DEPARTMENT OF TRANSPORTATION

State Aid for Local Transportation
395 John Ireland Blvd., MS 500
St. Paul, MN 55155

December 16, 2019

Wendell Meyer
Division Administrator
Federal Highway Administration
Cray Plaza
380 Jackson St, Suite 500
St. Paul, Minnesota 55101

Attention: Abbi Ginsberg

SUBJECT: **SP 0019-670-013;NHPP-STP 1920(071)**
CSAH 70 (215TH Street/Juniper Way
From: Kensington Boulevard/Kenrick Avenue
To: CSAH 23 (Cedar Avenue)
In the City of Lakeville, Dakota County
Environmental Assessment Approval Request

Dear Mr. Meyer:

Enclosed for your review and approval, is an electronic copy of the Environmental Assessment for the above referenced project. Concurrence that this action be classified as a Class III action (Environmental Assessment) in accordance with 23 CFR Section 771.119 (c), is hereby requested.

Please return a signed copy of the title/signature page.

If you have any questions, please do not hesitate to contact me at 651-366-3822, or by email at Lynnette.roshell@state.mn.us.

Sincerely,

Lynnette Roshell, PE
Project Development Engineer

Enclosures

Cc: Dan Erickson – DSAE
Colleen Brown – DSAA
Beth Kunkel—Kimley Horn
File

ENVIRONMENTAL ASSESSMENT
for
SP 019-670-013
Minn Proj No. NHPP-STP 1920(071)
County State Aid Highway 70 (215th Street/Juniper Way)
From: *Kensington Boulevard / Kenrick Avenue*
To: *County State Aid Highway* 23 (Cedar Avenue)

In the City of: Lakeville, In the County of: Dakota
Sec 31, 32, & 33 of Township 114N, Range 20W
Sec 36 of Township 114N, Range 21W

Submitted pursuant to 42 USC 4332
by the
FEDERAL HIGHWAY ADMINISTRATION and
Dakota County
for

Reconstruction of approximately 4 miles of existing 2-lane rural roadway to a 4-lane divided roadway with pedestrian and bicycle facilities and extension of 220th Street.

Contacts: FHWA
Phil Forst, Project Development Engineer
Galtier Plaza
380 Jackson Street, Suite 500
St. Paul, MN 55101-2904
Phone: 651-291-6110

Dakota County
Jake Rezac, Project Manager
Western Service Center
14995 Galaxie Ave
Apple Valley, MN 55124
Phone: 952-891-7981

Recommended:

Dakota County Highway Engineer — Date: 12/5/2019

Reviewed and Recommended:

District State Aid Engineer — Date: 12/9/19

Approved:

State Aid Engineer/State Aid for Local Transportation — Date: 12/16/19

Approved as per 23 CFR Part 771.119(c):

WILLIAM R LOHR
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FHWA - Project Development Engineer — Date: Jan. 7, 2020

Figure 1: STATE MAP

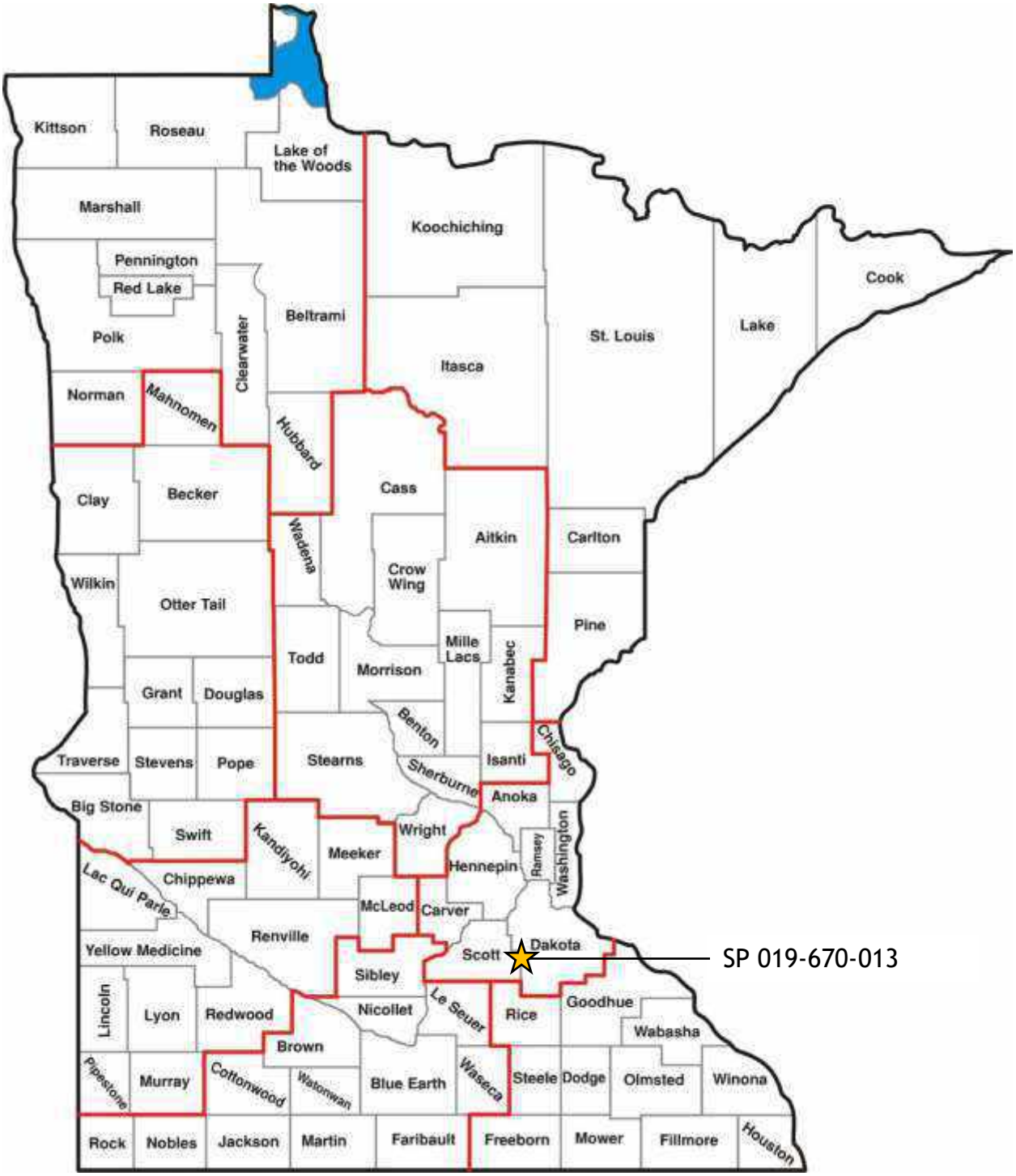

Figure 2: Project Location Map

Contents

ATTACHMENTS

- Attachment A: Roadway/Path Typical Sections and Project Layout
- Attachment B: Environmental Assessment Worksheet
- Attachment C: Section 4(f) Temporary Occupancy Letter for Hasse Arena
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- Attachment E: Section 7 Federally-listed Species Coordination
- Attachment F: Right-of-Way Acquisition Maps
- Attachment G: Phase 1 ESA Figures
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- Attachment L: Wetland Assessment and Two-Part Finding
- Attachment M: Railroad Coordination Summary
- Attachment N: Environmental Commitments

I. REPORT PURPOSE

This Environmental Assessment (EA) provides background information including:

- need for the proposed project
- alternatives considered
- environmental impacts and mitigation
- agency coordination and public involvement

This EA was prepared as a part of the National Environmental Policy Act (NEPA) process to fulfill requirements of 42 USC 4332. The EA is used to provide sufficient environmental documentation to determine the need for an Environmental Impact Statement (EIS) or that a Finding of No Significant Impact (FONSI) is appropriate.

This document is made available for public review and comment in accordance with the requirements of 23 CFR 771.119 (d).

II. HIGHWAY SECTION DESCRIPTION

This section of County State Aid Highway (CSAH) 70 extends from Kensington Boulevard/Kenrick Avenue on the west to Cedar Avenue (CSAH 23) on the east. The highway section is classified as an A-minor expander and according to the *Metropolitan Council, Regional Truck Highway Corridor Study*, CSAH 70 (east of I-35) is considered a Tier One regional truck corridor, identified as an important "last mile" connection for freight destinations and a driver of the regional economy.

The highway is a major connector between industrial and commercial land uses and the freight highway system. The segment between I-35 and Kensington Boulevard is currently a four-lane divided highway, whereas the section between Kensington Boulevard and Cedar Avenue is a two-lane undivided highway with turn lanes at major intersections.

Highway Section Termini

County State Aid Highway 70
From: Kensington Boulevard/Kenrick Avenue
To: Cedar Avenue (CSAH 23)
Length: 3.6 miles

220TH STREET W
From: Granada Avenue
To: Cedar Avenue (CSAH 23)
Length: Approximately 1,300 feet

See additional existing condition elements description in Section 9.

Roadway Cross-Section

This is a 2-lane rural undivided road section.

Unusual Traffic or Road/Facility Use

This section of CSAH 70 has a high volume of freight traffic, approximately 10 to 25 percent of the total traffic volume.

Horizontal/Vertical Alignment

CSAH 70 is mostly an east/west route with the exception of the segment between Kensington Boulevard and 215th Street West, which runs southeast/northwest. This highway section is straight and does not consist of any curves or large hills.

Adjacent Land Use

The adjacent land includes a combination of agricultural, residential, and industrial/commercial uses. From Kensington Boulevard to Dodd Boulevard, land use is mostly agricultural with some scattered industrial facilities. Between Dodd Boulevard and Cedar Avenue, land use is mostly commercial/industrial with the exception of one row of residential properties (13 homes total) along the north side of CSAH 70 east of Dodd Boulevard.

Industrial parks in the vicinity of the corridor include the Airlake Industrial Park and Creekside Business Park located between Dodd Boulevard and Cedar Avenue, and Fairfield Business Campus located at the intersection of 210th Street and Kensington Boulevard just northwest of the corridor. The South Creek Greenway is located north of CSAH 70 and west of Jacquard Avenue. This land is publicly owned green space designated as a "Nature (Grass) Trail" in the *Lakeville Thrive 2040 Comprehensive Plan*. Lakeville South High School is located northwest of the intersection at CSAH 70 and Jacquard Avenue. Suburban residential neighborhoods are located approximately 500 feet north of CSAH 70 between Jacquard Avenue and Holyoke Avenue.

Bridge Crossing: N/A

Railroad Crossing Location:

The project crosses a Canadian Pacific rail spur approximately 400 feet east of Holyoke Avenue. The spur is owned by Canadian Pacific but operated by Progressive Rail, Inc. Dakota County, the City of Lakeville, and MnDOT rail office have been coordinating the project as it pertains to this rail crossing with Progressive Rail. Details concerning the coordination are discussed below and included in **Attachment M**.

Airport Proximity:

The project is within the area of influence of the Airlake Airport, located southeast of the corridor. The project will require up to three separate easements from the airport to allow construction of the extension of 220th Street, modifications to the infiltration basin west of the airport, and the business access route connecting to 217th Street. The City of Lakeville in partnership with Dakota County and Metropolitan Airports Commission have been coordinating the easement agreements for these activities.

III. PROJECT PURPOSE AND NEED

Purpose/Objectives

The purpose of the proposed action is to improve traffic mobility and enhance pedestrian/bicycle connectivity along CSAH 70.

Need/Deficiencies

Freight and Vehicle Mobility

CSAH 70 between Kensington Boulevard/Kenrick Avenue and Cedar Avenue is currently a two-lane rural highway with turn lanes at major intersections, 9 full access local street intersections, and an additional 15 full access private driveways (many of which do not have turn lanes). The corridor provides critical connections to both I-35 and CSAH 23 (Cedar Avenue) for several large industrial parks, including Airlake Industrial Park and Creekside Business Park east of Dodd Boulevard, and Fairfield Business Park near the intersection of Kensington Boulevard and 210th Street (shown in Figure 2). Existing Average Annual Daily Traffic (AADT) ranges from 8,500 (vehicles per day) west of Cedar Avenue to 13,300 west of Dodd Boulevard, 10-25 percent of which is heavy commercial average daily traffic (HCADT).

According to the *Dakota County 2040 Comprehensive Plan*, CSAH 70 is planned to be upgraded from a minor arterial to a principal arterial.[1] Given the current geometry of CSAH 70, the 2040 traffic forecasts will not reasonably be accommodated on the existing roadway section. Dakota County completed a traffic study to analyze the roadway's ability to accommodate future traffic volumes. A large portion of the adjacent land area in Lakeville is currently undeveloped agricultural land and, according to the *Lakeville Thrive 2040 Comprehensive Plan,*[2] is planned to convert to mainly commercial and industrial uses. Traffic forecasts from the Dakota County

[1] *Dakota County 2040 Comprehensive Plan* available at https://www.co.dakota.mn.us/Government/Planning/CompPlan/Documents/DakotaCounty2040ComprehensivePlan.pdf

[2] *Lakeville Thrive, 2040 Comprehensive Plan* Land Use Plan Available at: http://www.ci.lakeville.mn.us/DocumentCenter/View/5464/2040-Land-Use-Map

Comprehensive Plan were used for the study, and the forecasts show an average annual growth rate of 1.1 to 2.8 percent. Table 1 lists 2040 forecast traffic volumes.

Table 1: 2040 Forecast Traffic Volumes

Roadway	Existing AADT (veh/day)	Forecast AADT (veh/day)	Average Annual Growth Rate
CSAH 70 West of CSAH 9 (Dodd Boulevard)	13,300	17,000	1.1%
CSAH 70 East of CSAH 9 (Dodd Boulevard)	13,000	20,000	1.2%
CSAH 70 West of CSAH 23 (Cedar Avenue)	8,500	15,000	2.6%
CSAH 9 (Dodd Boulevard) South of CSAH 70	6,000	11,000	2.8%
CSAH 9 (Dodd Boulevard) North of CSAH 70	5,700	8,500	1.8%
CSAH 23 (Cedar Avenue) South of CSAH 70	8,000	12,000	1.9%
CSAH 23 (Cedar Avenue) North of CSAH 70	12,600	20,000	2.1%

Based on traffic projections for Year 2040, multiple individual turn movements and approaches will fail if roadway geometrics do not change. Overall, there would be three failing intersections: CSAH 70 / CSAH 9 (Dodd Boulevard) in the AM Peak Hour, CSAH 70 / Hamburg Avenue in both peak hours, and CSAH 70 / CSAH 23 (Cedar Avenue) in the PM Peak Hour. Table 2 shows peak hour delay and Level of Service[3] (LOS) results anticipated by 2040 if existing road conditions were maintained. This shows that the existing geometrics and intersection control cannot support the projected growth in traffic. The volumes on CSAH 70 would exceed the two-lane capacity, and vehicles on the stop-controlled approaches would not be able to find gaps. In addition, queues would exceed the storage length at every intersection.

[3] Level of Service (LOS) is commonly used to assign a value to the level of congestion and efficiency of the roadway. LOS is a measure of delay and operating conditions defined by the *Highway Capacity Manual* using a grading scale from A, best operations, to F, worst operations.

Table 2: Design Year (2040) Peak Hour Delay and Level of Service Results Assuming No Road Improvements

Intersection	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
CSAH 70 & Jacquard Avenue *	55.1	E	46.4	D
CSAH 70 & CSAH 9 (Dodd Boulevard) *	100+	F	76.4	E
CSAH 70 & Holyoke Avenue	48.1	E	34.1	D
CSAH 70 & Highview Avenue	8.1	A	43.8	E
CSAH 70 & Hamburg Avenue	74.2	F	100+	F
CSAH 70 & CSAH 23 (Cedar Avenue) *	19.0	B	100+	F

* Signalized intersection. All other intersections have stop control on the minor street.

The traffic forecasts and future year intersection operations demonstrate the need for additional roadway capacity improvements within the project corridor.

Although the traffic study did not analyze the projected year in which LOS issues would develop, there are signs that the existing roadway is nearing capacity. According to the *Metropolitan Council Regional Truck Highway Corridor Study*,[4] a typical two-lane roadway begins to experience operational problems when traffic volumes reach 10,500 ADT, or approximately 85 percent of the roadway design capacity. Table 3 shows planning level capacities for various roadway types; for a two-lane section, the daily volume capacity ranges from 10,500 to 12,000 vehicles per day, while the three-lane section ranges from 14,000 to 17,000 vehicles per day. There are dedicated turn lanes at public street intersections along CSAH 70 so the three-lane planning level capacities were used as a basis. With an existing AADT of 13,300 vehicles per day along CSAH 70, west of Dodd Boulevard, the road segment is close to capacity as a three-lane roadway. With the existing volumes reaching capacity of the roadway segment, gaps for traffic turning onto CSAH 70 become more difficult and this is especially true for trucks that need a much larger gap. These issues are currently localized and related to shift changes and times with peak truck traffic, which generally occur outside of the AM and PM peak hours. However, with traffic volumes on CSAH 70 projected to continue to grow, they would begin to have impacts on the safety and operations of the corridor.

[4] Metropolitan Council, Regional Truck Highway Corridor Study (2017) available at: https://metrocouncil.org/Transportation/Publications-And-Resources/FREIGHT/Regional-Truck-Freight-Corridors-Study.aspx

Table 3: Average Daily Traffic Planning Level Capacities[5]

Roadway Type	Level of Service[3] Based on Average Daily Traffic Volumes					
	A	B	C	D	E	F
Two-Lane	<8,000	8,000-9,500	9,250-10,750	10,500-12,000	11,750-13,250	>13,250
Three-Lane	<9,000	9,000-12,000	11,500-14,500	14,000-17,000	16,500-19,500	>19,500
Four-Lane Undivided	<12,000	12,000-15,000	14,500-17,500	17,000-20,000	19,500-22,500	>22,500
Four-Lane Divided (center median)	<19,000	19,000-22,000	21,500-24,500	14,500-27,000	26,500-29,500	>29,500

An additional metric for measuring the operations of a roadway segment is the volume/capacity (V/C) ratio. A high volume to capacity ratio indicates poor operations. The V/C ratio for the segment of CSAH 70 west of Dodd Boulevard ranges from 1.11 to 1.27 for a two-lane roadway and 0.78 to 0.95 for a three-lane roadway, indicating a segment LOS rating of E/F for a two-lane roadway and LOS C/D for a three-lane roadway.

Table 4: Level of Service by Volume/Capacity ratio

Level of Service[3]	Volume/Capacity Ratio	Description
A	0.00 to 0.39	Free flow: Low volumes and no delays
B	0.40 to 0.59	Stable flow: Low volumes and speeds dictated by travel conditions
C	0.60 to 0.79	Stable flow: Speeds and maneuverability closely controlled due to higher volumes
D	0.80 to 0.99	Restricted flow: Higher density traffic restricts maneuverability and volumes approaching capacity
E	1.00 to 1.19	Low speeds, considerable delays, and volumes at or slightly over capacity

[5] Operating conditions derived from the *Highway Capacity Manual*

F	1.20 and above	Very low speed, volumes exceed capacity, and long delays with stop-and-go-traffic

According to the *Metropolitan Council, Regional Truck Highway Corridor Study*, CSAH 70 (east of I-35) is considered a Tier One regional truck corridor, identified as an important "last mile" connection for freight destinations and a driver of the regional economy. Furthermore, the study identified the segment between Jacquard Avenue and Kensington Boulevard (referred to as Juniper Way) as a "Truck Delay Hotspot," drawing attention to the performance issues of the corridor. The delay is primarily due to there being a single lane in each direction which limits speeds and traffic flow with the volume of trucks turning on and off the corridor. The segment ranked number 19 of 30 across the analyzed Twin Cities Tier One regional truck corridors. Table 5 lists truck delays along the road segment. The delays are concentrated at the west end of the corridor, which has the highest traffic volumes.

Table 5: Truck Delay along CSAH 70[6]

Total Hours Delay per Day	Total Hours Delay per Month	Total Hours Delay per Year	Min Delay per Truck (Hours)	Hours Peak Delay per Day	% of Delay in AM/PM Peak
11	249	2,993	0.4	4	18/15

Walkability/Bikeability

According to the *Dakota County Pedestrian Bicycle Study* (December 2018), CSAH 70 east of Kensington Boulevard is recognized as a medium priority pedestrian and bicycle gap. Gaps are defined as locations along County Highways lacking a sidewalk or a shared use trail. CSAH 70 serves as a connection between several destinations including Lakeville South High School, residences, and businesses (shown in Figure 2). In addition, CSAH 70's high speeds, 50 to 55 miles per hour, make using the shoulder not only uncomfortable, but dangerous for multimodal users.

Additional Considerations

There are a number of environmental resources within the corridor that should be avoided and/or minimized to the extent possible. These impacts should also be considered as the alternatives are evaluated.

[6] Source: *Metropolitan Council, Regional Truck Highway Corridor Study. Available at* https://metrocouncil.org/Transportation/Publications-And-Resources/FREIGHT/Regional-Truck-Freight-Corridors-Study.aspx

Stormwater – The corridor currently has no stormwater runoff treatment. Impervious surface will increase if traffic lanes are added and new runoff generated will need to be managed per local and state requirements.

Traffic Noise – If traffic lanes move closer to residential receptors traffic noise abatement measures will need to be considered.

IV. ALTERNATIVES

Alternatives under Consideration

No-Build Alternative

A No Build alternative would make no changes to the geometric layout of the roadway. The No Build condition would lead to mobility problems under future traffic forecasts.

This alternative is not feasible as it does not improve mobility within the corridor. The No Build alternative does not address the purpose and needs for the project; therefore, it was rejected as a viable alternative.

Alignment Alternatives

Given the location of the development in relation to the existing roadway right-of-way and the nature of the corridor needs (e.g., expanding on in-place alignment), consideration was given to shifting the existing alignment to minimize right-of-way acquisition. Shifting the road alignment north was eliminated from consideration because it would have greater property impacts than the preferred alternative, described below.

Preferred Alternative

The preferred alternative includes expanding approximately 4 miles of CSAH 70 between Kenrick Avenue/Kensington Boulevard and Cedar Avenue from a two-lane roadway to a four-lane roadway with a median, turn lanes, mixed use trails, and stormwater improvements (i.e. curb and gutter, stormwater Best Management Practices [BMPs]). The preferred alternative would satisfy the purpose and needs of the project by adding additional capacity and installing a raised center median to minimize full access private driveways and local streets to full access driveways to right-in/right-out access and some local streets to right-in/left-in/right-out access to improve future mobility. In addition, the project will construct trails to provide bike/pedestrian connections.

The median will break in five locations for full access intersections at 215th Street West, Jacquard Avenue, Dodd Boulevard, Highview Avenue, Hamburg Avenue, and Cedar Avenue. These full access intersections will be spaced at ½ mile, meeting County requirements for principal arterials. At several locations in the corridor, the

median will break to partially accommodate turning vehicles (i.e. right-in/left-in/right-out access). Humboldt Court/217th Street, Holyoke Avenue, Heath Avenue, and Grenada Avenue will all be partial access intersections. An additional driveway/business access road would be constructed at 217th Street to mitigate the access modification at Holyoke Avenue and provide for access to westbound CSAH 70 via Dodd Boulevard, shown in Figure 2.

In addition to these overall corridor changes, some minor intersection reconfigurations will be made in order to provide cohesive connectivity with the regional road system. The intersection of CSAH 70 & 215th Street West will be moved approximately 100 feet to the west in order to align with a future connection to 210th Street. This realigned intersection will be a future 4-legged full access intersection. Driveway intersections will be reconfigured in order to meet the driveway spacing guidelines.

As part of the project, 220th Street will be extended approximately 1,200 feet east to Cedar Avenue from its current end point at Grenada Avenue. This extension is planned and consistent with the *Lakeville Thrive, 2040 Comprehensive Plan* and will provide an alternate access for businesses to Cedar Avenue during and after construction and provides additional options for vehicle traffic to access the regional roadway network.

Trails will be added on the north side of the highway between Kenrick Avenue/Kensington Boulevard and Dodd Boulevard, both sides of the highway between Dodd boulevard and Cedar Avenue, the west side of the Jacquard Avenue, and the east side of Cedar Avenue. See **Attachment A** for project layout.

Timing/duration of Construction

Construction is planned to begin in May 2020 and the project will be constructed over 2 years. 220th Street extension and eastbound lanes of CSAH 70 will be constructed first. The westbound lanes of CSAH 70 will be constructed during the second construction season.

Alignment Alternatives

Because the preferred alternative follows an existing road alignment without site distance problems, there were no alignment alternatives considered. The only option for improving mobility is to expand CSAH 70 and manage accesses.

V. PROJECT COSTS AND FUNDING SUMMARY

Estimate of Cost

Roadway Costs:	$22,650,000
Bridge/Culvert Bridge Costs	$0
Total Estimated Costs:	**$22,650,000**

Anticipated Funding

Federal STP Funds (NHFP):	$7,000,000
Federal Other Funds (STBGP):	$7,000,000
State Aid:	$4,862,500
Other State:	$0
Local Funds:	$3,787,500
Total:	**$22,650,000**

The project is in the 2020-2023 State Transportation Improvement Program (STIP).

Federal fiscal year:	2020,
Sequence:	1401, 1402, and 1720
Estimated cost shown in STIP:	$18,885,690
Federal funding shown in STIP:	$14,000,000

Anticipated Schedule

Environmental Assessment:	December 2019
Public Hearing:	December 2019
EIS Need Decision:	February 2019
Right-of-Way Acquisition:	February 2020
Plans, Specifications, and Estimate:	February 2020
Letting:	April 2020

It is anticipated that this project will be constructed in advance of the federal funding being available; an Advance Construction Agreement will be requested from State Aid for Local Transportation.

Future Stages or Improvements:

This project is not part of a phased construction.

VI. SOCIAL, ECONOMIC, AND ENVIRONMENTAL (SEE) IMPACTS

Section 4(f) of the Transportation Act of 1966

The proposed project will result in a temporary occupancy of the Lakeville Hasse Arena, a Section 4(f) resource, located northwest of the intersection of Highview Avenue and CSAH 70 (shown on Figure 2). A temporary easement is needed along the southern edge of this parcel for trail construction along the northern edge of CSAH 70.

As per the Federal Register Rules and Regulations 23 CFR 774.13(d), the temporary construction impacts may be considered a temporary occupancy of Section 4(f) lands. A temporary occupancy may not constitute a Section 4(f) use when all of the conditions listed below are satisfied:

- *The duration of the occupancy will be temporary in nature (i.e., less than the time needed for the construction of the project)*. The construction of the project is anticipated to be staged directionally. Specifically, eastbound CSAH 70, the south side of the road, will constructed prior to westbound CSAH 70, the north side. The temporary occupancy will take place during the construction of westbound CSAH 70.

- *There will be no change in ownership of the land.* A temporary easement will be obtained from the Housing and Redevelopment Authority of the City of Lakeville for tying in side slopes adjacent to the new trail. No real property interest (e.g. permanent easement, fee title acquisition) of right-of-way will be acquired.
- *The scope of work to be performed will be minor (i.e., both the nature and magnitude of the changes to the Section 4(f) property are minimal).* The proposed easement is approximately 10 feet wide and will affect an area of 0.15 acres, approximately one percent of the 13-acre parcel, adjacent to Dakota County right-of-way.
- *There are no anticipated permanent adverse physical impacts nor there any interference with the activities or purposes of the property, on either a permanent or temporary basis.* The temporary occupancy will not affect the arena building or parking lot and the arena will remain open throughout construction.
- *The land being used will be fully restored to a condition that is at least as good as the condition that existed prior to the project.* The area will be reseeded with a high maintenance turf, restoring the manicured lawn that is currently present.
- *There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.* Coordination with Responsible Official with Jurisdiction Over the Section 4(f) Property attached as **Attachment C**.

Section 6(f) of the Land and Water Conservation Fund Act of 1965

The project will not impact Section 6(f) lands or properties.

Section 106 of the National Historic Preservation Act of 1996

It has been determined that no historic properties eligible for or listed in the National Register of Historic Places will be affected by the project.

See **Attachment D** for letter from the Mn/DOT's Cultural Resources Unit (CRU).

Endangered Species Act of 1973

The project is being coordinated with the MnDOT liaison for the US Fish and Wildlife Service (USFWS) who performs species reviews for species listed on the County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. According to the review, the project is located within the range of the northern long-eared bat (*Myotis septentrionalis*) and the rusty patched bumble bee (*Bombus affinis*).

The northern long-eared bat (NLEB), federally listed as threatened and state-listed as special concern, can be found throughout Minnesota. During the winter this species

hibernates in caves and mines, and during the active season (approximately April-October) it roosts underneath bark, in cavities, or in crevices of both live and dead trees. Pup rearing is during June and July.

Tree removal is proposed as part of the project. The trees to be removed are potentially suitable for NLEB use during the active season (approximately April-October). Due to the timing of the proposed tree removal, potentially between June 1st and August 15th, the MnDOT Wildlife Ecologist has issued a determination of **may affect, likely to adversely affect** for the NLEB; however, because the tree removal is not located near a documented NLEB hibernacula or maternity roost tree, the removal is not anticipated to be prohibited by the USFWS. In order to mitigate potential affects, tree clearing would be encouraged to occur before June 1st or after August 15, to the extent practicable. The County has requested concurrence from the USFWS for the NLEB determination.

Rusty-patched bumble bees (RPBB) prefer grasslands with flowering plants, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter. They are generally active from mid-March through mid-October. According to information provided by USFWS, the project limits are partially located within the high potential zone for the species, indicating the rusty patched bumble is likely present; however, due to the disturbed nature of the existing roadside, high value floral resources are not present and nesting/overwintering is extremely unlikely. Therefore, the MnDOT Wildlife Ecologist made a determination of **may affect, not likely to adversely affect** for the RPBB, which USFWS has concurred with, see **Attachment E**. In order to mitigate potential affects, the project will revegetate disturbed areas not proposed for mowing with a native seed mix which could provide a benefit to the RPBB.

Right-Of-Way

Efforts have been made to avoid and minimize right-of-way impacts to the extent practicable. The project has been designed to maintain existing width of right-of-way, approximately 170 feet, throughout the CSAH 70 corridor but temporary easements will be required to complete construction to tie the new road section into existing grades beyond the right-of-way. Permanent acquisition is required for the 215th Street intersection realignment and a stormwater feature northeast of the intersection of Holyoke Avenue and CSAH 70. Permanent easements are required for the proposed business access near 217th Street, and the 220th Street extension to Cedar Avenue. All of these project features have been sited to avoid residential or business relocations.

The project will require approximately:

- 9.8 acres of permanent right-of-way acquisition from 7 parcels and
- 4.1 acres of temporary easements from 28 parcels and
- 0 parcels secured by permit or agreement

The locations of these easements are shown in **Attachment F**.

The project will not require residential or business relocations.

Permanent and temporary easements will be acquired in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

The project will require change in accesses. The following access modifications are proposed:

- All private driveways would change to right-in right-out only access
- Four intersections (at Grenada Avenue, Heath Avenue, Holyoke Avenue, and Humboldt Court/217th Street) would change to ¾ access (i.e. right-in, right-out, and left-in only access)

Hazardous Materials

AECOM Technical Services, Inc (AECOM) conducted a Limited Phase I Environmental Site Assessment (ESA) of the all parcels located within 500 feet of the Corridor (Project Area). Parcels were ranked with a low, medium, or high potential for contamination using the ranking criteria derived from MnDOT's Office of Environmental Stewardship (OES) ranking protocols. All other properties were considered to present a De Minimis risk.

The following is a discussion of site ranking and the corresponding sites identified within the Corridor**:**

- Low Potential for Contamination Sites are defined as sites that are hazardous waste generators and sites where site reconnaissance showed poor housekeeping, soil disturbance, or and other issues suggesting potential environmental impact. AECOM identified 23 Low Potential for Contamination Sites within the Corridor.
- Medium Potential for Contamination Sites are sites with activities of concern that include, but are not limited to, closed leaking underground storage tanks (LUSTs), all sites with underground storage tanks (USTs) or aboveground storage tanks (ASTs), machine shops, historic vehicle repair, and closed agricultural release sites. AECOM identified 23 Medium Potential for Contamination Sites within the Corridor.
- High Potential for Contamination Sites are sites with activities of concern that include, but are not limited to, all active and inactive Voluntary Investigation and Cleanup Program (VIC), Minnesota Environmental Response and Liability Act (MERLA) sites, all active and inactive dump sites, all active LUST sites, dry cleaners (with on-site or unknown chemical processing), bulk oil facilities, all active agricultural release sites, and all historical industrial sites with likely chemical use. AECOM identified 5 High Potential for Contamination Sites within the Corridor.

Parcels with a contamination ranking are shown on a map in **Attachment G**.

Unknown materials may also be encountered during construction that were not identified during the initial site investigations. A Construction Contingency Plan (CCP) will be written and it will discuss how to handle the unknowns that are encountered.

Farmland Protection Policy Act of 1981

According to the city of Lakeville's 2040 Land Use Plan the entire corridor shows planned industrial and office park use; therefore, exempting the whole project from the Farmland Protection Policy Act (FPPA).

Air Quality

The project will not significantly impact air quality.

Highway Traffic Noise

The project is a Type 1 project under FHWA noise regulation 23 CFR 772 and an evaluation of noise impacts is required. The results of the noise analysis are provided in Section 17 of EAW, **Attachment B** with maps shown in **Attachment H**.

Construction Noise

The construction activities associated with the 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.

Construction and demolition noise is prohibited between 10 p.m. and 7 a.m unless approved by the City Engineer.[7] Night construction, if needed, will be coordinated with the City.

Floodplain Management

The project will include non-significant floodplain encroachment. The provisions of Executive Order 11988 have been complied with. A Floodplain Assessment including a Hydraulic Analysis and Risk Assessment have been completed and are included in **Attachment I**.

The Federal Emergency Management Agency (FEMA) identifies three areas within the construction limits that are within South Creek's 100-year floodplain:

- The West Branch of South Creek between 215th Street and Jacquard Avenue
- The West Branch of South Creek near the proposed stormwater pond expansion east of Cedar Avenue
- The South Branch of South Creek near the proposed 220th Street extension

For the two roadway crossing locations, the proposed roadway elevation will be above the 100-year flood elevation. In addition, no flood stage increases are proposed at any

[7] City of Lakeville Noise Ordinance 4-1-4-2 Part A and B.

of the encroachments. For the Cedar Avenue pond expansion, work within the floodplain consists of excavation only, no fill will be placed within the floodplain. Based on the assessment, no significant floodplain impacts are expected.

Wetland Protection

The project will include non-significant wetland encroachment. The provisions of Executive Order 11990 have been complied with. A Wetland Assessment including a Two Part Finding has been completed and is included in **Attachment L**.

Section 404 of the Clean Water Act (CWA)

The project will involve placement of fill into waters of the U.S. The project will be covered by the by the Section 404 Regional General Permit for Transportation. See Section 11 of the EAW in **Attachment B**.

Water Pollution / MPCA—NPDES

Construction activities will disturb 1 or more acre of land area (including clearing, grading, and excavation) so a Phase II NPDES permit will be acquired. The permit would be submitted to MnDOT State Aid prior to project authorization, and a Stormwater Pollution Prevention Plan (SWPPP) would be included in the construction plan package.

The project area consists of approximately 4 miles of two-lane rural highway. Stormwater runoff from the roadway is currently captured by roadside ditches and conveyed ultimately to South Creek at various locations along the corridor. A large portion of the corridor will be converted to an urban roadway which includes the addition of curb and gutter. This proposed conversion, will result in a net increase of 26.7 acres of new impervious surface.

The project must meet water quality, volume and erosion control standards set by the Vermillion River Watershed Joint Powers Organization (VRWJPO), which exceed that of the MPCA Construction Stormwater NPDES Permit. To meet requirements, two main stormwater treatment facilities are proposed. The proposed treatment sites are designed to exceed the treatment requirements and offset the storage lost from filling the existing roadside ditches. One infiltration basin is located in the parcel between Holyoke Ave, CSAH 70 and the railroad tracks and a second infiltration basin will be located northwest of the intersection of CSAH 70 and Jacquard Ave. A second infiltration basin is located at the intersection of 215th Street and CSAH 70. A filtration basin will be located northwest of the intersection of CSAH 70 and Jacquard Ave. A retention basin near the west end of the runway is being expanded slightly. The expansion is aimed to reduce the frequency with which the basin needs to be maintained. A rock trench is being added on the east side of the basin to help facilitate drawdown of the pond after rainfall events. At all other outfall locations, stormwater will be pre-treated before being discharged via a sumped structure with a SAFL Baffle or another mechanism.

Overall the drainage patterns are being maintained through the proposed improvements with all runoff ultimately being discharged to South Creek. At the eastern end of the project corridor, where the roadway will be converted to an urban section, stormwater will be stored and conveyed underground via storm sewer pipes in contrast to the western portion of the project where roadside ditches will convey runoff. The stormwater management system for the project has been designed to protect both travelers and businesses along the roadway, as well as the natural resources that receive the runoff.

Controversial Issues

The project is not anticipated to be controversial.

Environmental Justice

The purpose of Executive Order 12898 is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority[8] and low-income populations. American Community Survey data from 2012-2016 and 2013-2017 was examined to determine if minority and/or low-income populations are present in or adjacent to the project limits by block group level, which is the smallest geographic unit for which race and ethnicity data is available. The project falls within four block groups (see Figure 3). The summary of low income and minority demographics by block group is shown in Table 6 and Table 7.

[8] Minority populations were defined as non-white populations.

Figure 3: Census Block Groups in Study Area

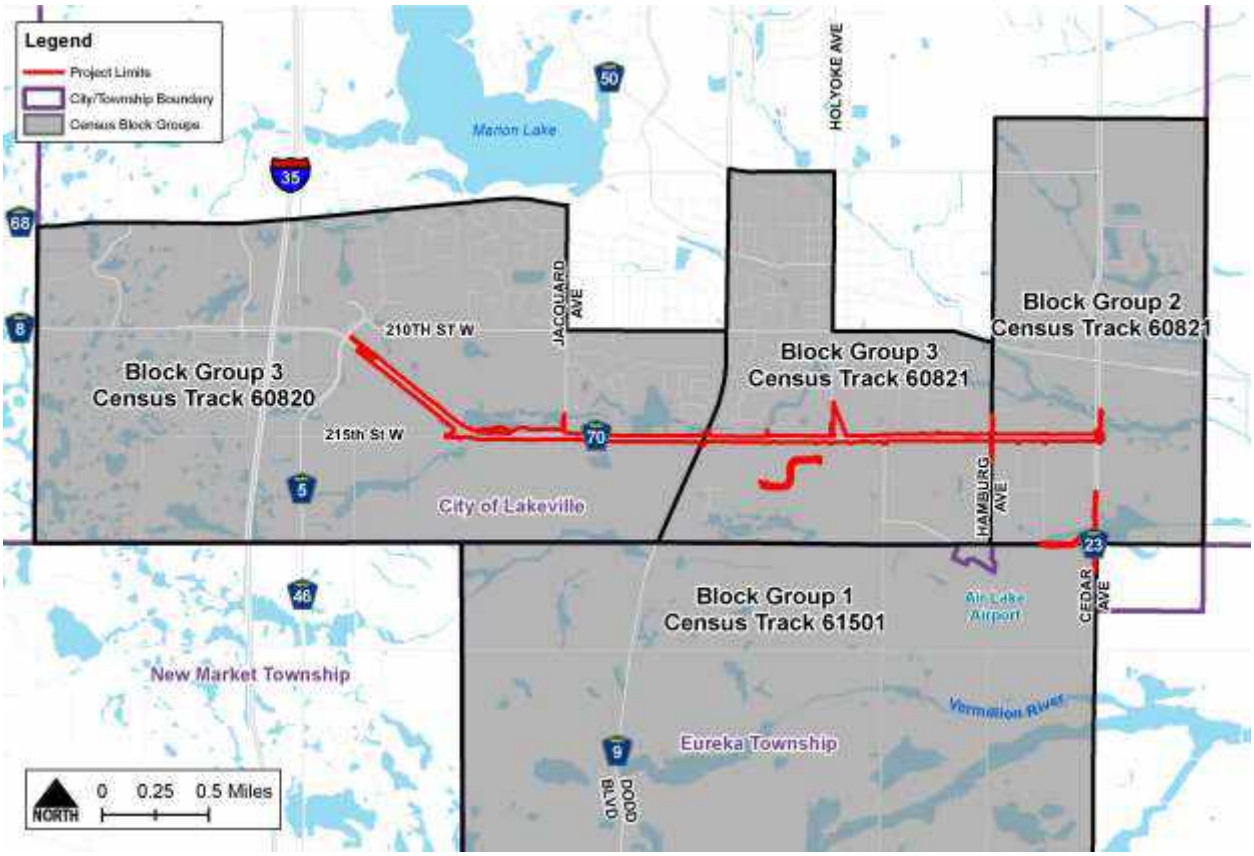


Table 6. Demographic Analysis Summary by Poverty Status[9]

	Population for Whom Poverty Status is Determined	Population Below Poverty	% Below Poverty Level	Difference from City
Dakota County	408,652	29,265	7%	
Lakeville	59,641	2,938	5%	
Block Group 1, Census Tract 61501	1,153	34	3%	-2%
Block Group 2, Census Tract 60821	734	61	8%	3%
Block Group 3, Census Tract 60820	3,523	53	2%	-3%
Block Group 3, Census Tract 60821	2,319	228	10%	5%

[9] Data are based on poverty status of individuals in the past 12 months by living arrangement by block group. Source: U.S. Census Bureau, 2012-2016 5-Year American Community Survey.

Table 7. Demographic Analysis Summary by Race and Hispanic Origin[10]

	Total Population	White, Not Hispanic Or Latino	Hispanic or Latino	Black or African American	American Indian & Alaska Native	Asian	Native Hawaiian & Pacific Islander	Some Other Race	Two or More Races	% Total Nonwhite	Difference from City
Dakota County	414,655	344,459	28,020	23,507	1,056	19,581	204	12,173	13,675	24%	
Lakeville	61,056	54,197	2,628	1,230	51	3,036	44	1,156	1,342	16%	
Block Group 1, Census Tract 61501	1,114	1,092	19	-	2	-	-	8	12	4%	-12%
Block Group 2, Census Tract 60821	847	739	-	96	-	-	-	-	12	13%	-3%
Block Group 3, Census Tract 60820	3,570	3,462	43	-	-	61	-	13	34	4%	-11%
Block Group 3, Census Tract 60821	2,272	1,748	14	91	30	189	-	88	126	24%	8%

Two out of four block groups within the project area have higher percentages of low-income populations when compared to the percentage of populations below the poverty level in the City of Lakeville (3% and 5% higher, respectively). One out of the four block groups have a higher percentage of minority residents within the project limits compared to the City of Lakeville (8% higher); however, the percentages are not meaningfully greater than compared to the city or county level, meaning they are not higher than 10% of the city or county average. See Figure 4 and Figure 5 for these block groups.

Readily identifiable minority and/or low-income populations are affected by the project. However, after considering public engagement, proposed mitigation, and the improved transportation mobility and enhanced pedestrian/bicycle connectivity that will benefit all users of CSAH 70, the adverse effects of the project will not be borne by the identified minority or low-income populations. Therefore, no Environmental Justice impacts are anticipated for this project.

[10] Data are based on Population by Race and Hispanic or Latino Origin by block group. Source: U.S. Census Bureau, 2013-2017 5-Year American Community Survey.

Figure 4: Low-Income Populations with the Study Area by Census Block Groups

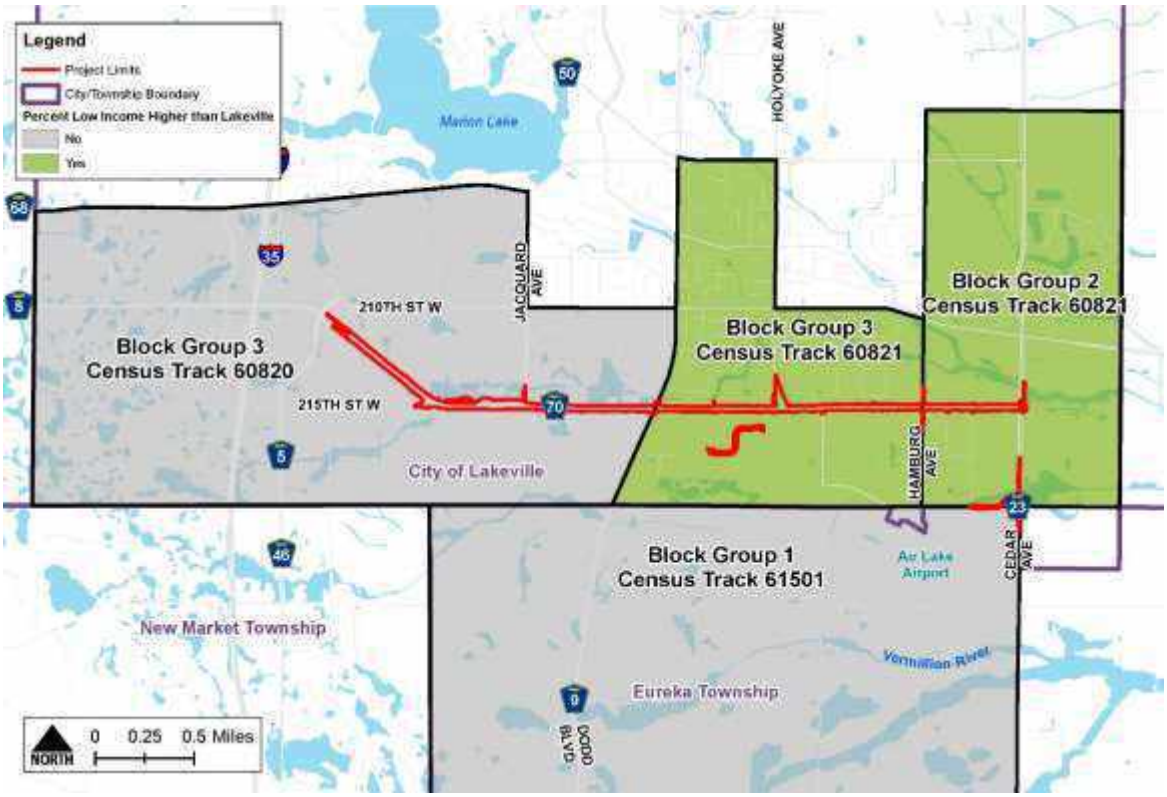
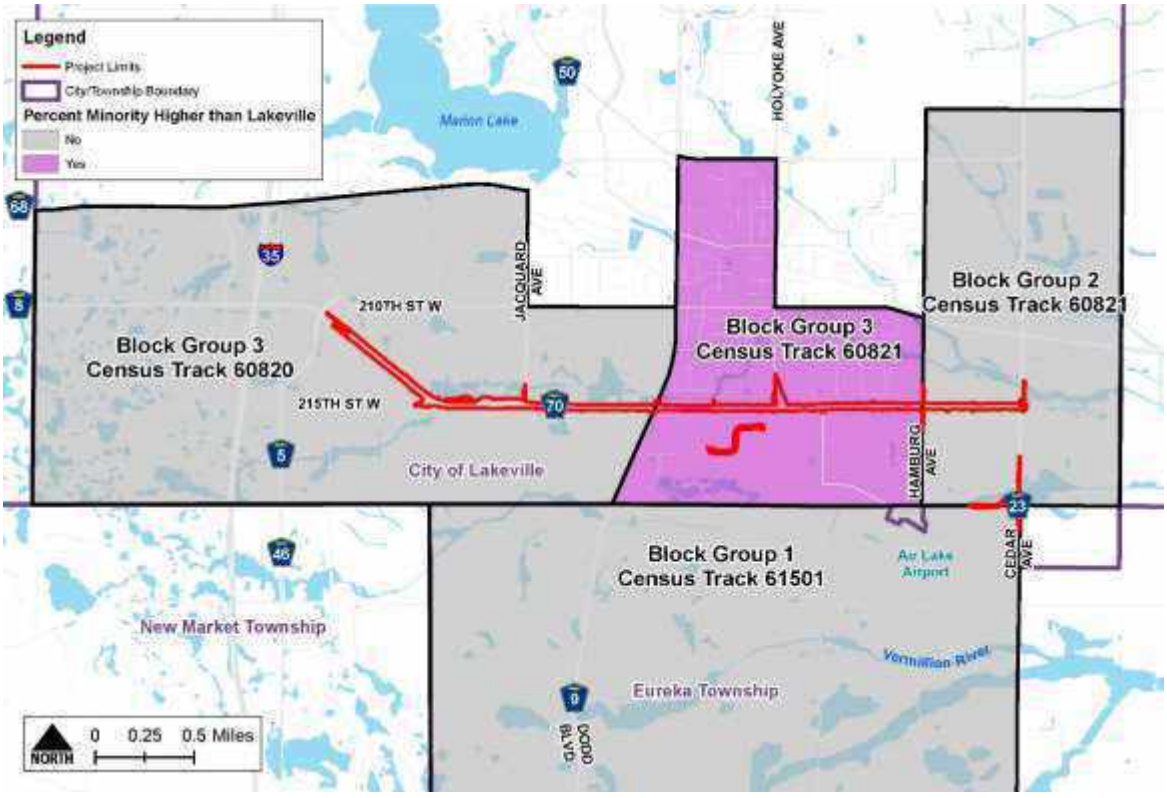


Figure 5: Minority Populations with the Study Area by Census Block Groups



State Environmental Review (MEQB)

The project meets the mandatory EAW thresholds under Minnesota Rules, Part 4410.4300, Subp. 22 or Part 4410.4400, Subp.16; but does not have potential for significant environmental effects. A completed EAW is included in **Attachment B** of this document.

VII. AGENCY COORDINATION

County Board Approval

Approval from the Dakota County Board is required for this project.

Municipal Approval

Approval from the City of Lakeville is required for this project.

Vermillion River Watershed Joint Powers Board

The project must follow Vermillion River Watershed Joint Powers Board (VRWJPB) standards which have been incorporated into the City of Lakeville's stormwater standards.

DNR Natural Heritage and Nongame Research Program

The DNR Natural Heritage Information System database was reviewed (per license agreement LA-843) for the area within approximately one mile of the proposed project. A summary of species identified and potential for impacts is found in EAW Section 13 in **Attachment B**.

Based on DNR Correspondence, no adverse impacts are anticipated to the species or the RSEA areas identified through the NHIS records search. Impacts to designated trout streams will be minimized and avoided to the extent practicable and all design will meet local and state requirements. Correspondence with the DNR is included in **Attachment J**.

Canadian Pacific

Approval from Canadian Pacific rail is needed for modification to the rail crossing west of Holyoke Avenue. Canadian Pacific is the owner of the railway and Progressive Rail, Inc. (PGR) operates on it. The County will have an agreement with PGR to cover the railroad improvements that are needed for the project, which the County is funding. See **Attachment M** for a memorandum documenting coordination between the County, MnDOT Rail, and Progressive Rail.

Metropolitan Airports Commission

The MnDOT Office of Aeronautics was contacted about the proposed project and instructed Dakota County to coordinate with the Metropolitan Airports Commission

(MAC). Approval from the MAC is required due to the project's proximity to the Airlake Airport. FAA approval is required for acquisition of easement or property from the airport for the extension of 220th Street, for the business access construction near 217th Street, and for the clean-out of an existing drainage basin at the west end of the existing runway. The following agreements are anticipated:

- Business access road near 217th Street:
    a. The business access road will be implemented/constructed with a shared access easement/agreement between the businesses (Lakeville Sanitation, Recycle MN, and Boise Cascade), property owners and the airport. It has been agreed that the County and City will design and construct the access road as part of the CSAH 70 project, but that it will be owned and maintained privately by the businesses and/or property owners under the shared access agreement.
    b. A drainage and utility easement had been prepared (for the City) which runs parallel with the access road. The easement will allow the City to route drainage along the business access road and into other existing drainage and utility easements that the City has over airport property including the airport drainage basin at the west end of the runway. The MAC and the businesses are responsible for execution of the shared access easement/agreement. The City will execute the drainage and utility easement as part of the CR 70 project.
- Clean-out of drainage basin at the west end of the runway:
    a. The City has had a joint powers agreement with the MAC to maintain this basin since 1999. The agreement allows the City to access the basin to perform periodic inspection and maintenance, including sediment removal to ensure that the basin infiltrates.
    b. The County proposes to clean-out the basin which requires approval under the terms of the Joint Powers Agreement.
- 220th Street Extension:
    a. Right-of-way for the 220th Street Extension is being coordinated with MAC by both the County and City. The County provided a legal description to MAC for the permanent right-of-way easement. There will eventually be a land release to the City for this area, but an agreement/right-of-entry for construction will be obtained if the land release is not complete ahead of construction.
    b. The proposed extension crosses the South Branch of South Creek which is classified as a trout stream. The stormwater management system in this location must meet water quality, volume and erosion control standards set by the Vermillion River Watershed Joint Powers Organization (VRWJPO) for trout streams.
    c. The right-of-way for the 220th Street Extension will be located entirely within the City of Lakeville per an approved Orderly Annexation Agreement between the City of Lakeville and Eureka Township.

Permits or Agreements

Permits or agreements needed for the project are listed in Table 8:.

Table 8: Agency Permits and Agreements

Agency Permit or Agreement	Required	Date Received
USACE Section 404	Yes	In process
Coast Guard	No	Not applicable
DNR--Water	Yes	In process
DNR--Public Waters	Yes	In process
MPCA--NPDES	Yes	In process
MPCA--Section 401	Yes	In process
MPCA—Sanitary Sewer Installation Permit	Yes	In process
Minnesota Department of Health -- Watermain Installation Permit	Yes	In process
City of Lakeville – Municipal Approval	Yes	In process
City of Lakeville -- Wetland Conservation Act Approval	Yes	In process
Dakota County -- County Board Approval	Yes	In process
Dakota County -- Environmental Impact Statement Need Decision	Yes	In Process
Progressive Rail, Inc. -- Approval	Yes	In process
Federal Highway Administration (FHWA) -- Finding of No Significant Impact	Yes	In process
MnDOT Cultural Resource Unit on behalf of FHWA -- Section 106 Finding	Yes	Oct. 28, 2019
MnDOT Office of Environmental Stewardship on behalf of FHWA -- Endangered Species Act Section 7 Determination	Yes	May 5, 2019 Nov. 1, 2019
Federal Aviation Administration -- Form 7460-1	Yes	In process

VIII. PUBLIC INVOLVEMENT

Public Information Meetings held:

Prior to the public open houses, two rounds of business owner meetings were held to gather feedback. Local concerns were provided through written and verbal comments. A copy of the meeting summaries are included in **Attachment K**.

The first round of meetings was held over two days, October 22 and October 23, 2018. 41 businesses were invited to attend via letters, email, and direct phone contact. Verbal comments presented at the meetings included:

- Operational and access accommodations for large trucks
- Access to/from I-35 and Cedar Avenue
- Intersection access modifications and restrictions
- Traffic and circulation impacts during construction

- CSAH 70 / Hamburg Avenue intersection change in traffic control from an all-way stop to a side-street stop

The second round of meetings was held on May 21, 2019. 41 businesses were invited to attend via letters, email, and direct phone contact. This round of business meetings focused on construction staging and gathering input from the businesses. Verbal comments raised included:

- Signalized intersections not being proposed at Highview Avenue and Hamburg Avenue intersections
- Truck/traffic accommodations and impacts to businesses during construction
- Maintaining two-way traffic on CSAH 70 at all times and providing reasonable access to I-35 and Cedar Avenue

The first open house was held on December 6, 2018 and provided an opportunity to share the project purpose and need as well as gather input on goals, issues, needs, and opportunities. The public was invited to attend via an open house newsletter. Concerns raised during this open house included:

- Questions about trails and pedestrian facilities
- Concern for loss of left-turn access in and out of properties
- FedEx truck lights shining in home windows near Dodd Boulevard
- Truck movements with transitioning the Hamburg Ave intersection from a 4-way to 2-way side street stop
- If and how landscaping will be incorporated
- Concern that expanding to four lanes would reduce the gaps for vehicles entering CSAH 70 from side streets
- How the noise study is being conducted

The second open house was held on June 10, 2019 with a focus on gathering additional input on proposed solutions including construction staging alternatives. The public was invited to attend via an open house newsletter. Verbal comments are generally summarized including:

- Truck movements with transitioning the Hamburg Ave intersection from a 4-way to 2-way side street stop
- Additional traffic on 210th Street during CSAH 70 construction
- Noise and light pollution

The third open house is planned for Fall 2019 and will present preferred project solutions and construction staging and schedule. The public will be invited to attend via an open house newsletter.

Public and business input has been considered and incorporated to the extent practicable given the purpose and need of the project. Specific project changes resulting from this input includes:

- Access modifications are being designed to allow for freight movement to continue. Accesses that are being modified to limit certain traffic movements

(e.g. full access to right-in / right-out only access) will improve overall mobility throughout the corridor.

- The 220th Street extension will allow for better access to and from Cedar Avenue.
- The project will be constructed in phases to allow for the roadway to maintain traffic during construction, providing access to and from I-35, Cedar Avenue and destinations along the corridor throughout construction. This should limit the number of drivers that choose to take alternate routes, such as 210th Street, during construction.
- Intersections at Highview Avenue and Hamburg Avenue were analyzed for signal warrants. Both intersections do not meet signal warrants and all-way stop control is not recommended at intersections with multiple through lanes and turn lanes as it is difficult for motorists to manage because they have difficulty determining who has the right-of-way to proceed, creating inefficiency and greater potential for crashes. For this reason, side street stop control is proposed at both intersections for safety and mobility reasons. Signal warrants may be met in the future as traffic volumes approach 2040 forecasts.

A noise impact focus group meeting was also held on June 4, 2019. Invitees included the neighborhood along 215th Street, a frontage road just east of Dodd Blvd, that is near CSAH 70.

Public Comment Period and Public hearing

Comments from the public and agencies affected by this project are requested during the public comment period described on the transmittal letter distributing this Environmental Assessment.

A public informational meeting/public hearing will be held during the Environmental Assessment 30-day comment period.

At the informational meeting/public hearing, preliminary design layouts for the alternatives under consideration along with other project documentation will be available for public review. The public will also be given the opportunity to express their comments, ideas and concerns about the proposed project. These comments will be received at the hearing and during the remainder of the comment period and will become a part of the official hearing record.

IX. DESIGN STUDY

The project will be designed in accordance with the FHWA-MnDOT Stewardship Agreement. For this project, the following design standards are applicable:

- 8820.9936 Minimum Design Standards, Urban; New or Reconstruction Projects
- 8820.9995 Minimum Bicycle Path Standards

- MnDOT Road Design Manual (for rural divided roadway segment)
- MnDOT Technical Memorandum No. 17-12-TS-05 (Shoulder Width Standards for State Highways)
- Minnesota Manual on Uniform Traffic Control Devices
- Americans with Disabilities Act (ADA)
- MnDOT Bikeway Facility Design Manual, March 2007
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, July 2004
- Public Right- of-Way Access Guidance (PROWAG)

The project will be constructed in accordance with the current edition of MnDOT's "Standard Specifications for Construction," including all Supplemental Specifications.

Roadway Data (CSAH 70)

Segment Termini: From: Kenrick Ave/Kensington Blvd To: Jacquard Ave

Design Element	Existing Condition	Proposed Design	Required
Roadway Type	Rural	Rural	
Project or segment length, ft	5,800	5,800	
Functional Class	Arterial	Principal Arterial	
ADT (Year)	13,300 (2018)	20,000 (2040)	
Heavy Commercial, %	17%	17%	
Speed, mph	55 mph (posted)	55 mph (design speed)	40
Thru Lanes each direction	1	2	
Lane width, ft	12	12	12
Roadway Surfacing type	Bituminous	Bituminous	Paved
Structural Design Strength, ton	10	10	10
Shoulder Width, ft	9	10 ft total: 8 ft (paved) + 2 ft (aggregate)	9.5 ft usable, includes 8 ft min. paved
Shoulder Surfacing type	Bituminous	8 ft Bituminous	8 ft Paved
Recovery Area	30 ft (min.)	30 to 50 ft	28 ft
Inslope, rise:run	1:4	1:4	
Approach Sideslopes	1:6	1:6	
Turn Lane, ft	11	12	12
Bypass Lane, ft	NA	NA	

Design Element	Existing Condition	Proposed Design	Required
Right-of-Way Width, ft	170	170	60
Median Type, ft	NA	6 (min.)	4 (min.)
Median Type, raised/painted Raised	NA	Raised	
Median Curb Reaction, ft	NA	2	2
Curb & Gutter type	NA	B418 (median)	
Curb Reaction, ft	NA	2	2
Clearance from Face/Curb, ft	NA	NA	
Parking Lane, ft	NA	NA	
Storm Sewer	N	Y	
Utilities	Y	Y	
Sidewalk Width	NA	NA	
Distance from edge of traveled way to sidewalk, ft	NA	NA	
Curb Ramps with detectable warning	NA	Y	
Traffic Signal(s)	Y	Y	
Roundabout	None	None	
Roadway Lighting, Type	Intersections	Intersections	
Railroad Crossing	N	N	
Landscaping	None	None	
Signing	Typical	Typical	
Pavement Marking	Typical	Typical	

Segment Termini: From: Jacquard Ave To: Cedar Ave

Design Element	Existing Condition	Proposed Design	Required
Roadway Type	Rural	Urban	
Project or segment length, ft	13,350	13,350	
Functional Class	Principal Arterial	Principal Arterial	
ADT (Year)	11,200 (2015)	20,000 (2040)	
Heavy Commercial, %	17%	17%	
Speed, mph	50 to 55 mph (posted)	55 mph (design speed)	30
Thru Lanes each direction	1	2	
Lane width, ft	12	12	11-12
Roadway Surfacing type	Bituminous	Bituminous	Paved
Structural Design Strength, ton	10	10	9

Design Element	Existing Condition	Proposed Design	Required
Shoulder Width, ft	9	8	NA
Shoulder Surfacing type	Bituminous	Bituminous	
Recovery Area	30 ft (min.)	30 to 50 ft	NA
Inslope, rise:run	NA	NA	
Approach Sideslopes	NA	NA	
Turn Lane, ft	12	14	12
Bypass Lane, ft	NA	NA	
Right-of-Way Width, ft	170	170	60
Median Type, ft	NA	6’ (min.)	4’ (min.)
Median Type, raised/painted Raised	NA	Raised	
Median Curb Reaction, ft	NA	2	1
Curb & Gutter type	NA	B418	
Curb Reaction, ft	NA	8 to 14	2-4
Clearance from Face/Curb, ft	NA	20’ (min.)	10
Parking Lane, ft	NA	NA	
Storm Sewer	N	Y	
Utilities	Y	Y	
Sidewalk Width	NA	NA	
Distance from edge of traveled way to sidewalk, ft	NA	NA	
Curb Ramps with detectable warning	NA	Y	
Traffic Signal(s)	Y	Y	
Roundabout	N	N	
Roadway Lighting, Type	Intersections	Intersections	
Railroad Crossing	Y	Y	
Landscaping	None	None	
Signing	Typical	Typical	
Pavement Marking	Typical	Typical	

Bike Path Data

Design Element	Existing Condition	Proposed Design	Required
Path Width, ft	NA	10	8
Path Surfacing	NA	Bituminous	Paved
Shoulder Width, ft	NA	2 (min.)	2

Design Element	Existing Condition	Proposed Design	Required
Shoulder Surfacing	NA	Turf / Grass	
Clear Zone, ft	NA	2 (min.)	2
Inslope, rise:run	NA	1:3 (max.)	1:2 (max.)
Design Speed, mph	NA	20	20
Maximum Grade, %	NA	2.65%	5%
Vertical Clearance, ft	NA	NA	8

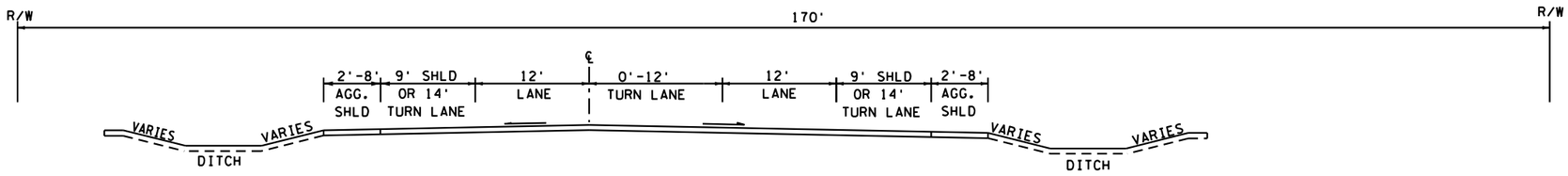
Traffic During Construction

CSAH 70 will be constructed under traffic. The south side (eastbound) lanes of the new roadway will be constructed first while traffic remains on the existing roadway. The north side (westbound) lanes will be constructed last while traffic is shifted to the newly constructed portion of the roadway.

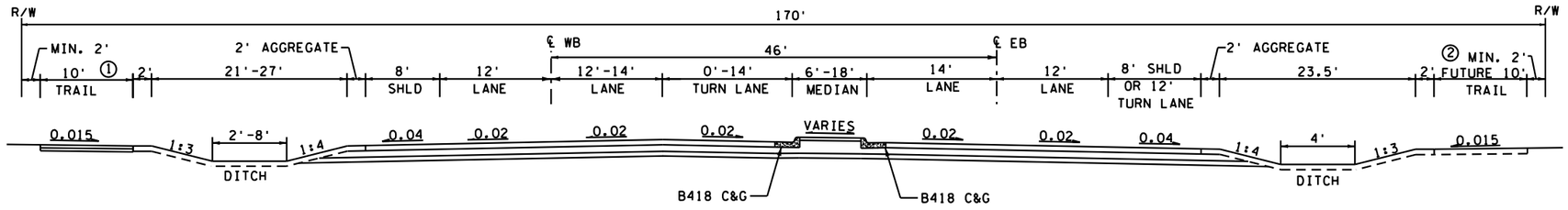
Design Exceptions

The proposed project meets State Aid Rules. There are no design exceptions required for this project.

CSAH 70 - EXISTING TYPICAL SECTION



CSAH 70 - PROPOSED TYPICAL SECTION
KENRICK AVE TO JACQUARD AVE

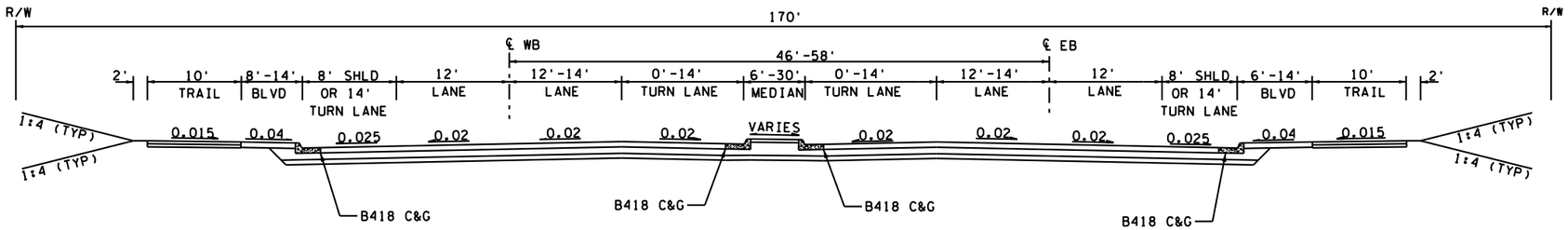


SPECIFIC NOTES:

① TRAIL FOLLOWS GREENWAY TRAIL ALIGNMENT IN SOME AREAS.

② GRADE FOR FUTURE TRAIL IN RURAL SECTIONS.

CSAH 70 - PROPOSED TYPICAL SECTION
JACQUARD AVE TO CEDAR AVE



NOT TO SCALE

HIGHWAY 70 EXPANSION PROJECT

Dakota County

Lakeville

COUNTY ROAD 70 EXPANSION TYPICAL SECTIONS

SHEET 1 OF 2

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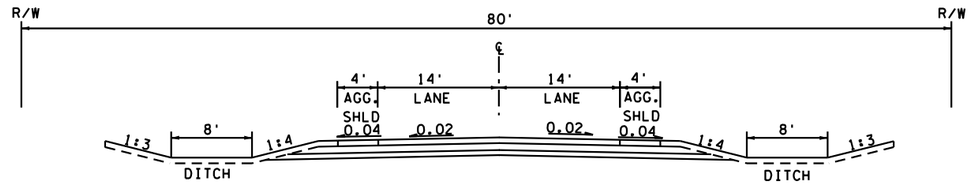
PROPOSED TYPICAL SECTION
220TH ST



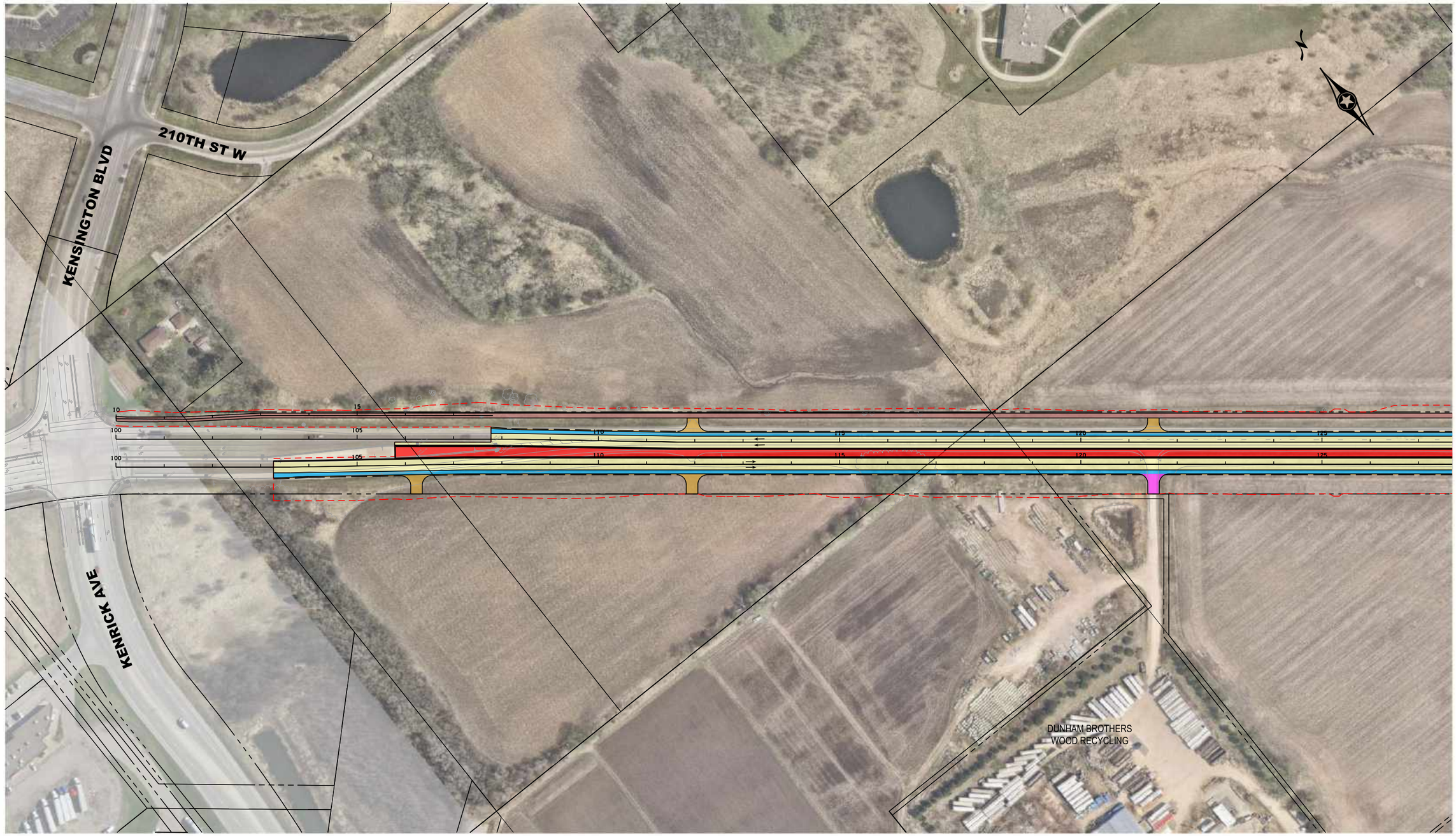
NOT TO SCALE

HIGHWAY 70 EXPANSION PROJECT

Dakota County

Lakeville

COUNTY ROAD 70 EXPANSION
TYPICAL SECTIONS



SCALE 0 100 200 FEET

HIGHWAY 70 EXPANSION PROJECT

Dakota

Lakeville

LAYOUT LEGEND

- PROPOSED ROADWAY
- RAISED CONC. MEDIAN, CURB & GUTTER
- PAVED SHOULDERS
- DRIVEWAY
- SHARED USE PATH
- TRAFFIC SIGNAL
- PROPOSED DRAINAGE BASIN
- GRAVEL FIELD ACCESS OR SHOULDER
- PARCEL LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- GRADING LIMITS

COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 1 OF 9

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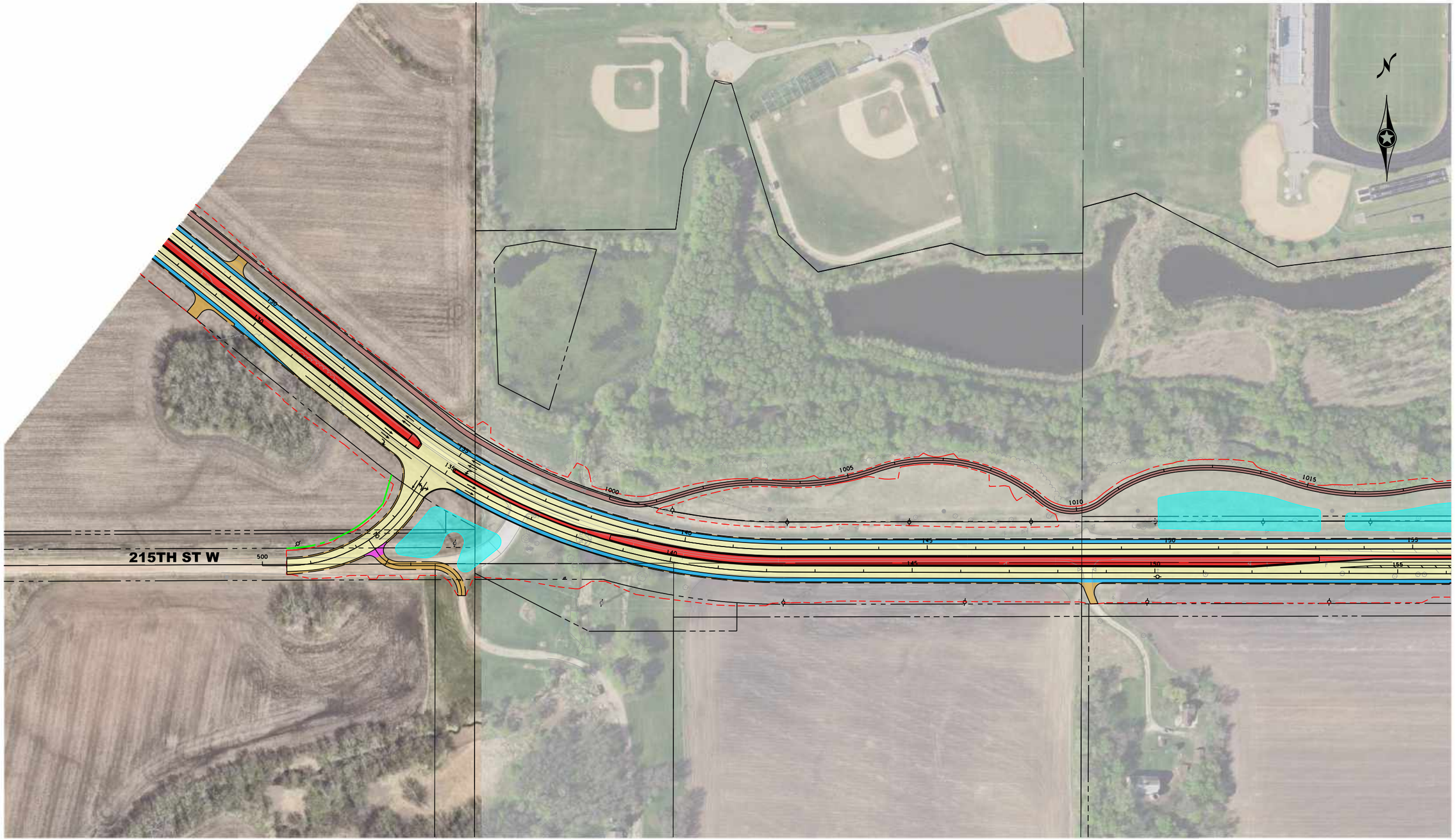

0 100 200
SCALE FEET

HIGHWAY 70
EXPANSION PROJECT

Dakota

Lakeville

LAYOUT LEGEND

- PROPOSED ROADWAY
- RAISED CONC. MEDIAN, CURB & GUTTER
- PAVED SHOULDERS
- DRIVEWAY
- SHARED USE PATH
- TRAFFIC SIGNAL
- PROPOSED DRAINAGE BASIN
- GRAVEL FIELD ACCESS OR SHOULDER
- PARCEL LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- GRADING LIMITS

COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 2 OF 9

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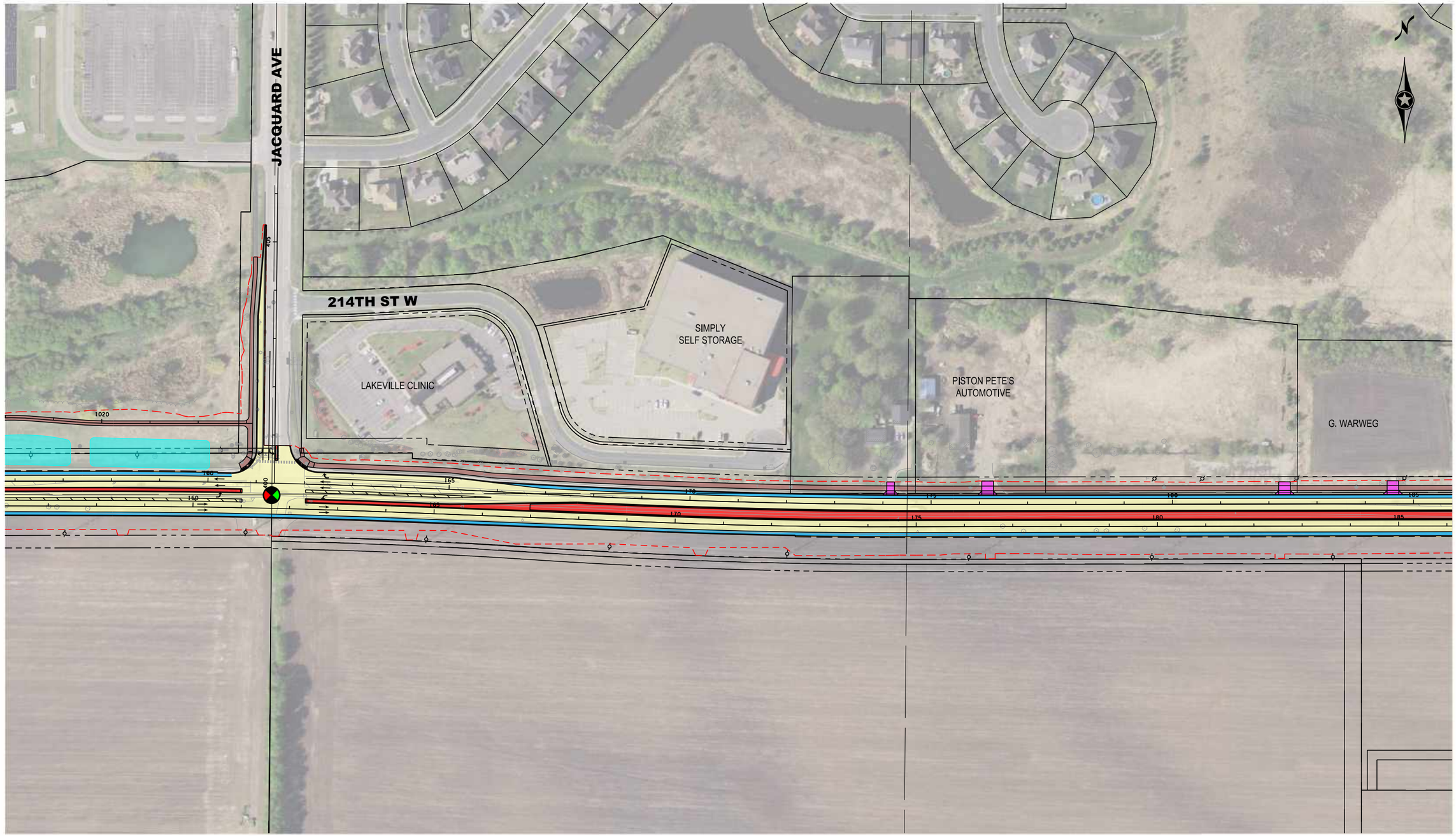

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HIGHWAY 70
EXPANSION PROJECT

Dakota

Lakeville

LAYOUT LEGEND

- PROPOSED ROADWAY
- RAISED CONC. MEDIAN, CURB & GUTTER
- PAVED SHOULDERS
- DRIVEWAY
- SHARED USE PATH
- TRAFFIC SIGNAL
- PROPOSED DRAINAGE BASIN
- GRAVEL FIELD ACCESS OR SHOULDER
- PARCEL LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- GRADING LIMITS

COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 3 OF 9

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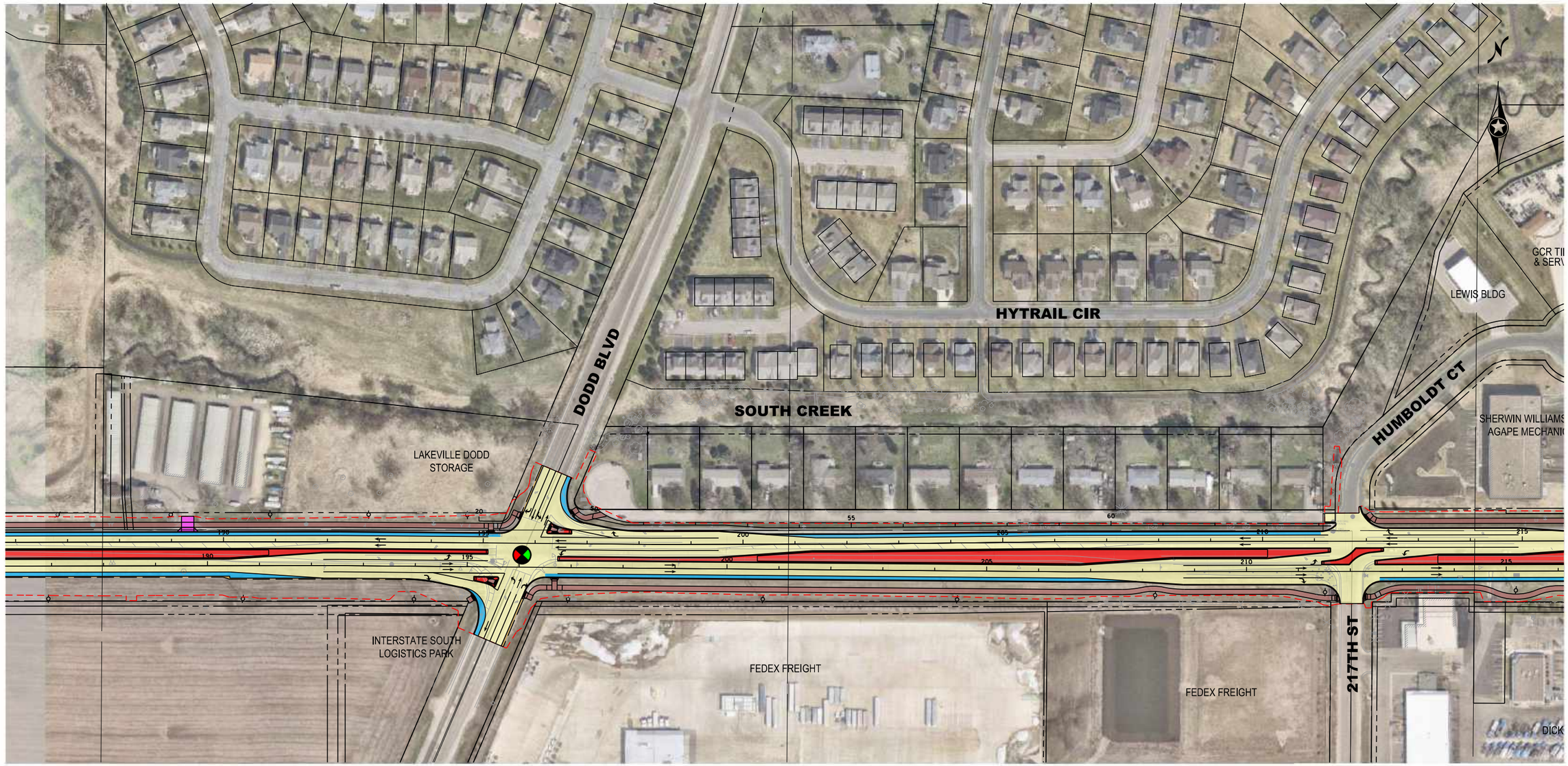

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HIGHWAY 70 EXPANSION PROJECT

Dakota

Lakeville

LAYOUT LEGEND

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COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 4 OF 9

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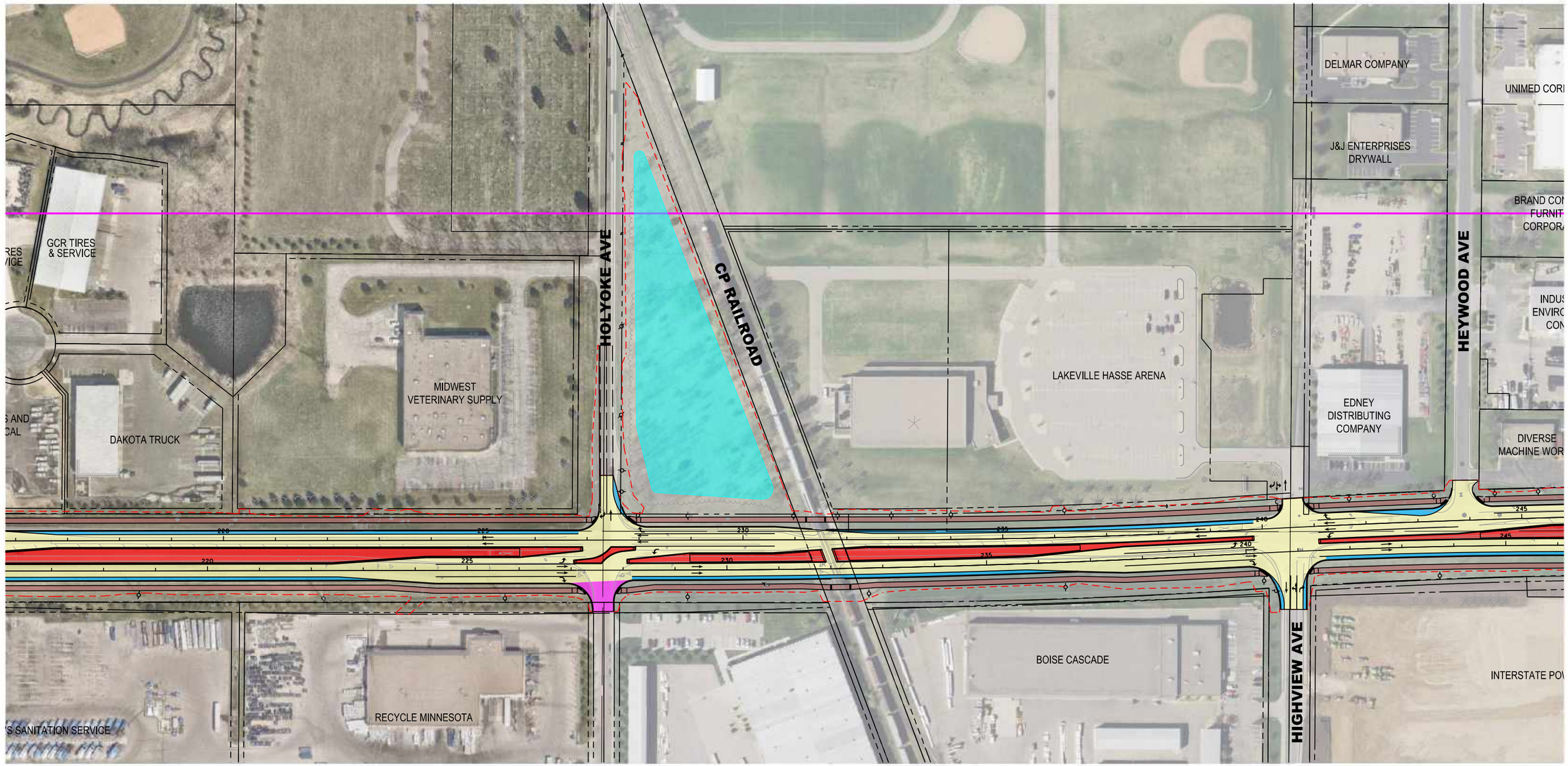

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HIGHWAY 70 EXPANSION PROJECT

Dakota

Lakeville

LAYOUT LEGEND

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COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

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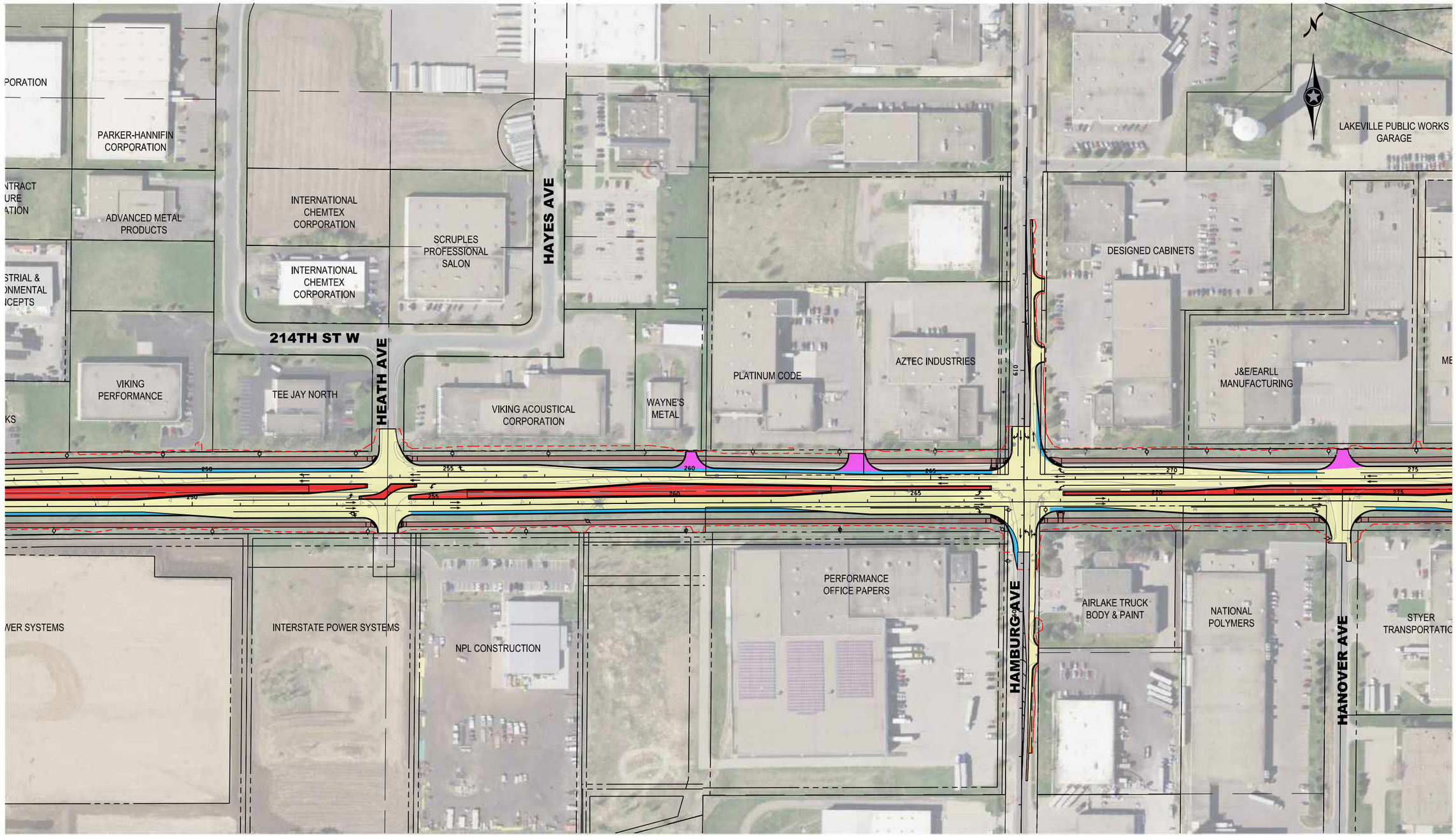

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HIGHWAY 70 EXPANSION PROJECT

Dakota COUNTY

Lakeville

LAYOUT LEGEND

- PROPOSED ROADWAY
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- PAVED SHOULDERS
- DRIVEWAY
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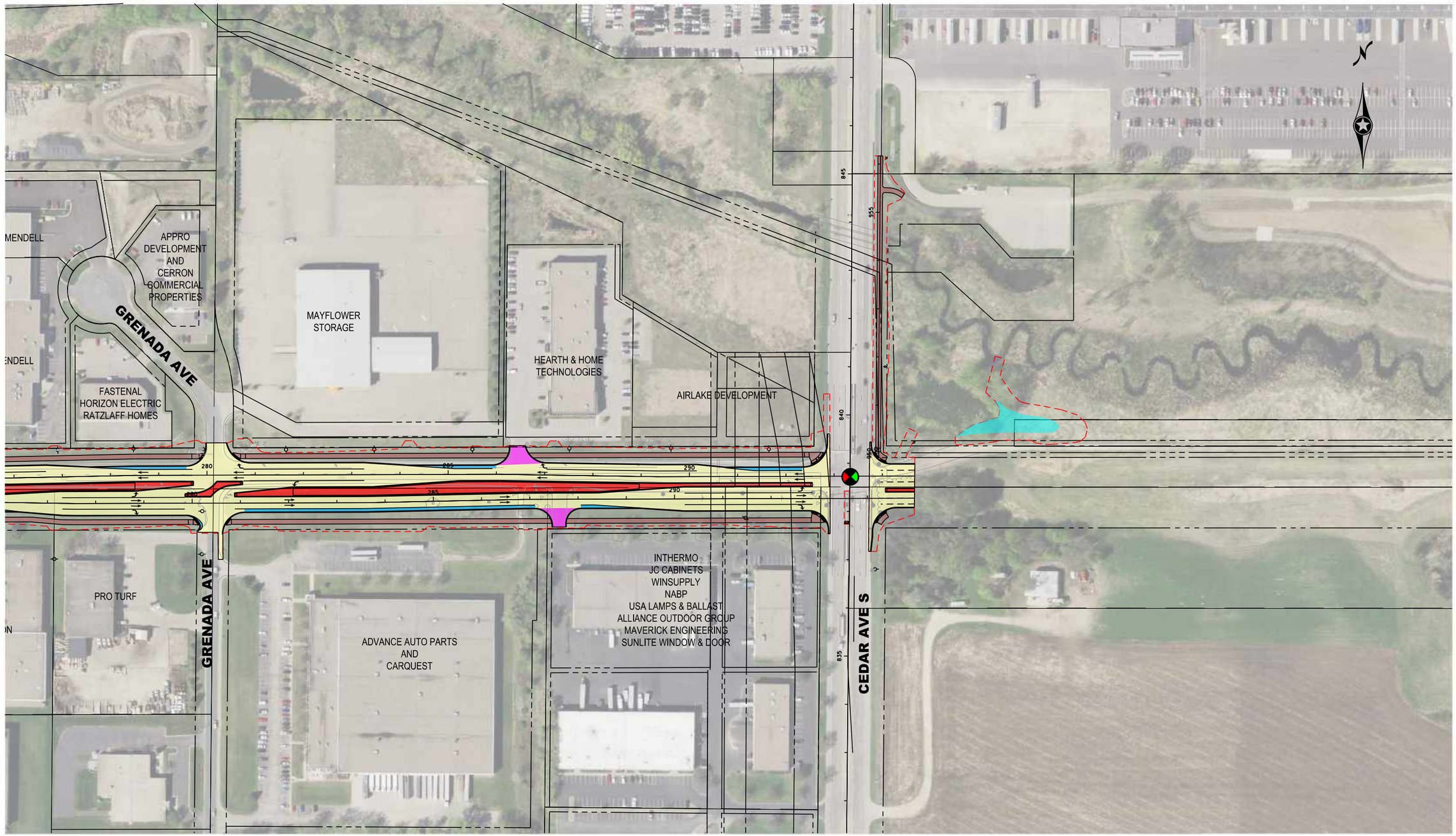
COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 6 OF 9



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HIGHWAY 70 EXPANSION PROJECT

Dakota County

Lakeville

LAYOUT LEGEND

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COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 7 OF 9

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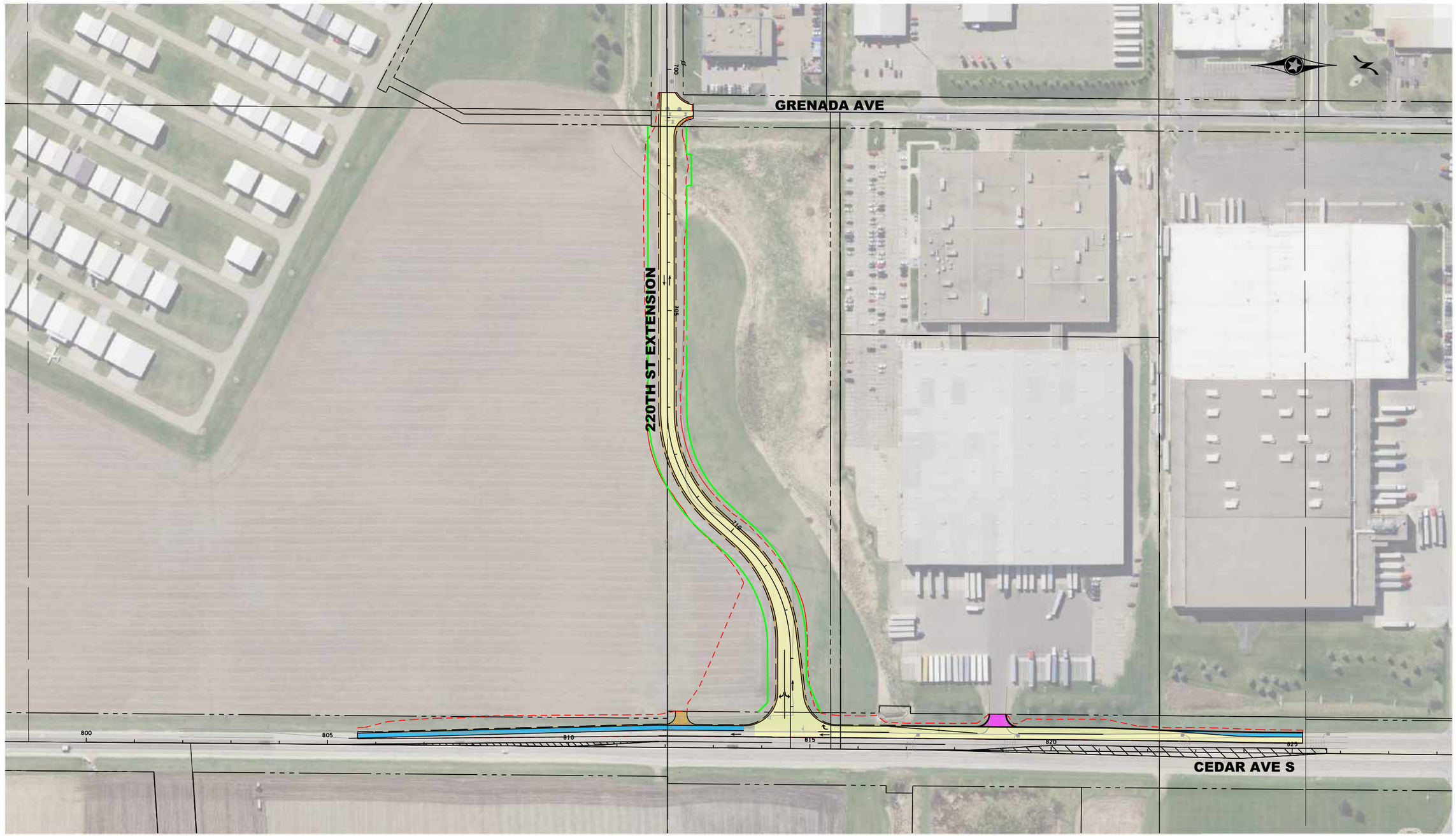

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HIGHWAY 70 EXPANSION PROJECT

Dakota

Lakeville

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COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 8 OF 9

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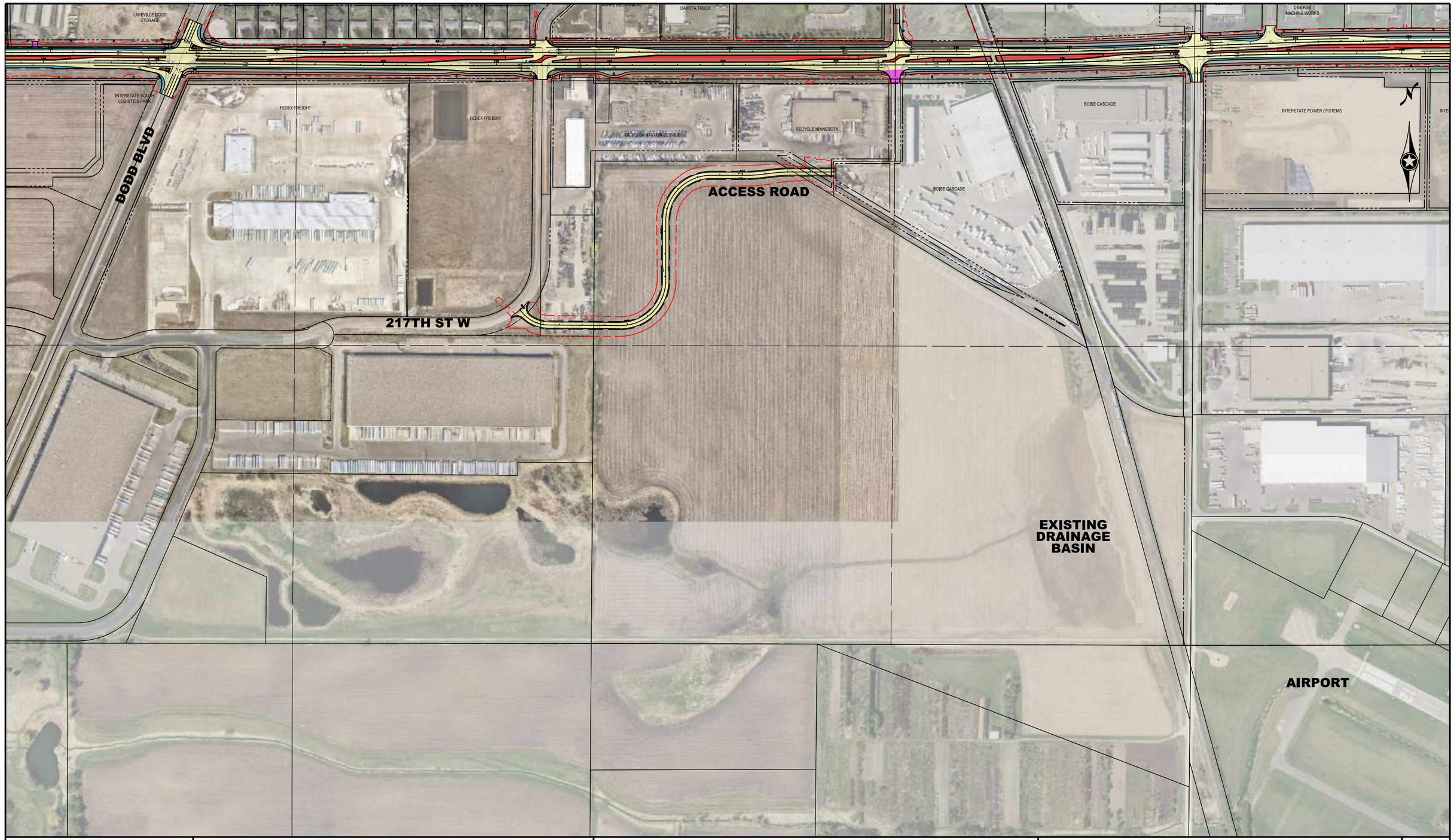

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SCALE FEET

HIGHWAY 70 EXPANSION PROJECT

Dakota County

Lakeville

LAYOUT LEGEND

- PROPOSED ROADWAY
- RAISED CONC. MEDIAN, CURB & GUTTER
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COUNTY ROAD 70 EXPANSION DESIGN LAYOUT

SHEET 9 OF 9

County State Aid Highway 70 Expansion Project

Environmental Assessment Worksheet

December 2019

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July 2013 Version

Environmental Assessment Worksheet

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

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

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

1. Project Title

County State Aid Highway 70 Expansion Project

2. Proposer

Proposer: Dakota County
Contact Person: Jake Rezac
Title: Project Manager
Address: 14995 Galaxie Ave
City, State, ZIP: Apple Valley, MN 55124
Phone: 952-891-7981
Email: jacob.rezac@co.dakota.mn.us

3. RGU

RGU: Dakota County
Contact Person: Mark Krebsbach
Title: County Engineer
Address: 14955 Galaxie Avenue
City, State, ZIP: Apple Valley, MN 55124
Phone: 952-891-7100
Email: mark.krebsbach@co.dakota.mn.us

4. Reason for EAW Preparation

Check one:

Required:
☐EIS Scoping
☒Mandatory EAW

Discretionary:
☐Citizen petition
☐RGU discretion
☐Proposer initiated

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

Minnesota Rule 4410.4300, Subp. 22 – Highway Projects (B) For construction of additional travel lanes on an existing road for a length of one or more miles.

5. Project Location

County: Dakota
City/Township: Lakeville
PLS Location (¼, ¼, Section, Township, Range): see **Table 5-1**

Table 5-1: Section, Township, Range

Section	Township	Range
31, 32, and 33	114N	20W
36	114N	21W

Watershed (81 major watershed scale): Mississippi Rover – Lake Pepin
GPS Coordinates: 44.63754, -93.245647
At a minimum, attach each of the following to the EAW:

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

6. Project Description

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

Dakota County is proposing to expand County State Aid Highway 70 (referred to in document as CSAH 70) from Kenrick Avenue/Kensington Boulevard to County State Aid Highway (CSAH 23) (Cedar Ave), to a four-lane divided highway. Improvements include two traffic lanes in each direction with a center median, the addition of turn lanes, access modifications, and a trail on both sides of CSAH 70.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion, include a description of the

existing facility. Emphasize 1) construction and operation methods and features that will cause physical manipulation of the environment or will produce wastes; 2) modifications to existing equipment or industrial processes; 3) significant demolition, removal, or remodeling of existing structures; and 4) timing and duration of construction activities.

The proposed project includes expanding approximately 4 miles of CSAH 70 between Kenrick Avenue/Kensington Boulevard and Cedar Avenue from a two-lane roadway to a four-lane roadway with a median, turn lanes, mixed use trails, and stormwater improvements (i.e. curb and gutter, stormwater Best Management Practices [BMPs]). The project proposes adding additional capacity and installing a raised center median to minimize full access private driveways and local streets to full access driveways to right-in/right-out access and some local streets to right-in/left-in/right-out access to improve future mobility. In addition, the project will construct trails to provide bike/pedestrian connections.

The median will break in five locations for full access intersections at 215th Street West, Jacquard Avenue, Dodd Boulevard, Highview Avenue, Hamburg Avenue, and Cedar Avenue. These full access intersections will be spaced at ½ mile, meeting County requirements for principal arterials. At several locations in the corridor, the median will break to partially accommodate turning vehicles (i.e. right-in/left-in/right-out access). Humboldt Court/217th Street, Holyoke Avenue, Heath Avenue, and Grenada Avenue will all be partial access intersections. An additional driveway/business access road would be constructed at 217th Street to mitigate the access modification at Holyoke Avenue and provide for access to westbound CSAH 70 via Dodd Boulevard, shown in Figure 2.

In addition to these overall corridor changes, some minor intersection reconfigurations will be made in order to provide cohesive connectivity with the regional road system. The intersection of CSAH 70 & 215th Street West will be moved approximately 100 feet to the west in order to align with a future connection to 210th Street allowing for a future 4-legged full access intersection. Driveway intersections will be reconfigured in order to meet the driveway spacing guidelines.

As part of the project, 220th Street will be extended approximately 1,200 feet east to Cedar Avenue from its current end point at Grenada Avenue. This extension is planned and consistent with the *Lakeville Thrive, 2040 Comprehensive Plan* and will provide an alternate access for businesses to Cedar Avenue during and after construction and provides additional options for vehicle traffic to access the regional roadway network.

Trails will be added on the north side of the highway between Kenrick Avenue/Kensington Boulevard and Dodd Boulevard, both sides of the highway between Dodd boulevard and Cedar Avenue, the west side of the Jacquard Avenue, and the east side of Cedar Avenue. See **Attachment A** for project layout.

Timing/duration of Construction – Construction is planned to begin in May 2020 and the project will be constructed over 2 years. 220th Street extension and eastbound lanes of CSAH 70 will be constructed first. The westbound lanes of CSAH 70 will be constructed during the second construction season.

c. Project magnitude

Table 6-1: Project Magnitude

Measure	Magnitude
Total Project Acreage	91.1 acres
Linear Project Length	3.7 miles

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

The purpose of the proposed action is to improve traffic mobility and enhance pedestrian/bicycle connectivity along CSAH 70.

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

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

Not applicable.

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

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

Not applicable.

7. Cover Types

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

Table 7-1: Cover Types

Cover Type	Before (Acres)	After (Acres)
Wetland Basins	0.59	0
Wetland Ditches	1.53	0
Streams	0.02	0
Wooded/Forest	3.80	0
Brush/Grassland	7.77	4.53
Cropland	10.90	0
Lawn/Landscaping	48.90	35.85
Impervious Surface	16.50	43.20
Stormwater Pond	0.02	6.72
Total	90.03	90.03

8. Permits and Approvals Required

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

Table 8-1: Permits and Approvals Required

Unit of Government	Type of Application	Status
LOCAL		
Railroad	Approval from Progressive Rail, Inc. (PGR)	In Progress
Dakota County	Board Approval	In Progress
Dakota County	Environmental Assessment Worksheet	Complete
Dakota County	Environmental Impact Statement Need Decision	In Progress
City of Lakeville	Wetland Conservation Act Approval	In Progress
City of Lakeville	Municipal Approval	In Progress
STATE		
Minnesota Department of Natural Resources (DNR)	Water/Public Waters	In Progress
Minnesota Pollution Control Agency (MPCA)	NPDES Permit	In Progress
MPCA	Section 401 Permit	In Progress
MPCA	Sanitary Sewer Installation Permit	In Progress
Minnesota Department of Health	Watermain Installation Permit	In Progress
FEDERAL		
Federal Highway Administration (FHWA)	Environmental Assessment	Complete
FHWA	Finding of No Significant Impact (anticipated outcome)	In Progress
MnDOT Cultural Resource Unit on behalf of FHWA	Section 106 Finding	Complete
MnDOT Office of Environmental Stewardship on behalf of FHWA	Endangered Species Act Section 7 Determination	Complete
Federal Aviation Administration	FAA Form 7460-1	In Progress
US Army Corps of Engineers (USACE)	Section 404 Permit	In Progress

9. Land Use

a. Describe:

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

The project area refers to a boundary that extends beyond the construction limits to capture any nearby and adjacent areas.

Existing Land Use

According to the City of Lakeville 2040 Comprehensive Land Use Plan[1], land use within and adjacent to the construction limits is comprised of multiple uses including existing right-of-way, commercial, agricultural, residential, industrial, parks, and restricted development. The restricted development includes South Creek Greenway, South Creek, and its buffer.

Parkland and Trails

No parklands are within or adjacent to the construction limits, but nearby parks, public, and quasi-public lands include Lakeville South High School, Chadwick Park, Stoneborough Park, McGuire Middle School, John F. Kennedy Elementary School, and All Saints Catholic Cemetery. Kenwood Trail, which runs north-south, crosses the construction limits just east of Holyoke Ave.

In addition, the Lakeville Hasse Arena is located on the corridor at 8525 215th St W. The ice arena is owned by the Housing and Redevelopment Authority of the City of Lakeville and leased by the City of Lakeville. Also, drainage easements are located along the southern and eastern edges of the property. The arena hosts sporting events and is available for public rent.

The Lakeville 2040 Comprehensive Plan notes a high priority for acquisition of land southwest of Lakeville South High School for parking and to accommodate extension of the South Creek/Lake Marion Greenway Regional Trail.

Prime/Unique Farmland

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey[2], 10 of the 14 soil types within the construction limits are classified as prime farmland, prime farmland if drained, or farmland of statewide importance; these soils represent approximately 90 percent of the soils within the construction limits. According to the city of Lakeville's 2040 Land Use Plan the entire corridor shows planned industrial and office park use; therefore, exempting the whole project from the Farmland Protection Policy Act (FPPA).

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

According to the City of Lakeville 2040 Land Use Plan Map[3], the land within and adjacent to the construction limits is planned for right-of-way, commercial, restricted development, industrial, residential, and public land. The future land use along CSAH 70 will help to promote this segment as an industrial corridor connecting I-35 and CSAH 23, as plans for the road including shifting it from an A-Minor Expander to a Principal Arterial.

[1] Source: http://www.ci.lakeville.mn.us/DocumentCenter/View/5466/Chapter-1-Land-Use-Plan
[2] Source: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
[3] Source: http://www.ci.lakeville.mn.us/DocumentCenter/View/5464/2040-Land-Use-Map

The South Creek Management Plan[4] outlines goals, strategies, and BMPs to preserve the South Creek Stormwater District. These include revegetating a riparian buffer for sufficient stream shade and transferring ownership of the buffer to the City of Lakeville.

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

The land uses identified in the City of Lakeville Zoning Map mirror those mentioned in the City of Lakeville 2040 Land Use Plan.

The Federal Emergency Management Agency (FEMA) identifies three areas within the construction limits that are within South Creek's 100-year floodplain:

- The West Branch of South Creek between 215th Street and Jacquard Avenue
- The West Branch of South Creek near the proposed stormwater pond expansion east of Cedar Avenue
- The South Branch of South Creek near the proposed 220th Street extension

The project crosses two shoreland overlay districts:

- South Creek West has a 300 foot shoreland overlay district which overlaps the project construction limits between 215th Street and Jacquard Avenue.
- South Creek South has a 300 foot shoreland overlay district which overlaps the project construction limits near the proposed 220th Street Extension.

There are no agricultural preserves, wild and scenic rivers, or critical areas within or adjacent to the project area.

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

The proposed improvements are consistent with current and future local zoning, the Lakeville Land Use Plan, and the South Creek Management Plan.

There are no specific city ordinances regarding the shoreland overlay districts that apply to linear roadway project. To mitigate the potential impacts to South Creek, the project will follow appropriate National Pollutant Discharge Elimination System (NPDES) requirements and develop a Stormwater Pollution Prevention Plan (SWPPP).

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

Not applicable.

[4] Source: http://www.ci.lakeville.mn.us/DocumentCenter/View/5470/Chapter-5-Water-and-Natural-Resources-Management-Plan

10. Geology, Soils, and Topography/Land Forms

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

According to the Geologic Atlas of Dakota County,[5] the project has upper bedrock contact with the Prairie du Chien Group. The Prairie du Chien is typically 150-190 feet thick and is comprised of Oneota Dolostone, New Richmond Sandstone, and Shakopee Dolostone. The Prairie du Chien is stratigraphically followed by the Jordan Sandstone, the St. Lawrence Formation, the Tunnel City Group (formerly known as the Franconia Formation), the Wonewoc Sandstone (formerly known as the Ironton and Galesville Sandstones), and the Eau Claire Formation. The depth to bedrock typically ranges from 100 to 300 feet throughout the project area.

There are no known sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst features present within or near the construction limits.

b. Soils and Topography – Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability, or other soil limitations, such as steep slopes or highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections, or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

The current elevations of the existing roadway range from 940 feet to 1,060 feet and generally slope downward from west to east along the corridor.

According to the NRCS Web Soil Survey, there are 14 soil types within the construction limits. One soil type (Waukengan silt loam, 0 to 1 percent slopes) makes up almost half of the 91.5 acres within the construction limits. Details on the soil types found within the construction limits are included in Table 10-1.

The NRCS Erosion Hazard Ratings indicate the hazard of soil loss from off-road areas after disturbance activities that expose soil surface. Within the construction limits, 91.6 percent have a "slight" rating, meaning that erosion is unlikely under normal climatic conditions, and the remaining 8.4 percent have no rating.

The proposed project would require approximately 300,000 cubic yards of excavation and 55,000 cubic yards of fill.

[5] Available at https://www.co.dakota.mn.us/HomeProperty/MappingServices/Maps/Documents/GeologicAtlas/Plate2BedrockGeology.pdf

Table 10-1: Soil Types within the Construction Limits

Map Unit Symbol	Map Unit Name	Erosion Hazard Rating	Percent of Construction Limits
2B	Ostrander loam, 1 to 6 percent slopes	Slight	1.1
39A	Wadena loam, 0 to 2 percent slopes	Slight	5.7
41B	Estherville sandy loam, 2 to 6 percent slopes	Slight	0.9
129	Cylinder loam, 0 to 2 percent slopes	Slight	23.8
176	Garwin silty clay loam	Slight	2.0
208	Kato silty clay loam	Slight	0.7
252	Marshan silty clay loam	Slight	11.4
411A	Waukegan silt loam, 0 to 1 percent slopes	Slight	42.5
411B	Waukegan silt loam, 1 to 6 percent slopes	Slight	0.2
539	Klossner muck, 0 to 1 percent slopes	Slight	1.8
540	Seelyeville muck	Slight	1.3
857A	Urban land-Waukegan complex, 0 to 1 percent slopes	Not rated	8.5
1027	Udorthents, wet	Not rated	0.1
1078	Anthroportic Udorthents, 2 to 9 percent slopes	Slight	0.1

An NPDES permit is required because the project will disturb more than 1 acre of land. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared. All unpaved areas disturbed during construction will be revegetated in accordance with the standard NPDES permit requirements. In areas with steep slopes, special consideration will be given to prevent erosion during construction, such as erosion control blankets, along with vegetation establishment to permanently stabilize side slopes and any areas impacted as a result of construction.

11. Water Resources

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

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

The project area contains multiple surface waters including wetlands, wetland ditches, and watercourses. Aquatic resources within the construction limits were delineated using a routine Level 2 delineation method.[6] A wetland delineation was completed (Kimley-Horn 2019) for all wetland boundaries shown in **Attachment I.**

[6] Level 2 delineation methodology outlined in the 1987 Corps of Engineers Wetlands Delineation Manual (USACE, 1987) along with the Midwest regional supplement (USACE, 2012). More information available at http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/.

Four watercourses were identified as part of the field delineations.

One DNR Public Watercourse, South Creek, is located within the construction limits at the far east end along Cedar Ave; there are no DNR Public Waterbodies. South Creek is tributary of the Vermillion River to the south and east of the project (see Figure 1).

Marion (East Bay) Lake, along with South Creek and Vermillion River, are the only water resources within one mile of the construction limits that are on the MPCA's 303d 2018 Impaired Waters list (see Table 11-1 and Figure 1).[7] The project does not have potential to effect the impairment of Marion Lake or South Creek (mercury and coliform, respectively). The project will meet the requirements of the Vermillion River Watershed Joint Powers Organization which means there should be no downstream effect on the impairments of the Vermillion River.

During construction of the project there is potential to add sediment and suspended solids to the water resources; however, stormwater best management practices (BMPs) would be added that would reduce potential turbidity impairment to South Creek and Vermillion River.

Table 11-1: Impaired Waters within One Mile of the Construction Limits

Waterbody	Assessment Unit	Impairment Cause
Marion (East Bay)	19-0026-01	Mercury
South Creek	07040001-527	Coliform
Vermillion River	07040001-517	Dissolved Oxygen, Fecal Coliform, Mercury in Fish Tissue, Fish and Macroinvertebrates, Turbidity

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

The project area is underlain by several bedrock aquifer systems; the Prairie du Chien-Jordan aquifers are the uppermost aquifers. The underlying St. Lawrence Formation is considered a regional confining bed hydraulically separating the overlying Prairie du Chien-Jordan aquifer from the underlying Tunnel City-Wonewoc (Franconia-Ironton-Galesville) aquifer. The Eau Claire Formation, a shale, siltstone, and very fine-grained sandstone layer that averages about 75 feet in thickness, acts as a confining layer hydraulically separating the overlying Wonewoc from the underlying Mt. Simon-Hinckley aquifer. In addition to the

[7] More information related to impaired waters is available at https://www.pca.state.mn.us/water/minnesotasimpaired-waters-list

bedrock aquifers, sand layers in the glacial drift may be used as a source of water supply.

A review of nearby well records via the Minnesota DNR's Water-Table Elevation and Depth to Water Table data (Minnesota Hydrogeology Atlas series HG-03)[8], the depth to groundwater varies from 0 to 20 feet across the project area. The project site is in an area considered to have medium to high susceptibility to groundwater contamination.

The Lakeville Wellhead Protection Area is located within the construction limits, as well as the Lakeville Drinking Water Supply Management Area (see **Figure 3).**

According to the Minnesota Department of Health (MDH) Well Index,[9] there are no wells within the construction limits, but ten that are located along CSAH 70 just outside of the construction limits. These wells range in depth from 120 to 340 feet. No wells were identified during surveys of the project area; however, if wells are encountered during construction, they will be sealed in accordance with current MDH regulations. Wells located within 150 feet of the construction limits are listed in Table 11-2 and **Figure 3.**

Table 11-2: Wells within 150 feet of the Construction Limits

Unique Well ID	Type of Well	Status
818551	Domestic	Active
180430	Domestic	Active
575406	Domestic	Active
424669	Commercial	Active
235584	Industrial	Unknown
436492	Domestic	Active
672534	Domestic	Active
798669	Domestic	Active
808517	Domestic	Active
618502	Domestic	Active

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

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

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

Not applicable

[8] Available at https://files.dnr.state.mn.us/waters/groundwater_section/mapping/mha/hg03_plate2.pdf
[9] Available at https://mnwellindex.web.health.state.mn.us/

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

   Not applicable

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

   Not applicable

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

The project area consists of approximately 4 miles of two-lane rural highway. Stormwater runoff from the roadway is currently captured by roadside ditches and conveyed ultimately to South Creek at various locations along the corridor. A large portion of the corridor will be converted to an urban roadway which includes the addition of curb and gutter. This proposed conversion, will result in a net increase of 26.7 acres of new impervious surface.

The project must meet water quality, volume and erosion control standards set by the Vermillion River Watershed Joint Powers Organization (VRWJPO), which exceed that of the MPCA Construction Stormwater NPDES Permit. To meet requirements, two main stormwater treatment facilities are proposed. The proposed treatment sites are designed to exceed the treatment requirements and offset the storage lost from filling the existing roadside ditches. One infiltration basin is located in the parcel between Holyoke Ave, CSAH 70 and the railroad tracks and a second infiltration basin will be located northwest of the intersection of CSAH 70 and Jacquard Ave. A second infiltration basin is located at the intersection of 215th Street and CSAH 70.

A filtration basin will be located northwest of the intersection of CSAH 70 and Jacquard Ave. A retention basin near the west end of the runway is being expanded slightly. The expansion is aimed to reduce the frequency with which the basin needs to be maintained. A rock trench is being added on the east side of the basin to help facilitate drawdown of the pond after rainfall events. At all other outfall locations, stormwater will be pre-treated before being discharged via a sumped structure with a SAFL Baffle or another mechanism.

Overall the drainage patterns are being maintained through the proposed improvements with all runoff ultimately being discharged to South Creek. At the eastern end of the project corridor, where the roadway will be converted to an

urban section, stormwater will be stored and conveyed underground via storm sewer pipes in contrast to the western portion of the project where roadside ditches will convey runoff. The stormwater management system for the project has been designed to protect both travelers and businesses along the roadway, as well as the natural resources that receive the runoff.

A NPDES permit is required for the project, therefore a Stormwater Pollution Prevention Plan (SWPPP) will be prepared and implemented for the project. The SWPPP will include erosion control BMPS and guidance to be executed by the contractor during all phases of construction.

iii. **Water Appropriation – Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use, and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.**

Dewatering is not anticipated as part of this project; however, if dewatering is needed, a plan will be prepared, and a water appropriation permit from the DNR will be obtained by the contractor.

iv. **Surface Waters**

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

A total of 2.16 acres of aquatic resource impacts are proposed, 2.14 acres of which are to wetlands or wetland ditches. All wetland and stream channel impacts are anticipated to be permanent, resulting from roadway fill or culvert installations (i.e., new pipes/aprons, riprap placement). These impacts are based on standard rural road and trail cross-section. A portion of these wetland impacts, 1.53 acres, are to wetlands located within the bed and banks of roadside ditches and currently function as part of the stormwater management system. The majority of these ditches would be filled as part of construction and replaced with stormwater infrastructure, including catch basins, pipes, and culverts. The ditches along the south side of CSAH 70 between Kensington Avenue/Kenrick Avenue and Dodd Boulevard would be

replaced adjacent to the proposed road shoulder. One wetland impact, 0.02 acres, is to a constructed stormwater basin. This basin may be reconstructed as part of this project, which is not anticipated to require mitigation. The remaining 0.59 acres are to wetland basins identified as Type 1 – Seasonally Flooded wetlands and are anticipated to require mitigation. Wetlands and impact areas are shown in **Attachment I**.

As design progresses, Dakota County will identify measures to avoid and minimize the wetland impacts to the extent practicable. The County will coordinate with the USACE and the City of Lakeville to ensure all activities are authorized by appropriate permits and approvals. It is anticipated that the project will qualify for the Board of Soil and Water Resources (BWSR) Local Road Replacement Program, meaning credits will be provided by BWSR from a USACE approved state wetland bank at an anticipated replacement ratio of 2:1 for regulated wetlands.

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

Two tributaries are anticipated to be impacted, South Creek-West located just east of 215th Street and South Creek-South located near the proposed 220th Street extension. The box culvert that carries the South Creek-West will be extended as part of this project. As part of the proposed 220th Street extension, box culverts will be installed to carry South Creek-South under the proposed 220th Street. The exact length and dimensions of the box culverts have yet to be determined; however, preliminary hydraulic analysis of the culvert crossings, included in **Attachment H,** demonstrate no floodplain impacts are anticipated. The design will be required to adhere to requirements for crossing trout streams of the DNR and the Vermillion River Watershed Management Organization.

12. Contamination/Hazardous Materials/Wastes

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

effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

AECOM Technical Services, Inc (AECOM) conducted a Limited Phase I Environmental Site Assessment (ESA) of the all parcels located within 500 feet of the Corridor (Project Area). Parcels were ranked with a low, medium, or high potential for contamination using the ranking criteria derived from MnDOT's Office of Environmental Stewardship (OES) ranking protocols. All other properties were considered to present a De Minimis risk.

The following is a discussion of site ranking and the corresponding sites identified within the Corridor:

- Low Potential for Contamination Sites are defined as sites that are hazardous waste generators and sites where site reconnaissance showed poor housekeeping, soil disturbance, or and other issues suggesting potential environmental impact. AECOM identified 23 Low Potential for Contamination Sites within the Corridor.
- Medium Potential for Contamination Sites are sites with activities of concern that include, but are not limited to, closed leaking underground storage tanks (LUSTs), all sites with underground storage tanks (USTs) or aboveground storage tanks (ASTs), machine shops, historic vehicle repair, and closed agricultural release sites. AECOM identified 23 Medium Potential for Contamination Sites within the Corridor.
- High Potential for Contamination Sites are sites with activities of concern that include, but are not limited to, all active and inactive Voluntary Investigation and Cleanup Program (VIC), Minnesota Environmental Response and Liability Act (MERLA) sites, all active and inactive dump sites, all active LUST sites, dry cleaners (with on-site or unknown chemical processing), bulk oil facilities, all active agricultural release sites, and all historical industrial sites with likely chemical use. AECOM identified 5 High Potential for Contamination Sites within the Corridor.

Parcels with a contamination ranking are shown on a map in **Attachment F**.

Unknown materials may also be encountered during construction that were not identified during the initial site investigations. A Construction Contingency Plan (CCP) will be written and it will discuss how to handle the unknowns that are encountered.

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

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

The disposal of solid waste generated by clearing the construction area is a common occurrence associated with road construction projects. During project construction, excavation of soil will need to occur within the construction limits. Preliminary design will consider selection of grade-lines and locations to minimize excess materials, and consideration will be given to using excess materials on the proposed project or other nearby projects. Any excess soil material that is not suitable for use on the project site or other nearby projects will be disposed of in accordance with state and federal requirements.

Excess materials and debris from this project such as concrete and asphalt will be disposed of in accordance with MnDOT Standard Specifications for Construction, 2104.3C and Minnesota Rule 7035.2825 and the Dakota County Solid Waste Ordinance.

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

   No ASTs or underground storage tanks (USTs) are planned for permanent use in conjunction with this project. Temporary storage tanks for petroleum products may be located in the construction limits for refueling construction equipment during roadway construction. Appropriate measures would be taken during construction to avoid spills that could contaminate groundwater or surface water in the project area. In the event that a leak or spill occurs during construction, appropriate action to remedy the situation would be taken immediately in accordance with MPCA guidelines and regulations.

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

   Normal construction wastes are anticipated. Toxic or hazardous materials such as fuel for construction equipment and materials used in the construction of roads (paint, contaminated rags, acids, bases, herbicides, and pesticides) may be used during site preparation and road construction. Although spills of these materials are not common, any spills of reportable quantities that occur will be reported to the Minnesota Pollution Control Agency (MPCA) and the contractor will clean up spilled material according to state requirements.

   Measures to avoid adverse effects from storage of hazardous waste include the following:

   - Products will be kept in their original containers unless they cannot be resealed. Original labels and Material Safety Data Sheets will be retained on site and will be

accessible at all times as they contain important product and safety information. If surplus product must be disposed of, manufacturers' or local and state recommended methods for proper disposal will be followed. An effort will be made to store only enough products required to do the job.

- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure with secondary containment.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.

The contractor's site superintendent will inspect daily to ensure proper use and disposal of materials onsite.

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

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

The majority of the land within the project area has been previously disturbed through construction of roadways, farmland, and residential and industrial areas. Habitats in the project area include manicured and un-manicured grassland/upland, cropland, deciduous forest, wetlands, and streams.

Due to fragmented and low-quality rural habitat, the wildlife that inhabit this area are generalist species adapted to highly disturbed conditions. These species are generally more tolerant of human presence and activities, such as traffic and agricultural practices, and have demonstrated by their presence that they adapt readily to the human environment.

Both the West Branch and South Branch of South Creek pass through the construction limits. Both branches of South Creek are marked as potential trout streams by the MN DNR, so fish species and habitat are probable. There are no lakes within the construction limits.

A regionally significant area (RSEA) is an area that the DNR identifies as an ecologically significant terrestrial or wetland area. There are no RSEAs present within the construction limits; three RSEAs are located within 1-mile south of the project near the Vermillion River.

There are two federally listed species identified within Dakota County. The northern long-eared bat is listed as threatened and the rusty patched bumble bee is listed as endangered. A determination letter from the US Fish and Wildlife Service is included in **Attachment E**.

b. Describe rare features such as state-listed (endangered, threatened, or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-843) from which the data

were obtained, and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe results.

NHIS Review and State-Listed Species

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

A review of the DNR Natural Heritage Inventory System database was conducted (per LA-843) for the area within approximately one mile of the project and two species were identified (see Table 13-1).

Table 13-1: State-Listed Species within One Mile of Project

Species	Type	Status	Last Obervation	Preferred Habitat
Rattlesnake Master (*Eryngium yuccifolium*)	Plant	Special concern	1979	Upland native prairies
Blanding's Turtle (*Emydoidea blandingii*)	Reptile	Threatened	1990	Prairie, forest, peatland, meadow, marsh, rivers, streams, and savanna.

Correspondence with the DNR is included in **Attachment K**.

RSEA

There are no RSEAs located within the construction limits, therefore there will be no RSEA impact.

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

The project would involve grading and ground disturbance within the construction limits. Much of this land has been previously disturbed due to residential, infrastructure, or roadway development and past agricultural practice. The following discusses how the project may affect the species identified above.

State-Listed Species

Rattlesnake master was identified a half-mile south of the 220th Street extension and one mile south of CSAH 70. Rattlesnake master requires upland native prairies without a high prevalence of invasive species or overgrown vegetation. Due to habitat fragmentation and conversion of the surrounding land to farmland, the project is not anticipated to have any impacts on the species.

The Blanding's turtle observation occurred 1.5 miles south of CSAH 70 near the Vermillion River. The preferred habitat for this species includes calm, shallow wetland areas with mud bottoms and abundant aquatic vegetation (e.g. cattails, water lilies). Nesting occurs in open (grassy or brushy) sandy uplands, often up to a mile from water bodies. The wetland areas within the project construction limits are primarily low-quality roadside ditch or forested wetlands with adjacent developed land. The only potential habitat within the project construction limits is near the proposed 220th Street extension where the project construction limits cross the South Branch of South Creek and adjacent wetland; however, the area contains a monotypic plant community of invasive reed canary grass and adjacent upland area contains farmland with mostly silt loams, loams, and clay loam soils; therefore, this location would not be considered prime habitat for the Blanding's turtle and species impact is not anticipated. The *DNR Blanding's Turtle Fact Sheet* will be provided to all contractors working on site so that appropriate measures can be followed if turtles are encountered during construction.

Invasive Species

The proposed project has low potential for the introduction of invasive species. Disturbed areas would be reestablished using appropriate native and stabilization seed mixes.

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

State-Listed Species

Due to entanglement issues with small animals, use of erosion control blankets would be limited to those with bio-netting or natural netting types; specifically, not products containing plastic mesh netting or other plastic components, as noted in Category 3N or 4N in the 2016 and 2018 MnDOT Standards Specifications for Construction.

Any mulch products containing synthetic fiber additives would not be used in areas that drain to public waters.

In order to mitigate any potential impacts to Blanding's turtles during and post construction, measures outlined in the Blanding's turtle fact sheet will be implemented to the extent possible. Specific erosion control measures will be considered during final design to minimize the potential effect on the species during construction.

14. Historic Properties

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include 1) historic designations; 2) known artifact areas; and 3) architectural features. Attach letter received from the State Historic Preservation Office

(SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

The proposed project was reviewed by MnDOT Cultural Resources Unit (CRU) staff for potential impacts to historic resources. MnDOT CRU determined that there would be no historic properties affected by the proposed project (see **Attachment D**).

Local tribal groups were consulted and had no concerns for the project. The Office of the State Archaeologist and the Minnesota Indian Affairs Council were also consulted but did not have documentation regarding any sites not previously found.

Due to the previously disturbed nature of the existing right-of-way and absence of known archaeological sites surrounding the project, it is unlikely that the project area of potential effects (APE) contains intact, significant archaeological resources. It is not anticipated that archaeological sites will be uncovered during the construction of this project. If cultural materials are encountered during construction, Unanticipated Discoveries protocols will be followed. If archaeological artifacts, features, or human remains are uncovered during construction, demolition, or earthmoving activities, ground disturbance at the location would cease and the state archaeologist will be contacted.

15. Visual

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

No significant impact to the visual resources of the natural, cultural, and project environments is anticipated. No significant impact to the ability of the affected population to view visual resources is anticipated. Visual quality will, therefore, not be altered by the proposed project. The proposed project will have no significant adverse impacts to visual quality nor will it create any opportunities to enhance visual quality in the project area.

A noise barrier will be constructed as part of the project (see Noise section for a description of noise barrier and the voting process) which would block the view of the highway from the residential properties near the barrier. The barrier will be located along the north side of CSAH 70 east of Dodd Boulevard. The barriers would also block the views of the residential properties from CSAH 70. The proposed barriers would be made of painted wooden planks and concrete posts. The County held an on-site meeting with affected properties to demonstrate the height of the noise wall. As noted in the noise section, the affected properties were given the opportunity to vote on whether or not to construct the noise wall and it was determined that the wall would be built.

16. Air

a. **Stationary Source Emissions – Describe the type, sources, quantities, and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health, or applicable regulatory**

criteria. Include a discussion of any methods used to assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

Not applicable.

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

Motor vehicles emit a variety of air pollutants including carbon monoxide (CO), hydrocarbons, nitrogen oxides, and particulates. The primary pollutant of concern is CO, which is a byproduct of the combustion process of motor vehicles. CO concentrations are highest where vehicles idle for extended periods of time. For this reason, CO concentrations are generally highest in the vicinity of signalized intersections where vehicles are delayed and emitting CO. Generally, concentrations approaching state air quality standards are found within about 100 feet of a roadway source. Further from the road, the CO in the air is dispersed by the wind such that concentrations rapidly decrease.

The U.S. Environmental Protection Agency has approved a screening method to determine which intersections need analysis for potential hot spot air quality impacts. The screening analysis consists of two criteria. If either criterion is met, then an intersection analysis would be required.

The first criterion is to determine whether the total daily approach volume of the study area exceeds 82,300 Average Annual Daily Traffic (AADT). All intersection AADTs for the project corridor are well below this threshold.

The second criterion compares the project area to the locations of 10 intersections that the MPCA has identified as having the highest volumes in the metro area. If any of these 10 intersections were affected by the project, then analysis would be required. None of these intersections are affected; therefore, the second criterion is not met, and no hot spot analysis is needed.

No air quality mitigation is required.

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

During grading and construction of the project, fugitive dust will be created. Due to impacts from wind and other construction conditions, nearby properties may be temporarily affected. It will be minimized through general dust control measures such as applying water to exposed soils and limiting the extent and duration of the exposed soil conditions. All exposed soil surfaces will be permanently covered after completion of construction with pavement or vegetation, eliminating the potential to generate dust.

The construction of the proposed project is not expected to generate objectionable odors.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area; 2) nearby sensitive receptors; 3) conformance to state noise standards; and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

The following section summarizes the findings in the CSAH 70 Traffic Noise Analysis Report (Kimley-Horn 2019). Summary tables and maps showing noise receptor locations are provided in **Attachment H**.

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.

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

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

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

Elevated noise levels during construction are unavoidable for this type of project. Dakota County will require that construction equipment be properly muffled and in proper working order. It is common 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 may sometimes 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 one year.

Traffic Noise Analysis

The project includes the addition of through traffic lanes. As such, this project is considered a federal Type I project requiring a traffic noise analysis. The following is a summary of the CSAH 70 Traffic Noise Analysis Report. Summary tables and maps showing receptor locations are included in **Attachment H**. This report includes background information on noise, information regarding federal traffic noise regulations and MPCA state noise standards, a discussion of the traffic noise analysis methodology, documentation of the potential traffic noise impacts associated with the proposed project, and an evaluation of noise abatement measures.

Federal Requirements

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

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

State Requirements

The Minnesota state noise standards are located in Minnesota Rules Chapter 7030. The MPCA is the state agency responsible for enforcing state noise rules. In 2016, the Commissioners of the MPCA and MnDOT agreed that the traffic noise regulations and mitigation requirements from the FHWA are sufficient to determine reasonable mitigation measures for highway noise. By this agreement, existing and newly constructed segments of highway projects under MnDOT's jurisdiction are statutorily exempt from Minnesota State Noise Standard (MN 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, as has been completed for this project. This project is not required to address Minnesota Rule 7030.

Methodology

Field measurements of existing noise levels were measured at 3 locations along CSAH 70. These 3 locations were identified because they are representative of the surrounding area and the typical cross section for that section of roadway. Field measurements were tested against model results. Noise levels from the field measurements were within 3 dBA (Leq) of modeled noise levels, validating the model.

Traffic noise modeling was completed using the FHWA approved Traffic Noise Model 2.5 (TNM 2.5). Traffic noise levels were modeled for existing conditions (2018), the future No Build (2040) Alternative, and the future Build (2040) Alternative. The 11:00 A.M to 12:00 PM period of a typical weekday was identified as the loudest hour along CSAH 70. Traffic noise levels were modeled at 347 receptor locations representing residential, commercial retail, business office, industrial, institutional (schools, churches), and recreational (trails) uses along CSAH 70.

Findings

The existing L_{eq} noise levels at modeled receptors varied between 39.6 dBA and 74.1 dBA, approaching or exceeding federal noise abatement criteria at 24 receptors.

Future 2040 No Build daytime L_{eq} noise levels at modeled receptors varied between 41.9 dBA and 76.5 dBA, approaching or exceeding federal noise abatement criteria at 27 receptors.

Future 2040 Build L_{eq} noise levels were predicted to range between 42.0 dBA and 77.3 dBA, approaching or exceeding federal noise abatement criteria at 144 receptors. Three receptors showed a substantial noise increase (an increase in noise levels of at least five dBA) in the Build (2040) condition compared to the existing noise level. The three receptors that have substantial noise increases are E13, L4 and N1.

Potential Noise Abatement

Noise abatement measures (i.e., noise walls) were evaluated along CSAH 70 at receptor locations where modeled noise levels were projected to approach or exceed Federal NAC, or result in a substantial increase (i.e., increase by 5 dBA or greater from existing to future Build Alternative conditions).

The noise wall analysis was completed for 62 potential wall variations along the corridor. Of the 62 wall options analyzed, one wall met the feasibility and reasonableness criteria and is proposed as part of the project (Wall 1F). The location of the proposed noise wall is shown in **Attachment H**.

Wall F1

Wall 1F would be located along the north side of CSAH 70, between Dodd Boulevard and Humboldt Court. The proposed wall is approximately 1,320 feet long with a height of 20 feet. The noise wall provides a reduction in L_{eq} traffic noise level of 0.1 to 12.4 dBA depending on receptor location. The cost effectiveness of this noise wall is $67,124 per benefited receptor (see **Attachment H**).

The noise wall solicitation process for Wall F1 concluded with the wall being voted to be constructed as part of the project.

18. Transportation

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

CSAH 70 provides critical connections to I-35 and CSAH 23 (Cedar Avenue) for one of the largest industrial parks in the Twin Cities metropolitan area. The *CSAH 70 Expansion from Kenrick Avenue/Kensington Boulevard to CSAH 23 (Cedar Avenue) Traffic Operations and Safety Technical Memorandum* study completed for this project identified the 2018 Average Annual Daily Traffic (AADT)[10] ranges from 13,300 west of Dodd Boulevard to 8,500 approaching Cedar Avenue.

The corridor is identified as a Tier 1 regional truck corridor with a heavy commercial average daily traffic (HCADT) volume approaching 2,000 vehicles per day, or 17 percent of the ADT. Truck volumes are highest from 8 AM to 2 PM, when traffic volumes on CSAH 70 are lower compared to the AM and PM peak hours. Peak hour heavy vehicle volumes at the study intersections vary from 10 to 20 percent of the eastbound and westbound through volumes on CSAH 70. Side street approaches and mainline turning movements did not show a consistent pattern in terms of heavy vehicle volumes.

Based on the anticipated growth, under the 2040 No-Build conditions there are multiple failing individual traffic turn movements and approaches. There are three failing intersections: CSAH 70 and Dodd Boulevard in both peak hours, CSAH 70 and Hamburg Avenue in both peak hours, and CSAH 70 and Cedar Avenue in the PM Peak Hour. Additionally, CSAH 70 and Highview Avenue operates unacceptably in the PM Peak Hour. This shows that the existing geometrics and intersection control cannot support the projected growth in traffic. The volumes on CSAH 70 exceed the two-lane capacity and vehicles on the stop-controlled approaches are not able to find gaps. This would result in poor operations but would also be expected to have safety impacts. Specific information on traffic volumes can be found in **Table 1 of the EA**.

Parking along CSAH 70 is not permitted; therefore, none is planned as part of this project. There are no transit providers that operate on CSAH 70 in the project area.

Construction is planned to begin in May 2020 and the project will be constructed over 2 years. 220th Street extension and eastbound lanes of CSAH 70 will be constructed first. The westbound lanes of CSAH 70 will be constructed during the second construction season. CSAH 70 will remain open during construction to minimize traffic impacts as these improvements are implemented.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.

In order to assess existing and future traffic mobility, a traffic study was completed in which operations were evaluated for no-build and build conditions (Design Year 2040).

[10] Source: MnDOT Interactive Traffic Data Application, accessed September 2018.

Under the 2040 No-Build conditions, there are multiple failing individual turn movements and approaches. In addition, the volumes on CSAH 70 exceed the two-lane capacity and vehicles on the stop-controlled approaches are not able to find gaps. The 2040 No-Build analysis showed the need for roadway improvements within the project corridor, including expanded capacity and intersection improvements.

A capacity analysis for the 2040 Build AM and PM peak hours was performed using Synchro/SimTraffic software to inform the intersection control and geometric design for the CSAH 70 expansion. The analysis is based on the proposed roadway and intersection improvements as shown in **Attachment A** and the forecasted traffic volumes. The conclusions of the traffic study found the following recommendations for intersection control and geometric design:

CSAH 70 & Jacquard Avenue

- A traffic signal is recommended to be reinstalled with the project.
- Extend the eastbound left-turn lane to at least 350 feet. The traffic signal operations should consider serving the left-turn phase before and after the westbound through phase during the AM peak hour when the eastbound left-turn volumes are highest.

CSAH 70 & CSAH 9 (Dodd Boulevard)

- A traffic signal is recommended to be reinstalled with the project.
- Further discussion of the design of the northbound approach is needed as part of the CSAH 70 project, due to the insufficient turn lane storage planned by 2040. The appropriate timing for the turn lane improvements and the appropriate scope of intersection improvements on CSAH 9 (Dodd Boulevard) will need to be coordinated between Dakota County and the City of Lakeville.

CSAH 70 & Highview Avenue/Heywood Avenue

- Side-street stop control is recommended to be installed with the CSAH 70 project.
- A traffic signal is recommended to be installed when traffic volumes grow approximately 70 percent over existing volumes, or when crash rates and available gaps indicate that a traffic signal is needed for safe and efficient intersection operations.

CSAH 70 & Hamburg Avenue

- The existing 4-way stop control will be replaced with side-street stop control .
- A traffic signal is recommended to be installed when traffic volumes grow to approximately 80 percent over existing volumes, or when crash rates and available gaps in CSAH 70 traffic indicate that a traffic signal is needed for safe and efficient intersection operations.

CSAH 70 and CSAH 23 (Cedar Avenue)

- A traffic signal is recommended to be reinstalled with the project.

- The eastbound approach geometry constructed as part of the CSAH 70 project is recommended to be dual left turn lanes, one through lane, and a dedicated right turn lane. Due to the uncertainty of the future extension of CSAH 70 east of CR 23, the design of the eastbound approach should allow for efficient traffic operations opening day without over-building the intersection. The pavement can be re-striped in the future to allow for two through lanes once the CSAH 70 extension is completed and changes in travel patterns show need for additional through capacity.
- The northbound left-turn lane is recommended to be extended to 250-300 feet to accommodate the expected increase in left-turn traffic at the intersection.

Access Modifications

At several locations in the corridor, the median will break to partially accommodate turning vehicles (i.e. right-in/left-in/right-out access). Humboldt Court, Holyoke Avenue, Heath Avenue, Hanover Avenue, Grenada Avenue will all be partial access intersections. An additional driveway/business access road would be constructed at 217th Street to mitigate the access modification at Holyoke Avenue, shown in Figure 2.

Several cross streets will be realigned and some driveway access points reconfigured in order to meet the driveway spacing guidelines and provide cohesive connectivity through the area. The intersection of CSAH 70 & 215th Street West will be moved approximately 100 feet to the west in order to align with a future connection to 210th Street and allow for a future 4-legged full access intersection.

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

The purpose of the proposed project is to improve traffic mobility and address geometric deficiencies throughout the corridor by expanding the two-lane undivided roadway to a four-lane divided roadway; therefore, mitigation is not needed.

19. Cumulative Potential Effects

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

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

Cumulative effects result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The geographic area considered for cumulative potential effects is the area proximate to the construction limits. Projects being considered for cumulative effects are either scheduled for construction between 2019 and 2021 or programmed in local, regional, or state plans. Project-related environmental effects that could combine with environmental effects and geographic extent of other projects are summarized in Table 19-1.

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

Document Section	Topic/Issue	Project-Related Environmental Effects	Geographic Extent	Mitigation Plan
Section 10	Soils and Topography (Erosion and Sedimentation Control)	Disturbed ground/soils during project construction	Throughout project area	NPDES permit and SWPPP
Section 11	Water Resources (Stormwater and Aquatic Resources)	Increase in impervious surface (26.5 acres) Impacts to aquatic resources (2.16 acres)	Throughout project area	Address via permit and stormwater mitigation measures Addressed via permit
Section 12	Existing Contamination / Potential Environmental Hazards	Four high risk sites within construction limits	West of Dodd Boulevard	Develop a plan for properly handling/ removing contaminate materials if encountered
Section 13	Fish, Wildlife, Plant Communities	The Blanding's turtle observation within one mile of project area	Throughout project area	Use of erosion control blankets would be natural netting types; no plastic mesh netting or other plastic components Measures outlined in the Blanding's turtle fact sheet will be implemented to the extent possible
Section 17	Noise	Modeled noise levels approaching/exceeding federal standards at 24 receptors	Throughout project area	Construction of one noise wall

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

There are two other reconstruction projects within the area that may impact alternative or detour routes for the CSAH 70 project. The intersection reconstruction of CSAH 9 and Icenic Trail/Heritage Dr is planned for 2020, while the intersection reconstruction at CSAH 23 and CSAH 80 is planned for 2021.

According to the city of Lakeville's Capital Improvement Projects map, a planned trail expansion/extension/replacement project is proposed along 210th St in 2022, along with a small local street reconstruction following Heywood Ave to 213th St W, Hemlock Ave, 214th St W, and Hayes Ave is planned for 2023.

A potential overlay project on CSAH 9 from CSAH 50 to 194th St is proposed in 2020 or 2021.

In addition, there are seven locally scheduled projects within the geographic area considered for cumulative potential effects:

- CP 19-05 – Hamburg Avenue (Lakeville Boulevard to 202nd Street/CSAH 50)- Programmed for 2019 construction. Proposed improvements include reclamation, roadway urbanizing (widening, concrete curb/gutter), trail/walk improvements and watermain improvements. Project includes assessments for street rehabilitation, and watermain extension between Hartford Way and 202nd Street.
- CP 21-03 - 205th Street (Keystone Avenue to Dodd Boulevard/CSAH 9)- Programmed for construction in 2021. Proposed improvements include reclamation, edge mill and overlay, and spot curb/gutter replacement.
- CP 22-04: Lakeville Boulevard (Holyoke Ave – Cedar Ave/CSAH 23) Programmed for 2022 construction. Proposed improvements include reclamation, mill and overlay, and spot curb/gutter replacement.
- CP 23-03: 210th Street (Kensington Blvd – Holyoke Ave) Programmed for 2022 construction. Proposed improvements include reconstruction reclamation, roadway urbanizing (widening, concrete curb/gutter), trail/walk and spot curb/gutter replacement.
- CP 20-06- Kenrick Avenue (1/8th-mile West of Kensington Boulevard to Kenrick Avenue): Realignment- Programmed for 2020 construction. Kenrick Avenue realigned from existing 210th Street/ CSAH 70 intersection (permanently removing access) to existing terminus 1/8th mile west of Kensington Boulevard to improve intersection geometrics and operations, make safety improvements and provide for increasing traffic levels. Project to be completed in conjunction with adjacent development.
- CP 23-05: Holyoke Avenue and 207th Street: Programmed for construction in 2023. Traffic signal service life is about 25 years. Existing traffic signal approaching the end of its lifecycle and scheduled for replacement.
- CP 19-06: South Creek Restoration (North/West Branch): Programmed for 2019/2020 construction. Stream realignment/restoration project between Hamburg Avenue and Cedar Avenue to improve water quality and enhance aquatic, fish and wildlife habitat.

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

Environmental effects resulting from the proposed project are summarized in Table 19-1. Other present and reasonably foreseeable future projects may affect the same environmental resources as those in the CSAH 70 Expansion project. These and all other impacts from the projects listed in Section 19B will be addressed via project-specific regulatory permitting and approval processes; therefore, they will be individually mitigated to ensure minimal cumulative impacts occur.

20. Other Potential Environmental Effects

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

All known potentially adverse environmental effects are addressed in the preceding EAW items or discussed in the EA.

RGU Certification

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

I hereby certify that:

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

Signature _____ Date 12/5/2019

Title Transportation Director/County Engineer

Figure 1: Project Location

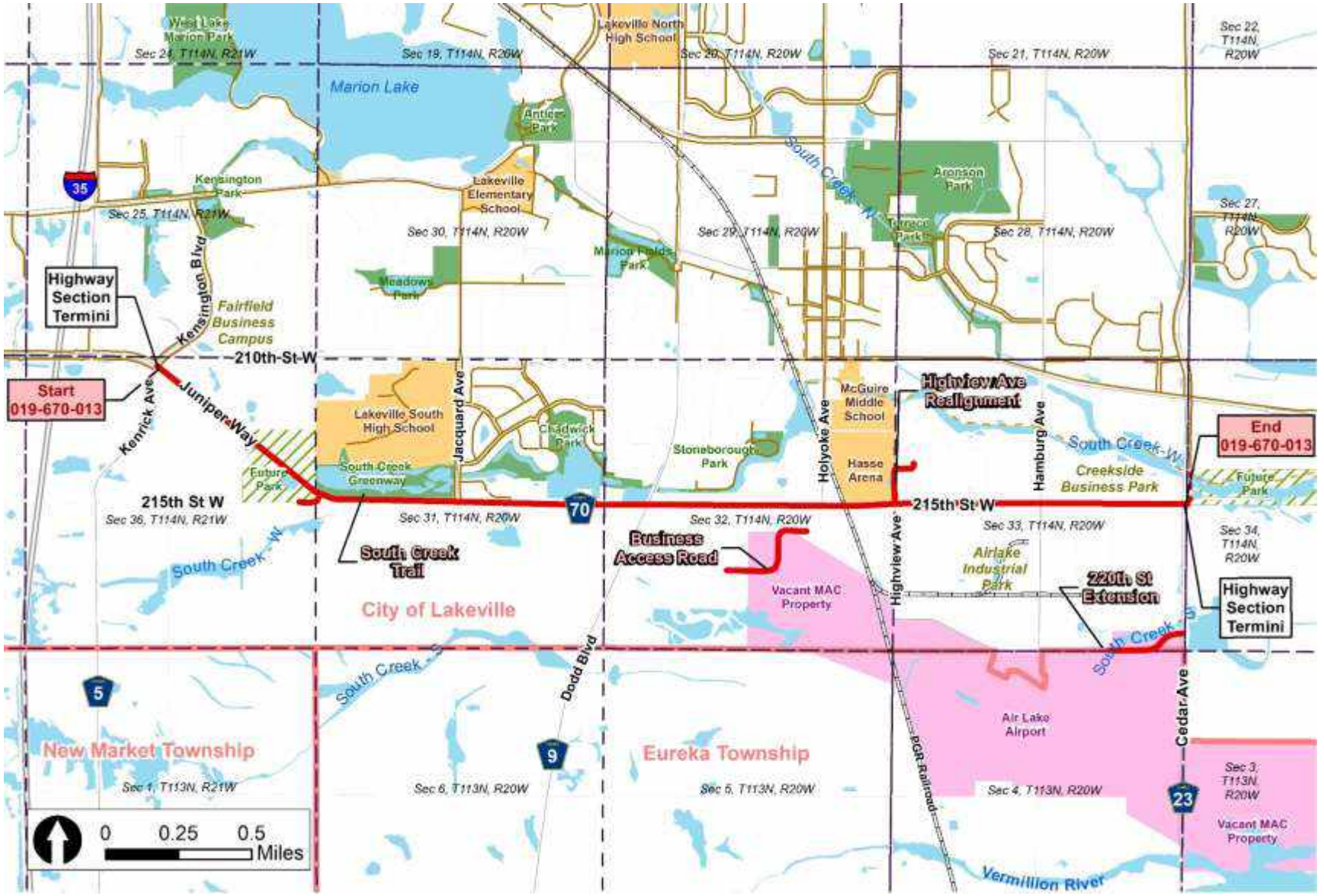


Figure 2: USGS 7.5 Minute Topographical Map

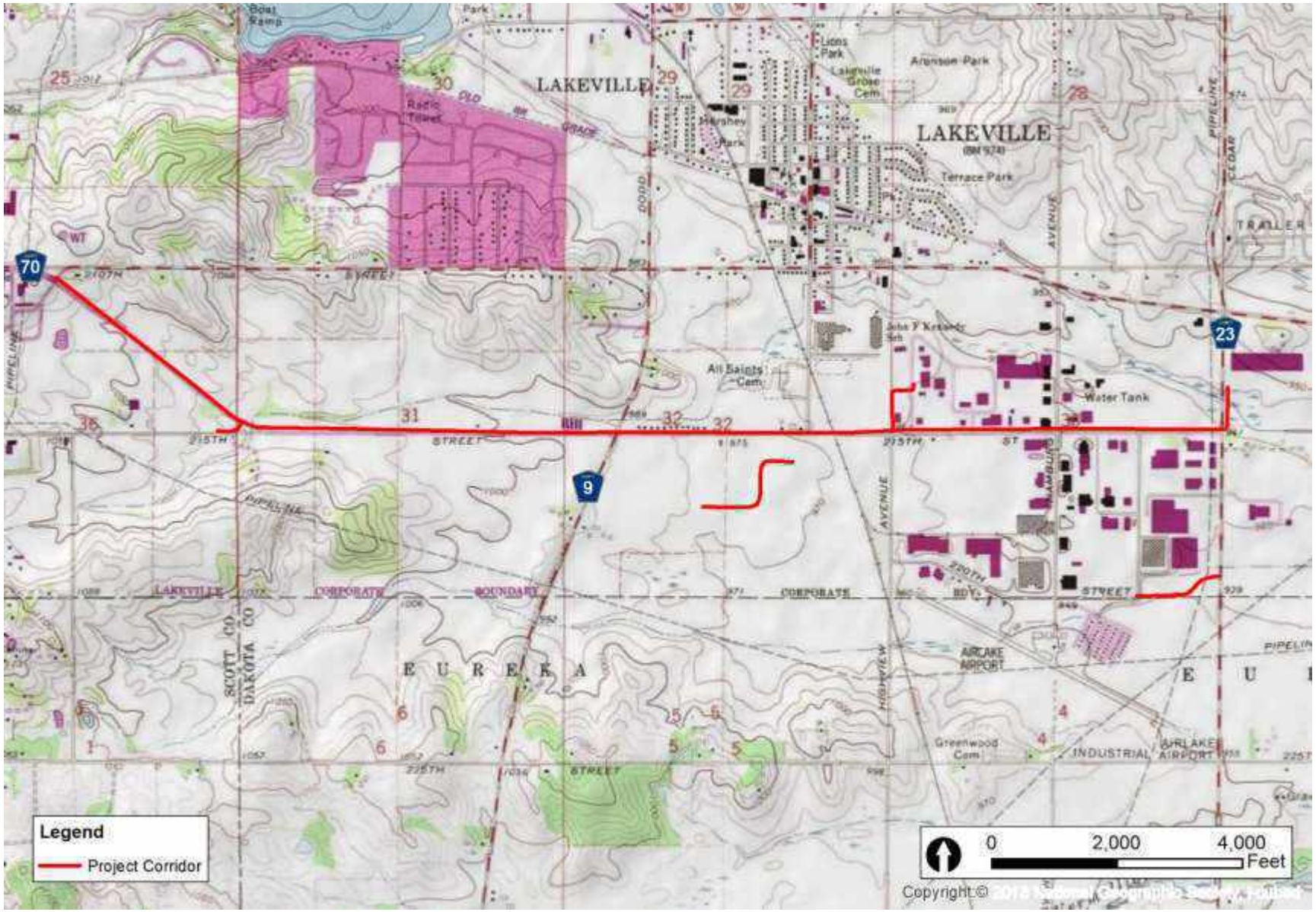
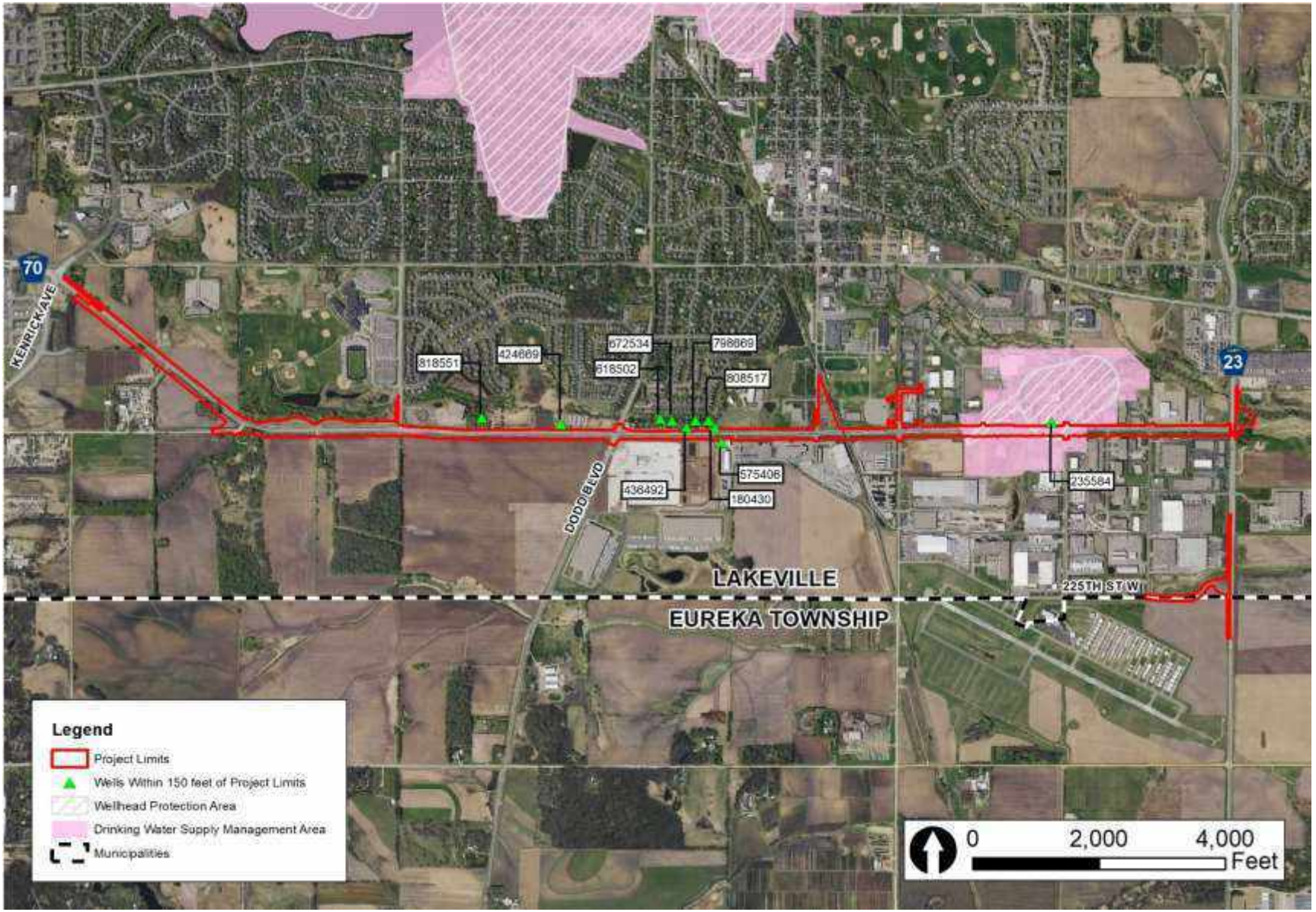


Figure 3: Wellhead Protection, Drinking Water Supply Management Area, and Well Sites



November 1, 2019

Shayne Ratlcliff
Arenas Manager, City of Lakeville
20195 Holyoke Avenue
Lakeville, MN 55044

Subject: S.P. 019-670-013 (Dakota County Project 70-23); and
S.P. 188-020-029 (Lakeville Project 20-05)
CSAH 70 Expansion Project
Section 4(f) Temporary Occupancy of the Lakeville Hasse Arena

Dear Mr. Ratcliff:

Dakota County is preparing plans for the CSAH 70 Expansion Project. The proposed project will result in temporary occupancy of the existing Lakeville Hasse Arena located northwest of the intersection of Highview Avenue and CSAH 70, a Section 4(f) resource. A temporary easement is needed along the southern edge of this parcel for trail construction along the northern edge of the new CSAH 70.

As per the Federal Register Rules and Regulations 23 CFR 774.13(d), the temporary construction impacts may be considered a temporary occupancy of Section 4(f) lands. A temporary occupancy may not constitute a Section 4(f) use when all of the conditions listed below are satisfied:

- The duration of the occupancy will be temporary in nature (i.e., less than the time needed for the construction of the project). The construction of the project is anticipated to be staged directionally. Specifically, eastbound CSAH 70, the south side of the road, will constructed prior to westbound CSAH 70, the north side. The temporary occupancy will take place during the construction of westbound CSAH 70.

- There will be no change in ownership of the land. A temporary easement will be obtained from the Housing and Redevelopment Authority of the City of Lakeville for tying in side slopes adjacent to the new trail. No real property interest (e.g. permanent easement, fee title acquisition) of right of way will be acquired.

- The scope of work to be performed will be minor (i.e., both the nature and magnitude of the changes to the Section 4(f) property are minimal). The proposed easement is approximately 10 feet wide and will affect an area of 0.20 acres, approximately one and one-half percent of the 13-acre parcel, adjacent to Dakota County right of way.

Physical Development Division
Steven C. Mielke, Director

Dakota County
Western Service Center
14955 Galaxie Avenue
Apple Valley, MN 55124-8579

952.891.7000
Fax 952.891.7031
www.dakotacounty.us

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- There are no anticipated permanent adverse physical impacts nor there any interference with the activities or purposes of the property, on either a permanent or temporary basis. The temporary occupancy will not affect the arena building or parking lot and the arena will remain open throughout construction.

- The land being used will be fully restored to a condition that is at least as good as the condition that existed prior to the project. The area will be reseeded with a high maintenance turf, restoring the manicured lawn that is currently present.

- There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions. Your signature on this document concurring as outlined above constitutes your concurrence with the assessment of impacts to the Lakeville Hasse Arena in your role as an official with jurisdiction over this resource.

Please review the attached figures and indicated your concurrence with the work proposed and that the above conditions are met by signing below. Please forward the signed original back to me for our records. If you have any questions regarding this matter, please contact me at your earliest convenience at (952) 891-7100. If you do not concur with our assessment of impacts to the Lakeville Hasse Arena, please respond in writing with a reference to this letter. Thank you.

Sincerely,

Jacob Rezac

Jacob Rezac
Dakota County

I concur with the assessment of proposed impacts to the Lakeville Hasse Arena property as described above.

11/6/19

Shayne Ratcliff, Arenas Manager, City of Lakeville Date

Attachments: Project Location Map showing boundaries of Lakeville Hasse Arena, features/activities, and limits of temporary occupancy impacts to the 4(f) Resource

CC: Justin Miller, City Administrator
Zach Johnson, City Engineer

DEPARTMENT OF TRANSPORTATION

Office of Environmental Stewardship
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155-1800

Office Tel: (651) 366-4291

Ashley Payne, Kimley-Horn and Associates, Inc.

October 28 2019
Re: S.P. 019-670-013, CSAH 70/ 215th St W, Lakeville, Dakota County

Dear Ms. Payne,

We have reviewed the above-referenced undertaking pursuant to our FHWA-delegated responsibilities for compliance with Section 306108 (formerly known as Section106 of the National Historic Preservation Act [54 USC 300101 et. seq.] and its implementing regulations, 36 CFR 800, and as per the terms of the 2015 Section 106 Programmatic Agreement between the FHWA and the Minnesota State Historic Preservation Office (SHPO). MnDOT is not responsible for compliance with the Minnesota Historic Sites Act (MS 138.665-.666) since we are not funding or permitting the project, or for compliance with the Field Archaeology Act of Minnesota (MS 138.40) and the Private Cemeteries Act (MS 307.08) on this project, since MnDOT does not control the said lands, however we did consult with the Minnesota Indian Affairs Council (MIAC) and the Office of State Archaeologist (OSA) on the behalf of the county.

Dakota County is proposing, as described in the Historical/Archaeological Review Request submitted January 29, 2019, to expand the existing two-lane rural highway section from Kenrick Ave/Kensington Blvd to CSAH 23 (Cedar Ave), to a four-lane divided highway. Improvements may include two traffic lanes in each direction and a median, the addition of turn lanes, access closure, stormwater ponds, and a trail on both sides of CSAH 70, and along Cedar Ave north of CSAH 70. In addition, 220th street, located south of CSAH 70, would be extended to connect to Cedar Ave about 0.5 miles south of the Cedar Ave/CSAH 70 intersection and an access road will be added along 217th Street.

Our office consulted with the following tribal groups, as per 36 CFR 800 or existing agreement between FHWA and certain tribes: Fort Peck Tribes, Lower Sioux Indian Community, Santee Sioux Nation, Sisseton-Wahpeton Oyate Community and Upper Sioux Community. Lower Sioux was the only tribe to respond, and they had no concerns. In addition, consultation letters were sent to the Office of the State Archaeologist and the Minnesota Indian Affairs Council, requesting information regarding sites not found during our searches. Neither responded with any documentation of such sites.

The project area of potential effects (APE) for direct effects consists of the proposed construction area. Because all work will occur within areas previously disturbed by road and associated construction and urban development, it is unlikely that the APE for direct effects contains intact, significant archaeological resources. No historic structures are located within the APE for direct effects. The project will create no indirect effects on archaeological or architecture/history resources.

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

Renée Hutter Barnes

Renée Hutter Barnes, Historian
Cultural Resources Unit
renee.barnes@state.mn.us

cc: MnDOT CRU Project File

DEPARTMENT OF TRANSPORTATION

May 5, 2019

Andrew Horton
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Minnesota-Wisconsin ES Field Office
4101 American Blvd East
Bloomington, MN 55425-1665

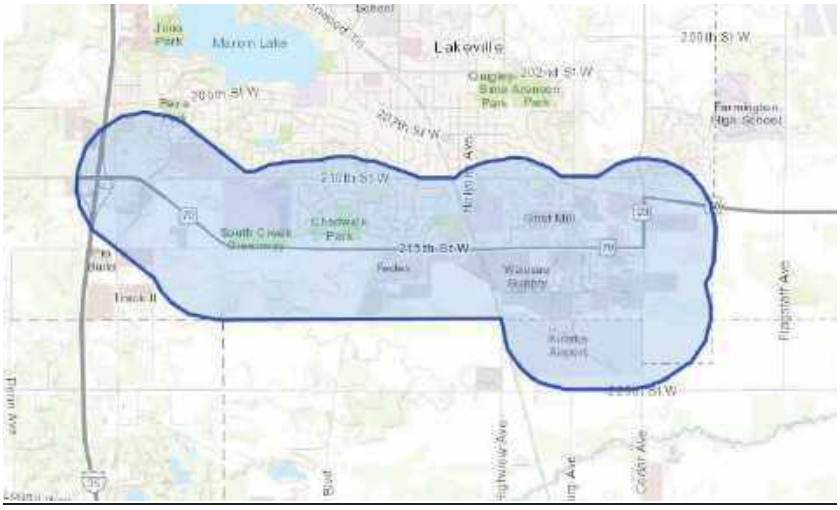
S.P. 019-670-013, CSAH 70
Lakeville, Dakota County, Minnesota

Request for Concurrence – May affect, not likely to adversely affect – Rusty-patched bumble bee (*Bombus affinis*)

Notification of Determination – May affect, not likely to adversely affect – northern long-eared bat (*Myotis septentrionalis*)

No Effect Determination – Prairie bush clover (*Lespedeza leptostachya*)

Project Description: This project consists of expanding the existing two-lane rural highway section of CSAH 70 in Lakeville, Minnesota to a four-lane divided highway from Kenrick Avenue/Kensington Boulevard to CSAH 23 (Cedar Avenue). Specific activities may include installing two traffic lanes in each direction, a median, turn lanes, access closure, and trail on both sides of CSAH 70 and along Cedar Avenue north of CSAH 70. In addition, 220th St will be extended to connect to Cedar Avenue approximately 0.5 miles south of the Cedar Avenue/CSAH 70 intersection. Less than 2 acres of tree removal is proposed, with removal to occur in the winter.



Action Area identified for the proposed project.

Conservation Measures:

Required Avoidance and Minimization Measures (AMMs) - Northern long-eared bat:

- **General AMM 1**: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental

commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (651-366-3605).*

- **Lighting AMM 1 & AMM 2:** Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Oct 31, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products.*
- **Tree Removal AMM 2:** Restrict all tree clearing activities to when NLEB are not likely to be present. *Winter tree clearing required – tree clearing allowed November 1 to March 31, inclusive.*
- **Tree Removal AMM 3**: Tree removal must be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).
- **Tree Removal AMM 4***:* Tree removal must not remove documented NLEB roosts, or trees within 0.25 miles of roosts; or documented foraging habitat any time of the year.

Additional Conservation Measures:

- If used, erosion control blanket must/should be limited to 'bio-netting' or 'natural netting' types, and specifically not products containing plastic mesh netting or other plastic components. These are Category 3N or 4N in the 2016 & 2018 MnDOT Standards Specifications for Construction. Be aware that hydro-mulch products may contain small plastic fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters impacting protected aquatic species (e.g., mussels, fishes). If used, mulch products must/should be reviewed, and any materials with plastic fiber additives must/should not be utilized in areas that drain to streams and rivers.
- Revegetation of disturbed soils must follow MnDOT Metro Vegetation Establishment Recommendations (http://www.dot.state.mn.us/environment/erosion/pdf/vegetation/metro_2016.pdf), and use native mixes in areas that are not proposed for mowed turf grass. For additional information, visit: http://www.dot.state.mn.us/environment/erosion/seedmixes.html

Species List for the Project Action Area

A list of federally threatened, endangered, proposed and candidate species, and designated and proposed critical habitat that overlaps with the action area, was requested via the Information for Planning and Consultation (IPaC) web application maintained by the U.S. Fish and Wildlife Service (requested May 2019). Based on this list, the project is within the range of the following:

Species	Status	Habitat
Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
Rusty patched bumble bee *Bombus affinis*	Endangered	Grasslands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter.
Prairie bush clover *Lespedeza leptostachya*	Threatened	Native prairie on well-drained soils

MnDOT consults the Minnesota Department of Natural Resources Natural Heritage Information System (Copyright 2019 State of Minnesota, Department of Natural Resources), and other resources as available, to determine if proposed projects may affect listed species.

Endangered Species Act – Section 7 Consultation

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

Concurrence Requests

Rusty-patched bumble bee – *May affect, not likely to adversely affect.*
The proposed project is within a USFWS identified High Potential Zone (HPZ) for this species. Suitable habitat may be present within the action area, however, generally speaking roadside habitats in the Twin Cities metropolitan area are dominated by grasses with few forage resources available to RPBB. Proposed activities are not anticipated to result in incidental take and/or significant modification or degradation to suitable habitat. Native seed mixes are proposed. **MnDOT on behalf of the FHWA has determined that the proposed action may affect, but is not likely to adversely affect the *rusty-patched bumble bee* and is requesting concurrence for this determination.**

Notice of Determination

Northern long-eared bat – May affect, not likely to adversely affect

No documented NLEB hibernacula and/or roost trees are documented within the project Action Area (https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf).

This project review relies on the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.). The review was completed using the U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) system (Consultation Code: 03E19000-2019-I-0585). The U.S. Fish and Wildlife Service's concurrence verification letter is attached (Attachment 1).

No Effect Determinations

No Effect Determination – Prairie bush clover (*Lespedeza leptostachya*)

Prairie bush clover – *No effect determination.*
No documented occurrences for this species exist within the Action Area. Suitable habitat is not anticipated to be impacted by the proposed project. ***Therefore, MnDOT on behalf of the FHWA has made a determination of no effect for this species.***

Please contact me if there are questions or concerns.

Thank you,

Digitally signed by Christopher E Smith
Date: 2019.05.05 16:37:08 -05'00'

Christopher E. Smith, M.Sc., C.W.B.®
Wildlife Ecologist | Protected Species Program Coordinator

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Blvd., M.S. 620
St. Paul, Minnesota 55155
O: 651-366-3605

Attachment 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
4101 American Blvd E
Bloomington, MN 55425-1665
Phone: (952) 252-0092 Fax: (952) 646-2873
http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html

In Reply Refer To:
Consultation Code: 03E19000-2019-I-0585
Event Code: 03E19000-2019-E-02513
Project Name: SP 019-670-013 CSAH 70 Lakeville

May 05, 2019

Subject: Concurrence verification letter for the 'SP 019-670-013 CSAH 70 Lakeville' project under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated to verify that the **SP 019-670-013 CSAH 70 Lakeville** (Proposed Action) may rely on the concurrence provided in the February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, may affect, but is not likely to adversely affect (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*).

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do not notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances, Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or Northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required. If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

The following species may occur in your project area and **are not** covered by this determination:

- Prairie Bush-clover, *Lespedeza leptostachya* (Threatened)
- Rusty Patched Bumble Bee, *Bombus affinis* (Endangered)

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

SP 019-670-013 CSAH 70 Lakeville

Description

This project consists of expanding the existing two-lane rural highway section of CSAH 70 in Lakeville, Minnesota to a four-lane divided highway from Kenrick Avenue/Kensington Boulevard to CSAH 23 (Cedar Avenue). Specific activities may include installing two traffic lanes in each direction, a median, turn lanes, access closure, and trail on both sides of CSAH 70 and along Cedar Avenue north of CSAH 70. In addition, 220th St will be extended to connect to Cedar Avenue approximately 0.5 miles south of the Cedar Avenue/CSAH 70 intersection. A limited amount of tree removal is proposed, with removal to occur in the winter.

Determination Key Result

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

Qualification Interview

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the Northern long-eared bat[1]?

   [1] See Northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?
   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   No

8. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the national consultation FAQs.

   Yes

9. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   Yes

10. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

11. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    No

12. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

13. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

14. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    B) During the inactive season

15. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?
    Yes

16. Will the tree removal alter *any* **documented** Indiana bat or NLEB roosts and/or alter any surrounding summer habitat **within** 0.25 mile of a documented roost?
    No

17. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?
    No

18. Are *all* trees that are being removed clearly demarcated?
    Yes

19. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?
    No

20. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?
    No

21. Does the project include slash pile burning?
    Yes

22. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?
    No

23. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)
    No

24. Will the project involve the use of **temporary** lighting *during* the active season?
    No

25. Will the project install new or replace existing **permanent** lighting?
    Yes

26. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **permanent** lighting will be installed or replaced?

    Yes

27. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

28. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

29. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

30. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

31. Will the project raise the road profile **above the tree canopy**?

    No

32. Is the slash pile burning portion of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered

    Yes, because it is near suitable habitat and >0.5 miles from any hibernaculum

33. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, conducted during the active season, and are not within documented habitat

34. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

35. Is the habitat removal portion of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the tree removal/trimming that occurs outside of the active season occurs greater than 0.5 miles from the nearest hibernaculum, is less than 100 feet from the existing road/rail surface, includes clear demarcation of the trees that are to be removed, and does not alter documented roosts and/or surrounding summer habitat within 0.25 miles of a documented roost

36. **General AMM 1**
    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

37. **Tree Removal AMM 1**
Can *all* phases/aspects of the project (e.g., temporary work areas, alignments) be modified, to the extent practicable, to avoid tree removal[1] in excess of what is required to implement the project safely?

Note: Tree Removal AMM 1 is a minimization measure, the full implementation of which may not always be practicable. Projects may still be NLAA as long as Tree Removal AMMs 2, 3, and 4 are implemented and LAA as long as Tree Removal AMMs 3, 5, 6, and 7 are implemented.

[1] The word "trees" as used in the AMMs refers to trees that are suitable habitat for each species within their range. See the USFWS' current summer survey guidance for our latest definitions of suitable habitat.

No

38. **Tree Removal AMM 2**
Can *all* tree removal activities be restricted to when Northern long-eared bats are not likely to be present (e.g., the inactive season)[1]?

[1] Coordinate with the local Service Field Office for appropriate dates.

Automatically answered
Yes

39. **Tree Removal AMM 3**
Can tree removal be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits)?

Yes

40. **Tree Removal AMM 4**
Can the project avoid cutting down/removal of *all* (1) **documented**[1] Indiana bat or NLEB roosts[2] (that are still suitable for roosting), (2) trees **within** 0.25 miles of roosts, and (3) documented foraging habitat any time of year?

[1] The word documented means habitat where bats have actually been captured and/or tracked.

[2] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

Yes

41. **Lighting AMM 1**
Will *all* **temporary** lighting used during the removal of suitable habitat and/or the removal/trimming of trees within suitable habitat be directed away from suitable habitat during the active season?

Yes

42. **Lighting AMM 2**
Does the lead agency use the BUG (Backlight, Uplight, and Glare) system developed by the Illuminating Engineering Society[1][2] to rate the amount of light emitted in unwanted directions?

[1] Refer to Fundamentals of Lighting - BUG Ratings

[2] Refer to The BUG System—A New Way To Control Stray Light

No

43. **Lighting AMM 2**
Will *all* **permanent** lighting use downward-facing, full cut-off[1] lens lights (with same intensity or less for replacement lighting)?

[1] Refer to Luminaire classification for controlling stray light

Yes

44. **Lighting AMM 2**
Will *all* **permanent** lighting be directed away from *all* areas with suitable habitat?

Yes

Project Questionnaire

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?
No

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?
Yes

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

[1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

1.9

Avoidance And Minimization Measures (AMMs)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

LIGHTING AMM 2

When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable.

TREE REMOVAL AMM 2

Apply time of year restrictions for tree removal when bats are not likely to be present, or limit tree removal to 10 or fewer trees per project at any time of year within 100 feet of existing road/ rail surface and **outside of documented** roosting/foraging habitat or travel corridors; visual emergence survey must be conducted with no bats observed.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

TREE REMOVAL AMM 4

Do not remove **documented** Indiana bat or NLEB roosts that are still suitable for roosting, or trees within 0.25 miles of roosts, or
documented foraging habitat any time of year.

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on March 16, 2018. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

Smith, Christopher E (DOT)

From: Horton, Andrew <andrew_horton@fws.gov>
Sent: Tuesday, May 14, 2019 11:46 AM
To: Smith, Christopher E (DOT)
Subject: Re: [EXTERNAL] Request For Concurrence -- SP 019-670-013, ESA (Section 7)

Chris,

I have looked over the information provided regarding the CSAH 70 road project (S.P. 019-670-013) located in Dakota County, Minnesota. A portion of the action area of the proposed road expansion is located within a mapped High Potential Zones for the rusty patched bumble bee (*Bombus affinis*, RPBB). However, our initial review is that little of no habitat currently exist on site for the RPBB. You have also acknowledged that MnDOT will utilize the USFWS Programmatic Biological Opinion for FHWA Projects with the range of the northern long-eared bat (*Myotis septentrionalis*) and that this project may affect, but is not likely to adversely affect the species.

We concur that this project may affect, but is not likely to adversely affect the rusty patched bumble bee. Based on the information provided, the action area is unlikely to have high value floral resources and nesting/overwintering is extremely unlikely within the area proposed for disturbance. If RPBB were present in the action area, we do not anticipated the temporary loss of this sub-optimal habitat to have a significant impact to the species. You have proposed a conversation measure to re-vegetate disturbed natural areas with a native seed mix that would benefit RPBB in the area.

This concludes consultation under Section 7 of the Endangered Species Act, as amended for the species listed above. Please contact our office if this project changes or new information reveals effects of the action to proposed or listed species or critical habitat to an extent not covered in your original request.

- Andrew

Andrew Horton
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4101 American Blvd East
Bloomington, MN 55425-1665
(952) 252-0092, ext. 208

On Sun, May 5, 2019 at 4:43 PM Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us> wrote:

> Hi Andrew-
>
> Attached is my **Request of Concurrence** that this project *may affect, but is not likely to adversely affect* the rusty-patched bumble bee (RPBB). Also included is my determination that this project *may affect, but is not likely to adversely affect* northern long-eared bats. The proposed project was reviewed under the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO). ***MnDOT, on behalf of FHWA, is requesting written concurrence that the project may affect, but is not likely to adversely affect RPBB.***
>
> Ashley -
>
> Endangered Species Act (link)

We need to wait for concurrence from USFWS before our ESA Section 7 obligations are complete. I will forward you a copy of the USFWS correspondence when received.

"Conservation Measures" identified in this review represent project commitments and must be incorporated into project documents (e.g., specifications, special provisions, green sheets, etc.). Please consult the OES wildlife ecologist if modifications are requested.

Migratory Bird Treaty Act (link)

Protected birds are not anticipated to be impacted by the proposed action.

Bald and Golden Eagle Protection Act (link)

Based on the best available information, the proposed action is not anticipated to disturb, harm, or destroy a bald eagle or a bald eagle nest.

Please let me know if you have questions or concerns.

Thank you,

Chris

--

Christopher E. Smith, M.Sc., C.W.B.®

Wildlife Ecologist | Protected Species Program Coordinator

Minnesota Department of Transportation

Office of Environmental Stewardship

395 John Ireland Blvd., M.S. 620

St. Paul, Minnesota 55155

O: 651-366-3605

mndot.gov

DEPARTMENT OF TRANSPORTATION

November 1, 2019

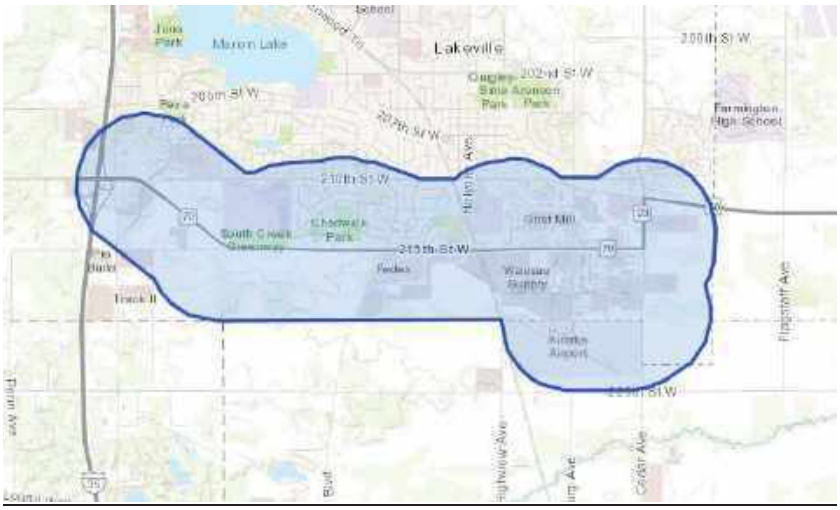
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Minnesota-Wisconsin ES Field Office
4101 American Blvd East
Bloomington, MN 55425-1665

S.P. 019-670-013, CSAH 70 – Update
Lakeville, Dakota County, Minnesota

Request for Concurrence – May affect, likely to adversely affect – northern long-eared bat (*Myotis septentrionalis*)

All other species not re-reviewed here.

Project Description: This project consists of expanding the existing two-lane rural highway section of CSAH 70 in Lakeville, Minnesota to a four-lane divided highway from Kenrick Avenue/Kensington Boulevard to CSAH 23 (Cedar Avenue). Specific activities may include installing two traffic lanes in each direction, a median, turn lanes, access closure, and trail on both sides of CSAH 70 and along Cedar Avenue north of CSAH 70. In addition, 220th St will be extended to connect to Cedar Avenue approximately 0.5 miles south of the Cedar Avenue/CSAH 70 intersection. Less than 5 acres of tree clearing is anticipated, tree clearing may occur during the bat active season.



Action Area identified for the proposed project.

Conservation Measures:

Required Avoidance and Minimization Measures (AMMs) - Northern long-eared bat:

- **General AMM 1**: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (651-366-3605).*

- **Lighting AMM 1 & AMM 2:** Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Oct 31, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products.*
- **Tree Removal AMM 3**: Tree removal must be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

Additional Conservation Measures:

- If used, erosion control blanket should be limited to 'bio-netting' or 'natural netting' types, and specifically not products containing plastic mesh netting or other plastic components. These are Category 3N or 4N in the 2016 & 2018 MnDOT Standards Specifications for Construction. Be aware that hydro-mulch products may contain small plastic fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters impacting protected aquatic species (e.g., mussels, fishes). If used, mulch products must/should be reviewed, and any materials with plastic fiber additives must/should not be utilized in areas that drain to streams and rivers.
- Revegetation of disturbed soils must follow MnDOT Metro Vegetation Establishment Recommendations (http://www.dot.state.mn.us/environment/erosion/pdf/vegetation/metro_2016.pdf), and use native mixes in areas that are not proposed for mowed turf grass. For additional information, visit: http://www.dot.state.mn.us/environment/erosion/seedmixes.html

Species List for the Project Action Area

A list of federally threatened, endangered, proposed and candidate species, and designated and proposed critical habitat that overlaps with the action area, was requested via the Information for Planning and Consultation (IPaC) web application maintained by the U.S. Fish and Wildlife Service (requested November 2019). Based on this list, the project is within the range of the following:

Species	Status	Habitat
Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
Rusty patched bumble bee *Bombus affinis*	Endangered	Grasslands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter.
Prairie bush clover *Lespedeza leptostachya*	Threatened	Native prairie on well-drained soils

MnDOT consults the Minnesota Department of Natural Resources Natural Heritage Information System (Copyright 2019 State of Minnesota, Department of Natural Resources), and other resources as available, to determine if proposed projects may affect listed species.

Endangered Species Act – Section 7 Consultation

Section 7 of Endangered Species Act of 1973, as amended (Act), requires each Federal agency to review any action that it funds, authorizes or carries out to determine whether it may affect threatened, endangered, proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the U.S. Fish and Wildlife Service (Service) if any such effects may occur as a result of their actions. Consultation with the Service is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal

agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale.

Notice of Determination

Northern long-eared bat – May affect, likely to adversely affect

No documented NLEB hibernacula and/or roost trees are documented within the project Action Area (https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf).

This project review relies on the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.). The review was completed using the U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) system (Consultation Code: 03E19000-2019-R-0585). The U.S. Fish and Wildlife Service's consistency verification letter is attached (Attachment 1).

Please contact me if there are questions or concerns.

Thank you,

Digitally signed by Christopher E Smith
Date: 2019.11.01 15:00:24 -05'00'

Christopher E. Smith, M.Sc., C.W.B.®
Wildlife Ecologist | Protected Species Program Coordinator

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Blvd., M.S. 620
St. Paul, Minnesota 55155
O: 651-366-3605

Attachment 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
4101 American Blvd E
Bloomington, MN 55425-1665
Phone: (952) 252-0092 Fax: (952) 646-2873
http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html

IPaC Record Locator: 780-15698379 November 01, 2019

Subject: Consistency letter for the 'SP 019-670-013 CSAH 70 Lakeville' project (TAILS 03E19000-2019-R-0585) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated to verify that the **SP 019-670-013 CSAH 70 Lakeville** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, and is likely to adversely affect the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required.

This "may affect - likely to adversely affect" determination becomes effective when the lead Federal action agency or designated non-federal representative uses it to ask the Service to rely on the PBO to satisfy the agency's consultation requirements for this project. Please provide this consistency letter to the lead Federal action agency or its designated non-federal representative with a request for its review, and as the agency deems appropriate, transmittal to this Service Office for verification that the project is consistent with the PBO.

This Service Office will respond by letter to the requesting Federal action agency or designated non-federal representative within 30 calendar days to:

- verify that the Proposed Action is consistent with the scope of actions covered under the PBO;
- verify that all applicable avoidance, minimization, and compensation measures are included in the action proposal;
- identify any action-specific monitoring and reporting requirements, consistent with the monitoring and reporting requirements of the PBO, and
- identify anticipated incidental take.

ESA Section 7 compliance for this Proposed Action is not complete until the Federal action agency or its designated non-federal representative receives a verification letter from the Service.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency for the Proposed Action accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- Prairie Bush-clover, *Lespedeza leptostachya* (Threatened)
- Rusty Patched Bumble Bee, *Bombus affinis* (Endangered)

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

SP 019-670-013 CSAH 70 Lakeville

Description

This project consists of expanding the existing two-lane rural highway section of CSAH 70 in Lakeville, Minnesota to a four-lane divided highway from Kenrick Avenue/Kensington Boulevard to CSAH 23 (Cedar Avenue). Specific activities may include installing two traffic lanes in each direction, a median, turn lanes, access closure, and trail on both sides of CSAH 70 and along Cedar Avenue north of CSAH 70. In addition, 220th St will be extended to connect to Cedar Avenue approximately 0.5 miles south of the Cedar Avenue/CSAH 70 intersection. Less than 5 acres of tree clearing is anticipated, tree clearing may occur during the bat active season.

Determination Key Result

Based on your answers provided, this project is likely to adversely affect the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the conclusion and Incidental Take Statement provided in the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

Qualification Interview

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the Northern long-eared bat[1]?

   [1] See Northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?
   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   No

8. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the national consultation FAQs.

   Yes

9. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   Yes

10. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

11. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    No

12. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

13. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

14. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    B) During the inactive season

15. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?
    Yes

16. Will the tree removal alter *any* **documented** Indiana bat or NLEB roosts and/or alter any surrounding summer habitat **within** 0.25 mile of a documented roost?
    No

17. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?
    Yes

18. Are *all* trees that are being removed clearly demarcated?
    Yes

19. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?
    No

20. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?
    No

21. Does the project include slash pile burning?
    No

22. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?
    No

23. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)
    No

24. Will the project involve the use of **temporary** lighting *during* the active season?
    Yes

25. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting will be used?
    Yes

26. Will the project install new or replace existing **permanent** lighting?

    Yes

27. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **permanent** lighting will be installed or replaced?

    Yes

28. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

29. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

30. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

31. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

32. Will the project raise the road profile **above the tree canopy**?

    No

33. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, conducted during the active season, and are not within documented habitat

34. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

35. Is the habitat removal portion of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the tree removal/trimming that occurs outside of the active season occurs greater than 0.5 miles from the nearest hibernaculum, is less than 100 feet from the existing road/rail surface, includes clear demarcation of the trees that are to be removed, and does not alter documented roosts and/or surrounding summer habitat within 0.25 miles of a documented roost

36. Is the habitat removal portion of this project consistent with a Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the tree removal that occurs during the winter is 100-300 feet from the existing road/rail surface, and is not in documented roosting/foraging habitat or travel corridors

37. **General AMM 1**
    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

38. **Tree Removal AMM 1**
Can *all* phases/aspects of the project (e.g., temporary work areas, alignments) be modified, to the extent practicable, to avoid tree removal[1] in excess of what is required to implement the project safely?

Note: Tree Removal AMM 1 is a minimization measure, the full implementation of which may not always be practicable. Projects may still be NLAA as long as Tree Removal AMMs 2, 3, and 4 are implemented and LAA as long as Tree Removal AMMs 3, 5, 6, and 7 are implemented.

[1] The word “trees” as used in the AMMs refers to trees that are suitable habitat for each species within their range. See the USFWS’ current summer survey guidance for our latest definitions of suitable habitat.

No

39. **Tree Removal AMM 3**
Can tree removal be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits)?

Yes

40. **Lighting AMM 1**
Will *all* **temporary** lighting used during the removal of suitable habitat and/or the removal/trimming of trees within suitable habitat be directed away from suitable habitat during the active season?

Yes

41. **Lighting AMM 1**
Will *all* **temporary** lighting be directed away from suitable habitat during the active season?

Yes

42. **Lighting AMM 2**
Does the lead agency use the BUG (Backlight, Uplight, and Glare) system developed by the Illuminating Engineering Society[1][2] to rate the amount of light emitted in unwanted directions?

[1] Refer to Fundamentals of Lighting - BUG Ratings

[2] Refer to The BUG System—A New Way To Control Stray Light

Yes

43. **Lighting AMM 2**
Will the **permanent** lighting be designed to be as close to 0 for all three BUG ratings as possible, with a priority of "uplight" of 0 and "backlight" as low as practicable?

Yes

44. For Indiana bat, if applicable, compensatory mitigation measures are required to offset adverse effects on the species (see Section 2.10 of the BA). Please select the mechanism in which compensatory mitigation will be implemented:
6. Not Applicable

Project Questionnaire

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?
No

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?
Yes

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

[1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

3

4. How many acres[1] of trees are proposed for removal between 100-300 feet of the existing road/rail surface?

[1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

1.99

5. **Please verify:**
   All tree removal will occur greater than 0.5 mile from any hibernaculum.

   Yes, I verify that all tree removal will occur greater than 0.5 miles from any hibernaculum.

6. Is the project location 0-100 feet from the edge of existing road/rail surface?
   Yes

7. Is the project location 100-300 feet from the edge of existing road/rail surface?
   Yes

8. **Please verify:**
   No documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31.

   Yes, I verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted during this period.

9. You have indicated that the following Avoidance and Minimization Measures (AMMs) will be implemented as part of the proposed project:
   - *General AMM 1*
   - *Lighting AMM 1*
   - *Lighting AMM 2*
   - *Tree Removal AMM 3*

Avoidance And Minimization Measures (AMMs)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

LIGHTING AMM 2

When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable.

TREE REMOVAL AMM 3

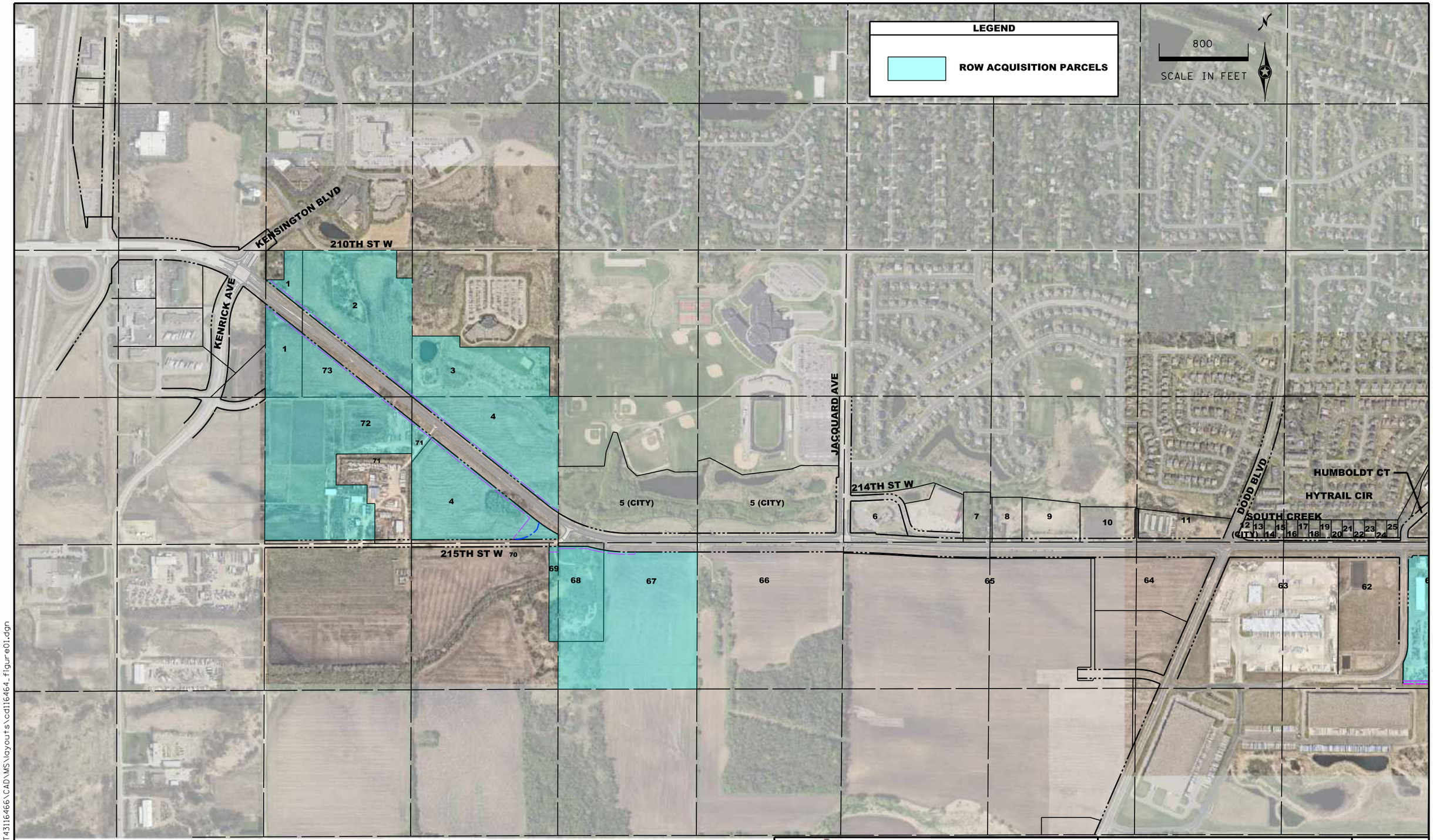
Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on March 16, 2018. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.



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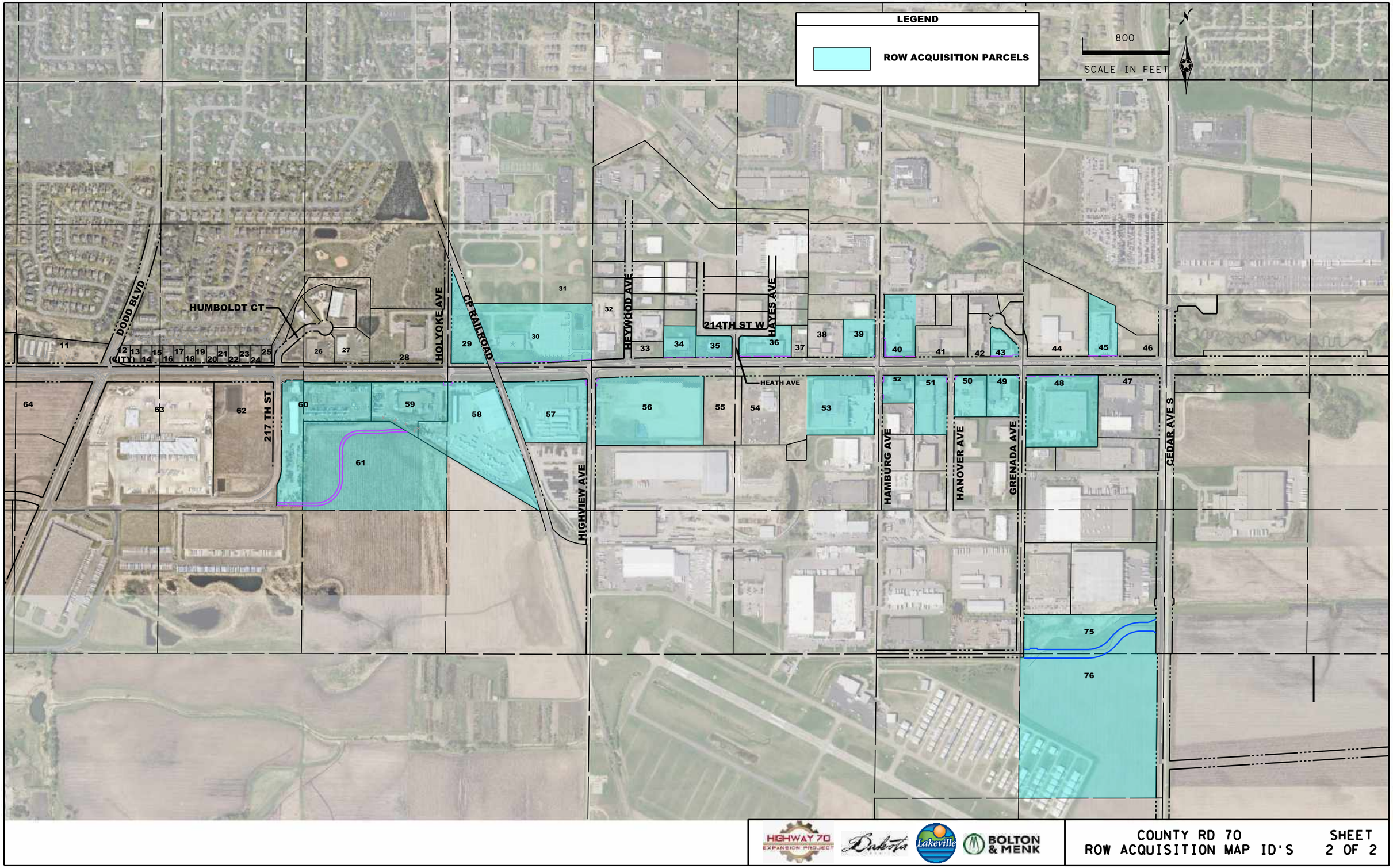
HIGHWAY 70 EXPANSION PROJECT | Dakota | Lakeville | BOLTON & MENK

COUNTY RD 70
ROW ACQUISITION MAP ID'S

SHEET
1 OF 2



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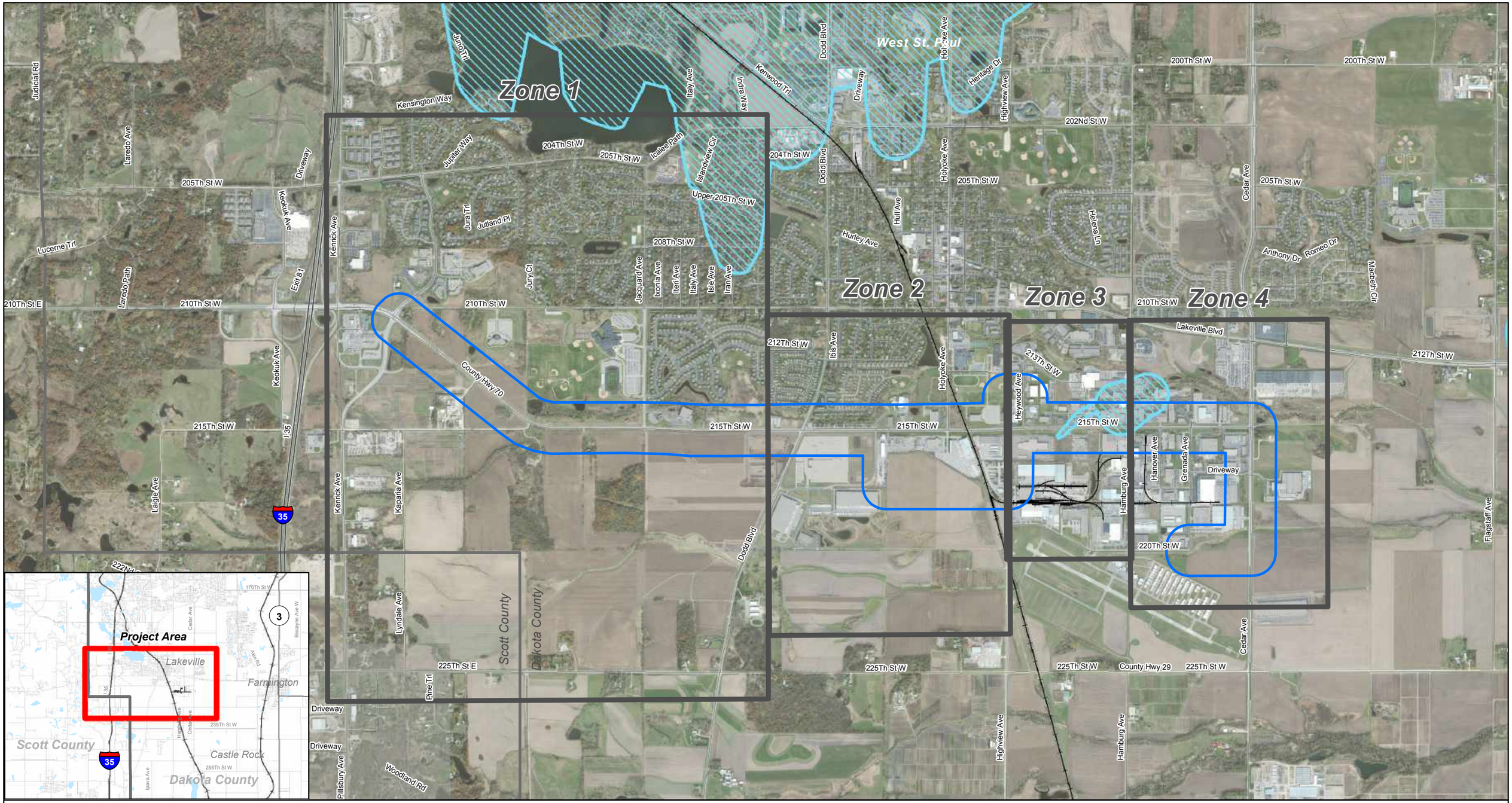
HIGHWAY 70 EXPANSION PROJECT | Dakota | Lakeville | BOLTON & MENK

COUNTY RD 70
ROW ACQUISITION MAP ID'S

SHEET
2 OF 2

***For Metropolitan Airport Commission (MAC) land (Parcels 61, 75, and 76), right-of-way to be acquired via a permanent easement, the MAC will retain ownership of these parcels



Project Overview
Phase I ESA
CSAH 70
Dakota County
Lakeville, Minnesota
C.P. 70-23

- 500-foot Investigation Area
- Project Zone
- Railroads
- MDH Wellhead Protection Area

N

1:23,622

0 1,250 2,500 3,750 5,000 Feet

Service Layer Credits: The 2018 aerial basemap was obtained from the Dakota County database (http://gis.co.dakota.mn.us/DCGIS/). Other Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
AECOM Path: G:\Minneapolis\DCS\GIS\ArcMap_GeoDB_Projects\60601043 CSAH 70
Revised: 6/11/2019 by MGD

AECOM Site ID	Site Name	Address	Activities of Concern	Risk Ranking
2	Intersection of Juniper Way and 215th St W	215th St W & Juniper Way	MNPCASPILLS	Medium
7	Styer Transportation Spill	County Rd 70 & Jacquard Ave	MNPCASPILLS	Medium
12	Intersection of Juniper Way and Kensington Blvd	Juniper Way & Kensington Blvd	MNPCASPILLS	Medium
22	Piston Pete's Automotive Service & Equipment Co. Hoffbeck Trucking Inc.	9745 215th St W	MNUAST, MNHWGS, Active Vehicle Repair Shop	Medium
24	Family Health Medical Clinic	9974 214th St W	MNHWGS	Low
41	Lakeville South High School	21135 Jacquard Ave	MNHWGS, MNUAST, MNTIERII	Medium
59	Dunham Brothers Shaving Inc A&D Recycling and Recovery Inc. Northern Natural Gas	10831 215th St W 10131 215th St W 10811 215th St W	MNUAST, Solid Waste Generator, MNHWGS	Medium
66	Marketville Shopping Center	11276 210th St W	MNPCASPILLS	Medium
69	Residential Property	10430 215th St W	MNHWGS	Low
72	Motel 6	11274 210th St W	MNHWGS	Low

Sites of Concern, Zone 1
Phase I ESA
CSAH 70
Dakota County
Lakeville, Minnesota
C.P. 70-23

Sites of Concern Risk Rank
- High Risk
- Medium Risk
- Low Risk

Project Design
- Median and Curb/Gutter
- Edge of Pavement
- Shoulder
- Sidewalk/Trail
- Aggregate

- Potential Acquisition Property
- 500-foot Investigation Area
- Railroads

N

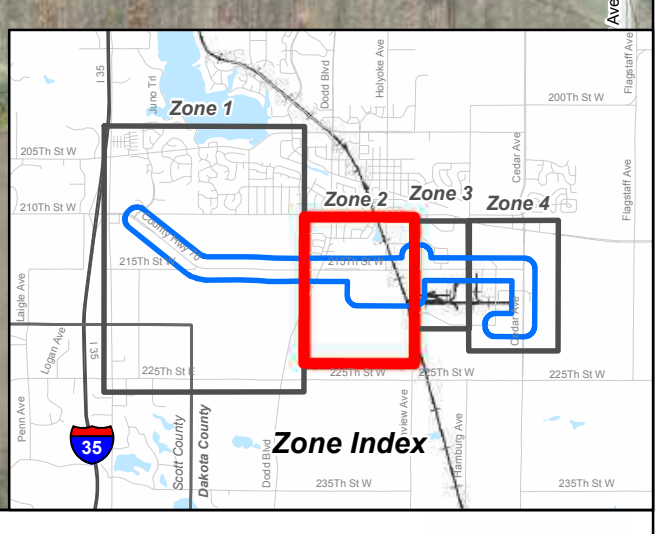
1:10,930

0 525 1,050 1,575 2,100 Feet

Service Layer Credits: The property boundaries for each Site were drawn following the parcel boundaries made available by the Dakota County GIS Online database. The 2018 aerial basemap was also obtained from the Dakota County database (http://gis.co.dakota.mn.us/DCGIS/). Other Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
AECOM Path: G:\Minneapolis\DCS\GIS\ArcMap_GeoDB_Projects\60601043 CSAH 70
Revised: 6/13/2019 by MGD

AECOM Site ID	Site Name	Address	Activities of Concern	Risk Ranking
1	Dicks Sanitation Recycle Minnesota LLC Kobra's Auto Body Inc	8812 215th St W 8984 215th St W	MNSWF, MNPBR, MNPCASPILLS, MNUAST, Tier II, MNHWGS, Active Railroad Tracks, Auto Repair Shop, Active Fueling Station	Medium
5	Lakeville Building Materials Distribution Center	8714 215th St W	MNTIERII, Adjacent Railroad Tracks	Low
10	FedEx Freight	9331 217th St W	Tier II, MNHWGS, MNUAST, Active Fueling Station	Medium
17	Sherwin-Williams AGAPE Mechanical Dakota Truck Co Midwest Veterinary Supply GCR Tires & Service Creekside Business Park	21486 Humboldt Ct 21450 Humboldt Ct 21467 HOLYOKE AVE 8777 215TH ST W	MNHWGS, MNUAST, Historic and Active Vehicle Repair Shop, MNLUAST, Demolition Dump Site, Unpermitted Dump Site	High
19	PAE (Minneapolis MTESC)	9150 217th St W	MNHWGS	Low
30*	Lakeville Hasse Arena	8525 215th St W	MNTIERII, Adjacent Railroad Tracks	Low
81	All Saints Catholic Cemetery	21341 Holyoke Ave	Cemetery	Low
82*	CH Carpenter Lumber Co.	21575 Highview Ave	Adjacent railroad tracks	Low
83	Miller Ponding Property	NE Corner of Holyoke Ave and 215th St W	Adjacent railroad tracks	Low

*This Site is located on Figures 3b and 3c



Sites of Concern, Zone 2
Phase I ESA
CSAH 70
Dakota County
Lakeville, Minnesota
C.P. 70-23

Sites of Concern Risk Rank
- High Risk
- Medium Risk
- Low Risk

Project Design
- Median and Curb/Gutter
- Edge of Pavement
- Shoulder
- Sidewalk/Trail
- Aggregate

- Potential Acquisition Property
- 500-foot Investigation Area
- Railroads

N

1:6,010

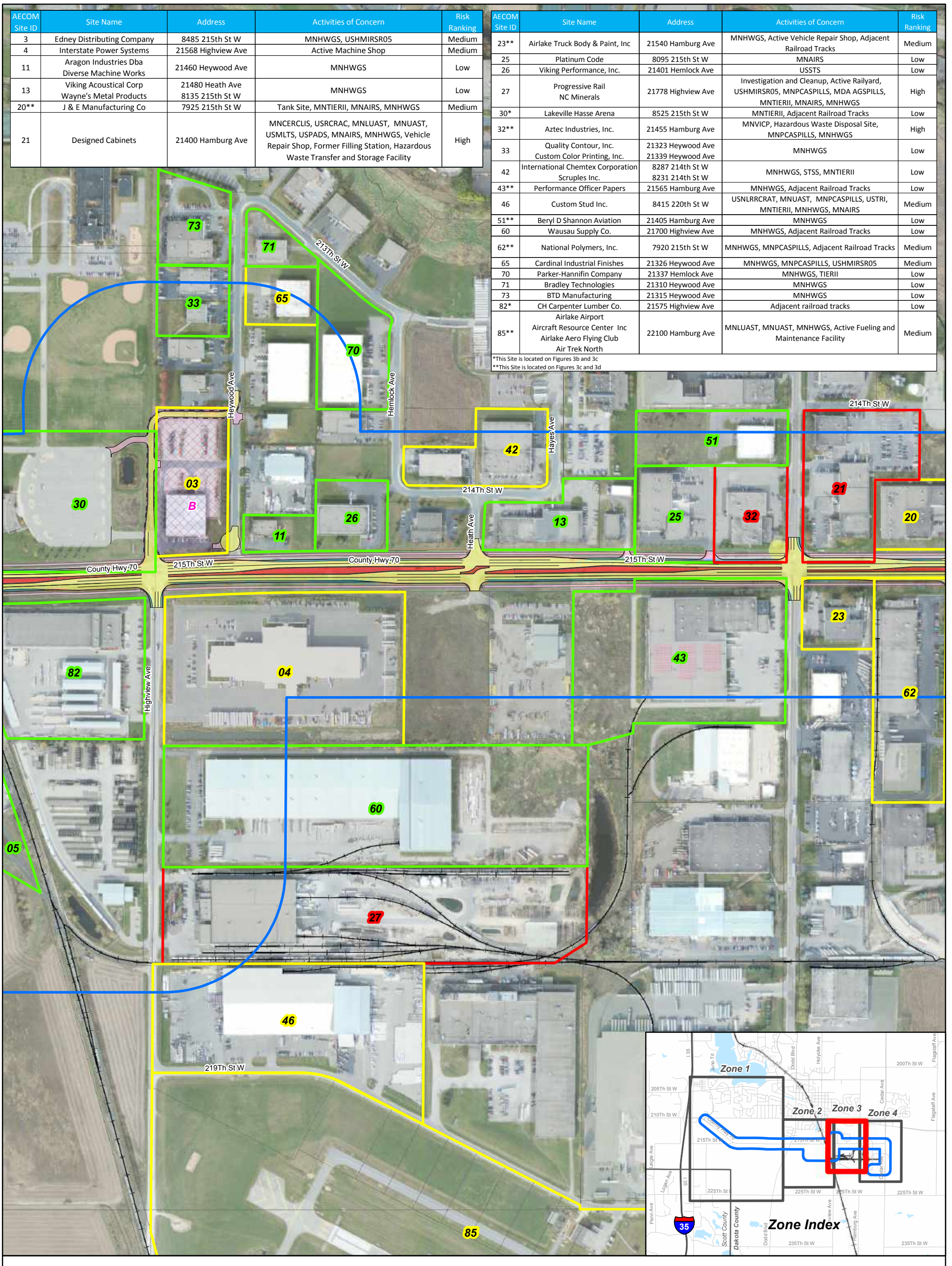
0 290 580 870 1,160 Feet

Service Layer Credits: The property boundaries for each Site were drawn following the parcel boundaries made available by the Dakota County GIS Online database. The 2018 aerial basemap was also obtained from the Dakota County database (http://gis.co.dakota.mn.us/DCGIS/). Other Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
AECOM Path: G:\Minneapolis\DCS\GIS\ArcMap_GeoDB_Projects\60601043 CSAH 70
Revised: 6/13/2019 by MGD

AECOM Site ID	Site Name	Address	Activities of Concern	Risk Ranking
3	Edney Distributing Company	8485 215th St W	MNHWGS, USHMIRSR05	Medium
4	Interstate Power Systems	21568 Highview Ave	Active Machine Shop	Medium
11	Aragon Industries Dba Diverse Machine Works	21460 Heywood Ave	MNHWGS	Low
13	Viking Acoustical Corp Wayne's Metal Products	21480 Heath Ave 8135 215th St W	MNHWGS	Low
20**	J & E Manufacturing Co	7925 215th St W	Tank Site, MNTIERII, MNAIRS, MNHWGS	Medium
21	Designed Cabinets	21400 Hamburg Ave	MNCERCLIS, USRCRAC, MNLUAST, MNUAST, USMLTS, USPADS, MNAIRS, MNHWGS, Vehicle Repair Shop, Former Filling Station, Hazardous Waste Transfer and Storage Facility	High

AECOM Site ID	Site Name	Address	Activities of Concern	Risk Ranking
23**	Airlake Truck Body & Paint, Inc	21540 Hamburg Ave	MNHWGS, Active Vehicle Repair Shop, Adjacent Railroad Tracks	Medium
25	Platinum Code	8095 215th St W	MNAIRS	Low
26	Viking Performance, Inc.	21401 Hemlock Ave	USSTS	Low
27	Progressive Rail NC Minerals	21778 Highview Ave	Investigation and Cleanup, Active Railyard, USHMIRSR05, MNPCASPILLS, MDA AGSPILLS, MNTIERII, MNAIRS, MNHWGS	High
30*	Lakeville Hasse Arena	8525 215th St W	MNTIERII, Adjacent Railroad Tracks	Low
32**	Aztec Industries, Inc.	21455 Hamburg Ave	MNVICP, Hazardous Waste Disposal Site, MNPCASPILLS, MNHWGS	High
33	Quality Contour, Inc. Custom Color Printing, Inc.	21323 Heywood Ave 21339 Heywood Ave	MNHWGS	Low
42	International Chemtex Corporation Scruples Inc.	8287 214th St W 8231 214th St W	MNHWGS, STSS, MNTIERII	Low
43**	Performance Officer Papers	21565 Hamburg Ave	MNHWGS, Adjacent Railroad Tracks	Low
46	Custom Stud Inc.	8415 220th St W	USNLRRCRAT, MNUAST, MNPCASPILLS, USTRI, MNTIERII, MNHWGS, MNAIRS	Medium
51**	Beryl D Shannon Aviation	21405 Hamburg Ave	MNHWGS	Low
60	Wausau Supply Co.	21700 Highview Ave	MNHWGS, Adjacent Railroad Tracks	Low
62**	National Polymers, Inc.	7920 215th St W	MNHWGS, MNPCASPILLS, Adjacent Railroad Tracks	Medium
65	Cardinal Industrial Finishes	21326 Heywood Ave	MNHWGS, MNPCASPILLS, USHMIRSR05	Medium
70	Parker-Hannifin Company	21337 Hemlock Ave	MNHWGS, TIERII	Low
71	Bradley Technologies	21310 Heywood Ave	MNHWGS	Low
73	BTD Manufacturing	21315 Heywood Ave	MNHWGS	Low
82*	CH Carpenter Lumber Co.	21575 Highview Ave	Adjacent railroad tracks	Low
85**	Airlake Airport Aircraft Resource Center Inc Airlake Aero Flying Club Air Trek North	22100 Hamburg Ave	MNLUAST, MNUAST, MNHWGS, Active Fueling and Maintenance Facility	Medium

*This Site is located on Figures 3b and 3c
**This Site is located on Figures 3c and 3d



Sites of Concern, Zone 3
Phase I ESA
CSAH 70
Dakota County
Lakeville, Minnesota
C.P. 70-23

Sites of Concern Risk Rank
- High Risk
- Medium Risk
- Low Risk

Project Design
- Median and Curb/Gutter
- Edge of Pavement
- Shoulder
- Sidewalk/Trail
- Aggregate

- Potential Acquisition Property
- 500-foot Investigation Area
- Railroads

N

1:4,430

0 210 420 630 840 Feet

Service Layer Credits: The property boundaries for each Site were drawn following the parcel boundaries made available by the Dakota County GIS Online database. The 2018 aerial basemap was also obtained from the Dakota County database (http://gis.co.dakota.mn.us/DCGIS/). Other Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
AECOM Path: G:\Minneapolis\DCS\GIS\ArcMap_GeoDB_Projects\60601043 CSAH 70
Revised: 6/13/2019 by MGD

AECOM Site ID	Site Name	Address	Activities of Concern	Risk Ranking
6	Hearthside Food Solutions	21750 Cedar Ave	Hazardous Waste Transfer and Storage Facility, MNHWCS, MNPCASPILLS, USHMIRSR05, MNTIERII, MNHWGS	High
8	Cedar 70 Business Park	21535-43 Cedar Ave S 21673 Cedar Ave	MNPBR, MNPCASPILLS, ICIS, MNTIERII, MNHWGS, MNAIRS	Medium
20**	J & E Manufacturing Co	7925 215th St W	Tank Site, MNTIERII, MNAIRS, MNHWGS	Medium
21	Designed Cabinets	21400 Hamburg Ave	MNCERCLIS, USRCRAC, MNLUAST, Hazardous Waste Disposal Site, MNUAST, USMLTS, USPADS, MNAIRS, MNHWGS, Vehicle Repair Shop, Former Filling Station	High
23**	Airlake Truck Body & Paint, Inc	21540 Hamburg Ave	MNHWGS, Active Vehicle Repair Shop, Adjacent Railroad Tracks	Medium
32**	Aztec Industries, Inc.	21455 Hamburg Ave	MNVICP, Hazardous Waste Disposal Site, MNPCASPILLS, MNHWGS	High
35	Mendell Inc.	21463 Grenada Ave 21456 Grenada Ave	MNHWGS	Low
36	Professional Turf, Inc.	7780 215th St W	MNAGSPILLS, MNPCASPILLS, MNHWGS	Medium

AECOM Site ID	Site Name	Address	Activities of Concern	Risk Ranking
40	Midstate Reclamation & Trucking	21955 Grenada Ave	MNHWGS, MNUAST, MNTIERII, Active Fleet Maintenance and Fueling Operations	Medium
43**	Performance Officer Papers	21565 Hamburg Ave	MNHWGS, Adjacent Railroad Tracks	Low
47	United Products	21470 Grenada Ave	MNAIRS, MNHWGS	Low
49	Medfab Manufacturing	21624 Grenada Ave	MNHWGS	Low
51**	Beryl D Shannon Aviation	21405 Hamburg Ave	MNHWGS	Low
57	Carquest Auto Parts Distribution Center Advance Auto Parts	21560 Grenada Ave	MNPCASPILLS, MNTIERII, MNHWGS	Medium
61	Hearthside Food Solutions	21850 Grenada Ave 21855 Cedar Ave	MNLUAST, MNPCASPILLS, MNUAST, USTRI, MNTIERII, MNHWGS, Adjacent Railroad Tracks	Medium
62**	National Polymers, Inc. Timberwolf Products LLC	7920 215th St W	MNHWGS, MNPCASPILLS, Adjacent Railroad Tracks	Medium
67	Century Refining, Inc.	21630 Hanover Ave	MNRECYCLERS, MNHWGS, Hazardous Waste Disposal Site	Medium
84	Overbye Transport Inc.	21881 Grenada Ave	MNHWGS, Adjacent railroad tracks	Low
85**	Airlake Airport Aircraft Resource Center Inc Airlake Aero Flying Club Air Trek North	22100 Hamburg Ave	MNLUAST, MNUAST, MNHWGS, Active Fueling and Maintenance Facility	Medium

**This Site is located on Figures 3c and 3d

214Th St W
215Th St W
218Th St W
220Th St W
Hanover Ave
Grenada Ave
Cedar Ave
Glade Ave
Driveway
Driveway
51
21
32
20
35
47
23
43
36
57
62
67
49
08
06
61
84
40
85

Zone 1
Zone 2
Zone 3
Zone 4
Zone Index

Sites of Concern, Zone 4
Phase I ESA
CSAH 70
Dakota County
Lakeville, Minnesota
C.P. 70-23

Sites of Concern Risk Rank
- High Risk
- Medium Risk
- Low Risk

Project Design
- Median and Curb/Gutter
- Edge of Pavement
- Shoulder
- Sidewalk/Trail
- Aggregate

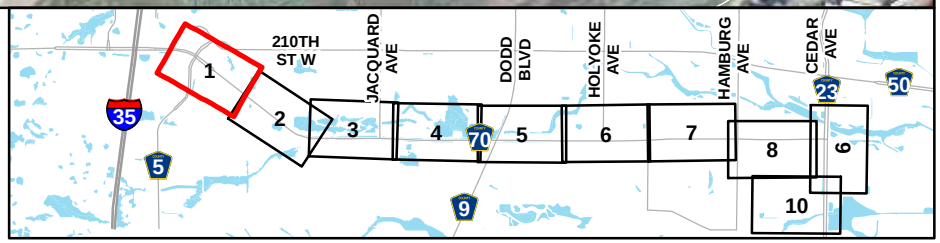
- Potential Acquisition Property
- 500-foot Investigation Area
- Railroads

N
1:5,370
0 250 500 750 1,000 Feet

Service Layer Credits: The property boundaries for each Site were drawn following the parcel boundaries made available by the Dakota County GIS Online database. The 2018 aerial basemap was also obtained from the Dakota County database (http://gis.co.dakota.mn.us/DCGIS/). Other Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
AECOM Path: G:\Minneapolis\DCS\GIS\ArcMap_GeoDB_Projects\60601043 CSAH 70
Revised: 6/13/2019 by MGD

Noise Walls and Benefitted Receptors - Page 1 of 10

- Proposed Roadways/Paved Driveways
- Proposed Shoulders/Gravel Driveways
- Proposed Trails
- Proposed Concrete Medians
- Parcels
- Not Benefitted
- Benefitted
- Wall Not Proposed
- Proposed Wall



Noise Walls and Benefitted Receptors - Page 2 of 10

- Proposed Roadways/Paved Driveways
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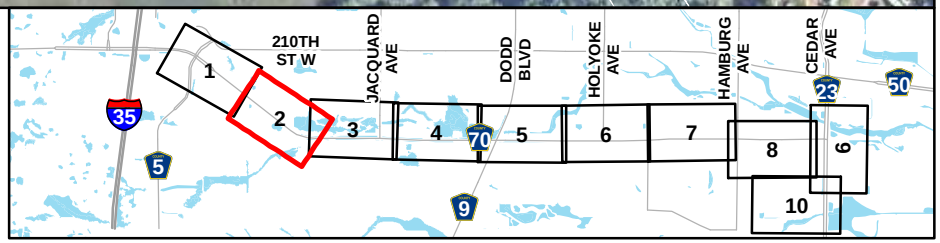

Noise Walls and Benefitted Receptors - Page 3 of 10

- Proposed Roadways/Paved Driveways
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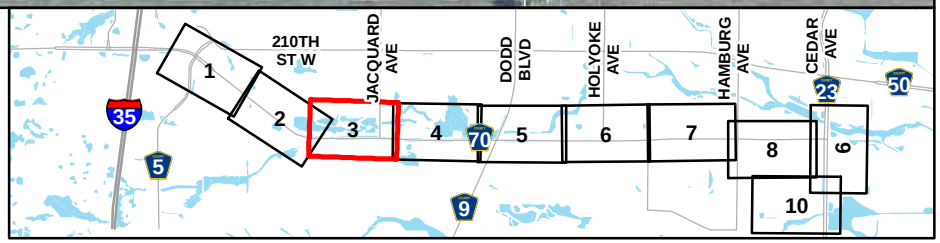

Noise Walls and Benefitted Receptors - Page 4 of 10

- Proposed Roadways/Paved Driveways
- Proposed Shoulders/Gravel Driveways
- Proposed Trails
- Proposed Concrete Medians
- Parcels
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- Benefitted
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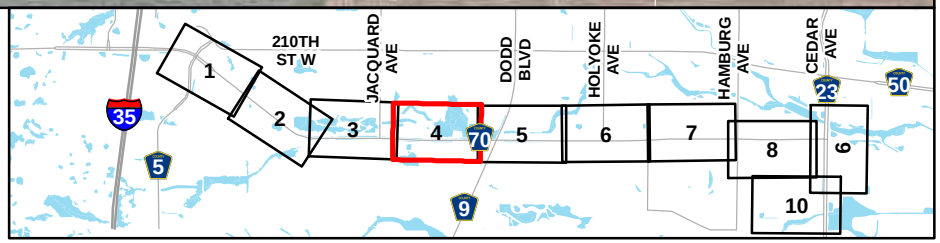
- Proposed Wall



Option 2 - trail striped on the 215th Street

Noise Walls and Benefitted Receptors - Page 5 of 10

- Proposed Roadways/Paved Driveways
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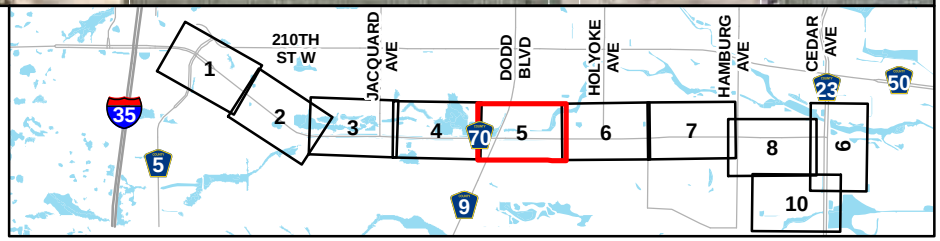
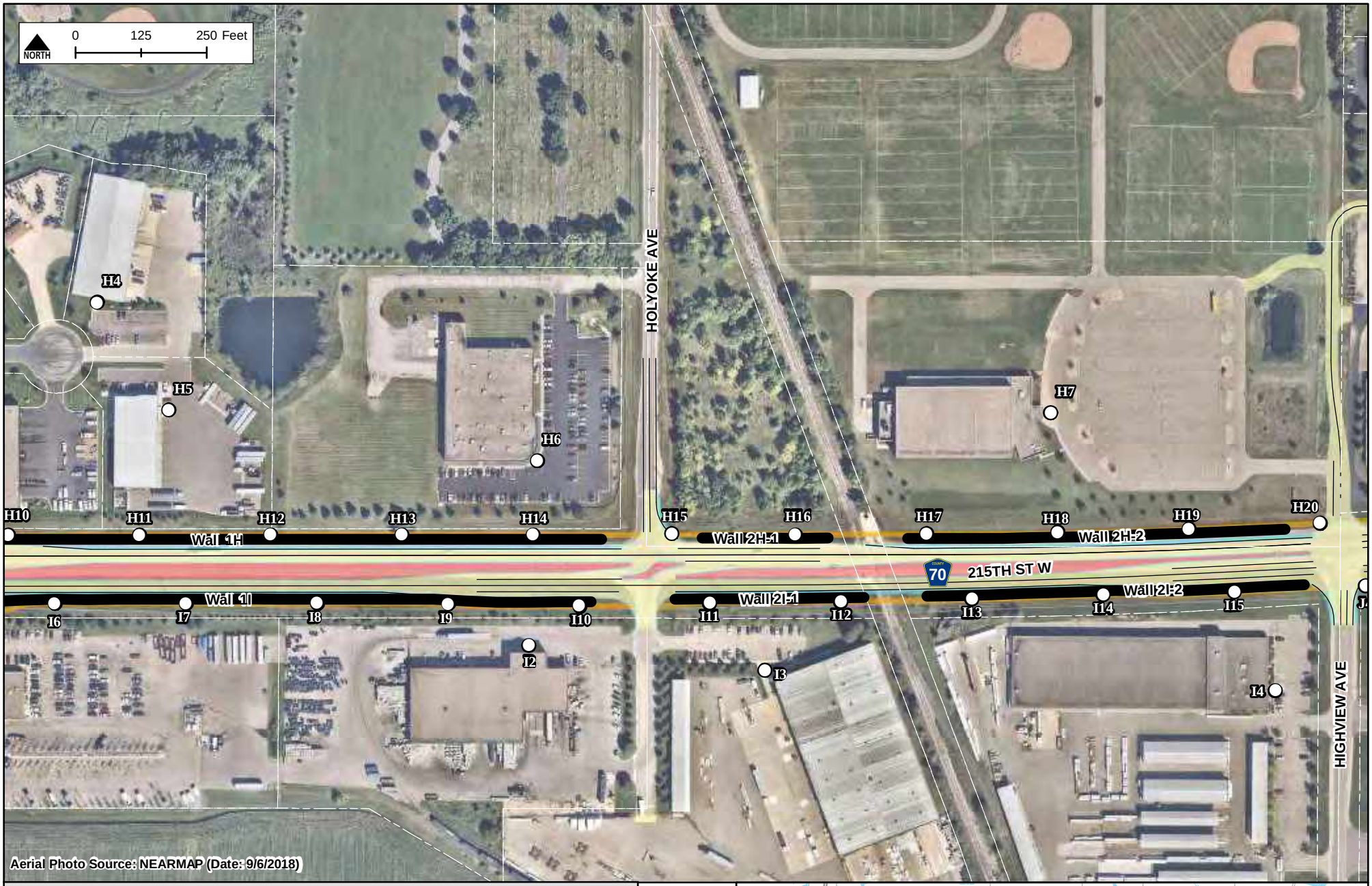
- Proposed Trails
- Proposed Concrete Medians
- Parcels
- Not Benefitted
- Benefitted
- Wall Not Proposed
- Proposed Wall





Noise Walls and Benefitted Receptors - Page 6 of 10

- Proposed Roadways/Paved Driveways
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- Parcels
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- Benefitted
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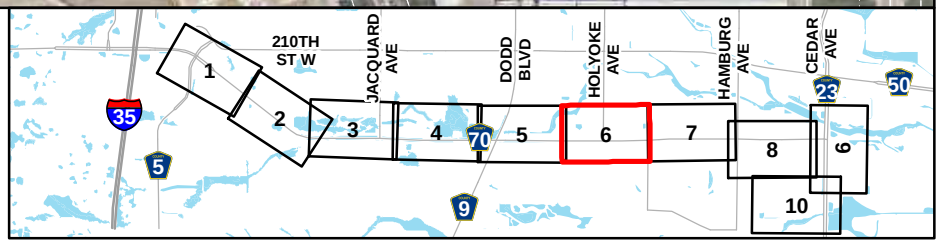
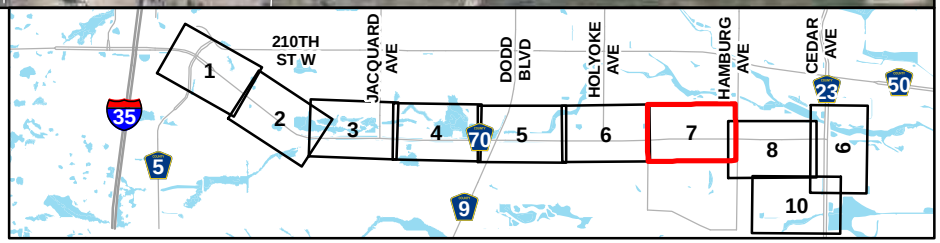
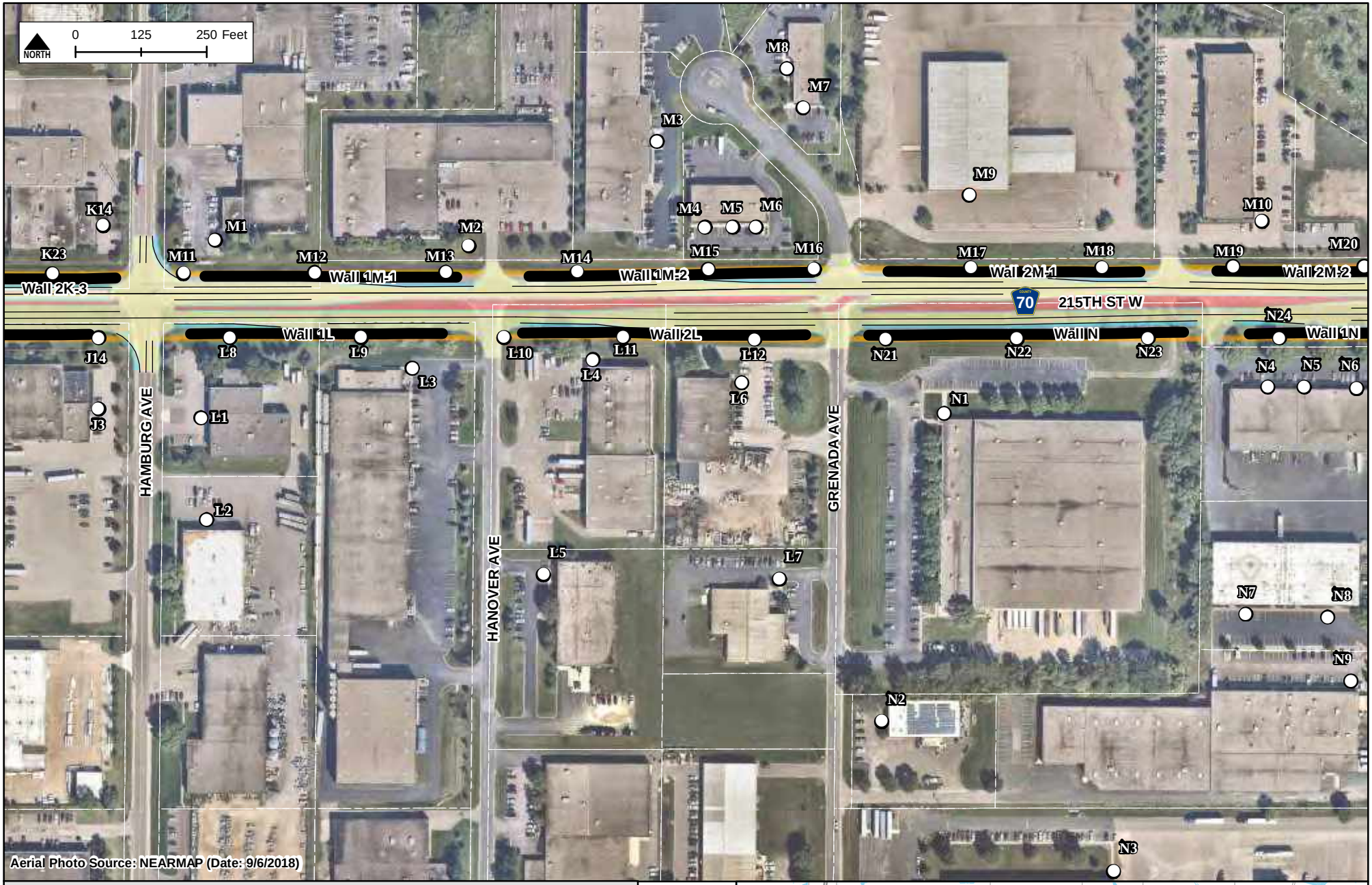
- Proposed Wall



Noise Walls and Benefitted Receptors - Page 7 of 10

- Proposed Roadways/Paved Driveways
- Proposed Shoulders/Gravel Driveways
- Proposed Trails
- Proposed Concrete Medians
- Parcels
- Not Benefitted
- Benefitted
- Wall Not Proposed
- Proposed Wall





Noise Walls and Benefitted Receptors - Page 8 of 10

- Proposed Roadways/Paved Driveways
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- Proposed Concrete Medians
- Parcels
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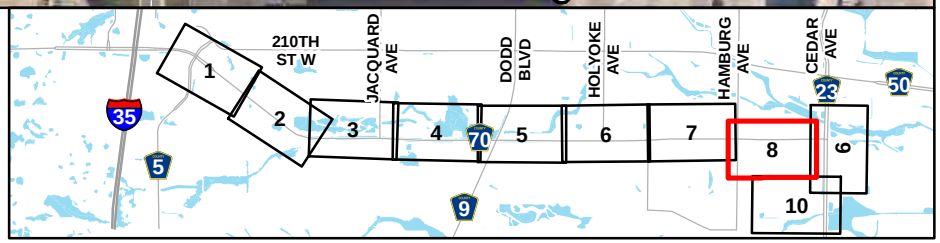

Noise Walls and Benefitted Receptors - Page 9 of 10

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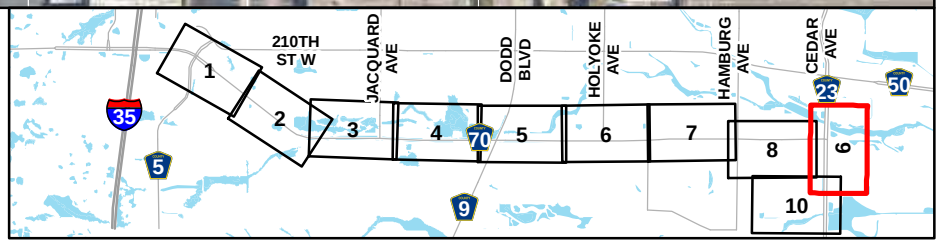

Noise Walls and Benefitted Receptors - Page 10 of 10

- Proposed Roadways/Paved Driveways
- Proposed Shoulders/Gravel Driveways
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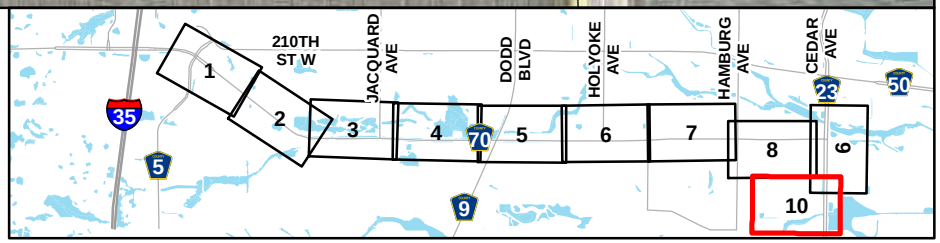

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
A1	1	C	67	74.1	76.5	2.4	76.5	2.4
A2	1	C	67	74.1	76.5	2.4	76.5	2.4
A3	1	E	72	67.1	69.5	2.4	69.5	2.4
A4	1	F	N/A	56.8	59.2	2.4	59.2	2.4
A5	1	F	N/A	57.1	59.5	2.4	59.5	2.4
A6	1	F	N/A	57.2	59.6	2.4	59.6	2.4
A7	1	F	N/A	57.7	60.0	2.3	60.1	2.4
A8	1	F	N/A	58.6	61.0	2.4	61.1	2.5
A9	1	F	N/A	59.8	62.1	2.3	62.2	2.4
A10	1	F	N/A	61.3	63.6	2.3	63.6	2.3
A11	1	F	N/A	63.3	65.5	2.2	65.6	2.3
B1	1	C	67	73.5	75.9	2.4	75.9	2.4
B2	1	C	67	73.4	75.8	2.4	75.8	2.4
B3	1	C	67	68.0	70.3	2.3	70.1	2.1
B4	1	C	67	63.9	66.0	2.1	65.9	2.0
B5	1	C	67	69.4	71.6	2.2	71.5	2.1
B6	1	C	67	64.6	66.7	2.1	66.7	2.1
B7	1	B	67	66.9	69.4	2.5	69.2	2.3
C1	1	F	N/A	50.2	52.8	2.6	51.7	1.5
C2	1	B	67	54.5	57.2	2.7	59.0	4.5
C3	1	B	67	60.7	63.4	2.7	65.1	4.4
D1	1	C	67	53.1	55.7	2.6	56.8	3.7
D2	1	C	67	51.8	54.3	2.5	55.5	3.7
D3	1	C	67	54.2	56.7	2.5	58.0	3.8
D4	1	C	67	52.6	55.1	2.5	56.3	3.7
D5	1	C	67	56.3	58.7	2.4	59.3	3.0
D6	1	C	67	55.4	57.8	2.4	58.4	3.0
D7	1	C	67	60.4	62.5	2.1	62.0	1.6
D8	1	C	67	66.6	68.8	2.2	67.7	1.1
E1	1	C	67	58.5	60.6	2.1	60.7	2.2
E2	1	C	67	65.6	67.8	2.2	67.2	1.6
E3	1	C	67	67.3	68.6	1.3	68.8	1.5
E4	1	C	67	62.8	64.1	1.3	65.1	2.3
E5	1	B	67	69.0	70.2	1.2	70.1	1.1
E6	1	B	67	68.7	69.9	1.2	69.9	1.2
E7	1	B	67	56.3	58.4	2.1	58.8	2.5
E8	1	B	67	54.6	56.7	2.1	57.4	2.8
E9	1	B	67	53.7	55.6	1.9	56.5	2.8
E10	1	B	67	52.7	54.6	1.9	55.6	2.9
E11	1	B	67	51.3	53.0	1.7	53.9	2.6
E12	1	B	67	48.8	50.2	1.4	53.5	4.7
E13	1	B	67	50.3	51.6	1.3	55.5	5.2
E14	1	B	67	52.4	53.8	1.4	57.3	4.9
E15	1	B	67	53.1	54.4	1.3	57.7	4.6
E16	1	B	67	52.2	53.6	1.4	56.7	4.5
E17	1	B	67	48.8	50.3	1.5	51.8	3.0
E18	1	F	N/A	67.1	68.3	1.2	68.5	1.4

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
E19	1	B	67	50.0	51.3	1.3	53.8	3.8
E20	1	B	67	48.8	50.0	1.2	52.5	3.7
E21	1	B	67	48.5	49.7	1.2	52.4	3.9
E22	1	B	67	48.4	49.7	1.3	52.6	4.2
E23	1	C	67	55.4	57.0	1.6	58.1	2.7
E24	1	B	67	55.4	57.1	1.7	58.5	3.1
E25	1	B	67	55.8	57.5	1.7	58.9	3.1
E26	1	B	67	56.1	57.9	1.8	59.2	3.1
E27	1	B	67	56.2	58.0	1.8	59.3	3.1
E28	1	B	67	56.5	58.3	1.8	59.5	3.0
E29	1	B	67	56.7	58.6	1.9	59.7	3.0
E30	1	B	67	57.1	59.0	1.9	59.9	2.8
E31	1	B	67	55.7	57.7	2.0	59.1	3.4
E32	1	B	67	49.1	50.5	1.4	52.7	3.6
E33	1	B	67	46.0	47.7	1.7	49.1	3.1
E34	1	B	67	46.4	48.2	1.8	49.6	3.2
E35	1	B	67	46.7	48.6	1.9	49.9	3.2
E36	1	B	67	45.8	47.8	2.0	48.7	2.9
E37	1	B	67	46.9	49.0	2.1	50.0	3.1
E38	1	B	67	47.5	49.9	2.4	50.8	3.3
E39	1	B	67	47.3	49.5	2.2	50.2	2.9
E40	1	B	67	42.0	43.6	1.6	44.6	2.6
E41	1	B	67	62.3	64.5	2.2	65.0	2.7
E42	1	B	67	62.4	65.0	2.6	65.5	3.1
E43	1	B	67	62.0	65.0	3.0	65.3	3.3
E44	1	B	67	61.0	64.2	3.2	64.4	3.4
E45	1	B	67	60.7	63.9	3.2	64.3	3.6
E46	1	B	67	60.5	63.8	3.3	64.2	3.7
F1	1	B	67	68.2	70.6	2.4	70.1	1.9
F2	1	B	67	67.9	70.3	2.4	69.7	1.8
F3	1	B	67	67.9	70.4	2.5	69.7	1.8
F4	1	B	67	67.7	70.1	2.4	69.5	1.8
F5	1	B	67	67.4	69.9	2.5	69.3	1.9
F6	1	B	67	67.2	69.7	2.5	69.1	1.9
F7	1	B	67	67.2	69.7	2.5	69.1	1.9
F8	1	B	67	67.4	69.9	2.5	69.3	1.9
F9	1	B	67	67.4	69.9	2.5	69.4	2.0
F10	1	B	67	67.4	69.9	2.5	69.5	2.1
F11	1	B	67	67.4	69.9	2.5	69.5	2.1
F12	1	B	67	67.3	69.9	2.6	69.5	2.2
F13	1	B	67	67.3	69.9	2.6	69.4	2.1
F14	1	C	67	47.8	50.3	2.5	50.6	2.8
F15	1	C	67	50.9	53.3	2.4	53.0	2.1
F16	1	C	67	51.2	53.7	2.5	53.6	2.4
F17	1	C	67	54.5	57.0	2.5	58.0	3.5
F18	1	C	67	49.4	52.0	2.6	53.3	3.9
F19	1	B	67	61.1	63.8	2.7	64.0	2.9

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

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ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
F20	1	B	67	59.2	61.7	2.5	62.1	2.9
F21	1	B	67	58.8	61.1	2.3	61.7	2.9
F22	1	B	67	57.9	60.2	2.3	60.8	2.9
F23	1	B	67	57.3	59.5	2.2	60.1	2.8
F24	1	B	67	55.9	57.9	2.0	58.4	2.5
F25	1	B	67	54.7	56.8	2.1	57.3	2.6
F26	1	B	67	54.0	56.1	2.1	56.6	2.6
F27	1	B	67	53.1	55.3	2.2	55.6	2.5
F28	1	B	67	52.2	54.4	2.2	54.5	2.3
F29	1	B	67	52.2	54.5	2.3	54.7	2.5
F30	1	B	67	51.8	54.2	2.4	54.6	2.8
F31	1	B	67	51.9	54.3	2.4	54.9	3.0
F32	1	B	67	52.1	54.5	2.4	55.0	2.9
F33	1	B	67	51.3	53.8	2.5	53.6	2.3
F34	1	B	67	51.3	53.7	2.4	53.6	2.3
F35	1	B	67	51.5	54.0	2.5	53.9	2.4
F36	1	B	67	51.5	54.0	2.5	53.9	2.4
F37	1	B	67	51.8	54.3	2.5	54.4	2.6
F38	1	B	67	52.3	54.8	2.5	55.0	2.7
F39	1	B	67	53.1	55.6	2.5	55.8	2.7
F40	1	B	67	53.9	56.5	2.6	56.8	2.9
F41	1	B	67	53.5	56.1	2.6	57.1	3.6
F42	1	B	67	51.9	54.5	2.6	55.9	4.0
F43	1	B	67	50.4	52.9	2.5	54.7	4.3
F44	1	B	67	48.9	51.4	2.5	53.0	4.1
F45	1	B	67	48.2	50.7	2.5	52.4	4.2
F46	1	B	67	47.6	50.1	2.5	51.4	3.8
F47	1	B	67	56.8	59.8	3.0	60.2	3.4
F48	1	B	67	55.8	58.4	2.6	58.7	2.9
F49	1	B	67	51.1	53.6	2.5	54.2	3.1
F50	1	B	67	51.4	53.5	2.1	54.7	3.3
F51	1	B	67	53.6	56.9	3.3	56.5	2.9
F52	1	B	67	54.9	58.1	3.2	56.8	1.9
F53	1	B	67	55.9	59.0	3.1	57.5	1.6
F54	1	B	67	56.7	59.8	3.1	58.1	1.4
F55	1	B	67	40.4	42.9	2.5	43.0	2.6
F56	1	B	67	40.4	42.8	2.4	43.0	2.6
F57	1	B	67	41.7	44.5	2.8	44.6	2.9
F58	1	B	67	46.7	49.0	2.3	49.3	2.6
F59	1	B	67	46.5	48.8	2.3	49.1	2.6
F60	1	B	67	47.1	49.5	2.4	50.2	3.1
F61	1	B	67	45.8	48.1	2.3	48.6	2.8
F62	1	B	67	45.9	48.3	2.4	48.5	2.6
F63	1	B	67	45.7	48.0	2.3	48.2	2.5
F64	1	B	67	45.5	47.8	2.3	48.0	2.5
F65	1	B	67	46.1	48.5	2.4	48.5	2.4
F66	1	B	67	39.6	41.9	2.3	42.0	2.4

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
F67	1	B	67	41.6	44.0	2.4	44.3	2.7
F68	1	B	67	42.5	45.1	2.6	44.5	2.0
F69	1	B	67	41.4	43.8	2.4	43.9	2.5
F70	1	B	67	41.7	44.2	2.5	44.3	2.6
F71	1	B	67	41.3	43.7	2.4	43.9	2.6
F72	1	B	67	40.9	43.2	2.3	43.4	2.5
G1	1	F	N/A	62.9	65.2	2.3	66.2	3.3
G2	1	F	N/A	57.6	60.2	2.6	61.1	3.5
H1	1	E	72	64.4	66.9	2.5	66.7	2.3
H2	1	E	72	58.6	61.2	2.6	61.2	2.6
H3	1	E	72	52.6	55.2	2.6	56.6	4.0
H4	1	F	N/A	52.4	55.0	2.6	56.5	4.1
H5	1	F	N/A	59.1	61.7	2.6	61.7	2.6
H6	1	E	72	63.5	66.1	2.6	66.1	2.6
H7	1	C	67	59.5	62.0	2.5	62.2	2.7
H8	1	F	N/A	67.2	69.7	2.5	68.8	1.6
I1	1	F	N/A	64.0	66.5	2.5	68.1	4.1
I2	1	F	N/A	64.6	67.1	2.5	68.8	4.2
I3	1	F	N/A	63.2	65.7	2.5	66.8	3.6
I4	1	F	N/A	62.1	64.3	2.2	64.7	2.6
J1	1	F	N/A	62.5	64.9	2.4	65.7	3.2
J2	1	F	N/A	62.1	64.6	2.5	65.5	3.4
J3	1	F	N/A	64.2	66.4	2.2	66.9	2.7
K1	1	F	N/A	67.1	69.6	2.5	68.5	1.4
K2	1	F	N/A	56.9	59.3	2.4	59.0	2.1
K3	1	E	72	53.5	55.6	2.1	55.9	2.4
K4	1	F	N/A	66.7	69.1	2.4	68.3	1.6
K5	1	F	N/A	49.7	52.2	2.5	52.9	3.2
K6	1	F	N/A	65.9	68.4	2.5	67.5	1.6
K7	1	E	72	64.4	66.9	2.5	66.3	1.9
K8	1	F	N/A	54.4	56.9	2.5	57.0	2.6
K9	1	E	72	53.0	55.5	2.5	56.2	3.2
K10	1	E	72	66.1	68.6	2.5	67.6	1.5
K11	1	F	N/A	65.8	68.3	2.5	67.5	1.7
K12	1	F	N/A	68.7	71.1	2.4	69.6	0.9
K13	1	E	72	59.2	61.0	1.8	61.6	2.4
K14	1	F	N/A	67.6	70.0	2.4	68.9	1.3
L1	1	F	N/A	64.1	66.4	2.3	66.8	2.7
L2	1	E	72	59.8	62.0	2.2	62.2	2.4
L3	1	F	N/A	63.0	65.6	2.6	67.5	4.5
L4	1	F	N/A	63.2	65.8	2.6	68.4	5.2
L5	1	F	N/A	47.8	50.5	2.7	52.2	4.4
L6	1	F	N/A	60.9	63.5	2.6	65.8	4.9
L7	1	F	N/A	54.4	56.5	2.1	57.1	2.7
M1	1	F	N/A	69.2	71.7	2.5	69.5	0.3
M2	1	F	N/A	66.9	69.5	2.6	68.0	1.1
M3	1	F	N/A	52.7	55.5	2.8	55.9	3.2

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
M4	1	E	72	64.7	67.4	2.7	66.3	1.6
M5	1	E	72	64.6	67.3	2.7	66.2	1.6
M6	1	E	72	64.7	67.4	2.7	66.3	1.6
M7	1	E	72	53.6	56.2	2.6	57.3	3.7
M8	1	E	72	48.0	50.6	2.6	51.8	3.8
M9	1	F	N/A	62.7	65.4	2.7	64.6	1.9
M10	1	E	72	64.6	67.3	2.7	66.2	1.6
N1	1	F	N/A	58.6	61.2	2.6	63.6	5.0
N2	1	F	N/A	54.7	56.7	2.0	56.7	2.0
N3	1	F	N/A	45.5	47.8	2.3	47.9	2.4
N4	1	E	72	61.3	63.9	2.6	66.1	4.8
N5	1	E	72	61.4	64.0	2.6	66.2	4.8
N6	1	E	72	61.6	64.2	2.6	66.2	4.6
N7	1	F	N/A	48.1	50.5	2.4	50.5	2.4
N8	1	F	N/A	51.5	53.8	2.3	53.9	2.4
N9	1	F	N/A	51.8	54.2	2.4	54.4	2.6
N10	1	E	72	64.3	66.8	2.5	67.5	3.2
N11	1	E	72	64.1	66.6	2.5	67.1	3.0
N12	1	E	72	63.9	66.4	2.5	66.7	2.8
N13	1	E	72	63.8	66.2	2.4	66.4	2.6
N14	1	E	72	63.7	66.2	2.5	66.4	2.7
N15	1	E	72	63.7	66.2	2.5	66.3	2.6
N16	1	E	72	63.7	66.1	2.4	66.2	2.5
N17	1	E	72	63.7	66.2	2.5	66.2	2.5
N18	1	E	72	63.7	66.1	2.4	66.1	2.4
N19	1	E	72	63.7	66.1	2.4	66.1	2.4
N20	1	F	N/A	63.4	65.8	2.4	65.8	2.4
O1	1	F	N/A	54.4	56.3	1.9	56.9	2.5
O2	1	F	N/A	51.2	53.2	2.0	53.3	2.1
O3	1	F	N/A	45.3	47.3	2.0	48.4	3.1
O4	1	F	N/A	55.0	57.3	2.3	57.5	2.5
P1	1	B	67	62.8	65.2	2.4	65.7	2.9
P2	1	F	N/A	53.5	56.0	2.5	56.0	2.5
B8	1	C	67	--	--	--	77.3	--
B9	1	C	67	--	--	--	74.8	--
B10	1	C	67	--	--	--	74.7	--
B11	1	C	67	--	--	--	74.6	--
B12	1	C	67	--	--	--	74.5	--
B13	1	C	67	--	--	--	73.8	--
B14	1	C	67	--	--	--	73.8	--
B15	1	C	67	--	--	--	73.8	--
B16	1	C	67	--	--	--	73.8	--
B17	1	C	67	--	--	--	73.8	--
B18	1	C	67	--	--	--	73.8	--
B19	1	C	67	--	--	--	73.8	--
B20	1	C	67	--	--	--	73.6	--
B21	1	C	67	--	--	--	73.7	--

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
D18	1	C	67	--	--	--	74.3	--
D19	1	C	67	--	--	--	74.3	--
D20	1	C	67	--	--	--	72.6	--
D21	1	C	67	--	--	--	68.9	--
D22	1	C	67	--	--	--	67.3	--
D23	1	C	67	--	--	--	68.2	--
D24	1	C	67	--	--	--	70.0	--
D25	1	C	67	--	--	--	67.6	--
D26	1	C	67	--	--	--	69.6	--
D27	1	C	67	--	--	--	69.2	--
D28	1	C	67	--	--	--	69.9	--
E47	1	C	67	--	--	--	75.2	--
E48	1	C	67	--	--	--	75.0	--
E49	1	C	67	--	--	--	75.4	--
E50	1	C	67	--	--	--	75.3	--
E51	1	C	67	--	--	--	75.3	--
E52	1	C	67	--	--	--	75.3	--
E53	1	C	67	--	--	--	75.3	--
E54	1	C	67	--	--	--	75.3	--
E55	1	C	67	--	--	--	75.3	--
E56	1	C	67	--	--	--	75.3	--
E57	1	C	67	--	--	--	75.3	--
E58	1	C	67	--	--	--	75.2	--
E59	1	C	67	--	--	--	75.3	--
E60	1	C	67	--	--	--	76.2	--
E61	1	C	67	--	--	--	71.4	--
E64	1	C	67	--	--	--	64.3	--
E65	1	C	67	--	--	--	61.3	--
E66	1	C	67	--	--	--	58.5	--
E67	1	C	67	--	--	--	55.8	--
E68	1	C	67	--	--	--	54.4	--
E69	1	C	67	--	--	--	52.7	--
E70	1	C	67	--	--	--	52.5	--
E71	1	C	67	--	--	--	57.0	--
E72	1	C	67	--	--	--	58.0	--
E73	1	C	67	--	--	--	58.0	--
E74	1	C	67	--	--	--	53.7	--
G3	1	C	67	--	--	--	76.7	--
G4	1	C	67	--	--	--	74.3	--
G5	1	C	67	--	--	--	73.8	--
G6	1	C	67	--	--	--	73.8	--
G7	1	C	67	--	--	--	73.6	--
G8	1	C	67	--	--	--	73.6	--
G9	1	C	67	--	--	--	72.6	--
H9	1	C	67	--	--	--	73.6	--
H10	1	C	67	--	--	--	73.6	--
H11	1	C	67	--	--	--	73.6	--

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
H12	1	C	67	--	--	--	73.6	--
H13	1	C	67	--	--	--	73.6	--
H14	1	C	67	--	--	--	73.6	--
H15	1	C	67	--	--	--	73.9	--
H16	1	C	67	--	--	--	73.6	--
H17	1	C	67	--	--	--	73.6	--
H18	1	C	67	--	--	--	73.7	--
H19	1	C	67	--	--	--	74.1	--
H20	1	C	67	--	--	--	74.2	--
H21	1	C	67	--	--	--	74.0	--
I5	1	C	67	--	--	--	74.7	--
I6	1	C	67	--	--	--	74.4	--
I7	1	C	67	--	--	--	74.5	--
I8	1	C	67	--	--	--	74.5	--
I9	1	C	67	--	--	--	74.2	--
I10	1	C	67	--	--	--	73.8	--
I11	1	C	67	--	--	--	73.9	--
I12	1	C	67	--	--	--	73.9	--
I13	1	C	67	--	--	--	73.8	--
I14	1	C	67	--	--	--	74.2	--
I15	1	C	67	--	--	--	73.8	--
J4	1	C	67	--	--	--	73.9	--
J5	1	C	67	--	--	--	73.4	--
J6	1	C	67	--	--	--	73.1	--
J7	1	C	67	--	--	--	73.1	--
J8	1	C	67	--	--	--	73.1	--
J9	1	C	67	--	--	--	73.0	--
J10	1	C	67	--	--	--	73.1	--
J11	1	C	67	--	--	--	73.1	--
J12	1	C	67	--	--	--	73.0	--
J13	1	C	67	--	--	--	73.3	--
J14	1	C	67	--	--	--	74.2	--
K15	1	C	67	--	--	--	73.5	--
K16	1	C	67	--	--	--	73.5	--
K17	1	C	67	--	--	--	73.4	--
K18	1	C	67	--	--	--	73.4	--
K19	1	C	67	--	--	--	73.4	--
K20	1	C	67	--	--	--	73.5	--
K21	1	C	67	--	--	--	73.4	--
K22	1	C	67	--	--	--	73.6	--
K23	1	C	67	--	--	--	74.3	--
L8	1	C	67	--	--	--	73.1	--
L9	1	C	67	--	--	--	72.1	--
L10	1	C	67	--	--	--	72.0	--
L11	1	C	67	--	--	--	72.4	--
L12	1	C	67	--	--	--	71.8	--
M11	1	C	67	--	--	--	73.8	--

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Analysis Summary
Existing and Future Scenarios

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria
XX	Substantial Noise Increase (Increase of 5dBA or more)

Receptor		FHWA Noise Abatement Criteria		2018 Existing Condition[1]	2040 No Build Conditions[1]	Difference - Existing and No Build[1]	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
M12	1	C	67	--	--	--	72.0	--
M13	1	C	67	--	--	--	71.8	--
M14	1	C	67	--	--	--	71.8	--
M15	1	C	67	--	--	--	71.5	--
M16	1	C	67	--	--	--	71.6	--
M17	1	C	67	--	--	--	71.5	--
M18	1	C	67	--	--	--	71.6	--
M19	1	C	67	--	--	--	71.3	--
M20	1	C	67	--	--	--	71.3	--
M21	1	C	67	--	--	--	73.7	--
M22	1	C	67	--	--	--	72.1	--
M23	1	C	67	--	--	--	70.7	--
M24	1	C	67	--	--	--	70.6	--
N21	1	C	67	--	--	--	71.8	--
N22	1	C	67	--	--	--	71.8	--
N23	1	C	67	--	--	--	71.3	--
N24	1	C	67	--	--	--	71.4	--
N25	1	C	67	--	--	--	71.7	--

1. "--" is shown for proposed trail receptors that do not exist in the 2018 Existing Conditions and 2040 No Build Conditions.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C1

Build Noise Barrier Cost Effectiveness - Wall 1A - 20 Foot Noise Barrier at 540 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1A	A1	C	1	67	76.5	62.6	**13.9**	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A2	C	1	67	76.5	65.2	**11.3**	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A3	E	1	72	69.5	57.4	**12.1**	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A4	F	1	N/A	59.2	58.0	1.2	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A5	F	1	N/A	59.5	58.3	1.2	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A6	F	1	N/A	59.6	58.2	1.4	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A7	F	1	N/A	60.1	58.4	1.7	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A8	F	1	N/A	61.1	59.2	1.9	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A9	F	1	N/A	62.2	60.8	1.4	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A10	F	1	N/A	63.6	62.6	1.0	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective
Wall 1A	A11	F	1	N/A	65.6	64.8	0.8	3	Yes	Yes	20	540	10,016	$422,676	$140,892	Not Cost Effective

Table C2

Build Noise Barrier Cost Effectiveness - Wall 1A - 15 Foot Noise Barrier at 540 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1A	A1	C	1	67	76.5	62.6	**13.9**	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A2	C	1	67	76.5	65.2	**11.3**	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A3	E	1	72	69.5	57.4	**12.1**	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A4	F	1	N/A	59.2	58.0	1.2	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A5	F	1	N/A	59.5	58.3	1.2	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A6	F	1	N/A	59.6	58.2	1.4	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A7	F	1	N/A	60.1	58.4	1.7	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A8	F	1	N/A	61.1	59.2	1.9	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A9	F	1	N/A	62.2	60.8	1.4	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A10	F	1	N/A	63.6	62.6	1.0	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective
Wall 1A	A11	F	1	N/A	65.6	64.8	0.8	3	Yes	Yes	15	540	7,776	$342,036	$114,012	Not Cost Effective

Table C3

Build Noise Barrier Cost Effectiveness - Wall 1A - 10 Foot Noise Barrier at 540 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1A	A1	C	1	67	76.5	62.6	**13.9**	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A2	C	1	67	76.5	65.2	**11.3**	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A3	E	1	72	69.5	57.4	**12.1**	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A4	F	1	N/A	59.2	58.0	1.2	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A5	F	1	N/A	59.5	58.3	1.2	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A6	F	1	N/A	59.6	58.2	1.4	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A7	F	1	N/A	60.1	58.4	1.7	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A8	F	1	N/A	61.1	59.2	1.9	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A9	F	1	N/A	62.2	60.8	1.4	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A10	F	1	N/A	63.6	62.6	1.0	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 1A	A11	F	1	N/A	65.6	64.8	0.8	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C4

Build Noise Barrier Cost Effectiveness - Wall 1B - 20 Foot Noise Barrier at 420 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1B	B1	C	1	67	75.9	58.0	**17.9**	2	Yes	Yes	20	420	7,616	$322,476	$161,238	Not Cost Effective
Wall 1B	B2	C	1	67	75.8	59.2	**16.6**	2	Yes	Yes	20	420	7,616	$322,476	$161,238	Not Cost Effective

Table C5

Build Noise Barrier Cost Effectiveness - Wall 1B - 15 Foot Noise Barrier at 420 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1B	B1	C	1	67	75.9	60.3	**15.6**	2	Yes	Yes	15	420	5,976	$263,436	$131,718	Not Cost Effective
Wall 1B	B2	C	1	67	75.8	60.9	**14.9**	2	Yes	Yes	15	420	5,976	$263,436	$131,718	Not Cost Effective

Table C6

Build Noise Barrier Cost Effectiveness - Wall 1B - 10 Foot Noise Barrier at 420 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1B	B1	C	1	67	75.9	63.8	**12.1**	2	Yes	Yes	10	420	4,136	$197,196	$98,598	Not Cost Effective
Wall 1B	B2	C	1	67	75.8	64.1	**11.7**	2	Yes	Yes	10	420	4,136	$197,196	$98,598	Not Cost Effective

Table C7

Build Noise Barrier Cost Effectiveness - Wall 2B - 20 Foot Noise Barrier at 240 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2B	B3	C	1	67	70.1	66.2	3.9	0	No	No	20	240	4,016	$172,176	N/A	Does Not Meet Noise Reduction Design Goal

Table C8

Build Noise Barrier Cost Effectiveness - Wall 3B - 20 Foot Noise Barrier at 420 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3B	B5	C	1	67	71.5	66.8	4.7	1	Yes	No	20	420	7,616	$322,476	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3B	B6	C	1	67	66.7	60.4	**6.3**	1	Yes	No	20	420	7,616	$322,476	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3B	B7	B	1	67	69.2	69.1	0.1	1	Yes	No	20	420	7,616	$322,476	N/A	Does Not Meet Noise Reduction Design Goal

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C9

Build Noise Barrier Cost Effectiveness - Wall 4B - 20 Foot Noise Barrier at 5506 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 4B	B7	B	1	67	69.2	66.5	2.7	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B8	C	1	67	77.3	77.3	0.0	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B9	C	1	67	74.8	57.7	**17.1**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B10	C	1	67	74.7	57.8	**16.9**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B11	C	1	67	74.6	56.8	**17.8**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B12	C	1	67	74.5	58.1	**16.4**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B13	C	1	67	73.8	72.4	1.4	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B14	C	1	67	73.8	56.2	**17.6**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B15	C	1	67	73.8	60.3	**13.5**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B16	C	1	67	73.8	58.7	**15.1**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B17	C	1	67	73.8	60.8	**13.0**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B18	C	1	67	73.8	56.7	**17.1**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B19	C	1	67	73.8	56.5	**17.3**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B20	C	1	67	73.6	59.3	**14.3**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	B21	C	1	67	73.7	56.3	**17.4**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D1	C	1	67	56.8	49.2	**7.6**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D2	C	1	67	55.5	47.8	**7.7**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D3	C	1	67	58.0	49.6	**8.4**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D4	C	1	67	56.3	48.6	**7.7**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D5	C	1	67	59.3	51.9	**7.4**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D6	C	1	67	58.4	52.7	**5.7**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D7	C	1	67	62.0	60.6	1.4	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D8	C	1	67	67.7	67.0	0.7	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D18	C	1	67	74.3	56.9	**17.4**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D19	C	1	67	74.3	56.5	**17.8**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D20	C	1	67	72.6	57.3	**15.3**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D21	C	1	67	68.9	55.3	**13.6**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D22	C	1	67	67.3	54.5	**12.8**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D23	C	1	67	68.2	55.4	**12.8**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D24	C	1	67	70.0	56.0	**14.0**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D25	C	1	67	67.6	55.3	**12.3**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D26	C	1	67	69.6	56.9	**12.7**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D27	C	1	67	69.2	57.7	**11.5**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective
Wall 4B	D28	C	1	67	69.9	60.5	**9.4**	29	Yes	Yes	20	5,506	109,336	$4,569,286	$157,562	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C10

Build Noise Barrier Cost Effectiveness - Wall 4B - 15 Foot Noise Barrier at 5506 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 4B	B7	B	1	67	69.2	66.7	2.5	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B8	C	1	67	77.3	77.3	0.0	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B9	C	1	67	74.8	59.7	**15.1**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B10	C	1	67	74.7	60.1	**14.6**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B11	C	1	67	74.6	59.0	**15.6**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B12	C	1	67	74.5	59.8	**14.7**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B13	C	1	67	73.8	72.4	1.4	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B14	C	1	67	73.8	58.3	**15.5**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B15	C	1	67	73.8	61.1	**12.7**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B16	C	1	67	73.8	59.7	**14.1**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B17	C	1	67	73.8	61.7	**12.1**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B18	C	1	67	73.8	58.6	**15.2**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B19	C	1	67	73.8	58.7	**15.1**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B20	C	1	67	73.6	60.1	**13.5**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	B21	C	1	67	73.7	58.3	**15.4**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D1	C	1	67	56.8	51.4	**5.4**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D2	C	1	67	55.5	50.0	**5.5**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D3	C	1	67	58.0	51.7	**6.3**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D4	C	1	67	56.3	50.4	**5.9**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D5	C	1	67	59.3	53.5	**5.8**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D6	C	1	67	58.4	53.7	4.7	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D7	C	1	67	62.0	60.7	1.3	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D8	C	1	67	67.7	67.0	0.7	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D18	C	1	67	74.3	59.1	**15.2**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D19	C	1	67	74.3	58.2	**16.1**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D20	C	1	67	72.6	59.6	**13.0**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D21	C	1	67	68.9	57.7	**11.2**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D22	C	1	67	67.3	57.0	**10.3**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D23	C	1	67	68.2	58.0	**10.2**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D24	C	1	67	70.0	58.7	**11.3**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D25	C	1	67	67.6	57.7	**9.9**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D26	C	1	67	69.6	59.2	**10.4**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D27	C	1	67	69.2	59.5	**9.7**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective
Wall 4B	D28	C	1	67	69.9	61.6	**8.3**	28	Yes	Yes	15	5,506	82,266	$3,594,766	$128,385	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C11

Build Noise Barrier Cost Effectiveness - Wall 4B - 10 Foot Noise Barrier at 5506 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 4B	B7	B	1	67	69.2	67.6	1.6	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B8	C	1	67	77.3	77.3	0.0	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B9	C	1	67	74.8	62.9	**11.9**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B10	C	1	67	74.7	63.8	**10.9**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B11	C	1	67	74.6	62.3	**12.3**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B12	C	1	67	74.5	63.8	**10.7**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B13	C	1	67	73.8	72.5	1.3	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B14	C	1	67	73.8	61.9	**11.9**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B15	C	1	67	73.8	63.3	**10.5**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B16	C	1	67	73.8	62.3	**11.5**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B17	C	1	67	73.8	64.0	**9.8**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B18	C	1	67	73.8	62.7	**11.1**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B19	C	1	67	73.8	62.5	**11.3**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B20	C	1	67	73.6	61.6	**12.0**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	B21	C	1	67	73.7	61.9	**11.8**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D1	C	1	67	56.8	54.1	2.7	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D2	C	1	67	55.5	53.0	2.5	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D3	C	1	67	58.0	55.1	2.9	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D4	C	1	67	56.3	53.5	2.8	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D5	C	1	67	59.3	56.5	2.8	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D6	C	1	67	58.4	56.0	2.4	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D7	C	1	67	62.0	61.3	0.7	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D8	C	1	67	67.7	67.4	0.3	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D18	C	1	67	74.3	62.3	**12.0**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D19	C	1	67	74.3	61.6	**12.7**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D20	C	1	67	72.6	63.0	**9.6**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D21	C	1	67	68.9	63.9	**5.0**	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D22	C	1	67	67.3	62.9	4.4	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D23	C	1	67	68.2	63.7	4.5	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D24	C	1	67	70.0	65.1	4.9	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D25	C	1	67	67.6	63.2	4.4	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D26	C	1	67	69.6	64.9	4.7	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D27	C	1	67	69.2	64.7	4.5	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective
Wall 4B	D28	C	1	67	69.9	65.8	4.1	16	Yes	Yes	10	5,506	54,996	$2,613,046	$163,315	Not Cost Effective

Table C12

Build Noise Barrier Cost Effectiveness - Wall 1D - 20 Foot Noise Barrier at 240 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1D	D8	C	1	67	67.7	63.9	3.8	0	No	No	20	240	4,016	$172,176	N/A	Does Not Meet Noise Reduction Design Goal

Table C13

Build Noise Barrier Cost Effectiveness - Wall 1E - 20 Foot Noise Barrier at 180 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1E	E2	C	1	67	67.2	62.7	4.5	0	No	No	20	180	2,816	$101,376	N/A	Does Not Meet Noise Reduction Design Goal
Wall 1E	E3	C	1	67	68.8	68.8	0.0	0	No	No	20	180	2,816	$101,376	N/A	Does Not Meet Noise Reduction Design Goal
Wall 1E	E47	C	1	67	75.2	75.3	-0.1	0	No	No	20	180	2,816	$101,376	N/A	Does Not Meet Noise Reduction Design Goal
Wall 1E	E48	C	1	67	75.0	75.2	-0.2	0	No	No	20	180	2,816	$101,376	N/A	Does Not Meet Noise Reduction Design Goal

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C14

Build Noise Barrier Cost Effectiveness - Wall 2E - 20 Foot Noise Barrier at 2400 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2E	E1	C	1	67	60.7	60.0	0.7	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E2	C	1	67	67.2	66.6	0.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E3	C	1	67	68.8	61.9	**6.9**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E4	C	1	67	65.1	57.0	**8.1**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E5	B	1	67	70.1	68.5	1.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E6	B	1	67	69.9	69.0	0.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E7	B	1	67	58.8	57.9	0.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E8	B	1	67	57.4	55.9	1.5	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E9	B	1	67	56.5	54.5	2.0	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E10	B	1	67	55.6	53.0	2.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E11	B	1	67	53.9	50.8	3.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E12	B	1	67	53.5	50.1	3.4	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E13	B	1	67	55.5	52.0	3.5	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E14	B	1	67	57.3	53.6	3.7	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E15	B	1	67	57.7	54.1	3.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E16	B	1	67	56.7	53.2	3.5	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E17	B	1	67	51.8	49.0	2.8	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E18	F	1	N/A	68.5	65.0	3.5	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E19	B	1	67	53.8	50.9	2.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E20	B	1	67	52.5	49.2	3.3	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E21	B	1	67	52.4	49.1	3.3	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E22	B	1	67	52.6	49.4	3.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E23	C	1	67	58.1	54.9	3.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E24	B	1	67	58.5	55.3	3.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E25	B	1	67	58.9	55.6	3.3	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E26	B	1	67	59.2	55.9	3.3	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E27	B	1	67	59.3	56.2	3.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E28	B	1	67	59.5	56.6	2.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E29	B	1	67	59.7	56.8	2.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E30	B	1	67	59.9	57.3	2.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E31	B	1	67	59.1	56.2	2.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E32	B	1	67	52.7	49.7	3.0	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E33	B	1	67	49.1	46.3	2.8	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E34	B	1	67	49.6	45.7	3.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E35	B	1	67	49.9	46.0	3.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E36	B	1	67	48.7	45.3	3.4	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E37	B	1	67	50.0	46.8	3.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E38	B	1	67	50.8	49.6	1.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E39	B	1	67	50.2	49.0	1.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E40	B	1	67	44.6	42.1	2.5	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E41	B	1	67	65.0	63.8	1.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E42	B	1	67	65.5	64.7	0.8	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E43	B	1	67	65.3	64.9	0.4	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E44	B	1	67	64.4	64.2	0.2	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E45	B	1	67	64.3	64.2	0.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E46	B	1	67	64.2	64.1	0.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E47	C	1	67	75.2	75.2	0.0	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E48	C	1	67	75.0	57.0	**18.0**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E49	C	1	67	75.4	57.1	**18.3**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E50	C	1	67	75.3	57.0	**18.3**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E51	C	1	67	75.3	58.3	**17.0**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E52	C	1	67	75.3	75.3	0.0	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E53	C	1	67	75.3	65.3	**10.0**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E54	C	1	67	75.3	57.6	**17.7**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E55	C	1	67	75.3	75.2	0.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C14 Continued

Build Noise Barrier Cost Effectiveness - Wall 2E - 20 Foot Noise Barrier at 2400 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2E	E56	C	1	67	75.3	75.2	0.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E57	C	1	67	75.3	58.5	**16.8**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E58	C	1	67	75.2	75.1	0.1	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E59	C	1	67	75.3	58.5	**16.8**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E60	C	1	67	76.2	66.6	**9.6**	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E61	C	1	67	71.4	71.1	0.3	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E64	C	1	67	64.3	61.9	2.4	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E65	C	1	67	61.3	57.4	3.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E66	C	1	67	58.5	55.5	3.0	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E67	C	1	67	55.8	54.0	1.8	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E68	C	1	67	54.4	50.8	3.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E69	C	1	67	52.7	49.3	3.4	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E70	C	1	67	52.5	49.5	3.0	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E71	C	1	67	57.0	52.5	4.5	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E72	C	1	67	58.0	54.4	3.6	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E73	C	1	67	58.0	54.3	3.7	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective
Wall 2E	E74	C	1	67	53.7	50.8	2.9	11	Yes	Yes	20	2,400	47,216	$1,975,776	$179,616	Not Cost Effective

Table C15

Build Noise Barrier Cost Effectiveness - Wall 2E - 15 Foot Noise Barrier at 2400 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2E	E1	C	1	67	60.7	60.1	0.6	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E2	C	1	67	67.2	66.7	0.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E3	C	1	67	68.8	62.4	**6.4**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E4	C	1	67	65.1	58.2	**6.9**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E5	B	1	67	70.1	68.6	1.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E6	B	1	67	69.9	69.0	0.9	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E7	B	1	67	58.8	57.9	0.9	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E8	B	1	67	57.4	56.0	1.4	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E9	B	1	67	56.5	54.7	1.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E10	B	1	67	55.6	53.3	2.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E11	B	1	67	53.9	51.1	2.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E12	B	1	67	53.5	50.4	3.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E13	B	1	67	55.5	52.3	3.2	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E14	B	1	67	57.3	54.0	3.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E15	B	1	67	57.7	54.4	3.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E16	B	1	67	56.7	53.6	3.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E17	B	1	67	51.8	49.5	2.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E18	F	1	N/A	68.5	65.2	3.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E19	B	1	67	53.8	51.1	2.7	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E20	B	1	67	52.5	49.6	2.9	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E21	B	1	67	52.4	49.4	3.0	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E22	B	1	67	52.6	49.7	2.9	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E23	C	1	67	58.1	55.3	2.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E24	B	1	67	58.5	55.7	2.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E25	B	1	67	58.9	56.1	2.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E26	B	1	67	59.2	56.4	2.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E27	B	1	67	59.3	56.6	2.7	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E28	B	1	67	59.5	57.0	2.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E29	B	1	67	59.7	57.3	2.4	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E30	B	1	67	59.9	57.7	2.2	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E31	B	1	67	59.1	56.6	2.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C15 Continued

Build Noise Barrier Cost Effectiveness - Wall 2E - 15 Foot Noise Barrier at 2400 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2E	E32	B	1	67	52.7	50.2	2.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E33	B	1	67	49.1	46.9	2.2	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E34	B	1	67	49.6	46.8	2.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E35	B	1	67	49.9	47.0	2.9	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E36	B	1	67	48.7	46.2	2.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E37	B	1	67	50.0	47.6	2.4	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E38	B	1	67	50.8	49.8	1.0	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E39	B	1	67	50.2	49.2	1.0	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E40	B	1	67	44.6	42.8	1.8	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E41	B	1	67	65.0	63.8	1.2	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E42	B	1	67	65.5	64.8	0.7	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E43	B	1	67	65.3	65.0	0.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E44	B	1	67	64.4	64.2	0.2	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E45	B	1	67	64.3	64.2	0.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E46	B	1	67	64.2	64.1	0.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E47	C	1	67	75.2	75.2	0.0	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E48	C	1	67	75.0	58.9	**16.1**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E49	C	1	67	75.4	59.4	**16.0**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E50	C	1	67	75.3	59.1	**16.2**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E51	C	1	67	75.3	60.1	**15.2**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E52	C	1	67	75.3	75.3	0.0	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E53	C	1	67	75.3	65.6	**9.7**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E54	C	1	67	75.3	59.7	**15.6**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E55	C	1	67	75.3	75.2	0.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E56	C	1	67	75.3	75.2	0.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E57	C	1	67	75.3	60.2	**15.1**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E58	C	1	67	75.2	75.1	0.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E59	C	1	67	75.3	60.4	**14.9**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E60	C	1	67	76.2	66.9	**9.3**	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E61	C	1	67	71.4	71.1	0.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E64	C	1	67	64.3	62.0	2.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E65	C	1	67	61.3	57.7	3.6	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E66	C	1	67	58.5	55.9	2.6	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E67	C	1	67	55.8	54.2	1.6	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E68	C	1	67	54.4	51.2	3.2	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E69	C	1	67	52.7	49.7	3.0	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E70	C	1	67	52.5	50.0	2.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E71	C	1	67	57.0	52.9	4.1	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E72	C	1	67	58.0	54.7	3.3	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E73	C	1	67	58.0	54.6	3.4	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective
Wall 2E	E74	C	1	67	53.7	51.2	2.5	11	Yes	Yes	15	2,400	35,676	$1,560,336	$141,849	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C16

Build Noise Barrier Cost Effectiveness - Wall 2E - 10 Foot Noise Barrier at 2400 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2E	E1	C	1	67	60.7	60.3	0.4	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E2	C	1	67	67.2	66.9	0.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E3	C	1	67	68.8	65.0	3.8	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E4	C	1	67	65.1	62.3	2.8	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E5	B	1	67	70.1	68.9	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E6	B	1	67	69.9	69.2	0.7	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E7	B	1	67	58.8	58.3	0.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E8	B	1	67	57.4	56.7	0.7	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E9	B	1	67	56.5	55.5	1.0	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E10	B	1	67	55.6	54.4	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E11	B	1	67	53.9	52.6	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E12	B	1	67	53.5	52.0	1.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E13	B	1	67	55.5	53.7	1.8	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E14	B	1	67	57.3	55.5	1.8	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E15	B	1	67	57.7	55.9	1.8	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E16	B	1	67	56.7	55.1	1.6	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E17	B	1	67	51.8	50.8	1.0	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E18	F	1	N/A	68.5	66.4	2.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E19	B	1	67	53.8	52.4	1.4	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E20	B	1	67	52.5	51.0	1.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E21	B	1	67	52.4	50.9	1.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E22	B	1	67	52.6	51.0	1.6	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E23	C	1	67	58.1	56.7	1.4	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E24	B	1	67	58.5	57.1	1.4	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E25	B	1	67	58.9	57.4	1.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E26	B	1	67	59.2	57.7	1.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E27	B	1	67	59.3	57.9	1.4	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E28	B	1	67	59.5	58.2	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E29	B	1	67	59.7	58.4	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E30	B	1	67	59.9	58.7	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E31	B	1	67	59.1	57.8	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E32	B	1	67	52.7	51.5	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E33	B	1	67	49.1	48.0	1.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E34	B	1	67	49.6	48.4	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E35	B	1	67	49.9	48.6	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E36	B	1	67	48.7	47.5	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E37	B	1	67	50.0	48.8	1.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E38	B	1	67	50.8	50.3	0.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E39	B	1	67	50.2	49.7	0.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E40	B	1	67	44.6	44.0	0.6	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E41	B	1	67	65.0	64.3	0.7	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E42	B	1	67	65.5	65.0	0.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E43	B	1	67	65.3	65.1	0.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E44	B	1	67	64.4	64.3	0.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E45	B	1	67	64.3	64.2	0.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E46	B	1	67	64.2	64.1	0.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E47	C	1	67	75.2	75.2	0.0	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E48	C	1	67	75.0	62.0	**13.0**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E49	C	1	67	75.4	62.7	**12.7**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E50	C	1	67	75.3	62.2	**13.1**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E51	C	1	67	75.3	62.8	**12.5**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E52	C	1	67	75.3	75.3	0.0	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E53	C	1	67	75.3	66.5	**8.8**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E54	C	1	67	75.3	62.6	**12.7**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E55	C	1	67	75.3	75.2	0.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C16 Continued

Build Noise Barrier Cost Effectiveness - Wall 2E - 10 Foot Noise Barrier at 2400 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2E	E56	C	1	67	75.3	75.3	0.0	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E57	C	1	67	75.3	63.3	**12.0**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E58	C	1	67	75.2	75.1	0.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E59	C	1	67	75.3	63.3	**12.0**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E60	C	1	67	76.2	67.7	**8.5**	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E61	C	1	67	71.4	71.2	0.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E64	C	1	67	64.3	63.0	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E65	C	1	67	61.3	59.4	1.9	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E66	C	1	67	58.5	57.2	1.3	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E67	C	1	67	55.8	54.9	0.9	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E68	C	1	67	54.4	52.8	1.6	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E69	C	1	67	52.7	51.2	1.5	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E70	C	1	67	52.5	51.1	1.4	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E71	C	1	67	57.0	54.8	2.2	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E72	C	1	67	58.0	56.1	1.9	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E73	C	1	67	58.0	56.1	1.9	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective
Wall 2E	E74	C	1	67	53.7	52.6	1.1	9	Yes	Yes	10	2,400	23,936	$1,137,696	$126,411	Not Cost Effective

Table C17

Build Noise Barrier Cost Effectiveness - Wall 3E - 20 Foot Noise Barrier at 240 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3E	E30	B	1	67	59.9	59.4	0.5	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E31	B	1	67	59.1	58.5	0.6	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E41	B	1	67	65.0	63.2	1.8	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E42	B	1	67	65.5	63.5	2.0	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E43	B	1	67	65.3	64.4	0.9	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E44	B	1	67	64.4	63.9	0.5	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E61	C	1	67	71.4	63.9	**7.5**	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E64	C	1	67	64.3	63.5	0.8	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective
Wall 3E	E65	C	1	67	61.3	61.0	0.3	1	Yes	Yes	20	240	4,016	$172,176	$172,176	Not Cost Effective

Table C18

Build Noise Barrier Cost Effectiveness - Wall 3E - 15 Foot Noise Barrier at 240 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3E	E30	B	1	67	59.9	59.6	0.3	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E31	B	1	67	59.1	58.7	0.4	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E41	B	1	67	65.0	63.5	1.5	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E42	B	1	67	65.5	63.8	1.7	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E43	B	1	67	65.3	64.6	0.7	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E44	B	1	67	64.4	64.0	0.4	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E61	C	1	67	71.4	64.1	**7.3**	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E64	C	1	67	64.3	63.6	0.7	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective
Wall 3E	E65	C	1	67	61.3	61.0	0.3	1	Yes	Yes	15	240	3,276	$145,536	$145,536	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C19

Build Noise Barrier Cost Effectiveness - Wall 3E - 10 Foot Noise Barrier at 240 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3E	E30	B	1	67	59.9	59.7	0.2	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E31	B	1	67	59.1	59.0	0.1	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E41	B	1	67	65.0	64.1	0.9	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E42	B	1	67	65.5	64.7	0.8	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E43	B	1	67	65.3	65.0	0.3	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E44	B	1	67	64.4	64.2	0.2	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E61	C	1	67	71.4	64.5	**6.9**	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E64	C	1	67	64.3	63.7	0.6	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal
Wall 3E	E65	C	1	67	61.3	61.1	0.2	1	Yes	No	10	240	2,336	$111,696	N/A	Does Not Meet Noise Reduction Design Goal

Table C20

Build Noise Barrier Cost Effectiveness - Wall 1F - 20 Foot Noise Barrier at 1320 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1F	F1	B	1	67	70.1	63.4	**6.7**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F2	B	1	67	69.7	60.5	**9.2**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F3	B	1	67	69.7	58.6	**11.1**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F4	B	1	67	69.5	57.6	**11.9**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F5	B	1	67	69.3	57.1	**12.2**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F6	B	1	67	69.1	56.8	**12.3**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F7	B	1	67	69.1	56.7	**12.4**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F8	B	1	67	69.3	56.9	**12.4**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F9	B	1	67	69.4	57.2	**12.2**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F10	B	1	67	69.5	58.1	**11.4**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F11	B	1	67	69.5	58.9	**10.6**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F12	B	1	67	69.5	62.6	**6.9**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F13	B	1	67	69.4	66.3	3.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F14	C	1	67	50.6	45.7	4.9	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F15	C	1	67	53.0	47.6	**5.4**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F16	C	1	67	53.6	49.9	3.7	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F17	C	1	67	58.0	57.5	0.5	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F18	C	1	67	53.3	53.0	0.3	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F19	B	1	67	64.0	63.4	0.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F20	B	1	67	62.1	61.1	1.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F21	B	1	67	61.7	60.6	1.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F22	B	1	67	60.8	59.7	1.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F23	B	1	67	60.1	58.5	1.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F24	B	1	67	58.4	56.0	2.4	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F25	B	1	67	57.3	54.6	2.7	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F26	B	1	67	56.6	53.3	3.3	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F27	B	1	67	55.6	51.9	3.7	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F28	B	1	67	54.5	50.4	4.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F29	B	1	67	54.7	50.3	4.4	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F30	B	1	67	54.6	49.2	**5.4**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F31	B	1	67	54.9	50.5	4.4	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F32	B	1	67	55.0	49.5	**5.5**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F33	B	1	67	53.6	49.0	4.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F34	B	1	67	53.6	48.6	**5.0**	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F35	B	1	67	53.9	50.4	3.5	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F36	B	1	67	53.9	50.2	3.7	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F37	B	1	67	54.4	51.2	3.2	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F38	B	1	67	55.0	52.6	2.4	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F39	B	1	67	55.8	54.2	1.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C20 Continued

Build Noise Barrier Cost Effectiveness - Wall 1F - 20 Foot Noise Barrier at 1320 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1F	F40	B	1	67	56.8	55.7	1.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F41	B	1	67	57.1	56.5	0.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F42	B	1	67	55.9	55.6	0.3	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F43	B	1	67	54.7	54.5	0.2	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F44	B	1	67	53.0	52.8	0.2	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F45	B	1	67	52.4	52.2	0.2	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F46	B	1	67	51.4	51.1	0.3	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F47	B	1	67	60.2	60.1	0.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F48	B	1	67	58.7	58.4	0.3	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F49	B	1	67	54.2	53.2	1.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F50	B	1	67	54.7	54.2	0.5	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F51	B	1	67	56.5	56.3	0.2	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F52	B	1	67	56.8	56.7	0.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F53	B	1	67	57.5	57.4	0.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F54	B	1	67	58.1	58.0	0.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F55	B	1	67	43.0	41.0	2.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F56	B	1	67	43.0	40.7	2.3	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F57	B	1	67	44.6	40.5	4.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F58	B	1	67	49.3	47.3	2.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F59	B	1	67	49.1	47.0	2.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F60	B	1	67	50.2	46.6	3.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F61	B	1	67	48.6	45.4	3.2	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F62	B	1	67	48.5	45.4	3.1	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F63	B	1	67	48.2	45.6	2.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F64	B	1	67	48.0	45.5	2.5	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F65	B	1	67	48.5	47.0	1.5	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F66	B	1	67	42.0	40.0	2.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F67	B	1	67	44.3	42.7	1.6	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F68	B	1	67	44.5	42.5	2.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F69	B	1	67	43.9	41.5	2.4	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F70	B	1	67	44.3	41.9	2.4	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F71	B	1	67	43.9	41.9	2.0	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct
Wall 1F	F72	B	1	67	43.4	41.9	1.5	16	Yes	Yes	20	1,320	25,616	$1,073,976	$67,124	Propose to Construct

Table C21

Build Noise Barrier Cost Effectiveness - Wall 1G - 20 Foot Noise Barrier at 1440 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1G	G1	F	1	N/A	66.2	63.2	3.0	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G2	F	1	N/A	61.1	60.6	0.5	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G3	C	1	67	76.7	76.8	-0.1	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G4	C	1	67	74.3	60.4	**13.9**	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G5	C	1	67	73.8	57.7	**16.1**	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G6	C	1	67	73.8	56.7	**17.1**	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G7	C	1	67	73.6	56.3	**17.3**	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G8	C	1	67	73.6	55.8	**17.8**	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective
Wall 1G	G9	C	1	67	72.6	68.0	4.6	5	Yes	Yes	20	1,440	28,016	$1,174,176	$234,835	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C22

Build Noise Barrier Cost Effectiveness - Wall 1G - 15 Foot Noise Barrier at 1440 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1G	G1	F	1	N/A	66.2	63.5	2.7	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G2	F	1	N/A	61.1	60.6	0.5	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G3	C	1	67	76.7	76.8	-0.1	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G4	C	1	67	74.3	61.5	**12.8**	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G5	C	1	67	73.8	59.3	**14.5**	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G6	C	1	67	73.8	58.5	**15.3**	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G7	C	1	67	73.6	58.1	**15.5**	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G8	C	1	67	73.6	57.9	**15.7**	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective
Wall 1G	G9	C	1	67	72.6	68.1	4.5	5	Yes	Yes	15	1,440	21,276	$931,536	$186,307	Not Cost Effective

Table C23

Build Noise Barrier Cost Effectiveness - Wall 1G - 10 Foot Noise Barrier at 1440 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1G	G1	F	1	N/A	66.2	65.1	1.1	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G2	F	1	N/A	61.1	60.9	0.2	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G3	C	1	67	76.7	76.8	-0.1	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G4	C	1	67	74.3	63.6	**10.7**	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G5	C	1	67	73.8	62.3	**11.5**	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G6	C	1	67	73.8	61.6	**12.2**	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G7	C	1	67	73.6	61.2	**12.4**	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G8	C	1	67	73.6	60.9	**12.7**	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective
Wall 1G	G9	C	1	67	72.6	68.4	4.2	5	Yes	Yes	10	1,440	14,336	$681,696	$136,339	Not Cost Effective

Table C24

Build Noise Barrier Cost Effectiveness - Wall 1H - 20 Foot Noise Barrier at 1380 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1H	H1	E	1	72	66.7	60.0	**6.7**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H2	E	1	72	61.2	57.9	3.3	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H3	E	1	72	56.6	53.2	3.4	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H4	F	1	N/A	56.5	49.6	**6.9**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H5	F	1	N/A	61.7	51.6	**10.1**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H6	E	1	72	66.1	61.2	4.9	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H9	C	1	67	73.6	71.2	2.4	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H10	C	1	67	73.6	55.7	**17.9**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H11	C	1	67	73.6	55.6	**18.0**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H12	C	1	67	73.6	55.9	**17.7**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H13	C	1	67	73.6	56.0	**17.6**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective
Wall 1H	H14	C	1	67	73.6	57.9	**15.7**	8	Yes	Yes	20	1,380	26,816	$1,124,076	$140,510	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C25

Build Noise Barrier Cost Effectiveness - Wall 1H - 15 Foot Noise Barrier at 1380 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1H	H1	E	1	72	66.7	60.3	**6.4**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H2	E	1	72	61.2	58.1	3.1	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H3	E	1	72	56.6	53.5	3.1	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H4	F	1	N/A	56.5	50.4	**6.1**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H5	F	1	N/A	61.7	53.3	**8.4**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H6	E	1	72	66.1	61.6	4.5	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H9	C	1	67	73.6	71.2	2.4	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H10	C	1	67	73.6	57.3	**16.3**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H11	C	1	67	73.6	57.4	**16.2**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H12	C	1	67	73.6	57.8	**15.8**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H13	C	1	67	73.6	57.9	**15.7**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective
Wall 1H	H14	C	1	67	73.6	59.4	**14.2**	8	Yes	Yes	15	1,380	20,376	$892,236	$111,530	Not Cost Effective

Table C26

Build Noise Barrier Cost Effectiveness - Wall 1H - 10 Foot Noise Barrier at 1380 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1H	H1	E	1	72	66.7	62.4	4.3	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H2	E	1	72	61.2	59.4	1.8	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H3	E	1	72	56.6	54.7	1.9	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H4	F	1	N/A	56.5	53.3	3.2	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H5	F	1	N/A	61.7	58.6	3.1	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H6	E	1	72	66.1	63.5	2.6	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H9	C	1	67	73.6	71.3	2.3	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H10	C	1	67	73.6	60.4	**13.2**	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H11	C	1	67	73.6	60.5	**13.1**	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H12	C	1	67	73.6	61.0	**12.6**	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H13	C	1	67	73.6	61.2	**12.4**	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective
Wall 1H	H14	C	1	67	73.6	62.3	**11.3**	5	Yes	Yes	10	1,380	13,736	$653,196	$130,639	Not Cost Effective

Table C27

Build Noise Barrier Cost Effectiveness - Wall 2H - 20 Foot Noise Barrier at 960 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2H	H7	C	1	67	62.2	56.1	**6.1**	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective
Wall 2H	H15	C	1	67	73.9	73.9	0.0	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective
Wall 2H	H16	C	1	67	73.6	58.8	**14.8**	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective
Wall 2H	H17	C	1	67	73.6	61.7	**11.9**	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective
Wall 2H	H18	C	1	67	73.7	56.1	**17.6**	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective
Wall 2H	H19	C	1	67	74.1	56.5	**17.6**	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective
Wall 2H	H20	C	1	67	74.2	74.2	0.0	5	Yes	Yes	20	960	18,416	$773,376	$154,675	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C28

Build Noise Barrier Cost Effectiveness - Wall 2H - 15 Foot Noise Barrier at 960 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2H	H7	C	1	67	62.2	56.6	**5.6**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2H	H15	C	1	67	73.9	73.9	0.0	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2H	H16	C	1	67	73.6	59.8	**13.8**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2H	H17	C	1	67	73.6	62.2	**11.4**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2H	H18	C	1	67	73.7	58.0	**15.7**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2H	H19	C	1	67	74.1	58.4	**15.7**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2H	H20	C	1	67	74.2	74.2	0.0	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective

Table C29

Build Noise Barrier Cost Effectiveness - Wall 2H - 10 Foot Noise Barrier at 960 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2H	H7	C	1	67	62.2	59.2	3.0	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2H	H15	C	1	67	73.9	73.9	0.0	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2H	H16	C	1	67	73.6	61.8	**11.8**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2H	H17	C	1	67	73.6	63.6	**10.0**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2H	H18	C	1	67	73.7	61.3	**12.4**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2H	H19	C	1	67	74.1	61.4	**12.7**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2H	H20	C	1	67	74.2	74.2	0.0	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective

Table C30

Build Noise Barrier Cost Effectiveness - Wall 1I - 20 Foot Noise Barrier at 1380 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1I	I1	F	1	N/A	68.1	65.1	3.0	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I2	F	1	N/A	68.8	61.4	**7.4**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I5	C	1	67	74.7	57.8	**16.9**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I6	C	1	67	74.4	56.2	**18.2**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I7	C	1	67	74.5	56.2	**18.3**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I8	C	1	67	74.5	56.0	**18.5**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I9	C	1	67	74.2	56.0	**18.2**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective
Wall 1I	I10	C	1	67	73.8	63.2	**10.6**	7	Yes	Yes	20	1,380	26,816	$965,376	$137,911	Not Cost Effective

Table C31

Build Noise Barrier Cost Effectiveness - Wall 1I - 15 Foot Noise Barrier at 1380 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1I	I1	F	1	N/A	68.1	65.2	2.9	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I2	F	1	N/A	68.8	61.8	**7.0**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I5	C	1	67	74.7	59.4	**15.3**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I6	C	1	67	74.4	58.4	**16.0**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I7	C	1	67	74.5	58.4	**16.1**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I8	C	1	67	74.5	58.4	**16.1**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I9	C	1	67	74.2	58.1	**16.1**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective
Wall 1I	I10	C	1	67	73.8	63.5	**10.3**	7	Yes	Yes	15	1,380	20,376	$733,536	$104,791	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C32

Build Noise Barrier Cost Effectiveness - Wall 1I - 10 Foot Noise Barrier at 1380 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1I	I1	F	1	N/A	68.1	65.9	2.2	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I2	F	1	N/A	68.8	64.6	4.2	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I5	C	1	67	74.7	62.2	**12.5**	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I6	C	1	67	74.4	61.7	**12.7**	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I7	C	1	67	74.5	61.9	**12.6**	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I8	C	1	67	74.5	61.7	**12.8**	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I9	C	1	67	74.2	61.5	**12.7**	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective
Wall 1I	I10	C	1	67	73.8	64.5	**9.3**	6	Yes	Yes	10	1,380	13,736	$494,496	$82,416	Not Cost Effective

Table C33

Build Noise Barrier Cost Effectiveness - Wall 2I - 20 Foot Noise Barrier at 1080 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2I	I3	F	1	N/A	66.8	62.2	4.6	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective
Wall 2I	I4	F	1	N/A	64.7	63.6	1.1	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective
Wall 2I	I11	C	1	67	73.9	59.2	**14.7**	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective
Wall 2I	I12	C	1	67	73.9	60.9	**13.0**	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective
Wall 2I	I13	C	1	67	73.8	57.4	**16.4**	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective
Wall 2I	I14	C	1	67	74.2	55.8	**18.4**	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective
Wall 2I	I15	C	1	67	73.8	58.3	**15.5**	5	Yes	Yes	20	1,080	20,816	$873,576	$174,715	Not Cost Effective

Table C34

Build Noise Barrier Cost Effectiveness - Wall 2I - 15 Foot Noise Barrier at 1080 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2I	I3	F	1	N/A	66.8	62.4	4.4	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective
Wall 2I	I4	F	1	N/A	64.7	63.7	1.0	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective
Wall 2I	I11	C	1	67	73.9	60.3	**13.6**	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective
Wall 2I	I12	C	1	67	73.9	61.6	**12.3**	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective
Wall 2I	I13	C	1	67	73.8	59.0	**14.8**	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective
Wall 2I	I14	C	1	67	74.2	58.1	**16.1**	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective
Wall 2I	I15	C	1	67	73.8	59.5	**14.3**	5	Yes	Yes	15	1,080	15,876	$695,736	$139,147	Not Cost Effective

Table C35

Build Noise Barrier Cost Effectiveness - Wall 2I - 10 Foot Noise Barrier at 1080 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2I	I3	F	1	N/A	66.8	64.2	2.6	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective
Wall 2I	I4	F	1	N/A	64.7	64.0	0.7	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective
Wall 2I	I11	C	1	67	73.9	62.2	**11.7**	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective
Wall 2I	I12	C	1	67	73.9	63.1	**10.8**	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective
Wall 2I	I13	C	1	67	73.8	61.5	**12.3**	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective
Wall 2I	I14	C	1	67	74.2	61.2	**13.0**	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective
Wall 2I	I15	C	1	67	73.8	61.8	**12.0**	5	Yes	Yes	10	1,080	10,736	$510,696	$102,139	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C36

Build Noise Barrier Cost Effectiveness - Wall 1J - 20 Foot Noise Barrier at 2280 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1J	J1	F	1	N/A	65.7	58.1	**7.6**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J2	F	1	N/A	65.5	57.2	**8.3**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J3	F	1	N/A	66.9	66.7	0.2	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J4	C	1	67	73.9	73.9	0.0	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J5	C	1	67	73.4	57.8	**15.6**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J6	C	1	67	73.1	56.2	**16.9**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J7	C	1	67	73.1	55.8	**17.3**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J8	C	1	67	73.1	55.7	**17.4**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J9	C	1	67	73.0	73.0	0.0	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J10	C	1	67	73.1	56.0	**17.1**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J11	C	1	67	73.1	55.5	**17.6**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J12	C	1	67	73.0	55.7	**17.3**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J13	C	1	67	73.3	56.4	**16.9**	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective
Wall 1J	J14	C	1	67	74.2	73.9	0.3	10	Yes	Yes	20	2,280	44,816	$1,875,576	$187,558	Not Cost Effective

Table C37

Build Noise Barrier Cost Effectiveness - Wall 1J - 15 Foot Noise Barrier at 2280 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1J	J1	F	1	N/A	65.7	58.7	**7.0**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J2	F	1	N/A	65.5	58.2	**7.3**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J3	F	1	N/A	66.9	66.7	0.2	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J4	C	1	67	73.9	73.9	0.0	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J5	C	1	67	73.4	59.0	**14.4**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J6	C	1	67	73.1	57.7	**15.4**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J7	C	1	67	73.1	57.3	**15.8**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J8	C	1	67	73.1	57.4	**15.7**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J9	C	1	67	73.0	73.0	0.0	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J10	C	1	67	73.1	57.4	**15.7**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J11	C	1	67	73.1	57.3	**15.8**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J12	C	1	67	73.0	57.4	**15.6**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J13	C	1	67	73.3	58.1	**15.2**	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective
Wall 1J	J14	C	1	67	74.2	73.9	0.3	10	Yes	Yes	15	2,280	33,876	$1,481,736	$148,174	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C38

Build Noise Barrier Cost Effectiveness - Wall 1J - 10 Foot Noise Barrier at 2280 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1J	J1	F	1	N/A	65.7	61.1	4.6	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J2	F	1	N/A	65.5	61.2	4.3	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J3	F	1	N/A	66.9	66.7	0.2	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J4	C	1	67	73.9	73.9	0.0	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J5	C	1	67	73.4	61.3	**12.1**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J6	C	1	67	73.1	60.2	**12.9**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J7	C	1	67	73.1	60.3	**12.8**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J8	C	1	67	73.1	60.1	**13.0**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J9	C	1	67	73.0	73.0	0.0	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J10	C	1	67	73.1	60.4	**12.7**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J11	C	1	67	73.1	60.4	**12.7**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J12	C	1	67	73.0	60.6	**12.4**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J13	C	1	67	73.3	60.8	**12.5**	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective
Wall 1J	J14	C	1	67	74.2	73.9	0.3	8	Yes	Yes	10	2,280	22,736	$1,080,696	$135,087	Not Cost Effective

Table C39

Build Noise Barrier Cost Effectiveness - Wall 1K - 20 Foot Noise Barrier at 1222 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1K	H8	F	1	N/A	68.8	63.3	**5.5**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	H21	C	1	67	74.0	59.3	**14.7**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K1	F	1	N/A	68.5	58.9	**9.6**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K2	F	1	N/A	59.0	52.8	**6.2**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K3	E	1	72	55.9	53.3	2.6	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K4	F	1	N/A	68.3	58.0	**10.3**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K5	F	1	N/A	52.9	48.8	4.1	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K6	F	1	N/A	67.5	63.0	4.5	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K8	F	1	N/A	57.0	55.3	1.7	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K15	C	1	67	73.5	57.6	**15.9**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K16	C	1	67	73.5	58.0	**15.5**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K17	C	1	67	73.4	57.9	**15.5**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective
Wall 1K	K18	C	1	67	73.4	61.2	**12.2**	9	Yes	Yes	20	1,222	23,656	$992,146	$110,238	Not Cost Effective

Table C40

Build Noise Barrier Cost Effectiveness - Wall 1K - 15 Foot Noise Barrier at 1222 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1K	H8	F	1	N/A	68.8	64.9	3.9	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	H21	C	1	67	74.0	61.9	**12.1**	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K1	F	1	N/A	68.5	63.1	**5.4**	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K2	F	1	N/A	59.0	55.9	3.1	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K3	E	1	72	55.9	54.7	1.2	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K4	F	1	N/A	68.3	63.6	4.7	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K5	F	1	N/A	52.9	50.9	2.0	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K6	F	1	N/A	67.5	64.4	3.1	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K8	F	1	N/A	57.0	56.0	1.0	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K15	C	1	67	73.5	60.7	**12.8**	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K16	C	1	67	73.5	61.5	**12.0**	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K17	C	1	67	73.4	61.4	**12.0**	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective
Wall 1K	K18	C	1	67	73.4	63.1	**10.3**	6	Yes	Yes	15	1,222	18,006	$788,746	$131,458	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C41

Build Noise Barrier Cost Effectiveness - Wall 1K - 10 Foot Noise Barrier at 1222 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1K	H8	F	1	N/A	68.8	64.9	3.9	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	H21	C	1	67	74.0	61.9	**12.1**	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K1	F	1	N/A	68.5	63.1	**5.4**	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K2	F	1	N/A	59.0	55.9	3.1	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K3	E	1	72	55.9	54.7	1.2	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K4	F	1	N/A	68.3	63.6	4.7	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K5	F	1	N/A	52.9	50.9	2.0	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K6	F	1	N/A	67.5	64.4	3.1	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K8	F	1	N/A	57.0	56.0	1.0	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K15	C	1	67	73.5	60.7	**12.8**	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K16	C	1	67	73.5	61.5	**12.0**	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K17	C	1	67	73.4	61.4	**12.0**	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective
Wall 1K	K18	C	1	67	73.4	63.1	**10.3**	6	Yes	Yes	10	1,222	12,156	$578,146	$96,358	Not Cost Effective

Table C42

Build Noise Barrier Cost Effectiveness - Wall 2K - 20 Foot Noise Barrier at 950 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2K	K7	E	1	72	66.3	65.3	1.0	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K9	E	1	72	56.2	55.8	0.4	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K10	E	1	72	67.6	64.8	2.8	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K11	F	1	N/A	67.5	62.6	4.9	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K12	F	1	N/A	69.6	63.2	**6.4**	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K13	E	1	72	61.6	61.3	0.3	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K14	F	1	N/A	68.9	67.6	1.3	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K19	C	1	67	73.4	59.7	**13.7**	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K20	C	1	67	73.5	57.2	**16.3**	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K21	C	1	67	73.4	73.1	0.3	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K22	C	1	67	73.6	62.1	**11.5**	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective
Wall 2K	K23	C	1	67	74.3	61.1	**13.2**	5	Yes	Yes	20	950	18,216	$765,026	$153,005	Not Cost Effective

Table C43

Build Noise Barrier Cost Effectiveness - Wall 2K - 15 Foot Noise Barrier at 950 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2K	K7	E	1	72	66.3	65.3	1.0	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K9	E	1	72	56.2	56.0	0.2	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K10	E	1	72	67.6	64.9	2.7	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K11	F	1	N/A	67.5	62.9	4.6	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K12	F	1	N/A	69.6	63.5	**6.1**	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K13	E	1	72	61.6	61.4	0.2	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K14	F	1	N/A	68.9	67.6	1.3	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K19	C	1	67	73.4	60.6	**12.8**	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K20	C	1	67	73.5	58.9	**14.6**	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K21	C	1	67	73.4	73.1	0.3	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K22	C	1	67	73.6	62.7	**10.9**	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective
Wall 2K	K23	C	1	67	74.3	62.0	**12.3**	5	Yes	Yes	15	950	13,926	$610,586	$122,117	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C44

Build Noise Barrier Cost Effectiveness - Wall 2K - 10 Foot Noise Barrier at 950 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2K	K7	E	1	72	66.3	65.5	0.8	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K9	E	1	72	56.2	56.1	0.1	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K10	E	1	72	67.6	65.8	1.8	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K11	F	1	N/A	67.5	64.4	3.1	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K12	F	1	N/A	69.6	65.2	4.4	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K13	E	1	72	61.6	61.4	0.2	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K14	F	1	N/A	68.9	68.1	0.8	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K19	C	1	67	73.4	62.3	**11.1**	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K20	C	1	67	73.5	62.0	**11.5**	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K21	C	1	67	73.4	73.1	0.3	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K22	C	1	67	73.6	64.0	**9.6**	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective
Wall 2K	K23	C	1	67	74.3	64.2	**10.1**	4	Yes	Yes	10	950	9,436	$448,946	$112,237	Not Cost Effective

Table C45

Build Noise Barrier Cost Effectiveness - Wall 1L - 20 Foot Noise Barrier at 480 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1L	L1	F	1	N/A	66.8	66.2	0.6	3	Yes	Yes	20	480	8,816	$372,576	$124,192	Not Cost Effective
Wall 1L	L2	E	1	72	62.2	62.0	0.2	3	Yes	Yes	20	480	8,816	$372,576	$124,192	Not Cost Effective
Wall 1L	L3	F	1	N/A	67.5	62.1	**5.4**	3	Yes	Yes	20	480	8,816	$372,576	$124,192	Not Cost Effective
Wall 1L	L8	C	1	67	73.1	61.3	**11.8**	3	Yes	Yes	20	480	8,816	$372,576	$124,192	Not Cost Effective
Wall 1L	L9	C	1	67	72.1	55.8	**16.3**	3	Yes	Yes	20	480	8,816	$372,576	$124,192	Not Cost Effective

Table C46

Build Noise Barrier Cost Effectiveness - Wall 1L - 15 Foot Noise Barrier at 480 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1L	L1	F	1	N/A	66.8	66.2	0.6	3	Yes	Yes	15	480	6,876	$302,736	$100,912	Not Cost Effective
Wall 1L	L2	E	1	72	62.2	62.0	0.2	3	Yes	Yes	15	480	6,876	$302,736	$100,912	Not Cost Effective
Wall 1L	L3	F	1	N/A	67.5	62.4	**5.1**	3	Yes	Yes	15	480	6,876	$302,736	$100,912	Not Cost Effective
Wall 1L	L8	C	1	67	73.1	62.0	**11.1**	3	Yes	Yes	15	480	6,876	$302,736	$100,912	Not Cost Effective
Wall 1L	L9	C	1	67	72.1	57.3	**14.8**	3	Yes	Yes	15	480	6,876	$302,736	$100,912	Not Cost Effective

Table C47

Build Noise Barrier Cost Effectiveness - Wall 1L - 10 Foot Noise Barrier at 480 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1L	L1	F	1	N/A	66.8	66.4	0.4	2	Yes	Yes	10	480	4,736	$225,696	$112,848	Not Cost Effective
Wall 1L	L2	E	1	72	62.2	62.2	0.0	2	Yes	Yes	10	480	4,736	$225,696	$112,848	Not Cost Effective
Wall 1L	L3	F	1	N/A	67.5	64.0	3.5	2	Yes	Yes	10	480	4,736	$225,696	$112,848	Not Cost Effective
Wall 1L	L8	C	1	67	73.1	63.5	**9.6**	2	Yes	Yes	10	480	4,736	$225,696	$112,848	Not Cost Effective
Wall 1L	L9	C	1	67	72.1	59.8	**12.3**	2	Yes	Yes	10	480	4,736	$225,696	$112,848	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C48

Build Noise Barrier Cost Effectiveness - Wall 2L - 20 Foot Noise Barrier at 540 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2L	L4	F	1	N/A	68.4	59.6	**8.8**	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective
Wall 2L	L5	F	1	N/A	52.2	50.3	1.9	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective
Wall 2L	L6	F	1	N/A	65.8	59.0	**6.8**	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective
Wall 2L	L7	F	1	N/A	57.1	56.7	0.4	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective
Wall 2L	L10	C	1	67	72.0	71.8	0.2	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective
Wall 2L	L11	C	1	67	72.4	55.0	**17.4**	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective
Wall 2L	L12	C	1	67	71.8	56.8	**15.0**	4	Yes	Yes	20	540	10,016	$422,676	$105,669	Not Cost Effective

Table C49

Build Noise Barrier Cost Effectiveness - Wall 2L - 15 Foot Noise Barrier at 540 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2L	L4	F	1	N/A	68.4	60.1	**8.3**	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective
Wall 2L	L5	F	1	N/A	52.2	50.4	1.8	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective
Wall 2L	L6	F	1	N/A	65.8	59.4	**6.4**	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective
Wall 2L	L7	F	1	N/A	57.1	56.8	0.3	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective
Wall 2L	L10	C	1	67	72.0	71.8	0.2	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective
Wall 2L	L11	C	1	67	72.4	56.9	**15.5**	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective
Wall 2L	L12	C	1	67	71.8	57.8	**14.0**	4	Yes	Yes	15	540	7,776	$342,036	$85,509	Not Cost Effective

Table C50

Build Noise Barrier Cost Effectiveness - Wall 2L - 10 Foot Noise Barrier at 540 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2L	L4	F	1	N/A	68.4	62.2	**6.2**	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 2L	L5	F	1	N/A	52.2	51.1	1.1	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 2L	L6	F	1	N/A	65.8	61.8	4.0	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 2L	L7	F	1	N/A	57.1	57.0	0.1	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 2L	L10	C	1	67	72.0	71.8	0.2	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 2L	L11	C	1	67	72.4	59.9	**12.5**	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective
Wall 2L	L12	C	1	67	71.8	60.1	**11.7**	3	Yes	Yes	10	540	5,336	$254,196	$84,732	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C51

Build Noise Barrier Cost Effectiveness - Wall 1M - 20 Foot Noise Barrier at 1020 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1M	M1	F	1	N/A	69.5	67.5	2.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M2	F	1	N/A	68.0	65.4	2.6	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M3	F	1	N/A	55.9	50.5	**5.4**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M4	E	1	72	66.3	57.6	**8.7**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M5	E	1	72	66.2	58.5	**7.7**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M6	E	1	72	66.3	59.7	**6.6**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M7	E	1	72	57.3	55.9	1.4	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M8	E	1	72	51.8	47.9	3.9	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M11	C	1	67	73.8	73.8	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M12	C	1	67	72.0	56.5	**15.5**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M13	C	1	67	71.8	62.7	**9.1**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M14	C	1	67	71.8	56.3	**15.5**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M15	C	1	67	71.5	54.5	**17.0**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1M	M16	C	1	67	71.6	69.6	2.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective

Table C52

Build Noise Barrier Cost Effectiveness - Wall 1M - 15 Foot Noise Barrier at 1020 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1M	M1	F	1	N/A	69.5	67.6	1.9	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M2	F	1	N/A	68.0	65.5	2.5	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M3	F	1	N/A	55.9	51.0	4.9	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M4	E	1	72	66.3	58.3	**8.0**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M5	E	1	72	66.2	59.1	**7.1**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M6	E	1	72	66.3	60.1	**6.2**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M7	E	1	72	57.3	56.0	1.3	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M8	E	1	72	51.8	48.4	3.4	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M11	C	1	67	73.8	73.8	0.0	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M12	C	1	67	72.0	58.0	**14.0**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M13	C	1	67	71.8	63.1	**8.7**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M14	C	1	67	71.8	57.6	**14.2**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M15	C	1	67	71.5	56.4	**15.1**	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective
Wall 1M	M16	C	1	67	71.6	69.6	2.0	7	Yes	Yes	15	1,020	14,976	$656,436	$93,777	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C53

Build Noise Barrier Cost Effectiveness - Wall 1M - 10 Foot Noise Barrier at 1020 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1M	M1	F	1	N/A	69.5	67.9	1.6	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M2	F	1	N/A	68.0	66.0	2.0	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M3	F	1	N/A	55.9	53.3	2.6	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M4	E	1	72	66.3	61.8	4.5	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M5	E	1	72	66.2	62.0	4.2	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M6	E	1	72	66.3	62.3	4.0	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M7	E	1	72	57.3	56.4	0.9	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M8	E	1	72	51.8	49.7	2.1	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M11	C	1	67	73.8	73.8	0.0	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M12	C	1	67	72.0	60.4	**11.6**	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M13	C	1	67	71.8	63.9	**7.9**	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M14	C	1	67	71.8	60.0	**11.8**	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M15	C	1	67	71.5	59.6	**11.9**	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective
Wall 1M	M16	C	1	67	71.6	69.7	1.9	4	Yes	Yes	10	1,020	10,136	$482,196	$120,549	Not Cost Effective

Table C54

Build Noise Barrier Cost Effectiveness - Wall 2M - 20 Foot Noise Barrier at 960 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2M	M9	F	1	N/A	64.6	59.1	**5.5**	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective
Wall 2M	M10	E	1	72	66.2	60.2	**6.0**	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective
Wall 2M	M17	C	1	67	71.5	54.2	**17.3**	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective
Wall 2M	M18	C	1	67	71.6	56.6	**15.0**	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective
Wall 2M	M19	C	1	67	71.3	60.5	**10.8**	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective
Wall 2M	M20	C	1	67	71.3	58.1	**13.2**	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective
Wall 2M	M21	C	1	67	73.7	73.7	0.0	6	Yes	Yes	20	960	18,416	$773,376	$128,896	Not Cost Effective

Table C55

Build Noise Barrier Cost Effectiveness - Wall 2M - 15 Foot Noise Barrier at 960 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2M	M9	F	1	N/A	64.6	59.6	5.0	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2M	M10	E	1	72	66.2	60.6	**5.6**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2M	M17	C	1	67	71.5	56.1	**15.4**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2M	M18	C	1	67	71.6	57.7	**13.9**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2M	M19	C	1	67	71.3	61.0	**10.3**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2M	M20	C	1	67	71.3	58.9	**12.4**	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective
Wall 2M	M21	C	1	67	73.7	73.7	0.0	5	Yes	Yes	15	960	14,076	$617,136	$123,427	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C56

Build Noise Barrier Cost Effectiveness - Wall 2M - 10 Foot Noise Barrier at 960 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 2M	M9	F	1	N/A	64.6	61.9	2.7	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2M	M10	E	1	72	66.2	62.4	3.8	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2M	M17	C	1	67	71.5	59.1	**12.4**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2M	M18	C	1	67	71.6	60.3	**11.3**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2M	M19	C	1	67	71.3	62.2	**9.1**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2M	M20	C	1	67	71.3	61.0	**10.3**	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective
Wall 2M	M21	C	1	67	73.7	73.7	0.0	4	Yes	Yes	10	960	9,536	$453,696	$113,424	Not Cost Effective

Table C57

Build Noise Barrier Cost Effectiveness - Wall 3M - 20 Foot Noise Barrier at 600 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3M	M22	C	1	67	72.1	72.0	0.1	2	Yes	Yes	20	600	11,216	$472,776	$236,388	Not Cost Effective
Wall 3M	M23	C	1	67	70.7	53.2	**17.5**	2	Yes	Yes	20	600	11,216	$472,776	$236,388	Not Cost Effective
Wall 3M	M24	C	1	67	70.6	52.3	**18.3**	2	Yes	Yes	20	600	11,216	$472,776	$236,388	Not Cost Effective

Table C58

Build Noise Barrier Cost Effectiveness - Wall 3M - 15 Foot Noise Barrier at 600 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3M	M22	C	1	67	72.1	72.0	0.1	2	Yes	Yes	15	600	8,676	$381,336	$190,668	Not Cost Effective
Wall 3M	M23	C	1	67	70.7	55.2	**15.5**	2	Yes	Yes	15	600	8,676	$381,336	$190,668	Not Cost Effective
Wall 3M	M24	C	1	67	70.6	54.5	**16.1**	2	Yes	Yes	15	600	8,676	$381,336	$190,668	Not Cost Effective

Table C59

Build Noise Barrier Cost Effectiveness - Wall 3M - 10 Foot Noise Barrier at 600 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 3M	M22	C	1	67	72.1	72.1	0.0	2	Yes	Yes	10	600	5,936	$282,696	$141,348	Not Cost Effective
Wall 3M	M23	C	1	67	70.7	58.5	**12.2**	2	Yes	Yes	10	600	5,936	$282,696	$141,348	Not Cost Effective
Wall 3M	M24	C	1	67	70.6	58.2	**12.4**	2	Yes	Yes	10	600	5,936	$282,696	$141,348	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C60

Build Noise Barrier Cost Effectiveness - Wall 1N - 20 Foot Noise Barrier at 1020 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1N	N1	F	1	N/A	63.6	58.2	**5.4**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N2	F	1	N/A	56.7	56.6	0.1	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N3	F	1	N/A	47.9	47.9	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N4	E	1	72	66.1	61.1	5.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N5	E	1	72	66.2	59.7	**6.5**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N6	E	1	72	66.2	58.7	**7.5**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N7	F	1	N/A	50.5	50.4	0.1	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N8	F	1	N/A	53.9	53.8	0.1	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N9	F	1	N/A	54.4	53.6	0.8	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N10	E	1	72	67.5	67.1	0.4	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N11	E	1	72	67.1	66.9	0.2	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N12	E	1	72	66.7	66.7	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N13	E	1	72	66.4	66.4	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N14	E	1	72	66.4	66.4	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N15	E	1	72	66.3	66.2	0.1	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N16	E	1	72	66.2	66.2	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N17	E	1	72	66.2	66.2	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N18	E	1	72	66.1	66.1	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N19	E	1	72	66.1	66.1	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N20	F	1	N/A	65.8	65.8	0.0	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N21	C	1	67	71.8	61.0	**10.8**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N22	C	1	67	71.8	54.5	**17.3**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N23	C	1	67	71.3	57.8	**13.5**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N24	C	1	67	71.4	57.4	**14.0**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective
Wall 1N	N25	C	1	67	71.7	58.1	**13.6**	8	Yes	Yes	20	1,020	19,616	$823,476	$102,935	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C61

Build Noise Barrier Cost Effectiveness - Wall 1N - 15 Foot Noise Barrier at 1020 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1N	N1	F	1	N/A	63.6	58.6	**5.0**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N2	F	1	N/A	56.7	56.6	0.1	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N3	F	1	N/A	47.9	47.9	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N4	E	1	72	66.1	61.5	4.6	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N5	E	1	72	66.2	60.3	**5.9**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N6	E	1	72	66.2	59.6	**6.6**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N7	F	1	N/A	50.5	50.4	0.1	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N8	F	1	N/A	53.9	53.8	0.1	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N9	F	1	N/A	54.4	53.7	0.7	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N10	E	1	72	67.5	67.1	0.4	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N11	E	1	72	67.1	66.9	0.2	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N12	E	1	72	66.7	66.7	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N13	E	1	72	66.4	66.4	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N14	E	1	72	66.4	66.4	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N15	E	1	72	66.3	66.2	0.1	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N16	E	1	72	66.2	66.2	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N17	E	1	72	66.2	66.2	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N18	E	1	72	66.1	66.1	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N19	E	1	72	66.1	66.1	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N20	F	1	N/A	65.8	65.8	0.0	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N21	C	1	67	71.8	61.3	**10.5**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N22	C	1	67	71.8	56.1	**15.7**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N23	C	1	67	71.3	58.7	**12.6**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N24	C	1	67	71.4	58.2	**13.2**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective
Wall 1N	N25	C	1	67	71.7	58.9	**12.8**	8	Yes	Yes	15	1,020	14,976	$656,436	$82,055	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C62

Build Noise Barrier Cost Effectiveness - Wall 1N - 10 Foot Noise Barrier at 1020 feet

Noise Barrier	Receptor	Land Use	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier[2] ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Standard	Build Year 2045 No Noise Barrier	Build Year 2045 With Noise Barrier										
Wall 1N	N1	F	1	N/A	63.6	60.7	2.9	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N2	F	1	N/A	56.7	56.7	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N3	F	1	N/A	47.9	47.9	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N4	E	1	72	66.1	63.5	2.6	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N5	E	1	72	66.2	63.1	3.1	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N6	E	1	72	66.2	62.9	3.3	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N7	F	1	N/A	50.5	50.4	0.1	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N8	F	1	N/A	53.9	53.9	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N9	F	1	N/A	54.4	54.0	0.4	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N10	E	1	72	67.5	67.3	0.2	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N11	E	1	72	67.1	67.0	0.1	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N12	E	1	72	66.7	66.7	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N13	E	1	72	66.4	66.4	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N14	E	1	72	66.4	66.4	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N15	E	1	72	66.3	66.2	0.1	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N16	E	1	72	66.2	66.2	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N17	E	1	72	66.2	66.2	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N18	E	1	72	66.1	66.1	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N19	E	1	72	66.1	66.1	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N20	F	1	N/A	65.8	65.8	0.0	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N21	C	1	67	71.8	62.4	**9.4**	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N22	C	1	67	71.8	59.2	**12.6**	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N23	C	1	67	71.3	60.6	**10.7**	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N24	C	1	67	71.4	60.3	**11.1**	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective
Wall 1N	N25	C	1	67	71.7	61.0	**10.7**	5	Yes	Yes	10	1,020	10,136	$482,196	$96,439	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.
2. The total cost of barrier includes rub rail at $115/linear foot.

FLOODPLAIN ASSESSMENT

FLOODPLAIN ENCROACHMENT		
Floodplain	**Type of Encroachment**	**Length, ft**
Zone A	**Transverse**	**280**

TRANSVERSE or LONGITUDINAL ENCROACHMENT

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

   a. Is the roadway grade above the 100 year flood elevation?
   (YES) Roadway elevation(s): 945.12 to 944.33 ft
   100 year flood elevation: 942.62 ft
   NO Frequency of overtopping: 500-year
   Reason(s) why roadway grade will not be raised:
   _____
   Are there reasonable alternative routes available that are above the 100 year flood elevations?
   _____

   b. If the 100 year flood elevation is not known, does roadway have a history of overtopping?
   (NO) Reference and length of record No known flooding at nearby airport.
   YES Discuss correcting deficiency _____

   c. Describe how emergency services will be maintained during construction:
   Emergency services will continue to use the existing 220th Street West and Grenada Avenue during construction.

2. There is no significant impact on natural and beneficial floodplain values.

   a. Impacts:

	Beneficial Impacts	**Adverse Impacts**
Fisheries	**N/A**	**N/A**
Wetlands	**None**	**None**
Plants	**None**	**Minor Fill**
Open Space/Aesthetics	**None**	**None**
Public Access (boat/canoe)	**N/A**	**N/A**
Channel Changes	**N/A**	**N/A**

Boat Passage	**N/A**	**N/A**
Threatened/Endangered Species	**None**	**None**
Water Quality	**None**	**None**

b. Minimization/Mitigation Measures:

3. There is no significant increased risk of flooding.
   a. Does the project result in any headwater or tailwater elevations that would endanger life or property? No
      Stage Increase 2.08 ft

   b. Are there any special hydraulic features? What is their purpose?
      No special features.

4. The project will not support and/or result in incompatible floodplain development.

   Reason(s) why project will not cause incompatible floodplain development:
   Meets local floodplain ordinances.

LONGITUDINAL ENCROACHMENT
Discuss reasons why longitudinal encroachment cannot be practicably avoided:

COORDINATION
Watershed District
DNR
No-rise certificate will be submitted to the LGU

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

Note: The alternative chosen for this project will cross numerous small drainage-ways. During design, these drainage-ways will be examined for any localized flooding problems and corrected to the extent practicable.

ATTACHMENTS
--Floodplain Extents Map
--Hydraulics Analysis and Risk Assessment

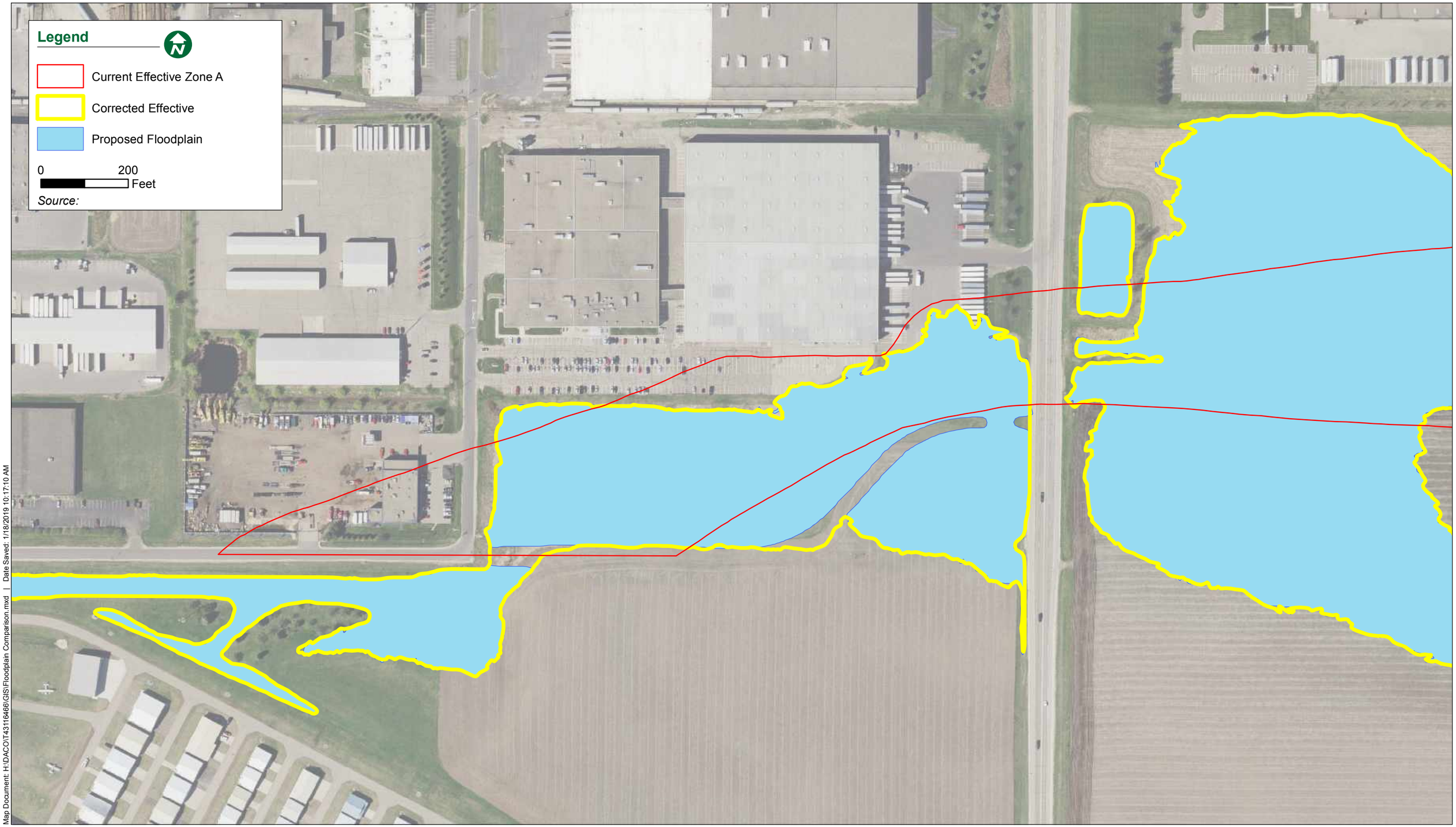
220th St. Culvert Crossing

Dakota County/Lakeville

Floodplain Comparison Map

August 2019

BOLTON & MENK
Real People. Real Solutions.



Map Document: H:\DACO\T43116466\GIS\Floodplain Comparison.mxd | Date Saved: 1/18/2019 10:17:10 AM

Bridge Number N/A

Date: 07/31/2019

*	Stream name	Unnamed Tributary to Vermillion River
	Drainage area	3.22 mi^2
	Flood of record	Unknown
	Maximum observed highwater elevation	Unknown
*	Design flood (100 - year frequency)	769 cfs
	Road sag point elevation	944.33 ft
	Design stage	942.62 ft
	Total stage increase	0.00 ft
*	Headwater elevation	942.62 ft
	Stage increase of the inplace condition	0.00 ft
	Min. waterway opening below elevation	941.75 ft
	Low member at or above elevation	941.75 ft
	Mean velocity through structure	9.1 ft/s
	Main channel velocity	6.4 ft/s
	Overtopping flood or Greatest flood (500 -year frequency)	1170 cfs
	Road sag point elevation	944.33 ft
	Stage	943.18 ft
	Total stage increase	1.67 ft
*	Headwater elevation	944.85 ft
	Stage increase of the inplace condition	1.67 ft
	Mean velocity through structure	10.60 ft/s
*	Basic flood (100-year frequency)	769 cfs
	Stage	942.62 ft
	Total stage increase	0.00 ft
*	Headwater elevation	942.62 ft
	Stage increase of the inplace condition	0.00 ft
	Min. overflow area above sag point elev.	N/A
	Mean overflow velocity	N/A
	Mean velocity through structure	9.13 ft/s
	Approximate flowline elevation	937.75 ft
	Estimated pier scour elevation	N/A
	Year frequency scour was calculated for	N/A
	Skew	N/A
	Scour Code	N/A

*Items to be shown on Grading Plan

RISK ASSESSMENT FOR ENCROACHMENT DESIGN

Date: 3/10/2011

District: Me **County:** Dakota **Vicinity of:** City of Lakeville

DATA REQUIREMENTS

1. **Location of Crossing:** 220th Street West **C.S.** **M.P.** N/A

   Sec. 4 **T** 113N **R** 20W

2. **Name of Stream:** Unnamed Vermillion River Trib **Bridge No. Old:** N/A **New:** N/A

3. **Current ADT:** 0 **Projected ADT:** 1700

4. **Practicable detour available** ☑ Yes ☐ No

If no is checked, please explain:

If there is no practicable detour available, then the use of the road must be analyzed. Considerations such as emergency vehicle access, emergency supply and evacuation route, and the need for school bus, milk and mail routes should be studied. Factors to consider for this analysis include design frequency, depth, duration, and frequency of inundation if appropriate, and available funding.

5. **Hydraulic Data: (Fill in as appropriate)**

   Elevation Datum: NAVD88

Q_2 =	111	cfs	HW_2 Elevation	940.71	ft
Q_5 =	230	cfs	HW_5 Elevation	941.29	ft
Q_{10} =	331	cfs	HW_{10} Elevation	941.64	ft
Q_{25} =	484	cfs	HW_{25} Elevation	942.11	ft
Q_{50} =	617	cfs	HW_{50} Elevation	942.37	ft
Q_{100} =	769	cfs	HW_{100} Elevation	942.62	ft
Q_{500} =	1170	cfs	HW_{500} Elevation	944.85	ft

Approximate Flowline Elevation: 937.75 Ft

Design Frequency Event: ☑ 100-yr ☐ 50-yr ☐ 25-yr ☐ 10-yr

Reasons for selecting Design Frequency: Do not want to flood neigboring proporties during the 100-year event.

6. **Magnitude and Frequency of the smaller of "Overtopping" or "500 yr." (Greatest) flood:** N/A

7. **Low member elevation:** 941.75 ft

8. **Minimum roadway overflow elevation if appropriate:** 944.33 ft

9. **Elevation of high risk property, i.e. residences:** N/A
   Other buildings 945.00 ft

10. **Horizontal location of overflow:**
    ☑ At Structure (See 12) ☐ Not At Structure:

11. **Type of proposed structure:**
    ☐ Bridge (See 12) ☑ Culvert(s)

12 If the proposed structure is a bridge with the sag point located on the bridge and there is ice and debris potential, strong consideration should be given to using Q_{50} as design discharge with 3' of clearance between the 50 year tailwater stage and low member.

	LTEC Design
1. BACKWATER DAMAGE - Major flood damage in this context refers to shopping centers, hospitals, chemical plants, power plants, housing developments, etc.	
1a. Is the overtopping flood greater than the 100 yr. flood? ☑ Yes (Go to 1b) ☐ No (Go to 1e)	
1b. Is the overtopping flood greater than the "greatest" flood (500 yr. Frequency)? ☐ Yes (Go to 1d) ☑ No (Go to 1c)	
1c. Is there major flood damage potential for the overtopping flood? ☑ No (Go to 1e)	☐ Yes (Go to 1e)
1d. Is there major flood damage potential for the greatest flood (500 year frequency)? ☐ No (Go to 1e)	☐ Yes (Go to 1e)
1e. Will there be flood damage potential to residence(s) or other buildings during a 100 yr. flood? ☐ Yes (Go to 1f) ☑ No (Go to 2)	
1f. Could this flood damage occur even if the roadway crossing wasn't there? ☐ Yes (Go to 1g) ☐ No (Go to 1h)	
1g. Could this flood damage be significantly increased by the backwater caused by the proposed crossing? ☐ Yes (Go to 1h) ☐ No (Go to 2)	
1h. Could the stream crossing be designed in such a manner so as to minimize this potential flood damage? ☐ Yes (Go to 1i) ☐ No (Go to 2)	
1i. Does the value of the building(s) and/or its contents have sufficient value to justify further evaluation of risk and potential flood damage? ☐ No (Go to 2)	☐ Yes (Go to 2)
2. TRAFFIC RELATED LOSSES	
2a. Is the overtopping flood greater than the "greatest" flood (500 yr. frequency)? ☐ Yes (Go to 3) ☑ No (Go to 2b)	
2b. Does the ADT exceed 50 vehicles per day? ☑ Yes (Go to 2c) ☐ No (Go to 3)	
2c. Would the (duration of road closure in days) multiplied by the (length of detour minus the length of normal route in miles) exceed 20? ☐ Yes (Go to 2d) ☑ No (Go to 3)	
2d. Does the annual risk cost for traffic related costs exceed 10% of the annual capital costs? ☐ No (Go to 3) (See figures A and B – Appendix A(2) - for Assistance)	☐ Yes (Go to 3)

3. ROADWAY AND/OR STRUCTURE REPAIR COSTS

3a. Is the overtopping flood less than a 100 year frequency flood?

☐ Yes (Go to 3b) ☑ No (Go to 3i)

3b. Compare the Tailwater (TW) elevation with the roadway sag point elevation for the overtopping flood. Check the appropriate category.

☐ When TW is above the sag point (Go to 4)

☐ TW is between 0 and 0.5' below sag point (Go to 3c)

☐ TW is between 0.5' and 1.0' below sag point (Go to 3d)

☐ When TW is 1.0' and 2.0' below sag point (Go to 3e)

☐ When TW is more than 2.0' below sag point (Go to 3g)

3c. Does the embankment have a good erosion resistant vegetative cover?

☐ Yes (Go to 3i) ☐ No (Go to 3d)

3d. Is the shoulder constructed from erosion resistant material such as paved, coarse gravel, or clay type soil?

☐ Yes (Go to 3i) ☐ No (Go to 3e)

3e. Will the duration of overtopping for the 25-year flood exceed 1 hour?

☐ Yes (Go to 3f) ☐ No (Go to 3i)

3f. Is the embankment constructed from erosion resistant material such as a clay type soil?

☐ Yes (Go to 3i) ☐ No (Go to 3g)

3g. Is the overtopping flood less than a 25-year frequency flood?

☐ Yes (Go to 3h) ☐ No (Go to 3i)

3h. Will the cost of protecting the roadway and/or embankment from severe damage caused by overtopping exceed the cost of providing additional culvert or bridge capacity?

☐ No (Go to 3i); ☐ Yes (Go to 3i)

3i. Is there damage potential to the structure caused by scour, ice, debris or other means during the lesser of the overtopping flood or the 100 year flood?

☑ Yes (Go to 3j) ☐ No (Go to 4)

3j. Will the cost of protecting the structure from damage exceed the cost of providing additional culvert or bridge water capacity?

☑ No (Go to 4); protecting abutments from scour by riprap. ☐ Yes (Go to 4)

4. Will the capital cost of the structure exceed $1,000,000?

☑ No (Go to 5); ☐ Yes (Go to 5)

5. In your opinion, are there any other factors that you feel should require further study through a risk analysis?

☑ No (Go to 6); ☐ Yes (Indicate)

6. If there are no ✓'s in the LTEC Design column on the right, proceed with the design, selecting the lowest acceptable grade line and the smallest waterway opening consistent with the constraints imposed on the project. The risk assessment has demonstrated that potential flood damage costs, traffic related costs, roadway and/or structure repair costs are minor and therefore disregarded for this project.

   One or more ✓'s in the LTEC Design column indicates further analysis in the category checked may be required utilizing the LTEC design process or justification (below) why it is not required.

JUSTIFICATION:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota:

Signature: Jordan Thole

License Number: 54147 Date: 8/8/2019

FLOODPLAIN ASSESSMENT

FLOODPLAIN ENCROACHMENT		
Floodplain	**Type of Encroachment**	**Length, ft**
Zone AE with Floodway	**Transverse**	**120**

TRANSVERSE or LONGITUDINAL ENCROACHMENT

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

   a. Is the roadway grade above the 100 year flood elevation?
   (YES) Roadway elevation(s) 1021.7
   100 year flood elevation 1020.66
   NO Frequency of overtopping: Est. ~500-year
   Reason(s) why roadway grade will not be raised:
   _____
   Are there reasonable alternative routes available that are above the 100 year flood elevations?
   _____

   b. If the 100 year flood elevation is not known, does roadway have a history of overtopping?
   (NO) Reference and length of record: No known or observed flooding
   YES Discuss correcting deficiency _____

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

2. There is no significant impact on natural and beneficial floodplain values.

   a. Impacts:

	Beneficial Impacts	**Adverse Impacts**
Fisheries	**N/A**	**N/A**
Wetlands	**None**	**None**
Plants	**None**	**None**
Open Space/Aesthetics	**None**	**None**
Public Access (boat/canoe)	**N/A**	**N/A**
Channel Changes	**N/A**	**N/A**

Boat Passage	**N/A**	**N/A**
Threatened/Endangered Species	**None**	**None**
Water Quality	**None**	**None**

b. Minimization/Mitigation Measures:
Standard erosion control measures including temporary silt fencing, soil cover and permanent stabilization covers and rip rap placement at culvert ends.

3. There is no significant increased risk of flooding.

   a. Does the project result in any headwater or tailwater elevations that would endanger life or property? No
   Stage Increase: 2.4 ft (no increase in HW elevation)

   b. Are there any special hydraulic features? What is their purpose?
   No special features.

4. The project will not support and/or result in incompatible floodplain development.

   Reason(s) why project will not cause incompatible floodplain development:
   Will meet local floodplain ordinance requirements.

LONGITUDINAL ENCROACHMENT
Discuss reasons why longitudinal encroachment cannot be practicably avoided:

COORDINATION
Watershed District
DNR
No-rise certificate will be submitted to the LGU (City of Lakeville)

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

Note: The alternative chosen for this project will cross numerous small drainage-ways. During design, these drainage-ways will be examined for any localized flooding problems and corrected to the extent practicable.

ATTACHMENTS
--FEMA Flood Map
--Hydraulics Analysis and Risk Assessment

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/9/2019 at 12:27:25 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Bridge Number: NA

Date: 08/09/2019

*	Stream name	West Branch South Creek
	Drainage area	1.32 SQ. MI.
	Flood of record	Unknown
	Maximum observed highwater elevation	Unknown
*	Design flood (100 - year frequency)	252 cfs
	Road sag point elevation	N/A
	Design stage	1020.66 ft
	Total stage increase	0.00 ft
*	Headwater elevation	1020.66 ft
	Stage increase of the inplace condition	0.00 ft
	Min. waterway opening below elevation	1018.56
	Low member at or above elevation	1018.56
	Mean velocity through structure	3.8 fps
	Main channel velocity	3.5 fps
	Overtopping flood or Greatest flood (500 -year frequency)	669 cfs (StreamStats)
	Road sag point elevation	N/A
	Stage	Not analyzed
	Total stage increase	Not analyzed
*	Headwater elevation	Not analyzed
	Stage increase of the inplace condition	Not analyzed
	Mean velocity through structure	Not analyzed
*	Basic flood (100-year frequency)	252 cfs
	Stage	1020.66 ft
	Total stage increase	0.00 ft
*	Headwater elevation	1020.66 ft
	Stage increase of the inplace condition	0.00 ft
	Min. overflow area above sag point elev.	N/A
	Mean overflow velocity	N/A
	Mean velocity through structure	4 fps
	Approximate flowline elevation	1015.23 (south)
	Estimated pier scour elevation	N/A
	Year frequency scour was calculated for	N/A
	Skew	
	Scour Code	I

*Items to be shown on Grading Plan

RISK ASSESSMENT FOR ENCROACHMENT DESIGN

Date: 3/10/2011

District: M **County:** Dakota **Vicinity of:** City of Lakeville

DATA REQUIREMENTS

1. **Location of Crossing:** CSAH 70 at 215th St. West **C.S.** _____ **M.P.** _____

   Sec. 4 **T** 113N **R** 20W

2. **Name of Stream:** West Branch South Creek **Bridge No. Old:** N/A **New:** N/A

3. **Current ADT:** 13,300 **Projected ADT:** 20,000

4. **Practicable detour available** ☑ Yes ☐ No

If no is checked, please explain: _____

If there is no practicable detour available, then the use of the road must be analyzed. Considerations such as emergency vehicle access, emergency supply and evacuation route, and the need for school bus, milk and mail routes should be studied. Factors to consider for this analysis include design frequency, depth, duration, and frequency of inundation if appropriate, and available funding.

5. **Hydraulic Data: (Fill in as appropriate)**

   Elevation Datum: NAVD88

Q_2 = _____ cfs		HW_2 Elevation _____ ft	
Q_5 = _____ cfs		HW_5 Elevation _____ ft	
Q_{10} = _____ cfs		HW_{10} Elevation _____ ft	
Q_{25} = _____ cfs		HW_{25} Elevation _____ ft	
Q_{50} = _____ cfs		HW_{50} Elevation _____ ft	
Q_{100} = 252 cfs		HW_{100} Elevation 1020.66 ft	
Q_{500} = _____ cfs		HW_{500} Elevation _____ ft	

Approximate Flowline Elevation: 1015.2 Ft

Design Frequency Event: ☑ 100-yr ☐ 50-yr ☐ 25-yr ☐ 10-yr

Reasons for selecting Design Frequency: Mapped floodplain/floodway requiring no-rise analysis.

6. **Magnitude and Frequency of the smaller of "Overtopping" or "500 yr." (Greatest) flood:** _____

7. **Low member elevation:** N/A

8. **Minimum roadway overflow elevation if appropriate:** N/A

9. **Elevation of high risk property, i.e. residences:** N/A
   Other buildings N/A

10. **Horizontal location of overflow:**
    ☐ At Structure (See 12) ☑ Not At Structure:

11. **Type of proposed structure:**
    ☐ Bridge (See 12) ☑ Culvert(s)

12 If the proposed structure is a bridge with the sag point located on the bridge and there is ice and debris potential, strong consideration should be given to using Q_{50} as design discharge with 3' of clearance between the 50 year tailwater stage and low member.

	LTEC Design
1. BACKWATER DAMAGE - Major flood damage in this context refers to shopping centers, hospitals, chemical plants, power plants, housing developments, etc.	
1a. Is the overtopping flood greater than the 100 yr. flood? ☑ Yes (Go to 1b) ☐ No (Go to 1e)	
1b. Is the overtopping flood greater than the "greatest" flood (500 yr. Frequency)? ☐ Yes (Go to 1d) ☑ No (Go to 1c)	
1c. Is there major flood damage potential for the overtopping flood? ☑ No (Go to 1e)	☐ Yes (Go to 1e)
1d. Is there major flood damage potential for the greatest flood (500 year frequency)? ☐ No (Go to 1e)	☐ Yes (Go to 1e)
1e. Will there be flood damage potential to residence(s) or other buildings during a 100 yr. flood? ☐ Yes (Go to 1f) ☑ No (Go to 2)	
1f. Could this flood damage occur even if the roadway crossing wasn't there? ☐ Yes (Go to 1g) ☐ No (Go to 1h)	
1g. Could this flood damage be significantly increased by the backwater caused by the proposed crossing? ☐ Yes (Go to 1h) ☐ No (Go to 2)	
1h. Could the stream crossing be designed in such a manner so as to minimize this potential flood damage? ☐ Yes (Go to 1i) ☐ No (Go to 2)	
1i. Does the value of the building(s) and/or its contents have sufficient value to justify further evaluation of risk and potential flood damage? ☐ No (Go to 2)	☐ Yes (Go to 2)
2. TRAFFIC RELATED LOSSES	
2a. Is the overtopping flood greater than the "greatest" flood (500 yr. frequency)? ☐ Yes (Go to 3) ☑ No (Go to 2b)	
2b. Does the ADT exceed 50 vehicles per day? ☑ Yes (Go to 2c) ☐ No (Go to 3)	
2c. Would the (duration of road closure in days) multiplied by the (length of detour minus the length of normal route in miles) exceed 20? ☐ Yes (Go to 2d) ☑ No (Go to 3)	
2d. Does the annual risk cost for traffic related costs exceed 10% of the annual capital costs? ☐ No (Go to 3) (See figures A and B – Appendix A(2) - for Assistance)	☐ Yes (Go to 3)

3. ROADWAY AND/OR STRUCTURE REPAIR COSTS

3a. Is the overtopping flood less than a 100 year frequency flood?

☐ Yes (Go to 3b) ☑ No (Go to 3i)

3b. Compare the Tailwater (TW) elevation with the roadway sag point elevation for the overtopping flood. Check the appropriate category.

☐ When TW is above the sag point (Go to 4)

☐ TW is between 0 and 0.5' below sag point (Go to 3c)

☐ TW is between 0.5' and 1.0' below sag point (Go to 3d)

☐ When TW is 1.0' and 2.0' below sag point (Go to 3e)

☐ When TW is more than 2.0' below sag point (Go to 3g)

3c. Does the embankment have a good erosion resistant vegetative cover?

☐ Yes (Go to 3i) ☐ No (Go to 3d)

3d. Is the shoulder constructed from erosion resistant material such as paved, coarse gravel, or clay type soil?

☐ Yes (Go to 3i) ☐ No (Go to 3e)

3e. Will the duration of overtopping for the 25-year flood exceed 1 hour?

☐ Yes (Go to 3f) ☐ No (Go to 3i)

3f. Is the embankment constructed from erosion resistant material such as a clay type soil?

☐ Yes (Go to 3i) ☐ No (Go to 3g)

3g. Is the overtopping flood less than a 25-year frequency flood?

☐ Yes (Go to 3h) ☐ No (Go to 3i)

3h. Will the cost of protecting the roadway and/or embankment from severe damage caused by overtopping exceed the cost of providing additional culvert or bridge capacity?

☐ No (Go to 3i); ☐ Yes (Go to 3i)

3i. Is there damage potential to the structure caused by scour, ice, debris or other means during the lesser of the overtopping flood or the 100 year flood?

☐ Yes (Go to 3j) ☑ No (Go to 4)

3j. Will the cost of protecting the structure from damage exceed the cost of providing additional culvert or bridge water capacity?

☐ No (Go to 4); protecting abutments from scour by riprap. ☐ Yes (Go to 4)

4. Will the capital cost of the structure exceed $1,000,000?

☑ No (Go to 5); ☐ Yes (Go to 5)

5. In your opinion, are there any other factors that you feel should require further study through a risk analysis?

☑ No (Go to 6); ☐ Yes (Indicate)

6. If there are no √'s in the LTEC Design column on the right, proceed with the design, selecting the lowest acceptable grade line and the smallest waterway opening consistent with the constraints imposed on the project. The risk assessment has demonstrated that potential flood damage costs, traffic related costs, roadway and/or structure repair costs are minor and therefore disregarded for this project.

   One or more √'s in the LTEC Design column indicates further analysis in the category checked may be required utilizing the LTEC design process or justification (below) why it is not required.

JUSTIFICATION:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota:

Signature: _____

License Number: 24411 Date: 8/9/2019

From: Bump, Samantha (DNR)
To: Stolte, Aaron
Cc: Horton, Becky (DNR); Parris, Leslie (DNR)
Subject: RE: CSAH 70 Improvement Project (S.P. 019-670-013) - NHIS Review
Date: Wednesday, June 5, 2019 5:46:11 PM
Attachments: image001.png
2_CSAH 70_USGS_Topo.pdf
1_CSAH 70_Project Location.pdf

Hi Aaron,
I have reviewed the attached assessment of the potential for the above project to impact rare features, and concur with your assessment.

- Given the presence of Blanding's turtles (*Emydoidea blandingii)*, a state-listed threatened species, please see the Blanding's turtle fact sheet, which describes the habitat use and life history of this species. The fact sheet also provides two lists of recommendations for avoiding and minimizing impacts to this rare turtle. **Please refer to the first list of recommendations for your project.** If greater protection for turtles is desired, the second list of additional recommendations can also be implemented.

  Due to entanglement issues with small animals, use of erosion control blanket shall be limited to 'bio-netting' or 'natural netting' types, and specifically not products containing plastic mesh netting or other plastic components. These are Category 3N or 4N in the 2016 & 2018 MnDOT Standards Specifications for Construction. Also be aware that hydro-mulch products may contain small synthetic (plastic) fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. As such, please review mulch products and not allow any materials with synthetic (plastic) fiber additives in areas that drain to Public Waters. For specific recommendations pertaining to transportation projects, please refer to Curb Design and Small Animals, Preventing Entanglement, & Reducing Wildlife Vehicle Collisions in Chapter One of the Minnesota Department of Transportation's Best Practices Manual.

- The rusty patched bumble bee (*Bombus affinis*), a federally-listed endangered species, was documented in the vicinity of the proposed project. The rusty patched bumble bee typically occurs in grasslands and urban gardens with flowering plants from April through October. This species nests underground in abandoned rodent cavities or in clumps of grasses. Please reference the guidance at the USFWS rusty patched bumble bee website to determine if the project has the potential to impact this protected species.

Thank you for notifying us of this project, and for the opportunity to provide comments.

Have a great day,
Samantha Bump
NHIS Review Specialist | Ecological & Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155
Phone: 651-259-5091
Samantha.Bump@state.mn.us
cid:image001.png@01D49301.342223D0

Links:
Blanding's Turtle Fact Sheet
http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/turtles/blandings_turtle/factsheet.pdf

Blanding's Turtle Flyer
http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/turtles/blandings_turtle/flyer.pdf
Wildlife Friendly Erosion Control
http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf
Chapter One of the Minnesota Department of Transportation's Best Practices Manual
http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/gp_2004_0001_manual.html
USFWS Rusty Patched Bumble Bee
https://www.fws.gov/midwest/endangered/insects/rpbb/guidance.html

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From: Stolte, Aaron <Aaron.Stolte@kimley-horn.com>
Sent: Friday, March 8, 2019 10:19 AM
To: MN_NHIS, Review (DNR) <Review.NHIS@state.mn.us>
Subject: CSAH 70 Improvement Project (S.P. 019-670-013) - NHIS Review

Hello,

Kimley-Horn has been contracted to complete an EA/EAW for the CSAH 70 Improvement Project located in Lakeville, Dakota County, MN. Dakota County is proposing to expand the existing two-lane rural highway section from Kenrick Ave/Kensington Blvd to CSAH 23 (Cedar Ave), to a four-lane divided highway. Additional improvements include:

- 220th Street, located south of CSAH 70, would be extended to connect to Cedar Ave about 0.5 miles south of the Cedar Ave/CSAH 70 intersection
- 217th Street would be extended between Humboldt and Holyoke Ave approximately 750 feet south of CSAH 70
- A trail is proposed adjacent to South Creek which runs parallel to the north of CSAH 70 for a portion of the corridor. The trail will be located on an existing berm.

The location of these improvements is shown on the attached project location figure.

A review of the DNR Natural Heritage Inventory System database was conducted (LA-843) for the project study area and within a 1-mile of the study area. The following were identified within a 1-mile radius of the project site.

- One record for Rattlesnake master was located outside of the project limits; however, was located within the 1-mile radius (southwest of the project area). The status of Rattlesnake master is of state special concern. The project is located adjacent to agricultural, suburban, and industrial land and would take place in manicured grassland, within or adjacent to existing roadside ditches, or existing agricultural land. There is likely no suitable habitat within the project limits therefore, no adverse impacts are anticipated on this species.
- One record for Blanding's Turtle was located outside of the project limits; however, was located within the 1-mile radius (southwest of the project area). The Blanding's turtle is listed as threatened. Based on the one observed occurrence of Blanding's turtle in the vicinity of the project study area, it is unlikely that population is present within the project construction limits; however, to minimize any potential impacts, measures identified in the Blanding's turtle fact sheet will be evaluated and wildlife friendly erosion control methods will be used during construction.

Three mapped regionally significant ecological areas (RSEA) are located within one mile of the project. Considering none of the RSEA areas are within the project limits, no adverse impacts in these RSEA's are anticipated.

Multiple DNR Public Waterways area located within the project vicinity and are considered trout streams.

Stormwater requirements such as temperature and rate control will be implemented during roadway design to meet City and VRWJPA requirements which are consistent with the MnDNR requirements.

Based on the information listed above, no adverse impacts are anticipated to the species or the RSEA areas identified through the NHIS records search. Impacts to designated trout streams will be minimized and avoided to the extent practicable and all design will meet local and state requirements. Please confirm our conclusions and let us know if you have any questions.

Thank you!

Aaron Stolte
Kimley-Horn | 767 Eustis Street, Suite 100, St. Paul, MN 55114
Direct: 612 326 9510 | Mobile: 651 491 4798 | www.kimley-horn.com

County Rd 70 Public Involvement and Communication Summary

Project stakeholders include one of the largest industrial parks in the metro area, Airlake Airport, residential neighborhoods, Lakeville school district, and regional commuters accessing I-35 and Cedar Ave. The County Rd 70 public involvement and communication plan involves several methods to solicit input from the public and stakeholders as well as provide information throughout all stages of project development. These items include newsletters to inform the public of events related to the project, contact information, and a link to INPUTiD.

Open Houses

A total of three open houses will be held throughout the final design phase to engage residents and property/business owners. The first open house was held on December 6, 2018 and provided an opportunity to share the project purpose and need as well as gather input on goals, issues, needs, and opportunities. The second open house was held on June 10, 2019 with a focus on gathering additional input on proposed solutions including construction staging alternatives. The third and final open house is planned for Fall of 2019 and will present preferred project solutions and construction staging and schedule.

One-on-One and Focus Group Meetings

Individualized contact with the stakeholders most affected by the project has been important. Two rounds of business owner meetings have been held ahead of the public open houses to gather feedback. Communication lines have been established to encourage on-going contact throughout the project.

A focus group meeting was also held with the neighborhood along 215th Street, a frontage road just east of Dodd Blvd, that is near County Rd 70.

Project Website

The project website houses the various public involvement items, including newsletters, project design layouts, and items displayed at the public open houses. A link to the project's online engagement tool, INPUTiD, as well as project contact information is included on the website.

Online Engagement

INPUTiD is an interactive map in which residents, businesses, schools, and commuters can provide their feedback throughout the project. This tool is used as a two-way format for communication with the project team which is made up of County, City, and Consultant representatives. Bi-Monthly INPUTiD summaries that break down the information received are being prepared and available for the public to view at any time.

INPUTiD Summary

October, 2018

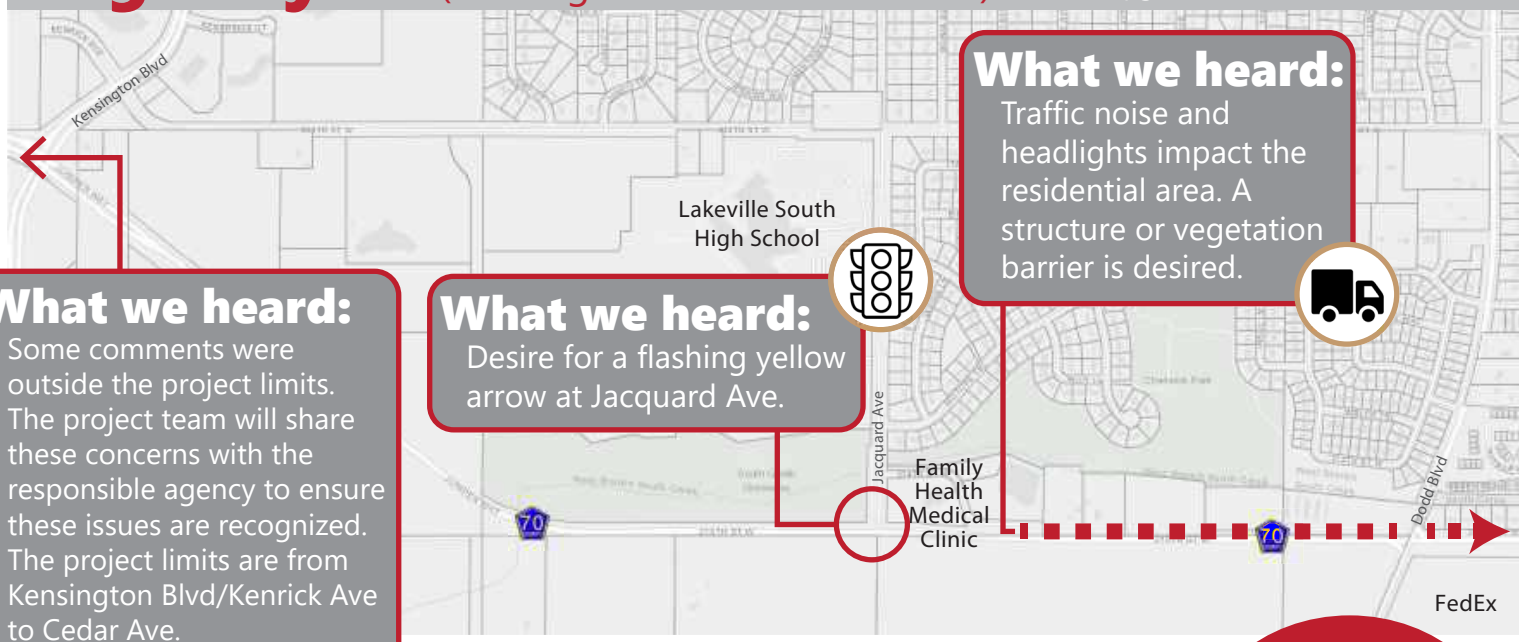
Online Public Engagement.

This is the first INPUTiD summary for the Highway 70 Expansion Project. A monthly summary will be provided by project email updates and on the website. *Please continue to submit your comments and look for monthly updates from the project team!*

15
Total Comments as of October 31

Highway 70 (Kensington Blvd to Dodd Blvd)

see pg 2 for Dodd Blvd to Cedar Ave



What we heard:
Some comments were outside the project limits. The project team will share these concerns with the responsible agency to ensure these issues are recognized. The project limits are from Kensington Blvd/Kenrick Ave to Cedar Ave.

What we heard:
Desire for a flashing yellow arrow at Jacquard Ave.

What we heard:
Traffic noise and headlights impact the residential area. A structure or vegetation barrier is desired.

Frequently Asked Questions or Comments

Click here to visit the INPUTiD tool and view all the comments received.

Click here to learn about traffic engineering considerations!

Will there be room for bicycles?
A continuous off-road trail connection is a project goal and being evaluated as part of the preliminary design.

Are noise barriers being considered?
As part of the design and planning process, the project team will be conducting a noise study per federal regulations. This noise study will include opportunity for public input and review.

Signal Timing Issues and Intersection Control Changes:
"When traffic is light many people turn left on red because the wait is too long"
"It is difficult to turn left across traffic"
"Would like to see a roundabout placed here"

The project team is assessing intersection control options and access modifications necessary to ensure Highway 70 operates safely and efficiently.

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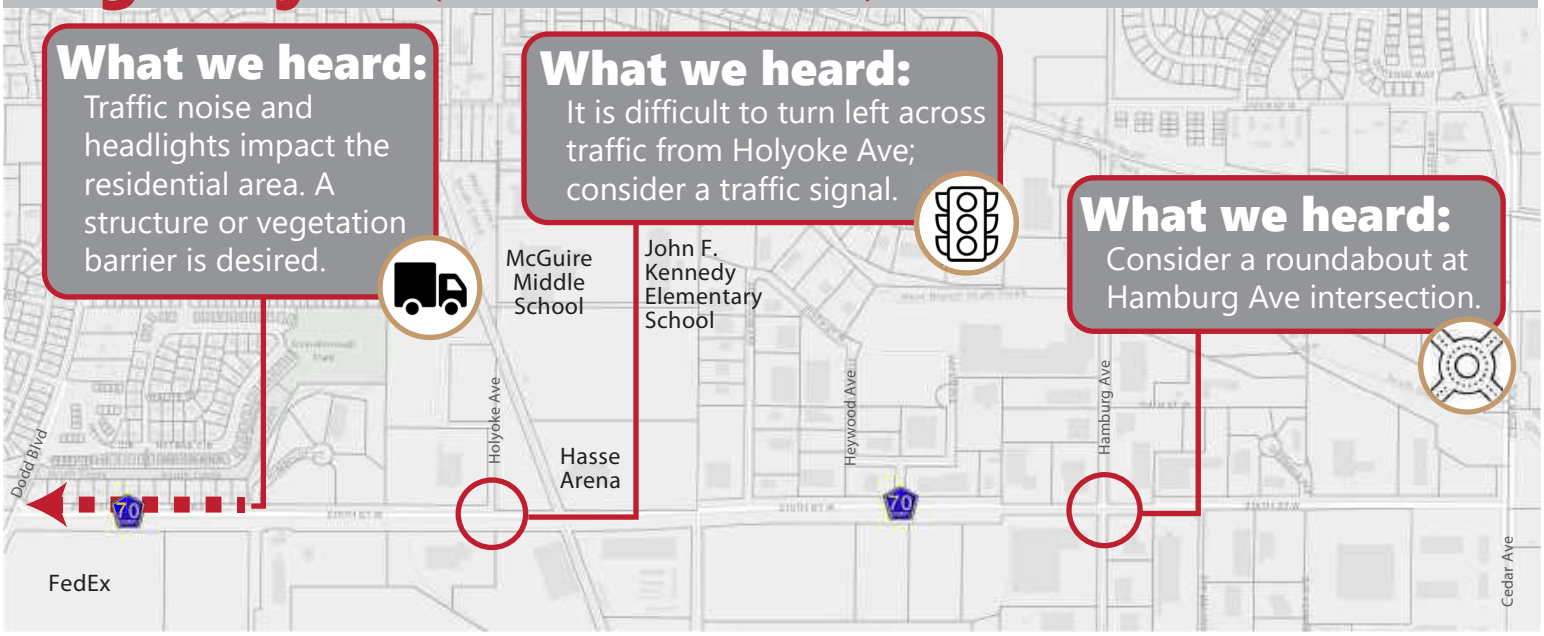
INPUTiD Summary

October, 2018

INPUTiD Online Public Engagement.

15 Total Comments as of October 31

Highway 70 (Dodd Blvd to Cedar Ave)



Public Involvement through October

Keep up to date with ongoing public involvement opportunities at highway70expansion.com

181 Email Update Subscribers

1,510 Adjacent Resident, Business & Property Owner Mailings

Sign up for Email Updates on the project website to receive these if you are outside the project area.

15 INPUTiD Comments

15 Business & Property Owner Meetings

951 Website Visits

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COUNTY ROAD 70 EXPANSION PROJECT

INPUTiD Summary

November/December, 2018

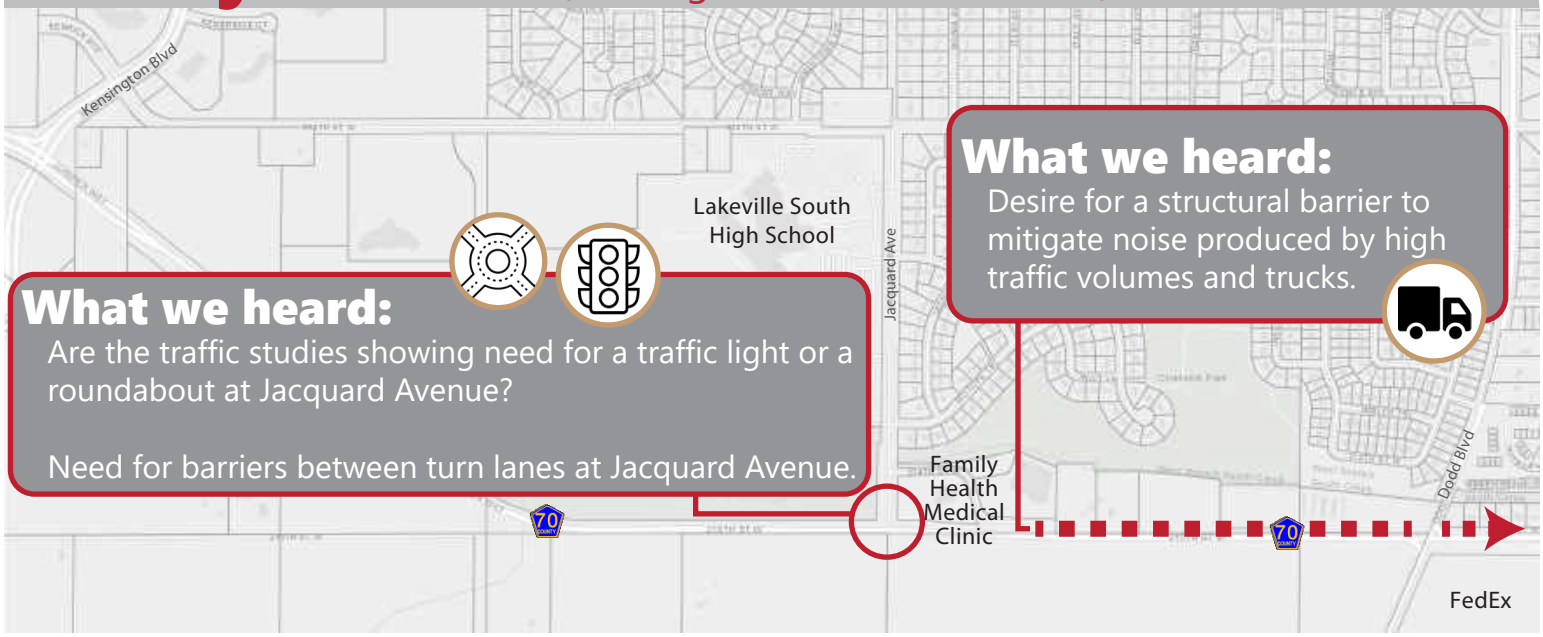
INPUTiD Online Public Engagement.

This is the second INPUTiD summary for the County Road 70 Expansion Project. All summaries will be shared by project email updates and on the website. *Please continue to submit your comments and look for updates from the project team!*

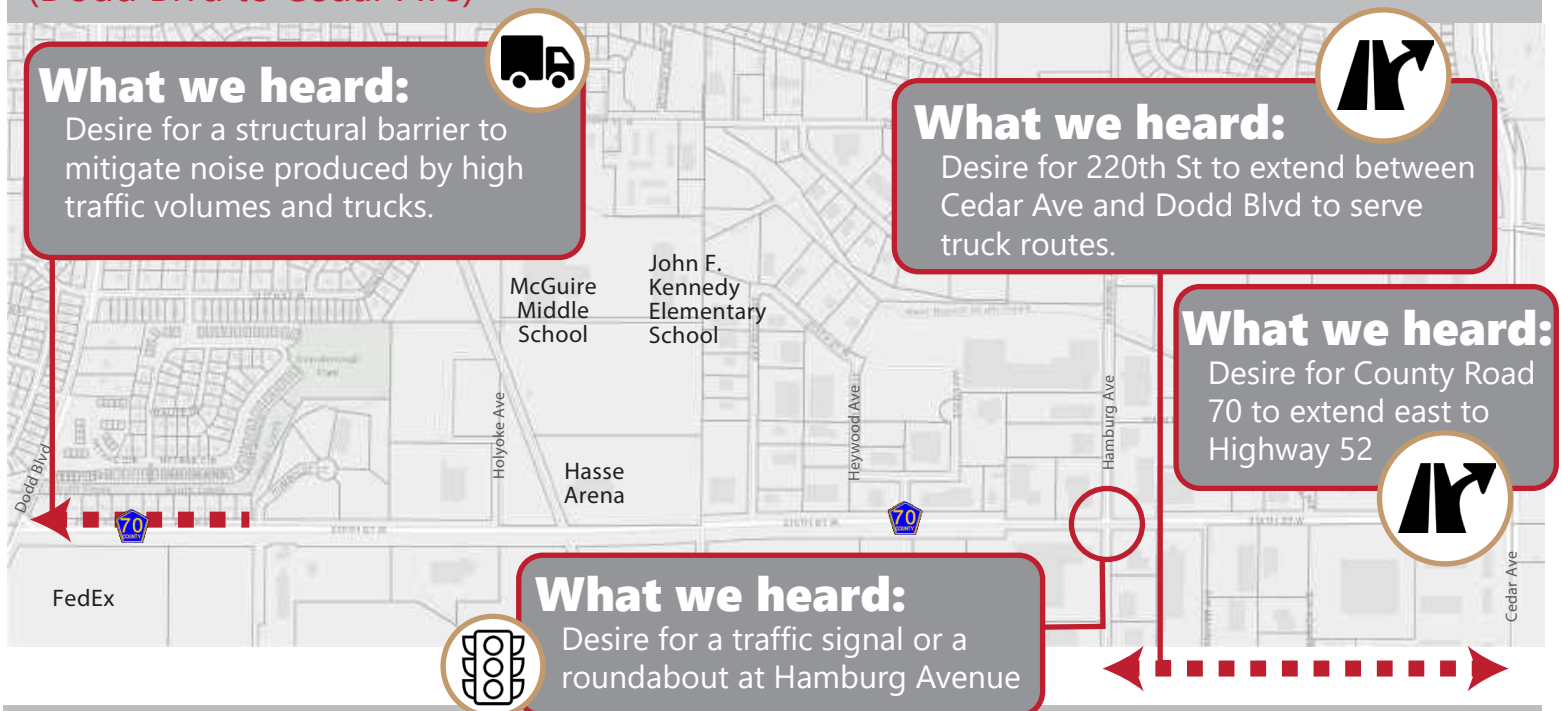
10 New Comments

25 Total Comments

County Road 70 (Kensington Blvd to Dodd Blvd)



(Dodd Blvd to Cedar Ave)



countyroad70expansion.com

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COUNTY ROAD 70 EXPANSION PROJECT

INPUTiD Summary

November/December, 2018

INPUTiD™ Online Public Engagement.

Project Team Responses to Frequent Questions and Comments:

Click here to visit the INPUTiD tool and view all the comments received.

Are noise barriers being considered?

Per federal regulations, the project team is currently conducting a noise wall study as part of the design and planning process. The results of the study will determine if a noise wall is warranted and will be available for public comment in early 2019. *Click here to view video about the study process.*

What is the traffic study showing for intersection controls?

Based on the study results, a traffic signal is proposed to remain at the Jacquard Avenue, Dodd Blvd, and Cedar Avenue intersections. The Hamburg Avenue intersection does not experience high enough traffic volumes to warrant a traffic signal installation with the proposed expansion project, but will continue to be monitored for future needs. This project is also looking at ways to increase mobility through new local street connections.

Can the project include an extension of 220th Street to serve truck routes?

The extension of 220th Street to Cedar Avenue is currently a part of the project.

Desire for County Road 70 to extend east from Cedar Ave to Highway 52.

Extending County Road 70 to Highway 52, and designating it as a Principal Arterial, is a long-term plan for Dakota County. No extensions of County Road 70 are planned with this project. *Click here to view the recent Dakota County Principal Arterial Study.*

Public Involvement through December

Below are highlights of the ongoing business and property owner engagement efforts. The purpose of these small group and one-on-one meetings is to understand operational needs and issues of businesses and residents, identify any access considerations, and discuss concerns regarding potential property impacts.

LOGISTICS

41 Business & Properties were represented

OCT 2018 Discussions began and are ongoing

Meeting Locations:
- Hasse Arena
- Lakeville Area Arts Center
- On Site

Invitation Formats:
- Letter
- Email
- Phone Call

FREQUENT BUSINESS & PROPERTY OWNER TOPICS

- **Access** that supports **Site Operations**
- **Connection** to **I-35** and **Cedar Avenue**
- Plans for future **Business Development**
- Concerns for **Operations** during **Construction**

FREQUENT RESIDENTIAL CONCERNS

- Noise and Light Pollution
- Property Values Impacts
- Impacts and Maintenance of Trail and Trees
- Drainage and Slope Stabilization
- Nonconforming Property Setback Constraints

Other Public Involvement:

45 Open House Attendees

Click here to view the summary.

2,700 Adjacent Resident, Business & Property Owner Mailings

Sign up for Email Updates on the project website to receive this information.

1 Dakota County Facebook Post

229 Email Update Subscribers

3,000 Website Visits

Keep up to date with ongoing public involvement opportunities at countyroad70expansion.com

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COUNTY ROAD 70 EXPANSION PROJECT

INPUTiD Summary

May, 2019

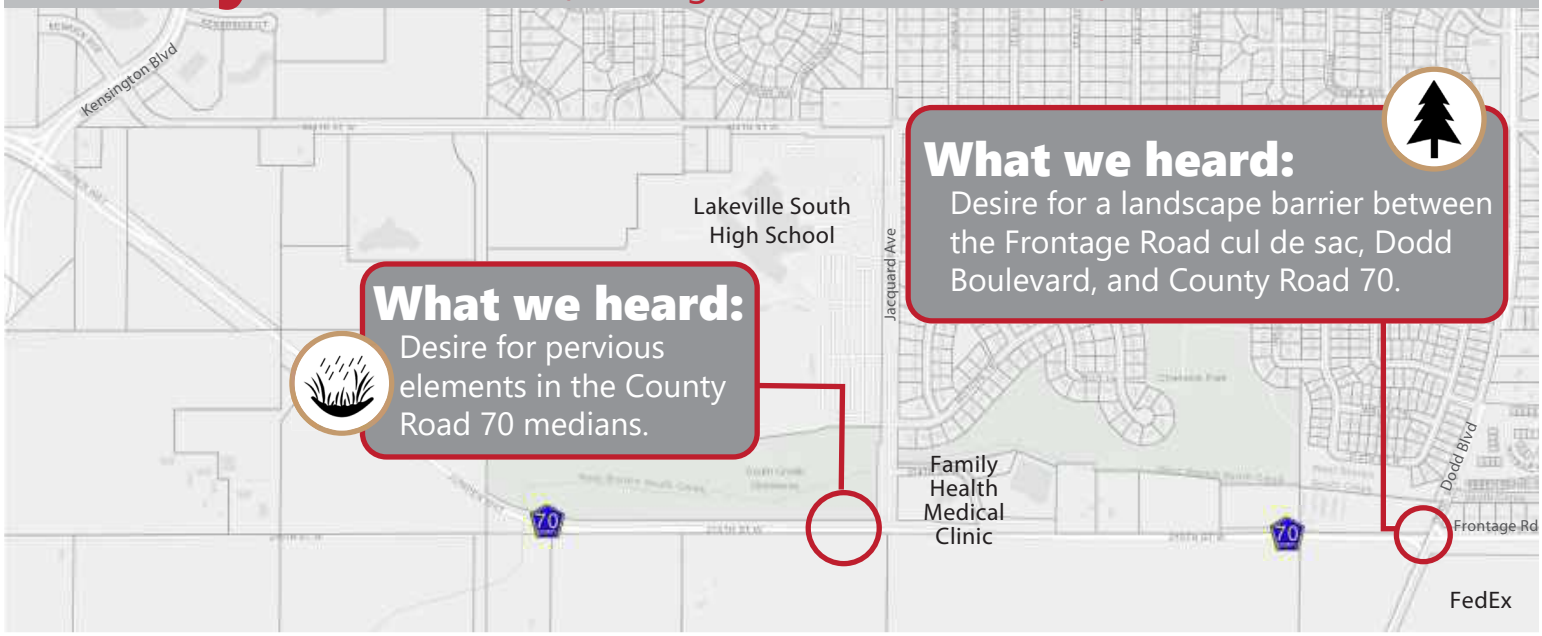
INPUTiD™ Online Public Engagement.

This is the third INPUTiD summary for the County Road 70 Expansion Project. All summaries will be shared by project email updates and on the website. *Please continue to submit your comments and look for updates from the project team!*

9 New Comments

34 Total Comments

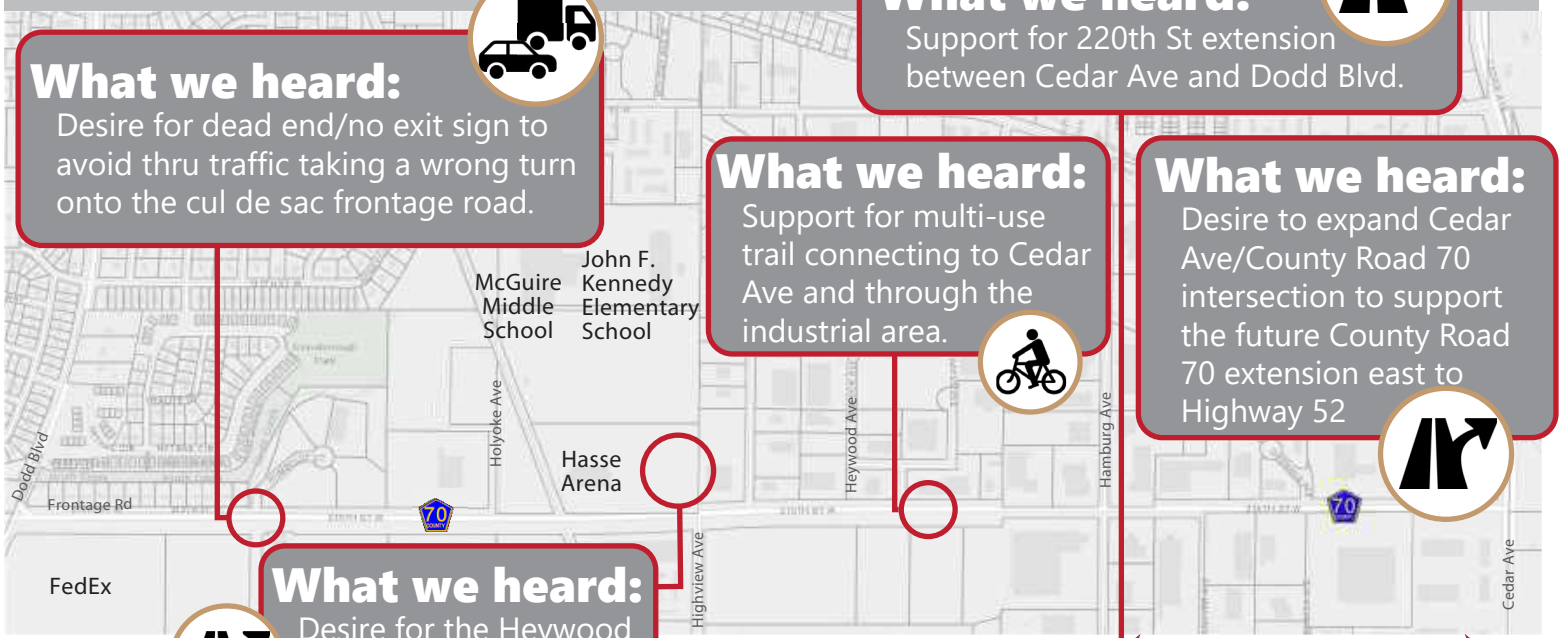
County Road 70 (Kensington Blvd to Dodd Blvd)



What we heard:
Desire for pervious elements in the County Road 70 medians.

What we heard:
Desire for a landscape barrier between the Frontage Road cul de sac, Dodd Boulevard, and County Road 70.

(Dodd Blvd to Cedar Ave)



What we heard:
Desire for dead end/no exit sign to avoid thru traffic taking a wrong turn onto the cul de sac frontage road.

What we heard:
Support for 220th St extension between Cedar Ave and Dodd Blvd.

What we heard:
Support for multi-use trail connecting to Cedar Ave and through the industrial area.

What we heard:
Desire to expand Cedar Ave/County Road 70 intersection to support the future County Road 70 extension east to Highway 52

What we heard:
Desire for the Heywood Ave realignment to include curb and gutter.

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COUNTY ROAD 70 EXPANSION PROJECT

INPUTiD Summary

May, 2019

INPUTiD Online Public Engagement.

Project Team Responses to Frequent Questions and Comments:

Click here to visit the INPUTiD tool and view all the comments received.

Desire for pervious and landscape elements for water quality and barrier benefits.

Enhanced corridors that serve multiple functions and provide multiple community benefits in areas of water quality, habitat, recreation and non-motorized transportation is always a goal of Dakota County's. These elements will be considered in final design to be completed in Summer/Fall of 2019.

Desire for dead end/no exit signage at the 215th Street Frontage Road intersection with County Road 70.

Signage will be determined in final design to be completed in Summer/Fall of 2019.

Desire to expand the Cedar Ave/County Road 70 intersection to support the future extension of County Road 70 east to Highway 52.

The extension of County Road 70 to Highway 52 is a long-term plan and not a part of this project. Although, the design of the Cedar Avenue intersection will allow for efficient operations on opening day of the future County Road 70 extension without overbuilding for the existing and mid-term operational needs. *Click here to view the recent Dakota County Principal Arterial Study.*

Will the Heywood Avenue realignment east of Hasse Arena include curb and gutter?

The details of the Heywood Avenue realignment have yet to be determined and will be done so in final design. The impacts and requirements for drainage will be a primary factors considered in the design.

2019 Public Involvement Highlights

Below are highlights of the ongoing stakeholder and property owner engagement efforts. Check back to the project website and previous INPUTiD summaries for all public and stakeholder involvement to date!

45
Agency & Public Meetings
This includes all impacted agencies, businesses, and property owners.

2 Dakota County Facebook Post

2,700
Adjacent Resident, Business & Property Owner Mailings
Sign up for Email Updates on the project website to receive this information.

36,600
Website Visits

250
Email Update Subscribers

INPUTiD Online Public Engagement.
34 Total INPUTiD Comments

The next Public Open House is planned for June 10, 2019. See the project website for more information. The December Open House summary is also available on the project website.

Keep up to date with ongoing public involvement opportunities at countyroad70expansion.com

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COUNTY ROAD 70 EXPANSION PROJECT

INPUTiD Summary

August, 2019

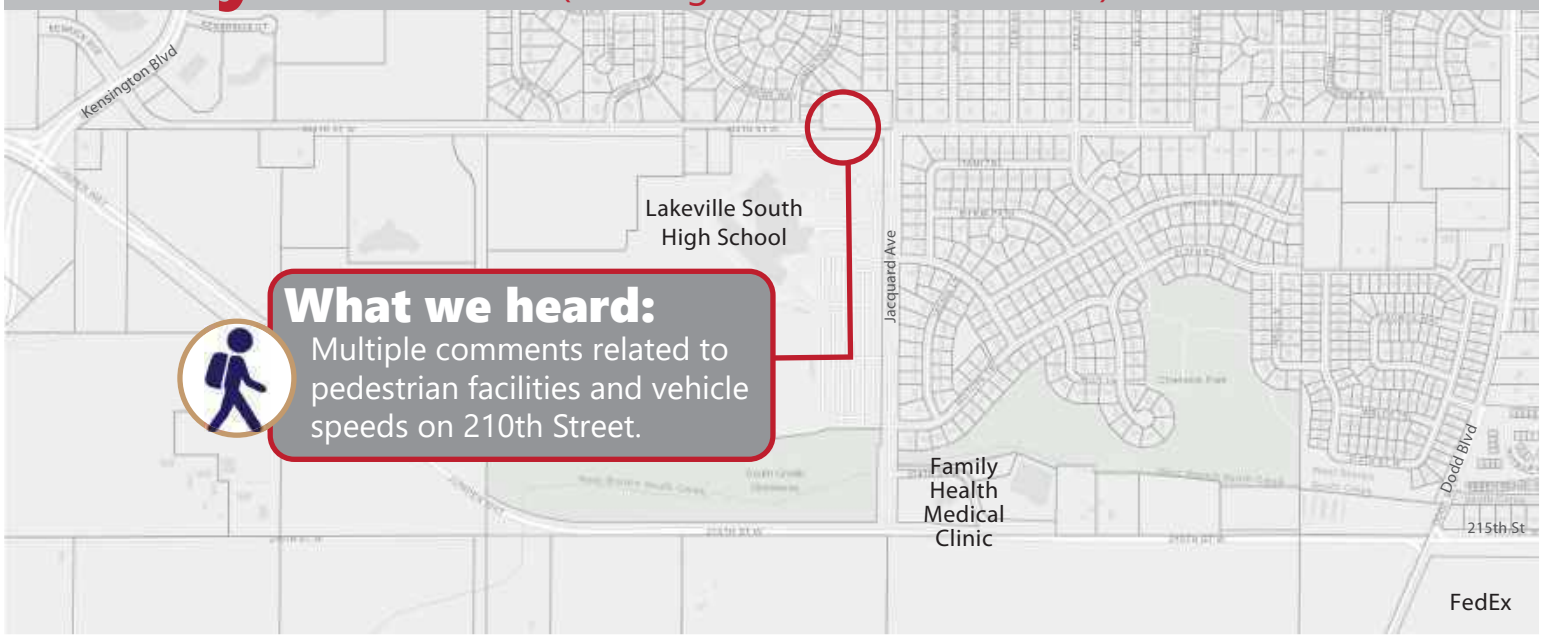
INPUTiD™ Online Public Engagement.

This is the fourth INPUTiD summary for the County Road 70 Expansion Project. All summaries have been shared by project email updates and on the project website *Stay Involved* page.

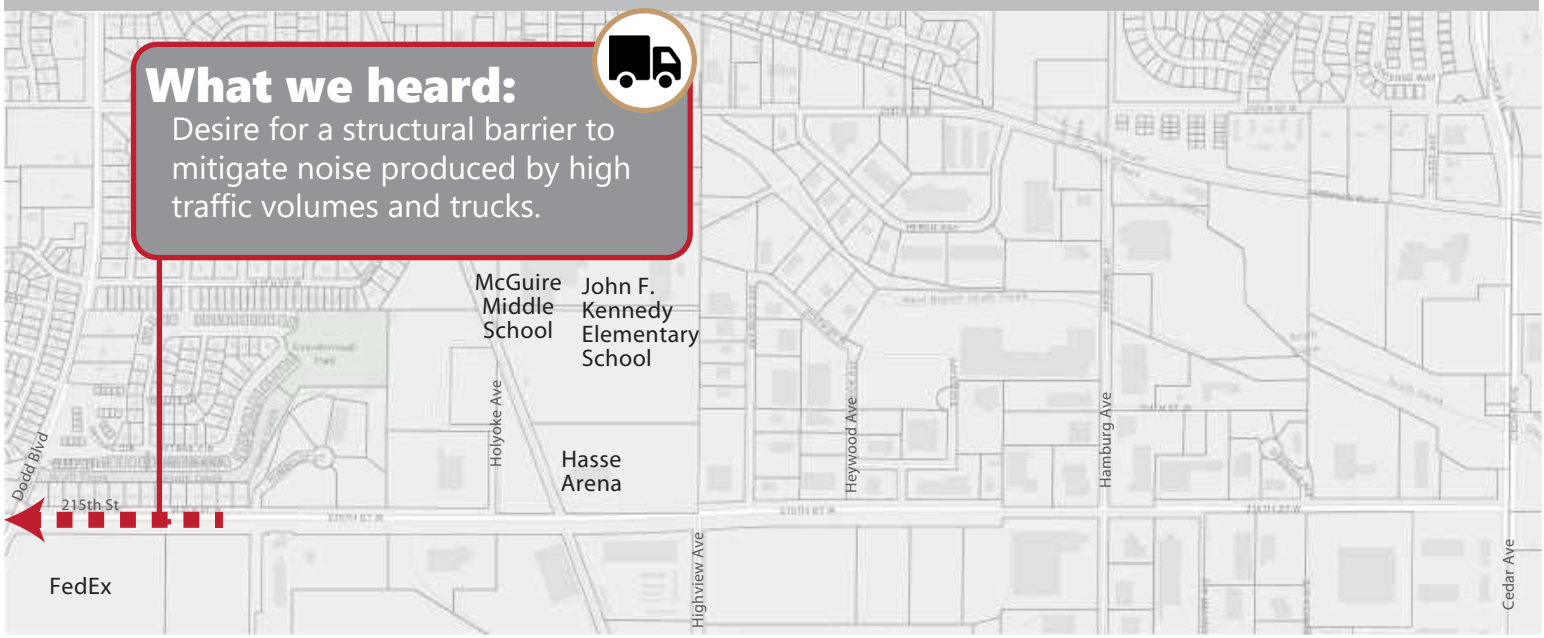
7 New Comments

41 Total Comments

County Road 70 (Kensington Blvd to Dodd Blvd)



(Dodd Blvd to Cedar Ave)



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COUNTY ROAD 70 EXPANSION PROJECT

INPUTiD Summary

August, 2019

INPUTiD Online Public Engagement.

Project Team Responses to Frequent Questions and Comments:

Click here to visit the INPUTiD tool and view all the comments received.

Multiple comments related to pedestrian facilities and vehicle speeds on 210th Street.

Reconstruction of 210th Street, from Kensington Blvd to Holyoke Ave, is a city project programmed for 2022. This project will include review of roadway design speeds, roadway reconstruction with curb and gutter, and pedestrian facilities.

Desire for a structural barrier to mitigate noise produced by high traffic volumes and trucks.

Per federal regulations, the project team conducted a noise study as part of the design and planning process. The results of the study determined that a noise wall is cost-effective for several properties east of Dodd Blvd, along 215th Street. The proposed barrier is 20 feet tall and approximately 1,320 feet long on the north side of County Road 70, between Dodd Blvd and Humboldt Ct. A vote from benefitting properties is currently in process to determine whether the proposed noise wall should be built. It is anticipated that the voting results will be known late summer/early fall of 2019.

2019 Public Involvement Highlights

Below are highlights of the ongoing stakeholder and property owner engagement efforts. Check back to the project website and previous INPUTiD summaries for all public and stakeholder involvement to date!

50+
Agency & Public Meetings
This includes all impacted agencies, businesses, and property owners.

2 Dakota County Facebook Post

4,260
Adjacent Resident, Business & Property Owner Mailings
Sign up for Email Updates on the project website to receive this information.

74,000
Website Visits

387
Email Update Subscribers

INPUTiD Online Public Engagement.
41 Total INPUTiD Comments

Open House #2 Summary:
The purpose of the June 19 Open House was to allow the public a chance to view the final improvements layout and provide input on construction staging. See the *Stay Involved* page on the project website for more details and the materials that were presented.

Business & Property Owner Summary:
The purpose of the May 21 meeting was to allow the business and property owners a chance to view the final improvements layout and provide input on construction staging prior to this information being shared at the second open house. See the *Project Layout & Construction Staging* page on the project website for more details on the selected construction staging plan.

Keep up to date with ongoing public involvement opportunities at countyroad70expansion.com

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Wetland Impact Assessment & Two Part Finding Form

Project Description

S.P. Number: S.P. 019-670-013 **County**: Dakota
Project Name: County State Aid Highway 70 Expansion Project **Watershed**: Mississippi River- Lake Pepin

Project Description

Dakota County is proposing to expand County State Aid Highway 70 (referred to in document as CSAH 70) from Kenrick Avenue/Kensington Boulevard to County State Aid Highway (CSAH 23) (Cedar Ave), to a four-lane divided highway. Improvements include two traffic lanes in each direction with a center median, the addition of turn lanes, access modifications, and a trail on both sides of CSAH 70 (with the exception of the south side between Dodd Boulevard and Kensington Avenue/Kenrick Avenue).

Purpose and Need

The purpose of the proposed action is to improve traffic mobility and enhance pedestrian/bicycle connectivity along CSAH 70. More details regarding purpose and need are included in **Section 3 of the EA**.

Primary needs for the project include freight and vehicle mobility, in which traffic operations data indicates that this section of CSAH 70 will not reasonably accommodate the 2040 traffic forecasts on the existing roadway section. The traffic forecasts and future year intersection operations demonstrate the need for additional roadway capacity improvements within the project corridor. There are signs that the existing roadway is nearing capacity. With an existing AADT of 13,300 vehicles per day along CSAH 70, west of Dodd Boulevard, the road segment is close to capacity as a three-lane roadway. With traffic volumes on CSAH 70 projected to continue to grow, they would begin to have impacts on the safety and operations of the corridor.

Secondary needs include the pedestrian and bicycle facility gaps along the corridor. This segment is recognized as a medium priority pedestrian and bicycle gap, meaning there are locations that lack sidewalk or a shared use trail.

Additional considerations include the protection of environmental resources, stormwater management, and traffic noise generation along CSAH 70.

Overview: Total Wetland Impacts

This wetland assessment addresses permanent wetland impacts for the CSAH 70 Expansion Project in Lakeville, MN. The definition of a permanent wetland impact is a loss in the quantity, quality or biological diversity of a wetland and will not be restored to pre-project conditions and functions within 90 days of the impact occurrence. The definition of a temporary wetland impact is an impact area that is repaired, rehabilitated or restored to existing conditions within 90 days of the impact occurrence. The regulatory agencies will determine whether an impact to an aquatic resource is permanent or temporary. Temporary impacts will be addressed

through the permitting process. Table 1 lists wetland impacts that are anticipated as part of the CSAH 70 Expansion Project.

Table 1. Total Permanent Impacts

	Permanent Impacts (Acres or Square Feet [1])
Wetland basins	0.43 ac
Ditches with wetlands in the bottom (WCA* and COE*)	0.00
Ditches with wetlands in the bottom (COE only)	1.56 ac
Constructed Stormwater Pond	0.02
Tributaries	714 sq ft
*Corps of Engineers *Wetland Conservation Act	

Location of Wetlands in Project Area

A Level 2 Delineation was completed in September 2018, October 2018, and July 2019 for all wetlands the project had the potential to impact. A Level 2 Delineation is based on a field survey of vegetation, soil, and hydrology characteristics, following procedures described in the *U.S. Army Corps of Engineers Wetlands Delineation Manua*l (Technical Report Y-87-1, 1987) and in accordance with the methods identified in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (Interim Regional Supplements) as required by both the Minnesota Wetland Conservation Act (WCA) and Section 404 of the Clean Water Act (CWA). Delineated wetland maps are attached to this form. Table 2 lists the total acreage of delineated resources (the acreages are the fully delineated basin, not just the area within Right of Way).

A majority of the delineated wetlands are located in the bottom of roadside ditches and appear to have been constructed in upland for the purposes of stormwater conveyance; therefore, these wetlands are not anticipated to be regulated under WCA but are anticipated to be jurisdictional under Section 404 of the CWA but may not require mitigation. Two tributaries, the West Branch and an unnamed ephemeral stream, were identified and delineated. Supporting information is included in the Compensation section.

Table 2. Aquatic Resource Overview

	Total Areas (Acres)
Wetland basins	7.09
Ditches with wetlands in the bottom (WCA and COE)	0
Ditches with wetlands in the bottom (COE only)	1.76

	Total Areas (Acres)
Constructed Stormwater Pond	0.64
Tributaries	0.58

PART 1: Avoidance Alternatives

No- Build Alternative

The No-Build Alternative would maintain the current roadway. This alternative would avoid all wetland impacts (except those due to routine maintenance) but would fail to meet the project purpose and need. It was therefore rejected from further consideration.

Alignment Alternatives

Given the location of the development in relation to the existing roadway right-of-way and the nature of the corridor needs (e.g., expanding on in-place alignment), consideration was given to shifting the existing alignment to minimize right-of-way acquisition. Shifting the road alignment north was eliminated from consideration because it would have greater property impacts than the preferred alternative.

Alternatives Considered

Given the needs of the project and the location of the delineated wetlands, there were no practical alternatives that avoided wetland impacts. Impacts to wetlands are the result of the roadway improvements, trail construction, and drainage management.

PART 2: Minimization Measures

It was not feasible to completely avoid all wetland impacts resulting from this roadway improvement. Specific minimization measures include:

- Realigning the 220th Street extension to minimize impacts to a large wetland associated with the South Creek – South Branch tributary.
- Situated the South Creek Greenway trail to avoid impacts to South Creek – West Branch tributary and associated wetlands.

Additional minimization measures are being evaluated as part of final design.

Table 3. Delineated Wetland Basin Impacts

Basin ID	Section, Township, Range	Wetland Type/ Existing Plant Community Type(s)	Basin Size (Acres)	Permitting Jurisdiction (COE, DNR, WCA)	Size of Permanent Impact of the Preferred Alternative (Acres)
1	S33, T114N, R20W	1/Seasonally Flooded Basin	5.27	COE/WCA	0.10
3	S34, T114N, R20W	1/Seasonally Flooded Basin	0.25	COE/WCA	0.12
35	S36, T114N, R21W	1/Seasonally Flooded Basin	0.52	COE/WCA	0.31
39	S36, T114N, R21W	1/Seasonally Flooded Basin	0.12	COE	0.06
				Total Permanent Impacts:	**0.59**

Table 4. Delineated Stormwater Pond Impacts

Basin ID	Section, Township, Range	Wetland Type/ Existing Plant Community Type(s)	Basin Size (Acres)	Permitting Jurisdiction (COE, DNR, WCA)	Size of Permanent Impact of the Preferred Alternative (Acres)
2	S34, T114N, R20W	3/Shallow Marsh	0.64	COE/WCA	0.02
				Total Permanent Impacts:	**0.02**

Table 5. Delineated Wetland Ditch Impacts

Ditch ID	Section, Township, Range	Wetland Type/ Existing Plant Community Type(s)	Basin Size (Acres)	Permitting Jurisdiction (COE, DNR, WCA)	Size of Permanent Impact of the Preferred Alternative (Acres or Square Feet*)
4	S33, T114N, R20W	1/Seasonally Flooded Basin	0.01	COE	340 sf

Ditch ID	**Section, Township, Range**	**Wetland Type/ Existing Plant Community Type(s)**	**Basin Size** (Acres)	**Permitting Jurisdiction** (COE, DNR, WCA)	**Size of Permanent Impact of the Preferred Alternative** (Acres or Square Feet*)
5	S33, T114N, R20W	1/Seasonally Flooded Basin	0.01	COE	303 sf
6	S33, T114N, R20W	1/Seasonally Flooded Basin	0	COE	64 sf
7	S33, T114N, R20W	1/Seasonally Flooded Basin	0	COE	107 sf
8	S32, T114N, R20W	1/Seasonally Flooded Basin	0.01	COE	0.01
9	S32, T114N, R20W	2/Fresh (Wet) Meadow	0.02	COE	0.02
10	S32, T114N, R20W	1/Seasonally Flooded Basin	0.03	COE	0.03
11	S32, T114N, R20W	6/Shrub Swamp	0	COE	199 sf
12	S32, T114N, R20W	2/Fresh (Wet) Meadow	0.02	COE	0.02
13	S32, T114N, R20W	2/Fresh (Wet) Meadow	0.12	COE	0.12
14	S32, T114N, R20W	2/Fresh (Wet) Meadow	0.02	COE	0.02
15	S32, T114N, R20W	2/Fresh (Wet) Meadow	0.07	COE	0.05
16	S32, T114N, R20W	1/Seasonally Flooded Basin	0	COE	191 sf
17	S32, T114N, R20W	1/Seasonally Flooded Basin	0.01	COE	68 sf
18	S32, T114N, R20W	1/Seasonally Flooded Basin	0.01	COE	324 sf
19	S32, T114N, R20W	2/Fresh (Wet) Meadow	0.36	COE	0.36
20	S31, T114N, R20W	1/Seasonally Flooded Basin	0	COE	139 sf
21	S31, T114N, R20W	2/Fresh (Wet) Meadow	0.01	COE	275 sf

Ditch ID	Section, Township, Range	Wetland Type/ Existing Plant Community Type(s)	Basin Size (Acres)	Permitting Jurisdiction (COE, DNR, WCA)	Size of Permanent Impact of the Preferred Alternative (Acres or Square Feet*)
22	S31, T114N, R20W	1/Seasonally Flooded Basin	0	COE	33 sf
23	S31, T114N, R20W	2/Fresh (Wet) Meadow	0.06	COE	0.04
24	S31, T114N, R20W	2/Fresh (Wet) Meadow	0.01	COE	301 sf
25	S31, T114N, R20W	2/Fresh (Wet) Meadow	0	COE	51 sf
27	S31, T114N, R20W	1/Seasonally Flooded Basin	0.09	COE	0.03
28	S31, T114N, R20W	1/Seasonally Flooded Basin	0.08	COE	0.03
29	S31, T114N, R20W	3/Shallow Marsh	0.02	COE	0.02
30	S31, T114N, R20W	2/Fresh (Wet) Meadow	0.02	COE	0.02
31	S31, T114N, R20W	1/Seasonally Flooded Basin	0.12	COE	0.12
32	S31, T114N, R20W	2/Fresh (Wet) Meadow	0.06	COE	0.06
34	S36, T114N, R21W	1/Seasonally Flooded Basin	0.05	COE	0.05
36	S36, T114N, R21W	1/Seasonally Flooded Basin	0.12	COE	0.12
37	S36, T114N, R21W	1/Seasonally Flooded Basin	0.05	COE	0.05
38	S36, T114N, R21W	1/Seasonally Flooded Basin	0.04	COE	0.04
39	S36, T114N, R21W	1/Seasonally Flooded Basin	0.12	COE	0.06
40	S36, T114N, R21W	1/Seasonally Flooded Basin	0.21	COE	0.21
				Total Permanent Impacts:	**1.53 acres**

* Size of impact recorded in square feet if below 0.01 acres

Table 6. Delineated Tributary Impacts

Resource ID	**Section, Township, Range**	**Wetland Type/ Existing Plant Community Type(s)**	**Basin Size** (Acres)	**Permitting Jurisdiction** (COE, DNR, WCA)	**Size of Permanent Impact of the Preferred Alternative** (Acres or Square Feet*)
West Branch of South Creek	S31, T114N, R20W	Tributary	0.57	COE	275 sf
Unnamed Ephemeral Tributary	S36, T114N, R21W	Tributary	0.01	COE	439 sf
				Total Permanent Impacts:	**0.02 ac**

* Size of impact recorded in square feet if below 0.01 acres

The location of each wetland impact is illustrated in attached exhibits.

COMPENSATION (REPLACEMENT/ENHANCEMENTS)

All delineated wetland ditches appear to have been created for stormwater conveyance. These wetlands meet the definition of “incidental” (as identified in the Minnesota Wetland Conservation Act 8420.0105, Subpart 2, Part D) as they have been created in historically upland areas and are dependent on the adjacent roadway runoff for their hydrology; however, are anticipated to be considered jurisdictional by the US Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA).

Applications for wetland permits will be made to the appropriate agencies with wetland jurisdiction. Expected wetland mitigation needs are refined on a continual basis during early stages of project design, and therefore subject to change. In the event that wetland mitigation it is anticipated that the project will qualify for Board of Soil and Water Resources (BWSR) Local Road Replacement Program, meaning credits will be provided by BWSR from a USACE approved state wetland bank at an anticipated replacement ratio of 2:1. Efforts will be made to replace wetland losses within the bank service area of the wetland impact. The specific wetland compensation (bank credits) to be used will be determined through consultation with BWSR, the Corps of Engineers and the Local Government Unit (the City of Lakeville) as the project proceeds.

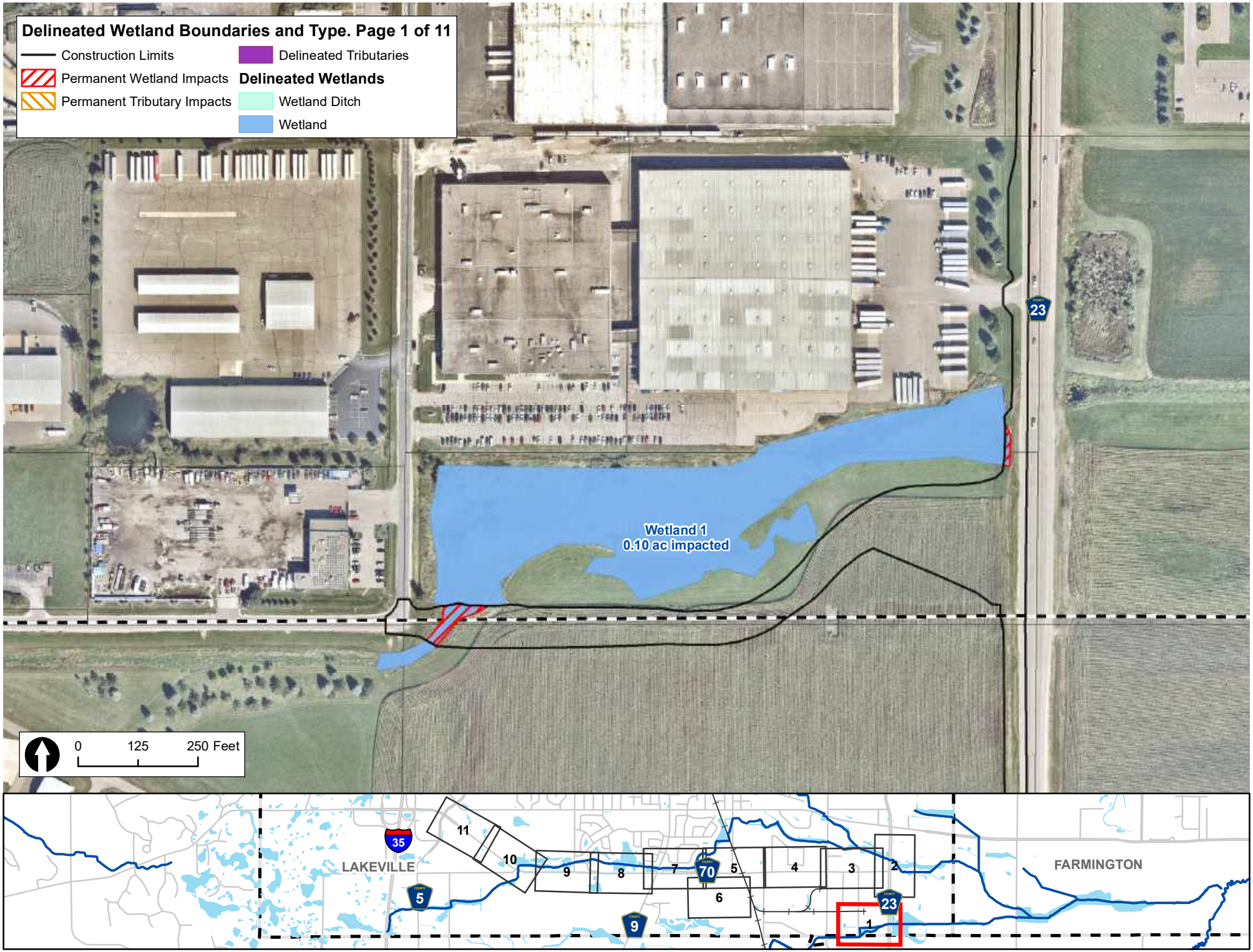
Conclusion

In accordance with Executive Order 11990, based upon the above factors and considerations, it is determined that there is no practicable alternative to the proposed construction in the identified wetlands, and that the proposed action includes all practicable measures to minimize harm to the wetlands.

Based on the estimated permanent wetland impacts, it is anticipated that the project will qualify for the following Army Corps of Engineers Transportation Regional General Permit. However, this finding is subject to change as continued coordination occurs with the US Army Corps of Engineers and the Local Government Unit as the permitting process proceeds.

ATTACHMENTS

- Map showing wetland impacts


Delineated Wetland Boundaries and Type. Page 1 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 1
0.10 ac impacted
0
125
250 Feet
23
LAKEVILLE
FARMINGTON
35
5
9
70
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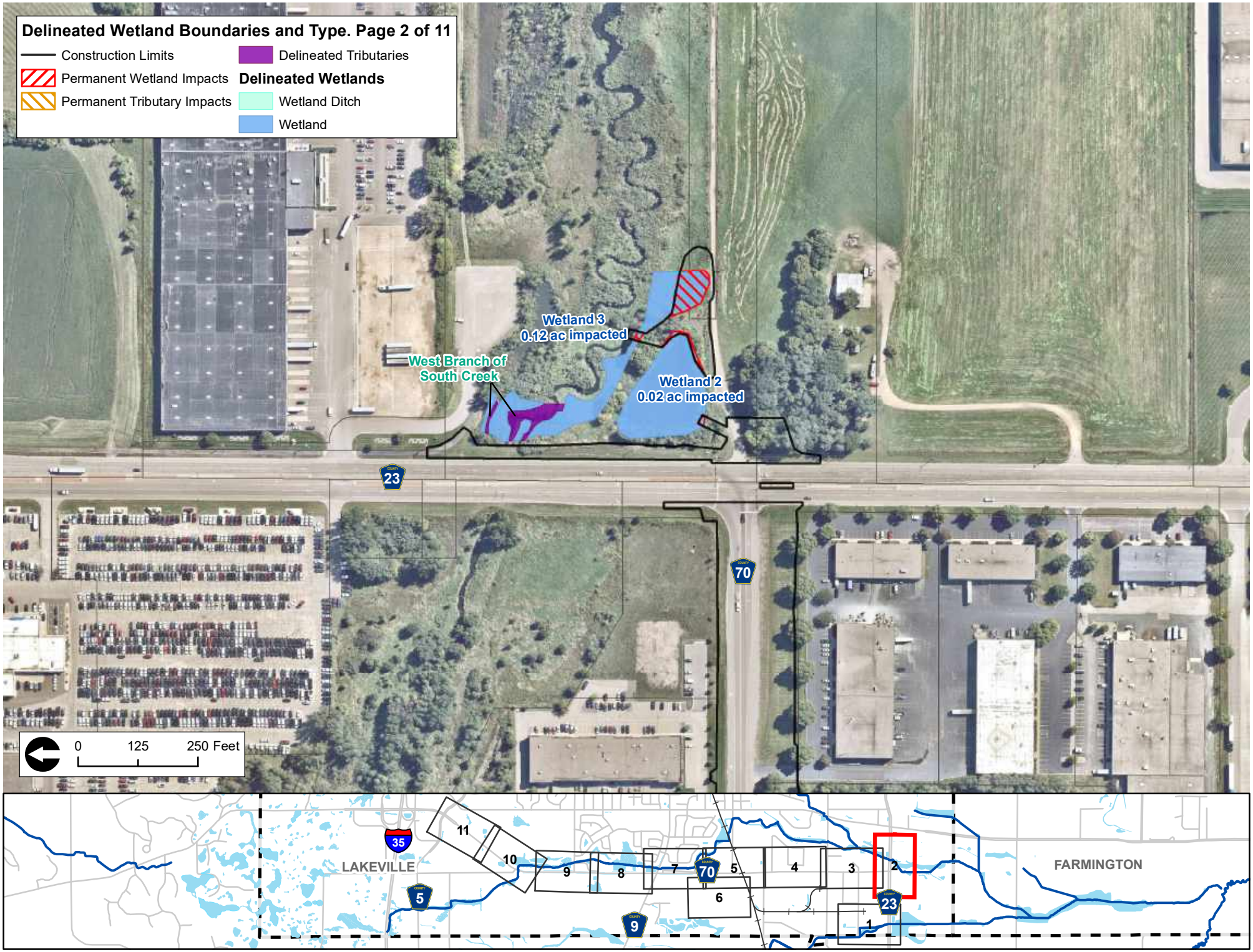
Delineated Wetland Boundaries and Type. Page 2 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 3
0.12 ac impacted
West Branch of
South Creek
Wetland 2
0.02 ac impacted
23
70
0
125
250 Feet
LAKEVILLE
FARMINGTON
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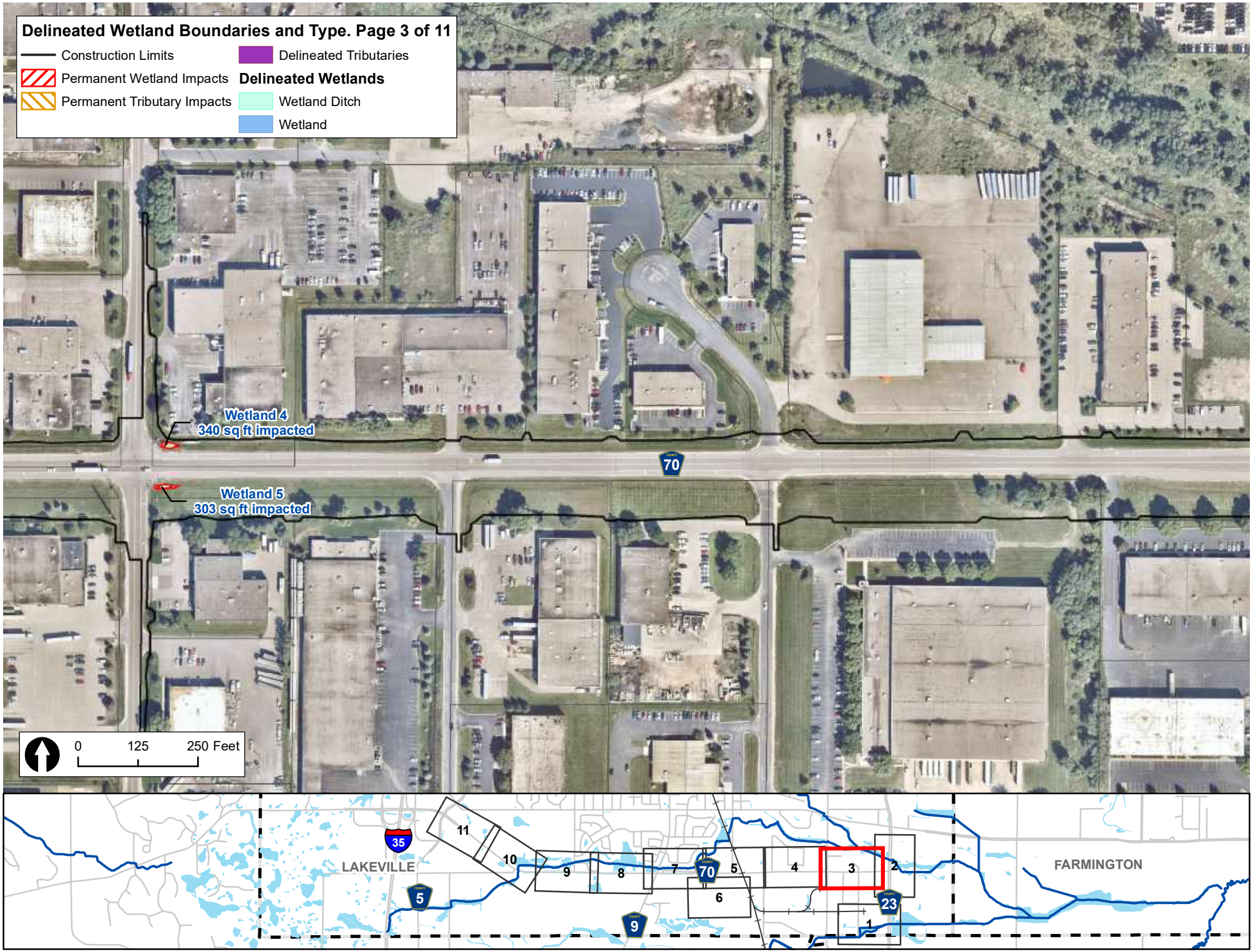
Delineated Wetland Boundaries and Type. Page 3 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 4
340 sq ft impacted
Wetland 5
303 sq ft impacted
70
0
125
250 Feet
LAKEVILLE
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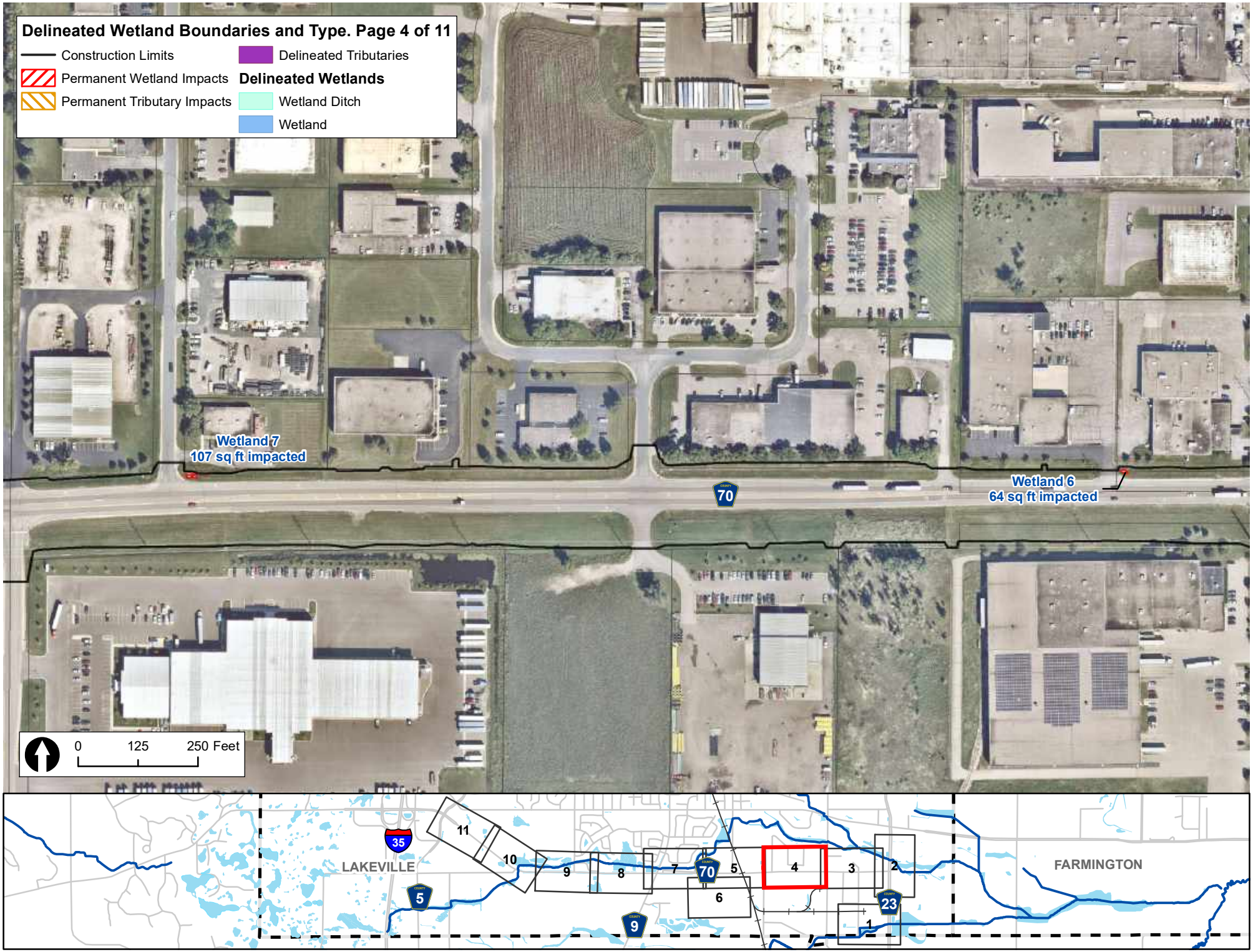
Delineated Wetland Boundaries and Type. Page 4 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 7
107 sq ft impacted
Wetland 6
64 sq ft impacted
70
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125
250 Feet
LAKEVILLE
FARMINGTON
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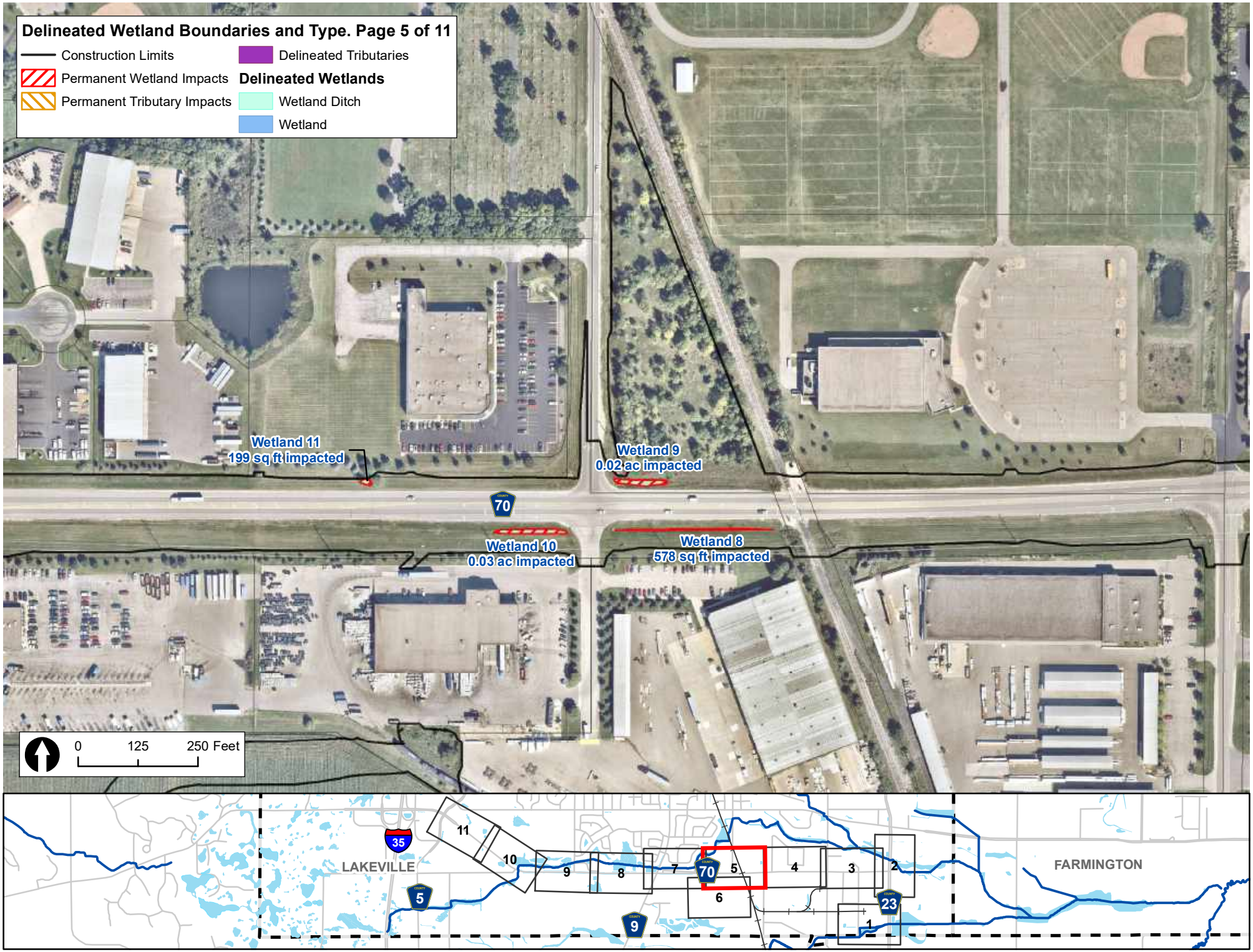
Delineated Wetland Boundaries and Type. Page 5 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 11
199 sq ft impacted
Wetland 9
0.02 ac impacted
70
Wetland 10
0.03 ac impacted
Wetland 8
578 sq ft impacted
0
125
250 Feet
LAKEVILLE
FARMINGTON
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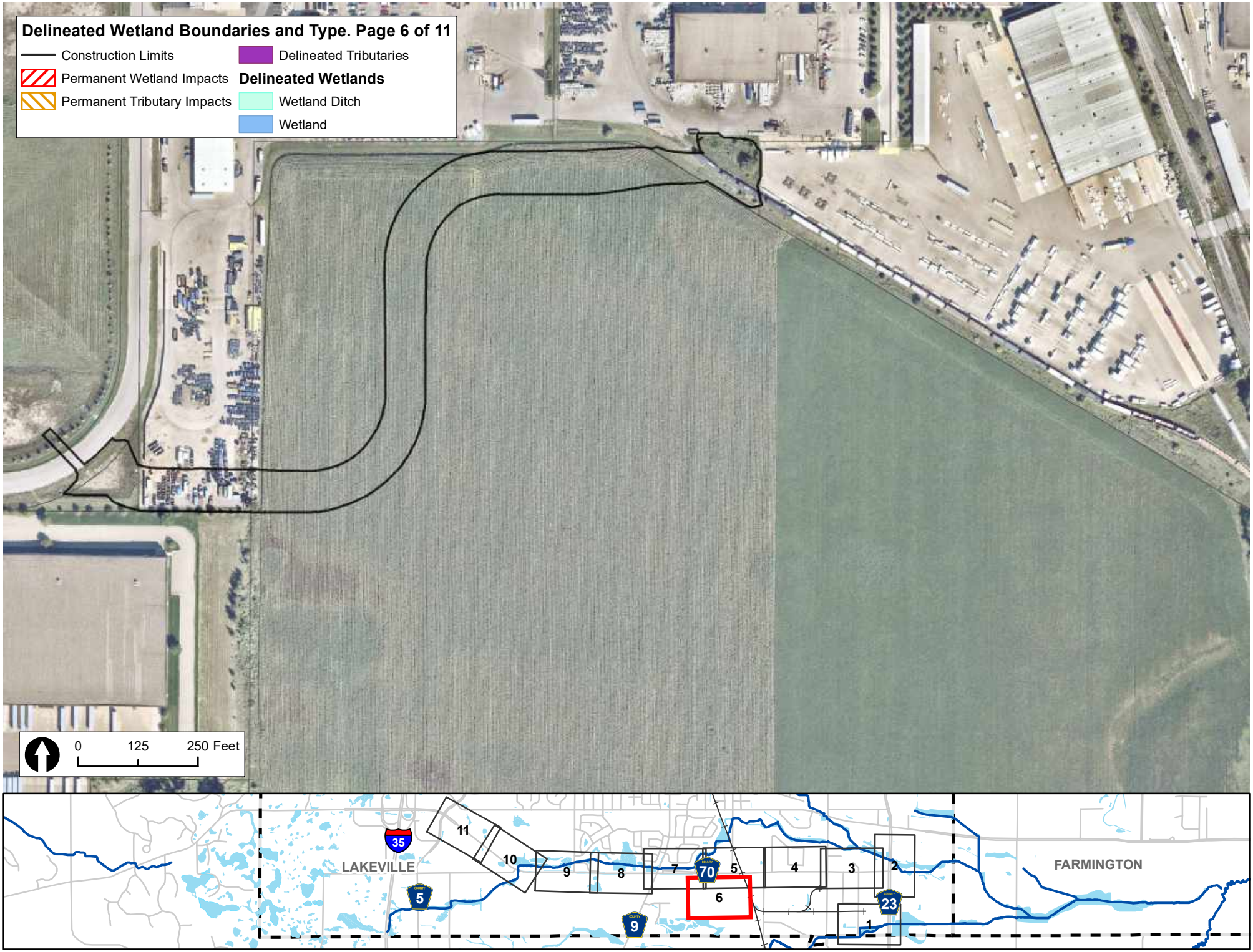
Delineated Wetland Boundaries and Type. Page 6 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
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LAKEVILLE
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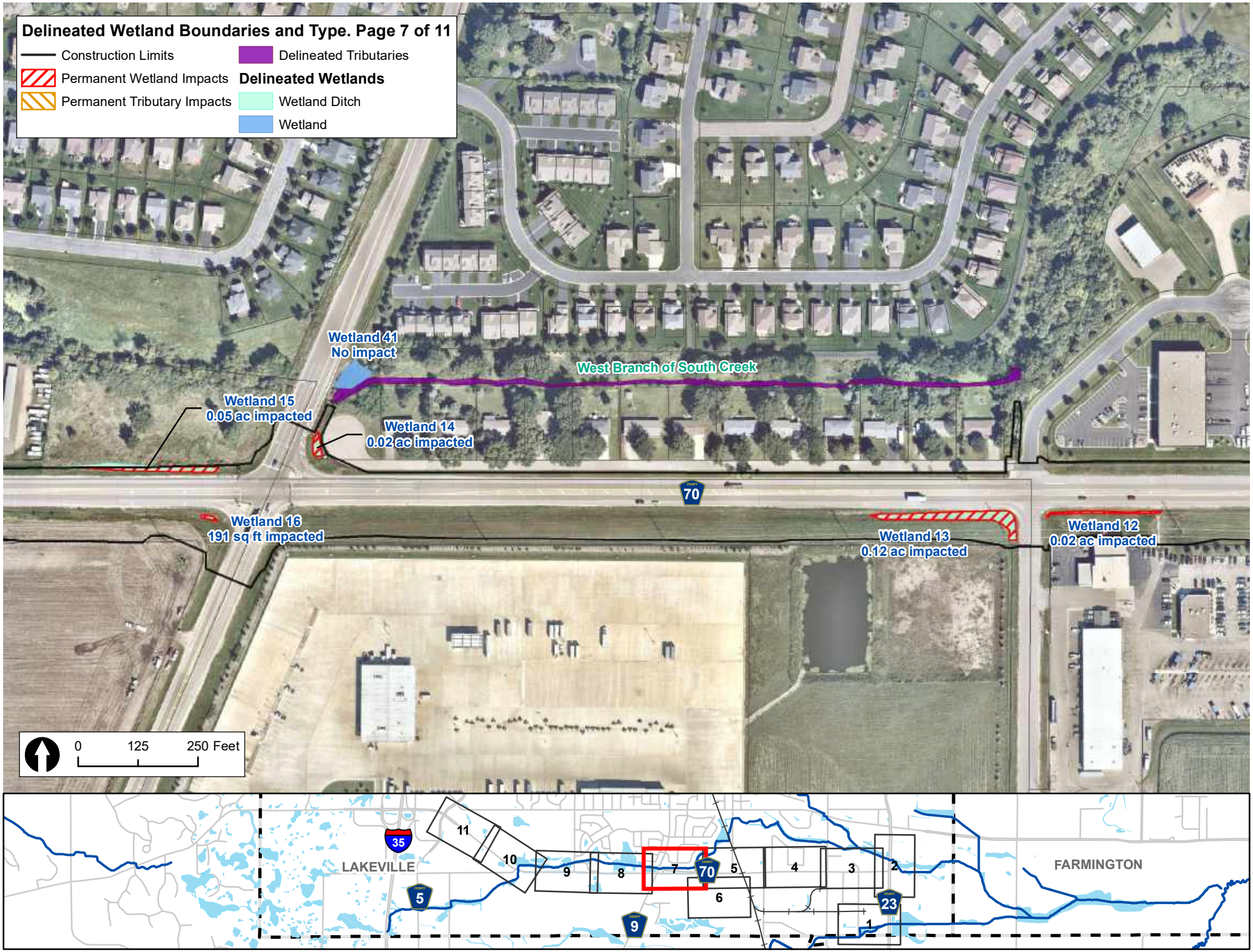
Delineated Wetland Boundaries and Type. Page 7 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 41
No impact
West Branch of South Creek
Wetland 15
0.05 ac impacted
Wetland 14
0.02 ac impacted
70
Wetland 16
191 sq ft impacted
Wetland 13
0.12 ac impacted
Wetland 12
0.02 ac impacted
0
125
250 Feet
LAKEVILLE
FARMINGTON
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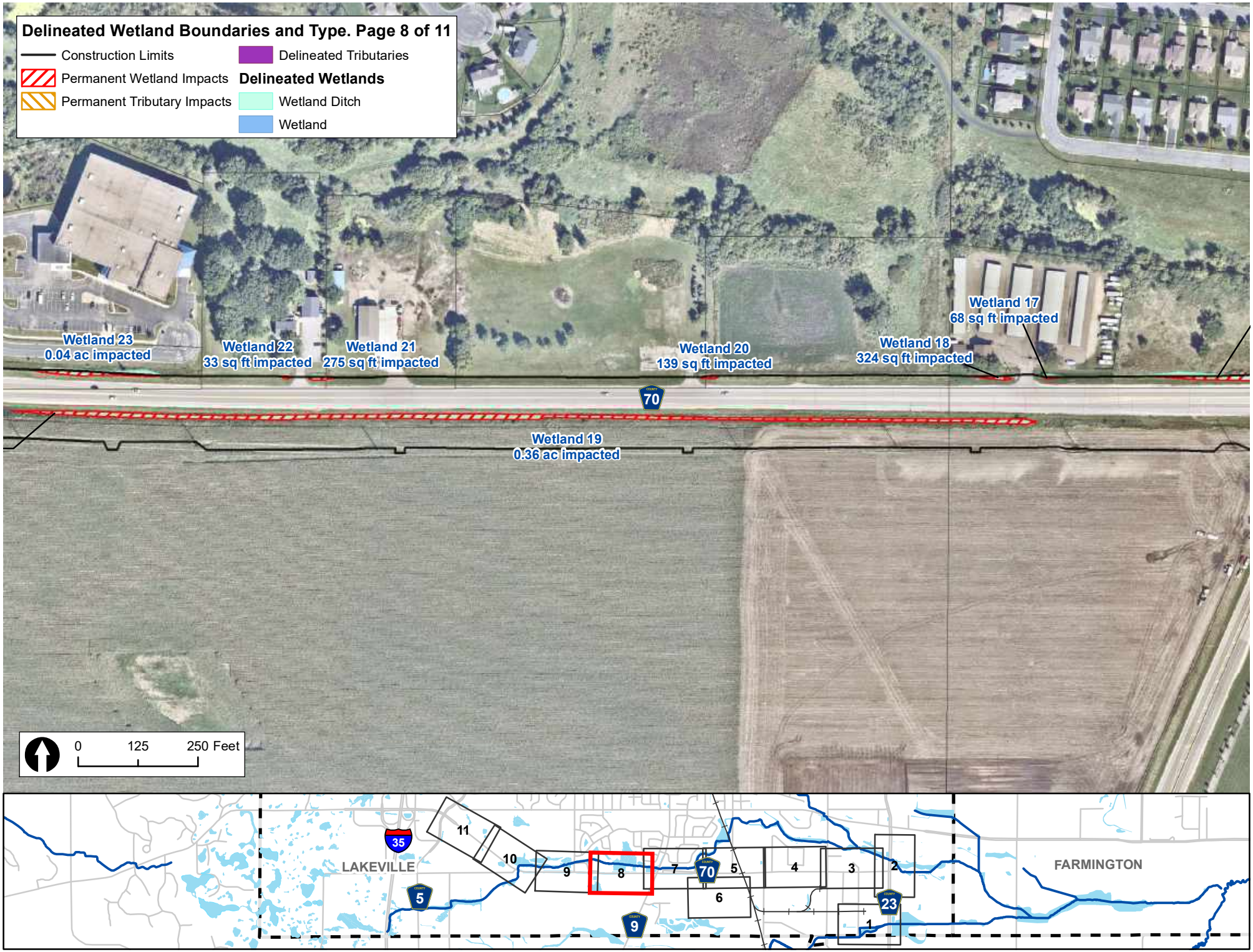
Delineated Wetland Boundaries and Type. Page 8 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 23
0.04 ac impacted
Wetland 22
33 sq ft impacted
Wetland 21
275 sq ft impacted
Wetland 20
139 sq ft impacted
Wetland 18
324 sq ft impacted
Wetland 17
68 sq ft impacted
Wetland 19
0.36 ac impacted
70
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LAKEVILLE
FARMINGTON
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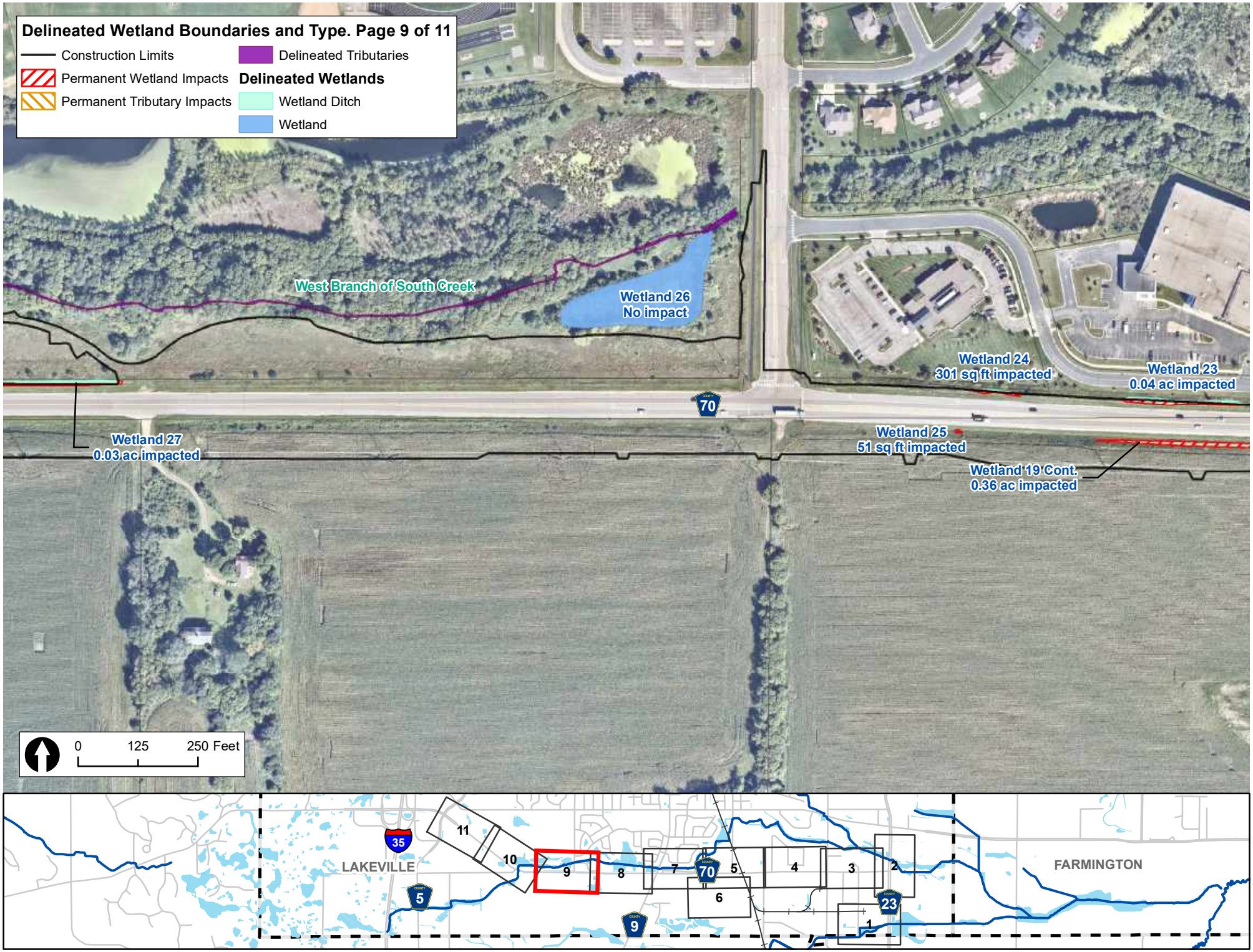
Delineated Wetland Boundaries and Type. Page 9 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
West Branch of South Creek
Wetland 26
No impact
Wetland 24
301 sq ft impacted
Wetland 23
0.04 ac impacted
70
Wetland 27
0.03 ac impacted
Wetland 25
51 sq ft impacted
Wetland 19 Cont.
0.36 ac impacted
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125
250 Feet
LAKEVILLE
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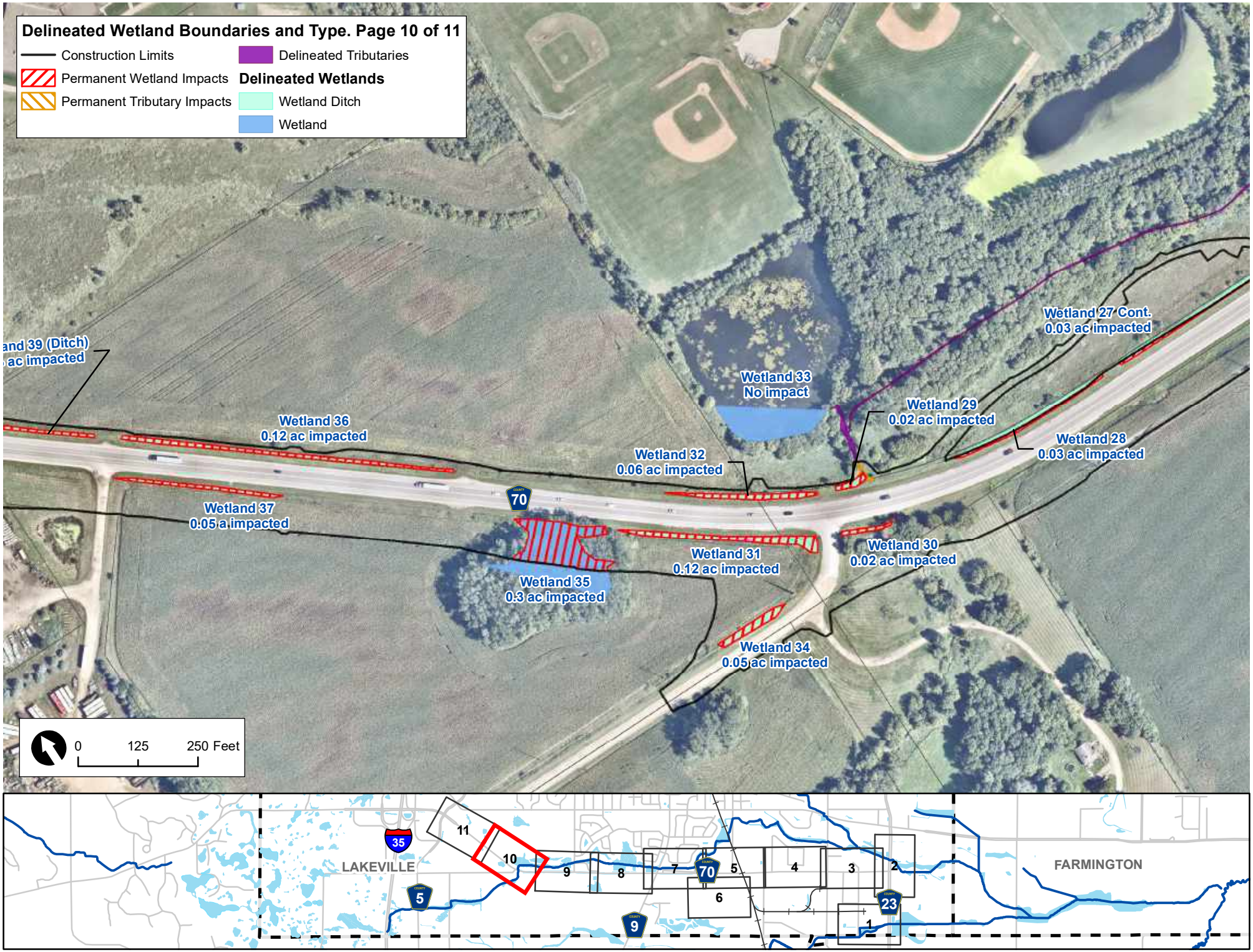
Delineated Wetland Boundaries and Type. Page 10 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
and 39 (Ditch)
ac impacted
Wetland 36
0.12 ac impacted
Wetland 37
0.05 a impacted
Wetland 33
No impact
Wetland 32
0.06 ac impacted
Wetland 27 Cont.
0.03 ac impacted
Wetland 29
0.02 ac impacted
Wetland 28
0.03 ac impacted
70
Wetland 31
0.12 ac impacted
Wetland 30
0.02 ac impacted
Wetland 35
0.3 ac impacted
Wetland 34
0.05 ac impacted
0
125
250 Feet
LAKEVILLE
FARMINGTON
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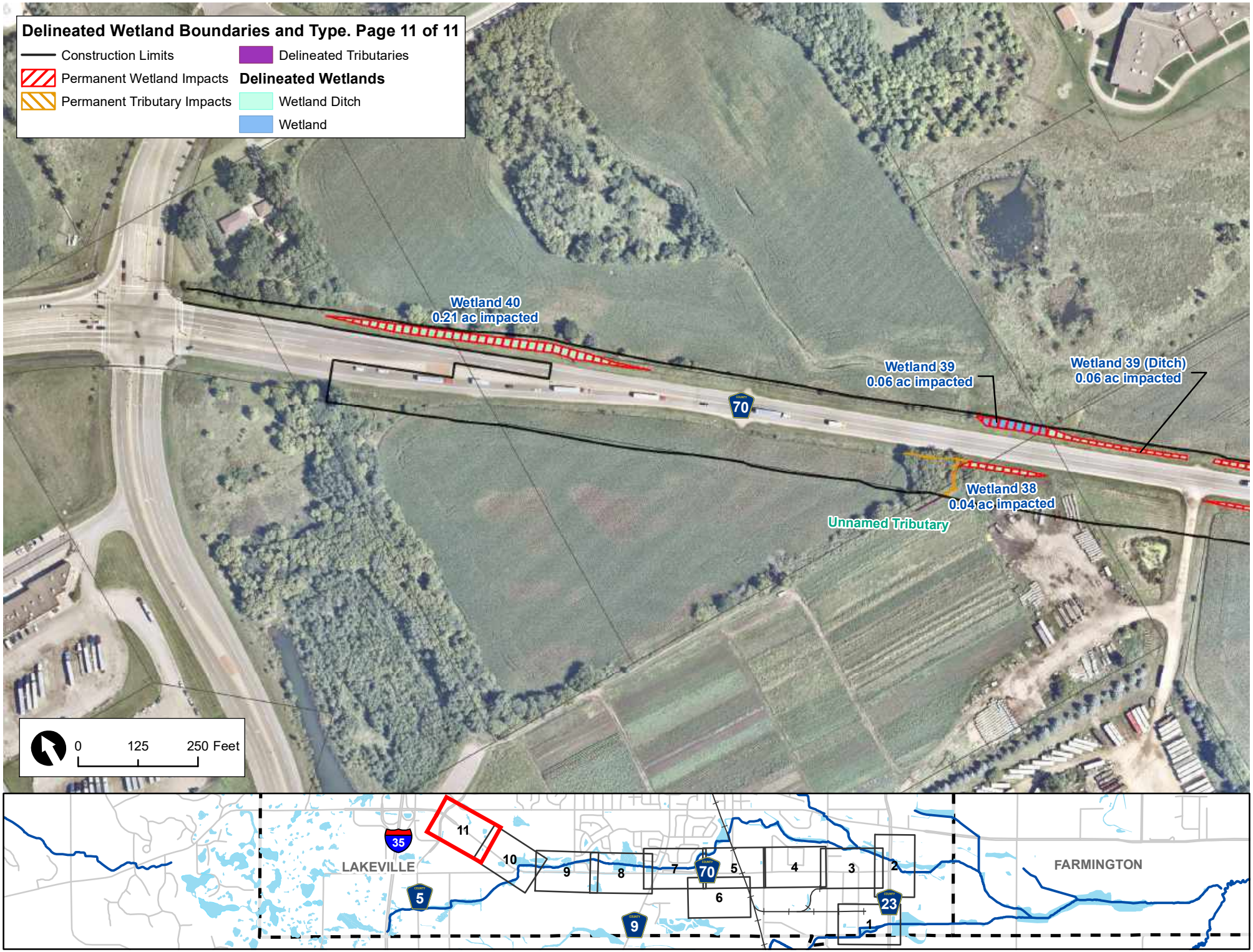
Delineated Wetland Boundaries and Type. Page 11 of 11
Construction Limits
Permanent Wetland Impacts
Permanent Tributary Impacts
Delineated Tributaries
Delineated Wetlands
Wetland Ditch
Wetland
Wetland 40
0.21 ac impacted
Wetland 39
0.06 ac impacted
Wetland 39 (Ditch)
0.06 ac impacted
Wetland 38
0.04 ac impacted
Unnamed Tributary
70
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125
250 Feet
35
5
9
LAKEVILLE
FARMINGTON
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MEMORANDUM

Date: August 26, 2019

To: Nik Shepard, Progressive Rail

From: County Rd 70 Project Management Team

Subject: County Rd 70 Expansion – CP Rail Crossing Improvements
Dakota County, MN
C.P. 70-23, S.P. 019-670-013, S.P. 188-020-029

Representatives from MnDOT Office of Freight and Commercial, Progressive Rail, Dakota County, City of Lakeville, and Bolton & Menk met on June 6, 2019 to discuss the County Rd 70 roadway expansion project and associated impacts to an existing railroad crossing just east of Holyoke Ave.

Attendees included:
Chris Rice, MnDOT Rail
Nik Shepard, Progressive Rail
Jake Rezac, Dakota County
Zach Johnson and Alex Jordan, City of Lakeville
Aaron Warford and Dena King, Bolton & Menk

The purpose of the meeting was to review and discuss railroad crossing impacts and improvements needed to accommodate the County Rd 70 roadway expansion project, both in the final condition and during construction staging under traffic. The two-year construction project is planned to begin in 2020.

This memo summarizes the diagnostic meeting discussion, includes follow-up recommendations from MnDOT Rail on June 20, 2019, and documents a plan for the implementation of railroad crossing improvements associated with the County Rd 70 roadway project.

Railroad Existing Conditions

MnDOT owns and has jurisdiction of the existing railroad warning devices. The current system is obsolete and will need to be fully replaced. Progressive Rail will coordinate directly with MnDOT on items to salvage.

Proposed Roadway Improvements

County Rd 70 is currently a two-lane rural roadway with right and left turn lanes in various locations. Proposed improvements include widening the roadway to a 4-lane divided facility with left and right turn lanes at intersections and trails on both sides. Replacement and addition of drainage infrastructure, sanitary sewer, and watermain will also be included with the project.

Impacts to Railroad Crossing and MnDOT Rail Recommendations

The reconstruction and expansion of County Rd 70 will increase the overall width of the railroad crossing and directly impact much of the existing railroad infrastructure. Since the current system is obsolete, it will need to be fully replaced.

Four active warning devices consisting of flashing lights and gates with constant warning circuitry will be required to cover the future 4-lane divided roadway. The widening of the roadway from two lanes to four lanes will require the addition of median gates.

For the trail on both sides of County Rd 70, trail users will be provided with advance warning signs and railroad pavement markings as per Figure 81 in the Highway Grade Crossing Handbook. Truncated domes on the trail will be installed in conjunction with a stop/yield bar set back 15' from the nearest rail. Signage at the stop/yield bars will include Crossbuck (R-15-1) and Yield (R1-2) signs. Any signage in the railroad right-of-way will be installed in coordination with Progressive Rail.

Construction Staging

Existing components, including gate arms, can be used for temporary systems during construction staging. Existing gate arms and associated electrical components will need to be relocated during the construction of County Rd 70. Stage 1 construction has traffic on the existing road and shifted north to provide more space for south side construction work. Stage 2 construction has traffic on the newly constructed south side of County Rd 70. See attached figures depicting Stage 1 and Stage 2 construction and location of relocated gate arms.

Implementation of New Railroad Infrastructure

It is desired that the installation of surface panels, circuitry, and a new bungalow all be completed ahead of the County Rd 70 roadway construction project. This work would need to occur under a road closure duration of approximately 4 to 6 days. Only the permanent railroad warning devices would remain to be installed after roadway construction is complete.

If the chosen detour route crosses the railroad, it will need to have a signalized crossing with gate arms. The County is planning to use detour routes that either do not cross the railroad or that currently have a signalized crossing with gate arms. For traffic on the east side of the railroad, Cedar Ave north to Dodd Blvd west to 185th Street is the planned detour and for traffic on the west side, I-35 is the planned detour route.

Pre-Road Construction Work:

- Installation of 168' length of panels
- Electrical/circuitry extensions
- Bungalow and associated hardware

During Construction Work:

- The relocation of existing gate arms/warning devices to accommodate traffic staging:
    - Stage 1 – Traffic on existing County Rd 70, future eastbound County Rd 70 (south side) is constructed
        - Shift the one existing warning device on the south side of County Rd 70 further north by approximately 10'.
    - Stage 2 – Traffic on new eastbound lanes of County Rd 70, future westbound County Rd 70 (north side) is constructed
        - Move the two existing warning devices to cover staged traffic running on the new eastbound lanes of County Rd 70.

    - The existing warning device on the north side of the road moves approximately 98’ to the south side of the road.
    - The existing warning device on the south side of the road moves approximately 30’ to the other side of the tracks.
- The potential for crossing of the railroad tracks by contractor construction equipment was discussed in the diagnostic meeting and that this would be acceptable on both the existing and new railroad surfacing.

Post-Construction Work:

- Furnishing and Installation of four (4) gate arms

Agreement

Dakota County is the road authority and so will pay for and own the new railroad crossing system. The county highway, trails, and roadway signage, including advanced warning signs, will be maintained by the County.

Progressive Rail will inspect and maintain the system under an agreement with the County. This includes crossbucks and posts, signals, and crossing surface.

The County will coordinate one agreement to cover all railroad work associated with the County Rd 70 construction project, including pre-road construction work.

Environmental Commitments

The following environmental commitments include mitigation activities and public commitments made during NEPA/MEPA, environmental permit requirements, and other legal and regulatory requirements related to environmental compliance. This method of tracking environmental commitments from project scoping, into project design, and through construction, is necessary to: (1) ensure that environmental commitments are carried into final design, (2) help contractors comply with construction components, (3) track and document compliance, and (4) promote consistency. These commitments will be carried forward by Dakota County into final design and construction by incorporating them into plan sheets and SPECS, where applicable.

Fish and Wildlife

- Measures outlined in the Blanding's turtle fact sheet will be implemented to the extent feasible.
- Northern Long-Eared Bat:
    - All operators, employees, and contractors working in areas of known or presumed bat habitat will be aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures.
        - Any bat sightings on the project will be reported to OES wildlife ecologist
    - Temporary lighting, if used, will be directed away from wooded areas during the bat active season (April 1 to October 21, inclusive). If installing new or replacing existing permanent lights, downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting) will be used; or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, will be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable.
    - Tree clearing will be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (i.e., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).
    - Although there is no restriction on the time of year that tree clearing is to occur, the contractor will be encouraged to clear trees before June 1st or after August 15th, to the extent practicable.
- Rusty-Patched Bumble Bee: Disturbed areas not proposed for mowing will be seeded with a native seed mix.
- If dewatering in excess of 10,000 gallons per day is expected, a dewatering permit will be applied for by the Contractor. Dewatering discharge will be treated to be free of suspended sediment before entering surface waters.

Vegetation

- Disturbed natural areas will be re-vegetated with a native seed mix and will follow MnDOT Metro Vegetation Establishment Recommendations.

- Identify and eradicate noxious weeds before construction.

Wetlands

- Follow conditions specifically outlined in respective permits issued for the project.
- All preserved wetland areas will be labeled on plan sheets as “Environmentally Sensitive Areas”.
- The 220th Street extension has been aligned to minimize impacts to a large wetland associated with the South Creek—South Branch tributary.
- The South Creek Greenway trail has been aligned to avoid impacts to South Creek—West Branch tributary and associated wetlands.
- Wetland impacts will be mitigated as directed by the permits issued for this project and will be coordinated via the Local Government Unit and the United States Army Corps of Engineers (USACE). It is anticipated that any impacts to regulated resources will be mitigated through the purchase of wetland banking credits.

Wells

- Known active wells near the construction limits will be labeled on plan sheets as sensitive resources to prevent impacts due to potential project changes during construction.

Contamination and Regulated Materials

- Excess materials and debris from this project such as concrete and asphalt will be disposed of in accordance with MnDOT Standard Specifications for Construction, 2104.3C and Minnesota Rule 7035.2825 and the Dakota County Solid Waste Ordinance.
- Unknown materials may be encountered during construction that were not identified during the initial site investigations. A Construction Contingency plan (CCP) will be written and incorporated within the RAP, and it will discuss how to handle the unknowns that may be encountered.
- A spill kit will be kept near any storage tanks. Appropriate measures will be taken during construction to avoid spills that could contaminate groundwater or surface water in the project area.
- If a spill or leak were to occur during construction, the Project Engineer and Minnesota Duty Officer will be contacted and appropriate action to remediate will be taken immediately in accordance with MPCA guidelines and regulations in place at the time of project construction.
- If any demolition of buildings or bridges is added to this project, coordinate with the Regulated Materials Unit and obtain necessary demolition approvals.

Erosion Control

- A SWPPP will be developed for this project. All areas disturbed during construction would be revegetated in accordance with the SWPPP and related permitting requirements.

- Erosion control blankets will be limited to those with bio-netting or natural netting types; specifically, not products containing plastic mesh netting or other plastic components, as noted in Category 3N or 4N in the 2016 and 2018 MnDOT Standards Specifications for Construction.
    - Mulch products will be reviewed, and any materials with plastic fiber additives will not be utilized in areas that drain to streams and rivers.

Water Quality/Stormwater

- Two main stormwater treatment facilities are proposed in order to meet the water quality, volume, and erosion control standards set by the Vermillion River Watershed Joint Powers Organization.
    - At all other outfall locations, stormwater will be pre-treated before being discharged via sumped structure with a SAFL Baffle or other mechanism.
- Stormwater requirements such as temperature and rate control for Trout Streams will be implemented during roadway design to meet City and VRWJPA requirements which are consistent with the MnDNR requirements.

Section 404

- The necessary permits will be obtained from the USACE through continued coordination and review.

Construction Noise

- High-impact noise construction activities will be limited in duration to the greatest extent possible. The use of pile drivers, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours.

Traffic Noise

- Wall 1F will be constructed along the north side of CSAH 70 between Dodd Boulevard and Humboldt Court.

Right-of-Way

- Dakota County will obtain permanent easements in the locations where stormwater management will be created outside existing right-of-way.

Air Quality

- All construction equipment used on the project will be required to meet the emissions requirements identified in *MnDOT's Standard Specifications for Construction*.

Historic Properties

- If cultural materials are encountered during construction, unanticipated discoveries protocols will be followed. If archaeological artifacts, features, or human remains are uncovered during construction, demolition, or earthmoving activities, ground disturbance at the location would cease and the state archaeologist will be contacted.

Section 4(f) Properties

- Temporary impacts to the Lakeville Hasse Arena property will be fully restored with a high maintenance turf.