	61.4	1.2	61.3	1.1
NW-13 (1)	Retail Facility	F	46.7	48.4	1.7	48.5	1.8
NW-14 (1)	Retail Facility	F	56.8	58.6	1.8	58.6	1.8
NW-15 (1)	Retail Facility	F	57.0	58.8	1.8	58.9	1.9
NW-16 (1)	Residential	B	54.6	56.4	1.8	56.6	2.0
NW-17 (1)	Residential	B	53.0	54.8	1.8	54.9	1.9

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NW-18 (1)	Residential	B	52.7	54.4	1.7	54.6	1.9
NW-19 (1)	Residential	B	51.1	52.8	1.7	52.4	1.3
NW-20 (1)	Residential	B	52.7	54.4	1.7	54.5	1.8
NW-21 (1)	Residential	B	50.2	51.9	1.7	52.4	2.2
NW-22 (1)	Residential	B	52.7	54.4	1.7	54.4	1.7
NW-23 (1)	Residential	B	54.4	56.2	1.8	56.5	2.1
NW-24 (1)	Hotel	E	57.2	58.9	1.7	57.6	0.4
NW-25 (1)	Retail Facility	F	57.1	59.2	2.1	58.9	1.8
NW-26 (1)	Restaurant/Bar	E	49.6	51.2	1.6	51.6	2.0
NW-27 (1)	Retail Facility	F	58.4	60.2	1.8	60.2	1.8
NW-28 (1)	Residential	B	60.5	62.1	1.6	62.2	1.7
NW-29 (1)	Residential	B	60.6	62.2	1.6	62.4	1.8
NW-30 (1)	Residential	B	60.8	62.4	1.6	62.5	1.7
NW-31 (1)	Residential	B	60.8	62.4	1.6	62.5	1.7
NW-32 (1)	Restaurant	E	60.2	62.1	1.9	62.1	1.9
NW-33 (1)	Residential	B	64.7	**66.2**	1.5	**66.3**	1.6
NW-34 (1)	Residential	B	64.5	**66.0**	1.5	**66.1**	1.6
NW-35 (1)	Residential	B	64.5	**66.0**	1.5	**66.1**	1.6
NW-36 (1)	Residential	B	64.1	65.8	1.7	65.8	1.7

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
NW-37 (1)	Retail Facility	F	60.5	62.0	1.5	61.8	1.3
NW-38 (1)	Retail Facility	F	57.1	58.7	1.6	59.2	2.1
NW-39 (1)	Retail Facility	F	60.1	61.6	1.5	61.8	1.7
NW-40 (1)	Retail Facility	F	60.5	62.0	1.5	61.8	1.3
NW-41 (1)	Residential	B	59.6	61.1	1.5	61.6	2.0
NW-42 (1)	Retail Facility	F	56.5	58.0	1.5	58.5	2.0
NW-43 (1)	Retail Facility	F	57.2	58.7	1.5	59.2	2.0
NW-44 (1)	Residential	B	61.7	63.2	1.5	63.4	1.7
NW-45 (1)	Restaurant/Bar	E	66.4	67.8	1.4	67.6	1.2
NW-46 (1)	Residential	B	63.5	65.0	1.5	64.8	1.3
NW-47 (1)	Residential	B	62.8	64.3	1.5	64.3	1.5
NW-48 (1)	Retail Facility	F	70.6	72.1	1.5	71.8	1.2
NW-49 (1)	Retail Facility	F	62.9	64.4	1.5	64.3	1.4
SE-1 (1)	Retail Facility	F	63.5	64.9	1.4	55.8	-7.7
SE-2 (1)	Retail Facility	F	64.1	65.6	1.5	60.3	-3.8
SE-3 (1)	Residential	B	54.0	55.5	1.5	52.4	-1.6
SE-4 (1)	Residential	B	53.7	55.2	1.5	52.1	-1.6
SE-5 (1)	Residential	B	53.2	54.6	1.4	52.3	-0.9
SE-6 (1)	Residential	B	52.0	53.5	1.5	51.1	-0.9

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-7 (1)	Residential	B	52.4	53.9	1.5	51.5	-0.9
SE-8 (1)	Residential	B	52.8	54.3	1.5	51.7	-1.1
SE-9 (1)	Residential	B	52.4	53.9	1.5	51.2	-1.2
SE-10 (1)	Residential	B	52.1	53.6	1.5	51.1	-1.0
SE-11 (1)	Residential	B	51.8	53.3	1.5	50.7	-1.1
SE-12 (1)	Residential	B	51.4	52.8	1.4	50.4	-1.0
SE-13 (1)	Residential	B	51.8	53.3	1.5	51.0	-0.8
SE-14 (1)	Residential	B	51.9	53.4	1.5	50.9	-1.0
SE-15 (1)	Office	E	56.6	58.2	1.6	55.3	-1.3
SE-16 (1)	Office	E	55.9	57.4	1.5	54.7	-1.2
SE-17 (1)	Office	E	60.3	62.0	1.7	59.8	-0.5
SE-18 (1)	School	C	52.4	53.9	1.5	52.9	0.5
SE-19 (1)	Office	E	53.7	55.4	1.7	54.7	1.0
SE-20 (1)	Office	E	58.0	59.6	1.6	58.6	0.6
SE-21 (1)	Office	E	54.6	56.1	1.5	54.5	-0.1
SE-22 (1)	Residential	B	55.2	56.8	1.6	56.0	0.8
SE-23 (1)	Residential	B	55.3	56.8	1.5	56.3	1.0
SE-24 (1)	Residential	B	55.1	56.6	1.5	56.0	0.9
SE-25 (1)	Retail Facility	F	58.4	59.9	1.5	58.5	0.1

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

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(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-26 (1)	Residential	B	51.2	52.8	1.6	52.5	1.3
SE-27 (1)	Residential	B	50.9	52.5	1.6	52.4	1.5
SE-28 (1)	Residential	B	50.8	52.4	1.6	52.1	1.3
SE-29 (1)	Residential	B	48.0	49.5	1.5	49.1	1.1
SE-30 (1)	Residential	B	47.1	48.6	1.5	48.5	1.4
SE-31 (1)	Residential	B	47.1	48.6	1.5	48.1	1.0
SE-32 (1)	Residential	B	50.2	51.7	1.5	50.9	0.7
SE-33 (1)	Residential	B	49.5	51.0	1.5	49.6	0.1
SE-34 (1)	Residential	B	49.6	51.1	1.5	48.7	-0.9
SE-35 (1)	Residential	B	51.1	52.6	1.5	50.2	-0.9
SE-36 (1)	Residential	B	47.7	49.2	1.5	48.7	1.0
SE-37 (1)	Residential	B	46.5	48.0	1.5	48.1	1.6
SE-38 (1)	Residential	B	56.9	58.4	1.5	58.5	1.6
SE-39 (1)	Residential	B	59.3	60.9	1.6	61.0	1.7
SE-40-1 (1)	Residential	B	58.2	59.7	1.5	59.6	1.4
SE-40-2 (1)	Residential	B	61.2	62.8	1.6	63.0	1.8
SE-40-3 (1)	Residential	B	61.9	63.5	1.6	63.5	1.6
SE-41-1 (1)	Residential	B	58.0	59.5	1.5	59.3	1.3
SE-41-2 (1)	Residential	B	61.1	62.6	1.5	62.8	1.7

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

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Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-41-3 (1)	Residential	B	61.8	63.3	1.5	63.4	1.6
SE-42-1 (1)	Residential	B	57.7	59.2	1.5	58.9	1.2
SE-42-2 (1)	Residential	B	60.7	62.2	1.5	62.3	1.6
SE-43-1 (1)	Residential	B	57.6	59.1	1.5	58.8	1.2
SE-43-2 (1)	Residential	B	60.5	62.0	1.5	62.1	1.6
SE-43-3 (1)	Residential	B	61.4	63.0	1.6	63.0	1.6
SE-43-3 (1)	Residential	B	61.4	63.0	1.6	63.0	1.6
SE-44-1 (1)	Residential	B	57.0	58.5	1.5	58.2	1.2
SE-44-2 (1)	Residential	B	59.8	61.3	1.5	61.1	1.3
SE-44-3 (1)	Residential	B	61.1	62.6	1.5	62.4	1.3
SE-45-1 (1)	Residential	B	56.9	58.4	1.5	58.1	1.2
SE-45-2 (1)	Residential	B	59.6	61.1	1.5	60.8	1.2
SE-45-3 (1)	Residential	B	61.1	62.6	1.5	62.3	1.2
SE-46-1 (1)	Residential	B	56.2	57.7	1.5	56.9	0.7
SE-46-2 (1)	Residential	B	58.8	60.2	1.4	59.3	0.5
SE-46-3 (1)	Residential	B	61.6	63.1	1.5	62.5	0.9
SE-47-1 (1)	Residential	B	56.7	58.2	1.5	57.3	0.6
SE-47-2 (1)	Residential	B	59.0	60.5	1.5	59.4	0.4
SE-47-3 (1)	Residential	B	61.9	63.4	1.5	62.7	0.8

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

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Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

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Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-48-1 (1)	Residential	B	65.8	**67.3**	1.5	**66.1**	0.3
SE-48-2 (1)	Residential	B	**66.4**	**67.9**	1.5	**67.3**	0.9
SE-49-1 (1)	Residential	B	65.9	**67.4**	1.5	**66.1**	0.2
SE-49-2 (1)	Residential	B	**66.5**	**68.0**	1.5	**67.3**	0.8
SE-50-1 (1)	Residential	B	**66.8**	**68.3**	1.5	**66.8**	0.0
SE-50-2 (1)	Residential	B	**67.3**	**68.8**	1.5	**67.6**	0.3
SE-51-1 (1)	Residential	B	65.5	**67.0**	1.5	65.4	-0.1
SE-51-2 (1)	Residential	B	65.8	**67.3**	1.5	65.8	0.0
SE-51-3 (1)	Residential	B	**66.7**	**68.2**	1.5	**66.7**	0.0
SE-52-1 (1)	Residential	B	63.6	65.1	1.5	63.5	-0.1
SE-52-2 (1)	Residential	B	64.3	65.7	1.4	64.3	0.0
SE-52-3 (1)	Residential	B	65.5	**67.0**	1.5	65.8	0.3
SE-53-1 (1)	Residential	B	49.9	51.4	1.5	50.3	0.4
SE-53-2 (1)	Residential	B	52.6	54.1	1.5	53.2	0.6
SE-53-3 (1)	Residential	B	59.8	61.3	1.5	60.9	1.1
SE-54-1 (1)	Residential	B	49.2	50.7	1.5	49.8	0.6
SE-54-2 (1)	Residential	B	51.8	53.3	1.5	52.6	0.8
SE-54-3 (1)	Residential	B	58.9	60.3	1.4	59.9	1.0
SE-55-1 (1)	Residential	B	58.4	59.9	1.5	59.3	0.9

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

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Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-55-2 (1)	Residential	B	59.6	61.1	1.5	60.0	0.4
SE-55-3 (1)	Residential	B	62.7	64.2	1.5	63.4	0.7
SE-56-1 (1)	Residential	B	59.7	61.2	1.5	60.3	0.6
SE-56-2 (1)	Residential	B	60.6	62.1	1.5	60.9	0.3
SE-56-3 (1)	Residential	B	63.6	65.1	1.5	64.2	0.6
SE-57 (1)	Residential	B	52.7	54.2	1.5	53.0	0.3
SE-58 (1)	Residential	B	54.9	56.4	1.5	55.0	0.1
SE-59 (1)	Residential	B	59.7	61.2	1.5	59.3	-0.4
SE-60-1 (1)	Residential	B	63.9	65.4	1.5	63.1	-0.8
SE-60-2 (1)	Residential	B	65.2	**66.7**	1.5	64.8	-0.4
SE-60-3 (1)	Residential	B	65.5	**67.0**	1.5	65.3	-0.2
SE-61-1 (1)	Residential	B	63.9	65.4	1.5	63.2	-0.7
SE-61-2 (1)	Residential	B	65.2	**66.7**	1.5	64.9	-0.3
SE-61-3 (1)	Residential	B	65.6	**67.1**	1.5	65.3	-0.3
SE-62 (1)	Residential	B	52.1	53.6	1.5	52.4	0.3
SE-63 (1)	Residential	B	51.9	53.4	1.5	52.3	0.4
SE-64-1 (1)	Residential	B	59.7	61.1	1.4	59.1	-0.6
SE-64-2 (1)	Residential	B	62.4	63.8	1.4	62.0	-0.4
SE-64-3 (1)	Residential	B	64.5	**66.0**	1.5	64.2	-0.3

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-65-1 (1)	Residential	B	62.1	63.5	1.4	61.4	-0.7
SE-65-2 (1)	Residential	B	64.3	65.8	1.5	63.8	-0.5
SE-65-3 (1)	Residential	B	65.0	**66.5**	1.5	64.7	-0.3
SE-66 (1)	Residential	B	63.9	65.4	1.5	63.2	-0.7
SE-67 (1)	Residential	B	63.7	65.2	1.5	63.0	-0.7
SE-68-1 (1)	Residential	B	62.4	63.9	1.5	61.6	-0.8
SE-68-2 (1)	Residential	B	64.8	**66.3**	1.5	64.4	-0.4
SE-68-3 (1)	Residential	B	65.3	**66.8**	1.5	64.9	-0.4
SE-69-1 (1)	Residential	B	60.0	61.5	1.5	59.3	-0.7
SE-69-2 (1)	Residential	B	63.1	64.6	1.5	62.7	-0.4
SE-69-3 (1)	Residential	B	64.7	**66.1**	1.4	64.4	-0.3
SE-70-1 (1)	Residential	B	57.7	59.2	1.5	57.2	-0.5
SE-70-2 (1)	Residential	B	62.0	63.5	1.5	61.5	-0.5
SE-70-3 (1)	Residential	B	62.7	64.2	1.5	62.5	-0.2
SE-71-1 (1)	Residential	B	57.7	59.1	1.4	57.2	-0.5
SE-71-2 (1)	Residential	B	62.1	63.6	1.5	61.5	-0.6
SE-71-3 (1)	Residential	B	62.8	64.3	1.5	62.6	-0.2
SE-72-1 (1)	Residential	B	54.5	55.9	1.4	54.3	-0.2
SE-72-2 (1)	Residential	B	59.6	61.1	1.5	59.3	-0.3

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-72-3 (1)	Residential	B	61.4	62.9	1.5	61.3	-0.1
SE-73-1 (1)	Residential	B	53.0	54.4	1.4	53.1	0.1
SE-73-2 (1)	Residential	B	58.3	59.8	1.5	58.2	-0.1
SE-73-3 (1)	Residential	B	59.8	61.3	1.5	60.1	0.3
SE-74 (1)	Retail Facility	F	68.1	69.6	1.5	67.8	-0.3
SE-75 (1)	Retail Facility	F	68.1	69.6	1.5	69.0	0.9
SE-76 (1)	Retail Facility	F	67.0	68.5	1.5	68.0	1.0
SE-77 (1)	Retail Facility	F	50.2	51.6	1.4	51.3	1.1
SE-78 (1)	Retail Facility	F	64.1	65.5	1.4	65.4	1.3
SE-79 (1)	Residential	B	52.9	54.4	1.5	54.5	1.6
SE-80 (1)	Residential	B	54.7	56.1	1.4	56.7	2.0
SE-81 (1)	Residential	B	63.2	64.7	1.5	65.3	2.1
SE-82 (1)	Residential	B	**66.6**	**68.1**	1.5	**68.3**	1.7
SE-83 (1)	Residential	B	**66.1**	**67.6**	1.5	**68.1**	2.0
SE-84 (1)	Residential	B	65.2	**66.7**	1.5	**67.3**	2.1
SE-85 (1)	Residential	B	65.2	**66.7**	1.5	**66.8**	1.6
SE-86 (1)	Hotel	E	64.6	66.1	1.5	59.0	-5.6
SE-87 (1)	Hotel	E	67.3	68.8	1.5	64.7	-2.6
SE-88 (1)	Residential	B	54.9	56.4	1.5	55.6	0.7

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SE-89 (1)	Retail Facility	F	63.1	64.5	1.4	62.1	-1.0
SE-90 (1)	Hotel	E	58.4	59.9	1.5	58.7	0.3
SE-91 (1)	Retail Facility	F	60.9	62.4	1.5	60.9	0.0
SW-1 (1)	School	C	61.6	62.7	1.1	62.7	1.1
SW-2 (1)	Retail Facility	E	63.8	64.8	1.0	64.8	1.0
SW-3 (1)	Hotel	E	57.0	58.5	1.5	58.2	1.2
SW-4 (1)	Restaurant/Bar	E	61.1	62.5	1.4	62.4	1.3
SW-5 (1)	Retail Facility	F	57.5	58.9	1.4	58.7	1.2
SW-6 (1)	Retail Facility	F	53.3	54.9	1.6	54.3	1.0
SW-7 (1)	Retail Facility	F	51.9	53.4	1.5	51.6	-0.3
SW-8 (1)	Retail Facility	F	49.7	51.2	1.5	50.4	0.7
SW-9 (1)	Retail Facility	F	56.3	57.8	1.5	51.7	-4.6
SW-10 (1)	Retail Facility	F	66.7	68.2	1.5	61.4	-5.3
SW-11 (1)	Retail Facility	F	66.5	67.9	1.4	63.2	-3.3
SW-12 (1)	Residential	B	**68.6**	**70.1**	1.5	64.8	-3.8
SW-13 (1)	Residential	B	**66.4**	**67.8**	1.4	62.4	-4.0
SW-14 (1)	Residential	B	59.8	61.2	1.4	56.8	-3.0
SW-15 (1)	Residential	B	58.2	59.6	1.4	55.5	-2.7
SW-16 (1)	Residential	B	56.6	58.1	1.5	54.5	-2.1

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SW-17 (1)	Residential	B	55.1	56.5	1.4	53.4	-1.7
SW-18 (1)	Residential	B	53.8	55.3	1.5	52.6	-1.2
SW-19 (1)	Residential	B	53.0	54.5	1.5	52.1	-0.9
SW-20 (1)	Residential	B	51.6	53.1	1.5	51.3	-0.3
SW-21 (1)	Residential	B	51.0	52.5	1.5	50.6	-0.4
SW-22 (1)	Residential	B	50.5	52.0	1.5	50.2	-0.3
SW-23 (1)	Residential	B	50.2	51.7	1.5	49.9	-0.3
SW-24 (1)	Residential	B	50.1	51.6	1.5	49.8	-0.3
SW-25 (1)	Residential	B	49.9	51.4	1.5	49.6	-0.3
SW-26 (1)	Residential	B	49.8	51.2	1.4	49.4	-0.4
SW-27 (1)	Residential	B	49.6	51.1	1.5	49.3	-0.3
SW-28 (1)	Residential	B	49.6	51.0	1.4	49.2	-0.4
SW-29 (1)	Residential	B	49.6	51.1	1.5	49.3	-0.3
SW-30 (1)	Residential	B	49.8	51.2	1.4	49.4	-0.4
SW-31 (1)	Residential	B	49.9	51.3	1.4	49.6	-0.3
SW-32 (1)	Residential	B	50.0	51.5	1.5	49.8	-0.2
SW-33 (1)	Residential	B	50.3	51.8	1.5	50.0	-0.3
SW-34 (1)	Residential	B	50.5	52.0	1.5	50.2	-0.3
SW-35 (1)	Residential	B	50.7	52.2	1.5	50.4	-0.3

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SW-36 (1)	Residential	B	50.9	52.4	1.5	50.7	-0.2
SW-37 (1)	Residential	B	51.2	52.6	1.4	50.9	-0.3
SW-38 (1)	Residential	B	51.5	53.0	1.5	51.2	-0.3
SW-39 (1)	Residential	B	51.8	53.3	1.5	51.5	-0.3
SW-40 (1)	Residential	B	52.4	53.9	1.5	51.9	-0.5
SW-41 (1)	Residential	B	51.8	53.2	1.4	51.4	-0.4
SW-42 (1)	Residential	B	51.5	52.9	1.4	51.3	-0.2
SW-43 (1)	Residential	B	51.3	52.7	1.4	51.3	0.0
SW-44 (1)	Residential	B	51.0	52.5	1.5	51.3	0.3
SW-45 (1)	Residential	B	50.8	52.3	1.5	51.2	0.4
SW-46 (1)	Residential	B	50.6	52.1	1.5	51.1	0.5
SW-47 (1)	Residential	B	50.4	51.9	1.5	50.9	0.5
SW-48 (1)	Residential	B	50.2	51.6	1.4	50.6	0.4
SW-49 (1)	Residential	B	49.6	51.1	1.5	49.9	0.3
SW-50 (1)	Residential	B	49.3	50.8	1.5	49.6	0.3
SW-51 (1)	Residential	B	48.8	50.3	1.5	49.1	0.3
SW-52 (1)	Residential	B	48.3	49.8	1.5	48.7	0.4
SW-53 (1)	Residential	B	47.8	49.3	1.5	48.4	0.6
SW-54 (1)	Residential	B	47.4	48.9	1.5	48.0	0.6

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SW-55 (1)	Residential	B	47.7	49.2	1.5	48.1	0.4
SW-56 (1)	Residential	B	48.1	49.6	1.5	48.4	0.3
SW-57 (1)	Residential	B	48.6	50.1	1.5	48.9	0.3
SW-58 (1)	Residential	B	49.2	50.7	1.5	49.4	0.2
SW-59 (1)	Residential	B	49.8	51.3	1.5	50.0	0.2
SW-60 (1)	Residential	B	50.4	51.9	1.5	50.6	0.2
SW-61 (1)	Residential	B	50.8	52.2	1.4	50.6	-0.2
SW-62 (1)	Residential	B	50.8	52.3	1.5	50.5	-0.3
SW-63 (1)	Residential	B	49.8	51.3	1.5	49.5	-0.3
SW-64 (1)	Residential	B	49.6	51.1	1.5	49.3	-0.3
SW-65 (1)	Residential	B	49.5	50.9	1.4	49.1	-0.4
SW-66 (1)	Residential	B	48.8	50.3	1.5	49.5	0.7
SW-67 (1)	Residential	B	49.3	50.8	1.5	50.1	0.8
SW-68 (1)	Residential	B	49.9	51.4	1.5	50.8	0.9
SW-69 (1)	Residential	B	50.5	52.0	1.5	51.6	1.1
SW-70 (1)	Residential	B	50.8	52.3	1.5	51.8	1.0
SW-71 (1)	Residential	B	51.2	52.6	1.4	52.1	0.9
SW-72 (1)	Residential	B	51.3	52.8	1.5	52.1	0.8
SW-73 (1)	Residential	B	51.5	52.9	1.4	52.0	0.5

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SW-74 (1)	Residential	B	51.7	53.1	1.4	52.1	0.4
SW-75 (1)	Residential	B	51.9	53.4	1.5	52.3	0.4
SW-76 (1)	Residential	B	52.4	53.9	1.5	52.3	-0.1
SW-77 (1)	Residential	B	54.4	55.8	1.4	53.1	-1.3
SW-78 (1)	Residential	B	56.2	57.7	1.5	54.5	-1.7
SW-79 (1)	Residential	B	57.4	58.8	1.4	55.6	-1.8
SW-80 (1)	Residential	B	59.8	61.3	1.5	57.5	-2.3
SW-81 (1)	Residential	B	61.3	62.8	1.5	58.6	-2.7
SW-82 (1)	Residential	B	**66.3**	**67.8**	1.5	62.3	-4.0
SW-83 (1)	Residential	B	**67.7**	**69.2**	1.5	63.6	-4.1
SW-84 (1)	Residential	B	56.8	58.2	1.4	55.0	-1.8
SW-85 (1)	Residential	B	53.2	54.7	1.5	52.6	-0.6
SW-86 (1)	Residential	B	51.8	53.3	1.5	51.6	-0.2
SW-87 (1)	Residential	B	51.3	52.8	1.5	51.1	-0.2
SW-88 (1)	Residential	B	50.4	51.9	1.5	50.1	-0.3
SW-89 (1)	Residential	B	50.8	52.3	1.5	50.5	-0.3
SW-90 (1)	Residential	B	51.0	52.5	1.5	50.7	-0.3
SW-91 (1)	Residential	B	51.1	52.6	1.5	50.9	-0.2
SW-92 (1)	Residential	B	51.4	52.9	1.5	51.3	-0.1

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
SW-93 (1)	Retail Facility	F	61.0	62.4	1.4	58.9	-2.1
SW-94 (1)	Retail Facility	F	68.0	69.5	1.5	67.8	-0.2
SW-95 (1)	Retail Facility	F	66.8	68.2	1.4	67.1	0.3
SW-96 (1)	Warehouse	F	58.1	59.5	1.4	58.4	0.3
SW-97 (1)	Retail Facility	F	55.6	57.1	1.5	56.4	0.8
T-1 (1)	Trail	C	--	--	--	**71.8**	--
T-2 (1)	Trail	C	--	--	--	**72.8**	--
T-3 (1)	Trail	C	--	--	--	**74.4**	--
T-4 (1)	Trail	C	--	--	--	**72.3**	--
T-5 (1)	Trail	C	--	--	--	**75.1**	--
T-6 (1)	Trail	C	--	--	--	**72.5**	--
T-7 (1)	Trail	C	--	--	--	62.1	--
T-8 (1)	Trail	C	--	--	--	64.1	--
T-9 (1)	Trail	C	--	--	--	**68.2**	--
T-10 (1)	Trail	C	--	--	--	**71.4**	--
T-11 (1)	Trail	C	--	--	--	**72.1**	--
T-12 (1)	Trail	C	--	--	--	**73.8**	--
T-13 (1)	Trail	C	--	--	--	**69.5**	--
T-14 (1)	Trail	C	--	--	--	**72.1**	--

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
T-15 (1)	Trail	C	--	--	--	**74.4**	--
T-16 (1)	Trail	C	--	--	--	64.0	--
T-17 (1)	Trail	C	--	--	--	62.8	--
T-18 (1)	Trail	C	--	--	--	64.6	--
T-19 (1)	Trail	C	--	--	--	**68.6**	--
T-20 (1)	Trail	C	--	--	--	**69.8**	--
T-21 (1)	Trail	C	--	--	--	**72.7**	--
T-22 (1)	Trail	C	--	--	--	64.8	--
T-23 (1)	Trail	C	--	--	--	60.3	--
T-24 (1)	Trail	C	--	--	--	**72.9**	--
T-25 (1)	Trail	C	--	--	--	**70.4**	--
T-26 (1)	Trail	C	--	--	--	**70.5**	--
T-27 (1)	Trail	C	--	--	--	**72.3**	--
T-28 (1)	Trail	C	--	--	--	**76.0**	--
T-29 (1)	Trail	C	--	--	--	62.8	--
T-30 (1)	Trail	C	--	--	--	**71.5**	--
T-31 (1)	Trail	C	--	--	--	**74.7**	--
Federal Activity Category B	--	B	67	67	--	67	--

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

Table 3.1 continued Hwy 10 and Hwy 23 Traffic Noise Model Results

Receptor ID (1)	Activity Description	Federal Activity Category	Modeled Existing Leq, dBA	Modeled 2040 No Build Alternative Leq, dBA	Difference (2040 No Build – Existing) Leq, dBA	Modeled 2040 Build Alterative Leq, dBA	Difference (2040 Build – Existing) Leq, dBA
Federal Activity Category C	--	C	67	67	--	67	--
Federal Activity Category E	--	E	72	72	--	72	--
Federal Activity Category F	--	F	--	--	--	--	--

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Underlined numbers are receptors that have substantial increases in noise levels (i.e., increase from existing to 2040 Build Alternative equal to or greater than 5.0 dBA).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

(1) Number in "Receptor ID" column is the number of residences, business/commercial establishments, or industrial establishments represented by each modeled receptor location.

3.2.2 2040 No Build Alternative

Future Leq noise levels under the 2040 No Build Alternative are projected to range from 47.7 dBA to 72.1 dBA. Modeled traffic noise levels are predicted to increase by 0.6 dBA to 2.1 dBA under the 2040 No Build Alternative compared to existing conditions. Modeled Leq noise levels are projected to approach or exceed the Federal noise abatement criterion for Activity Category B at 35 receptor locations under the 2040 No Build Alternative. Modeled Leq noise levels at all other receptor locations are below Federal noise abatement criteria.

3.2.3 2040 Build Alternative

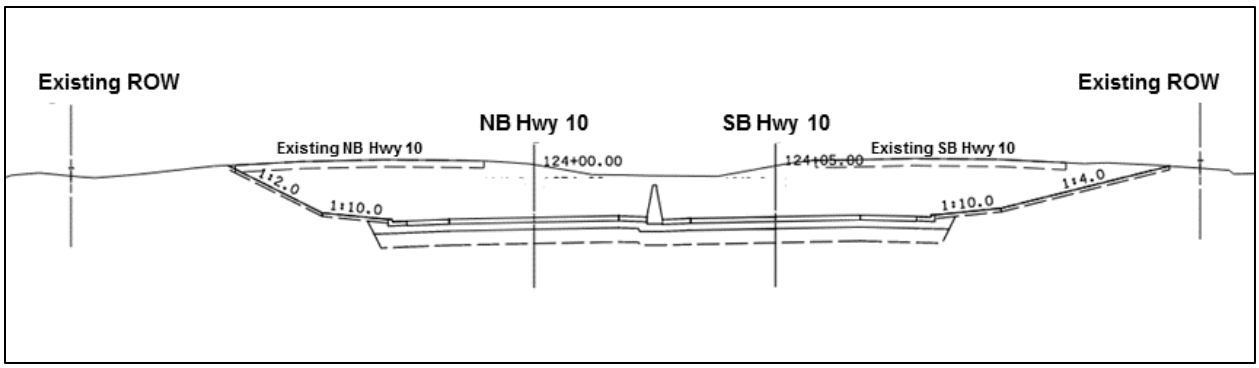
Future Leq noise levels under the 2040 Build Alternative are projected to range from 48.0 dBA to 76.0 dBA. Modeled Leq noise levels are projected to approach or exceed the Federal noise abatement criterion for Activity Category B at 18 receptor locations under the 2040 Build Alternative. Modeled Leq noise levels are projected to approach or exceed the Federal noise abatement criterion for Activity Category C at 23 receptor locations representing most of the trail receptors added as part of the proposed project. Modeled Leq noise levels at all other receptor locations are below Federal noise abatement criteria.

Modeled traffic noise levels are predicted to change by -7.7 dBA to 3.0 dBA under the 2040 Build Alternative compared to existing conditions. None of the modeled receptor locations are projected to experience a substantial increase in noise levels (i.e., increase of 5 dBA or greater from existing to 2040 Build Alternative conditions).

Receptors SW-12 through SW-83 represent a manufactured home community on the east side of Hwy 10, south of the proposed 4th Street SE overpass. Decreases in traffic noise levels are projected at modeled receptor locations because of changes in the horizontal and vertical profile of Hwy 10 near the proposed 4th Street SE overpass under the Build Alternative. With the addition of the 4th Street overpass, the eastbound and westbound Hwy 10 lanes are shifted inward towards the middle of the corridor, removing the existing center median ditch and constructing a center median barrier. The northbound and southbound Hwy 10 vertical profile is depressed by approximately 8 feet at Receptors SW-12 through SW-83, and approximately 12 feet at the proposed 4th Street SE overpass. The proposed 4th Street SE overpass also blocks the line of sight to Hwy 10 for nearby receptors.

Figure 3.1 on the following page illustrates the proposed Hwy 10 cross section across from the manufactured home community represented by Receptors SW-12 through SW-83.

Figure 3.1 Proposed Hwy 10 Cross Section South of 4th Street SE Overpass



Chapter 4 Consideration of Noise Abatement

MnDOT's noise requirements (July 10, 2017) describes noise abatement measures that are to be considered when a traffic noise impact has been identified with a highway improvement project (i.e., modeled traffic noise levels approach or exceed Federal noise abatement criteria, a 5 dBA or greater increase in noise levels from existing to future Build Alternative conditions). These noise abatement measures are described below.

- Construction of noise barriers (noise walls or earthen berms), 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.

4.1 Noise Barrier Evaluation

The 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's noise requirements (July 10, 2017). The factors for determining noise barrier feasibility and reasonableness as described in the MnDOT noise requirements document are summarized below.

4.1.1 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 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.

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 this traffic noise analysis, it was assumed that noise barriers were feasible with respect to engineering feasibility/constructability considerations. It was assumed that utilities in existing right of way could be relocated, existing and proposed drainage could be maintained, and no soil corrections would be necessary for the construction of noise walls. All modeled noise barriers were located within existing Hwy 10 and Hwy 23 right of way limits.

4.1.2 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 MnDOT's noise reduction design goal.

Cost Effectiveness

To be considered cost-effective, the cost per individual benefited receptor (e.g., residence, commercial entity, industrial entity) should be equal to, or less than $78,500. 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 an estimated construction cost of $36 per square foot of barrier. This price is for an acoustically absorbent concrete post/concrete panel type barrier.3 To be considered cost-effective, the cost per individual benefited receptor must be equal to or less than $78,500 per receptor.

There are several steps to assessing the cost effectiveness of a noise barrier. First, the cost-effective noise barrier height is determined for each segment of the project area. If this noise barrier meets the reasonableness criteria and is feasible, it would be proposed for construction. Noise barrier heights up to MnDOT's maximum noise wall height of 20 feet are studied. 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 a 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

[3] The concrete post and concrete panel noise wall is MnDOT's standard noise wall design.

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 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. MnDOT's noise requirements allows for up to two solicitation periods to request votes and determine the outcome regarding proposed noise abatement measures.

- **Initial Solicitation:** If at least 50 percent of all possible voting points from eligible voters are received after the initial request for votes, a simple majority of points cast will determine whether the proposed noise barrier will be constructed. If less than 50 percent of the possible voting points for a barrier are received after this initial request, then a second ballot will be distributed to the benefited property owners who did not respond to the first solicitation.
- **Second Request:** If the combination of the first and second solicitation results in responses for at least 25 percent of all possible points for a barrier, a simple majority of voting points cast will determine whether the proposed noise barrier will be constructed. If fewer than 25 percent of total possible points for a noise barrier are received after the second request for votes, then the barrier will not be constructed. If there is a tie, where there are equal numbers of points for and against a noise barrier, then noise barrier will be constructed.

4.1.3 Noise Barrier Analysis Results

Noise barriers (i.e., noise walls) were evaluated at modeled receptor locations adjacent to Hwy 10 and Hwy 23 where traffic noise levels are predicted to approach or exceed Federal noise abatement criteria under the 2040 Build Alternative, or where modeled receptor locations are projected to experience a substantial increase in noise levels from existing conditions to the 2040 Build Alternative. The layout figures in Appendix A illustrate the locations of modeled noise walls. Table C.1 through Table C.29 in Appendix C tabulate the modeled noise wall cost-effectiveness results.

Noise Wall 1, West side of Hwy 10 at East St. Germain Street (Receptor NW-27 to Receptor NW-42)

Modeled receptor locations on the west side of Hwy 10 at East St. Germain Street represent residential and commercial uses. Modeled traffic noise levels at three residential receptor locations along East St. Germain Street (Receptors NW-33, NW-34, and NW-35) are projected to approach or exceed the Federal noise abatement criterion for Activity Category B under the 2040 Build Alternative.; therefore, a noise wall was evaluated on the west side of Hwy 10 at East St. Germain Street.

An approximately 690-foot long, 20-foot high noise wall was modeled along the west side of Hwy 10 in MnDOT right of way adjacent to East St. Germain Street. The modeled wall includes gaps for a driveway access from southbound Hwy 10 and East St. Germain Street. Noise Wall 1 consists of three segments: an approximately 195-foot long noise wall north of the driveway access from southbound Hwy 10; an approximately 130-foot noise wall between the driveway access and East St. Germain Street; and an approximately 365-foot long noise wall south of East St. Germain Street. The 20-foot high noise wall provides a reduction in traffic noise levels that varies from 0.1 dBA to 2.4 dBA (see Table C.1 in Appendix C). The approximately 690-foot long, 20-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible; therefore, Noise Wall 1 is not proposed.

Noise Wall 2, East of Hwy 10 and North of Hwy 23 (Receptor NE-23 through Receptor NE-25, Receptor NE-38, Receptor NE-42, Receptor NE-43, and Receptor T-7 through Receptor T-9)

Modeled receptor locations in the northeast quadrant of Hwy 10 and Hwy 23 from Hwy 23 to East Division Street represent residential and commercial uses and a proposed trail. Modeled traffic noise levels at residential receptor locations east of the proposed trail are below the Federal noise abatement criterion for Activity Category B. Modeled noise levels at Receptor T-9 along the proposed trail are projected to approach the Federal noise abatement criterion for Activity Category C; therefore, a noise wall was evaluated on the east side of Hwy 10 and north of Hwy 23 adjacent to Receptor T-9.

An approximately 425-foot long, 20-foot high noise wall was modeled along the east side of Hwy 10, north of Hwy 23. The modeled wall was in MnDOT right of way along the proposed trail at Receptor T-9. The 20-foot high noise wall provides a reduction in traffic noise levels that varies from 0.1 dBA to 5.3 dBA (see Table C.2 in Appendix C). Traffic noise generated by vehicles traveling on Division Street east of Noise Wall 2 reduces the effectiveness of Noise Wall 2. The approximately 425-foot long, 20-foot high noise wall does not meet the MnDOT noise reduction design goal of 7 dBA for at least one benefited receptor to be considered reasonable.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors east of Hwy 10 and north of Hwy 23. Therefore, an 8-foot high noise wall was evaluated.

An approximately 425-foot long, 8-foot high noise wall was modeled along the east side of Hwy 10, north of Hwy 23. The modeled wall was in MnDOT right of way along the proposed trail at Receptor T-9. The 8-foot high noise wall provides a

reduction in traffic noise levels that varies from 0.0 dBA to 3.9 dBA (see Table C.3 in Appendix C). Traffic noise generated by vehicles traveling on Division Street east of Noise Wall 2 reduces the effectiveness of Noise Wall 2. The approximately 425-foot long, 8-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible; therefore, Noise Wall 2 is not proposed.

Noise Wall 3, Southeast Quadrant of Hwy 23 and 14th Avenue SE (Receptor SE-38 through Receptor SE-56-3)

Modeled receptor locations on the south side of Hwy 23 and east of 14th Avenue SE represent residential uses. Modeled traffic noise levels at residential receptors are projected to exceed the Federal noise abatement criterion for Activity Category B under the 2040 Build Alternative; therefore, a noise wall was evaluated in the southeast quadrant of Hwy 23 and 14th Avenue SE.

An approximately 535-foot long, 20-foot high noise wall was modeled in the southeast quadrant of Hwy 23 and 14th Avenue SE. The modeled wall was in MnDOT right of way along Hwy 23. The 20-foot high noise wall provides a 0.0 dBA to 8.3 dBA reduction in traffic noise levels (see Table C.4 in Appendix C). The approximately 535-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at four receptors, and a 5 dBA reduction or greater at eight receptors. The cost-effectiveness of the noise is $45,450 per benefited receptor. The approximately 535-foot long, 20-foot high wall meets MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 3 is proposed.

Noise Wall 4, Southwest Quadrant of Hwy 23 and Edgemont Drive NE (Receptor SE-78 through Receptor SE-85)

Modeled receptor locations on the south side of Hwy23 at Edgemont Drive NE represent residential uses and a business/office. Modeled traffic noise levels at Receptors SE-82 through SE-85 are projected to exceed the Federal noise abatement criterion for Activity Category B under the 2040 Build Alternative; therefore, a noise was evaluated on the south side of Hwy 23, west of Edgemont Drive NE.

An approximately 700-foot long, 20-foot high noise wall was modeled along the south side of Hwy 23, west of Edgemont Drive NE. The modeled wall was in MnDOT right of way west of Edgemont Drive NE. The 20-foot high noise wall provides a 2.2 dBA to 8.5 dBA reduction in traffic noise levels (see Table C.5 in Appendix C). The approximately 700-foot long, 20-foot high wall achieved a 7 dBA reduction or greater at three receptors, and a 5 dBA reduction or greater at four receptors. The cost-effectiveness of the noise wall is $120,600 per benefited receptor. The approximately 700-foot long, 20-foot high noise wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 700-foot long, 18-foot high noise wall was modeled along the south side of Hwy 23, west of Edgemont Drive NE. The modeled wall was in MnDOT right of way west of Edgemont Drive NE. The 18-foot high noise wall provides a 2.0 dBA to 7.5 dBA reduction in traffic noise levels (see Table C.6 in Appendix C). The approximately 700-foot long, 18-foot high wall achieved a 7 dBA reduction or greater at three receptors, and a 5 dBA reduction or greater at four receptors. The cost-effectiveness of the noise wall is $109,080 per benefited receptor. The approximately 700-foot long, 18-foot high noise wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 700-foot long, 16-foot high noise wall was modeled along the south side of Hwy 23, west of Edgemont Drive NE. The modeled wall was in MnDOT right of way west of Edgemont Drive NE. The 16-foot high noise wall provides a 1.6 dBA to 6.0 dBA reduction in traffic noise levels (see Table C.7 in Appendix C). The approximately 700-foot long, 16-foot high noise wall does not meet the MnDOT noise reduction design goal of 7 dBA for at least one benefited receptor to be considered reasonable; therefore, Noise Wall 4 is not proposed.

Noise Wall 5, South Side of Hwy 23 between Lincoln Avenue SE and Southbound Hwy 10 Entrance Ramp (Receptor SW-3 and Receptor T-29 through Receptor T-31)

Modeled receptor locations on the south side of Hwy 23 west of the southbound Hwy 10 ramps represent a proposed trail and retail facility. Modeled traffic noise levels at Receptors T-30 and T-31 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the south side of Hwy 23 between Lincoln Avenue SE and the southbound Hwy 10 entrance ramp.

An approximately 570-foot long, 20-foot high noise wall was modeled on the south side of Hwy 23 between Lincoln Avenue SE and the southbound Hwy 10 entrance ramp. The modeled wall was in the boulevard area between the trail and Hwy 23. The 20-foot high noise wall provides a 0.8 dBA to 17.9 dBA reduction in traffic noise levels (see Table C.8 in Appendix C). The approximately 570-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at three receptors. The cost-effectiveness of the noise wall is $129,600 per benefited receptor. The approximately 570-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 570-foot long, 10-foot high noise wall was modeled on the south side of Hwy 23 between Lincoln Avenue SE and the southbound Hwy 10 entrance ramp. The modeled wall was in the boulevard area between the trail and Hwy 23. The 10-foot high noise wall provides a 0.7 dBA to 13.0 dBA reduction in traffic

noise levels (see Table C.9 in Appendix C). The approximately 570-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $102,600 per benefited receptor. The approximately 570-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the south side of Hwy 23 between Lincoln Avenue SE and the southbound Hwy 10 entrance ramp. Therefore, an 8-foot high noise wall was evaluated.

An approximately 570-foot long, 8-foot high noise wall was modeled on the south side of Hwy 23 between Lincoln Avenue SE and the southbound Hwy 10 entrance ramp. The modeled wall was in the boulevard area between the trail and Hwy 23. The 8-foot high noise wall provides a 0.5 dBA to 10.8 dBA reduction in traffic noise levels (see Table C.10 in Appendix C). The approximately 570-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $82,080 per benefited receptor. The approximately 570-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 570-foot long, 7-foot high noise wall was modeled on the south side of Hwy 23 between Lincoln Avenue SE and the southbound Hwy 10 entrance ramp. The modeled wall was in the boulevard area between the trail and Hwy 23. The 7-foot high noise wall provides a 0.5 dBA to 9.3 dBA reduction in traffic noise levels (see Table C.11 in Appendix C). The approximately 570-foot long, 7-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $71,820 per benefited receptor. The approximately 570-foot long, 7-foot high wall meets MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 5 is proposed.

Noise Wall 6, South Side of Hwy 23 between Southbound Hwy 10 Exit Ramp and Hwy 23 Bridges (Receptor T-28)

The modeled receptor location on the south side of Hwy 23 between the southbound Hwy 10 exit ramp and the Hwy 23 bridge represents a proposed trail. Modeled traffic noise levels at Receptor T-28 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the south side of Hwy 23 between the southbound Hwy 10 exit ramp and the Hwy 23 bridge.

An approximately 165-foot long, 20-foot high noise wall was modeled along the south side of Hwy 23 from the southbound Hwy 10 ramps to the Hwy 23 bridge. The wall was modeled in the boulevard area between the curb and proposed trail. There is no boulevard area between the trail and eastbound Hwy 23 as the trail approaches the Hwy 23 bridge. The trail is directly behind the curb at the Hwy 23 bridge. Receptor T-28 is located on the trail behind the curb at the Hwy 23 bridge. The 20-foot high noise wall provides a 0.0 dBA reduction in traffic noise levels (see Table C.12 in Appendix C). The approximately 165-foot long, 20-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible.

An approximately 165-foot long, 10-foot high noise wall was modeled along the south side of Hwy 23 from the southbound Hwy 10 ramps to the Hwy 23 bridge. The wall was modeled in the boulevard area between the curb and proposed trail. There is no boulevard area between the trail and eastbound Hwy 23 as the trail approaches the Hwy 23 bridge. The trail is directly behind the curb at the Hwy 23 bridge. Receptor T-28 is located on the trail behind the curb at the Hwy 23 bridge. The 10-foot high noise wall provides a 0.0 dBA reduction in traffic noise levels (see Table C.13 in Appendix C). The approximately 165-foot long, 8-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the south side of Hwy 23. Therefore, an 8-foot high noise wall was evaluated.

An approximately 165-foot long, 8-foot high noise wall was modeled along the south side of Hwy 23 from the southbound Hwy 10 ramps to the Hwy 23 bridges. The wall was modeled in the boulevard area between the curb and proposed trail. There is no boulevard area between the trail and eastbound Hwy 23 as the trail approaches the Hwy 23 bridge. The trail is directly behind the curb at the Hwy 23 bridge. Receptor T-28 is located on the trail behind the curb at the Hwy 23 bridge. The 8-foot high noise wall provides a 0.0 dBA reduction in traffic noise levels (see Table C.14 in Appendix C). The approximately 165-foot long, 8-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible; therefore, Noise Wall 6 is not proposed.

Noise Wall 7, South Side of Hwy 23 Between Hwy 23 Bridge and Northbound Hwy 10 Entrance Ramp (Receptor T-27)

The modeled receptor location on the south side of Hwy 23 between the Hwy 23 bridge and the northbound Hwy 10 entrance ramp represents a proposed trail.

Modeled traffic noise levels at Receptor T-27 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the south side of Hwy 23 between the Hwy 23 bridge and the northbound Hwy 10 entrance ramp.

An approximately 265-foot long, 20-foot high noise wall was modeled along the south side of Hwy 23 from the Hwy 23 bridge to the northbound Hwy 10 entrance ramp. There is no boulevard area between the trail and eastbound Hwy 23 at this location. The trail is directly behind the curb; therefore, the modeled wall was located behind the trail and shields Receptor T-27 from Hwy 10 and the northbound Hwy 10 entrance ramp. The 20-foot high noise wall provides 0.4 dBA reduction in traffic noise levels (see Table C.15 in Appendix C). The approximately 265-foot long, 20-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible.

An approximately 265-foot long, 10-foot high noise wall was modeled along the south side of Hwy 23 from the Hwy 23 bridge to the northbound Hwy 10 entrance ramp. There is no boulevard area between the trail and eastbound Hwy 23 at this location. The trail is directly behind the curb; therefore, the modeled wall was located behind the trail and shields Receptor T-27 from Hwy 10 and the northbound Hwy 10 entrance ramp. The 10-foot high noise wall provides 0.0 dBA reduction in traffic noise levels (see Table C.16 in Appendix C). The approximately 265-foot long, 10-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the south side of Hwy 23. Therefore, an 8-foot high noise wall was evaluated.

An approximately 265-foot long, 8-foot high noise wall was modeled along the south side of Hwy 23 from the Hwy 23 bridge to the northbound Hwy 10 entrance ramp. There is no boulevard area between the trail and eastbound Hwy 23 at this location. The trail is directly behind the curb; therefore, the modeled wall was located behind the trail and shields Receptor T-27 from Hwy 10 and the northbound Hwy 10 entrance ramp. The 8-foot high noise wall provides 0.0 dBA reduction in traffic noise levels (see Table C.17 in Appendix C). The approximately 265-foot long, 8-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible; therefore, Noise Wall 7 is not proposed.

Noise Wall 8, South Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE (Receptor SE-21 through Receptor SE-26 and Receptor T-13 through Receptor T-15)

Modeled receptor locations on the south side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE represent residential uses, retail facilities, and a proposed trail. Modeled traffic noise levels at Receptors T-13 through T-15 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the south side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE.

An approximately 740-foot long, 20-foot high noise wall was modeled along the south side of Hwy 23 between the northbound Hwy 10 ramps and 14th Avenue SE. The modeled was in the boulevard area between the trail and Hwy 23. The 20-foot high noise wall provides a 0.6 dBA to 17.1 dBA reduction in traffic noise levels (see Table C.18 in Appendix C). The approximately 740-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at three receptors. The cost-effectiveness of the noise wall is $170,400 per benefited receptor. The approximately 740-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 740-foot long, 10-foot high noise wall was modeled along the south side of Hwy 23 between the northbound Hwy 10 ramps and 14th Avenue SE. The modeled was in the boulevard area between the trail and Hwy 23. The 10-foot high noise wall provides a 0.3 dBA to 12.9 dBA reduction in traffic noise levels (see Table C.19 in Appendix C). The approximately 740-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at three receptors. The cost-effectiveness of the noise wall is $88,800 per benefited receptor. The approximately 740-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the south side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE. Therefore, an 8-foot high noise wall was evaluated.

An approximately 740-foot long, 8-foot high noise wall was modeled along the south side of Hwy 23 between the northbound Hwy 10 ramps and 14th Avenue SE. The modeled was in the boulevard area between the trail and Hwy 23. The 8-foot high noise wall provides a 0.3 dBA to 10.9 dBA reduction in traffic noise levels (see Table C.20 in Appendix C). The approximately 740-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at three receptors. The cost-effectiveness of the noise wall is $71,040 per

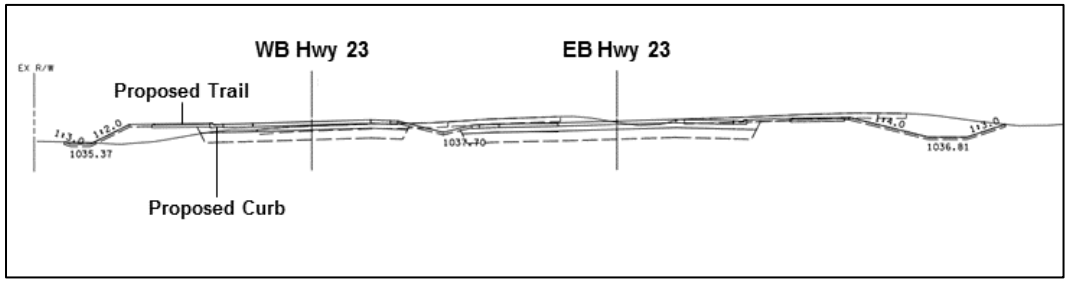
benefited receptor. The approximately 740-foot long, 8-foot high wall meets MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 8 is proposed.

Noise Wall 9, North Side of Hwy 23 between the Northbound Hwy 10 Exit Ramp and 14th Avenue SE (Receptor NE-26-1 through Receptor NE-33-3 and Receptor T-10 through Receptor T-12)

Modeled receptor locations on the north side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE represent residential uses and a proposed trail. Modeled traffic noise levels at Receptor NE-33-3 are projected to approach the Federal noise abatement criterion for Activity Category B under the 2040 Build Alternative. Modeled traffic noise levels at Receptor T-10 through Receptor T-12 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the north side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE.

Noise Wall 9 consists of two segments. The wall segment east of the northbound Hwy 10 exit ramp is in the boulevard area between the proposed trail and curb. The wall segment west of 14th Avenue SE is behind the proposed trail between the trail and the Hwy 23 right of way limits because there is no boulevard area available to accommodate a noise wall. Figure 4.1 illustrates the Hwy 23 cross section west of 14th Avenue SE.

Figure 4.1 Proposed Hwy 23 Cross Section East of 14th Avenue SE



An approximately 800-foot long, 20-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE. The 20-foot high noise wall provides a 0.1 dBA to 12.0 dBA reduction in traffic noise levels (see Table C.21 in Appendix C). The approximately 800-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $277,200 per benefited receptor. The approximately 800-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 800-foot long, 18-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE. The 18-foot high noise wall provides a 0.1 dBA to 11.8 dBA reduction in traffic noise levels (see Table C.22 in Appendix C). The approximately 800-foot long, 18-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $250,560 per benefited receptor. The approximately 800-foot long, 18-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 800-foot long, 16-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE. The 16-foot high noise wall provides a 0.1 dBA to 11.6 dBA reduction in traffic noise levels (see Table C.23 in Appendix C). The approximately 800-foot long, 16-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $447,840 per benefited receptor. The approximately 800-foot long, 16-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

The approximately 800-foot long, 16-feet high wall benefits one trail receptor (Receptor T-10). Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall.; therefore, an 8-foot high noise wall was evaluated.

An approximately 800-foot long, 8-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 ramps and 14th Avenue SE. The 8-foot high noise wall provides a 0.0 dBA to 8.7 dBA reduction in traffic noise levels (see Table C.24 in Appendix C). The approximately 800-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $230,400 per benefited receptor. The approximately 800-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 800-foot long, 6-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 ramps and 14th Avenue SE. The 6-foot high noise wall provides a 0.0 dBA to 5.1 dBA reduction in traffic noise levels (see Table C.25 in Appendix C). The approximately 800-foot long, 6-foot high noise wall does not meet the MnDOT noise reduction design goal of 7 dBA for at least one benefited receptor to be considered reasonable; therefore, Noise Wall 9 is not proposed.

Noise Wall 10, North Side of Hwy 23 Between Northbound Hwy 10 Entrance Ramp and Hwy 23 Bridge (Receptor T-5 and Receptor T-6)

Modeled receptor locations on the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge represents a proposed trail. Modeled traffic noise levels at Receptor T-5 and Receptor T-6 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge.

An approximately 320-foot long, 20-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge. The modeled was modeled in the boulevard between westbound Hwy 23 and the proposed trail. The 20-foot high noise wall provides a 0.0 dBA to 12.8 dBA reduction in traffic noise levels (see Table C.26 in Appendix C). The approximately 320-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $230,400 per benefited receptor. The approximately 320-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 320-foot long, 10-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge. The modeled was modeled in the boulevard between westbound Hwy 23 and the proposed trail. The 10-foot high noise wall provides a 0.0 dBA to 10.7 dBA reduction in traffic noise levels (see Table C.27 in Appendix C). The approximately 320-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $115,200 per benefited receptor. The approximately 320-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge. Therefore, an 8-foot high noise wall was evaluated.

An approximately 320-foot long, 8-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge. The modeled was modeled in the boulevard between westbound Hwy 23 and the proposed trail. The 8-foot high noise wall provides a 0.0 dBA to 9.4 dBA reduction in traffic noise levels (see Table C.28 in Appendix C). The approximately 320-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at one

receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $92,160 per benefited receptor. The approximately 320-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 320-foot long, 6-foot high noise wall was modeled along the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridge. The modeled was modeled in the boulevard between Hwy 23 and the proposed trail. The 6-foot high noise wall provides a 0.0 dBA to 7.0 dBA reduction in traffic noise levels (see Table C.29 in Appendix C). The approximately 320-foot long, 6-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $69,120 per benefited receptor. The approximately 320-foot long, 6-foot high wall meets MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 10 is proposed.

Noise Wall 11, North Side of Hwy 23 between Hwy 23 Bridge and Southbound Hwy 10 Exit Ramp (Receptor T-3 and Receptor T-4)

Modeled receptor locations on the north side of Hwy 23 between the Hwy 23 bridge and the southbound Hwy 10 exit ramp represents a proposed trail. Modeled traffic noise levels at Receptor T-3 and Receptor T-4 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the north side of Hwy 23 between the Hwy 23 bridge and the southbound Hwy 10 exit ramp.

An approximately 320-foot long, 20-foot high noise wall was modeled along the north side of Hwy 23 between the Hwy 23 bridge and southbound Hwy 10 ramp exit ramp. The modeled was modeled in the boulevard between westbound Hwy 23 and the proposed trail. The 20-foot high noise wall provides a 4.8 dBA to 14.8 dBA reduction in traffic noise levels (see Table C.30 in Appendix C). The approximately 320-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $230,400 per benefited receptor. The approximately 320-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 320-foot long, 10-foot high noise wall was modeled along the north side of Hwy 23 between the Hwy 23 bridge and southbound Hwy 10 ramp exit ramp. The modeled was modeled in the boulevard between westbound Hwy 23 and the proposed trail. The 10-foot high noise wall provides a 4.6 dBA to 12.0 dBA reduction in traffic noise levels (see Table C.31 in Appendix C). The approximately 320-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of

the noise wall is $115,200 per benefited receptor. The approximately 320-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the north side of Hwy 23 between the Hwy 23 bridge and the southbound Hwy 10 exit ramp. Therefore, an 8-foot high noise wall was evaluated.

An approximately 320-foot long, 8-foot high noise wall was modeled along the north side of Hwy 23 between the Hwy 23 bridge and southbound Hwy 10 ramp exit ramp. The modeled was modeled in the boulevard between westbound Hwy 23 and the proposed trail. The 8-foot high noise wall provides a 4.3 dBA to 10.2 dBA reduction in traffic noise levels (see Table C.32 in Appendix C). The approximately 320-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at one receptor, and a 5 dBA reduction or greater at one receptor. The cost-effectiveness of the noise wall is $92,160 per benefited receptor. The approximately 320-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 320-foot long, 6-foot high noise wall was modeled along the north side of Hwy 23 between the Hwy 23 bridge and the southbound Hwy 10 exit ramp. The modeled was modeled in the boulevard between Hwy 23 and the proposed trail. The 6-foot high noise wall provides a 3.3 dBA to 5.4 dBA reduction in traffic noise levels (see Table C.33 in Appendix C). The approximately 320-foot long, 6-foot high noise wall does not meet the minimum 5 dBA reduction to be considered acoustically feasible; therefore, Noise Wall 11 is not proposed.

Noise Wall 12, North Side of Hwy 23 Between Southbound Hwy 10 Entrance Ramp and Lincoln Avenue SE (Receptor T-1 and Receptor T-2)

Modeled receptor locations on the north side of Hwy 23 between the southbound Hwy 10 entrance ramps and Lincoln Avenue SE represent a proposed trail. Modeled traffic noise levels at Receptor T-1 and Receptor T-2 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the north side of Hwy 23 between the southbound Hwy 10 entrance ramp and Lincoln Avenue SE.

An approximately 660-foot long, 20-foot high noise wall was modeled along the north side of Hwy 23 between the southbound Hwy 10 entrance ramp and Lincoln Avenue SE. The modeled wall was in the boulevard between Hwy 23 and the proposed trail. The 20-foot high noise wall provides a 15.1 dBA to 16.4 dBA reduction in traffic noise levels (see Table C.34 in Appendix C). The approximately

660-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $237,600 per benefited receptor. The approximately 660-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 660-foot long, 10-foot high noise wall was modeled along the north side of Hwy 23 between the southbound Hwy 10 entrance ramp and Lincoln Avenue SE. The modeled wall was in the boulevard between Hwy 23 and the proposed trail. The 10-foot high noise wall provides a 11.5 dBA to 12.3 dBA reduction in traffic noise levels (see Table C.35 in Appendix C). The approximately 660-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $118,800 per benefited receptor. The approximately 660-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the north side of Hwy 23 between the southbound Hwy 10 entrance ramp and Lincoln Avenue SE. Therefore, an 8-foot high noise wall was evaluated.

An approximately 660-foot long, 8-foot high noise wall was modeled along the north side of Hwy 23 between the southbound Hwy 10 entrance ramp and Lincoln Avenue SE. The modeled wall was in the boulevard between Hwy 23 and the proposed trail. The 8-foot high noise wall provides a 9.6 dBA to 10.3 dBA reduction in traffic noise levels (see Table C.36 in Appendix C). The approximately 660-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost-effectiveness of the noise wall is $95,040 per benefited receptor. The approximately 660-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 660-foot long, 6-foot high noise wall was modeled along the north side of Hwy 23 between the southbound Hwy 10 entrance ramp and Lincoln Avenue SE. The modeled wall was in the boulevard between Hwy 23 and the proposed trail. The 6-foot high noise wall provides a 6.0 dBA to 6.2 dBA reduction in traffic noise levels (see Table C.37 in Appendix C). The approximately 660-foot long, 6-foot high noise wall does not meet the MnDOT noise reduction design goal of 7 dBA for at least one benefited receptor to be considered reasonable; therefore, Noise Wall 12 is not proposed.

Noise Wall 13, East Side of Hwy 10 and North of 4th Street SE Overpass (Receptor SE-1 through Receptor SE-20, Receptor SE-29 through Receptor SE-37, and Receptor T-16 through Receptor T-21)

Modeled receptor locations on the east side of Hwy 10 between Hwy 23 and the proposed 4th Street SE overpass represent residential uses, retail facilities, and a proposed trail. Modeled traffic noise levels at Receptor T-19 through Receptor T-21 are projected to exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the east side of Hwy 10 and north of the proposed 4th Street SE overpass.

An approximately 555-foot long, 20-foot high noise wall was modeled along the east side of Hwy 10 and north of the proposed 4th Street SE overpass. The 20-foot high noise wall provides a 0.0 dBA to 16.0 dBA reduction in traffic noise levels (see Table C.38 in Appendix C). The approximately 555-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at three receptors. The cost effectiveness of the noise wall is $126,000 per benefited receptor. The approximately 555-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 555-foot long, 10-foot high noise wall was modeled along the east side of Hwy 10 and north of the proposed 4th Street SE overpass. The 10-foot high noise wall provides a 0.0 dBA to 11.7 dBA reduction in traffic noise levels (see Table C.39 in Appendix C). The approximately 555-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $99,900 per benefited receptor. The approximately 555-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted receptors on the east side of Hwy 10 between the proposed 4th Street SE overpass and Hwy 23. Therefore, an 8-foot high noise wall was evaluated.

An approximately 555-foot long, 8-foot high noise wall was modeled along the east side of Hwy 10 and north of the proposed 4th Street SE overpass. The 8-foot high noise wall provides a 0.0 dBA to 10.6 dBA reduction in traffic noise levels (see Table C.40 in Appendix C). The approximately 555-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $79,920 per benefited receptor. The approximately 555-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 555-foot long, 7-foot high noise wall was modeled along the east side of Hwy 10 and north of the proposed 4th Street SE overpass. The 7-foot high noise wall provides a 0.0 dBA to 9.6 dBA reduction in traffic noise levels (see Table C.41 in Appendix C). The approximately 555-foot long, 7-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $6930 per benefited receptor. The approximately 555-foot long, 7-foot high wall meets MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 13 is proposed.

Noise Wall 14, East Side of Hwy 10 and South of 4th Street SE Overpass (Receptor SE-86 through Receptor SE-88 and Receptor T-24 through Receptor T-26)

Modeled receptor locations on the east side of Hwy 10 and south of proposed 4th Street SE overpass represent residential uses, retail facilities, and a proposed trail. Modeled traffic noise levels at Receptor T-24 through Receptor T-26 are projected exceed the Federal noise abatement criterion for Activity Category C under the 2040 Build Alternative; therefore, a noise wall was evaluated on the east side of Hwy 10 and south of the proposed 4th Street SE overpass.

An approximately 550-foot long, 20-foot high noise wall was modeled along the east side of Hwy 10 and south of the proposed 4th Street SE overpass. The 20-foot high noise wall provides a 0.1 dBA to 14.2 dBA reduction in traffic noise levels (see Table C.42 in Appendix C). The approximately 550-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $187,200 per benefited receptor. The approximately 550-foot long, 20-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 550-foot long, 10-foot high noise wall was modeled along the east side of Hwy 10 and south of the proposed 4th Street SE overpass. The 10-foot high noise wall provides a 0.0 dBA to 11.2 dBA reduction in traffic noise levels (see Table C.43 in Appendix C). The approximately 550-foot long, 10-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $99,000 per benefited receptor. The approximately 550-foot long, 10-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

Based on the MnDOT noise requirement guidance of no more than one receptor per 250 feet of trail, and with no other adjacent benefited receptors, the maximum possible noise wall height adjacent to a trail that can meet MnDOT's cost effectiveness criterion is an 8-foot high noise wall. There are no other impacted

receptors on the east side of Hwy 10 and south of the proposed 4th Street SE overpass. Therefore, an 8-foot high noise wall was evaluated.

An approximately 550-foot long, 8-foot high noise wall was modeled along the east side of Hwy 10 and south of the proposed 4th Street SE overpass. The 8-foot high noise wall provides a 0.0 dBA to 10.0 dBA reduction in traffic noise levels (see Table C.44 in Appendix C). The approximately 550-foot long, 8-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $79,200 per benefited receptor. The approximately 550-foot long, 8-foot high wall exceeds MnDOT's cost effectiveness criterion of $78,500 per benefited receptor.

An approximately 550-foot long, 7-foot high noise wall was modeled along the east side of Hwy 10 and south of the proposed 4th Street SE overpass. The 7-foot high noise wall provides a 0.0 dBA to 9.2 dBA reduction in traffic noise levels (see Table C.45 in Appendix C). The approximately 550-foot long, 7-foot high noise wall achieved a 7 dBA reduction or greater at two receptors, and a 5 dBA reduction or greater at two receptors. The cost effectiveness of the noise wall is $69,300 per benefited receptor. The approximately 550-foot long, 7-foot high wall meets MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 14 is proposed.

Noise Wall 15, East Side of Hwy 10 from East St. Germain Street to Railroad (Receptor NE-1 through Receptor NE-14 and Receptor NE-62 through Receptor NE-74)

Modeled receptor locations on the east side of Hwy 10 between the railroad and East St. Germain Street represent residential receptors, retail facilities, and a restaurant/bar. Modeled traffic noise levels at Receptor NE-2 are projected to approach the Federal noise abatement criterion for Activity Category B under the 2040 Build Alternative. Modeled traffic noise levels at Receptor NE-62 and Receptor NE-63 are projected to exceed the Federal noise abatement criterion for Activity Category B under the 2040 Build Alternative; therefore, a noise wall was evaluated on the east side of Hwy 10 from north of East St. Germain Street to the railroad.

An approximately 640-foot long, 20-foot high noise wall was modeled along the east side of Hwy 10 from north of East St. Germain Street to the railroad, adjacent to residential uses at the Cloverleaf Park manufactured home community. The 20-foot high noise wall provides a 1.8 dBA to 8.1 dBA reduction in traffic noise levels (see Table C.46 in Appendix C). The approximately 640-foot long, 20-foot high noise wall achieved a 7 dBA reduction or greater at two receptors and a 5 dBA reduction or greater at eight receptors. The cost effectiveness of the noise wall is $54,900 per benefited receptor. The approximately 640-foot long, 20-foot high noise wall meets

MnDOT's cost effectiveness criterion of $78,500 per benefited receptor; therefore, Noise Wall 15 is proposed.

4.1.4 Other Noise Mitigation Techniques

Noise abatement measures other than noise walls were considered but determined not feasible and reasonable for the proposed project. These measures are summarized below.

Traffic Management Measures

Traffic management measures include such items as prohibition of certain vehicle types and time-use restrictions for certain vehicle types. These traffic management measures are not reasonable for the Hwy 10 and Hwy 23 corridor. These measures would be inconsistent with the function Hwy 10 and Hwy 23 as principal arterial roadways.

Modified Speed Limits

In general, a decrease in speed of approximately 20 mph is necessary for a noticeable decrease in noise levels. The existing posted speed limit within the project area is 50 mph along Hwy 10 and varies between 45 mph and 55 mph on Hwy 23. The design speed for the project segment of Hwy 10 is 55 mph and the design speed for the project segment of Hwy 23 is 45 mph. Lowering the speed limit on Hwy 10 or Hwy 23 would be inconsistent with their function as principal arterial roadways. In addition, motorists would likely not obey a substantially lower speed limit.

Vertical and Horizontal Alignment

The proposed changes to the Hwy 10 and Hwy 23 interchange are within the existing highway right-of-way. The proposed shift in the horizontal alignment on Hwy 23 is within the existing right-of-way. If the Hwy 23 alignment were to be shifted in either the north or south direction, traffic noise levels would be reduced on one side of the corridor at the expense of increasing traffic noise levels on the opposite side of the corridor.

The proposed project does not include significant modifications in the vertical profile as compared to existing conditions. However, as part of the proposed interchange modifications 4th Street SE will be extended over Hwy 10 to the east and connect into the frontage road system. This change in vertical profile is anticipated to reduce the modeled traffic noise levels at residential and commercial receptors near the proposed 4th Street SE overpass.

Landscaping/Natural Noise Screening

Vegetation is only effective for reducing noise levels if it is at least 100 feet to 200 feet deep, a minimum of 15 feet above the line of sight, and dense enough that it cannot be seen through (e.g., evergreen vegetation that maintains its foliage year-round). It is not feasible to plant enough vegetation within existing and proposed right of way to achieve substantial noise level reductions. As such, vegetation is not a reasonable noise mitigation measure.

Exclusive Land Use Designations

Buffer zones are undeveloped, open spaces adjacent to a roadway corridor. Residential, retail facilities, business offices, restaurants/bars, and industrial land uses are located along Hwy 10 and Hwy 23 within the project area. Because the project is within a developed, urban area, and because of the large amount of land necessary to accommodate buffer zones, acquisition of land to create buffer zones is not feasible.

Noise Insulation of Non-Residential Building

Under MnDOT's noise requirements, only non-residential buildings such as schools, hospitals, and places of worship should be considered for acoustical insulation if there are no exterior areas of frequent human use associated with the property. These land uses fall under Federal Activity Category D. The Federal noise abatement criterion for interior locations under Activity Category D is 52 dBA (Leq) (see Table 1.1).

If there are impacts to exterior areas of frequent human uses at an Activity Category C receptor, and exterior noise abatement is not feasible or reasonable, then an interior noise analysis is completed if the receptor also falls under Activity Category D. Interior noise mitigation is proposed only if the modeled interior noise level exceeds Activity Category D threshold of 52 dBA (L_{eq}).

There are two schools and one place of worship within the project limits. Kingdom Hall of Jehovah's Witnesses (Receptor NE-37) is on the east side of Hwy 10 between East St. Germain Street and East Division Street. Lincoln Elementary School (Receptor SW-1) is on the south side of Hwy 23 between Wilson Avenue SE and Lincoln Avenue SE. Reach Up Head Start (Receptor SE-18) is in the southeast quadrant of the Hwy 10 and Hwy 23 interchange. There are no other schools, hospitals, or other land uses identified in Activity Category D in the project area.

Kingdom Hall of Jehovah's Witnesses

Kingdom Hall of Jehovah's Witnesses is on the east side of Hwy 10 between East St. Germain Street and East Division Street and is represented by Receptor NE-37 (see Figure 4, Appendix A). Receptor NE-37 is at the entrance on the north side of the

building. The modeled noise level at Receptor NE-37 under the 2040 Build Alternative is 53.7 dBA (Leq).

The modeled noise level at Receptor NE-37 is projected to be below the Federal noise abatement criterion of 67 dBA for Activity Category C. Receptor NE-37 is not projected to experience a substantial increase in traffic noise from existing conditions to the 2040 Build Alternative; therefore, interior noise levels were not evaluated.

Lincoln Elementary School

Lincoln Elementary School is on the south side of Hwy 23 between Wilson Avenue SE and Lincoln Avenue SE and is represented by Receptor SW-1 (see Figure 3, Appendix A). Receptor SW-1 is at the entrance on the north side of the building facing Hwy 23. The modeled noise level at Receptor SW-1 under the 2040 Build Alternative is 62.7 dBA (Leq).

The modeled noise level at Receptor SW-1 is projected to be below the Federal noise abatement criterion of 67 dBA for Activity Category C. Receptor SW-1 is not projected to experience a substantial increase in traffic noise from existing conditions to the 2040 Build Alternative; therefore, interior noise levels were not evaluated.

Reach Up Head Start

Reach Up Head Start is in the southeast quadrant of the Hwy 10 and Hwy 23 interchange and is represented by Receptor SE-18 (see Figure 5, Appendix A). Receptor SE-18 is at the entrance on the west side of the building facing Hwy 10. The modeled noise level at Receptor SE-18 under the 2040 Build Alternative is 52.9 dBA (Leq).

The modeled noise level at Receptor SE-18 is projected to be below the Federal noise abatement criterion of 67 dBA for Activity Category C. Receptor SE-18 is not projected to experience a substantial increase in traffic noise from existing conditions to the 2040 Build Alternative; therefore, interior noise levels were not evaluated.

Chapter 5 Construction Noise

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

Table 5.1 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Table 5.1 Typical Construction Equipment Noise Levels at 50 Feet

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

Source: United States Environmental Protection Agency and Federal Highway Administration

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction will be required to minimize traffic impacts and to improve safety. However, construction will be limited to daytime hours as much as possible. This project is expected to be under construction for two construction seasons. If necessary, a detailed nighttime construction mitigation plan will be developed during the project final design stage.

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. Pile-driving noise is associated with any bridge construction and sheet piling necessary for retaining wall construction. While pile-driving equipment results in the highest peak noise level, as shown in Table 5.1 it is limited in duration to the

activities noted above (e.g., bridge construction, retaining wall construction). The use of pile drivers, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours.

Chapter 6 Conclusions and Recommendations

6.1 Traffic Noise Analysis Results

Construction of the Hwy 10 and Hwy 23 Pavement and Interchange Reconstruction Project is anticipated to increase modeled future traffic noise levels compared to existing conditions. Modeled Leq noise levels are predicted to range from 48.0 dBA to 76.0 dBA under the 2040 Build Alternative. Modeled Leq noise levels are projected to change by -7.7 dBA to 3.0 dBA under the 2040 Build Alternative compared to existing conditions. Modeled Leq noise levels are projected to approach or exceed the Federal noise abatement criterion for Activity Category B at 18 receptor locations under the 2040 Build Alternative. Modeled Leq noise levels are projected to approach or exceed the Federal noise abatement criterion for Activity Category C at 23 receptor locations representing receptors along proposed trails. None of the modeled receptor locations are predicted to experience a substantial increase in traffic noise levels (i.e., increase of 5 dBA or greater) from existing conditions to the 2040 Build Alternative.

6.2 Consideration of Noise Abatement Measures

Noise walls were evaluated along Hwy 10 and Hwy 23 at modeled receptor locations that are projected to approach or exceed Federal noise abatement criteria under the 2040 Build Alternative. Fifteen noise walls were modeled along the project corridor. Seven modeled walls did not meet MnDOT's cost effectiveness criterion and noise reduction design goal of 7 dBA or greater.

Based upon the analysis completed following the guidelines and procedures identified in the 2017 MnDOT Noise Requirements, MnDOT intends to construct seven noise walls with the Hwy 10 and Hwy 23 Pavement and Interchange Reconstruction Project. The layout figures in Appendix A illustrate the location of the proposed noise walls. The following noise walls are being proposed as part of the project:

- Noise Wall 3 is on the south side of Hwy 23, east of 14th Avenue SE. Noise Wall 3 has a preliminary cost per benefited receptor of $45,450. Noise Wall 3 is 20 feet tall with a proposed length of approximately 535 feet. Eight benefited receptors are adjacent to Noise Wall 3.

- Noise Wall 5 is on the south side of Hwy 23 between Lincoln Avenue SE and the entrance ramp to southbound Hwy 10. Noise Wall 5 has a preliminary cost per benefited receptor of $71,820. Noise Wall 5 is 7 feet tall with a proposed length of approximately 570 feet. Two benefited receptors are adjacent to Noise Wall 5.

- Noise Wall 8 is on the south side of Hwy 23 between the northbound Hwy 10 exit ramp and 14th Avenue SE. Noise Wall 8 has a preliminary cost per benefited receptor of $71,040. Noise Wall 8 is 8 feet tall with a proposed length of approximately 740 feet. Three benefited receptors are adjacent to Noise Wall 8.
- Noise Wall 10 is on the north side of Hwy 23 between the northbound Hwy 10 entrance ramp and the Hwy 23 bridges over Hwy 10. Noise Wall 10 has a preliminary cost per benefited receptor of $69,120. Noise Wall 10 is 6 feet tall with a proposed length of approximately 320 feet. One benefited receptor is adjacent to Noise Wall 10.
- Noise Wall 13 is on the east side of Hwy 10 and north of the proposed 4th Street SE overpass. Noise Wall 13 has a preliminary cost per benefited receptor of $69,930. Noise Wall 13 is 7 feet tall with a proposed length of approximately 555 feet. Two benefited receptors are adjacent to Noise Wall 13.
- Noise Wall 14 is on the east side of Hwy 10 and south of the proposed 4th Street SE overpass. Noise Wall 14 has a preliminary cost per benefited receptor of $69,300. Noise Wall 14 is 7 feet tall with a proposed length of approximately 550 feet. Two benefited receptors are adjacent to Noise Wall 14.
- Noise Wall 15 is on the east side of Hwy 10 from north of East St. Germain Street to the railroad. Noise Wall 15 has a preliminary cost per benefited receptor of $54,900. Noise Wall 15 is 20 feet tall with a proposed length of approximately 640 feet. Eight benefited receptors are adjacent to Noise Wall 15.

6.3 Statement of Likelihood

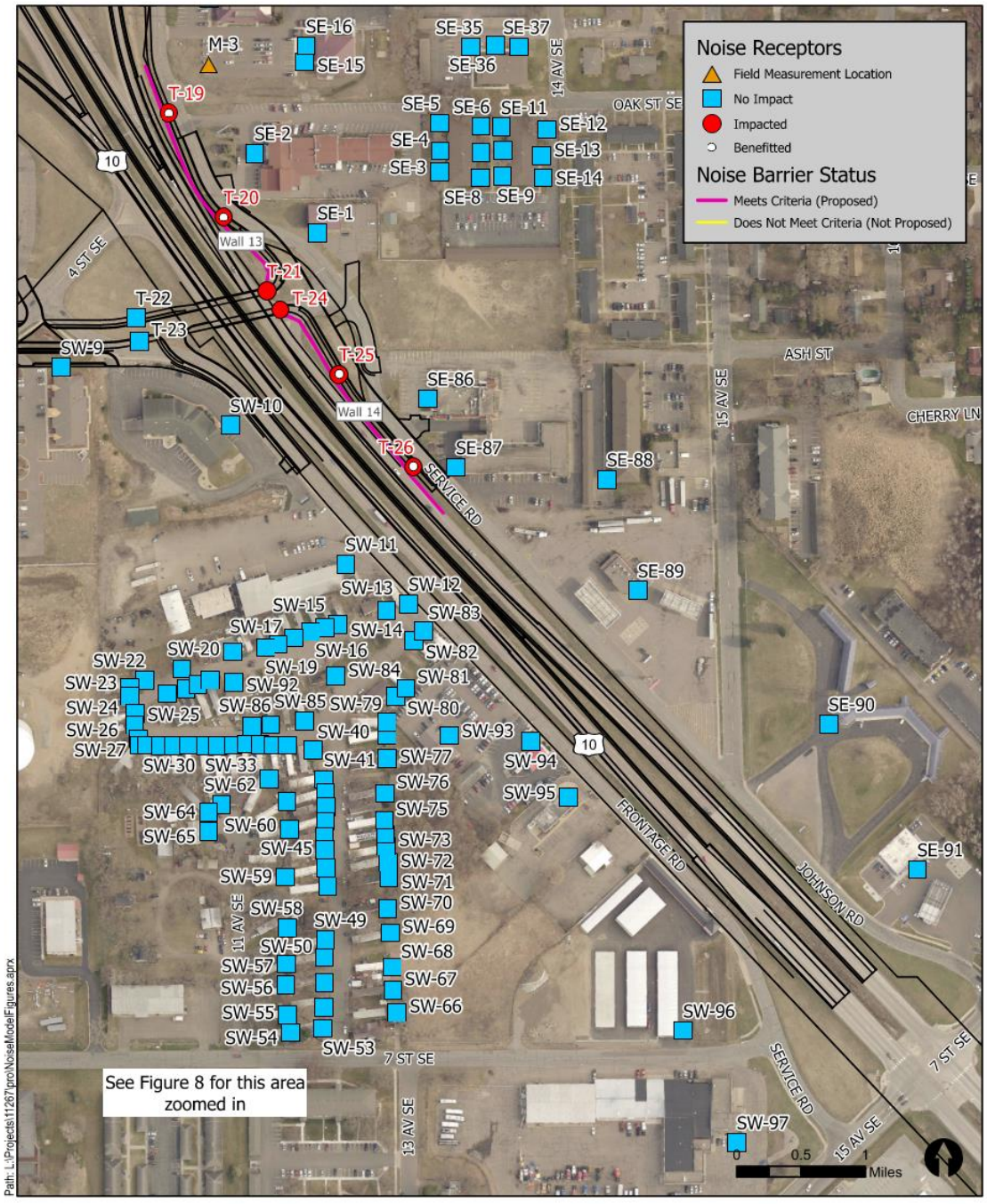
The traffic noise analysis for the proposed noise wall described above is based upon preliminary design studies completed to date. Final noise mitigation decisions will be subject to final design considerations and the viewpoint of benefited residents and property owners.

If conditions substantially change by the time the project reaches the final design stage, noise abatement measures may not be provided. If the final plan changes substantially, receptors that would have received benefits from noise walls, along with local officials, will be notified of plans to eliminate or substantially modify a noise abatement measure prior to the final design process. This notification will explain any changes in site conditions (if any), additional site information, any design changes implemented during the final design process, and explanation of noise wall 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

Figures

Appendix A. Figure 1 of 8 Noise Receptors and Proposed Wall Locations



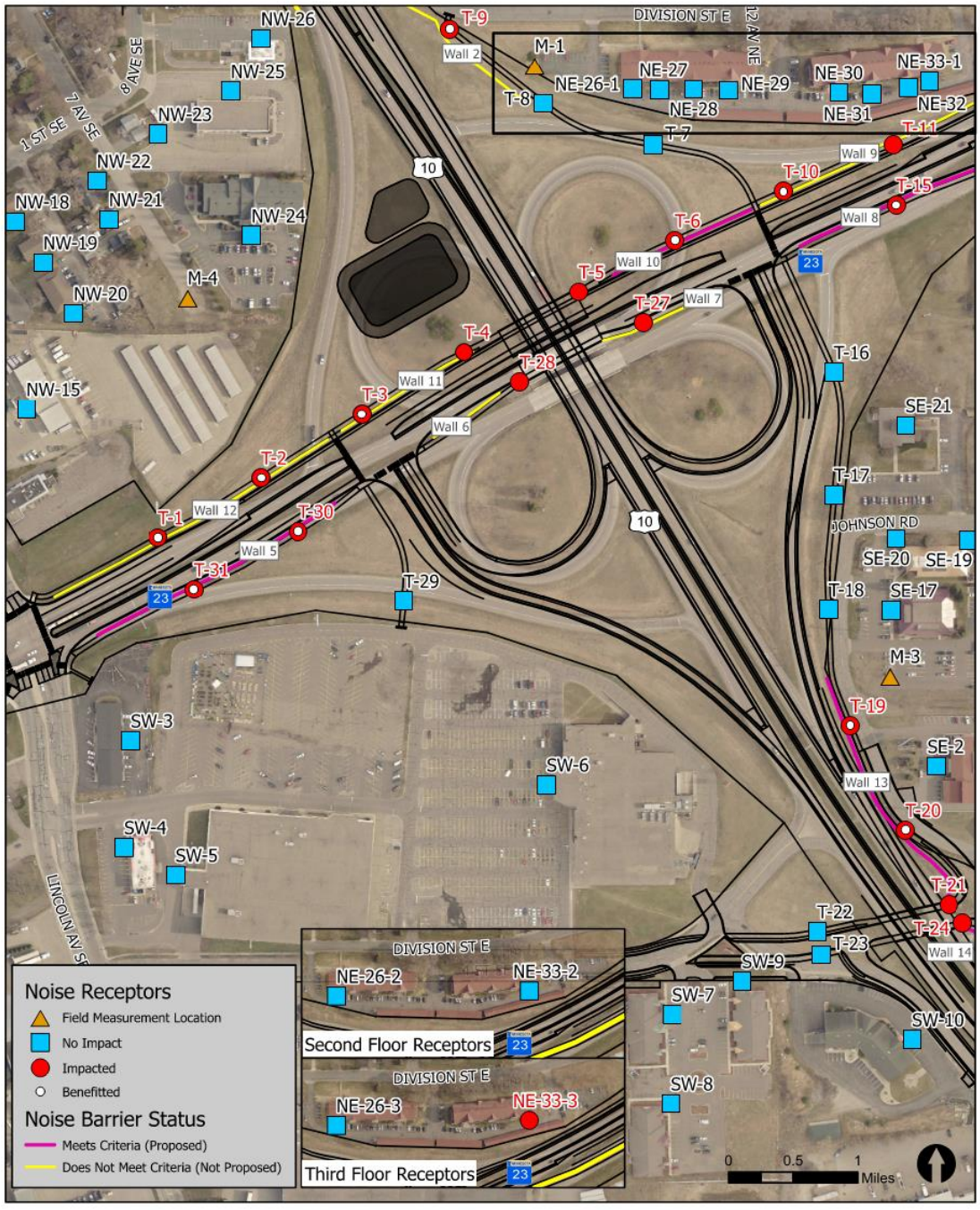
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 1 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 2 of 8 Noise Receptors and Proposed Wall Locations



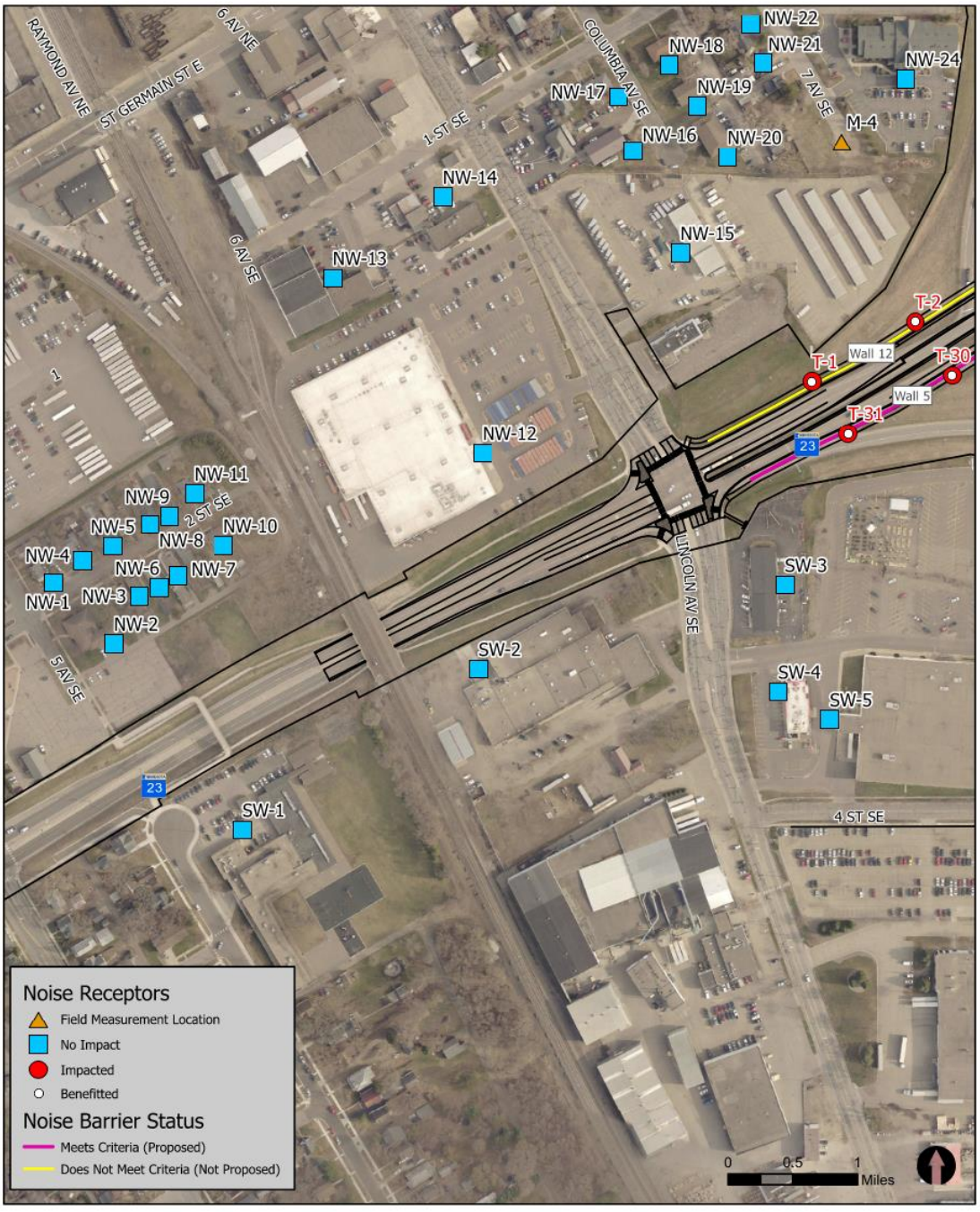
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 2 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 3 of 8 Noise Receptors and Proposed Wall Locations



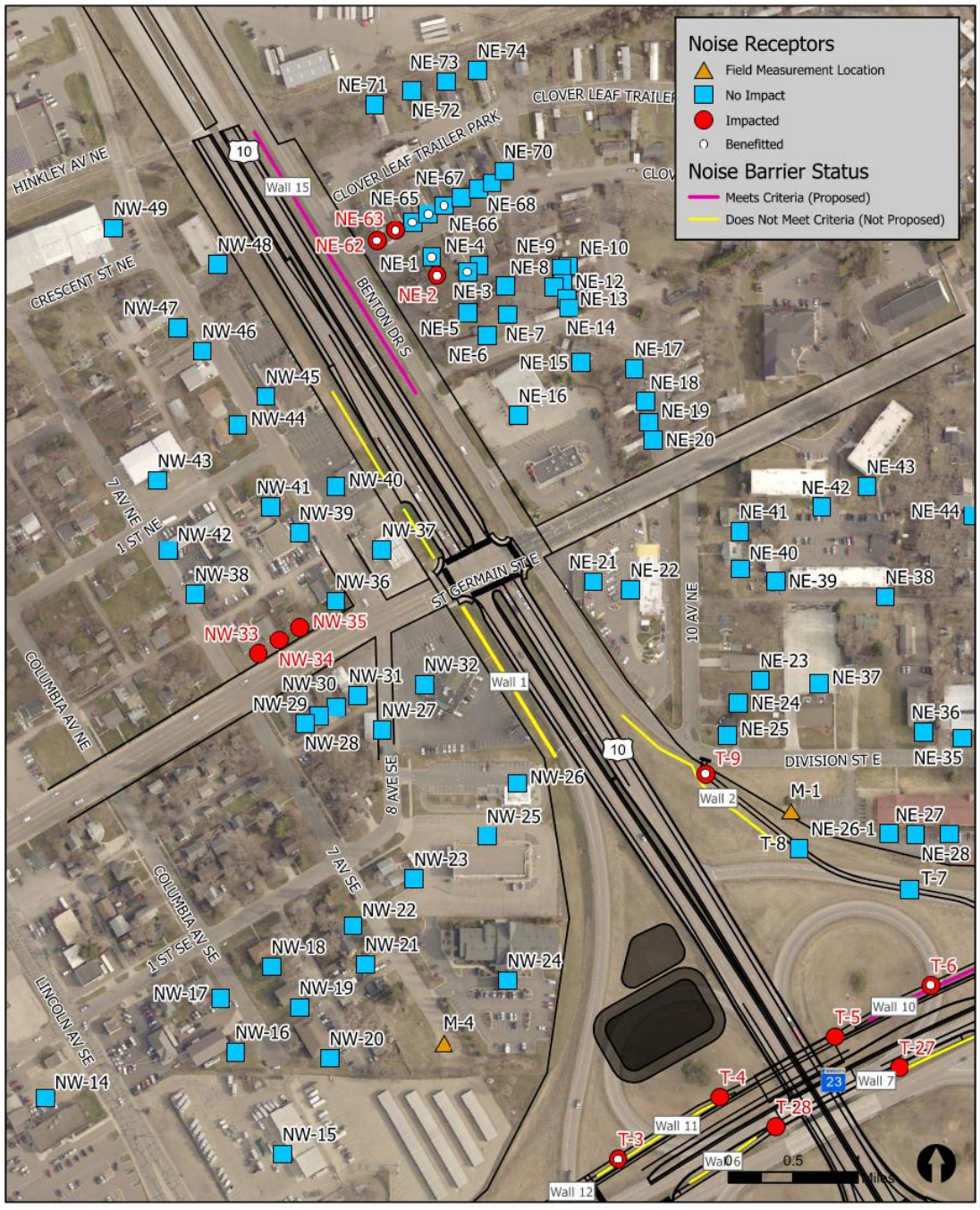
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 3 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 4 of 8 Noise Receptors and Proposed Wall Locations



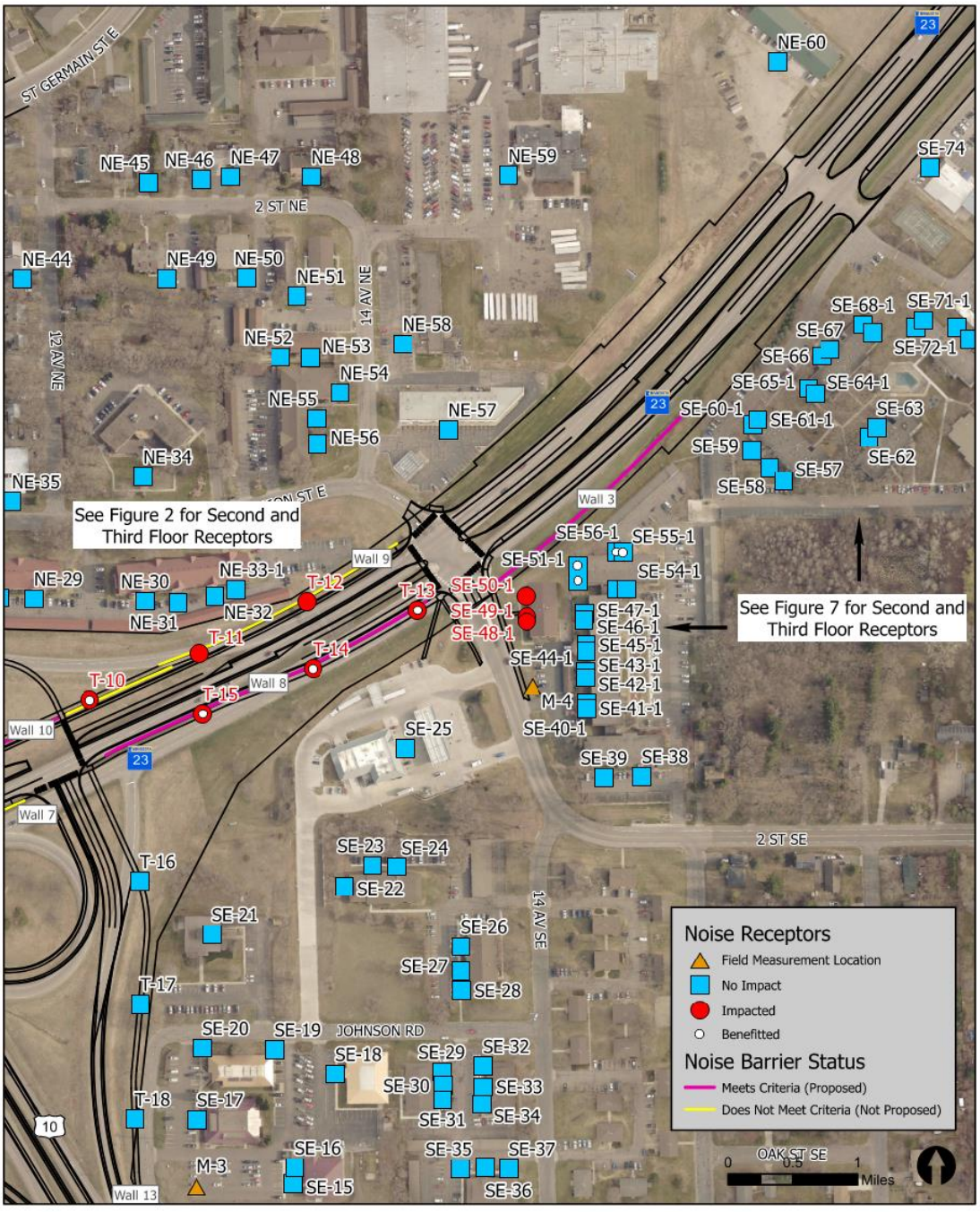
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 4 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 5 of 8 Noise Receptors and Proposed Wall Locations



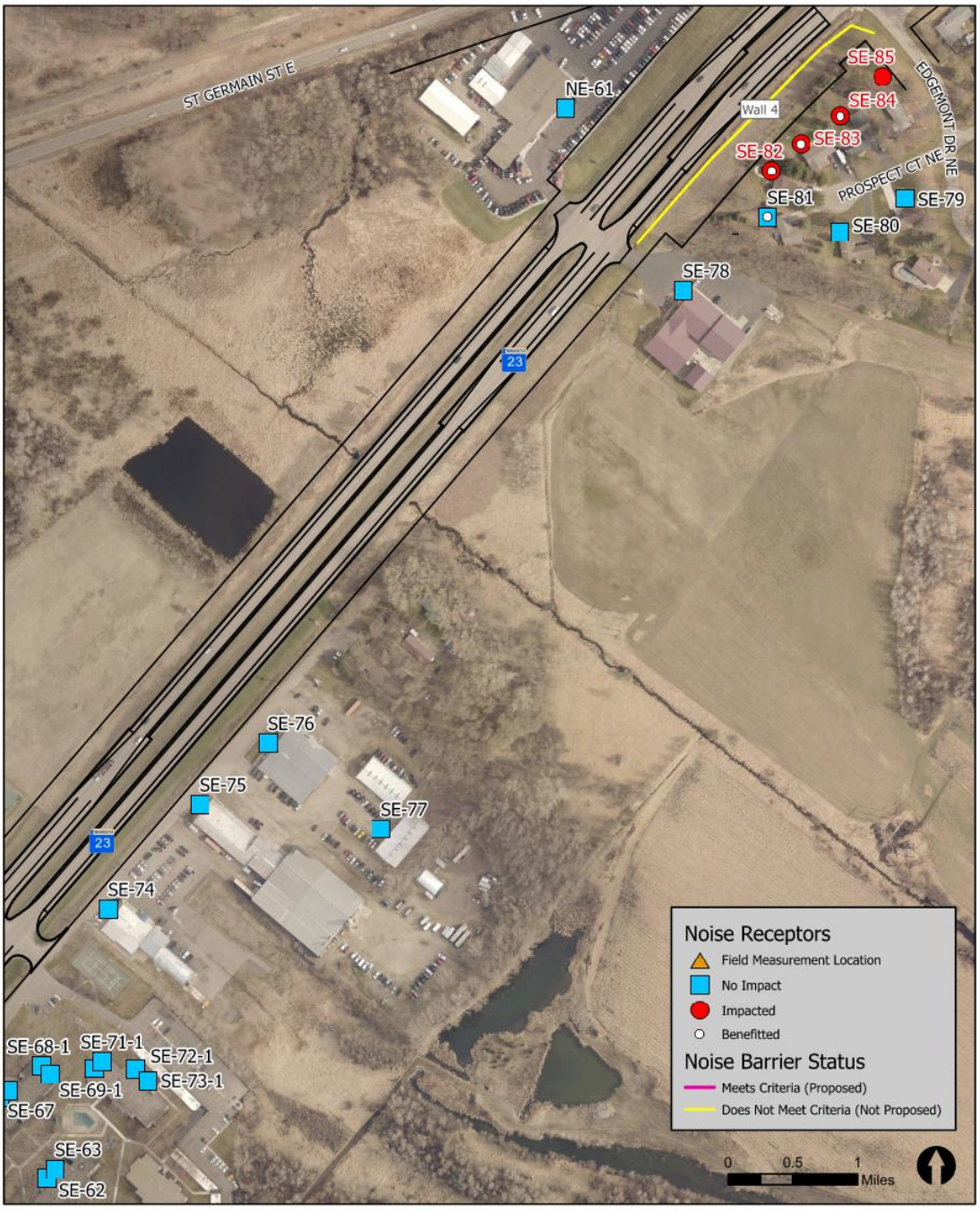
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 5 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 6 of 8 Noise Receptors and Proposed Wall Locations



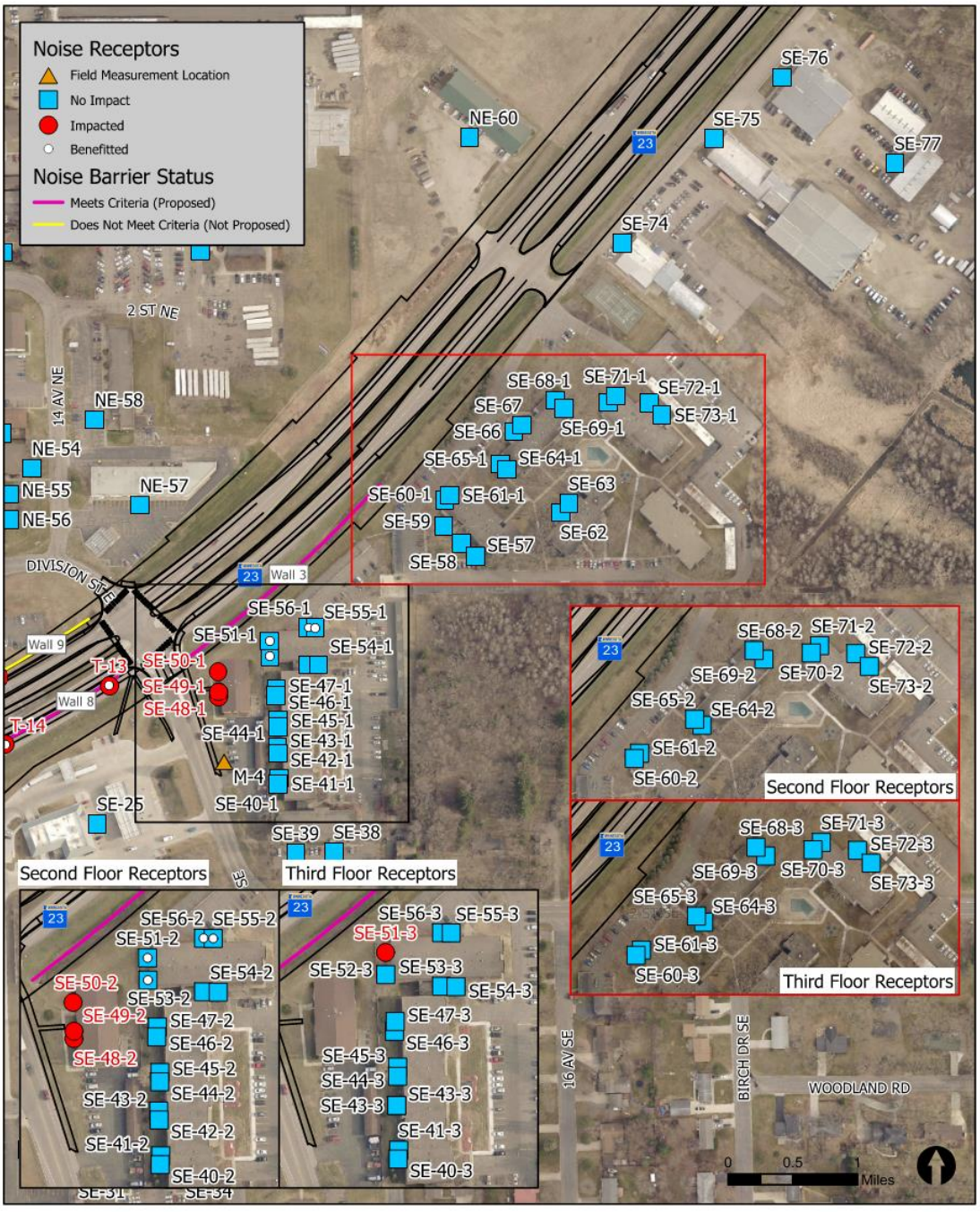
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 6 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 7 of 8 Noise Receptors and Proposed Wall Locations



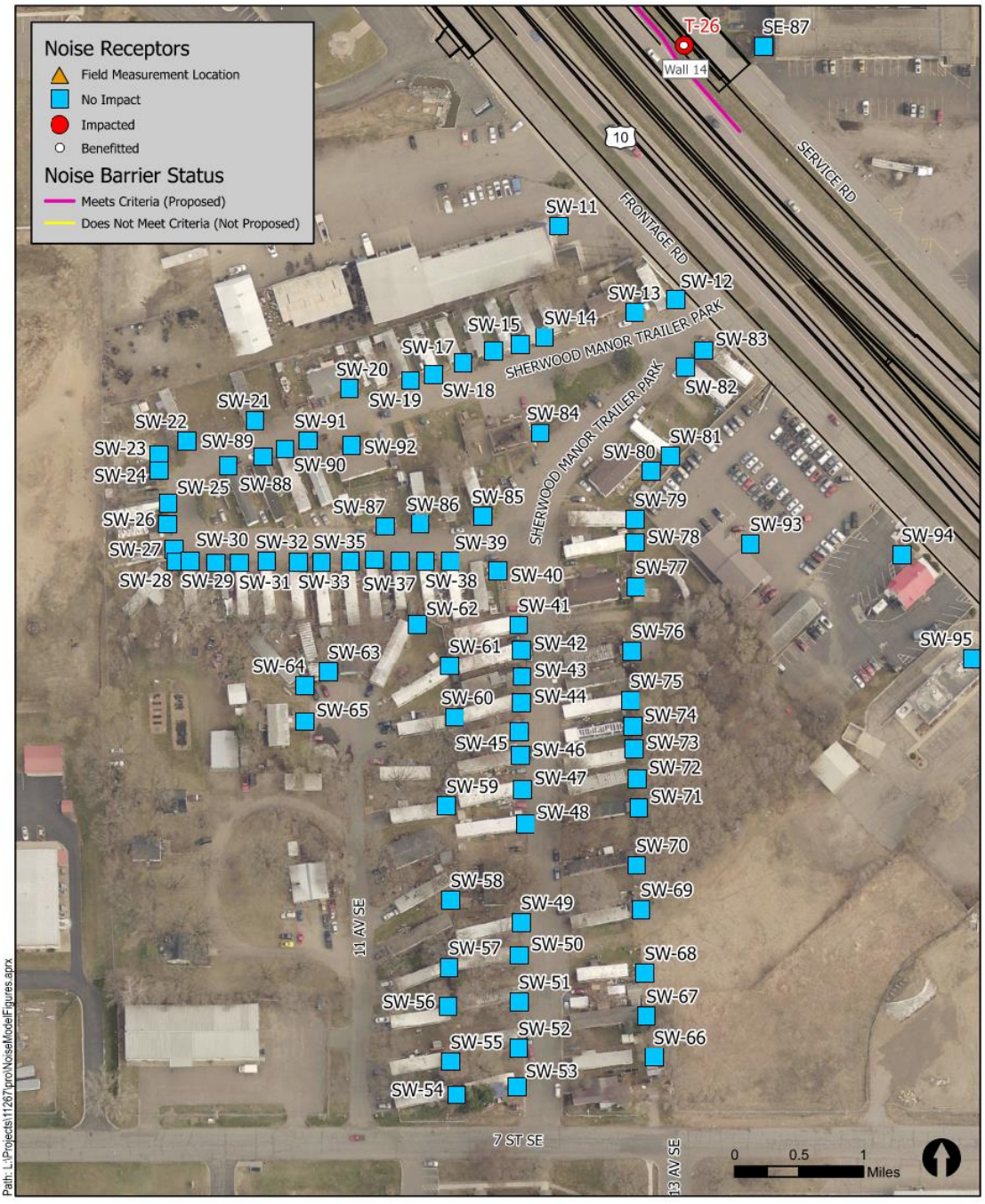
Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 7 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix A. Figure 8 of 8 Noise Receptors and Proposed Wall Locations



Noise Receptors and Proposed Wall Locations

MnDOT TH 10/CSAH 23 Pavement/Interchange - SP 0503-91 Figure 8 of 8

Saint Cloud, MN

DEPARTMENT OF TRANSPORTATION

Appendix B

Field Measurement Data Sheets

Appendix B. Field Measurement Data Sheet, Site M1

FIELD MEASUREMENT DATA SHEET

Sound Level Meter (SLM) Settings				
Time:	**Fast**	Slow	Name:	MnDOT District 3
Weighting:	Lin.	**A**	Date:	November 15, 2019
Mic. Setting:	Fr.	**Rnd**	Project Name:	Hwy 10, Hwy 23 - east St. Cloud
			Project Number:	SP 0503-91

Sound Level Meter (SLM)		**Calibrator**		
Manufacturer	Bruel & Kjær	Manufacturer	Bruel & Kjær	
Model	Type 2250	Model	4231	
Serial No.	3000540	Serial No.	2725243	
Microphone	Type 4189 (Serial No. 2933208)	Calibrator Frequency (Hz)		1000 Hz

Calibration			
Initial Calibration	0.02	Time	10:20 AM
Final Calibration	--	Time	--

Monitor Location and Terrain Conditions: Location 1 (northeast quadrant of Hwy 10/23 interchange)
West side of parking lot at apartments (1100 Division Street East)

Dominant and Observed Noise Sources: Traffic noise from vehicles on Hwy 10 and Hwy 23

MEASURMENT INFORMATION					
Test Number	1	2	3	4	5
Date	11/15/2019				
Start Time	10:30 AM				
End Time	10:45 AM				
Weather	Cloudy				
Temp (^{o}F)	31				
Rel. Humidity (%)	59				
Wind (mph)	8				
Wind direction	ENE				
Road conditions	Dry				

TRAFFIC					
Test Number	Hwy 10	Hwy 23	3	4	5
Autos	--	--			
Med Trucks	--	--			
Heavy Trucks	--	--			
Buses	--	--			
Motorcycles	--	--			
Total	--	--			
Speed Limit	50 mph	45 mph			

MONITOR RESULTS (dBA)					
Test Number	1	2	3	4	5
L1	65.0				
L5	62.0				
L10	60.5				
L50	57.0				
L90	52.5				
L99	50.0				
Leq	58.3				
Lmax	72.0				
Lmin	48.6				

(See other side for plan view and cross section images)

Page 1 of 2

Appendix B. Field Measurement Data Sheet, Site M1 continued

Plan view and cross section images

(Include noise source, receiver, microphone location, reflecting objects, obstructions, landmarks and approximate distances)

GPS Coordinates: X: 45.568051 Y: -93.139058

Comments:

PLAN VIEW

CROSS SECTION

Page 2 of 2

Appendix B. Field Measurement Data Sheet, Site M2

FIELD MEASUREMENT DATA SHEET

Sound Level Meter (SLM) Settings				
Time:	**Fast**	Slow	Name:	MnDOT District 3
Weighting:	Lin.	**A**	Date:	November 15, 2019
Mic. Setting:	Fr.	**Rnd**	Project Name:	Hwy 10, Hwy 23 - east St. Cloud
			Project Number:	SP 0503-91

Sound Level Meter (SLM)		**Calibrator**		
Manufacturer	Bruel & Kjær	Manufacturer	Bruel & Kjær	
Model	Type 2250	Model	4231	
Serial No.	3000540	Serial No.	2725243	
Microphone	Type 4189 (Serial No. 2933208)	Calibrator Frequency (Hz)		1000 Hz

Calibration

Initial Calibration	--	Time	--
Final Calibration	--	Time	--

Monitor Location and Terrain Conditions: Location 2 (south side of Hwy 23 at 14th Avenue SE)
West side of parking lot at apartments (200 14th Avenue SE)

Dominant and Observed Noise Sources: Traffic noise from vehicles on Hwy 23

MEASURMENT INFORMATION					
Test Number	1	2	3	4	5
Date	11/15/2019				
Start Time	10:57 AM				
End Time	11:12 AM				
Weather	Cloudy				
Temp (^{o}F)	31				
Rel. Humidity (%)	59				
Wind (mph)	8				
Wind direction	ENE				
Road conditions	Dry				

TRAFFIC					
Test Number	EB Hwy 23	WB Hwy 23	3	4	5
Autos	--	--			
Med Trucks	--	--			
Heavy Trucks	--	--			
Buses	--	--			
Motorcycles	--	--			
Total	--	--			
Speed Limit	45 mph	45 mph			

MONITOR RESULTS (dBA)					
Test Number	1	2	3	4	5
L1	70.0				
L5	67.0				
L10	65.5				
L50	58.0				
L90	52.5				
L99	49.0				
Leq	61.6				
Lmax	79.5				
Lmin	47.2				

(See other side for plan view and cross section images)

Page 1 of 2

Plan view and cross section images

(Include noise source, receiver, microphone location, reflecting objects, obstructions, landmarks and approximate distances)

GPS Coordinates: X: 45.567313 Y: -94.133342

Comments:

PLAN VIEW

CROSS SECTION

Appendix B. Field Measurement Data Sheet, Site M3

FIELD MEASUREMENT DATA SHEET

Sound Level Meter (SLM) Settings				
Time:	**Fast**	Slow	Name:	MnDOT District 3
Weighting:	Lin.	**A**	Date:	November 15, 2019
Mic. Setting:	Fr.	**Rnd**	Project Name:	Hwy 10, Hwy 23 - east St. Cloud
			Project Number:	SP 0503-91

Sound Level Meter (SLM)		**Calibrator**		
Manufacturer	Bruel & Kjær	Manufacturer	Bruel & Kjær	
Model	Type 2250	Model	4231	
Serial No.	3000540	Serial No.	2725243	
Microphone	Type 4189 (Serial No. 2933208)	Calibrator Frequency (Hz)		1000 Hz

Calibration

Initial Calibration	--	Time	--
Final Calibration	--	Time	--

Monitor Location and Terrain Conditions: Location 3 (southeast quadrant of Hwy 10 and Hwy 23)
Southwest corner of office building parking lot (350 US Hwy 10)

Dominant and Observed Noise Sources: Traffic noise from vehicles on Hwy 10 and Hwy 23

MEASURMENT INFORMATION					
Test Number	1	2	3	4	5
Date	11/15/2019				
Start Time	11:25 AM				
End Time	11:40 AM				
Weather	Cloudy				
Temp (^{o}F)	32				
Rel. Humidity (%)	56				
Wind (mph)	7				
Wind direction	ENE				
Road conditions	Dry				

TRAFFIC					
Test Number	Hwy 10	Hwy 23	3	4	5
Autos	--	--			
Med Trucks	--	--			
Heavy Trucks	--	--			
Buses	--	--			
Motorcycles	--	--			
Total	--	--			
Speed Limit	50 mph	45 mph			

MONITOR RESULTS (dBA)					
Test Number	1	2	3	4	5
L1	66.5				
L5	64.5				
L10	63.0				
L50	58.0				
L90	52.0				
L99	49.0				
Leq	59.7				
Lmax	70.7				
Lmin	46.8				

(See other side for plan view and cross section images)

Page 1 of 2

Plan view and cross section images

(Include noise source, receiver, microphone location, reflecting objects, obstructions, landmarks and approximate distances)

GPS Coordinates: X: 45.564451 Y: -94.13621

Comments:

PLAN VIEW

CROSS SECTION

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Appendix B. Field Measurement Data Sheet, Site M4

FIELD MEASUREMENT DATA SHEET

Sound Level Meter (SLM) Settings				
Time:	**Fast**	Slow	Name:	MnDOT District 3
Weighting:	Lin.	**A**	Date:	November 15, 2019
Mic. Setting:	Fr.	**Rnd**	Project Name:	Hwy 10, Hwy 23 - east St. Cloud
			Project Number:	SP 0503-91

Sound Level Meter (SLM)		**Calibrator**		
Manufacturer	Bruel & Kjær	Manufacturer	Bruel & Kjær	
Model	Type 2250	Model	4231	
Serial No.	3000540	Serial No.	2725243	
Microphone	Type 4189 (Serial No. 2933208)	Calibrator Frequency (Hz)		1000 Hz

Calibration			
Initial Calibration	--	Time	--
Final Calibration	0.01	Time	12:10 PM

Monitor Location and Terrain Conditions: Location 4 (northwest quadrant of Hwy 10 and Hwy 23) 7th Avenue SE cul-de-sac at Country Inn & Suites Hotel (120 7th Avenue SE)

Dominant and Observed Noise Sources: Traffic noise from vehicles on Hwy 10 and Hwy 23

MEASURMENT INFORMATION					
Test Number	1	2	3	4	5
Date	11/15/2019				
Start Time	11:48 AM				
End Time	12:03 PM				
Weather	Cloudy				
Temp (°F)	32				
Rel. Humidity (%)	56				
Wind (mph)	7				
Wind direction	ENE				
Road conditions	Dry				

TRAFFIC					
Test Number	Hwy 10	Hwy 23	3	4	5
Autos	--	--			
Med Trucks	--	--			
Heavy Trucks	--	--			
Buses	--	--			
Motorcycles	--	--			
Total	--	--			
Speed Limit	50 mph	45 mph			

MONITOR RESULTS (dBA)					
Test Number	1	2	3	4	5
L1	60.5				
L5	57.0				
L10	56.0				
L50	53.5				
L90	51.0				
L99	49.0				
Leq	54.3				
Lmax	63.2				
Lmin	47.1				

(See other side for plan view and cross section images)

Page 1 of 2

Plan view and cross section images

(Include noise source, receiver, microphone location, reflecting objects, obstructions, landmarks and approximate distances)

GPS Coordinates: X: 45.566728 Y: -94.141815

Comments:

PLAN VIEW

CROSS SECTION

Page 2 of 2

Appendix C

Noise Wall Cost Effectiveness Results

Table C.1 Noise Mitigation Cost Effectiveness Results (Modeled Wall 1: West Side of Hwy 10 at East St. Germain Street) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NW-23	56.5	55.4	1.1	1	0	0	690	13,200	$475,200	N/A
NW-25	58.9	57.8	1.1	1	0	0				
NW-26	51.6	51.5	0.1	1	0	0				
NW-27	60.2	59.1	1.1	1	0	0				
NW-28	62.2	61.8	0.4	1	0	0				
NW-29	62.4	61.8	0.6	1	0	0				
NW-30	62.5	62.0	0.5	1	0	0				
NW-31	62.5	61.9	0.6	1	0	0				
NW-32	62.1	59.7	2.4	1	0	0				
NW-33	**66.3**	**66.2**	0.1	1	0	0				
NW-34	**66.1**	65.9	0.2	1	0	0				
NW-35	**66.1**	65.9	0.2	1	0	0				
NW-36	65.8	65.2	0.6	1	0	0				
NW-37	61.8	59.7	2.1	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.1 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 1: West Side of Hwy 10 at East St. Germain Street) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NW-38	59.2	58.6	0.6	1	0	0	690	13,200	$475,200	N/A
NW-39	61.8	60.3	1.5	1	0	0				
NW-40	61.8	60.9	0.9	1	0	0				
NW-41	61.6	60.0	1.6	1	0	0				
NW-42	58.5	57.7	0.8	1	0	0				
NW-43	59.2	58.4	0.8	1	0	0				
NW-44	63.4	62.8	0.6	1	0	0				
NW-45	67.6	67.2	0.4	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.2 Noise Mitigation Cost Effectiveness Results (Modeled Wall 2: East of Hwy 10 and North of Hwy 23) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-23	57.4	55.3	2.1	1	0	0	425	7,900	$284,400	N/A
NE-24	58.8	56.8	2.0	1	0	0				
NE-25	65.9	63.2	2.7	1	0	0				
NE-37	53.7	53.1	0.6	1	0	0				
NE-38	53.3	52.9	0.4	1	0	0				
NE-42	51.6	51.5	0.1	1	0	0				
NE-43	53.9	53.8	0.1	1	0	0				
T-8	64.1	63.8	0.3	1	0	0				
T-9	**68.2**	62.9	5.3	1	1	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.3 Noise Mitigation Cost Effectiveness Results (Modeled Wall 2: East of Hwy 10 and North of Hwy 23) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-23	57.4	56.6	0.8	1	0	0	425	3,400	$122,400	N/A
NE-24	58.8	58.1	0.7	1	0	0				
NE-25	65.9	64.7	1.2	1	0	0				
NE-37	53.7	53.6	0.1							
NE-38	53.3	53.2	0.1	1	0	0				
NE-42	51.6	51.6	0.0	1	0	0				
NE-43	53.9	53.9	0.0	1	0	0				
T-8	64.1	64.1	0.0	1	0	0				
T-9	**68.2**	64.3	3.9	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.4 Noise Mitigation Cost Effectiveness Results (Modeled Wall 3: Southeast Quadrant of Hwy 23 and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-38	58.5	58.5	0.0	1	0	0	535	10,100	$363,600	$45,450
SE-39	61.0	61.0	0.0	1	0	0				
SE-40-1	59.6	59.5	0.1	1	0	0				
SE-40-2	63.0	62.8	0.2	1	0	0				
SE-40-3	63.5	63.4	0.1	1	0	0				
SE-41-1	59.3	59.2	0.1	1	0	0				
SE-41-2	62.8	62.6	0.2	1	0	0				
SE-41-3	63.4	63.2	0.2	1	0	0				
SE-42-1	58.9	58.6	0.3	1	0	0				
SE-42-2	62.3	62.0	0.3	1	0	0				
SE-43-1	58.8	58.5	0.3	1	0	0				
SE-43-2	62.1	61.8	0.3	1	0	0				
SE-43-3	63.0	62.6	0.4	1	0	0				
SE-43-3	63.1	62.6	0.5	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.4 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 3: Southeast Quadrant of Hwy 23 and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-44-1	58.2	57.6	0.6	1	0	0	535	10,100	$363,600	$45,450
SE-44-2	61.1	60.5	0.6	1	0	0				
SE-44-3	62.4	61.9	0.5	1	0	0				
SE-45-1	58.1	57.3	0.8	1	0	0				
SE-45-2	60.8	60.0	0.8	1	0	0				
SE-45-3	62.3	61.7	0.6	1	0	0				
SE-46-1	56.9	54.0	2.9	1	0	0				
SE-46-2	59.3	56.7	2.6	1	0	0				
SE-46-3	62.5	61.4	1.1	1	0	0				
SE-47-1	57.3	53.6	3.7	1	0	0				
SE-47-2	59.4	56.2	3.2	1	0	0				
SE-47-3	62.7	61.5	1.2	1	0	0				
SE-48-1	**66.1**	65.5	0.6	1	0	0				
SE-48-2	**67.3**	**66.7**	0.6	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.4 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 3: Southeast Quadrant of Hwy 23 and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-49-1	**66.1**	65.3	0.8	1	0	0	535	10,100	$363,600	$45,450
SE-49-2	**67.3**	**66.6**	0.7	1	0	0				
SE-50-1	**66.8**	64.4	2.4	1	0	0				
SE-50-2	**67.6**	**66.1**	1.5	1	0	0				
SE-51-1	65.4	57.1	8.3	1	1	1				
SE-51-2	65.8	59.1	6.7	1	1	0				
SE-51-3	**66.7**	65.0	1.7	1	0	0				
SE-52-1	63.5	55.3	8.2	1	1	1				
SE-52-2	64.3	57.5	6.8	1	1	0				
SE-52-3	65.8	63.5	2.3	1	0	0				
SE-53-1	50.3	48.3	2.0	1	0	0				
SE-53-2	53.2	51.4	1.8	1	0	0				
SE-53-3	60.9	60.1	0.8	1	0	0				
SE-54-1	49.8	48.5	1.3	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.4 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 3: Southeast Quadrant of Hwy 23 and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-54-2	52.6	51.4	1.2	1	0	0	535	10,100	$363,600	$45,450
SE-54-3	59.9	59.3	0.6	1	0	0				
SE-55-1	59.3	51.9	7.4	1	1	1				
SE-55-2	60.0	54.6	5.4	1	1	0				
SE-55-3	63.4	62.1	1.3	1	0	0				
SE-56-1	60.3	52.2	8.1	1	1	1				
SE-56-2	60.9	54.7	6.2	1	1	0				
SE-56-3	64.2	62.9	1.3	1	0	0				
SE-57	53.0	52.7	0.3	1	0	0				
SE-58	55.0	54.5	0.5	1	0	0				
SE-59	59.3	56.4	2.9	1	0	0				
SE-60-1	63.1	62.7	0.4	1	0	0				
SE-60-2	64.8	64.4	0.4	1	0	0				
SE-60-3	65.3	64.9	0.4	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.4 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 3: Southeast Quadrant of Hwy 23 and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-61-1	63.2	62.7	0.5	1	0	0	535	10,100	$363,600	$45,450
SE-61-2	64.9	64.5	0.4	1	0	0				
SE-61-3	65.3	65.0	0.3	1	0	0				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 3					**8**	–				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.5 Noise Mitigation Cost Effectiveness Results (Modeled Wall 4: Southwest Quadrant of Hwy 23 and Edgemont Drive NE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-78	65.4	62.9	2.5	1	0	0	700	13,400	$482,400	$120,600
SE-79	54.5	52.3	2.2	1	0	0				
SE-80	56.7	53.5	3.2	1	0	0				
SE-81	65.3	58.9	6.4	1	1	0				
SE-82	**68.3**	59.9	8.4	1	1	1				
SE-83	**68.1**	59.6	8.5	1	1	1				
SE-84	**67.3**	59.5	7.8	1	1	1				
SE-85	**66.8**	62.4	4.4	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.6 Noise Mitigation Cost Effectiveness Results (Modeled Wall 4: Southwest Quadrant of Hwy 23 and Edgemont Drive NE) (18-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-78	65.4	62.9	2.5	1	0	0	700	12,120	$436,320	$109,080
SE-79	54.5	52.5	2.0	1	0	0				
SE-80	56.7	53.9	2.8	1	0	0				
SE-81	65.3	59.5	5.8	1	1	0				
SE-82	**68.3**	60.8	7.5	1	1	1				
SE-83	**68.1**	60.7	7.4	1	1	1				
SE-84	**67.3**	60.3	7.0	1	1	1				
SE-85	**66.8**	62.5	4.3	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.7 Noise Mitigation Cost Effectiveness Results (Modeled Wall 4: Southwest Quadrant of Hwy 23 and Edgemont Drive NE) (16-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-78	65.4	63.0	2.4	1	0	0	700	10,840	$390,240	N/A
SE-79	54.5	52.9	1.6	1	0	0				
SE-80	56.7	54.5	2.2	1	0	0				
SE-81	65.3	60.7	4.6	1	0	0				
SE-82	**68.3**	62.3	6.0	1	1	0				
SE-83	**68.1**	62.2	5.9	1	1	0				
SE-84	**67.3**	61.5	5.8	1	1	0				
SE-85	**66.8**	63.1	3.7	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.8 Noise Mitigation Cost Effectiveness Results (Modeled Wall 5: South Side of Hwy 23 Between Lincoln Avenue and Southbound Hwy 10 Entrance Ramp) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-29	62.8	62.0	0.8	1	0	0	570	10,800	$388,800	$129,600
T-30	**71.6**	58.8	12.8	1	1	1				
T-31	**74.7**	56.8	17.9	1	1	1				
SW-3	58.2	53.1	5.1	1	1	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.9 Noise Mitigation Cost Effectiveness Results (Modeled Wall 5: South Side of Hwy 23 Between Lincoln Avenue and Southbound Hwy 10 Entrance Ramp) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-29	62.8	62.1	0.7	1	0	0	570	5,700	$205,200	$102,600
T-30	**71.6**	61.3	10.3	1	1	1				
T-31	**74.7**	61.7	13.0	1	1	1				
SW-3	58.2	55.3	2.9	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.10 Noise Mitigation Cost Effectiveness Results (Modeled Wall 5: South Side of Hwy 23 Between Lincoln Avenue and Southbound Hwy 10 Entrance Ramp) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-29	62.8	62.3	0.5	1	0	0	570	4,560	$164,160	$82,080
T-30	**71.6**	62.8	8.8	1	1	1				
T-31	**74.7**	63.9	10.8	1	1	1				
SW-3	58.2	55.7	2.5	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.11 Noise Mitigation Cost Effectiveness Results (Modeled Wall 5: South Side of Hwy 23 Between Lincoln Avenue and Southbound Hwy 10 Entrance Ramp) (7-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-29	62.8	62.3	0.5	1	0	0	570	3,990	$143,640	$71,820
T-30	**71.6**	63.9	7.7	1	1	0				
T-31	**74.7**	65.4	9.3	1	1	0				
SW-3	58.2	55.8	2.4	1	0	0				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 5					2	--				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.12 Noise Mitigation Cost Effectiveness Results (Modeled Wall 6: South Side of Hwy 23 Between Southbound Hwy 10 Exit Ramp and Hwy 23 Bridge) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-28	**76.0**	**76.0**	0.0	1	0	0	165	3,300	$118,800	N/A

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.13 Noise Mitigation Cost Effectiveness Results (Modeled Wall 6: South Side of Hwy 23 Between Southbound Hwy 10 Exit Ramp and Hwy 23 Bridge) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-28	**76.0**	**76.0**	0.0	1	0	0	165	1,650	$59,400	N/A

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.14 Noise Mitigation Cost Effectiveness Results (Modeled Wall 6: South Side of Hwy 23 Between Southbound Hwy 10 Exit Ramp and Hwy 23 Bridge) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-28	**76.0**	**76.0**	0.0	1	0	0	165	1,320	$47,520	N/A

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.15 Noise Mitigation Cost Effectiveness Results (Modeled Wall 7: South Side of Hwy 23 Between Hwy 23 Bridge and Northbound Hwy 10 Entrance Ramp) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-27	**72.3**	**71.9**	0.4	1	0	0	265	5,300	$190,800	N/A

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.16 Noise Mitigation Cost Effectiveness Results (Modeled Wall 7: South Side of Hwy 23 Between Hwy 23 Bridge and Northbound Hwy 10 Entrance Ramp) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-27	**72.3**	**72.3**	0.4	1	0	0	265	2,650	$95,400	N/A

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.17 Noise Mitigation Cost Effectiveness Results (Modeled Wall 7: South Side of Hwy 23 Between Hwy 23 Bridge and Northbound Hwy 10 Entrance Ramp) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-27	**72.3**	**72.3**	0.0	1	0	0	265	2,120	$76,320	N/A

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.18 Noise Mitigation Cost Effectiveness Results (Modeled Wall 8: South Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-21	54.5	52.2	2.3	1	0	0	740	14,200	$511,200	$170,400
SE-22	56.0	54.0	2.0	1	0	0				
SE-23	56.3	54.5	1.8	1	0	0				
SE-24	56.0	54.7	1.3	1	0	0				
SE-25	58.5	56.9	1.6	1	0	0				
SE-26	52.5	51.9	0.6	1	0	0				
T-13	**69.5**	62.8	6.7	1	1	0				
T-14	**72.1**	55.9	16.2	1	1	1				
T-15	**74.4**	57.3	17.1	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.19 Noise Mitigation Cost Effectiveness Results (Modeled Wall 8: South Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-21	54.5	53.4	1.1	1	0	0	740	7,400	$266,400	$88,800
SE-22	56.0	55.0	1.0	1	0	0				
SE-23	56.3	55.3	1.0	1	0	0				
SE-24	56.0	55.3	0.7	1	0	0				
SE-25	58.5	57.5	1.0	1	0	0				
SE-26	52.5	52.2	0.3	1	0	0				
T-13	**69.5**	63.1	6.4	1	1	0				
T-14	**72.1**	59.9	12.2	1	1	1				
T-15	**74.4**	61.5	12.9	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.20 Noise Mitigation Cost Effectiveness Results (Modeled Wall 8: South Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-21	54.5	53.7	0.8	1	0	0	740	5,920	$213,120	$71,040
SE-22	56.0	55.1	0.9	1	0	0				
SE-23	56.3	55.4	0.9	1	0	0				
SE-24	56.0	55.4	0.6	1	0	0				
SE-25	58.5	57.8	0.7	1	0	0				
SE-26	52.5	52.2	0.3	1	0	0				
T-13	**69.5**	63.6	5.9	1	1	0				
T-14	**72.1**	61.9	10.2	1	1	1				
T-15	**74.4**	63.5	10.9	1	1	1				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 8					**3**	–				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.21 Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-26-1	59.9	59.8	0.1	1	0	0	800	15,400	$554,400	$277,200
NE-26-2	63.2	63.1	0.1	1	0	0				
NE-26-3	65.2	64.9	0.3	1	0	0				
NE-27	59.2	59.1	0.1	1	0	0				
NE-28	57.6	57.3	0.3	1	0	0				
NE-29	54.7	54.0	0.7	1	0	0				
NE-30	54.2	50.7	3.5	1	0	0				
NE-31	54.5	50.1	4.4	1	0	0				
NE-32	56.2	51.7	4.5	1	0	0				
NE-33-1	57.2	52.8	4.4	1	0	0				
NE-33-2	59.2	55.8	3.4	1	0	0				
NE-33-3	**66.1**	60.9	5.2	1	1	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.21 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Hwy 10 Exit Ramp and 14th Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-10	**71.4**	59.4	12.0	1	1	1	800	15,400	$554,400	$277,200
T-11	**72.1**	**72.0**	0.1	1	0	0				
T-12	**73.8**	**73.7**	0.1	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.22 Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (18-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-26-1	59.9	59.8	0.1	1	0	0	800	13,920	$501,120	$250,560
NE-26-2	63.2	63.1	0.1	1	0	0				
NE-26-3	65.2	64.9	0.3	1	0	0				
NE-27	59.2	59.1	0.1	1	0	0				
NE-28	57.6	57.3	0.3	1	0	0				
NE-29	54.7	53.9	0.8	1	0	0				
NE-30	54.2	50.6	3.6	1	0	0				
NE-31	54.5	49.9	4.6	1	0	0				
NE-32	56.2	51.6	4.6	1	0	0				
NE-33-1	57.2	52.7	4.5	1	0	0				
NE-33-2	59.2	56.1	3.1	1	0	0				
NE-33-3	**66.1**	61.1	5.0	1	1	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.22 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (18-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-10	**71.4**	59.6	11.8	1	1	1	800	13,920	$501,120	$250,560
T-11	**72.1**	**72.0**	0.1	1	0	0				
T-12	**73.8**	**73.7**	0.1	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.23 Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (16-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-26-1	59.9	59.8	0.1	1	0	0	800	12,440	$447,840	$447,840
NE-26-2	63.2	63.1	0.1	1	0	0				
NE-26-3	65.2	64.9	0.3	1	0	0				
NE-27	59.2	59.1	0.1	1	0	0				
NE-28	57.6	57.3	0.3	1	0	0				
NE-29	54.7	53.9	0.8	1	0	0				
NE-30	54.2	50.5	3.7	1	0	0				
NE-31	54.5	50.0	4.5	1	0	0				
NE-32	56.2	51.6	4.6	1	0	0				
NE-33-1	57.2	52.7	4.5	1	0	0				
NE-33-2	59.2	55.3	3.9	1	0	0				
NE-33-3	**66.1**	61.4	4.7	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.23 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (16-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-10	**71.4**	59.8	11.6	1	1	1	800	12,440	$447,840	$447,840
T-11	**72.1**	**72.0**	0.1	1	0	0				
T-12	**73.8**	**73.7**	0.1	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.24 Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-26-1	59.9	59.8	0.1	1	0	0	800	6,400	$230,400	$230,400
NE-26-2	63.2	63.2	0.0	1	0	0				
NE-26-3	65.2	65.0	0.2	1	0	0				
NE-27	59.2	59.2	0.0	1	0	0				
NE-28	57.6	57.5	0.1	1	0	0				
NE-29	54.7	54.3	0.4	1	0	0				
NE-30	54.2	52.4	1.8	1	0	0				
NE-31	54.5	52.6	1.9	1	0	0				
NE-32	56.2	54.4	1.8	1	0	0				
NE-33-1	57.2	55.6	1.6	1	0	0				
NE-33-2	59.2	57.3	1.9	1	0	0				
NE-33-3	**66.1**	65.6	0.5	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.24 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-10	**71.4**	62.7	8.7	1	1	1	800	6,400	$230,400	$230,400
T-11	**72.1**	**72.1**	0.0	1	0	0				
T-12	**73.8**	**73.8**	0.0	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.25 Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (6-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-26-1	59.9	59.9	0.0	1	0	0	800	4,800	$172,800	N/A
NE-26-2	63.2	63.2	0.0	1	0	0				
NE-26-3	65.2	65.0	0.2	1	0	0				
NE-27	59.2	59.2	0.0	1	0	0				
NE-28	57.6	57.5	0.1	1	0	0				
NE-29	54.7	54.3	0.4	1	0	0				
NE-30	54.2	53.0	1.2	1	0	0				
NE-31	54.5	53.4	1.1	1	0	0				
NE-32	56.2	55.0	1.2	1	0	0				
NE-33-1	57.2	56.0	1.2	1	0	0				
NE-33-2	59.2	57.9	1.3	1	0	0				
NE-33-3	**66.1**	65.9	0.2	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.25 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 9: North Side of Hwy 23 Between Northbound Hwy 10 Exit Ramp and 14th Avenue SE) (6-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-10	**71.4**	**66.3**	5.1	1	1	0	800	4,800	$172,800	N/A
T-11	**72.1**	**72.1**	0.0	1	0	0				
T-12	**73.8**	**73.8**	0.0	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.26 Noise Mitigation Cost Effectiveness Results (Modeled Wall 10: North Side of Hwy 23 Between Northbound Hwy 10 Entrance Ramp and Hwy 23 Bridge) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-5	**75.1**	**75.1**	0.0	1	0	0	320	6,400	$230,400	$230,400
T-6	**72.5**	59.7	12.8	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.27 Noise Mitigation Cost Effectiveness Results (Modeled Wall 10: North Side of Hwy 23 Between Northbound Hwy 10 Entrance Ramp and Hwy 23 Bridge) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-5	**75.1**	**75.1**	0.0	1	0	0	320	3,200	$115,200	$115,200
T-6	**72.5**	61.8	10.7	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.28 Noise Mitigation Cost Effectiveness Results (Modeled Wall 10: North Side of Hwy 23 Between Northbound Hwy 10 Entrance Ramp and Hwy 23 Bridge) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-5	**75.1**	**75.1**	0.0	1	0	0	320	2,560	$92,160	$92,160
T-6	**72.5**	63.1	9.4	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.29 Noise Mitigation Cost Effectiveness Results (Modeled Wall 10: North Side of Hwy 23 Between Northbound Hwy 10 Entrance Ramp and Hwy 23 Bridge) (6-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-5	**75.1**	**75.1**	0.0	1	0	0	320	1,920	$69,120	$69,120
T-6	**72.5**	65.5	7.0	1	1	1				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 10					**1**	–				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.30 Noise Mitigation Cost Effectiveness Results (Modeled Wall 11: North Side of Hwy 23 Between Hwy 23 Bridge and Southbound Hwy 10 Exit Ramp) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-3	**74.4**	59.6	14.8	1	1	1	320	6,400	$230,400	$230,400
T-4	**72.3**	**67.5**	4.8	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.31 Noise Mitigation Cost Effectiveness Results (Modeled Wall 11: North Side of Hwy 23 Between Hwy 23 Bridge and Southbound Hwy 10 Exit Ramp) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-3	**74.4**	62.4	12.0	1	1	1	320	3,200	$115,200	$115,200
T-4	**72.3**	**67.7**	4.6	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.32 Noise Mitigation Cost Effectiveness Results (Modeled Wall 11: North Side of Hwy 23 Between Hwy 23 Bridge and Southbound Hwy 10 Exit Ramp) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-3	**74.4**	64.2	10.2	1	1	1	320	2,560	$92,160	$92,160
T-4	**72.3**	**68.0**	4.3	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.33 Noise Mitigation Cost Effectiveness Results (Modeled Wall 11: North Side of Hwy 23 Between Hwy 23 Bridge and Southbound Hwy 10 Exit Ramp) (6-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-3	**74.4**	**69.0**	5.4	1	1	1	320	1,920	$69,120	N/A
T-4	**72.3**	**69.0**	3.3	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.34 Noise Mitigation Cost Effectiveness Results (Modeled Wall 12: North Side of Hwy 23 Between Southbound Hwy 10 Entrance Ramp and Lincoln Avenue SE) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-1	**71.8**	56.7	15.1	1	1	1	660	13,200	$475,200	$237,600
T-2	**72.8**	56.4	16.4	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.35 Noise Mitigation Cost Effectiveness Results (Modeled Wall 12: North Side of Hwy 23 Between Southbound Hwy 10 Entrance Ramp and Lincoln Avenue SE) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-1	**71.8**	60.3	11.5	1	1	1	660	6,600	$237,600	$118,800
T-2	**72.8**	60.5	12.3	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.36 Noise Mitigation Cost Effectiveness Results (Modeled Wall 12: North Side of Hwy 23 Between Southbound Hwy 10 Entrance Ramp and Lincoln Avenue SE) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-1	**71.8**	62.2	9.6	1	1	1	660	5,280	$190,080	$95,040
T-2	**72.8**	62.5	10.3	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.37 Noise Mitigation Cost Effectiveness Results (Modeled Wall 12: North Side of Hwy 23 Between Southbound Hwy 10 Entrance Ramp and Lincoln Avenue SE) (6-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
T-1	**71.8**	65.8	6.0	1	1	0	660	3,960	$142,560	N/A
T-2	**72.8**	**66.6**	6.2	1	1	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.38 Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-1	55.8	53.5	2.3	1	0	0	555	10,500	$378,000	$126,000
SE-2	60.3	55.2	5.1	1	0	0				
SE-3	52.4	50.8	1.6	1	0	0				
SE-4	52.1	50.7	1.4	1	0	0				
SE-5	52.3	50.8	1.5	1	0	0				
SE-6	51.1	49.9	1.2	1	0	0				
SE-7	51.5	50.4	1.1	1	0	0				
SE-8	51.7	50.5	1.2	1	0	0				
SE-9	51.2	50.3	0.9	1	0	0				
SE-10	51.1	50.2	0.9	1	0	0				
SE-11	50.7	49.7	1.0	1	0	0				
SE-12	50.4	49.9	0.5	1	0	0				
SE-13	51.0	50.2	0.8	1	0	0				
SE-14	50.9	50.2	0.7	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.38 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-15	55.3	53.0	2.3	1	0	0	555	10,500	$378,000	$126,000
SE-16	54.7	52.5	2.2	1	0	0				
SE-17	59.8	59.2	0.6	1	0	0				
SE-18	52.9	52.4	0.5	1	0	0				
SE-19	54.7	54.7	0.0	1	0	0				
SE-20	58.6	58.4	0.2	1	0	0				
SE-29	49.1	49.0	0.1	1	0	0				
SE-30	48.5	48.4	0.1	1	0	0				
SE-31	48.1	48.0	0.1	1	0	0				
SE-32	50.9	50.7	0.2	1	0	0				
SE-33	49.6	49.3	0.3	1	0	0				
SE-34	48.7	48.1	0.6	1	0	0				
SE-35	50.2	48.9	1.3	1	0	0				
SE-36	48.7	47.9	0.8	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.38 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-37	48.1	47.9	0.2	1	0	0	555	10,500	$378,000	$126,000
T-16	64.0	64.0	0.0	1	0	0				
T-17	62.8	62.8	0.0	1	0	0				
T-18	64.6	64.5	0.1	1	0	0				
T-19	**68.6**	54.7	13.9	1	1	1				
T-20	**69.8**	53.8	16.0	1	1	1				
T-21	**72.7**	**72.0**	0.7	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.39 Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-1	55.8	54.2	1.6	1	0	0	555	5,550	$199,800	$99,900
SE-2	60.3	56.3	4.0	1	0	0				
SE-3	52.4	51.2	1.2	1	0	0				
SE-4	52.1	51.0	1.1	1	0	0				
SE-5	52.3	51.0	1.3	1	0	0				
SE-6	51.1	50.1	1.0	1	0	0				
SE-7	51.5	50.6	0.9	1	0	0				
SE-8	51.7	50.8	0.9	1	0	0				
SE-9	51.2	50.5	0.7	1	0	0				
SE-10	51.1	50.4	0.7	1	0	0				
SE-11	50.7	49.9	0.8	1	0	0				
SE-12	50.4	50.1	0.3	1	0	0				
SE-13	51.0	50.4	0.6	1	0	0				
SE-14	50.9	50.4	0.5	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.39 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-15	55.3	53.3	2.0	1	0	0	555	5,550	$199,800	$99,900
SE-16	54.7	52.9	1.8	1	0	0				
SE-17	59.8	59.3	0.5	1	0	0				
SE-18	52.9	52.5	0.4	1	0	0				
SE-19	54.7	54.7	0.0	1	0	0				
SE-20	58.6	58.4	0.2	1	0	0				
SE-29	49.1	49.1	0.0	1	0	0				
SE-30	48.5	48.5	0.0	1	0	0				
SE-31	48.1	48.1	0.0	1	0	0				
SE-32	50.9	50.8	0.1	1	0	0				
SE-33	49.6	49.4	0.2	1	0	0				
SE-34	48.7	48.2	0.5	1	0	0				
SE-35	50.2	49.1	1.1	1	0	0				
SE-36	48.7	48.1	0.6	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.39 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-37	48.1	48.0	0.1	1	0	0	555	5,550	$199,800	$99,900
T-16	64.0	64.0	0.0	1	0	0				
T-17	62.8	62.8	0.0	1	0	0				
T-18	64.6	64.5	0.1	1	0	0				
T-19	**68.6**	57.5	11.1	1	1	1				
T-20	**69.8**	58.1	11.7	1	1	1				
T-21	**72.7**	**72.0**	0.7	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.40 Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-1	55.8	54.5	1.3	1	0	0	555	4,440	$159,840	$79,920
SE-2	60.3	56.9	3.4	1	0	0				
SE-3	52.4	51.4	1.0	1	0	0				
SE-4	52.1	51.2	0.9	1	0	0				
SE-5	52.3	51.2	1.1	1	0	0				
SE-6	51.1	50.2	0.9	1	0	0				
SE-7	51.5	50.7	0.8	1	0	0				
SE-8	51.7	50.9	0.8	1	0	0				
SE-9	51.2	50.6	0.6	1	0	0				
SE-10	51.1	50.5	0.6	1	0	0				
SE-11	50.7	50.0	0.7	1	0	0				
SE-12	50.4	50.1	0.3	1	0	0				
SE-13	51.0	50.5	0.5	1	0	0				
SE-14	50.9	50.5	0.4	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.40 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-15	55.3	53.4	1.9	1	0	0	555	4,440	$159,840	$79,920
SE-16	54.7	53.0	1.7	1	0	0				
SE-17	59.8	59.3	0.5	1	0	0				
SE-18	52.9	52.6	0.3	1	0	0				
SE-19	54.7	54.7	0.0	1	0	0				
SE-20	58.6	58.4	0.2	1	0	0				
SE-29	49.1	49.1	0.0	1	0	0				
SE-30	48.5	48.5	0.0	1	0	0				
SE-31	48.1	48.1	0.0	1	0	0				
SE-32	50.9	50.8	0.1	1	0	0				
SE-33	49.6	49.4	0.2	1	0	0				
SE-34	48.7	48.3	0.4	1	0	0				
SE-35	50.2	49.1	1.1	1	0	0				
SE-36	48.7	48.1	0.6	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.40 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-37	48.1	48.1	0.0	1	0	0	555	4,440	$159,840	$79,920
T-16	64.0	64.0	0.0	1	0	0				
T-17	62.8	62.8	0.0	1	0	0				
T-18	64.6	64.5	0.1	1	0	0				
T-19	**68.6**	59.0	9.6	1	1	1				
T-20	**69.8**	59.2	10.6	1	1	1				
T-21	**72.7**	**72.1**	0.6	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.41 Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (7-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-1	55.8	54.7	1.1	1	0	0	555	3,885	$139,860	$69,930
SE-2	60.3	57.3	3.0	1	0	0				
SE-3	52.4	51.5	0.9	1	0	0				
SE-4	52.1	51.3	0.8	1	0	0				
SE-5	52.3	51.3	1.0	1	0	0				
SE-6	51.1	50.3	0.8	1	0	0				
SE-7	51.5	50.8	0.7	1	0	0				
SE-8	51.7	51.0	0.7	1	0	0				
SE-9	51.2	50.7	0.5	1	0	0				
SE-10	51.1	50.5	0.6	1	0	0				
SE-11	50.7	50.1	0.6	1	0	0				
SE-12	50.4	50.1	0.3	1	0	0				
SE-13	51.0	50.5	0.5	1	0	0				
SE-14	50.9	50.5	0.4	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.41 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (7-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-15	55.3	53.6	1.7	1	0	0	555	3,885	$139,860	$69,930
SE-16	54.7	53.2	1.5	1	0	0				
SE-17	59.8	59.4	0.4	1	0	0				
SE-18	52.9	52.6	0.3	1	0	0				
SE-19	54.7	54.7	0.0	1	0	0				
SE-20	58.6	58.4	0.2	1	0	0				
SE-29	49.1	49.1	0.0	1	0	0				
SE-30	48.5	48.5	0.0	1	0	0				
SE-31	48.1	48.1	0.0	1	0	0				
SE-32	50.9	50.8	0.1	1	0	0				
SE-33	49.6	49.4	0.2	1	0	0				
SE-34	48.7	48.3	0.4	1	0	0				
SE-35	50.2	49.2	1.0	1	0	0				
SE-36	48.7	48.2	0.5	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.41 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 13: East Side of Hwy 10 and North of 4th Street SE Overpass) (7-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-37	48.1	48.1	0.0	1	0	0	555	3,885	$139,860	$69,930
T-16	64.0	64.0	0.0	1	0	0				
T-17	62.8	62.8	0.0	1	0	0				
T-18	64.6	64.5	0.1	1	0	0				
T-19	**68.6**	59.8	8.8	1	1	1				
T-20	**69.8**	60.2	9.6	1	1	1				
T-21	**72.7**	**72.2**	0.5	1	0	0				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 13					2	–				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.42 Noise Mitigation Cost Effectiveness Results (Modeled Wall 14: East Side of Hwy 10 and South of 4th Street SE Overpass) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-86	59.0	55.6	3.4	1	0	0	550	10,400	$374,400	$187,200
SE-87	64.9	62.7	2.2	1	0	0				
SE-88	55.6	55.5	0.1	1	0	0				
T-24	**72.9**	**71.1**	1.8	1	0	0				
T-25	**70.4**	56.2	14.2	1	1	1				
T-26	**70.6**	58.7	11.9	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.43 Noise Mitigation Cost Effectiveness Results (Modeled Wall 14: East Side of Hwy 10 and South of 4th Street SE Overpass) (10-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-86	59.0	56.5	2.5	1	0	0	550	5,500	$198,000	$99,000
SE-87	64.9	62.9	2.0	1	0	0				
SE-88	55.6	55.6	0.0	1	0	0				
T-24	**72.9**	**71.1**	1.8	1	0	0				
T-25	**70.4**	59.2	11.2	1	1	1				
T-26	**70.6**	60.6	10.0	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.44 Noise Mitigation Cost Effectiveness Results (Modeled Wall 14: East Side of Hwy 10 and South of 4th Street SE Overpass) (8-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-86	59.0	56.7	2.3	1	0	0	550	4,400	$158,400	$79,200
SE-87	64.9	63.0	1.9	1	0	0				
SE-88	55.6	55.6	0.0	1	0	0				
T-24	**72.9**	**71.1**	1.8	1	0	0				
T-25	**70.4**	60.4	10.0	1	1	1				
T-26	**70.6**	61.5	9.1	1	1	1				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.45 Noise Mitigation Cost Effectiveness Results (Modeled Wall 14: East Side of Hwy 10 and South of 4th Street SE Overpass) (7-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
SE-86	59.0	56.8	2.2	1	0	0	550	3,850	$138,600	$69,300
SE-87	64.9	63.1	1.8	1	0	0				
SE-88	55.6	55.6	0.0	1	0	0				
T-24	**72.9**	**71.1**	1.8	1	0	0				
T-25	**70.4**	61.2	9.2	1	1	1				
T-26	**70.6**	62.0	8.6	1	1	1				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 14					2	–				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

Table C.46 Noise Mitigation Cost Effectiveness Results (Modeled Wall 15: East Side of Hwy 10 from North of East St. Germain Street to Railroad) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-1	65.7	59.3	6.4	1	1	0	640	12,200	$439,200	$54,900
NE-2	**66.1**	59.7	6.4	1	1	0				
NE-3	63.5	58.5	5.0	1	1	0				
NE-4	62.5	57.9	4.6	1	0	0				
NE-5	65.1	60.5	4.6	1	0	0				
NE-6	64.2	60.6	3.6	1	0	0				
NE-7	61.7	58.1	3.6	1	0	0				
NE-8	61.4	57.3	4.1	1	0	0				
NE-9	58.3	54.9	3.4	1	0	0				
NE-10	58.4	54.9	3.5	1	0	0				
NE-11	58.7	55.3	3.4	1	0	0				
NE-12	58.2	54.9	3.3	1	0	0				
NE-13	58.2	54.8	3.4	1	0	0				
NE-14	58.1	54.8	3.3	1	0	0				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.

Table C.46 continued Noise Mitigation Cost Effectiveness Results (Modeled Wall 15: East Side of Hwy 10 from North of East St. Germain Street to Railroad) (20-foot Tall Noise Wall)

Receptor ID	L_{eq} Noise Level, 2040 Build (No Noise Wall)	L_{eq} Noise Level, 2040 Build (With Noise Wall)	Reduction (in dBA) With Noise Wall	Number of Residences, Commercial, or Industrial Establishments	Number of Benefited Residences, Commercial, or Industrial Establishments (1)	Design goal reduction ≥ 7 dBA (2)	Length of Wall (feet)	Wall Area (sq. ft.) (3)	Total Cost of Wall ($36/sq. ft.)	Cost per Benefited Receptor
NE-62	**67.7**	59.6	8.1	1	1	1	640	12,200	$439,200	$54,900
NE-63	**67.2**	59.9	7.3	1	1	1				
NE-64	65.2	58.4	6.8	1	1	0				
NE-65	64.0	58.5	5.5	1	1	0				
NE-66	62.5	57.3	5.2	1	1	0				
NE-67	61.3	56.7	4.6	1	0	0				
NE-68	60.3	56.2	4.1	1	0	0				
NE-69	59.6	56.0	3.6	1	0	0				
NE-70	59.0	55.8	3.2	1	0	0				
NE-71	62.4	59.0	3.4	1	0	0				
NE-72	60.4	57.9	2.5	1	0	0				
NE-73	59.2	57.2	2.0	1	0	0				
NE-74	58.2	56.4	1.8	1	0	0				
Total number of benefited residences, commercial, or industrial establishments for Modeled Wall 15					8	–				

Bold numbers approach or exceed Federal noise abatement criteria (see Table 1.1).

Italic numbers exceed 23 CFR 774.15(f)(2) or 23 CFR 774.15(f)(3).

N/A = not applicable because none of the receptors adjacent to the modeled noise wall meet the noise reduction design goal criterion of ≥ 7 dBA.

(1) Number of benefited residences, commercial establishments, or industrial establishments with a minimum 5 dBA or greater reduction.

(2) Noise barrier must meet MnDOT's noise reduction design goal of at least 7 dBA at a minimum of one benefited receptor behind each noise barrier.

(3) Area of the barrier includes tapers on both ends.