Environmental Assessment Worksheet

TH 169/101st Avenue Interchange Project

S.P. 2750-92

City of Brooklyn Park
Hennepin County, Minnesota

Proposer: City of Brooklyn Park
RGU: Minnesota Department of Transportation (MnDOT)

September 2016

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Environmental Assessment Worksheet

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: **http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm.**

The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

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

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

1 EAW Item 1: Project Title

TH 169/101st Avenue Interchange Project

2 EAW Item 2: Proposer

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3 EAW Item 3: RGU

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4 EAW Item 4: Reason for EAW Preparation

(Check one)

Required:	Discretionary:
☐ EIS Scoping	☐ Citizen petition
☒ Mandatory EAW	☐ 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 (B) - for construction of additional travel lanes on an existing road for a length of one or more miles.

5 EAW Item 5: Project Location

County: Hennepin

City/Township: City of Brooklyn Park

PLS (¼, ¼, Section, Township, Range): Sections 6 and 7, Township 119 N, Range 21 W; and Sections 1 and 12, Township 119 N, Range 22 W

Watershed (81 major watershed scale): Mississippi River Watershed

GPS Coordinates: Not applicable (N/A)

Tax Parcel Number: N/A

At a minimum attach each of the following to the EAW:

- **County map showing the general location of the project**

  See **Figure 1 and 2A, Appendix A**.

- **U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable)**

  See **Figure 2B, Appendix A**.

- **Site plans showing all significant project and natural features. Pre-construction site plan and post- construction site plan.**

  See **Figure 3-5, Appendix A**.

6 EAW Item 6: Project Description

6.1 Project Summary

Item 6.a. Provide a project summary of 50 words or less to be published in the EQB Monitor (Approximately 50 words).

The Trunk Highway (TH) 169/101st Avenue Interchange Project involves the construction of a new full access interchange at the TH 169/101st Avenue intersection in the City of Brooklyn Park. Additional project elements include reconstruction of 101st Avenue to a four-lane roadway from Jefferson Highway to Xylon Avenue; addition of auxiliary lanes along TH 169 between TH 610 and the proposed interchange; construction of stormwater ponds; and construction of trails and sidewalks.

6.2 Complete Description of the Proposed Project

Item 6.b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes and significant demolition, 3) removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The proposed TH 169/101st Avenue interchange project limits extends from Jefferson Highway west of TH 169 to Xylon Avenue (approximately 0.25 miles east of TH 169), and from the TH 610/TH 169 interchange to approximately 0.5 miles north of 101st Avenue. The Metro Transit Blue Line Extension Light Rail Transit (LRT) project includes roadway improvements between TH 169 and West Broadway Avenue, east of the proposed TH 169/101st Avenue interchange. These improvements include construction of Oak Grove Parkway as a four-lane roadway between 101st Avenue and West Broadway Avenue, and construction of Xylon Avenue north of 101st Avenue/Oak Grove Parkway. MnDOT previously determined that the proposed TH 169/101st Avenue interchange and the roadway

improvements identified as part of the Metro Blue Line Extension Project are not connected actions.

As part of the TH 169/101st Avenue Interchange Study (see discussion below), projected peak period traffic volumes were generated to evaluate the future (year 2030) traffic conditions. For this current phase of the interchange project (preliminary engineering and environmental review) adjustments were completed to the forecasted peak period volumes generated from the TH 169/101st Avenue Interchange Study. The adjustments were made based on new existing counts and year 2040 forecasts developed for the ongoing Metro Transit Blue Line LRT Final Environmental Impact Statement (FEIS). However, to remain consistent with the previous interchange study and minimize confusion with the separate forecasts prepared for Blue Line LRT FEIS, it was determined to continue to identify the traffic forecast volumes presented in this EAW as year 2030 volumes. It is important to note the year 2030 forecasts currently being used are generally consistent with the year 2040 forecasts developed for Blue Line LRT, although year 2040 socio-economic assumptions are different (less aggressive) than the previously used year 2030 socio-economic assumptions.

TH 169/101st Avenue Interchange Study

In 2012, the City of Brooklyn Park formally initiated the highway interchange request process with MnDOT for a full access interchange at or near TH 169/101st Avenue, including documentation to satisfy the qualifying criteria for new interchanges found in the Metropolitan Council's Transportation Policy Plan (TPP). The evaluation procedures for highway interchange requests are described in Appendix F of the Metropolitan Council's *2040 Transportation Policy Plan*. Following MnDOT's review, a functional classification change of 101st Avenue to be an "A" minor arterial to satisfy Criteria 3 was requested. Criteria 3 for a Type B project (Multi-lane Highway with Traffic Signals to Freeway) is provided below. [1]

> *Principal arterial system interchanges should only connect principal arterials to other principal arterials or to an A-minor arterial as defined in the functional classification system adopted by the Transportation Advisory Board and approved by the Metropolitan Council.*

In 2013, MnDOT notified the City of Brooklyn Park that the Interchange Review Committee determined a future interchange at or near TH 169/101st Avenue interchange follows the qualifying criteria found in the TPP with the condition that the City continues to work with MnDOT through the project development phase to ensure the qualifying criteria are being met and additional study is conducted to evaluate and address traffic operations on TH 169.

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[1] Metropolitan Council. 2040 Transportation Policy Plan. Appendix F. Highway Interchange Request Criteria and Review Procedure. Available at http://www.metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan-(1)/The-Adopted-2040-TPP-(1)/Final-2040-Transportation-Policy-Plan/2040-TPP-Appendix-F-Highway-Interchange.aspx.

In response to MnDOT's request, the City of Brooklyn Park initiated the TH 169/101st Avenue Interchange Study. The purpose of the study was to guide the ultimate geometry of TH 169 between TH 610 and 109th Avenue and to identify a supporting roadway system for the area. The findings of the study are documented in the *TH 169/101st Avenue Interchange Study Report* (December 2014), available for review from the City of Brooklyn Park and online at http://projects.srfconsulting.com/hwy169and101st/. Relevant information from this interchange study is summarized in this EAW where appropriate.

The TH 169/101st Avenue Interchange Study was a collaborative effort led by the City of Brooklyn Park. A Study Advisory Committee (SAC), representing decision-making authorities, agencies, and key stakeholders affected by the project, met regularly during the study to guide the overall project development, participate in the development and evaluation of alternatives, as well as formulate study recommendations. Project partners include:

- Cities of Brooklyn Park, Champlin, Maple Grove and Osseo
- MnDOT
- Metropolitan Council
- Metro Transit
- Hennepin County
- Three Rivers Park District
- Target Corporation

Principal Arterial Intersection Conversion Study

The Metropolitan Council and MnDOT, in coordination with regional highway partners, are currently completing a Principal Arterial Intersection Conversion Study. The purpose of this study is to analyze intersections on the non-freeway principal arterial system to identify and prioritize intersections that may be good candidates for conversion to grade-separated facilities, such as overpasses, interchanges, and other improvements to enhance safety and performance. Phase I of the study consisted of an initial screening process to identify corridors and intersections to advance for detailed study (Phase II). Phase II will identify grade-separation investment priorities. Based on the results of Phase I of the study, it was determined that the TH 169 corridor from TH 610 north through the influence area of the proposed interchange met the initial screening traffic volume and capacity criteria to further evaluate as part of Phase II of the study as a candidate corridor for conversion. It is anticipated that final recommendations will be completed in spring 2017.

Evaluation of Alternatives

Existing Conditions

TH 610 and TH 169 serve as the two major transportation corridors in the northwestern portion of the City of Brooklyn Park, as well as several secondary supporting roadways. TH 169 is a four-lane highway with a posted speed limit of 55 miles per hour (mph). TH 610 is a four-lane freeway with a posted speed limit of 65 mph. 101st Avenue is a two-lane undivided roadway with a posted speed limit of 45 mph. The existing intersection of TH 169 and 101st Avenue operates as a right-in/right-out, at-grade intersection.

No Build Alternative

The No Build Alternative maintains the existing TH 169/101st Avenue right-in/right-out intersection. 101st Avenue would remain as a two-lane, rural section roadway from Jefferson Highway to TH 169, and east of TH 169 to Xylon Avenue. The No Build Alternative assumes planned local roadway improvements east of TH 169 identified as part of the Metro Transit Blue Line Extension Project have been constructed and are in operation, including reconstruction of West Broadway Avenue north of TH 610, construction of Oak Grove Parkway between 101st Avenue and West Broadway Avenue, and construction of Xylon Avenue north of 101st Avenue/Oak Grove Parkway (see **Figure 2A, Appendix A**).

The No Build Alternative does not address the project need. A traffic operations analysis was completed based on future (year 2030) no build conditions to provide a basis for comparison with the Recommended Alternative. As presented in **Table 4**, **Item 6.d** below, under future (year 2030) no build conditions traffic operations at the TH 169/101st Avenue intersection are expected to fail.

Build Alternatives

At-Grade Intersection Alternative

At-grade intersection alternatives were evaluated using the Federal Highway Administration's (FHWA) Capacity Analysis for Planning of Junctions (CAP-X) tool. Based on this evaluation, all at-grade intersection alternatives are expected to exceed capacity (volume-to-capacity ratio greater than 1) during both the year 2030 a.m. and p.m. peak hours. Displaced left-turns for the mainline (TH 169) would provide the best option for an at-grade alternative, but the intersection would be over capacity in year 2030 (V/C = 1.16 in the a.m. peak and V/C = 1.14 in the p.m. peak).

The displaced left-turns at-grade alternative assumes that conflict points would be controlled by three additional traffic signals on TH 169 between TH 610 and 109th Avenue. The southern-most traffic signal would likely be located near the ramp gores for the southbound TH 169-to-eastbound TH 610 ramp and westbound TH 610-to-northbound TH 169 ramp. The close proximity of this signal to the TH 610/TH 169 interchange would introduce

safety issues to the TH 169 corridor which would be avoided with the interchange alternatives.

Based on the results of the CAP-X evaluation, an at-grade intersection alternative was determined to not be feasible and was dismissed from further consideration.

Interchange Alternatives

Several interchange alternatives were evaluated in the *TH 169/101st Interchange Study*. This study involved a two-stage screening process, including extensive public and agency involvement. A SAC was established and met eight times throughout the planning process to review technical analyses and provide input on the study contents. Additionally, three open houses were held to provide stakeholders information on the study and solicit input on the proposed alternatives. An initial high-level screening process narrowed the number of preliminary alternatives considered to seven. These preliminary alternatives were further screened using established criteria to determine which alternatives best addressed project issues, problems and needs, and were consistent with the overall study goals. The preliminary alternatives analysis is provided in Chapter 4 of the *TH 169/101st Interchange Study*.

Based on the results of the preliminary screening evaluation, three interchange alternatives were identified for further study in a detailed alternatives analysis. Brief descriptions of these three alternatives are provided below.

- Folded Diamond Interchange at 101st Avenue (Alternative #2): This alternative includes construction of a folded diamond interchange on the current alignment of 101st Avenue at TH 169. The east and west interchange ramps are folded to the north to provide better spacing between TH 610 and 101st Avenue and minimize impacts to the Rush Creek Regional Trail pedestrian bridge.
- Buttonhook Interchange at 101st Avenue (Alternative #4): Alternative #4 consists of a buttonhook interchange at the existing TH 169/101st Avenue intersection. Ramps are designed to eliminate impacts to the Rush Creek Regional Trail pedestrian bridge and nearby churches.
- Folded Diamond North Interchange at Oxbow Creek Drive (Alternative #7): This alternative includes the construction of a folded diamond interchange on a new alignment north of Rush Creek Regional Trail at TH 169. Ramps providing access to/from the south are folded to avoid the Rush Creek Regional Trail pedestrian bridge.

Identification of a Recommended Alternative

Results and recommendations of the detailed alternative analysis are documented in Chapters 6 and 7 of the *TH 169/101st Interchange Study* (see **Appendix C**).Based on the results of the detailed alternatives analysis, the Folded Diamond Interchange at 101st Avenue (Alternative #2) was identified as the Recommended Alternative. The following paragraphs

summarize the rationale for identification of Alternative #2 (Folded Diamond Interchange at 101st Avenue) as the Recommended Alternative.

The detailed alternatives analysis included several transportation-related criteria to compare the three interchange alternatives. Transportation criteria assessed the ability of each alternative to reduce segment overloads of the regional network; achieve acceptable intersection operations; minimize impacts to TH 169 and TH 610 safety, capacity and operations; provide regional connectivity with a continuous arterial roadway system; and support local and regional transportation plans and local land use plans and economic development goals. Alternatives were scored and categorized as rating good, fair or poor based on the score. The complete list of criteria utilized in the analysis is provided in Table 6-1 in Chapter 6 of the *TH 169/101st Interchange Study* (see **Appendix C**).

The detailed alternatives analysis determined that the Buttonhook Interchange at 101st (Alternative #4) rated poor for Criteria C (minimizes overall impacts to mainline TH 169 safety, capacity and operations) and the Folded Diamond Interchange at Oxbow Creek Drive (Alternative #7) rated poorly for Criteria I (ability to provide regional connectivity with a continuous arterial roadway system. The Folded Diamond Interchange at 101st Avenue Alternative (Alternative #2) was not rated poorly for any transportation criteria. Alternative #2 rated higher than the other two alternatives for providing regional connectivity, consistency with local and regional transportation plans/policy, and supporting local agency land use plans and economic development goals for Brooklyn Park, Champlin, Maple Grove, and Osseo.

Traffic Operations Analysis

One of the transportation goals identified in the detailed alternatives analysis was to maintain or improve traffic operations within the regional TH 169/TH 610 network (e.g., 109th Avenue intersection, TH 610/West Broadway Avenue interchange). As shown in **Table 1**, Alternative #2 (Recommended Alternative) maintains or improves intersection operations at 109th Avenue and the TH 610/West Broadway Avenue ramp intersections. While the TH 169/109th intersection operates at LOS F, the estimated delay per vehicle improves under Alternative #2 compared to the No Build Alternative. Operations at the TH 610/West Broadway Avenue north ramp intersection improve to a LOS C under Alternative #2 compared to LOS D under the No Build Alternative.

Table 1. Future (Year 2030) No Build Alternative and Recommended Alternative Peak Hour Intersection Operations Analysis

Intersection	Level of Service (delay per vehicle)			
	2030 No Build Alternative AM Peak Hour	2030 No Build Alternative PM Peak Hour	2030 Recommended Alternative AM Peak Hour	2030 Recommended Alternative PM Peak Hour
Jefferson Highway/109th Avenue	C (35 sec.)	C (30 sec.)	C (30 sec.)	C (25 sec.)

Intersection	Level of Service (delay per vehicle)			
	2030 No Build Alternative AM Peak Hour	2030 No Build Alternative PM Peak Hour	2030 Recommended Alternative AM Peak Hour	2030 Recommended Alternative PM Peak Hour
TH 169/109th Avenue	F (140 sec.)	F (105 sec.)	F (115 sec.)	F (100 sec.)
TH 610/W. Broadway Avenue North Ramp	D (35 sec.)	D (45 sec.)	C (35 sec.)	C (30 sec.)

Consistency with Regional Transportations Plans and Regional Connectivity

Alternative #2 (Recommended Alternative) scored higher than the other two interchange alternatives (Alternative #4 and Alternative #7) for the ability to provide regional connectivity with a continuous arterial roadway system; consistency with local and regional transportation plans/policy; and supporting local agency land use plans and economic development goals for Brooklyn Park, Champlin, Maple Grove and Osseo.

Social, Environmental and Economic (SEE) Impacts

The detailed alternatives analysis conducted as part of the TH 169/101st Interchange Study included a planning-level evaluation of potential social, environmental, and economic (SEE) impacts. Overall, the three interchange alternatives scored similarly with respect to potential SEE impacts. The SEE analysis indicated that Alternative #2 would result in the least acreage of total right-of-way impacts compared with Alternative #4 and Alternative #7; however, right-of-way impacts to Three Rivers Park District property would be greater under Alternative #2. Potential environmental impacts (including wetland and woodland impacts) associated with Alternative #2 were moderate compared to the other two interchange alternatives. Economic impacts (construction and right of way costs) resulting from Alternative #2 were similar to Alternative #4 and less than Alternative #7. Refer to Table 6.1 of Chapter 6 included in **Appendix C** to review the full results of the SEE impacts evaluation.

Public Involvement

Additionally, the SAC solicited public input at an open house held on September 9, 2014 as well as other outreach opportunities during the TH 169/101st Interchange Study (e.g., mail, e-mail and a survey). Responses received generally indicated a preference for Alternative #2. A number of local residents from Brooklyn Park's Northwoods neighborhood voiced concerns regarding Alternative #7. Refer to the *TH 169/101st Interchange Study Final Report* (December 2014) for additional details regarding public input.

Recommended Alternative

Description of the Recommended Alternative

The project includes the construction of a new folded diamond interchange (ramps to and from the south are folded to the north) at the existing at-grade intersection of TH 169 and 101st Avenue. A new bridge along 101st Avenue would be constructed over TH 169, and auxiliary lanes would be constructed on northbound and southbound TH 169 between TH 610 and 101st Avenue. 101st Avenue would be reconstructed as a four-lane urban section roadway between Jefferson Highway and Xylon Avenue (approximately 3,900 feet, or approximately 0.7 miles). Stormwater ponds and infiltration basins would be constructed near the Jefferson Highway/101st Avenue intersection and within the TH 169/101st Avenue interchange ramp areas. Pedestrian and bicycle facilities would also be constructed along 101st Avenue and the bridge over TH 169. The Recommended Alternative project layout is shown in **Figure3 through Figure 5**, **Appendix A**.

Recommended Alternative Benefit-Cost Analysis

The purpose of a benefit cost analysis is to evaluate the economic advantages (benefits) and disadvantages (costs) of a proposed highway investment. According to MnDOT guidance, "the objective of a benefit-cost analysis is to translate the effects of an investment into monetary terms and to account for the fact that benefits generally accrue over a long period of time while capital costs are incurred primarily in the initial years." [2] A benefit cost analysis takes into account highway user benefits (e.g., travel time savings, vehicle operating cost savings, safety benefits) and weight them against project costs (e.g., initial capital costs, rehabilitation costs, maintenance costs, etc.). This analysis indicates whether transportation savings (travel time, safety) exceed the costs of design, construction, and long-term operations.

Projects are considered cost-effective if the present value of benefits exceeds the present value of the costs of implementing the project (i.e., a benefit/cost ratio greater than 1.0).

A benefit-cost analysis for the proposed TH 169/101st Avenue interchange was completed following MnDOT benefit-cost analysis guidance and methodology. The Recommended Alternative (folded diamond interchange at TH 169/101st Avenue) has a benefit cost ratio of approximately 5.0, which indicates that the transportation benefits of the project are estimated to be greater than the initial construction costs of the project.

The complete benefit cost analysis technical memorandum is available for review from the City of Brooklyn Park (see contact information in EAW Item 2).

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[2] Minnesota Department of Transportation. Office of Planning & Programming. 2016. Benefit-Cost Analysis for Transportation Projects available at http://www.dot.state.mn.us/planning/program/benefitcost.html.

1) Construction, Operation Methods and Features That Will Cause Physical Manipulation of the Environment or Will Produce Wastes.

Construction activities associated with the proposed interchange project will likely result in noise and dust. Dust generated during construction will be minimized through standard dust control measures such as applying water to exposed soil and limiting the extent and duration of exposed soil conditions. Construction contractors will be required to control dust and other airborne particulates in accordance with MnDOT standard specifications in place at the time of construction. Permanent vegetation cover will be re-established as soon as practicable. Refer to EAW Item 17 for a discussion of noise during construction.

Excess materials and debris generated from the project such as existing pavement, fencing material, unsuitable grading material, and trees/vegetation will be disposed of in accordance with MnDOT standard specifications and applicable rules in place at the time of construction. In particular, excess materials and debris will not be placed in wetlands or floodplains.

Vibrations are expected to result from pile driving for bridge piers during bridge construction over TH 169. While vibration is often a nuisance during roadway projects, actual damage to structures is extremely rare. Construction vibrations may be perceptible and possibly annoying to occupants of buildings within the project area. Any necessary building susceptibility studies will be completed prior to construction following MnDOT standard practices in place at that time.

The project has the potential to cause temporary vehicle delays on TH 169 during construction. A Transportation Management Plan (TMP) will be developed to address the maintenance of traffic on TH 169 during construction.

2) Modifications to Existing Equipment or Industrial Processes.

The project does not modify equipment or industrial processes.

3) Significant Demolition, Removal or Remodeling of Existing Structures.

The project will require three residential relocations in the northwest quadrant of the TH 169/101st Avenue intersection. Existing structures located on these properties will be demolished and removed as part of the interchange project.

4) Timing and Duration of Construction Activities.

The timing and duration of construction activities will be determined in the future as part of the final design process.

The project is not currently programmed for construction. Preliminary engineering and design are being completed at this time to develop a shelf-ready project should funding become available in the future.

6.3 Project Magnitude Data

Item 6.c. Project Magnitude Data

Project magnitude data (total project acreage and linear project length) are listed in **Table 2**.

Table 2. Project Magnitude [1]

Total project acreage	Approximately 52.3 acres[1]
Linear project length (101st Avenue)	Approximately 0.7 miles
Linear project length (TH 169)	Approximately 0.8 miles
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s)	N/A

[1] Total project acreage includes the area within the preliminary design construction limits and the anticipated right-of-way limits.

6.4 Project Purpose

Item 6.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.

Project Purpose

The purpose of the project is to enhance access to TH 169 and provide the connecting transportation infrastructure that will help support the projected growth of approximately 1,500 acres of undeveloped property in northwest Brooklyn Park. The project is unfunded and is not programmed for construction. The outcome of the TH 169/101st Avenue Interchange Project as described in this EAW is to develop a "shelf-ready" project (i.e., complete preliminary engineering and design) when funding becomes available in the future.

Project Need

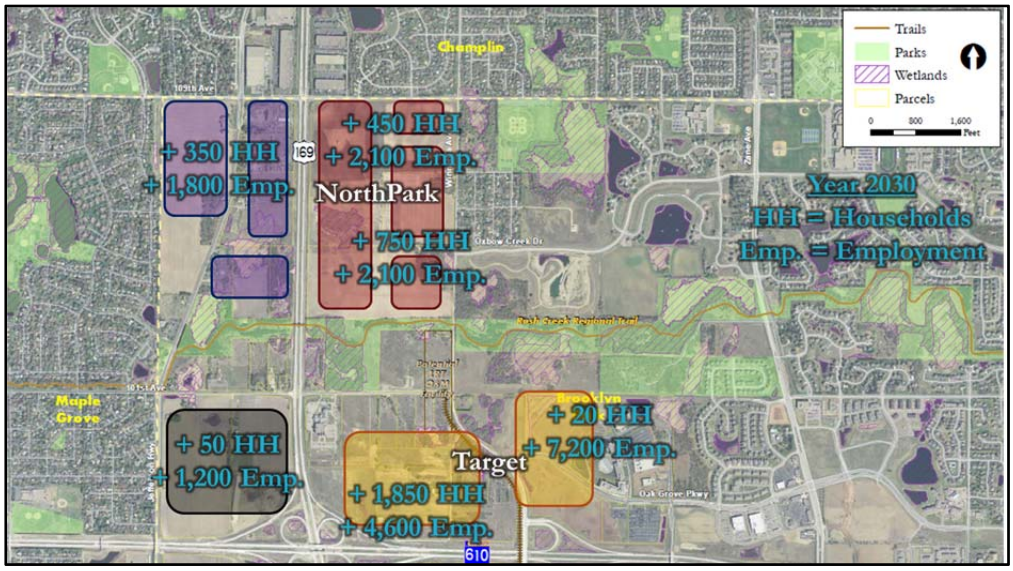
Future Planned Development

Based on the City of Brooklyn Park's *2030 Comprehensive Plan* (dated October 24, 2011), substantial future development is planned near the TH 169/101st Avenue intersection. The majority of the City of Brooklyn Park is fully built-out. Therefore, there is limited available land suitable for development outside of the area surrounding the intersection of TH 169 and 101st Avenue. As discussed in Item 9.a.ii, planned land uses near the TH 169/101st Avenue intersection include business park, mixed use and institutional developments, with portions to be preserved for park and recreational uses. Planned development in the project

area includes the expansion of the Target North Campus located along Oak Grove Parkway, the proposed NorthPark development located within the southeast quadrant of the intersection of TH 169 and 109th Avenue, and the planned Blue Line LRT Extension Project.

To gain an understanding of the level of growth anticipated to occur near the TH 169/101st Avenue intersection, a future land development analysis was completed. As part of this analysis, households, retail employment and non-retail employment were assessed for the existing (year 2010) and future (year 2030) scenarios. Year 2010 population and household values used in the analysis were based on 2010 U.S. Census block-level data. Year 2010 employment allocations were based on 2010 city-level data from the State of Minnesota, Metropolitan Council, past forecasts and visual inspection of aerial imagery. Future (year 2030) development estimates were based on information from the *City of Brooklyn Park 2030 Comprehensive Plan*. **Exhibit 1** illustrates the projected growth near the project area.

Exhibit 1. Future (Year 2030) Anticipated Employment and Household Growth



Trip Generation

Existing and future household and employment information was utilized to develop daily trip generation estimates for existing (year 2010) and future (year 2030) conditions within the study area. For existing conditions, trip generation is estimated at approximately 7,500 daily trips. It is anticipated that daily trip generation will increase to approximately 115,000 daily trips based on year 2030 land use projections. **Table 3** below shows the trip generation estimates for existing (year 2010) and future (year 2030) conditions within the study area.

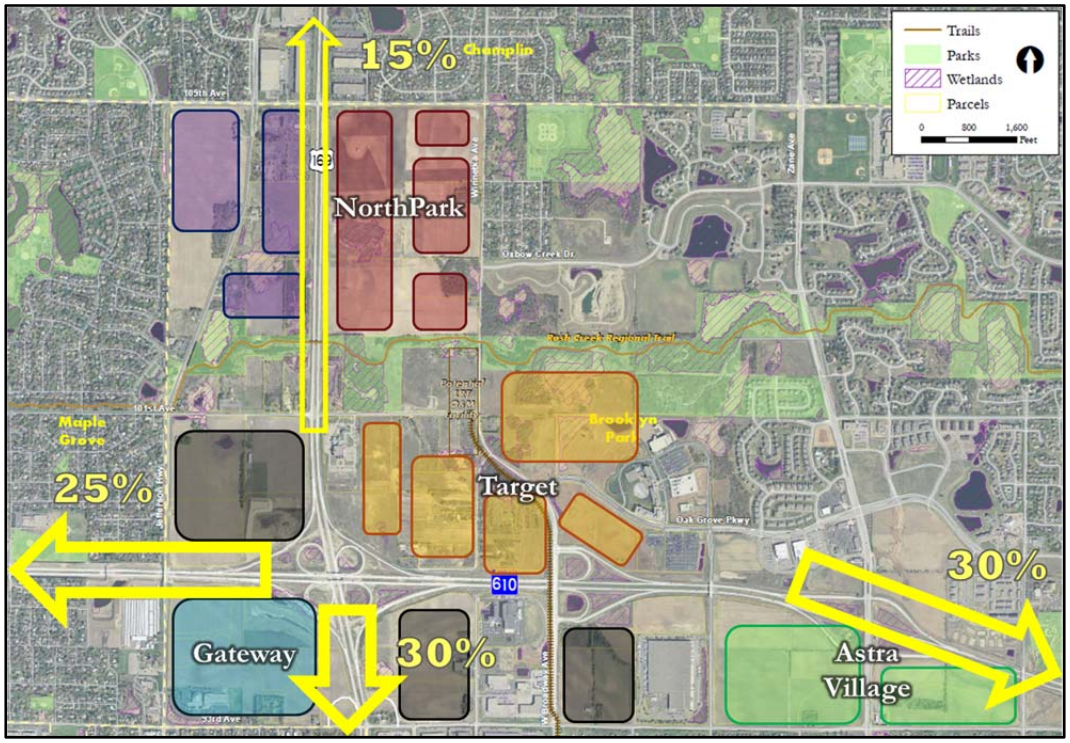
Table 3. Existing and Future Trip Generation

Scenario	Households	Retail Employment	Non-Retail Employment	Total Employment	Estimated Daily Trip Generation
Year 2010	42	0	2,026	2,026	7,500
Year 2030	3,499	1,425	17,951	19,376	115,000

Trip Distribution

The majority of trips generated in the study area are traveling towards the south (before dispersing east-west, including TH 610, for regional destinations). As shown in **Exhibit 2**, approximately 15 percent of trips are destined north on TH 169, while approximately 85 percent of trip are traveling south of the study area (approximately 55 percent dispersing east-west on TH 610 and approximately 30 percent continuing south on TH 169).

Exhibit 2. Future (Year 2030) Directional Distribution of Trips

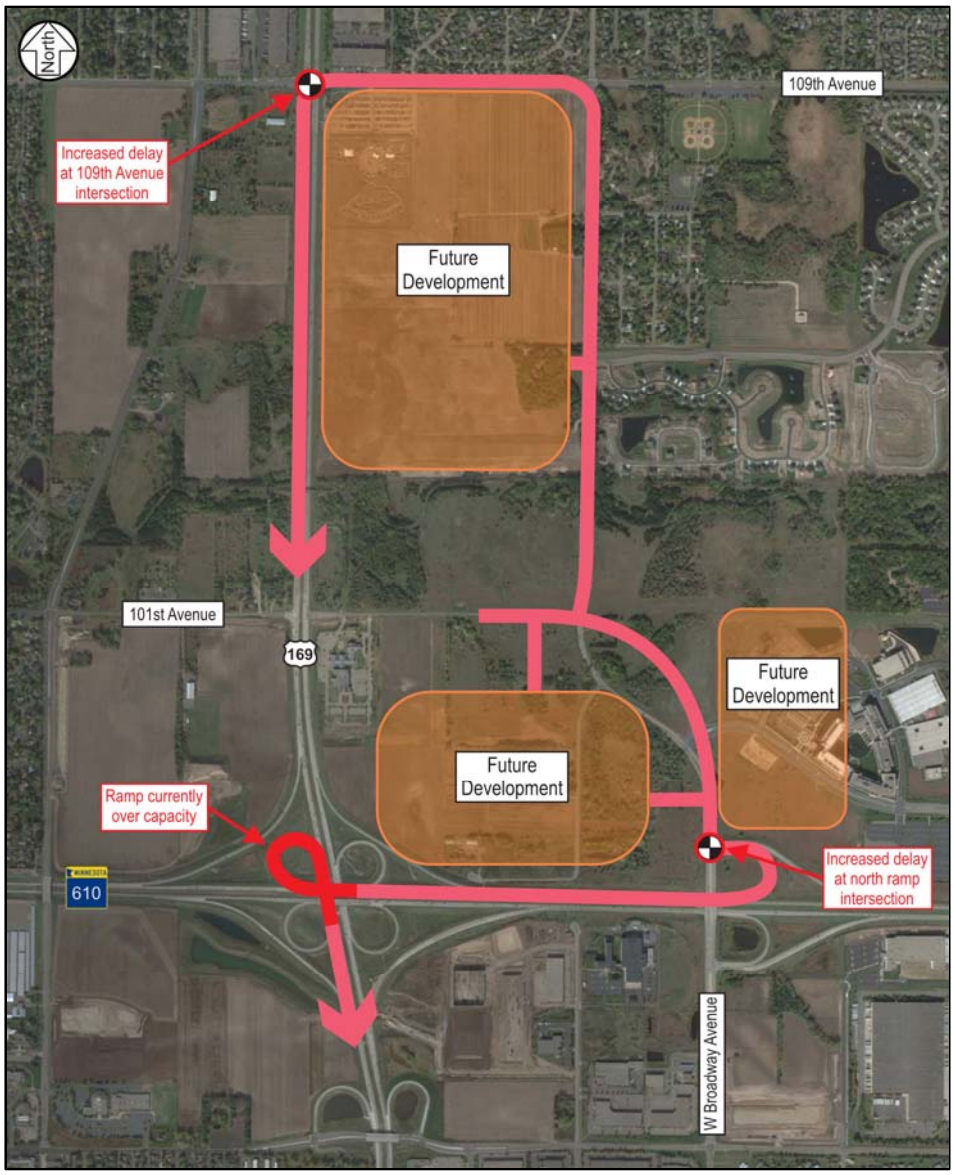


Access to TH 169 and TH 610

As discussed above, trip generation is anticipated to substantially increase from 7,500 estimated daily trips in 2010 to 115,000 estimated daily trips in 2030 due to planned development near the TH 169/101st Avenue intersection. A large percentage of these trips are destined to the south on TH 169 as illustrated in **Exhibit 2**. Under existing conditions and the No Build Alternative, full access to the regional system includes the TH 169/109th Avenue intersection or the TH 610/West Broadway Avenue interchange. The TH 169/101st

Avenue intersection is restricted to right-in/right-out movements. As such, trips must travel to either the TH 169/109th Avenue intersection of the TH 610/West Broadway Avenue interchange to access southbound TH 169 (see **Exhibit 3**).

Exhibit 3. No Build Conditions Southbound TH 169 Wayfinding



Traffic Operations Analysis Results

A traffic operations analysis was completed for the existing and the year 2030 No Build Alternative at study area intersections using Synchro/SimTraffic (Version 8.0) software and Highway Capacity Manual (HCM). The 2030 No Build Alternative analysis was completed using travel demand forecast volumes developed as part of the *TH 169/101st Avenue Interchange Study*. The capacity analysis results identified a Level of Service (LOS), which

indicates how well an intersection is operating. Intersections are ranked from LOS A through LOS F. The LOS results are based on average delay per vehicle (seconds). LOS A indicates the best traffic operation and LOS F denotes an intersection where demand exceeds capacity. Typically, intersection LOS A through D is considered to be acceptable traffic flow conditions.

Results of the traffic operations analysis are presented in **Table 4**. Under existing conditions, most all study intersections operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours. The TH 169/109th Avenue intersection operates at a LOS E during the a.m. peak hour and operates near the LOS D/E threshold during the p.m. peak hour.

As traffic volumes increase over time, congestion and delays will worsen at the TH 169/101st intersection. The TH 169/101st Avenue intersection is projected to operate at LOS F under the 2030 No Build Alternative during the a.m. and p.m. peak hours. Delays on 101st Avenue are projected to be greater than three minutes (see **Table 4**).

As described above, trips generated in the planned growth area east of TH 169 destined for southbound TH 169 would need to travel north to 109th Avenue, contributing to congestion and delays at the TH 169/109th Avenue intersection. The TH 169/109th Avenue intersection is projected to operate at LOS F during the a.m. and p.m. peak hours under the 2030 No Build Alternative.

Another route for access southbound TH 169 is by the TH 610/West Broadway Avenue interchange and westbound TH 610 to the TH 169/TH 610 system interchange. The TH 610/West Broadway Avenue north ramp intersection currently operates at LOS B during the a.m. and p.m. peak periods, but is projected to operate at LOS D under the future No Build Alternative. The westbound TH 610 to southbound TH 169 interchange loop currently operates at capacity during peak periods, creating merging issues with traffic on the southbound TH 169 mainline. A freeway operations analysis prepared for TH 169 shows that southbound TH 169 currently operates at LOS E/F during the a.m. peak hour from approximately 101st Avenue to the 93rd Avenue (CSAH 30) interchange. This congestion is projected to extend from 109th Avenue to the 93rd Avenue (CSAH 30) interchange under the 2030 No Build Alternative.[3]

Table 4. Existing and 2030 No Build Alternative Peak Hour Intersection Operations Analysis

Intersection	Existing Conditions AM Peak Hour	Existing Conditions PM Peak Hour	2030 No Build Alternative AM Peak Hour	2030 No Build Alternative PM Peak Hour
TH 169/101st Avenue (1)	A/C (20 sec.)	A/A (4 sec.)	F/F (>3 min.)	F/F (>3 min.)

[3] TH 169/101st Avenue Interchange Study – Preliminary Design (Phase II). Traffic Analysis Update – TH 169 Freeway Analysis Technical Memorandum. April 2016. Available for review from the City of Brooklyn Park (see project proposer contact information in EAW Item 2).

Intersection	Existing Conditions AM Peak Hour	Existing Conditions PM Peak Hour	2030 No Build Alternative AM Peak Hour	2030 No Build Alternative PM Peak Hour
101st Avenue/West Broadway Avenue (CSAH 103) (1)	A/A (8 sec.)	A/B (14 sec.)	N/A	N/A
101st Avenue/Oak Grove Parkway/ West Broadway Avenue (CSAH 103)	N/A	N/A	D (42 sec.)	F (96 sec.)
TH 169/109th Avenue	E (67 sec.)	D (52 sec.)	F (140 sec.)	F (105 sec.)
Jefferson Highway/109th Avenue	B (12 sec.)	C (15 sec.)	C (35 sec.)	C (30 sec.)
TH 610/West Broadway Avenue North Ramp	B (15 sec.)	B (16 sec.)	D (35 sec.)	D (45 sec.)

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

It is important to note that the traffic operations analysis for the year 2030 No Build Alternative assumed that the TH 169/101st Avenue intersection would remain operational. However, given the projected increase in traffic volumes on TH 169, it is possible that it may be recommended to close the intersection of TH 169/101st Avenue intersection sometime in the future. Closure of the TH 169/101st Avenue intersection would shift additional traffic to the TH 169/109th Avenue intersection to the north and the TH 610/West Broadway Avenue interchange to the southeast, further contributing to congestion and delays at these locations.

Project Beneficiaries

Construction of the TH 169/101st Avenue interchange would support the long-term growth and land use plans for the northwest growth area in the City of Brooklyn Park. Construction of the proposed interchange will benefit both local and regional traffic. The proposed TH 169/101st Avenue interchange would divert traffic from other nearby intersections and interchanges, improving operations for all users at these locations.

6.5 Future Stages of Development

Item 6.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.

7 EAW Item 7: Cover Types

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

Cover types before the project and after the project are tabulated in **Table 5**.

Table 5. Cover Types [1]

Cover Type	Before (acres)	After (acres)
Wetlands	3.0	0
Stormwater Features	3.8	7.1
Roadside Wetland Ditches (Within Center Median)	0.7	0.7
Deep Water/Streams	N/A	N/A
Wooded/Forest	4.7	0
Brush/Grassland	11.4	0
Cropland	5.8	0
Lawn/Landscaping	9.1	23.1
Impervious Surface	13.8	21.4
Other (describe)	N/A	N/A
Total	52.3	52.3

[1] Cover types analysis assumes that all areas within preliminary design right of way limits would be converted to transportation uses (e.g., lawn/landscaping, impervious surfaces, stormwater features).

[2] Cover types analysis assumes areas for stormwater BMP's based on current regulatory requirements and potential ponding locations described in EAW Item 11.b.ii.

8 EAW Item 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.

Anticipated permits and approvals required are listed in **Table 6**.

Table 6. Permits and Approvals

Unit of Government	Type of Application	Status
Federal		
U.S. Army Corps of Engineers (USACE)	Section 404 of the Clean Water Act	To be completed
State		

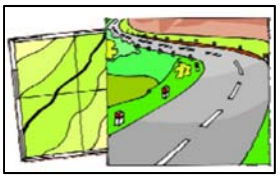
Unit of Government	Type of Application	Status
Minnesota Department of Natural Resources (DNR)	Public Waters Work Permit (if necessary for impacts to Public Water Wetland 254W)	To be completed
DNR	Temporary Water Appropriation Permit (if necessary)	To be completed
MnDOT	Environmental Assessment Worksheet	Completed
MnDOT	EIS Need Decision	To be completed
MnDOT	Wetland Conservation Act (Boundary Approval/Replacement Plan)	To be completed
MnDOT	Cooperative Agreement for Construction Projects	To be completed
Minnesota Pollution Control Agency (MPCA)	Section 401 Certification	To be completed
MPCA	National Pollutant Discharge Elimination System (NPDES) Permit	To be completed
Local		
West Mississippi Watershed Management Commission	Stormwater treatment and erosion control review	To be completed
Metropolitan Council	Highway Interchange Request	Complete
Metropolitan Council and Three Rivers Park District	Parkland Conversion Request	To be completed
City of Brooklyn Park	Wetland Conservation Act (Boundary Approval/Replacement Plan)	To be completed

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19.

9 EAW Item 9: Land Use

9.1 Describe Existing Land Use, Plans and Zoning

Item 9.a.i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.



Existing Land Use

Existing land use within the project area is predominantly characterized by agricultural land, rural residential and open space areas. Two churches

(Crossroads Alliance Church and Grace Fellowship) are located along 101st Avenue between Jefferson Highway to the west and West Broadway Avenue to the east. Three residential properties are located along 101st Avenue and West Broadway Avenue. The Target North Campus is located southeast of the project area on West Broadway Avenue.

The Cities of Maple Grove and Champlin are located west and north of the project area, respectively. Land uses west of Jefferson Highway in Maple Grove include residential and commercial uses. Land uses north of 109th Avenue in the City of Champlin also include residential and commercial uses.

Parks and Trails

Several parcels within the project area are owned by the Three Rivers Park District and encompass the Rush Creek Regional Trail. The Rush Creek Regional Trail Bridge crosses over TH 169 approximately 0.2 miles north of TH 169/101st Avenue intersection. The Rush Creek Regional Trail is a 7.2 mile greenway, which connects Elm Creek Reserve to the Coon Rapids Dam Regional Park. The trail is an important regional resource as it provides connections to the Anoka County regional trail system and the Minneapolis Park and Recreation regional trail system. The trail consists of a 10-foot wide paved multi-purpose trail used by pedestrians, bicyclists and in-line skaters. Acquisition of Rush Creek Regional Trail properties adjacent to the TH 169/101st Avenue intersection was funded through the Park Acquisition Opportunity Fund grant program administered by the Metropolitan Council, which establishes a restrictive covenant on the property.

Prime or Unique Farmlands

A small portion of the soil within the project is considered prime farmland or farmland of statewide importance. Approximately 2.6 acres of farmland within the project construction limits would be converted to transportation uses. Areas considered farmland of statewide importance along TH 169 south of the proposed interchange have already been converted to transportation uses. Locations of prime farmland and farmland of statewide importance are shown in **Figure 6, Appendix A**.

Item 9.a.ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The entire City of Brooklyn Park lies within the Metropolitan Urban Service Area (MUSA) and has followed a growth management plan over the past several decades. The majority of the City is built-out, and the southern and eastern portions of the City have developed a mature, suburban character. Portions of the northwestern region of the City that have retained a rural and agricultural character have been identified for future development.

The northwestern region of the City of Brooklyn Park provides the greatest amount of vacant land available for future development, and includes the Target North Campus.

Section 3.4 of the *City of Brooklyn Park 2030 Comprehensive Plan* identifies the Target North Campus area as a "Special Issue Area" which warrants special attention due to the future development potential of the area. Future uses for the Target North Campus area identified in the plan include office, retail/commercial space, housing, and hotels.

Based on the future development plan presented in the *2030 Comprehensive Plan*, the City intends to utilize the area along 101st Avenue between TH 169 and West Broadway Avenue for the development of mixed use, business park, institutional, and park and recreation uses. In particular, the TH 169/610 interchange area has been targeted for development of "Signature Mixed Use" development, consisting of high quality and landmark buildings.

Additionally, the *2030 Comprehensive Plan* recommends planned improvements to TH 169 and 101st Avenue. Planned improvements include upgrading 101st Avenue to a four-lane major urban collector between Jefferson Highway and Winnetka Avenue, and constructing an interchange at TH 169/101st Avenue. It is noted in the plan that implementing an interchange at TH 169/101st Avenue is critical to supporting future development in the area.

Item 9.a.iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The majority of the parcels within the proposed project location are within the Urban Reserve District (R1) as shown in **Figure 7, Appendix A**. Pursuant to §152.201 of the City of Brooklyn Park's Zoning Code, the purpose of the R1 District is to guide the orderly phasing and development of land until municipal services are extended into the area. The R1 District allows for short-term agriculture uses and very low density residential uses. A portion of the project area is located with the Highway Overlay District (HO).

Two parcels (Parcel ID 06-119-21-43-0002 and 06-119-21-43-0006) located along 101st Avenue, east of the intersection with TH 169 are included in the Conservancy District (CD) as shown in **Figure 7, Appendix A**. These parcels are owned by the Three Rivers Park District. Per §152.450 of the City of Brooklyn Park's Zoning Code, the Conservancy District is comprised of areas that contain valuable environmental qualities which are to be preserved as park or open space uses.

9.2 Compatibility with Nearby Land Uses, Zoning and Plans

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

Based on the *City of Brooklyn Park 2030 Comprehensive Plan*, the City has targeted the area near the TH 169/101st Avenue intersection for future development as there is limited availability of land outside of the northwest region of Brooklyn Park suitable for development. As illustrated in **Figure 8, Appendix A**, the City envisions parcels within and in close proximity

to the project area to be utilized into business park, industrial, and mixed use developments based on the City's Land Use Plan. Furthermore, the comprehensive plan highlights the importance of the growth of the Target North Campus as a key asset to the City. The proposed TH 169/101st Avenue interchange would provide the transportation infrastructure necessary to support planned development in northwest Brooklyn Park.

The proposed project includes reconstructing 101st Avenue into a four-lane roadway and constructing an interchange at TH 169/101st Avenue, consistent with the transportation recommendations established in the City's comprehensive plan.

The proposed project would convert existing parkland owned by Three Rivers Park District in the northeast quadrant of TH 169 and 101st Avenue to transportation uses. Based on the current preliminary design, it is anticipated that approximately 3.6 acres of property owned by Three Rivers Park District would be acquired for highway right of way.

9.3 Measures to Mitigate Any Potential Incompatibility

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

Potential right of way impacts to Three Rivers Park District property will be refined during final design. Opportunities to further reduce the amount of parkland converted to transportation uses will be evaluated as part of the final design process. The City of Brooklyn Park is coordinating with Three Rivers Park District staff to identify mitigation measures for anticipated parkland impacts as required under Metropolitan Council Parks and Open Space System Protection Policy – Strategy 2 (Conversion of Regional Park System Lands to Other Uses).[4]

[4] Metropolitan Council. Regional Parks Policy Plan. Chapter 4. Policies and Strategies. System Protection Policy available at http://www.metrocouncil.org/Parks/Publications-And-Resources/POLICY-PLANS/2040-Regional-Parks-Policy-Plan.aspx.

10 EAW Item 10: Geology, Soils and Topography/Land Forms

10.1 Geology Underlying the Project Area

Item 10.a. 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.

Bedrock

The uppermost bedrock underlying the project corridor is St. Lawrence Formation and Jordan Sandstone. In the project area, depth to bedrock is approximately 100 to 200 feet of the ground surface (Minnesota Geological Survey, 1989, Geologic Atlas for Hennepin County, *Depth to Bedrock and Bedrock Topography*).

Groundwater

The Hennepin County Geological Atlas Bedrock Hydrogeology map (Minnesota Geological Survey, 1989) indicates a water table elevation of approximately 850 feet above mean sea level in the vicinity of the project.

The potentiometric surface of the Franconia-Ironton-Galesville Aquifer, in the vicinity of the project area, slopes down to the east-northeast (Minnesota Geological Survey, Geologic Atlas for Hennepin County, Bedrock Hydrogeology). The Franconia-Ironton-Galesville aquifer underlies the majority of Hennepin County except for the southwestern and northern areas of the county. The Prairie du Chien-Jordan overlies the Franconia-Ironton-Galesville aquifer, which is the most heavily used aquifer in the county. The Franconia-Ironton-Galesville aquifer is minimally used in areas where the Prairie du Chien-Jordan aquifer is present. However, in the western and northern area of the county, the Franconia-Ironton-Galesville aquifer serves as a major source of supply for domestic wells. The depth and gradient of the groundwater table can change seasonally in response to weather/precipitation patterns and recharge.

Geologic Site Hazards

A review of the Minnesota Department of Natural Resources (DNR) GIS-based karst database and the Minnesota Geological Survey (MGS) Geologic Atlas of Hennepin County indicate no known occurrences of sinkholes, shallow limestone formations, or karst features within the project vicinity. The absence of shallow limestone formations and karst

conditions reduce the probability of sinkholes and problematic shifting of soil and landforms. Additionally, the lack of unconfined/shallow aquifers and sinkholes indicate no additional measures are required beyond basic geotechnical awareness of land conditions.

10.2 Soils and Topography

Item 10.b. Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

Topography

The topography of northwestern Brooklyn Park is relatively flat. The elevation within the project area is approximately 880 feet above sea level throughout the project area.

Soils

Soil types within the project area, based on the Natural Resources Conservation Service (NRCS) Soil survey for Hennepin County are listed below in **Table 7** and illustrated in **Figure 9**, **Appendix A**.

Table 7. Soil Types

Soil Name	Soil Symbol	Percent Slope	Erodibility
Anoka and Zimmerman Soils, Terrace	D1B (1)	2 to 6 percent slopes	NHEL
Isan Sandy Loam	D20A (1)	0 to 2 percent slopes	NHEL
Isan Sandy Loam, Depressional	D21A (1)	0 to 1 percent slopes	NHEL
Soderville Loamy Fine Sand, Terrace	D25A (1)	0 to 3 percent slopes	NHEL
Seelyeville and Markey Soils, Depressional	D30A (1)	0 to 1 percent slopes	NHEL
Verndale Sandy Loam, Acid Substratum	D6A (2)	0 to 2 percent slopes	NHEL
Verndale Sandy Loam, Acid Substratum	D6B (2)	2 to 6 percent slopes	NHEL
Hubbard Loamy Sand	D7A (1)	0 to 2 percent slopes	NHEL

Source: NHEL: NRCS classification for Not Highly Erodible Land based on characteristics for soil type.

(1) Not prime farmland

(2) Farmland of statewide importance

Soil Permeability

The topography According to the NRCS Soil Survey for Hennepin County, the project area is primarily composed of sand, gravelly sand, and loamy sand; overlain by thin deposits of silt, loam, or organic sediment. The most prevalent soil on the site is Isan sandy loam (D20A), which consists of poorly drained soils. Permeability of this soil type ranges from moderately rapid to rapid. Potential for groundwater contamination in the project area is not only dependent on soil characteristics, but also on the nature of the contaminant and depth to groundwater. Depth to groundwater within the project area varies from less than 10 feet to nearly 20 feet. A limited amount of hazardous materials will be stored on-site during project construction; therefore, concern for causing soil contamination is low.

Highly Erodible Soils

According to the NRCS, Highly Erodible Land (HEL) and Potentially Highly Erodible Land (PHEL) are areas of land that have a high potential for erosion. Highly erodible land, when disturbed through construction activities or vegetation removal, has the likelihood of creating unstable conditions that lead to erosion and sedimentation. These classifications are based on soil type and steep slope characteristics. As presented in **Table 8** above, the area within the project limits is classified as Not Highly Erodible Land (NHEL).

Project Impacts

The project would require approximately 15,000 cubic yards of soil fill and earthwork. The area to be graded is approximately 52 acres (area within the preliminary construction limits).

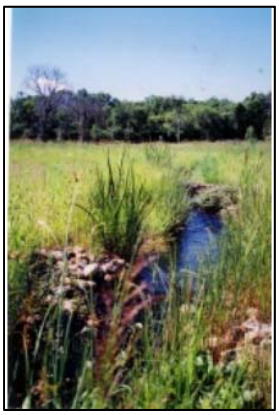
The majority of construction impacts would be associated with site grading and site preparation necessary for construction of the new interchange. A discussion of erosion control, stormwater management and effects to water quality is provided in EAW Item 11.b.ii.

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

11 EAW Item 11: Water Resources

11.1 Surface Water and Groundwater Features

Item 11.a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.



Item 11.a.i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

DNR Public Waters

Two DNR Public Water Wetlands (254W) are located within the project limits (see **Figure 10, Appendix A)**. The two wetlands are located north and south of 101st Avenue near Jefferson Highway, and were likely originally part of one larger wetland that was previously bisected by 101st Avenue.

Aquatic Resources

A preliminary review of NRCS soil mapping, National Wetland Inventory (NWI) data, contour data, and recent aerial photography was conducted to identify potential wetland areas within the project area. An on-site field review was performed on May 19, 2015 to conduct a visual assessment of hydrology and vegetation within the project area. Areas within TH 169 or on private property were assessed from a distance. Several potential wetland areas and stormwater features were identified within the project area (see **Figure 10, Appendix A**). The results of the desktop review and on-site field review are provided in the wetlands memorandum in **Appendix D**.

There are no lakes or streams within the project area.

MPCA 303d Impaired Waters List

There are no impaired waters within one mile of the proposed TH 169/101st Avenue interchange (see **Figure 10, Appendix A**).

Item 11.a.ii. Groundwater - aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Depth to Groundwater

Depth to groundwater within the project area varies from less than 10 feet to nearly 20 feet, depending upon location (see **Table 8** below).

Wellhead Protection Areas (WHPA) and Drinking Water Supply Management Areas (DWSMA)

A Drinking Water Supply Management Area (DWSMA) is located southwest of the intersection of Jefferson Highway and 101st Avenue. The approximate project limits do not extend into the DWSMA as shown in **Figure 11**, **Appendix A**. On a range from very low to very high vulnerability, the area of the DWSMA within the project area was ranked as "low" for likelihood of a potential contaminant source within the DWSMA to contaminate a public water supply well. Additionally, a Wellhead Protection Area (WHPA) is located south of the project area. The project limits are not located within the WHPA.

Wells

A search of the Minnesota County Well Index (CWI) indicates that five wells are located within a 500-foot buffer of the preliminary design project limits. Two of these wells are located within the projects limits. Wells within the 500-foot buffer are listed in **Table 8** and shown in **Figure 11**, **Appendix A**. The depth to groundwater ranged from 8 feet to 20 feet.

The County Well Index does not represent all wells in the state, but is the most complete listing of state wells. Wells that are to be impacted must either be sealed by a licensed well contractor according to Minnesota Rules, Chapter 4725, or be relocated and coordinated with the MPCA and Minnesota Department of Health (MDH).If any unused or unsealed wells are discovered in the project area during construction, they will also be sealed in accordance with Minnesota Rules Chapter 4725.

Table 8. Well Locations

Well Number	Well Use	Depth to Static Water Level (feet)	Impacted
122233	Public Supply/ Non-Commercial	8 feet from land surface	No
133211	Domestic	15 feet from land surface	Yes
171060	Domestic	N/A	Yes

Well Number	Well Use	Depth to Static Water Level (feet)	Impacted
415896	Domestic	8 feet from land surface	No
556721	Public Supply/ Non-Commercial	20 feet from land surface	No

11.2 Effects From Project Activities on Water Resources and Measure to Minimize or Mitigate the Effects

Item 11.b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

Item 11.b.i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

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

Not applicable.

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

Not applicable.

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

Not applicable.

Item 11.b.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.

Pollutants typically associated with roadway corridors consist of various trace metals, phosphorus, chlorides from winter deicing activities, and total suspended solids (TSS). These pollutants collect on the roadway surface and are conveyed into the roadway drainage system during rainfall events.

Existing Conditions

101st Avenue is a rural roadway, with no curb and gutter or storm sewer. Stormwater runoff is captured in roadside ditches that convey it directly to receiving waters via wetlands, open channels, or culverts. There are several existing stormwater management facilities located within and adjacent to the project corridor.

The majority of stormwater runoff from the area of the project west of TH 169 drains to an existing wetland (254W) that is bisected by 101st Avenue. There is also a stormwater pond located at the west end of the project, adjacent to Jefferson Highway. This pond was constructed to provide stormwater treatment for Jefferson Highway, and a small portion of this project area also drains to this pond. The area of the project located adjacent to TH 169 discharges to the TH 169 ditch system and an existing stormwater pond located on the east side of TH 169, north of 101st Avenue. The area of the project east of TH 169 generally drains south and east to existing low areas, and ultimately discharges to the Target North Campus stormwater system. The soils in this area consist of loamy sand and sandy loams, and are well drained soils. The NRCS Web Soil Survey classifies the soils as Hydrologic Group A with a few pockets of Group B. Significant infiltration takes place within the existing low areas.

Proposed Conditions

The existing impervious area within the project is approximately 13.8 acres, and the proposed impervious area is approximately 21.4 acres, resulting in an increase of approximately 7.6 acres of new impervious surface. Roadway runoff will be collected in curb and gutter and pipes and directed to proposed stormwater ponds and infiltration basins (see **Figure 12, Appendix A)**.

The proposed drainage design for the TH 169/101st Avenue Interchange Project assumes roundabouts would be constructed at the TH 169 interchange ramp intersections at 101st Avenue and the existing Jefferson Highway/101st Avenue intersection would be converted into a roundabout in the future. Constructing roundabouts at these intersections would result in greater impervious surface area (i.e., worst-case scenario) and; therefore, represents a conservative estimate of potential stormwater runoff impacts compared to signalized intersections.

The preliminary stormwater management design for the project includes infiltration basins and wet stormwater ponds designed to meet current regulatory requirements. The infiltration

basins are located in areas of Hydrologic Soil Group (HSG) A and HSG A/D soils.[5] The proposed basins are located in areas where there are currently infiltration basins; therefore, it is likely that infiltration would continue to occur with the proposed project. Additional geotechnical information, including soil borings, would be obtained during final design. If infiltration is not feasible due to soil types or the presence of groundwater, then the proposed stormwater treatment system would only consist of wet stormwater ponds.

The West Drainage Area includes the portion of the project from the edge of the southbound off-ramp to the intersection of 101st Avenue and Jefferson Highway. The existing pond in the southeast quadrant of Jefferson Highway and 101st Avenue will be expanded to mitigate for the additional impervious surfaces associated with this project, and to meet the water quality requirements for the project corridor. An infiltration basin will also be constructed adjacent to the expanded stormwater pond. The ponds will provide water quality treatment, volume control, and rate control to mitigate for the increase in impervious surface. This drainage area will ultimately drain to the existing wetland (254W).

The Central Drainage Area includes the portion of the project that is located within MnDOT right-of-way, which is between the southbound off-ramp and the northbound on-ramp and includes the new bridges over TH 169. This portion of the project will discharge to a series of wet stormwater ponds and infiltration basins located within the northbound off-ramp and southbound on-ramp. The ponds will provide water quality treatment, volume control, and rate control to mitigate for the increase in impervious surface.

The East Drainage Area includes the portion of the project from the northbound on-ramp to the intersection of 101st Avenue and Xylon, which is the eastern project boundary. The City and Target Corporation are planning to complete a Subarea Stormwater Master Plan for the area between TH 169 and the West Broadway/Oak Grove Parkway intersection. This study will include more detailed analysis of the overall drainage system, and will incorporate the stormwater runoff from this project on the East Drainage Area.

Stormwater Pollution Prevention Program and Other Permitting

The MPCA will require that a National Pollutant Discharge Elimination System (NPDES) permit be obtained for the project, and all design and construction will follow NPDES permitting requirements. The NPDES permit requires that the project be designed to retain the water quality volume of 1 inch of runoff from the new impervious surfaces created by the project through infiltration or other volume reduction practices. A stormwater pollution prevention plan (SWPPP) will be developed during final design. The SWPPP will describe temporary and permanent runoff controls and potential best management practices site locations to manage or treat stormwater runoff. During construction, sediment control and

[5] HSG A soils have a low runoff potential. Water moves more freely through the soil column. HSG D soils have a high runoff potential. Water movement through the soil is restricted. (Source: USDA. NRCS. May 2007. Part 630, Hydrology, National Engineering Handbook. Chapter 7. Hydrologic Soil Groups).

erosion prevention will be required to prevent sediment from leaving the site and adversely impacting surface waters adjacent to the roadway.

The project corridor falls within the jurisdiction of the West Mississippi Water Management Commission (WMWMC). The WMWMC reviews projects that disturb more than 5 acres. The WMWMC requires that the proposed peak discharge rates not exceed existing rates for the 2-, 10-, and 100-year events. Linear projects that create one acre or more of new impervious surface must meet all commission requirements for the net new impervious surface. Stormwater must be treated prior to discharge to remove 60 percent of phosphorus and 85 percent of total suspended solids, and stormwater runoff volume abstraction shall be provided onsite in the amount equivalent to one inch of runoff generated from net new impervious surface. The water quality and volume control requirements can both be met by infiltrating all site runoff from a 1.3 inch rain event. The City of Brooklyn Park requires that the WMWMC standards be met.

Item 11.b.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.

If temporary dewatering is necessary during project construction, the appropriate DNR groundwater appropriation permits would be obtained for temporary dewatering activities. Any groundwater would be treated prior to discharge as per NPDES permitting requirements.

Refer to **EAW Item 11.a.ii** for a discussion of water wells. The project would not involve other water uses (e.g., connection to municipal water system, expansion of municipal water infrastructure).

Item b.iv. Surface Waters

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

Anticipated Wetland Impacts

Aquatic resources within the project area were identified based on desktop sources (e.g., hydric soils, National Wetland Inventory (NWI), contours, DNR Public Waters, etc.) (see wetland review memorandum in **Appendix D**). Existing stormwater management features were identified based on available records and as-built drawings from MnDOT, Hennepin County, and the City of Brooklyn Park. Aquatic resources were then categorized by resource type:

- Potential wetland areas;
- Stormwater features (stormwater basins identified from information provided by MnDOT, Hennepin County, and City of Brooklyn Park); and
- Roadside wetland ditches (wetland ditches confined to the center median of TH 169)

The categorization of aquatic resource types is preliminary based on information available at the time this EAW was completed. Aquatic resources within the project area will be categorized as appropriate in the future with the Level 2 wetland delineation and as a part of wetland permitting for the project.

Approximately 6.8 acres of aquatic resource impacts will result based on preliminary design construction limits and Level 1 wetland boundaries (see **Table 9** and **Figure 10, Appendix A**).

Table 9. Aquatic Resource Impacts

ID No.	Resource Type	Impact Area (acres)
1	Potential Wetland Area	0.4
2A	Stormwater Feature	0.3
2B	Potential Wetland Area	0.5
3	Potential Wetland Area	0.9
4	Stormwater Feature	3.3
5	Potential Wetland Area	1.2
6	Roadside Wetland Ditch (Within Center Median)	0
7	Roadside Wetland Ditch (Within Center Median)	0
8	Stormwater Feature	0.2
9	Stormwater Feature	0
	Total Aquatic Resource Impacts	6.8

A Level 2 wetland delineation (i.e., field delineation) will be completed in the future during the final design and permitting phases of the project. Wetland impacts will be calculated based on the Level 2 wetland delineation and final design construction limits. It is anticipated that wetland impacts will be reduced compared to the impacts described above.

Sequencing Considerations

Avoidance and Minimization

Complete avoidance of wetland impacts is not feasible with the proposed project. All interchange concepts considered as part of the TH 169/101st Avenue Interchange Study would result in wetland impacts. The proposed folded diamond interchange at the existing intersection of TH 169 and 101st Avenue best addresses the transportation needs and objectives of the project, as well as compatibility with surrounding planned land uses (refer to the Alternatives Evaluation discussion in **Item 6.b**).

The folded diamond interchange configuration was identified to maximize spacing between interchange ramps on TH 169 at TH 610 and the proposed 101st Avenue interchange. An interchange configuration with ramps to the south would be spaced too close to TH 610, creating traffic operations problems and congestion on TH 169 as entering traffic at 101st Avenue weaves with through traffic on TH 169 and exiting traffic to TH 610. A freeway operations analysis completed for the project showed that the ramp spacing between TH 610 and 101st Avenue was adequate.

Shifting the TH 169/101st Avenue interchange to the south to avoid or minimize wetland impacts to the north of the proposed interchange is also not feasible. A church is located in the southeast quadrant of the proposed TH 169/101st Avenue interchange. Shifting the TH 169/101st Avenue interchange to the south of the existing roadway alignment would impact this church, as well as result in greater right of way impacts to the west of TH 169. To avoid the church, the TH 169/101st Avenue interchange would need to be shifted even further to the south towards TH 610.

Avoidance of wetland impacts along 101st Avenue at Jefferson Highway is not feasible because wetlands are located on both sides of the roadway. Shifting the alignment in one direction (north or south) to avoid or minimize wetland impacts to one wetland would result in greater impacts to the other wetland on the opposite side of the roadway.

Minimization of wetland impacts will be evaluated as part of the future design process for the TH 169/101st Avenue interchange (e.g., side slope construction), and are anticipated to reduce overall wetland impacts associated with the future project.

Mitigation

Impacts to wetlands are regulated by the Minnesota Wetland Conservation Act (WCA) and the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. Current regulations require impacts to wetlands within this area of the state be replaced at a minimum ratio of 2:1. A Level 2 wetland delineation will be completed in the future prior to project construction. Wetland impacts will be identified based on project construction limits and the delineated wetland boundaries. Mitigation for unavoidable wetland impacts will be provided in accordance with all regulations and requirements in place at the time of final design and permitting.

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

Not applicable.

12 EAW Item 12: Contamination/Hazardous Materials/ Wastes

12.1 Pre-Project Site Conditions

Item 12.a. Pre-Project Site Conditions. Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

A Phase I Environmental Site Assessment (ESA) was completed in February 2016 to assess the presence of potential contaminated properties within the project area. The Phase I ESA study area included a 500-foot buffer of the preliminary construction limits. High, medium and low rankings were assigned to each site using criteria established by MnDOT. The ranking is based solely on the sites' potential for contamination and not on the sites' location with respect to the proposed construction limits. A copy of the Phase I ESA is available from the City of Brooklyn Park (see contact information in EAW Item 2).

Fourteen (14) low ranked sites and two medium ranked sites were identified in the study area (see **Figure 13, Appendix A** and **Figure 14, Appendix A)**. No high ranked sites were identified within the study area. If necessary, Phase II drilling investigations will be completed in the future prior to construction at medium potential sites, at other locations where a substantial amount of earthwork is anticipated, and where former buildings occupied right of way to determine if any existing contamination is present. The results of the drilling investigations will be used to determine if any contaminated materials can be avoided or if the project's impacts can be minimized. If necessary, plans will be developed for properly handling and treating contaminated soil and/or groundwater during

construction. Any contaminated soils or other potentially hazardous materials encountered during construction will be handled in accordance with regulatory requirements.

12.2 Project Related Generation/Storage of Solid Wastes

Item 12.b. 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.

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 would need to occur within the construction limits. Future design studies 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. If the material is suitable, all excavated material would be reused onsite for construction of ramps and roadway embankments. Any excess soil material that is not suitable for use on the project site would become the property of the contractor and will be disposed of in accordance with state and federal requirements in place at the time of project construction.

Excess materials and debris from this project such as concrete and asphalt will be disposed of in accordance with specifications in place at the time of final design and construction. In particular, excess materials and debris will not be placed in wetlands or floodplains.

12.3 Project Related Use/Storage of Hazardous Materials

Item 12.c. Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

The project would not include permanent hazardous materials storage. No above- or below-ground storage tanks are planned for permanent use in conjunction with this project. Temporary storage tanks for petroleum products may be located in the project area for refueling equipment during roadway construction. Appropriate measures will be taken during construction to avoid spills that could contaminate groundwater or surface water in the project area. In the event a leak or spill occurs during construction, it will be responded to in accordance with MPCA containment and remedial action procedures.

12.4 Project Related Generation/Storage of Hazardous Materials

Item 12.d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Not applicable. The project would not generate or store hazardous waste. Temporary storage of fuel for construction equipment is discussed above in **Item 12.c**.

13 EAW Item 13: Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (rare features)

13.1 Fish and Wildlife Resources

Item 13.a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

Habitat within project area predominantly consists of agricultural and disturbed open space areas. Wooded areas are also present primarily near the Rush Creek Regional Trail. . In general, wildlife species found in the project area are those species generally adapted to live in areas of mixed development, agricultural lands, and fragmented or partially fragmented habitats.

13.2 Rare Features

Item 13.b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-) and/or correspondence number (ERDB) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

Sites of Biodiversity Significance

Based on a review of DNR Geographical Information Systems (GIS) data, there are three Regionally Ecological Significant Areas (CRRESA) located within one mile of the project. CRRESA sites represent ecologically significant terrestrial and wetland areas within the seven-county metropolitan area based on a landscape-scale assessment conducted by the

DNR Central Region. CRRESA sites are ranked as moderate, high, or outstanding ecological significance. The three CRRESA sites within one mile of the project location consist primarily of disturbed grasslands and deciduous woodlands, and are considered moderate ecological significance areas. These CRRESA sites are located outside of the project limits.

There are no Minnesota County Biological Survey (MCBS) sites, native plant communities, calcareous fens, railroad right-of-way prairies, trout streams, or other rare species within the project area.

State Listed Threatened and Endangered Species

State-listed endangered and threatened species are subject to Minnesota's Endangered and Threatened Species Statutes, which protect species at risk of extinction. Special Concern Species within Minnesota are not threatened or endangered, but are either extremely uncommon in Minnesota, or have unique habitat requirements that require special monitoring. Species defined as "watchlist species" are tracked, but have no legal protection status in Minnesota.

MnDOT has a liaison with the DNR who performs project reviews as part of the MnDOT early notification memorandum process; therefore, no LA or ERDB number has been assigned. Correspondence from the DNR is included in **Appendix B**. A search of the DNR Natural Heritage Information System (NHIS) indicated no rare species within the immediate project area; however, Blanding's turtle occurrences have been observed in the larger overall area.

Federally Listed Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service (USFWS) County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species (revised April 2016), three federally listed threatened and endangered species are located in Hennepin County (see **Table 10**).

Table 10. Federally-Listed Species within Hennepin County

Species Group	Scientific Name	Common Name	Protection Status
Clams	*Lampsilis higginsii*	Higgins Eye	Endangered
Clams	*Epioblasma triquetra*	Snuffbox Mussel	Endangered
Mammals	*Myotis septentrionalis*	Northern Long-Eared Bat	Threatened

Higgins Eye (*Lampsilis higginsii*) is a freshwater mussel typically found in large rivers with deep water and moderate currents, including the Mississippi River. The Snuffbox Mussel (*Epioblasma triquetra)* is a freshwater mussel. In Minnesota, this mussel species is primarily

found in the St. Croix River and limited areas of the Mississippi River. The project is not located in close proximity to the Mississippi River.

The USFWS listed the northern long-eared bat (*Myotis septentrionalis*) as a threatened species under the ESA in April 2015 and the final 4(d) Rule for the Northern Long-Eared Bat went into effect on January 14, 2016. Additionally, the northern long-eared bat is a state-listed species of special concern throughout Minnesota.

13.3 Impacts of the Project

Item 13.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 majority of the habitat surrounding the project area consists of disturbed open space and agricultural areas. Wetland resources and fragmented wooded areas are also present within close proximity to the project area. Farmland can temporarily provide cover and a food source for wildlife within the project area. The areas of disturbed woodlands and wetlands have a higher potential for greater plant and animal species diversity compared to agricultural areas.

The project would impact woodland habitat areas in the northeast and northwest quadrants of the proposed TH 169/101st Avenue interchange. The amount of tree loss and timing of tree removal will be identified during the final design and permitting processes. Other areas affected by the project include wetlands, mowed roadside ditches, and disturbed agricultural lands.

Native plant communities, biodiversity sites and CRRSEA sites identified within one mile of the project area are outside of the construction limits and would not be disturbed as a result of the project.

The construction of the interchange will require tree removal. As of July 2016, the project is not located in the vicinity of known northern long-eared bat (*Myotis septentrionalis*) tree roosting areas and/or hibernacula entrances. Measures to mitigate potential impacts to northern long-eared bat habitat will be identified once the project is programmed for construction and will adhere to the regulatory requirements in place at that time.

13.4 Measures to Avoid, Minimize, or Mitigate Adverse Effects

Item 13.d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

At the time that the TH 169/101st Avenue interchange project is programmed for construction, coordination will occur with regulatory agencies to review the project for potential impacts to listed threatened and endangered species in place at that time.

Areas disturbed during construction will be re-vegetated with a native seed mix as soon as possible to inhibit the potential spread of invasive plant species. Other measures will include the inspection and cleaning of construction equipment and the use of invasive-free mulches, top soils, and seed mixes.

Blanding's turtles (*Emydoidea blandingii)*, a state-listed threatened species, have been reported in the vicinity of the project area and may potentially be encountered during construction. The DNR's *Blanding's Turtle Fact Sheet* will be provided to all contractors working on site, and appropriate measures will be followed if turtles are encountered during construction.

14 EAW Item 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 TH 169/101st Avenue Interchange Project was reviewed by MnDOT's Cultural Resources Unit (CRU). CRU determined MnDOT Cultural Resources Unit (CRU) has determined that there will be no historic properties affected by the project as currently proposed. Refer to Appendix B for the MnDOT CRU determination letter dated September 14, 2015.

15 EAW Item 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.

Scenic views or vistas are not present on or near the proposed project location. The project does not include related visual effects such as vapor plumes or glare from intense lights.

The project area is an existing highway corridor (TH 169) and local roadway (101st Avenue). The proposed project would add auxiliary lanes within the existing highway right of way, introduce a new interchange to an existing highway corridor, and expand the local roadway corridor from a two-lane to a four-lane roadway.

The Rush Creek Regional Trail is located north of the proposed TH 169/101st Avenue interchange. The interchange footprint has been minimized to the extent practical to reduce the amount of tree loss in the northeast and northwest quadrants of the proposed interchange.

16 EAW Item 16: Air

16.1 Stationary Source Emissions

Item 16.a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

Not applicable.

16.2 Vehicle Emissions

Item 16.b. Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality as the number of vehicles and the congestion levels in a given area change. The adverse impacts this project could have on air quality have been analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the EPA on the basis of criteria (information on health and/or environmental effects of pollution). The criteria pollutants identified by the EPA are ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. Potential impacts resulting from these pollutants are assessed by comparing the project's projected concentrations to National Ambient Air Quality Standards (NAAQS).

What is National Ambient Air Quality Standards (NAAQS)?

The United States Environmental Protection Agency (US EPA) establishes maximum allowable levels of six important air pollutants. These limits are called NAAQS, and exceedances of those limits may be harmful to human health. Air pollution has regional consequences, therefore regions are classified as attainment (complying with the limits), not-attainment (not complying with the limits), or maintenance (has now improved and complies, and therefore has to maintain compliance for 20 years before being classified as attainment).

In addition to the criteria air pollutants, the EPA also regulates air toxics. The FHWA provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the National Environmental Policy Act (NEPA) process. A quantitative evaluation of MSATs has been performed for this project, as documented below. The scope and methods of the analysis performed were developed in collaboration with the Minnesota Department of Transportation (MnDOT), the Minnesota Pollution Control Agency (MPCA), and the FHWA.

Ozone

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

The MPCA, in cooperation with various other agencies, industries, and groups, has encouraged voluntary control measures for ozone concentrations and has begun developing a regional ozone modeling effort. Ozone concentrations in the lower atmosphere are influenced by a complex relationship of precursor concentrations, meteorological conditions, and regional influences on background concentrations. MPCA states in the document, *Air Quality in Minnesota: 2015 Report to the Legislature* (January 2015, page 32), that:

> *On November 24, 2014, the EPA announced proposed changes to the National Ambient Air Quality Standard for ozone. The proposal seeks to strengthen the ozone standard by lowering the standard from 75 ppb to a value between 65 ppb and 70 ppb. The proposal is based on scientific evidence that strongly indicates ozone impacts human health at levels below the existing standard of 75 ppb.*
>
> *Based on 2013 ozone monitoring results, all areas of Minnesota will meet the revised ozone standard if it is set at 70 ppb.* If the ozone standard is set at 66 ppb or lower, the Twin Cities metropolitan area will not meet the standard. The EPA is expected to finalize the revised ozone standard in October 2015, EPA plans to use monitoring data from 2014-2016 to determine compliance. The MPCA will closely monitor ozone levels over the summer of 2015 and 2016 to assess the likelihood of violating the revised ozone standard.*

*Note that on October 1, 2015, the EPA set the ozone standard at 70 ppb. All areas of Minnesota will meet this new ozone standard.

Additionally, the State of Minnesota is classified by the EPA as an "ozone attainment area," which means that Minnesota has been identified as a geographic area that meets the national health-based standards for ozone levels. Because of these factors, a quantitative ozone analysis was not conducted for this project.

Particulate Matter

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

Motor vehicles (i.e., cars, trucks, and buses) emit direct PM from their tailpipes, as well as from normal brake and tire wear. Vehicle dust from paved and unpaved roads may be re-entrained, or re-suspended, in the atmosphere. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs. $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

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

Source**:** http://www3.epa.gov/pm/health.html

On December 14, 2012, the EPA issued a final rule revising the annual health NAAQS for fine particles ($PM_{2.5}$). The EPA website states:

> *With regard to primary (health-based) standards for fine particles (generally referring to particles less than or equal to 2.5 micrometers (mm) in diameter, $PM_{2.5}$), the EPA is strengthening the annual $PM_{2.5}$ standard by lowering the level to 12.0 micrograms per cubic meter ($\mu g/m^3$). The existing annual standard, 15.0 $\mu g/m^3$, was set in 1997. The EPA is revising the annual $PM_{2.5}$ standard to 12.0 $\mu g/m^3$ so as to provide increased protection against health effects associated with long- and short-term exposures (including premature mortality, increased hospital admissions and emergency department visits, and development*

of chronic respiratory disease), and to retain the 24-hour $PM_{2.5}$ standard at a level of 35 $\mu g/m^3$ (the EPA issued the 24-hour standard in 2006). The EPA is revising the Air Quality Index (AQI) for $PM_{2.5}$ to be consistent with the revised primary $PM_{2.5}$ standards.

Source: http://www.epa.gov/pm/actions.html

The agency also retained the existing standards for coarse particle pollution (PM_{10}). The NAAQS 24-hour standard for PM_{10} is 150 $\mu g/m^3$, which is not to be exceeded more than once per year on average over three years.

The Clean Air Act conformity requirements include the assessment of localized air quality impacts of federally-funded or federally-approved transportation projects that are deemed to be projects of air quality concern located within $PM_{2.5}$ nonattainment and maintenance areas. This project is not considered one of air quality concern. This is supported, in part, by the designation of the State of Minnesota as an unclassifiable/ attainment area for PM. This means that Minnesota has been identified as a geographic area that meets or exceeds the national standards for the reduction of PM levels, and therefore is exempt from performing PM analyses.

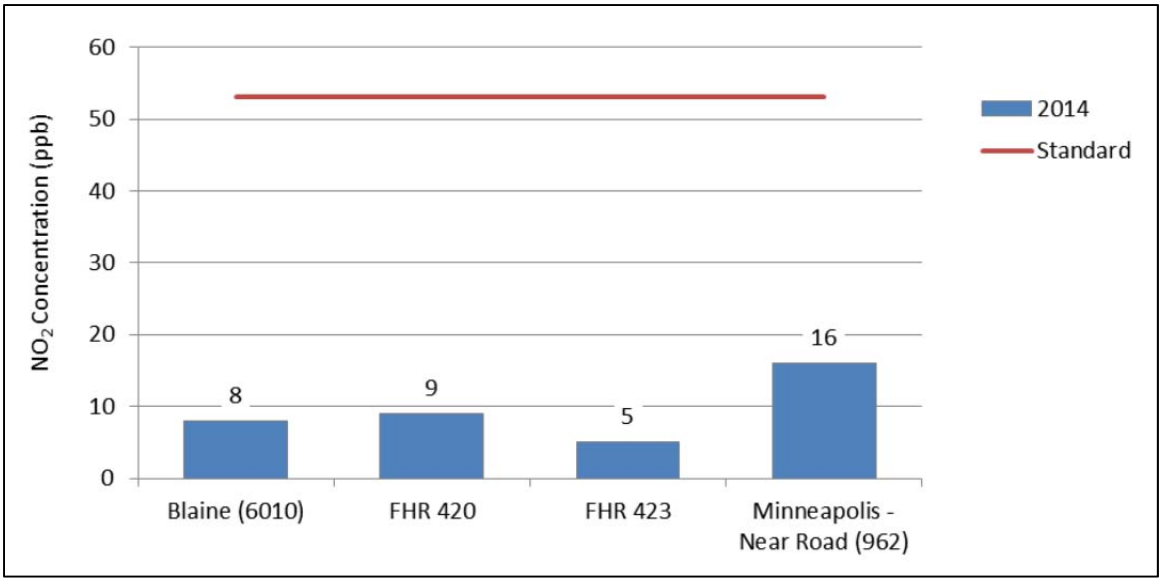
Nitrogen Dioxide (Nitrogen Oxides)

Nitrogen oxides, or NO_x, is the generic term for a group of highly reactive gases, including Nitrogen Dioxide (NO_2), all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides are formed when fuel is burned at high temperatures, as in a combustion process. The primary sources of NO_x are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. The MPCA's *Air Quality in Minnesota: 2015 Report to the Legislature* (January 2015, page 6) indicates that gasoline light-duty vehicles and trucks and diesel on-road heavy-duty trucks, delivery trucks, and buses account for approximately 40% of NO_x emissions in Minnesota. In addition to being a precursor to ozone, NO_x can worsen bronchitis, emphysema and asthma, and increase risk of premature death from heart or lung disease.

Minnesota currently meets federal nitrogen dioxide standards as shown in **Exhibit 4** below (Source: MPCA. *Annual Air Monitoring Network Plan for Minnesota, 2016*. October 2015. Figure 21: Average Annual NO_2 Concentrations compared to the NAAQS). In the MPCA's report *Annual Air Monitoring Network Plan for Minnesota, 2016* (October 2015), the following statement is made on page 33 with regard to NO_2:

A monitoring site meets the annual NAAQS for NO_2 if the annual average is less than or equal to 53 ppb. Figure 21 shows the 2014 averages at Minnesota sites and compares them to the standard. Minnesota averages ranged from 5 ppb at FHR 423 to 16 ppb at the Minneapolis Near Road (962) site; therefore, Minnesota currently meets the annual NAAQS for NO_2.

Exhibit 4. Average Annual NO_2 Concentrations Compared to the NAAQS

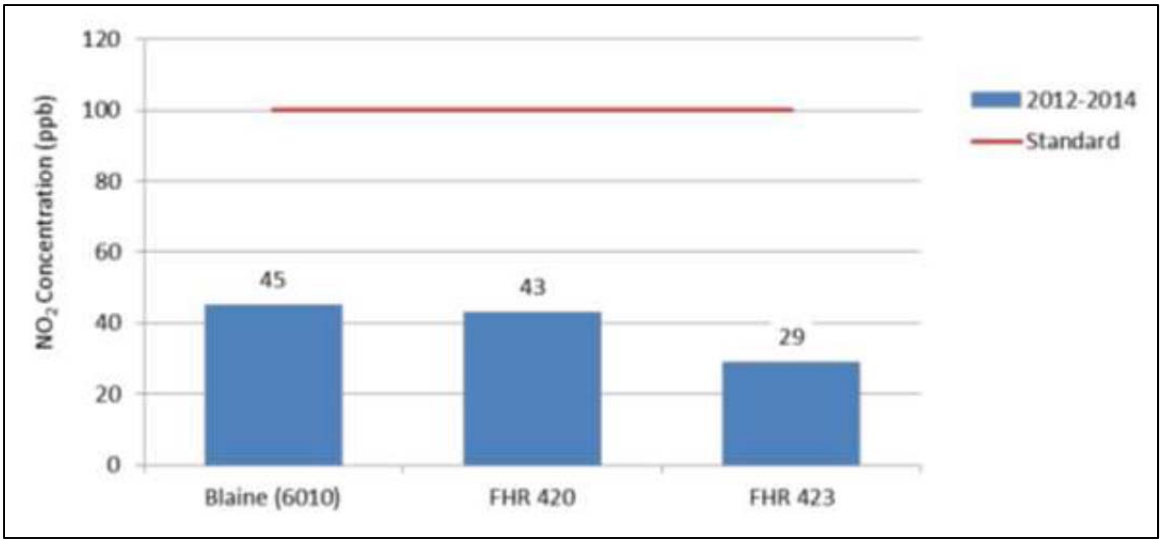


In the Annual Air Monitoring Network Plan for Minnesota, 2016, it states the following with regard to the 1-hr NO2 Standard (Source: MPCA. Annual Air Monitoring Network Plan for Minnesota, 2016. October 2015, page 33):

> *On January 22, 2010 the EPA finalized revisions to the NO_2 NAAQS. As part of the standard review process, the EPA retained the existing annual NO_2 NAAQS, but also created a new 1-hour standard. This new 1-hour NAAQS will protect against adverse health effects associated with short term exposures to elevated NO_2. To meet this standard, the three-year average of the annual 98th percentile daily maximum 1-hour NO_2 concentration must not exceed 100 ppb. Figure 22 shows the 2012-2014 average of the annual 98th percentile daily maximum 1-hour NO_2 concentrations at Minnesota sites and compares them to the 1-hour standard. Minnesota averages ranged from 29 ppb at FHR 423 to 45 ppb at Blaine (6010); therefore, all Minnesota sites currently meet the1-hour NAAQS for NO_2.*

Exhibit 5 depicts the 2012-2014 1-hour NO_2 concentrations at Minnesota sites compared to the 1-hour NO_2 NAAQS (Source: MPCA. *Annual Air Monitoring Network Plan for Minnesota, 2016*. October 2015. Figure 22: 1-hour NO_2 Concentrations compared to the NAAQS).

Exhibit 5. 1-hour NO2 Concentrations Compared to the NAAQS



The EPA's regulatory announcement, EPA420-F-99-051 (December 1999), describes the Tier 2 standards for tailpipe emissions, and states:

> *The new tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. Vehicles weighing less than 6000 pounds will be phased-in to this standard between 2004 and 2007.*
>
> *As newer, cleaner cars enter the national fleet, the new tailpipe standards will significantly reduce emissions of nitrogen oxides from vehicles by about 74 percent by 2030. The standards also will reduce emissions by more than 2 million tons per year by 2020 and nearly 3 million tons annually by 2030.*

Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in Minnesota and on the long-term trend toward reduction of NO_x emissions. Because of these factors, a specific analysis of NO_2 was not conducted for this project.

Sulfur Dioxide

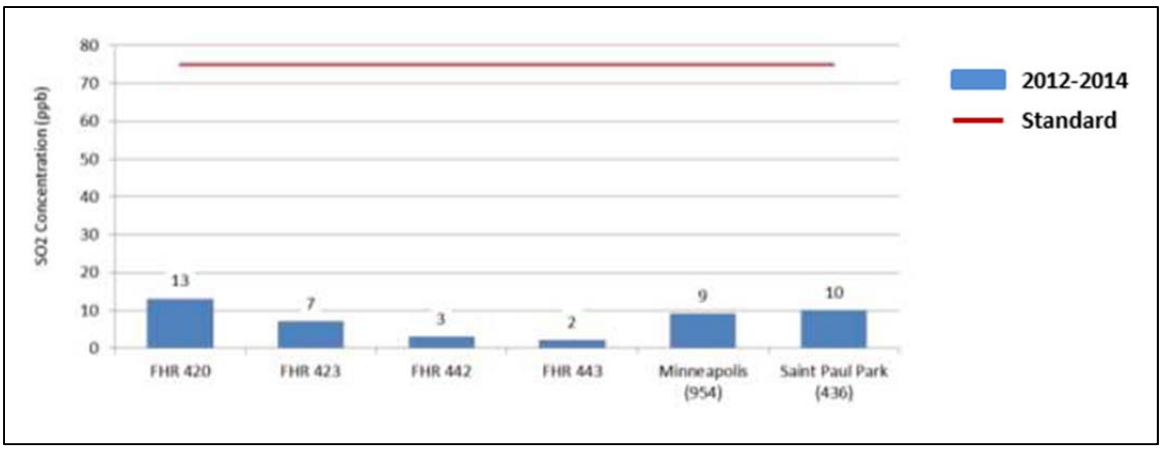
Sulfur dioxide (SO_2) and other sulfur oxide gases (SO_x) are formed when fuel containing sulfur, such as coal, oil, and diesel fuel, is burned. Sulfur dioxide is a heavy, pungent, colorless gas. Elevated levels can impair breathing, can lead to other respiratory symptoms, and at very high levels, can aggravate heart disease. People with asthma are most at risk when SO_2 levels increase. Once emitted into the atmosphere, SO_2 can be further oxidized to sulfuric acid, a component of acid rain.

MPCA monitoring shows that ambient SO_2 concentrations were at less than 20 percent of the federal standards over the 3-year period from 2011 through 2013, as shown in **Exhibit 6** below (Source: MPCA. *Annual Air Monitoring Network Plan for Minnesota, 2015*. September 2014*)*. MPCA also states that approximately 51 percent of SO_2 emissions released into the air in Minnesota are generated by electric utilities (Source: MPCA. *Pollution Report to Legislature*. April 2014, page 22). A much smaller proportion is of the total SO_2 released into the air in Minnesota is attributable to on-road mobile sources. The MPCA has concluded that long-term trends in both ambient air concentrations and total SO_2 emissions in Minnesota indicate steady improvement.

Minnesota currently meets federal SO_2 standards as shown in **Exhibit 6** below (source: MPCA. *Annual Air Monitoring Network Plan for Minnesota, 2016*. October 2015. Figure 24: 1-hour SO2 concentrations compared to the NAAQS). In the MPCA's report *Annual Air Monitoring Network Plan for Minnesota, 2016* (October 2015), the following statement is made on page 34 with regard to SO_2:

> *On June 2, 2010, the EPA finalized revisions to the primary SO_2 NAAQS. EPA established a new 1-hour standard which is met if the three-year average of the annual 99th percentile daily maximum 1-hour SO_2 concentration is less than 75 ppb. In addition to creating the new 1-hour standard, the EPA revoked the existing 24-hour and annual standards. Figure 24 describes the 2012 -2014 average 99th percentile 1-hour SO_2 concentration and compares them to the 1-hour standard. Minnesota averages ranged from 2 ppb at FHR 443 to 13 ppb at FHR 420; therefore, all Minnesota sites currently meet the1-hour NAAQS for SO_2.*

Exhibit 6. One-hour SO2 Concentration Compared to the NAAQS



Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Additionally, the project area is classified by the EPA as a "sulfur dioxide attainment area," which means that the project area has been identified as a geographic area that meets the national health-based

standards for sulfur dioxide levels. Because of these factors, a quantitative analysis for sulfur dioxide was not conducted for this project.

Lead

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

Carbon Monoxide

Carbon monoxide (CO) is the traffic-related pollutant that has been of concern in the Twin Cities Metropolitan area. In 1999, the EPA re-designated all of Hennepin, Ramsey, Anoka, and portions of Carver, Scott, Dakota, Washington, and Wright counties as a maintenance area for CO. This means the area was previously classified as a nonattainment area but has now been found to be in attainment. This area includes the project area, which is located in Dakota and Hennepin Counties. Evaluation of CO for assessment of air quality impacts is required for environmental approval in NEPA documents.

Air Quality Conformity

The EPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate State Implementation Plan (SIP) compliance for transportation projects. It requires that transportation projects meeting criteria to be classified as regionally significant be included in a regional emissions analysis approved as part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP). This project is not included in the Metropolitan Council's *2016-2019 TIP for the Twin Cities Metropolitan Area*; however at such time it is added, a conformity analysis will be completed to demonstrate compliance with the SIP.

On November 8, 2010, the EPA approved a limited maintenance plan request for the Twin Cities maintenance area. Under a limited maintenance plan, the EPA has determined that there is no requirement to project emissions over the maintenance period and that "an emission budget may be treated as essentially not constraining for the length of the maintenance period. The reason is that it is unreasonable to expect that our maintenance area will experience so much growth within this period that a violation of CO National Ambient Air Quality Standard (NAAQS) would result" (US EPA Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas, October 6, 1995). Therefore, no regional modeling analysis for the LRTPP and TIP is required; however federally funded and state funded projects are still subject to "hot-spot" analysis requirements. The limited maintenance plan adopted in 2010 determines that the level of CO emissions and resulting ambient concentrations will continue to demonstrate attainment of the CO NAAQS.

What is a hot-spot analysis?

A hot-spot analysis is defined by the US EPA as an estimation of likely future localized air pollutant concentrations and a comparison of those concentrations to the relevant NAAQS.

Hot Spot Analysis

CO evaluation is performed by evaluating the worst-operating (hot-spot) intersections in the project area. The EPA has approved a screening method to determine which intersections need hot-spot analysis. The hot-spot screening method uses a traffic volume threshold of 79,400 entering vehicle per day. Intersections with traffic volumes above this threshold must be evaluated using EPA-approved emission and dispersion models. Intersections with traffic volumes below this threshold are not expected to result in CO concentrations that exceed state or federal standards, and detailed modeling is not required.

Entering traffic volumes at all intersections in the project area are forecast to be less than this threshold, as shown in **Table 10**. The results of the screening procedure demonstrate that intersection volumes are below the threshold and additional detailed analysis is not required.

Table 11. Year 2030 Intersection Volumes for the Recommended Alternative (Vehicles per Day)

101st Avenue Intersection	North	East	South	West	Total Entering
Jefferson Highway	7,500	13,000	10,800	5,200 (1)	18,250
TH 169 West Ramps	5,000	20,000	N/A	13,000	21,500
TH 169 East Ramps	N/A	27,000	8,700	20,000	32,200
Xylon Avenue	10,000	21,000	9,500[2]	27,000	33,750

(1) Daily volumes estimated based on forecast peak hour turning movements in conjunction with adjacent forecast daily volumes provided in the *TH 169/101st Avenue Interchange Study*

Improvements in vehicle technology and in motor fuel regulations continue to result in reductions in vehicle emission rates. The EPA MOVES 2010b emissions model estimates that emission rates will continue to fall from existing rates through year 2030. Consequently, year 2030 vehicle-related CO concentrations in the study area are likely to be lower than existing concentrations even considering the increase in development-related and background traffic.

Mobile Source Air Toxics

The Federal Highway Administration (FHWA) provides guidance for the assessment of MSAT effects for transportation projects in the NEPA process. The proposed TH 169/101st Avenue interchange is being reviewed through the State of Minnesota environmental review process. There is no federal funding or approval from FHWA for the proposed project. However, a qualitative evaluation of MSAT's following FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* (December 6, 2012), including references to the National Environmental Policy Act (NEPA) review process, has been incorporated into this EAW.

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

Motor Vehicle Emissions Simulator (MOVES)

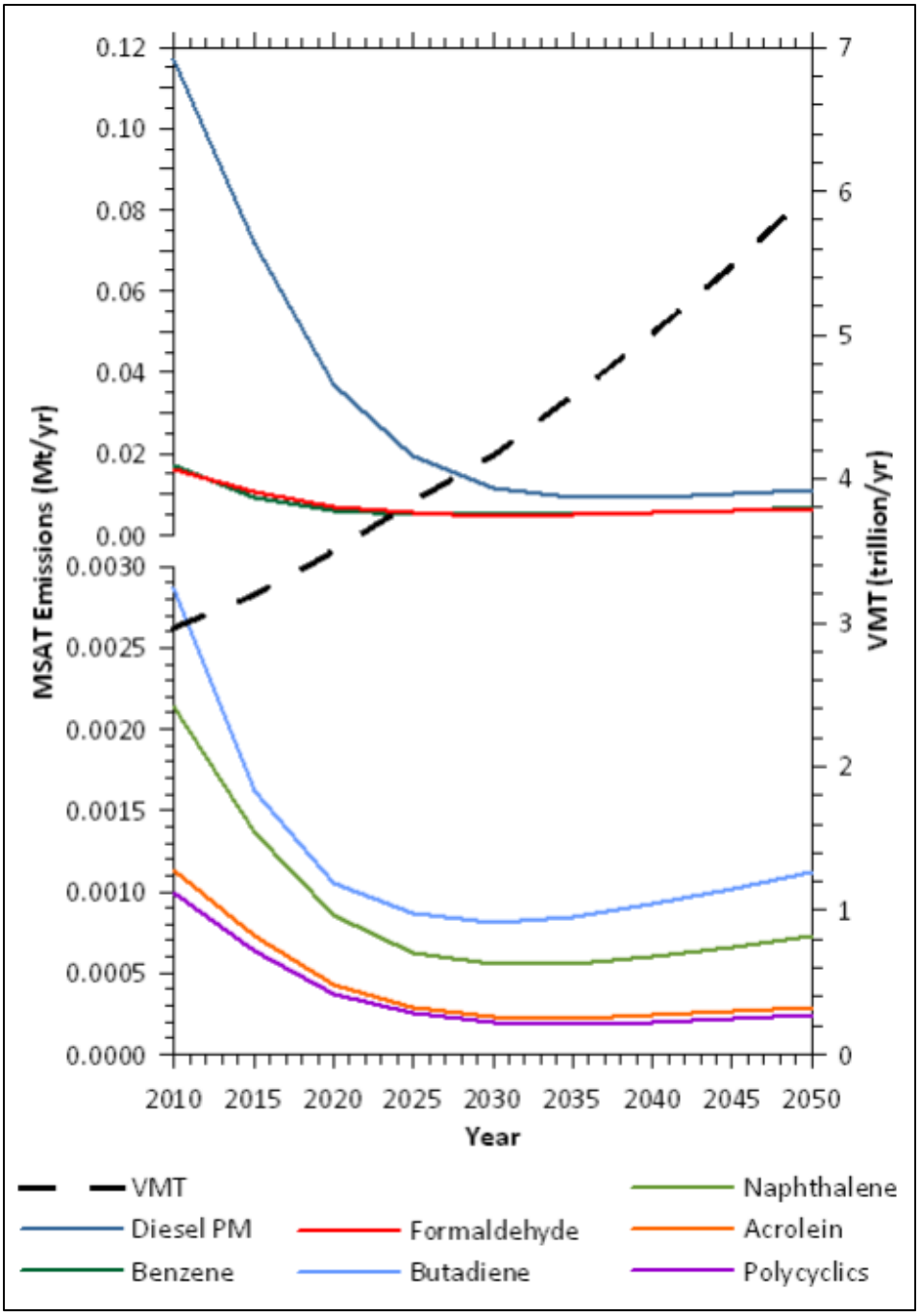
According to EPA, MOVES improves upon the previous MOBILE model in several key aspects: MOVES is based on a vast amount of in-use vehicle data collected and analyzed since the latest release of MOBILE, including millions of emissions measurements from light-duty vehicles. Analysis of this data enhanced EPA's understanding of how mobile sources contribute to emissions inventories and the relative effectiveness of various control strategies. In addition, MOVES accounts for the significant effects that vehicle speed and temperature have on PM emissions estimates, whereas MOBILE did not. MOVES2010b includes all air toxic pollutants in NATA that are emitted by mobile sources. EPA has incorporated more recent data into MOVES2010b to update and enhance the quality of MSAT emission estimates. These data reflect advanced emission control technology and modern fuels, plus additional data for older technology vehicles.

Based on an FHWA analysis using EPA's MOVES2010b model, as shown in **Exhibit 7**, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

The implications of MOVES on MSAT emissions estimates compared to MOBILE are: lower estimates of total MSAT emissions; significantly lower benzene emissions; significantly higher diesel PM emissions, especially for lower speeds. Consequently, diesel PM is projected to be the dominant component of the emissions total.

(Source: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm)

Exhibit 7. National MSAT Emission Trends 1999 - 2050 For Vehicles Operating On Roadways Using EPA's MOVES2010b Model



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

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

NEPA Context

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals. The NEPA also requires Federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The NEPA requires and FHWA is committed to the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, we must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest. The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

Incomplete or Unavailable Information for Project Specific MSAT Health Impacts Analysis

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking. The FHWA has prepared the following summary to demonstrate current limitations in evaluating MSAT effects.

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

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

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

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

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.health

effects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

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

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

Qualitative Analysis

For each alternative in this EAW, the amount of MSAT emitted would be proportional to the annual average daily traffic, or AADT, assuming that other variables such as fleet mix are the same for each alternative. The projected increase in AADT from existing to future (2030) conditions is largely a function of planned land uses in the study area. AADT volumes are generally comparable under the Build Alternative compared to those under the No Build for a majority of the study area, as the proposed TH 169/101st Avenue interchange would result in traffic shifting between regional system access points. For example, 2030 volumes on TH 169 are projected to be approximately four percent greater under the Build Alternative compared to the No Build Alternative; however, 2030 volumes are projected to decrease on TH 610 between TH 169 and West Broadway Avenue by approximately seven percent (City of Brooklyn Park. *TH 169/101st Avenue Interchange Study*. Chapter 5. Traffic Forecasts and Future Traffic Operations).

Because the AADT's under each of the alternatives are generally comparable, it is expected that were will be no appreciable difference in overall MSAT emissions among the alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, AADT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for AADT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Under each alternative there may be localized areas where AADT would increase, and other areas where AADT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new/expanded roadway sections built between Jefferson Highway and Xylon Avenue under the Build Alternative. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, under both the No Build and Build Alternatives it is expected there would be very little difference in MSAT emissions in the study area based on changes in AADT. There could be increases in MSAT levels in a few localized areas where AADT increases. However, EPA's vehicle and fuel regulations will bring about significantly lower MSAT levels for the area in the future than today.

16.3 Dust and Odors

Item 16.c. 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.

The proposed project will not generate substantial odors during construction. Potential odors will likely include exhaust from diesel engines and fuel storage. Dust generated during construction will be minimized through standard dust control measures such as applying water to exposed soils and limiting the extent and duration of exposed soil conditions. Construction contractors will be required to control dust and other airborne particulates in accordance with the construction contract specifications. After construction is complete, dust levels are anticipated to be minimal because all soil surfaces exposed during construction will be in permanent cover (i.e., paved or re-vegetated areas).

17 EAW Item 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 question format will answer the EAW question in relation to highway projects and summarizes the findings in the Noise Report provided in **Appendix E**.

17.1 Construction Noise

What is noise, what is a decibel, and what is a dBA?

Noise is defined as unwanted sound. Decibel is the unit of measure used to quantify sound pressure level (SPL). The terms sound and noise are often interchangeable, although noise is considered unwanted sound.

The human hearing organs do not hear all frequencies of sound equally; we hear some frequencies better than others. The A-weighting scale was created to apply more emphasis or weighting on the frequencies we hear best, and to de-emphasize or apply less weighting to frequencies we don't hear well.

Will there be noise during construction?

The construction activities associated with the proposed project are expected to produce noise levels that are louder than existing levels. Possible impacts will primarily be associated with construction equipment and pile driving.

Table 12 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is usually used during site grading/site preparation, which is usually the loudest phase of the roadway construction process.

What can be done to reduce the annoyance associated with construction noise?

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. The duration of construction and need for nighttime construction will be determined during the final design of the project. However, construction will be limited to daytime hours (7:00 AM to 10:00 PM) as much as possible.

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. Pile driving noise is often associated with bridge construction and sheet-piling. Pile-driving equipment results in the highest peak noise level, as shown in **Table 12**. High-impact noise construction activities will be limited in duration to the greatest extent possible.

Table 12. 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

Source: United States Environmental Protection Agency and Federal Highway Administration.

17.2 Traffic Noise Analysis

Traffic Noise Analysis Report

The following is a summary of the *TH 169/101st Avenue Interchange Project Traffic Noise Analysis Report*. The complete traffic noise analysis report is included in **Appendix E**. This report includes background information on noise, information regarding traffic noise regulations (i.e., MPCA noise standards [see Appendix E, Table 1]), 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.

As described in EAW Item 6, the project is not funded and is not programmed for construction. A traffic noise analysis is required because the project meets the criteria for a mandatory EAW under Minnesota Rules. This noise analysis addresses Minnesota state noise standards. An updated traffic noise analysis will be completed in the future when the project is programmed for construction, following the MnDOT Highway Noise Policy in place at that time, taking into account any new development within the project area. If federal-aid funding is received, the noise analysis will also follow FHWA requirements in place at that time.

How is traffic noise regulated in Minnesota?

The MPCA is the state agency responsible for enforcing state noise rules (see Appendix E, Table 1, Minnesota State Noise Standards). The MPCA noise standards are different for daytime and nighttime. MPCA defines daytime as 7:00 A.M. to 10:00 P.M. and nighttime as 10:00 P.M. to 7:00 A.M. The state noise standards also take into account the differing noise sensitivities of different land uses such as residential uses, commercial uses, or industrial uses. Minnesota state noise standards apply to the outdoor environment (i.e., exterior noise levels). The MPCA noise standards apply to traffic noise from certain highways, including TH 169 and the proposed TH 169/101st Avenue interchange.

What are L10 and L50?

Measured traffic noise levels are characterized as a function of time. One way to do that is to use a statistical term such as the percent of time a noise level is exceeded. The L10 level is the noise level exceeded 10 percent of the time (typically a one hour period). The L50 level is the noise level exceeded 50 percent of the time.

Under State rules, noise impacts are determined based on land use activities and predicted loudest hourly L10 and L50 noise levels under future conditions. For example, for residential land uses (Noise Area Classification 1, or NAC-1), the state daytime noise standards are 65 dBA (L10) and 60 dBA (L50). The state nighttime standards for NAC-1 are 55 dBA (L10) and 50 dBA (L50). We use the term receptor to mean a discrete location of a noise sensitive area(s) for any of the land uses defined in Minnesota State Noise Standards (Minnesota Rule 7030). . Receptor locations where modeled traffic noise levels are projected to exceed the State daytime and/or nighttime standards must be evaluated for noise abatement feasibility and reasonableness.

How are traffic noise impacts determined?

Traffic noise is evaluated by modeling the traffic noise levels during the hours of the day and/or night that have the loudest traffic noise levels. The traffic noise model uses existing and forecasted traffic volumes, as well as characteristics of the roadway and surrounding environment, to calculate traffic noise levels at representative receptor locations. Modeled traffic noise levels are then compared to state daytime and nighttime noise standards. If modeled traffic noise levels are projected to exceed state daytime and/or nighttime noise standards under the Build Alternative, then a traffic noise impact is identified and noise abatement measures (e.g., noise barriers) are considered.

How was traffic noise evaluated on this project?

Traffic noise levels were modeled for existing (year 2014) conditions, the future (2030) No Build Alternative, and the future (2030) Build Alternative using the "MINNOISEV31" model, a version of the FHWA "STAMINA" model adapted by MnDOT. Traffic noise levels were modeled at 33 representative receptor locations within the project area. These modeled receptor locations represent residential, institutional (places of worship), agricultural, and recreational (local and regional trail) uses. Additional details regarding the traffic noise analysis modeling methodology are described in the *Traffic Noise Analysis Report* in **Appendix E**.

What were the results of the traffic noise analysis?

The Traffic Noise Report found in **Appendix E** provides the detailed analysis results for each modeled receptor. **Table 13** provides a summary of the noise level ranges and number of receptors that exceed state daytime and nighttime standards for existing (2014), future (2030) No Build conditions, and future (2030) Build conditions. The analysis shows that under the No Build Alternative, modeled traffic noise levels (daytime and nighttime) are projected to increase by 1.5 dBA to 2.8 dBA (L10) over existing conditions. Modeled noise

levels under the Build Alternative (daytime and nighttime) are projected to increase by 1.3 dBA to 3.5 dBA (L10) compared to existing (2014) conditions.

Table 13. Traffic Noise Analysis Results

Modeled Year	Existing (2014) Conditions	2030 No Build Alternative	2030 Build Alternative
Number of Receptors Exceeding State Daytime Standards	L10 = 1 receptor L50 = 2 receptors	L10 = 5 receptors L50 = 5 receptors	L10 = 4 receptors L50 = 4 receptors
Number of Receptors Exceeding State Nighttime Standards	L10 = 4 receptors L50 = 5 receptors	L10 = 4 receptors L50 = 6 receptors	L10 = 1 receptor L50 = 3 receptors
Modeled Noise Level Ranges (L10, Daytime)	56.1 dBA to 79.9 dBA	58.2 dBA to 81.6 dBA	59.4 dBA to 81.5 dBA
Modeled Noise Level Ranges (L50, Daytime)	52.5 dBA to 73.6 dBA	55.9 dBA to 76.1 dBA	55.1 dBA to 76.0 dBA
Modeled Noise Level Ranges (L10, Nighttime)	54.9 dBA to 78.2 dBA	57.0 dBA to 80.0 dBA	58.4 dBA to 79.8 dBA
Modeled Noise Level Ranges (L50, Nighttime)	51.2 dBA to 71.9 dBA	54.6 dBA to 74.4 dBA	53.8 dBA to 74.2 dBA

What is MnDOT's Noise Reduction Design Goal?

MnDOT's Noise Policy establishes a noise reduction design goal of at least **7 dBA**. This design goal must be achieved at a minimum of one benefited receptor for each proposed noise abatement measure to be considered reasonable. This goal provides that even though the minimum noise reduction required for receptors to be considered as benefited is 5 dBA a minimum 7 dBA reduction must be achieved for at least one benefited receptor.

What noise abatement measures were considered?

Noise abatement measures were evaluated along the project area where modeled traffic noise levels are projected to exceed state daytime and/or nighttime noise standards. In order for a noise abatement measure to be proposed as part of a project, it must be both feasible and reasonable as established in MnDOT's Noise Policy (dated June 15, 2015).

Feasibility

Noise abatement measures must meet acoustic and engineering feasibility criteria to be proposed. For a noise abatement measure to be considered acoustically feasible, it must provide a substantial reduction in noise, defined as a 5 dBA reduction by at least one impacted receptor per proposed barrier. Engineering feasibility addresses whether or not it is possible to design and construct a proposed noise abatement measure. Potential constructability factors could include safety, topography, drainage, utilities and maintenance.

What is MnDOT's Noise Wall Cost Effectiveness?

Cost effectiveness threshold of **$43,500** per individual benefited receptor has been established as part of MnDOT's 2015 Noise Policy, based on an estimated construction cost of $20/sq. ft. for noise walls. The cost effectiveness threshold and basis for construction cost estimate will be tracked and the cost effectiveness number will be updated every five years.

Reasonableness

Three reasonableness factors or "tests" must be met for a noise abatement measure to be considered reasonable: 1) noise reduction design goal of 7 dBA is met for at least one receptor, 2) cost effectiveness criteria of $43,500 per individual benefited receptor must be met, and 3) the viewpoint of benefited residents and property owners.

Noise Barrier Analysis Results

Noise barriers (i.e., noise walls) were assessed at all locations where future (2030) modeled noise levels were projected to exceed state daytime or nighttime standards. Three different noise walls were modeled attempting to shield impacted noise receptor locations. Modeled noise walls were located in the southeast, northeast, and northwest quadrants of the proposed TH 169/101st Avenue interchange. Modeled noise levels in the southwest quadrant were below state standards for agricultural uses; therefore, a noise wall was not modeled at this location. None of the three modeled noise walls meet MnDOT's acoustic feasibility or reasonableness (i.e., noise reduction design goal) requirements.

Traffic Noise and Land Use Planning

The prevention of future traffic noise impacts is an important component of noise control. Local governments, through their authority to regulate land development, can help prevent future traffic noise impacts by prohibiting noise-sensitive land uses from being located adjacent to a highway or by ensuring that developments are planned, designed, and implemented in such a way as to minimize noise impacts.

Undeveloped land is located adjacent to the TH 169/101st Avenue interchange. This land is guided toward future business park, mixed use, and park/open space uses as identified in the City of Brooklyn Park's 2030 Land Use Plan. As part of the TH 169/101st Avenue Interchange Project, a study was completed to identified setback distances from existing proposed right of way limits where modeled traffic noise levels under 2030 Build Alternative conditions would be below state daytime and nighttime standards. In general, modeled noise levels at approximately 100 to 150 feet from TH 169 were projected to be below state daytime standards (L10) for NAC-2 (e.g., commercial uses). Modeled noise levels at approximately 50 to 100 feet from TH 169 were projected to be below state nighttime standards (L10) for NAC-2 (e.g., commercial uses) (see "Land Use Planning Analysis" section in the *Traffic Noise Analysis Report* in **Appendix E**).

18 EAW Item 18: Transportation

18.1 Traffic-Related Aspects of Project Construction and Operation

Item 18.a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

1) Existing and proposed additional parking spaces.

Not applicable. The project will not add parking spaces.

2) Estimated total average daily traffic generated.

Not applicable. The proposed project will not generate new trips in the same way as a new residential or commercial development because TH 169 and the proposed TH 169/101st Avenue interchange are not a destination or end point like a neighborhood or business.

3) Estimated maximum peak hour traffic generated and time of occurrence.

Not applicable. See the response above.

4) Indicate source of trip generation rates used in the estimates.

Future (year 2030) travel demand was evaluated for the project using the Twin Cities Regional Travel Demand Model.

5) Availability of transit and/or other alternative transportation modes.

There are no existing transit service routes within the immediate project area. Nearby bus service routes are located east of the project area near the TH 610/West Broadway Avenue interchange and west of the project area in Maple Grove. These bus routes connect commuters in the northern suburbs (Maple Grove, Osseo, Brooklyn Park, and Brooklyn Center) to downtown Minneapolis. Express bus service (Metro Transit Route 765) includes a stop at the Target North Campus, east of the project area.

The Metro Blue Line LRT Extension Project is planned to extend the existing Blue Line LRT approximately 13 miles from Minneapolis to Brooklyn Park. The Blue Line LRT extension will terminate at the proposed Oak Grove Parkway Station near the Target North Campus. The Blue Line LRT Extension Project would connect northern suburbs and Minneapolis with the greater regional LRT system. The Blue Line LRT Extension is anticipated to begin service in 2021.

The Rush Creek Regional Trail crosses TH 169 north of the proposed TH 169/101st Avenue interchange. The Rush Creek Regional Trail is a 5.6 mile greenway that connects the Elm Creek Reserve to the Coon Rapids Dam Regional Park, with an additional 1.6 miles of trail located within the Elm Creek Reserve, for a total length of 7.2 miles. This trail has been an important regional resource since opening to the public in 1981 and provides greater regional connections to the Anoka County regional trail system and the Minneapolis Park and Recreation regional trail system.

18.2 Effect on Traffic Congestion

Item 18.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.

This project is a transportation improvement project that has a purpose to improve access to TH 169 and provide the transportation infrastructure to support planned growth in the northwest growth area of Brooklyn Park. The following discussion demonstrates how traffic operations and mobility would improve with the proposed TH 169/101st Avenue interchange in comparison to having no improvements along the TH 169 corridor (i.e. the No Build Alternative).

A traffic operations analysis for the future (year 2030) conditions was completed to determine the effects of the proposed interchange on traffic congestion in the area. As shown in **Table 14**, all intersections evaluated are expected to operate at an acceptable LOS D or better in the a.m. and p.m. peak hours with the proposed TH 169/101st Avenue interchange.

Table 14. Future (Year 2030) Peak Hour Intersection Operations Analysis

Intersection	2030 No Build Alternative AM Peak Hour	2030 No Build Alternative PM Peak Hour	2030 With TH 169/101st Avenue Interchange AM Peak Hour	2030 With TH 169/ 101st Avenue Interchange PM Peak Hour
Jefferson Highway/101st Avenue	B (15 sec.)	B (15 sec.)	C (29 sec.)	B (13 sec.)
TH 169/101st Avenue (1)	F/F (>3 min.)	F/F (>3 min.)	N/A	N/A
101st Avenue/SB TH 169 (signalized)	N/A	N/A	B (12 sec.)	B (18 sec.)

Intersection	2030 No Build Alternative AM Peak Hour	2030 No Build Alternative PM Peak Hour	2030 With TH 169/101st Avenue Interchange AM Peak Hour	2030 With TH 169/ 101st Avenue Interchange PM Peak Hour
101st Avenue/NB TH 169 (signalized)	N/A	N/A	B (18 sec.)	B (19 sec.)
101st Avenue/Xylon Avenue	B (19 sec.)	B (19 sec.)	C (29 sec.)	D (39 sec.)
101st Avenue/Oak Grove Parkway/West Broadway Avenue	D (42 sec.)	F (96 sec.)	C (29 sec.)	C (31 sec.)

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS. The delay shown represents the worst side-street approach delay.

101st Avenue is planned to be converted to a four-lane roadway; as such, the 101st Avenue/Jefferson Highway intersection will need to be modified to accommodate the additional lane on the westbound approach and an eastbound departure lane. Configuration of the Jefferson Highway/101st Avenue intersection, along with additional access to 101st Avenue between Jefferson Highway and the proposed TH 169/101st Avenue interchange will be determined by future development.

To assess the freeway operations for TH 169, a.m. and p.m. peak hour CORSIM (version 6.3) models were developed for the 2030 conditions (2030 No Build Alternative and 2030 Recommended Alternative). The limits of the CORSIM model are described below:

- TH 169 from north of 93rd Avenue (CSAH 30) to 109th Avenue, including the TH 169/109th Avenue intersection; and
- TH 610 from west of TH 169 to West Broadway Avenue.

Results of the CORSIM analysis for northbound TH 169 are tabulated in **Table 15**. The CORSIM analysis results for southbound TH 169 are tabulated in **Table 16**. As shown in **Table 15** and **Table 16**, traffic operations on TH 169 will be the same or improve with the proposed TH 169/101st Avenue interchange compared to the No Build Alternative.

Table 15. TH 169 Traffic Operations Analysis (Northbound TH 169)

Roadway Segment (From)	Roadway Segment (To)	2030 No Build Alternative AM Peak Hour	2030 With TH 169/101st Avenue Interchange AM Peak Hour	2030 No Build Alternative PM Peak Hour	2030 With TH 169/101st Avenue Interchange PM Peak Hour
109th Avenue	101st Avenue	B	B	D	D
101st Avenue	TH 610	B	A	D	C
TH 610	93rd Avenue	B	B	F	F

(1) Future No Build Alternative results assume the following 109th Avenue intersection improvements: dual left-turn lanes on all approaches and dual right-turn lanes on the eastbound and westbound approaches.

Table 16. TH 169 Traffic Operations Analysis (Southbound TH 169)

Roadway Segment (From)	Roadway Segment (To)	2030 No Build Alternative AM Peak Hour	2030 With TH 169/101st Avenue Interchange AM Peak Hour	2030 No Build Alternative PM Peak Hour	2030 With TH 169/101st Avenue Interchange PM Peak Hour
109th Avenue	101st Avenue	F	F	B	B
101st Avenue	TH 610	F	F	B	B
TH 610	93rd Avenue	F	F	C	C

(1) Future No Build Alternative results assume the following 109th Avenue intersection improvements: dual left-turn lanes on all approaches and dual right-turn lanes on the eastbound and westbound approaches.

While southbound TH 169 is projected to operate at LOS F during the a.m. peak hour, density (vehicles per mile per lane) improves compared to the No Build Alternative. This is due to the distribution of trips using TH 610 and 101st Avenue to access TH 169. With the proposed TH 169/101st Avenue interchange, more traffic would access TH 169 at the proposed 101st Avenue interchange compared to the No Build Alternative, improving the weaving that occurs between the loop ramps at TH 610. Traffic spillback on southbound TH 169 from the TH 169/TH 610 system interchange is anticipated to reach the 101st Avenue on-ramp; however, it is not anticipated to back traffic into the ramp terminal intersection at 101st Avenue.

The TH 169/109th Avenue intersection is located north of the project area along the Brooklyn Park/Champlin border. The TH 169/109th Avenue intersection is the first full access intersection to TH 169 north of the TH 169/TH 610 system interchange. With increases in background traffic along TH 169, along with additional trips generated from planned development, this intersection is projected to operate at LOS F during a.m. and p.m. peak hours under the No Build Alternative. The traffic signal at TH 169/109th Avenue is projected to generate queues on northbound TH 169 during the p.m. peak hour greater than 1/2- mile (approximately 3,400 feet).

Traffic operations analysis results for the TH 169/109th Avenue intersection under the 2030 conditions (No Build Alternative and with the proposed TH 169/101st Avenue interchange) are shown in **Table 17**. While the TH 169/109th Avenue intersection is projected to operate at LOS F during the p.m. peak hour with the proposed TH 169/101st Avenue interchange, the vehicle delay is anticipated to improve compared to the No Build Alternative.

Table 17. TH 169 and 109th Avenue Intersection Operations

Scenario	Northbound TH 169 Queue (distance from 109th Avenue intersection, feet)	PM Peak Hour LOS (delay, seconds per vehicle)
2030 No Build Alternative	3,400 feet	F (137 sec.)
2030 With TH 169/101st Avenue Interchange	1,900 feet	F (107 sec.)
2030 With TH 169/101st Avenue Interchange and 109th Avenue Intersection Improvements	1,500 feet	D (45 sec.)

Reconstruction of the TH 169/109th Avenue intersection would further improve operations and traffic queues on northbound TH 169 during the p.m. peak hour (see **Table 16**). Recommended improvements for the TH 169/109th Avenue intersection as identified in the *TH 169/101st Avenue Interchange Study* (December 2014) are listed below.

- Dual left-turn lanes on all approach legs at the TH 169/109th Avenue intersection. Turn bay lengths for each approach would vary between 200 feet and 400 feet.
- Dual right-turn lanes on the eastbound and westbound approach legs at the TH 169/109th Avenue intersection. Turn bay lengths for the eastbound approach would be 200 feet and 100 feet for the westbound approach.

These improvements, along with other long-term transportation system improvements identified in the *TH 169/101st Avenue Interchange Study,* would be coordinated with adjacent cities and/or related agencies in subsequent phases or as development necessitates.

18.3 Measures to Minimize or Mitigate Project-Related Transportation Effects

Item 18.c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Not applicable.

19 EAW Item 19: Cumulative Potential Effects

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

19.1 Geographic Scales and Timeframes

Item 19.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.

The geographic scale considered for the cumulative effects analysis is the roadway corridor and development areas adjacent to the intersection of TH 169 and 101st Avenue, as well as adjacent roadways. The analysis considered other projects under construction or planned to occur between now and 2030, which is consistent with the planning horizon documented in the City of Brooklyn Park *2030 Comprehensive Plan*.

19.2 Reasonably Foreseeable Future Projects

Item 19.b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

The City of Brooklyn Park has identified approximately 1,500 acres in the northwest portion of the City adjacent to the proposed TH 169/101st Avenue interchange for future development. Several planning documents have been prepared to identify and guide future developments within this area. Planned developments within the project area are listed below (see **Figure 15, Appendix A**). Projects that were considered are consistent with guidance provided by the Minnesota Environmental Quality Board (EQB), which establishes that projects be considered if it is actually planned or if a basis of expectation has been laid (i.e. reasonably likely to occur and sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects).

- Target North Campus: The Target North Campus is projected to encompass nearly 1,700,000 square feet of corporate office space, 300,000 square feet of commercial space and 130,600 square feet of technical/data space within a 136 acre site located along Oak Grove Parkway, east of CSAH 103/West Broadway Avenue. Additionally, the Target Corporation owns an additional 204 acres to the west of CSAH 103/West Broadway Avenue that is bordered by TH 610, TH 169 and 101st Avenue. Target has prepared a master plan to guide the development and campus expansion within this area. The master plan envisions that this area will include mixed used development consisting of residential, commercial, and recreational uses.
- NorthPark: The NorthPark development consists of a 227 acre mixed use development proposed in the southwest quadrant of the TH 169 and 109th Avenue intersection, which is bound by the Rush Creek Regional Trail to the south and Winnetka Avenue to the east. The proposed development includes approximately three million square feet of industrial/office/warehouse space and up to 600 units of high-density residential space.

The Metropolitan Council is developing the Metro Blue Line Extension LRT Project. The Metro Blue Line LRT Extension Project proposes to construct a 13-mile extension of the existing Blue Line LRT from Minneapolis to Brooklyn Park. The proposed Blue Line LRT Extension Project will connect northwest suburbs and Minneapolis with the regional LRT system. The Blue Line LRT Extension includes a number of improvements near the

proposed TH 169/101st Avenue interchange, including the Operations and Maintenance Facility (OMF), construction of Xylon Avenue, and extension of Oak Grove Parkway from West Broadway Avenue to 101st Avenue. Other improvements located further to the southeast near the TH 610/West Broadway Avenue interchange include the Oak Grove Parkway Station, a park and ride facility, and reconstruction of West Broadway Avenue. The Final Environmental Impact Statement (FEIS) for the Blue Line Extension LRT is anticipated to be complete in 2016. Construction is anticipated to begin in 2018.[6]

19.3 Nature of Cumulative Potential Effects

Item 19.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.

Potential impacts that were considered as part of the cumulative potential effects evaluation include water resources (e.g., water quality and quantity, stormwater runoff), wetlands, noise, farmlands, and parklands.

Water Resources

The existing impervious area within the project is approximately 13.8 acres, and the proposed impervious area is approximately 21.4 acres, resulting in an increase of approximately 7.6 acres of new impervious surface. This additional impervious surface area would increase the rate, volume, and quality of stormwater runoff from project area roadways. Roadway runoff would be collected in curb and gutter and pipes and conveyed to proposed stormwater ponds and infiltration basins for rate control, volume control, and treatment prior to discharge

Conversion of land uses from rural residential, agricultural and open space to more dense mixed use development would increase the amount of impervious surfaces in the study area. These developments will need to incorporate stormwater best management practices (BMPs) in accordance with City, Watershed and MPCA approval and permitting requirements. The City of Brooklyn Park is currently undertaking a comprehensive water resources study of their northwest growth area adjacent to the existing Target Campus to plan for and address water resources needs as this area develops in the future. Therefore, adverse cumulative impacts to water quality and quantity are not anticipated.

Wetlands

The proposed TH 169/101st Avenue interchange would result in approximately 6.8 acres of wetland impacts. This estimate is based on a Level 1 (desktop) wetland review using

[6] Source: Metropolitan Council. Metro Blue Line Extension Project Timeline accessed 05 April 2016 at http://www.metrocouncil.org/Transportation/Projects/Current-Projects/METRO-Blue-Line-Extension/Timeline.aspx.

National Wetland Inventory (NWI) data. Wetland impacts will be re-evaluated during final design and permitting based on a field delineation of wetland boundaries within the project area.

Planned development adjacent to the proposed TH 169/101st Avenue interchange could also affect project area wetlands. However, wetlands are protected by federal and state laws (e.g., Clean Water Act – Section 404, the Minnesota Wetland Conservation Act) that mandate the "no net loss" concept of wetland functions and values. These laws require the avoidance of wetland impacts when possible, and when avoidance is not possible, impacts must be minimized and mitigated. Given the extensive federal and state regulations protecting wetlands, sequencing requirements, and mitigation for unavoidable wetland impacts, there is a low potential for adverse cumulative impacts on wetlands.

Noise

The proposed project would result in higher traffic noise levels at some modeled receptor locations within the project area. Increases in traffic noise from existing to future conditions are largely the results of growth in background traffic volumes over time.

Planned development could increase the number of sensitive receptors within the study area and the number of roadways that generate traffic noise (e.g., local roadways to provide circulation and access to planned land uses). Development could also introduce other noise sources such as noise from mechanical systems associated with commercial and industrial buildings. The proposed Blue Line Extension would generate noise from LRT vehicles travelling to and from the OMF, as well as noise from activities on the OMF property (although a majority of these activities would occur within the OMF structure).

Minnesota state noise rules require local governments to consider noise impacts and State noise standards in conjunction with proposed land use changes. Local governments have the authority to decrease noise impacts on sensitive receptors through their zoning and land use controls, as well as the development review and approval process. The traffic noise analysis completed with this project included identification of potential set-back distances from project area roadways to help avoid future traffic noise impacts. Given these regulations and local government authority regarding development and land use, there is a low potential for adverse cumulative effects regarding noise.

Farmlands

The proposed TH 169/101st Avenue interchange would impact approximately 2.6 acres of land with soils that are considered prime farmland or farmland of statewide importance.

Planned development in areas surrounding the proposed TH 169/101st Avenue interchange would also convert farmland to other land uses. Development in northwest Brooklyn Park is guided by the City's land use plan and zoning codes, which guides the phased development of the area. The City of Brooklyn Park, through their land use policies and zoning

regulations, can control the intensification of development and protect open space and agricultural land from further development. Therefore, there is low potential for adverse cumulative impacts to farmland.

Parklands

The project would impact approximately 3.6 acres of parkland owned by the Three Rivers Park District in the northeast quadrant of the proposed TH 169/101st Avenue interchange. This parkland was acquired with a Metropolitan Council parks and open space grant and is protected by a restrictive covenant. Conversion of this parkland to transportation uses must be approved by the Metropolitan Council in accordance with their parkland conversion guidelines. Mitigation requirements for parkland conversions include providing replacement parkland of equal or greater value and usefulness. The City of Brooklyn Park has been and will continue to coordinate with Three Rivers Park District to address the parkland conversion process and identify suitable mitigation measures consistent with Metropolitan Council parkland conversion guidelines.

Parklands and trails such as the Rush Creek Regional Trail are protected by local, county, regional, state, and federal laws and regulations. Any project, public or private, that would impact the Rush Creek Regional Trail, would need to address Metropolitan Council parkland conversion requirements. These laws and regulations reduce the potential for adverse cumulative impacts to parklands.

20 EAW Item 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.

The project would require approximately 22.8 acres of permanent right of way acquisition from 13 parcels. The project would require three residential relocations located in the northwest quadrant of the TH 169/101st intersection. Refer to Figure 3 which identifies the proposed right of way boundaries. Construction of the TH 169/101st Avenue interchange would require the closure of the existing driveways that provide access to the Grace Fellowship Church from 101st Avenue. As part of the project, access to the church would be provided from the future intersection of 101st Avenue and Xylon Avenue (see **Figure 4, Appendix A**). Access to other properties along 101st Avenue west of TH 169 would be maintained with the proposed interchange.

No other potential environmental impacts are anticipated other than those discussed in Items 1 through 19.

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

I hereby certify that:

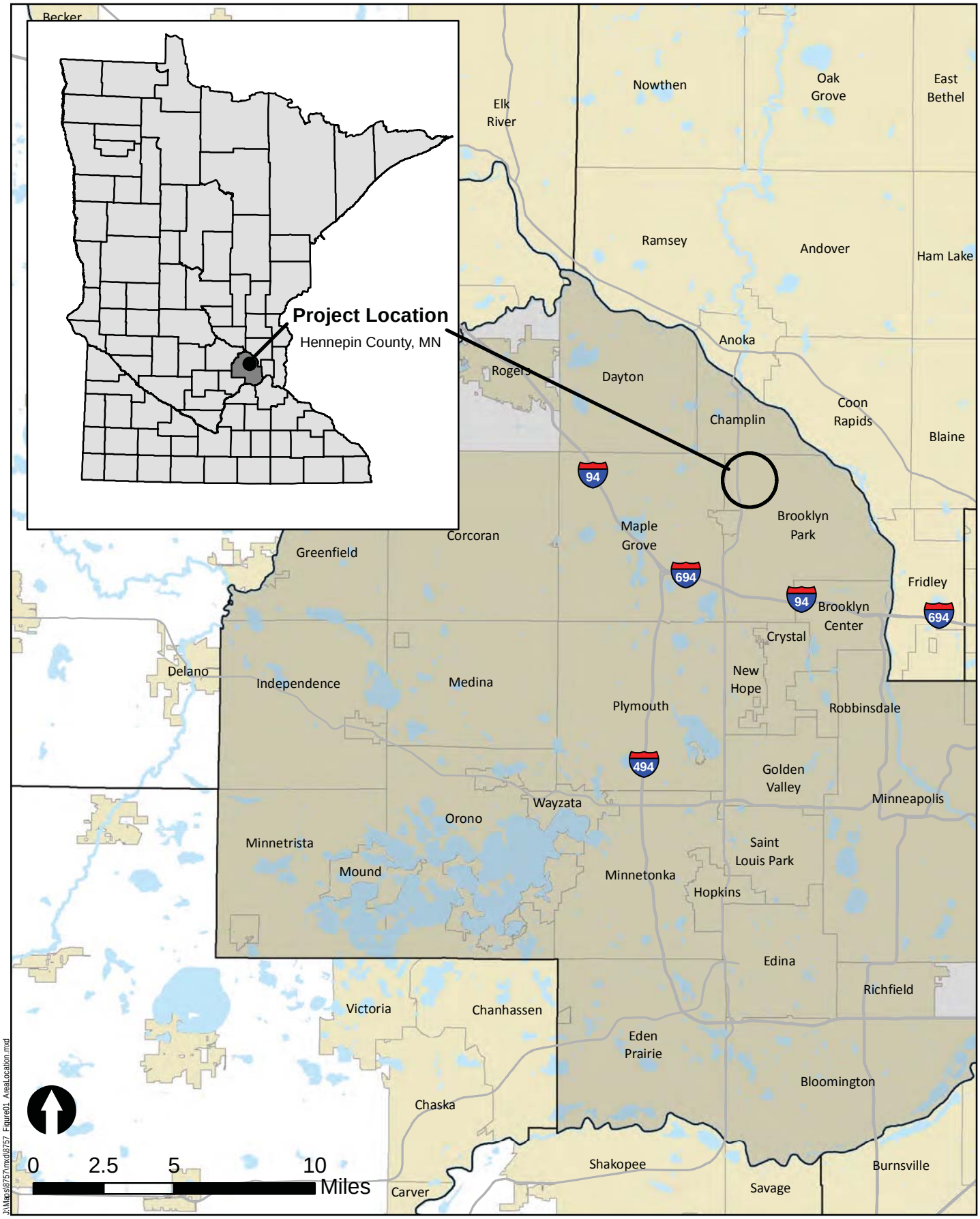
- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, 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 10-12-2016

Title Chief Environmental Officer

Appendix A

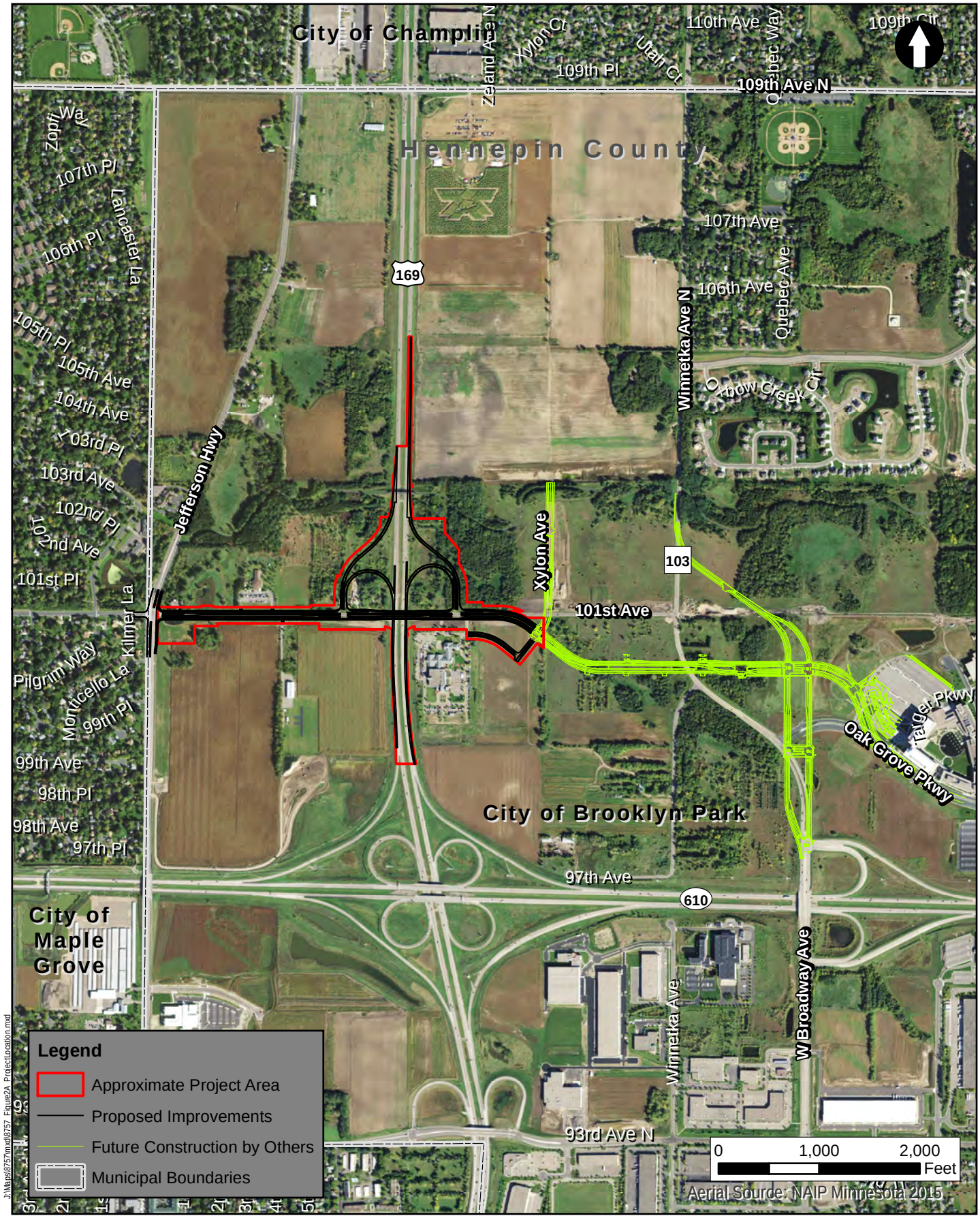
Figures



State Location Map

Figure 1

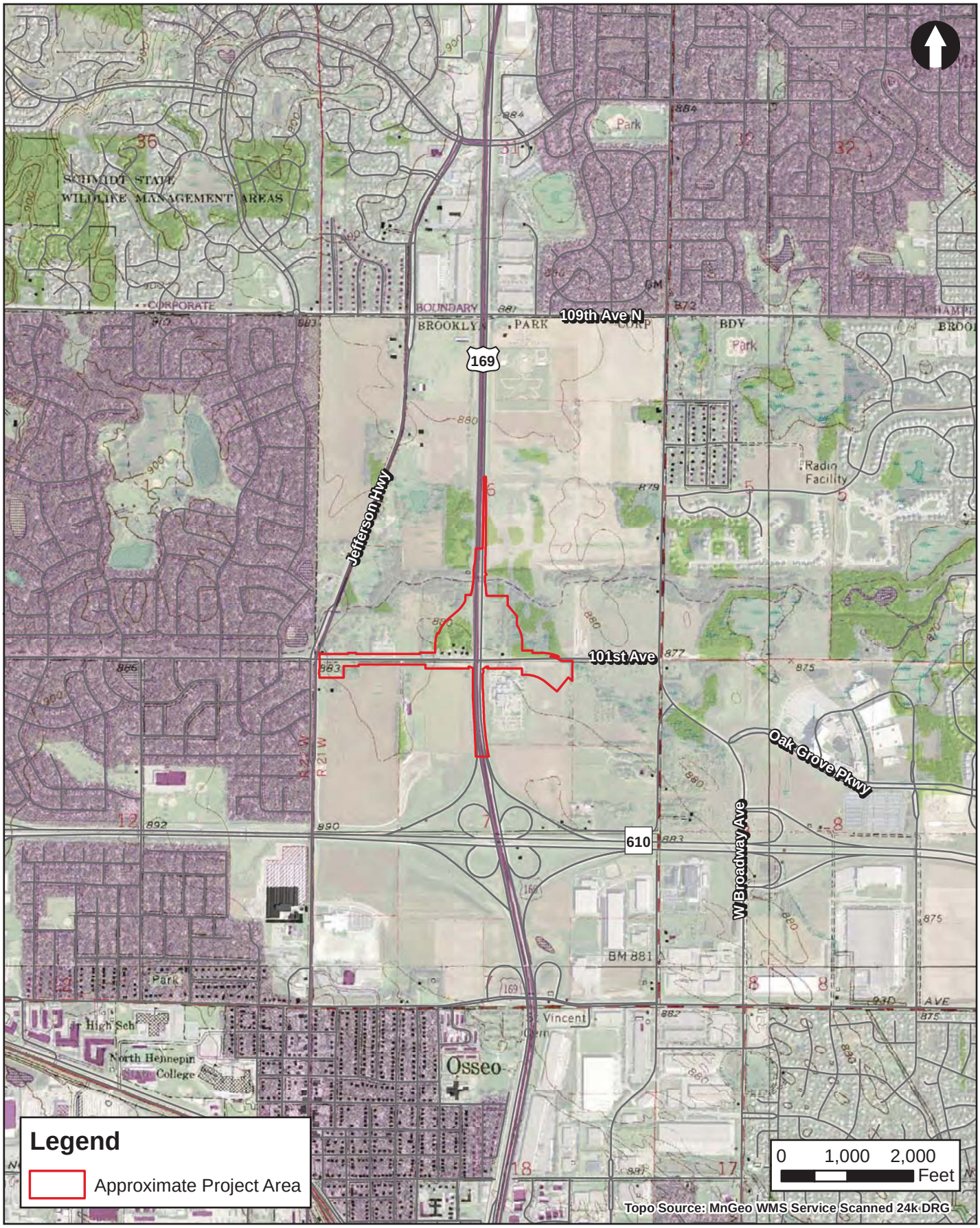
TH 169/101st Avenue Interchange Project
SP 2750-92
Hennepin County, MN



Project Location

Figure 2A

TH 169/101st Avenue Interchange Project
City of Brooklyn Park
SP 2750-92



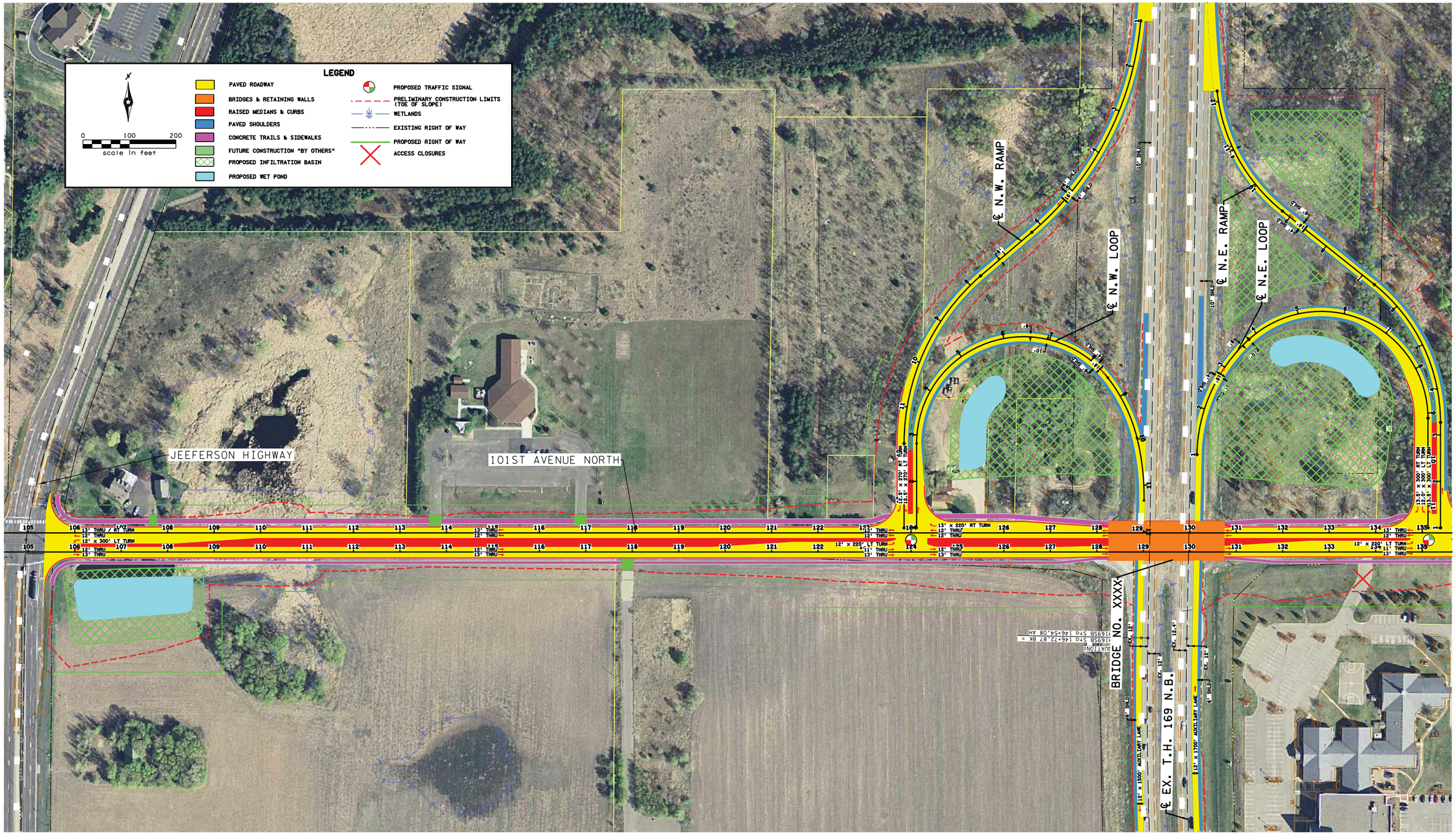
USGS 24k Topo Map

Figure 2B

TH 169/101st Avenue Interchange Project

City of Brooklyn Park

SP 2750-92



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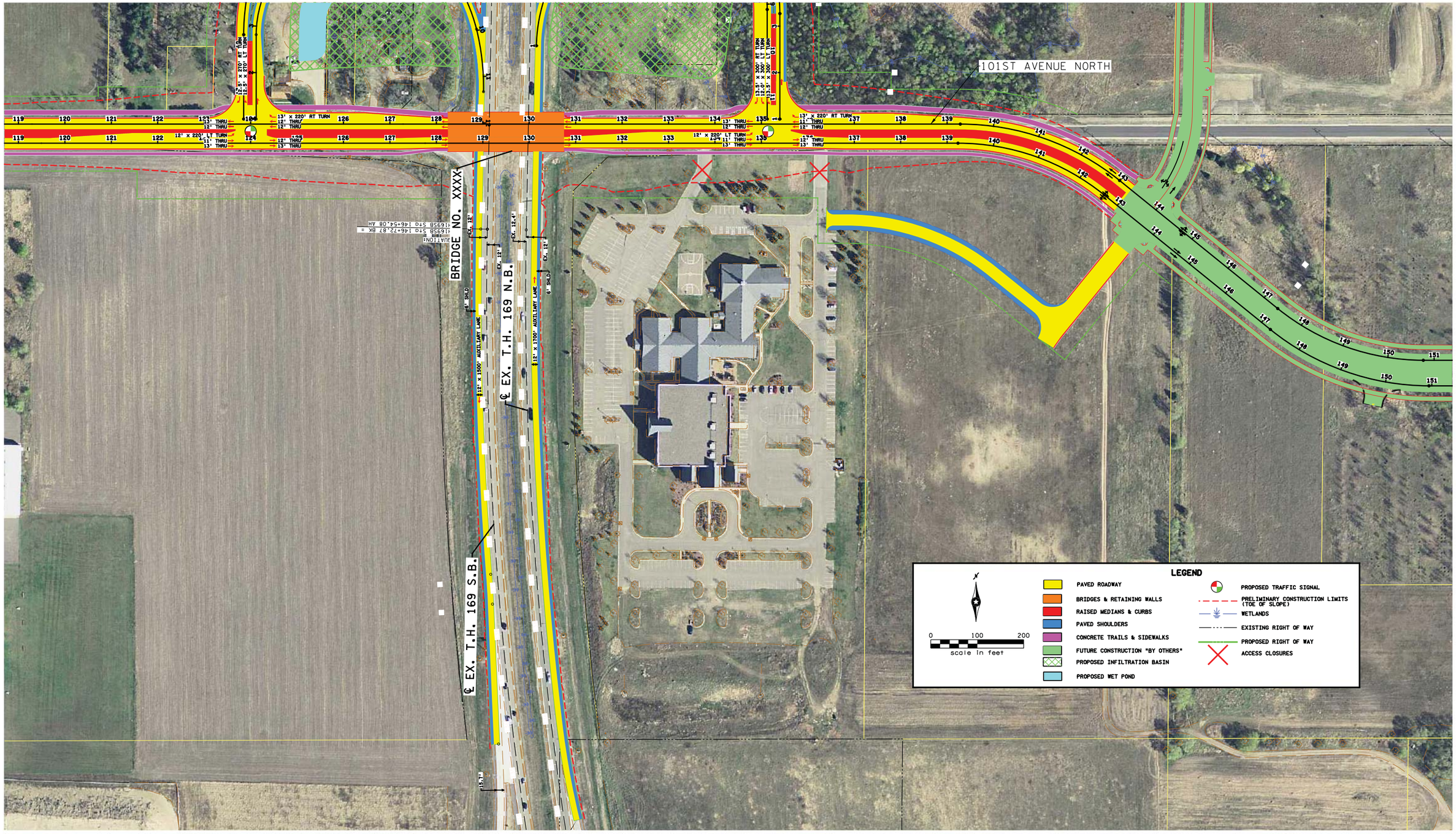
SRF Consulting Group, Inc.

Job 8757
8/31/2016

TH 169/101ST AVENUE INTERCHANGE (PROJECT LAYOUT)

City of Brooklyn Park
SP 2750-95

Figure 3



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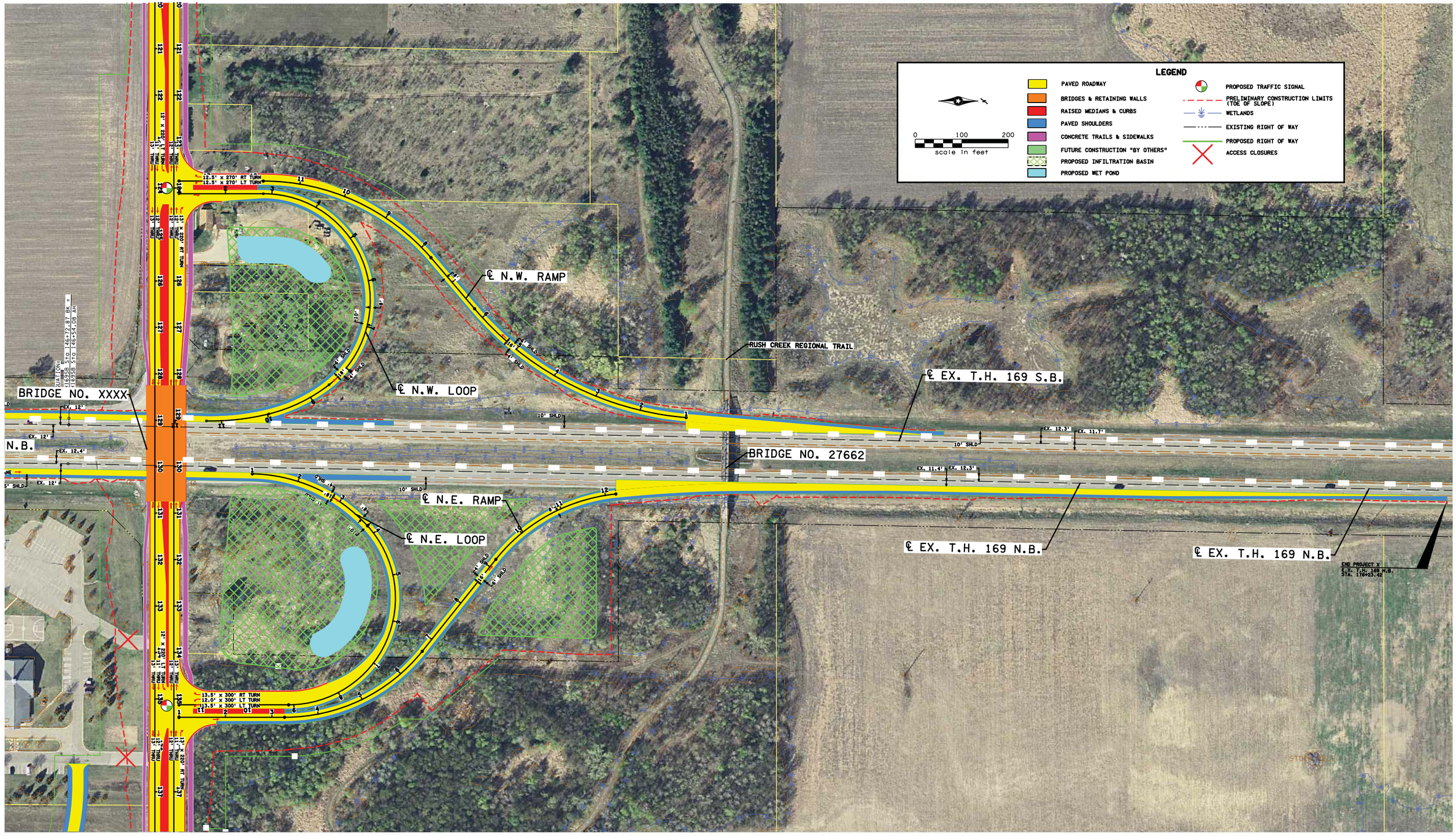
SRF Consulting Group, Inc.

Job 8757
8/31/2016

TH 169/101ST AVENUE INTERCHANGE (PROJECT LAYOUT)

City of Brooklyn Park
SP 2750-95

Figure 4



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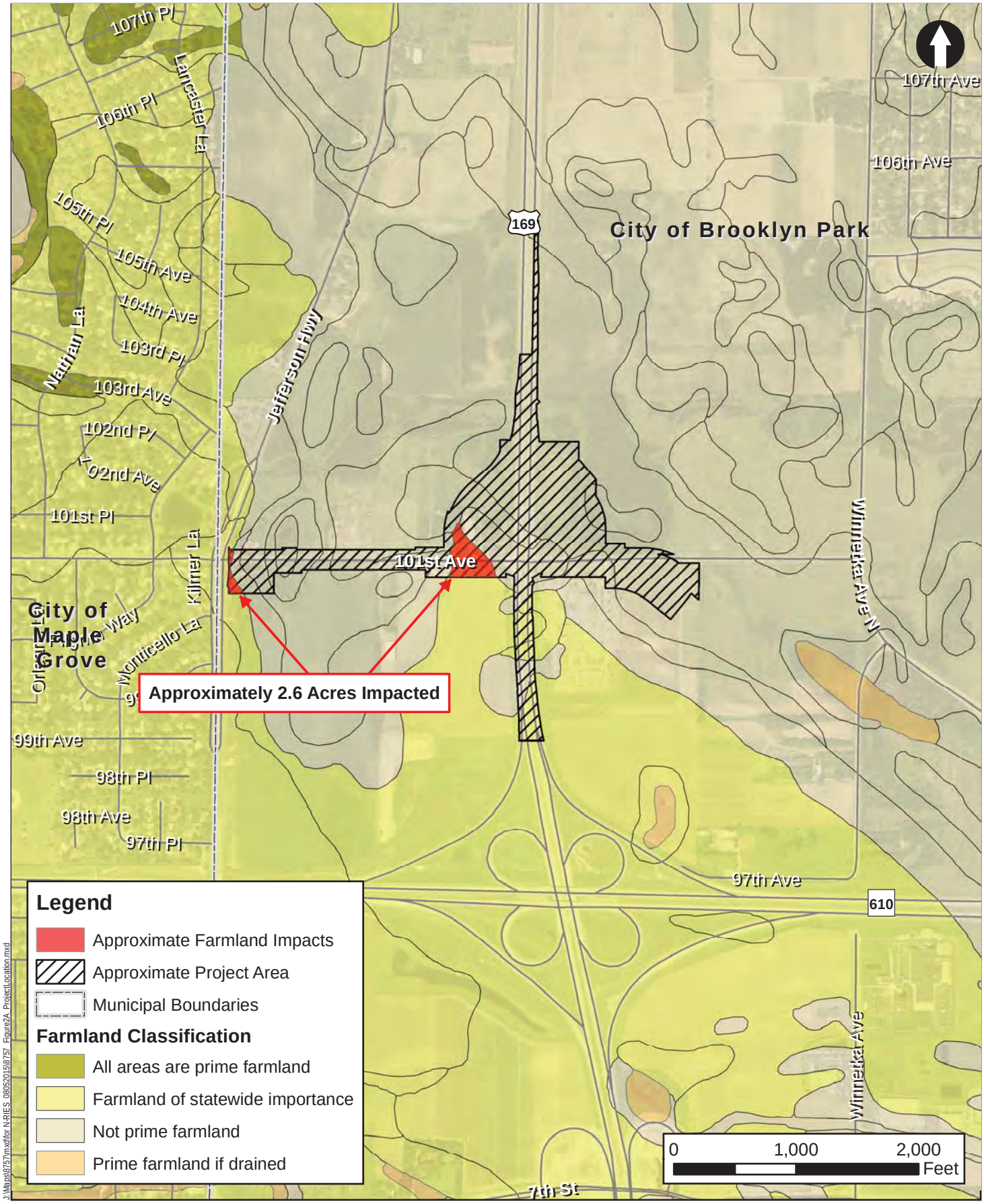
SRF Consulting Group, Inc.

Job 8757
9/14/2016

TH 169/101ST AVENUE INTERCHANGE (PROJECT LAYOUT)

City of Brooklyn Park
SP 2750-95

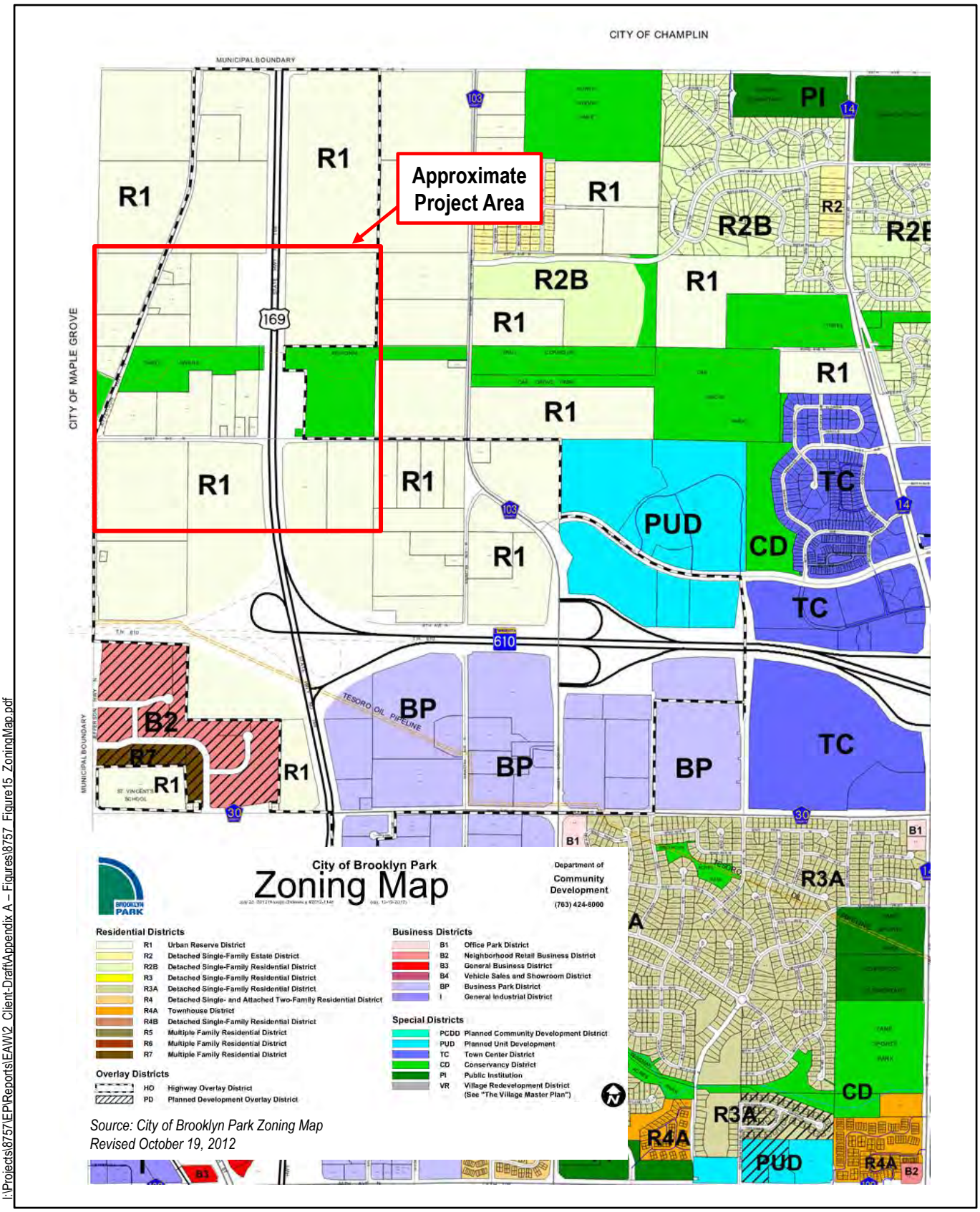
Figure 5



Farmland Classification

Figure 6

TH 169/101st Avenue Interchange Project
SP 2750-92
City of Brooklyn Park



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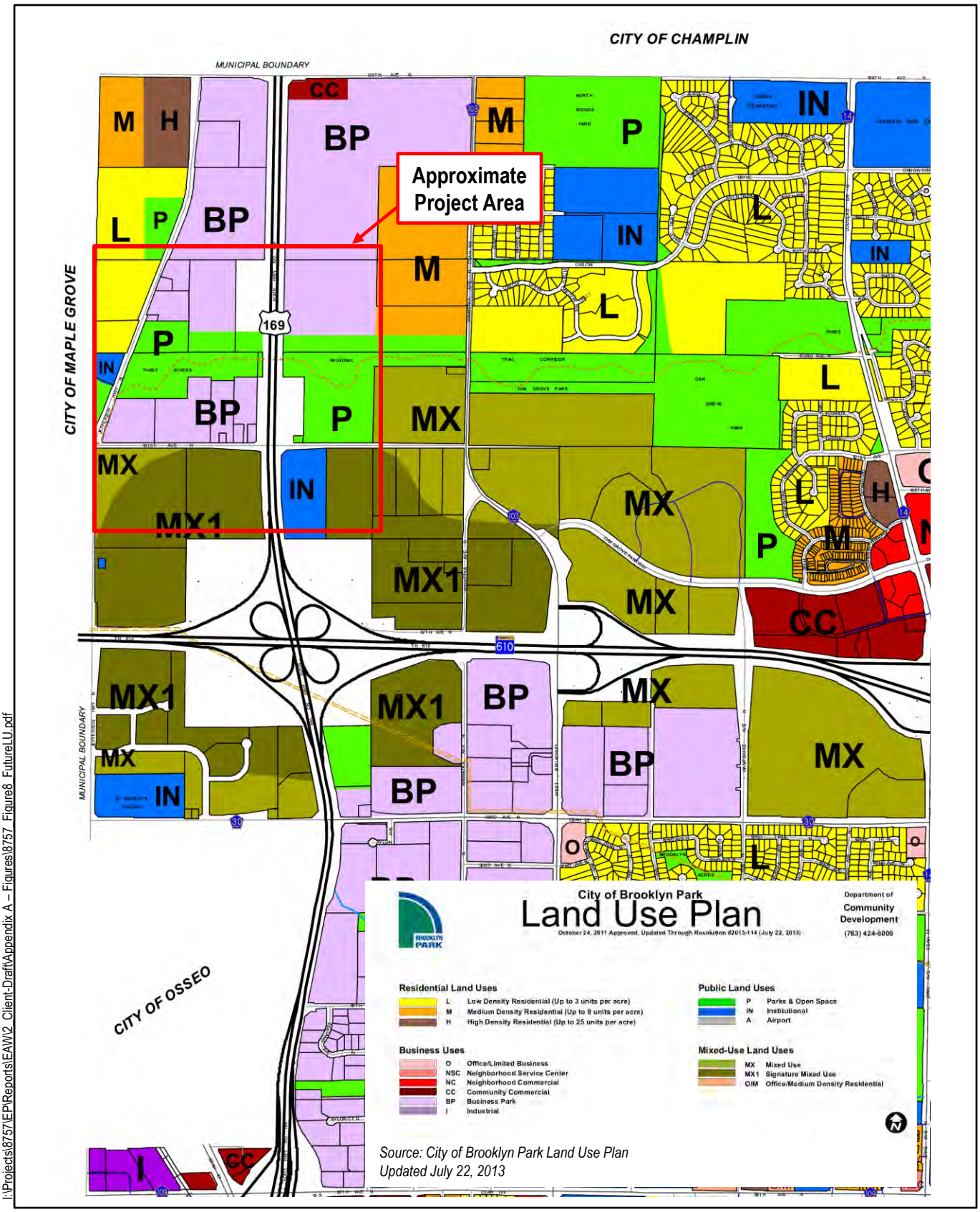
City of Brooklyn Park Zoning Map

Figure 7

TH 169/101st Avenue Interchange Project
City of Brooklyn Park
SP 2750-92



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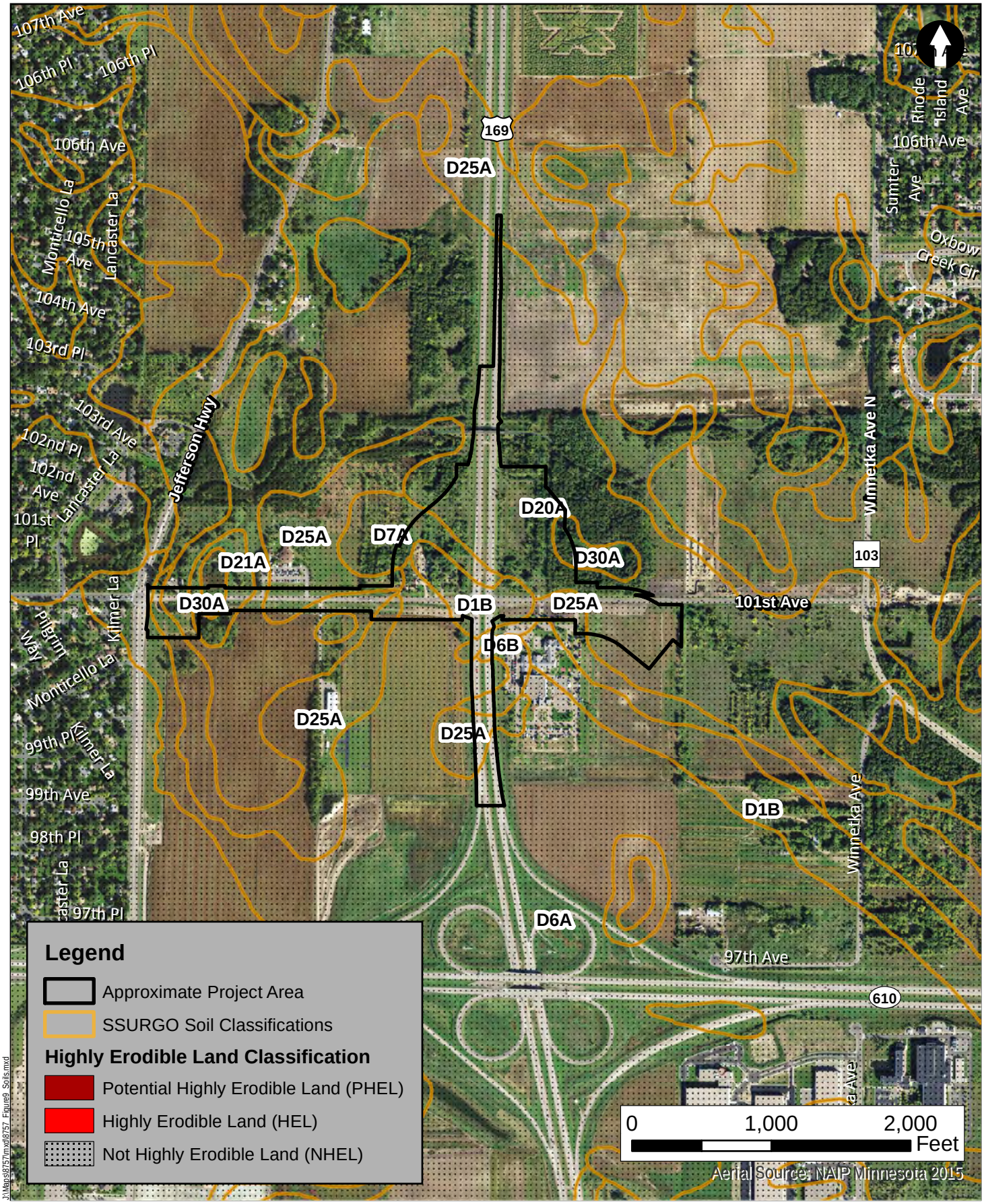
City of Brooklyn Park Land Use Plan

Figure 8

TH 169/101st Avenue Interchange Project
City of Brooklyn Park
SP 2750-92

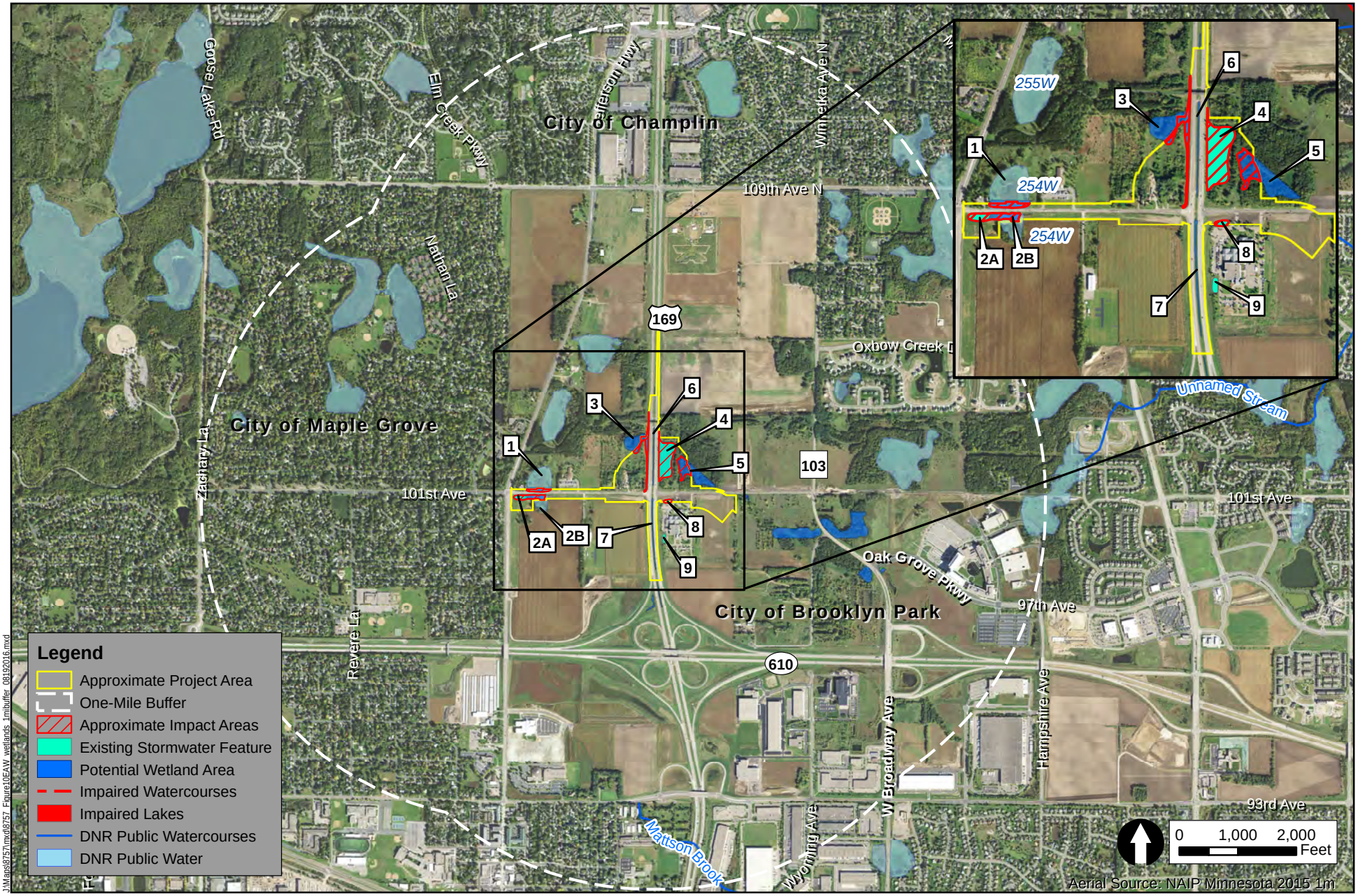


Soils

TH 169/101st Avenue North Interchange - Preliminary Design

City of Brooklyn Park
SP 2750-92

Figure 9

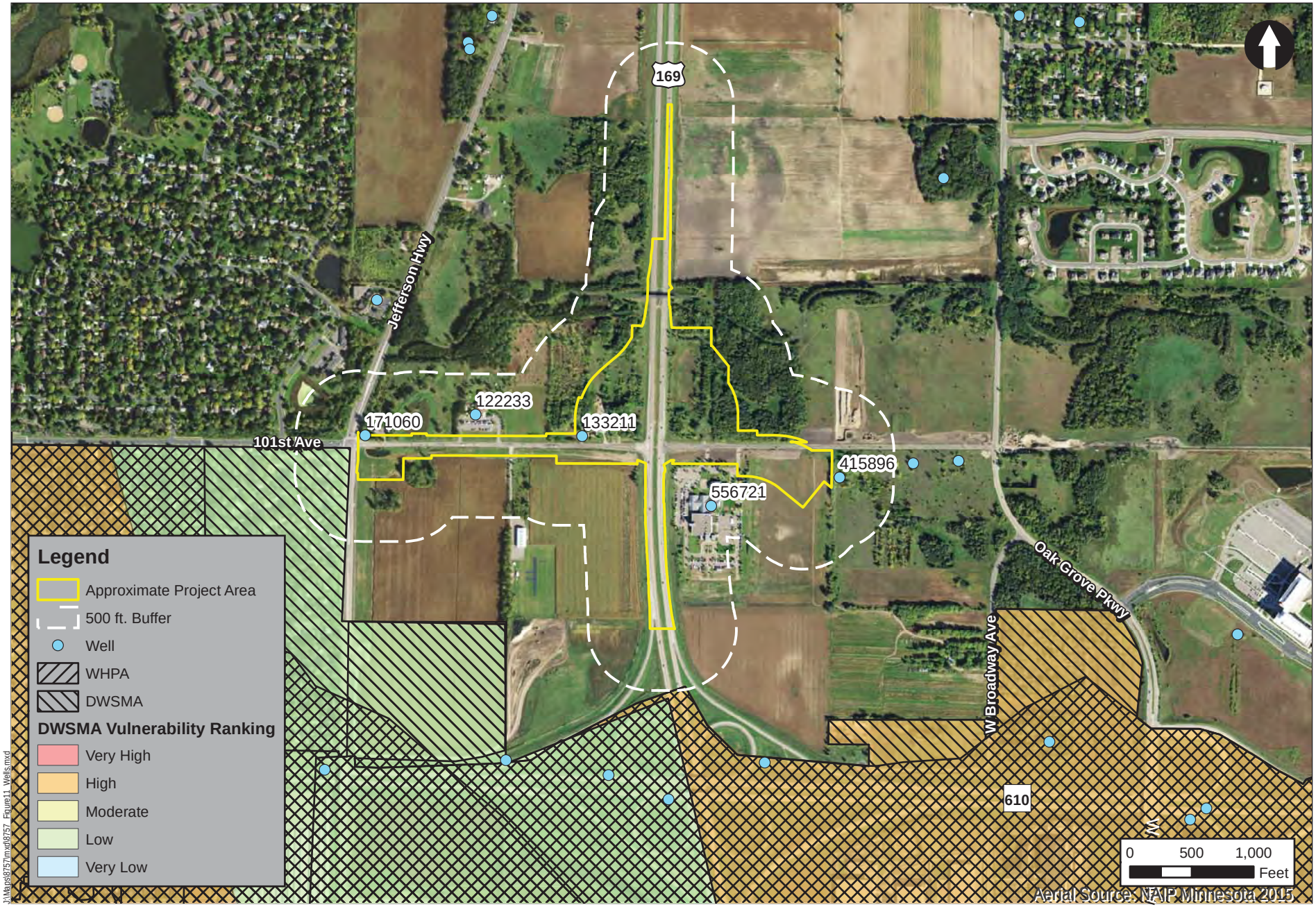


Aquatic Resources, Public Waters and Impaired Waters

TH 169 / 101st Avenue Interchange Project

City of Brooklyn Park

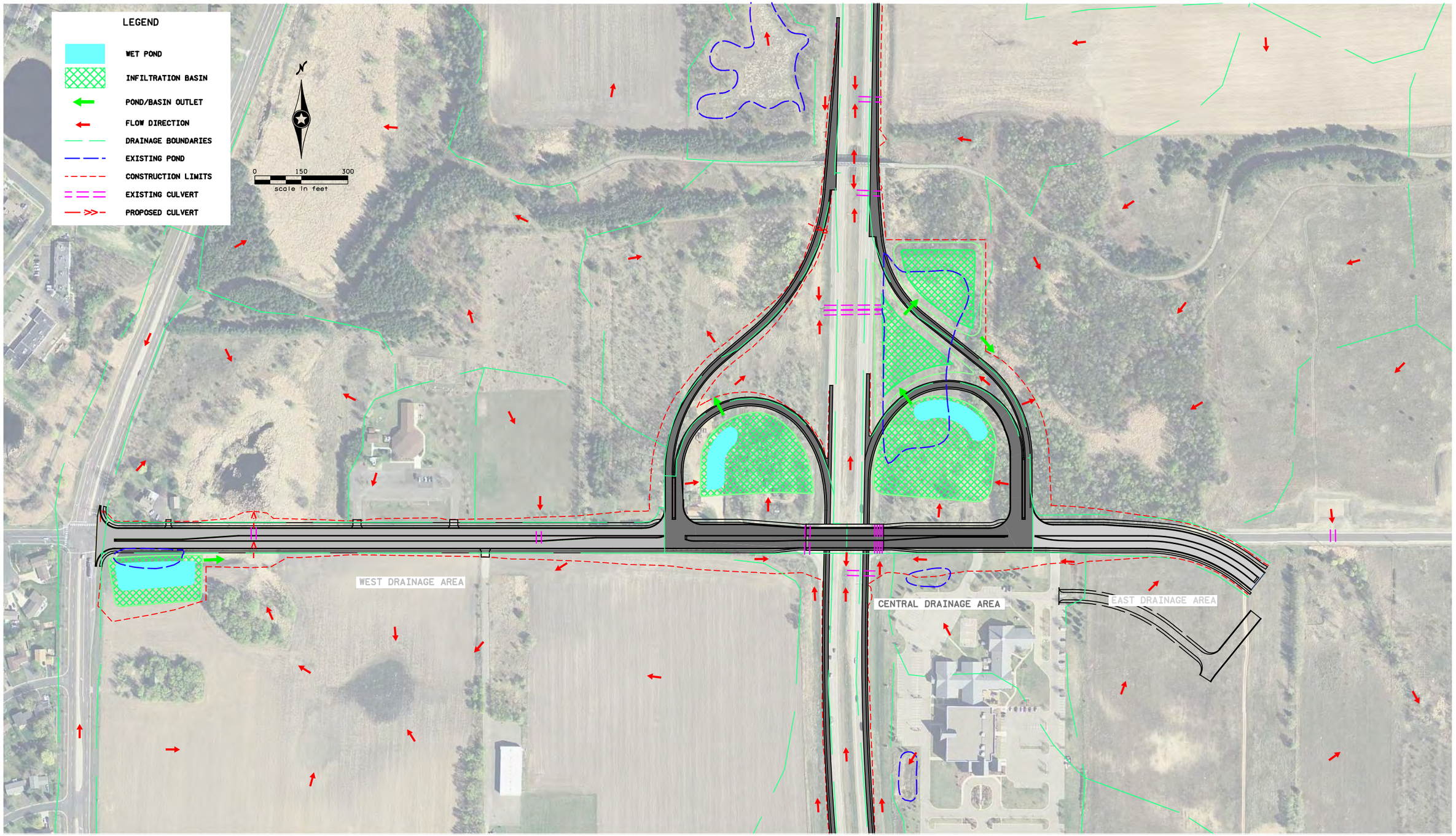
Figure 10



Well Locations

Figure 11

TH 169/101st Avenue Interchange Project
City of Brooklyn Park
SP 2750-92



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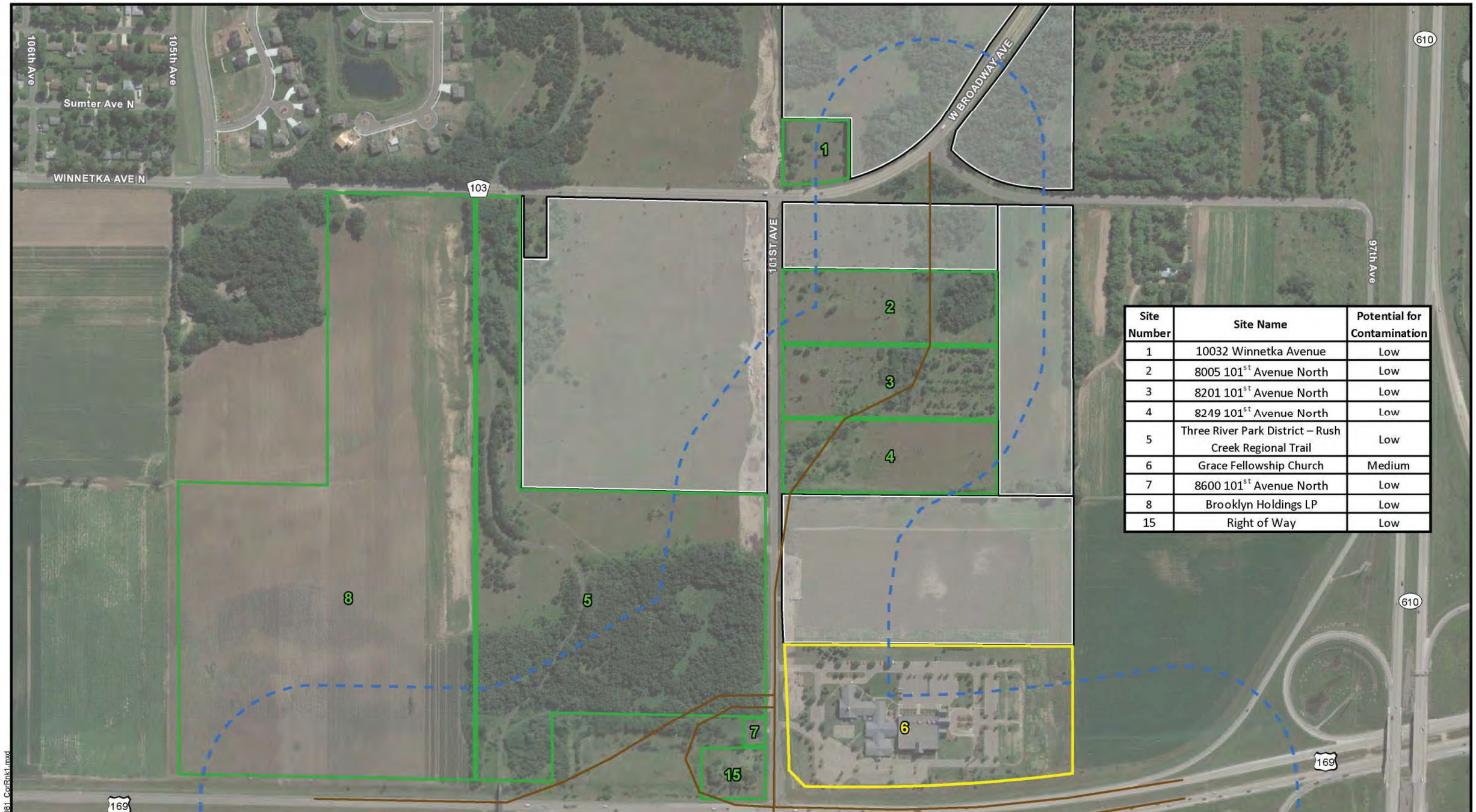
SRF Consulting Group, Inc.

Job 8757
8/30/2016

TH 169/101ST AVENUE INTERCHANGE (WATER RESOURCES LAYOUT)

City of Brooklyn Park
SP 2750-92

Figure 12



Site Number	Site Name	Potential for Contamination
1	10032 Winnetka Avenue	Low
2	8005 101st Avenue North	Low
3	8201 101st Avenue North	Low
4	8249 101st Avenue North	Low
5	Three River Park District – Rush Creek Regional Trail	Low
6	Grace Fellowship Church	Medium
7	8600 101st Avenue North	Low
8	Brooklyn Holdings LP	Low
15	Right of Way	Low

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Project No. B1511981
Drawing No. B1511981_CorRnk1
Scale: 1 inch = 400 feet
Drawn By: CMF
Date Drawn: 12/21/2015
Checked By: KB
Last Modified: 2/2/2016

N

0 200 400 Feet

LEGEND

Approximate Project Alignment

Approximate 500 foot Buffer

Potential for Contamination

HIGH

MED

LOW

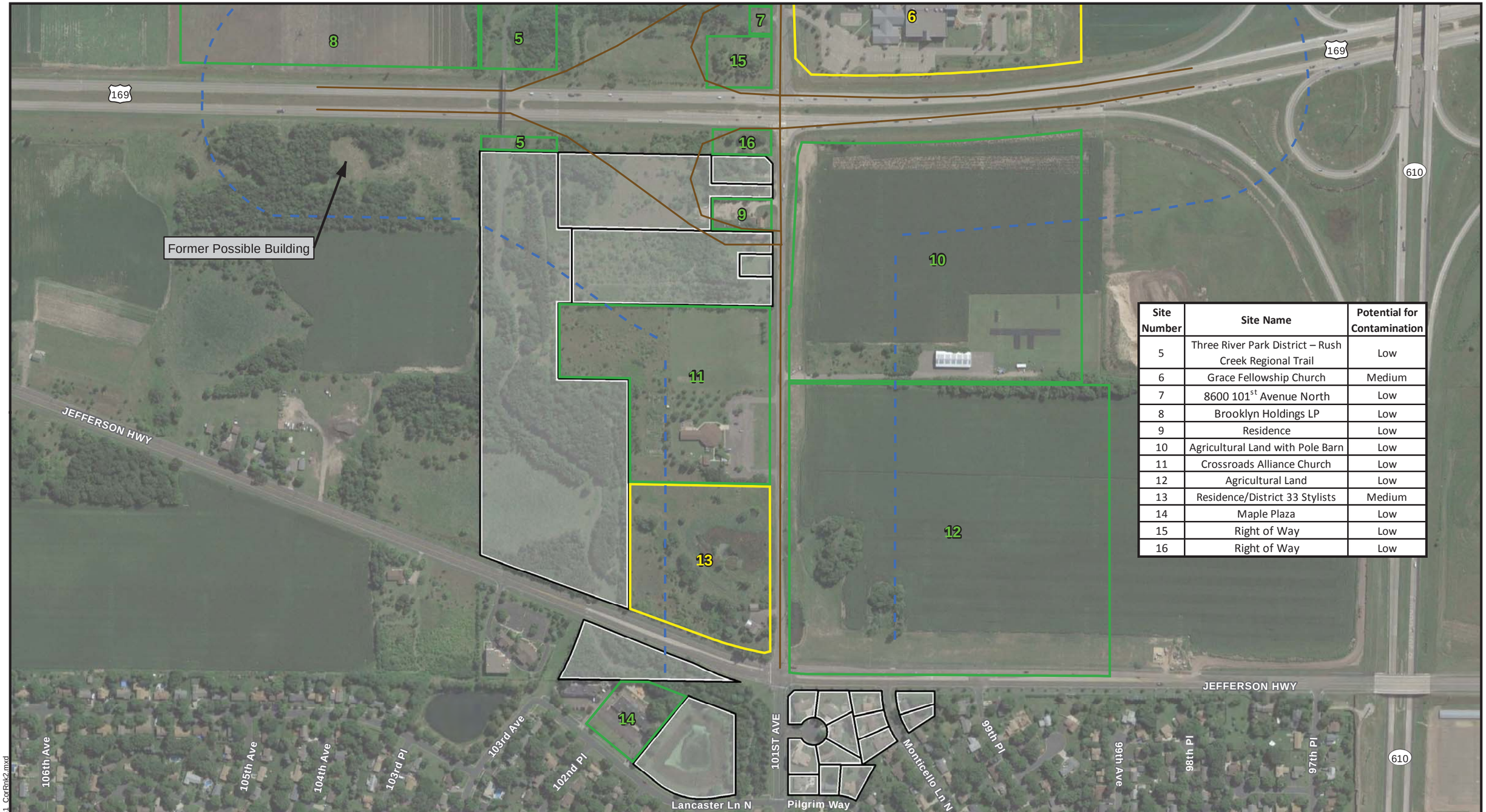
Parcels in the Corridor that were not ranked, were evaluated, but were determined not to have a low, medium, or high potential for contamination.

BRAUN INTERTEC
11001 Hampshire Avenue So. Minneapolis, MN 55438
PH. (952) 995-2000 FAX (952) 995-2020

FIGURE 2 - CORRIDOR SITE RANKING

Modified Phase I
Environmental Site Assessment
US 169 and 101st Avenue
Brooklyn Park, MN

FIGURE 13



Site Number	Site Name	Potential for Contamination
5	Three River Park District – Rush Creek Regional Trail	Low
6	Grace Fellowship Church	Medium
7	8600 101st Avenue North	Low
8	Brooklyn Holdings LP	Low
9	Residence	Low
10	Agricultural Land with Pole Barn	Low
11	Crossroads Alliance Church	Low
12	Agricultural Land	Low
13	Residence/District 33 Stylists	Medium
14	Maple Plaza	Low
15	Right of Way	Low
16	Right of Way	Low

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Project No. B1511981
Drawing No. B1511981_CorRnk2
Scale: 1 inch = 400 feet
Drawn By: CMF
Date Drawn: 12/21/2015
Checked By: KB
Last Modified: 1/12/2016

N

0 200 400 Feet

LEGEND

Approximate Project Alignment

Approximate 500 foot Buffer

Potential for Contamination

HIGH

MED

LOW

Parcels in the Corridor that were not ranked, were evaluated, but were determined not to have a low, medium, or high potential for contamination.

BRAUN INTERTEC
11001 Hampshire Avenue So. Minneapolis, MN 55438
PH. (952) 995-2000 FAX (952) 995-2020

FIGURE 2 - CORRIDOR SITE RANKING
Modified Phase I
Environmental Site Assessment
US 169 and 101st Avenue
Brooklyn Park, MN

FIGURE 14

Future Planned Development

Figure 15

TH 169/101st Avenue Interchange Project
City of Brooklyn Park
SP 2750-92

Appendix B

Agency Correspondence

Minnesota Department of Transportation

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

Office Tel: (651) 366-4291
Fax: (651) 366-3603

September 14, 2015

Rick Dalton
MnDOT Metro District
1500 West County Road B2
Roseville, MN 55113

Re: S.P. 2750-92, TH 169/101st Avenue Interchange, Brooklyn Park, Hennepin County

Dear Mr. Dalton,

We have reviewed the above-referenced undertaking pursuant to our FHWA-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800), and as per the terms of the 2005 Section 106 Programmatic Agreement between the FHWA and the Minnesota State Historic Preservation Office (SHPO). The Section 106 review fulfills MnDOT's responsibilities under the Minnesota Historic Sites Act (MS 138.665-.666), the Field Archaeology Act of Minnesota (MS 138.40); and the Private Cemeteries Act (MS 307.08, Subd. 9 and 10).

This project is not currently funded or programmed for construction. The project proposer, City of Brooklyn Park, is completing a State Environmental Assessment Worksheet (EAW) at this time to assist in project readiness to compete for state and federal funding programs and allow for land use and local transportation improvement projects consistent with the Preferred Alternative to be implemented over time. MnDOT will be the Regulatory Governmental Unit for the EAW. The City of Brooklyn Park will likely pursue federal funding for this project in the future. The project includes construction of a folded diamond interchange at Trunk Highway 169 and 101st Avenue in the City of Brooklyn Park. The ramps providing accessing to/from the south are folded to the north to provide better spacing between the TH 610 interchange, while the ramps to/from the north are designed to minimize impacts to the Rush Creek Regional Trail pedestrian bridge. The project will also include reconstruction/construction on a new alignment of the 101st Avenue/Oak Grove Parkway local road as a four-lane facility from Jefferson Highway to West Broadway Avenue. Stormwater ponding sites will also be required as part of the project.

Based on our existing programmatic agreements with various tribal groups, we sent a consultation letter to the following tribes: Fort Peck Tribes, Santee Sioux Nation, Sisseton-Wahpeton Oyate Community, and Turtle Mountain Band of Chippewa. We did not receive any response within the allotted time.

The area of potential effects (APE) for the project consists of the proposed construction area and the first tier of adjacent properties. Because all work will occur within areas either disturbed by previous road and associated construction or with low archaeological potential, it is unlikely that the APE contains intact, significant archaeological resources. No historic structures are located within the APE.

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

Your request for review indicates that the project requires a permit from the U.S. Army Corps of Engineers. FHWA is the lead federal agency for this Section 106 Review. As per the terms of the 2005 PA between the FHWA and the Corps, this letter concludes the Section 106 Review for this project, and the Corps has no further 106 responsibilities under 36 CFR 800. **Please include a copy of this findings letter with your permit application to aid in their review.**

Sincerely,

Renée Hutter Barnes

Renée Hutter Barnes, Historian
Cultural Resources Unit

cc: MnDOT CRU Project File

Minnesota Department of Transportation

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

Office Tel: (651) 366-3614
Fax: (651) 366-3603

August 3, 2015

Re: S.P. 2750-92, Trunk Highway 169/101st Avenue Interchange, Brooklyn Park, Hennepin County
T119N, R21W, Sections 6 and 7

Dear Tribal Representative:

The City of Brooklyn Park is proposing to construct a folded diamond interchange at Trunk Highway 169 and 101st Avenue. It is strongly anticipated that this project will be carried out with federal funds administered by the Federal Highway Administration (FHWA), which would make it an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and under the National Environmental Policy Act (NEPA). Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties (i.e., those properties eligible for or listed on the National Register of Historic Places). This process involves efforts to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. On behalf of the FHWA, which has designated its Section 106 responsibilities to the Minnesota Department of Transportation (Mn/DOT) Cultural Resources Unit (CRU), we are now initiating review to determine the possible effects of the undertaking (if any) on historic properties. In accordance with 36 CFR 800.2(c) of the NHPA and as per the terms of the Programmatic Agreement between the Tribe and the FHWA, we are contacting you to see if you know of any historic properties of religious or historic significance in the area, and to see if you would like to participate in the Section 106 process for this project (i.e., to be a consulting party).

This project is not currently funded or programmed for construction, but it is strongly anticipated that it will receive federal funds. The project proposer, City of Brooklyn Park, is completing a State Environmental Assessment Worksheet (EAW) at this time to assist in project readiness to compete for state and federal funding programs and allow for land use and local transportation improvement projects consistent with the Preferred Alternative to be implemented over time. MnDOT will be the Regulatory Governmental Unit for the EAW. The City of Brooklyn Park will likely pursue federal funding for this project in the future. The project includes construction of a folded diamond interchange at Trunk Highway 169 and 101st Avenue in the City of Brooklyn Park. The ramps providing accessing to/from the south are folded to the north to provide better spacing between the TH 610 interchange, while the ramps to/from the north are designed to minimize impacts to the Rush Creek Regional Trail pedestrian bridge. The project will also include reconstruction/construction on a new alignment of the 101st Avenue/Oak Grove Parkway local road as a four-lane facility from Jefferson Highway to West Broadway Avenue. Stormwater ponding sites will also be required as part of the project.

Our office has defined the area of potential effect (APE) for the project as the proposed construction limits. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. Once the APE was established, we examined the SHPO database for the list of previously recorded resources in the area. Based on these queries, there are no previously recorded archaeological resources within the APE, or adjacent to it.

We would appreciate any comments you may have about historic, cultural, and archaeological resources and other concerns regarding this project. Our planning schedule is such that we must initiate work on our environmental and historic preservation studies, so we hope to hear from you within **30 days** of receipt of this letter. If you indicate that you are not aware of any historic properties with religious or cultural significance and that you do not wish to comment on the project, or if our office does not receive a response within 30 days, we will conclude that you do not wish to be a consulting party for this project and no further project information will be forwarded.

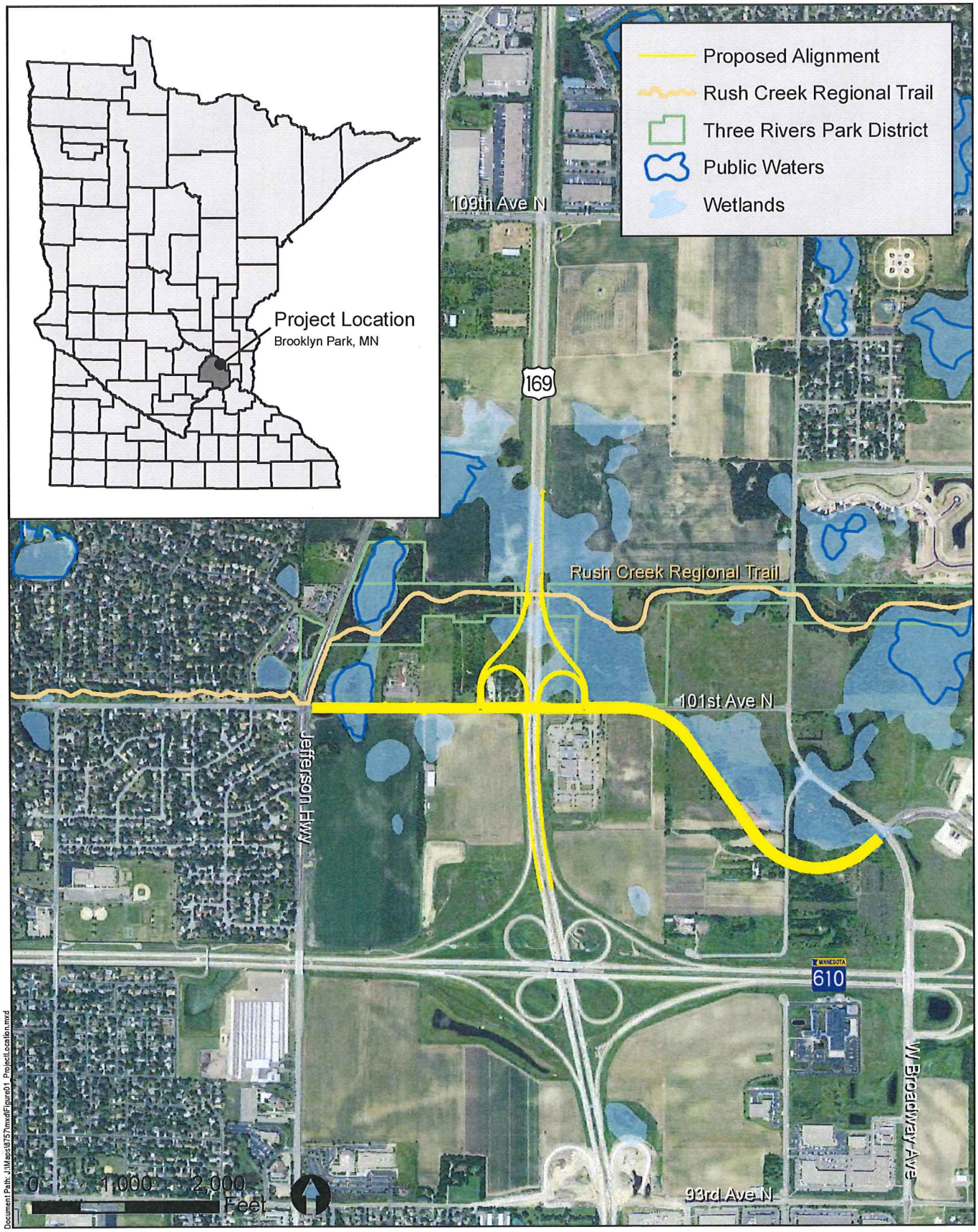
Thank you for your attention to this request. We look forward to working with you on this project.

Sincerely,

Craig Johnson
Archaeologist
Cultural Resources Unit (CRU)

Encl.

cc: AT Rusty Stafne, Chairman, Fort Peck Tribes
Roger Trudell, Chairman, Santee Sioux Nation (email)
Richard Thomas, THPO, Santee Sioux Nation (email)
Bruce Nadeau, THPO, Turtle Mountain Band of Chippewa (email)
Dianne Desrosiers, THPO, Sisseton-Wahpeton Oyate Community (email)
Jim Whitted, Sisseton-Wahpeton Oyate Community (email)
Rick Dalton, MnDOT Metro District
MnDOT CRU Project File



Project Location

TH 169/101st Avenue North Interchange - Preliminary Design

City of Brooklyn Park

Figure 1

Natalie Ries

From: Aufdencamp, Keri (DOT) <keri.aufdencamp@state.mn.us>
Sent: Friday, July 10, 2015 8:07 AM
To: Dalton, Richard (DOT)
Subject: S.P. 2750-XX Early Notification Memo

Follow Up Flag: Follow up
Flag Status: Flagged

Rick,

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

Based on the database review, there are no reported release sites within approximately 500 feet of the project area.

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

1. The project involves acquisition of new right of way.

2. Project excavations will be substantial including new alignment of roadway and ponds. Excavations will be taking place in areas with historically razed structures. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way.

3. The project is in a mixed use area. Structures have been historically razed in the project footprint. Historic structures were likely residential or farmsteads. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way.

4. The project requires no groundwater dewatering.

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

Keri B. Aufdencamp
Hydrogeologist
Office of Environmental Stewardship (MS 620)
Minnesota Department of Transportation
395 John Ireland Blvd

St. Paul, MN 55155
651-366-3627
keri.aufdencamp@state.mn.us

Natalie Ries

From: Leete, Peter (DOT) <peter.leete@state.mn.us>
Sent: Monday, July 20, 2015 12:35 PM
To: Dalton, Richard (DOT)
Cc: Drewry, Kate (DNR); Haworth, Brooke (DNR)
Subject: Preliminary comments on SP2750-XX (TH 169/101st Ave. Interchange) - Early Notification Memo for review by 7/15/2015
Attachments: ENM.pdf; Project location from ENM.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

How much of a lead is MnDOT taking on this project? It sounds like this a is project driven by Brooklyn Park? A quick look and all I see is the Public Waters 27-254W that is bisected by 101st. There is a road there now, though I assume additional work would be proposed. Those rules would apply (avoid minimize mitigate). I did take a quick look at the NHIS as see no rare species in the immediate area, though in the larger area there are Blandings turtles. That's what I see. However, there may have been additional items outlined separately between the city and DNR filed folks… If you need a longer write up, let me know.

Contact me if you have questions

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

From: Dalton, Richard (DOT)
Sent: Friday, July 17, 2015 3:23 PM
To: Leete, Peter (DOT); *DOT_CulturalResources; Nnaemeka.Ezekwemba@dot.gov
Cc: Kannankutty, Ramankutty (DOT); Natalie Ries
Subject: RE: 2750-XX (TH 169/101st Ave. Interchange) - Early Notification Memo for review by 7/15/2015

Hi – just checking back to see if you have any comments on this project.

From: Dalton, Richard (DOT)
Sent: Saturday, May 30, 2015 5:32 PM
To: Leete, Peter (DOT); *DOT_CulturalResources; Aufdencamp, Keri (DOT) (keri.aufdencamp@state.mn.us); Nelson, Douglas (DOT); Nnaemeka.Ezekwemba@dot.gov
Cc: Markeson, Christina (DOT); Mitteco, Gina (DOT); Prather, Daniel (DOT); Henricksen, Jim (DOT); Wasko, Peter (DOT); Heinz, Katherine (DOT); Kelly, Brian (DOT) (Brian.Kelly@state.mn.us); Erickson, Chad (DOT); Moynihan, Debra (DOT); Baker, Keith (DOT); Kannankutty, Ramankutty (DOT); Erickson, Dan (DOT) (Dan.Erickson@state.mn.us); Reihl, Gary (DOT); Natalie Ries
Subject: 2750-XX (TH 169/101st Ave. Interchange) - Early Notification Memo for review by 7/15/2015

Hi - Please review and respond to the Early Notification Memo (ENM) for this project (attached; EDMS doc 1586842).

The project includes construction of a folded diamond interchange at TH 169/101st Avenue in the City of Brooklyn Park (the current intersection at 101st is un-signalized; the median has been closed). The ramps providing accessing to/from the south are folded to the north to provide better spacing between the TH 610 interchange, while the ramps to/from the north are designed to minimize impacts to the Rush Creek Regional Trail pedestrian bridge. The project will also include reconstruction/ construction on a new alignment of the 101st Avenue/Oak Grove Parkway local road as a four-

lane facility from Jefferson Highway to West Broadway Avenue. Stormwater ponding sites will also be required as part of the project.

The project area can be viewed in:
Google Streets at https://www.google.com/maps/@45.1380896,-93.393413,15z/data=!3m1!1e3
Within MnDOT at **Georilla** at
http://georilla/metrogis?extent=467509.71505999996,4997140.36172597,470811.7148,4999696.23652463&layers=base_routes_pgis/all,mngeo/mncomp

This project is not currently funded or programmed for construction. The project proposer, City of Brooklyn Park, is completing a State Environmental Assessment Worksheet (EAW) at this time to assist in project readiness to compete for state and federal funding programs and allow for land use and local transportation improvements consistent with the Preferred Alternative to be implemented over time. This project meets the threshold for a State EAW due to construction of additional lanes/new roadway for a distance greater than 1 mile (101st Avenue). MnDOT will be the Regulatory Governmental Unit (RGU) for the EAW. The City of Brooklyn Park will likely pursue federal funding for this project in the future. For many of you, this ENM is provided as an FYI, since Brooklyn Park's consultant will be providing mush of the information needed for the EAW.

Within MnDOT, the ENM can also be viewed at:
http://edms/cyberdocs/quickstart.asp?show=view:1586842&noframes=yes

Please respond to this ENM by 7/15/2015 if you have been asked to provide information. Return comments to Rick Dalton and Natalie Reis (SRF at nries@srfconsulting.com).

Appendix C

TH 169/101st Avenue Interchange Study (December 2014)

- **Chapter 6 Detailed Alternatives Analysis**
- **Chapter 7 Conclusions and Recommendations**

Chapter 6 Detailed Alternatives Analysis

The purpose of this chapter is to document the detailed evaluation analysis and the process of refining the alternatives. Documentation of the detailed evaluation analysis provides a foundation for further analysis and presents decision makers and governmental review agencies with the rationale for selecting a SAC recommendation for future phases of the project. Documentation of the alternatives that were carried forward for more detailed analysis helped adequately demonstrate that the SAC recommendation provides the best solution to problems and issues identified for the project.

Detailed Evaluation Process

The detailed alternative development and evaluation process was an iterative process that began with the development of the detailed evaluation criteria. Presentation of the evaluation criteria in advance of the detailed evaluation process provided clarification for the criteria that would be used to aid in the identification of a SAC recommendation, ensuring that the process was fair and met the study goals, as well as purpose and need.

The detailed evaluation criteria was developed to provide for a measurement of the transportation, environmental, social and economic impacts for the three build alternatives carried forward, ultimately resulting in the selection of the SAC recommendation. After conducting the detailed evaluation process, the alternative that best met the evaluation criteria was selected to advance to the study's second phase, which would include environmental documentation and preliminary engineering (not included as part of this study).

Study area goals, preliminary screening criteria and input from SAC members were utilized to establish the initial set of detailed evaluation criteria. Whereas the preliminary screening process was applied first in an effort to identify broader impacts and eliminate alternatives with fairly obvious design flaws, the detailed evaluation analysis was applied to help differentiate alternatives using technical analysis to determine which alternative best met the overall project goals and the identified transportation issues and needs.

Detailed Evaluation Criteria

A detailed evaluation on the interchange and supporting roadway alternatives that advanced from the preliminary screening was conducted to provide the necessary information to identify a SAC recommendation. The three roadway alternatives carried forward from the preliminary screening evaluation were evaluated using the following detailed evaluation criteria:

Transportation

A. Does the alternative reduce segment and intersection overloads on the supporting local arterial network? Does the alternative reduce segment overloads on the trunk highway system?

B. Does the alternative achieve acceptable intersection operations (number of unacceptable intersections with an LOS E or worse)? Does the alternative reduce conflicting traffic volumes at TH 169 and 109th Avenue?

C. Does the alternative minimize impacts to mainline TH 610 and TH 169 safety, capacity and operations?

D. Does the alternative reduce the system vehicle miles traveled (VMT) and achieve travel time savings (VHT)?

E. Does the alternative reduce interchange ramp overloads?

F. Does the alternative maintain and/or improve safety through reduction of daily traffic at congested and high crash intersections?

G. Does the alternative provide for transit, pedestrian and bicycle accommodations? Does the alternative reduce traffic volumes at Rush Creek Regional Trail crossings?

H. Does the alternative provide for strong local circulation?

I. Is the alternative able to provide regional connectivity with a continuous arterial roadway system?

J. Is the alternative consistent with local and regional transportation plans/policy?

K. Does the alternative support land use plans and economic development goals for Brooklyn Park, Champlin, Maple Grove and Osseo?

L. Does the alternative minimize local trips on the TH 610 and TH 169 freeway system?

M. Does the alternative support future plans for the proposed Blue Line LRT Extension Operations and Maintenance (Bottineau O&M) facility, including no greater LRT-related wetland or parkland impacts than stated in the draft DEIS?

Social/Environmental

N. Does the alternative minimize right-of-way (approximate number of parcels impacted and acres of right-of-way) impacts?

O. Does the alternative minimize environmental (wetland, public waters, woodland and natural community) impacts?

Economic

P. Does the alternative maximize cost effectiveness?

Q. Can the alternative be physically and financially staged over time?

The detailed analysis described above was completed in a matrix format with the alternatives, overall ratings for the category and supporting documentation of why the rating level was selected. The detailed evaluation criteria were presented to the SAC on June 26, 2014. Project stakeholders provided additional criteria to be incorporated into the detailed evaluation process and feedback on the analyses to be conducted.

Results from the detailed analysis were presented and discussed at the July 31, 2014 SAC meeting. In advance of this meeting each stakeholder group represented on the SAC was encouraged to conduct their own detailed evaluation of the three alternatives, using the same screening criteria and matrix. This approach was encouraged to promote discussion during the presentation of the detailed analysis results and discuss potential differences. As a result of this meeting, criteria and matrix results were updated to reflect the discussions at the meeting and for presentation to the public. The goal of this process was to identify a SAC recommendation for further study in the environmental documentation process.

Detailed Concept Refinement

Concept alternatives were further refined to establish alignment and right-of-way assumptions needed to complete the detailed analysis. This process involved establishing typical cross-sections that were consistent with Brooklyn Park's design criteria (and those established for nearby development – NorthPark and Target) and coordinating interchange ramp designs with MnDOT staff to ensure ramp spacing and radii were consistent with published standards. The following section summarizes the assumptions established as part of the detailed concept refinement process for each alternative that was carried forward.

Three concepts were selected and confirmed by SAC members at the meeting on June 26, 2014. These concepts were carried forward for the detailed evaluation analysis and are summarized below.

Alternative #2 – Folded Diamond Interchange at 101st Avenue

- This alternative provides a folded diamond interchange on the current alignment of 101st Avenue at TH 169 (Figure 6-1). The ramps providing accessing to/from the south are folded to the north to provide better spacing between the TH 610 interchange, while the ramps to/from the north are designed to minimize impacts to the Rush Creek Regional Trail pedestrian bridge. Auxiliary lanes are assumed along TH 169 in both directions between the interchange and TH 610 and in the northbound direction to 109th Avenue.

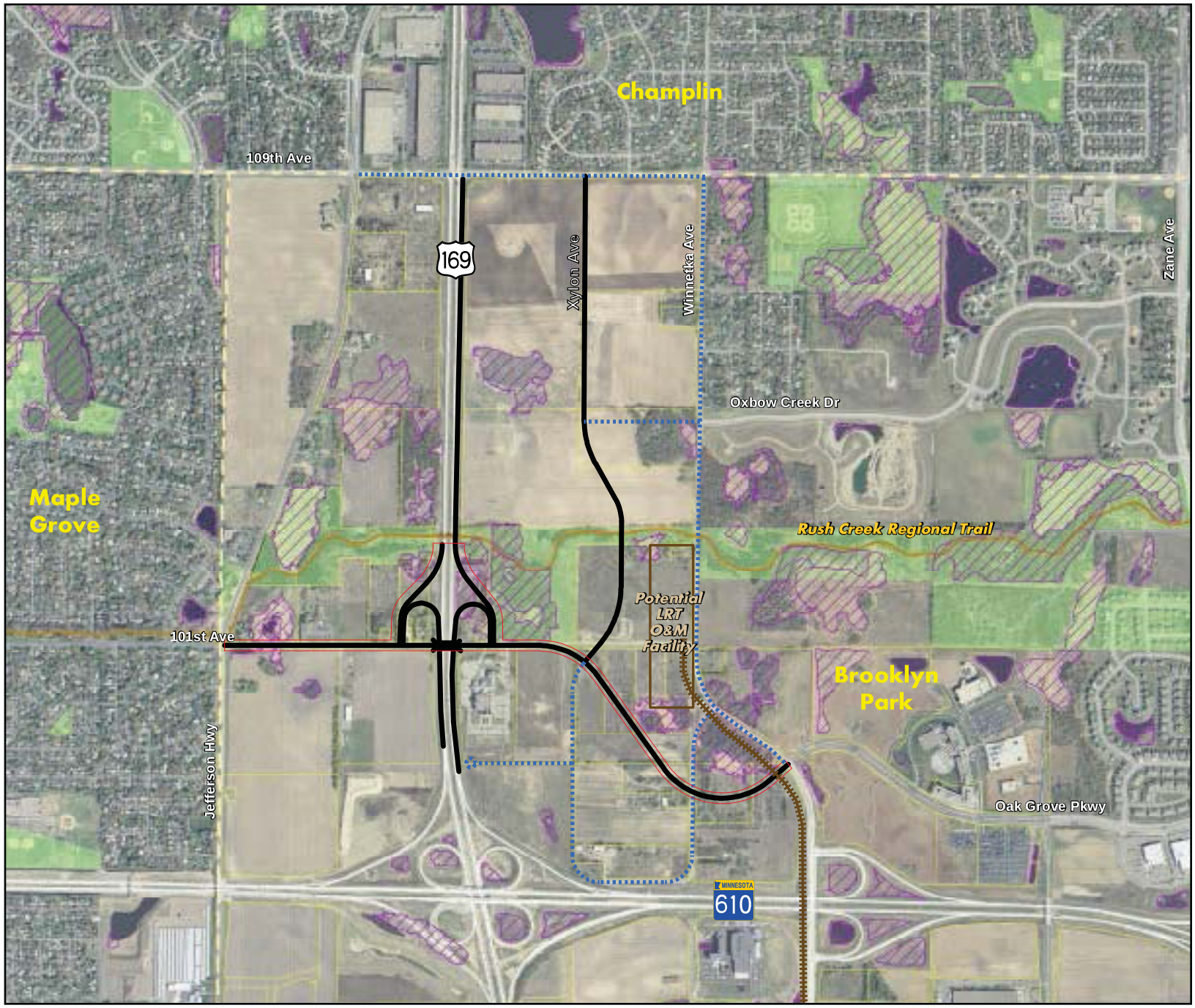
- This alternative assumes 101st Avenue/Oak Grove Parkway (Jefferson Highway to W Broadway Avenue) as a four-lane roadway, construction of Xylon Avenue south of 109th Avenue and expansion of 109th Avenue and Winnetka Avenue to four-lane roadways.
- All black lines in Figure 6-1 were taken into consideration when evaluating transportation criteria. It is very important to note that right-of-way and construction costs were not included for the Xylon Avenue extension.

Alternative #4 – Buttonhook Interchange at 101st Avenue

- This alternative provides a buttonhook interchange at the current 101st Avenue intersection at TH 169 (Figure 6-2). Ramps are designed to eliminate impacts to the Rush Creek Regional Trail pedestrian bridge and the nearby churches. Auxiliary lanes are assumed along TH 169 in both directions between the interchange and TH 610 and in the northbound direction to 109th Avenue.
- This alternative assumes 101st Avenue/Oak Grove Parkway (Jefferson Highway to W Broadway Avenue) as a four-lane roadway, construction of Xylon Avenue south of 109th Avenue and expansion of 109th Avenue and Winnetka Avenue to four-lane roadways.
- All black lines in Figure 6-2 were taken into consideration when evaluating transportation criteria. It is very important to note that right-of-way and construction costs were not included for the Xylon Avenue extension.

Alternative #7 Folded Diamond North Interchange at Oxbow Creek Drive

- This alternative provides a folded diamond interchange on a new alignment north of the Rush Creek Regional Trail at TH 169 (Figure 6-3). Ramps providing accessing to/from the south are folded to avoid the Rush Creek Regional Trail pedestrian bridge. Auxiliary lanes are assumed along TH 169 in both directions between the interchange and TH 610 and in the northbound direction to 109th Avenue.
- This alternative assumes 101st Avenue/Oak Grove Parkway (Jefferson Highway to W Broadway Avenue) as a four-lane roadway from W Broadway Avenue to Xylon Avenue and a two-lane roadway west of Xylon Avenue, construction of Xylon Avenue south of 109th Avenue and expansion of 109th Avenue and Winnetka Avenue to four-lane roadways.
- All black lines in Figure 6-3 were taken into consideration when evaluating transportation criteria. It is very important to note that right-of-way and construction costs were not included for the Xylon Avenue extension.



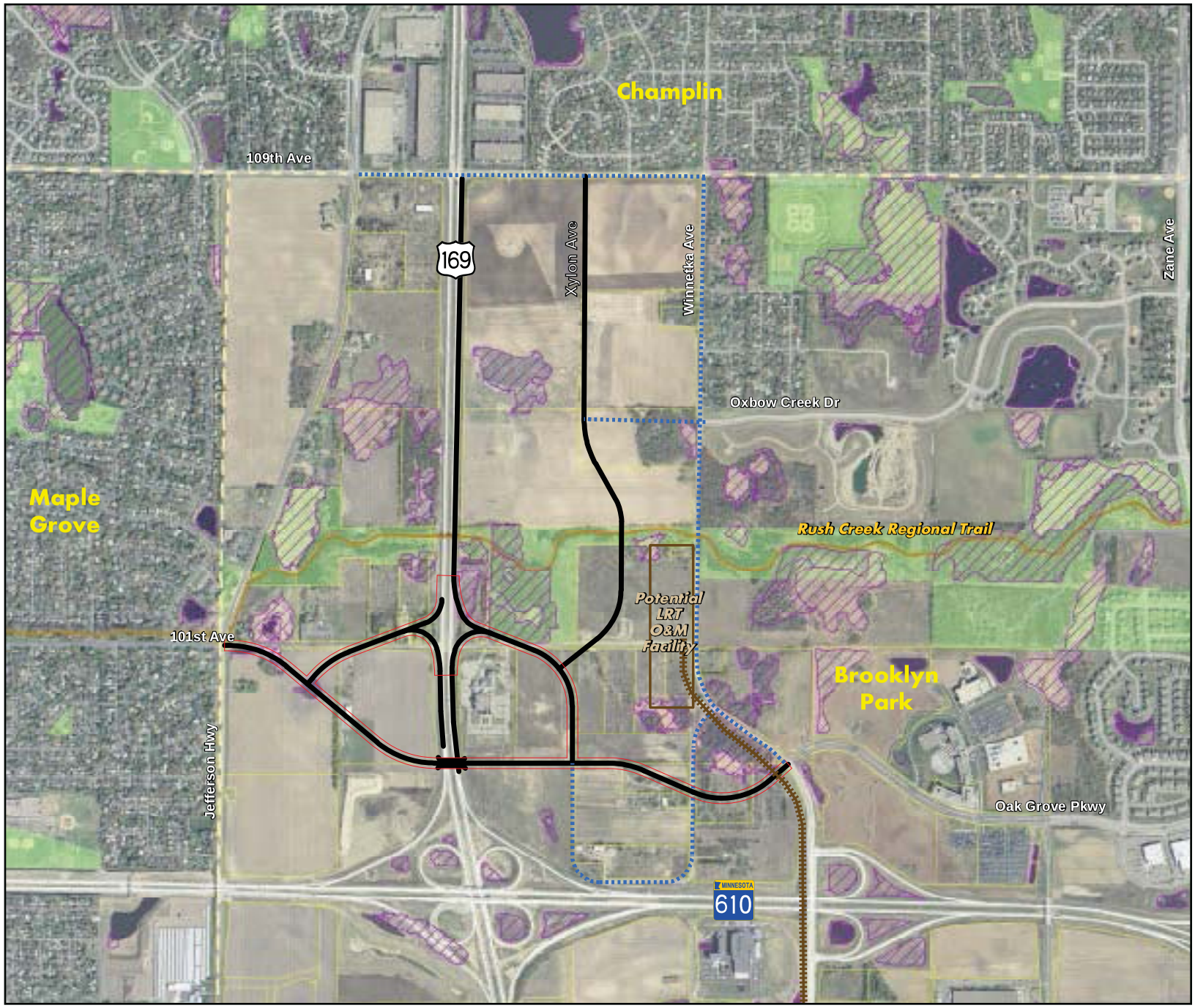
169 / 101st Avenue INTERCHANGE STUDY

FIGURE 6-1
ALTERNATIVE #2
FOLDED DIAMOND
INTERCHANGE
AT 101ST AVENUE
(DETAILED)

Legend

- Wetlands
- Trails
- Parks
- Parcels
- Proposed Project Improvements
- Other Supporting Roadway Improvements
- Right-of-Way

0 800 1,600 Feet



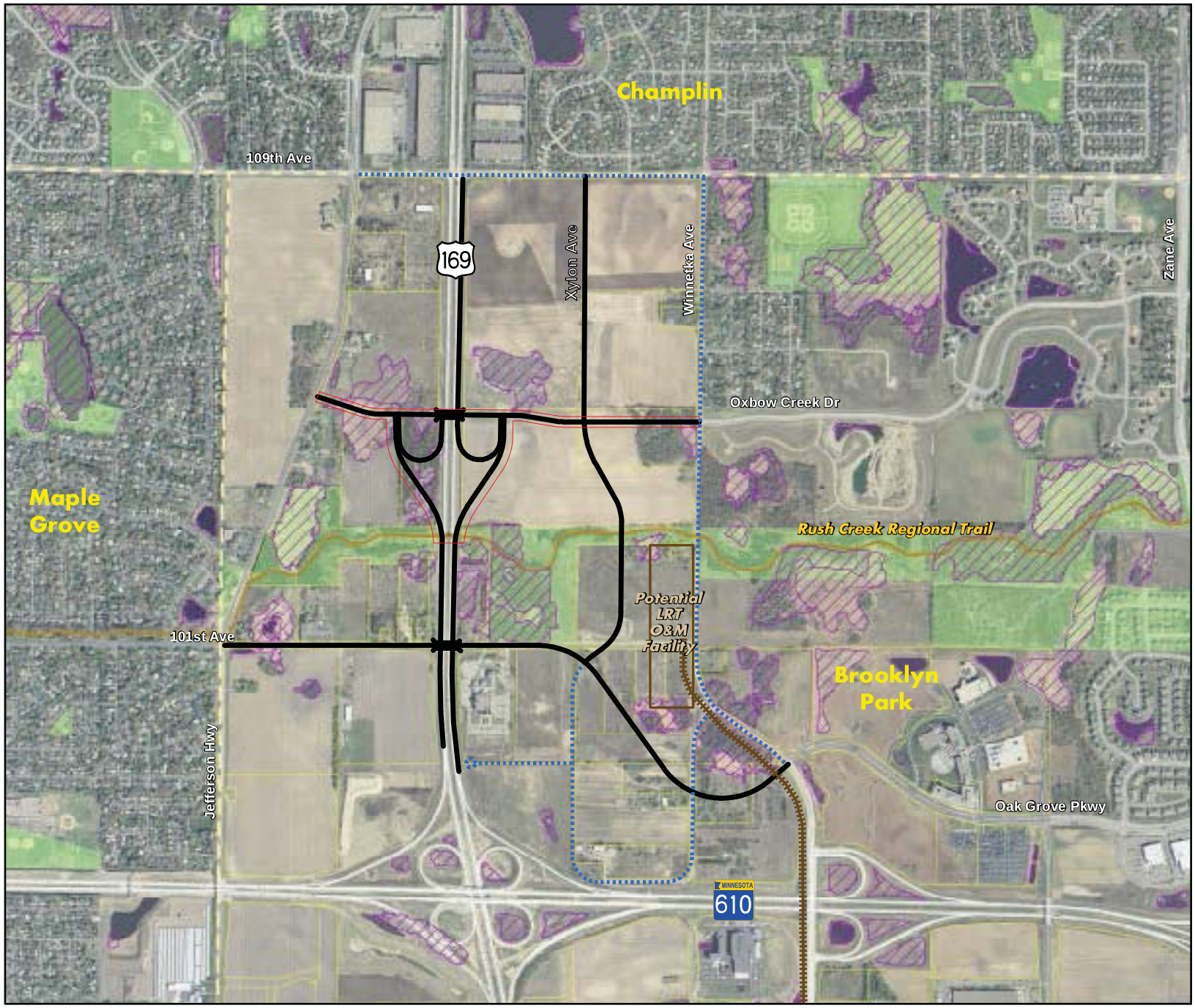
169 / 101st Avenue INTERCHANGE STUDY

FIGURE 6-2
ALTERNATIVE #4
BUTTONHOOK INTERCHANGE
AT 101ST AVENUE
(DETAILED)

Legend

- Wetlands
- Trails
- Parks
- Parcels
- Proposed Project Improvements
- Other Supporting Roadway Improvements
- Right-of-Way

0 800 1,600 Feet



169 / 101st Avenue INTERCHANGE STUDY

FIGURE 6-3
ALTERNATIVE #7
FOLDED DIAMOND NORTH INTERCHANGE
AT OXBOW CREEK DRIVE
(DETAILED)

Legend

- Wetlands
- Trails
- Parks
- Parcels
- Proposed Project Improvements
- Other Supporting Roadway Improvements
- Right-of-Way

0 800 1,600 Feet

Detailed Analysis Results

Mindful of the issues and goals identified, as well as the preliminary screening results, the detailed evaluation analysis was conducted to provide for a measurement of the impacts for the three alternatives carried forward, to aid in the selection of a SAC recommendation. A matrix was developed using the detailed evaluation criteria to identify an alternative that could be carried forward to a future phase that would include environmental documentation and preliminary engineering (not included as part of this study).

Detailed Analysis Summary

The results of the detailed evaluation analysis were presented and scored using a summary matrix to simplify the technical process that was applied. Table 6-1 provides a summary of the results for each of the detailed evaluation criteria.

The initial results were presented at the July 31, 2014 SAC meeting, which included a thorough discussion of the criteria and how each of the alternatives was scored. This meeting discussed weighting of the criteria, as well as adding a criterion to further understand the impacts to at-grade trail crossings. With the exception of total project cost, all three alternatives continue to be feasible solutions to address identified transportation issues and needs. For more detailed notes regarding the decision-making process, please refer to Appendix A – Public Involvement.

Based upon the feedback received from the SAC regarding the detailed evaluation analysis, the results from this analysis were presented to the public at the open house on September 9, 2014. A detailed summary of the comments received and compiled via the website and email were summarized and provided in Appendix A – Public Involvement.

Conclusions

The detailed alternatives analysis established that all three alternatives represented feasible solutions to address identified transportation issues and needs. Before the project progresses into future phases that would include right-of-way preservation, preliminary design, environmental review and official mapping, a SAC recommendation must be identified. The identification of a SAC recommendation would include input received from the open house meetings and the projects SAC members.

Table 6-1: Detailed Analysis Results

Criteria	Measurable Criteria		No Build[1]	Alternative #2: Folded Diamond Interchange at 101st Ave	Alternative #4: Buttonhook Interchange at 101st Ave	Alternative #7: Folded Diamond Interchange at Oxbow Creek Dr
Transportation						
A	Arterials	Reduces segment overloads on the supporting arterial network (Jefferson Hwy, Winnetka/W Broadway Ave, 109th Ave, Oak Grove Pkwy and 93rd Ave) (number of corridor segments with a V/C ratio greater than 1.1)	0 of 22	0 of 22	0 of 22	0 of 22
	Trunk Highways	Reduces segment overloads on TH 169 and TH 610 (number of corridor segments with a V/C ratio greater than 1.1)	4 of 9	3 of 9	3 of 9	3 of 9
B	Achieves acceptable intersection operations		A.M.: 3 of 9	A.M.: 2 of 9	A.M.: 2 of 9	A.M.: 1 of 9
	(number of unacceptable intersections with LOS E or worse)		P.M.: 3 of 9	P.M.: 1 of 9	P.M.: 1 of 9	P.M.: 1 of 9
	Reduces conflicting traffic volumes at TH 169 and 109th Avenue		- -	0	0	+
C	Minimizes overall impacts to mainline TH 169 safety, capacity and operations		- -	0		0
	Minimizes overall impacts to mainline TH 610 safety, capacity and operations		- -	+	+	+
D	Reduces the system vehicle miles traveled (VMT)		- -	-1,850	-1,500	-3,450
				-0.11%	-0.09%	-0.20%
	Achieves travel time savings (average daily change of vehicle hours traveled (VHT))		- -	-890	-730	-840
				-1.57%	-1.29%	-1.49%
E	Reduction of interchange ramp overloads (number of ramps with a V/C ratio greater than 1.1)		2 of 6	2 of 6	2 of 6	2 of 6
F	Ability to maintain and/or improve safety through the reduction of daily traffic at congested and high crash intersections (net change in crashes per year)		- -	-4.1	-3.4	-3.7
G	Provides for multi-modal (transit, pedestrian and bicycle) accommodations		- -	0	0	0
	Reduces traffic volumes at Rush Creek Regional Trail crossings		- -	0	0	0
H	Provides strong local circulation		- -	+	0	+
I	Ability to provide regional connectivity with a continuous arterial roadway system		- -	+	0	
J	Consistency with local and regional transportation plans/policy		- -	+	+	0
K	Supports local agency land use plans and economic development goals for Brooklyn Park, Champlin, Maple Grove and Osseo		- -	+	0	0
L	Ability to minimize local trips on TH 610 and TH 169 (percent local trips on new interchange)		- -	13%	11%	11%
M	Supports future plans for Blue Line Extension (Bottineau) O&M LRT facility (including no greater LRT-related wetland or parkland impacts than stated in the draft DEIS)		- -	+	+	+
Social						
N	Approximate Number of Partial Parcel Acquisitions (Total)			16	14	22
	• Residential			1	1	2
	• Commercial/Church/Institutional			2	2	2
	• Agricultural			11	10	15
	• Rush Creek Regional Trail (Three Rivers Park District)			2	1	3
	Approximate Number of Full Parcel Acquisitions (Total)			6	6	6
	• Residential			5	5	5
	• Commercial/Church/Institutional			0	0	0
	• Agricultural			1	1	1
	• Rush Creek Regional Trail (Three Rivers Park District)			0	0	0
	Approximate Acres of Right-of-Way Impact (Total)			27.5	35.8	47.4
	• Residential			14.0	13.5	17.5
	• Commercial/Church/Institutional			0.5	0.9	0.5
	• Agricultural			10.7	20.5	28.7
	• Rush Creek Regional Trail (Three Rivers Park District)			2.3	0.9	0.7
Environmental						
O	Acres of wetland impacts (NWI)			6.0	2.9	6.3
	• Impacts to forested/shrub wetlands (hardwood wetland)			2.3	0.7	0.4
	• Impacts to emergent wetlands (seasonally flooded basin)			3.6	2.0	3.2
	• Impacts to emergent wetlands (shallow marsh)			0.0	0.0	2.6
	• Impacts to "Other" wetlands			0.1	0.2	0.1
	Impacts to DNR Public Waters Wetlands			0.5	0.8	2.3
	Acres of woodland impacts			4.0	2.7	10.0
	Acres of natural community impacts (Regionally Significant Ecological Areas and/or MBS sites of Biodiversity Significance)			0.0	0.0	0.0
Economic						
P[2]	Estimated Construction Cost			$28M	$21M	$39M
	Estimated Right-of-Way cost (land value only - does not include relocation costs or cost for impacted structures)			$6M	$8M	$11M
Q	Ability to provide interim improvement options (staging)			0	+	+

1 – The no build alternative assumes that the roadway infrastructure stays the same as in place today, notwithstanding the identified programmed improvements.
2 – Does not include any costs associated with potential mitigation efforts.

Good
Fair
Poor

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Open House Feedback

The third project open house was on September 9, 2014 to present the draft results of the detailed evaluation process and provide local stakeholders an opportunity to share their concerns and/or feedback regarding the three alternatives under consideration. Meeting notices were mailed to nearby Brooklyn Park, Champlin, Maple Grove and Osseo residents, with additional notifications posted to social media sites such as Facebook and Twitter. Comments received at the meeting were used to aid in the refinement of the detailed evaluation process and played an important role in identifying a SAC recommendation.

Attendees provided both written and verbal comments regarding the three alternatives on display, while additional opportunities were provided to submit comments for those unable to attend in person (e.g., mail, e-mail and a survey provided on the project website). Based upon the feedback received at the final open house meeting, local stakeholders indicated their preference for Alternative #2, while a number of local residents from Brooklyn Park's Northwoods neighborhood voiced strong concerns regarding Alternative #7 and did not want this alternative to be considered as the project moves forward into future phases. A summary of the open house feedback and attendance is provided in Table 6-2 and Table 6-3.

Table 6-2: Open House Feedback on Alternatives

Alternative	Most Preferred/ Acceptable	Least Preferred/ Do Not Consider
Alt #2 – Folded Diamond Interchange at 101st Ave.	9	
Alt #4 – Buttonhook Interchange at 101st Ave.		7
Alt #7 – Folded Diamond North Interchange at Oxbow Creek Dr.	2	12

Table 6-3: Open House Attendee and Comment Summary

	Brooklyn Park	Champlin	Other
Open House Attendee	10	1	11
Comment Submission	13	1	1

A detailed summary of the comments received and compiled via the website and email were summarized and provided in Appendix A – Public Involvement.

SAC Discussion

At the October 16, 2014 SAC meeting, it was discussed that there were three viable alternatives (#2, 3 and 7) that could be brought forward to the next phase of the project. These three alternatives ranked similarly in the detailed evaluation, with the project cost being the primary difference. Initially the study was not intended to recommend an interchange alternative, but the identification of a SAC recommendation will allow the

project to move quickly into the environmental documentation and preliminary design phase of the project. The SAC had a thorough discussion focusing on each SAC member's preference between the three alternatives to see if a recommendation could be identified. A detailed summary of these discussions is provided in Appendix A – Public Involvement.

Chapter 7 Conclusions and Recommendations

The objective of the study was to verify the need for an interchange along TH 169 between TH 610 and 109th Avenue, provide a recommendation for the ultimate geometry of TH 169 between TH 610 and 109th Avenue, and identify a supporting roadway system for the area that can be implemented over time. These improvements will establish the area's transportation framework and support the projected growth that includes the Target North Campus, as well as development proposals for NorthPark, Gateway, and Astra Village and other currently undeveloped properties in this northwest area.

The purpose of this chapter is to summarize the key conclusions identified throughout the study process and document the recommendations identified by the SAC.

Study Conclusions

Existing Conditions

- The intersection of 109th Avenue at TH 169 has a calculated crash rate exceeding the typical crash rate, which is not uncommon for highly congested signalized arterial intersections with high side-street volumes. Approximately 70 percent of the crashes were rear-end collisions involving vehicles traveling north-south, with a majority attributed to northbound travel during the evening commute period.

- The intersection of 109th Avenue at Winnetka Avenue was identified in the City of Brooklyn Park's annual crash summary as having a calculated crash rate exceeding the critical crash rate. Despite recent improvements, additional northbound and southbound left-turn lanes have been identified as potential improvements by local agencies, to be implemented as development necessitates.

- All study intersections operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, except the TH 169/109th Avenue and TH 169/114th Avenue intersections. The TH 169/109th Avenue intersection operates at a LOS E during the a.m. peak hour, while the TH 169/114th Avenue intersection operates at a LOS E during the p.m. peak hour. It should be noted that the TH 169/109th Avenue intersection also operates near the LOS D/E threshold during the p.m. peak hour.

- A freeway mainline capacity analysis was completed under existing conditions, identifying locations that currently operate at LOS E or worse during the existing a.m. and p.m. peak hours. This analysis identified operational issues along TH 169 and TH 610 for the a.m. (TH 169 southbound and TH 610 westbound) and p.m. peak hours (TH 169 northbound and TH 610 eastbound).

2030 No Build Analysis

- A freeway mainline capacity analysis was conducted under year 2030 conditions for the No Build alternative. The results identified operational deficiencies along TH 169 and the need for improvements along TH 169 and the supporting roadway system to meet the demand of vehicles wanting to access 101st Avenue. In addition, TH 610 is expected to operate at LOS E/F near the W Broadway Avenue interchange, indicating limited reserve capacity available along TH 610 to accommodate additional demand if access were further restricted or closed at 101st Avenue.

- The intersection capacity analysis results indicate that there are multiple intersections expected to operate at an unacceptable LOS E or worse during the a.m. and p.m. peak hours, assuming existing traffic controls and geometric layout. These intersections are primarily located along the TH 169 and W Broadway Ave/Winnetka Ave corridors. The analysis results show the need for an access change along TH 169 between TH 610 and 109th Avenue, as demand along TH 169 will prevent vehicles from being able to turn right out of 101st Avenue.

2030 Build Analysis

- A freeway mainline capacity analysis was conducted under year 2030 conditions for Alternatives #2, #4, and #7 along TH 169 and TH 610 for the a.m. and p.m. peak hour conditions. The analysis indicated that a new interchange would maintain or improve operations under all alternatives along TH 169, but more importantly it would not result in a worsening of operations along the corridor. Operations would improve similarly under all alternatives along TH 610 due to the additional access point along TH 169, with Alternatives #2 and #4 providing the most benefit due to their ability to remove more volume from the W Broadway Avenue interchange.

- The intersection capacity analysis completed for the Build conditions indicated that operational problems are still expected along TH 169. Study intersections are not able to meet regional traffic demand for the area, resulting in longer peak periods of congested travel. If 101st Avenue at TH 169 were closed as recommended, an interchange is needed to serve the development proposed in the project area.

Sensitivity Analysis

Higher Intensity Alternative

- Alternative #2 would better support the higher-intensity land uses, as compared to Alternative #7, as Alternative #2 is located closer to the higher-density development and provides more balanced access to the regional transportation system.

Lower Intensity Alternative

- Traffic produced in the study area under the lower-intensity scenario would strongly suggest the need for a new interchange, considering traffic volume growth along 109th Avenue, W Broadway Avenue, and 101st Avenue and future intersection operations.

General Conclusions

- Safety and congestion issues have been identified along the TH 169 corridor and at study area intersections under existing conditions.
- Future development and freeway operational deficiencies along TH 169 suggest the need for improvements along TH 169 and the supporting roadway system to meet the demand of vehicles wanting access at 101st Avenue. TH 610 freeway operational deficiencies near the W Broadway Avenue interchange indicate that limited capacity would be available along TH 610 to accommodate demand if access were further restricted or closed at 101st Avenue.
- The intersection capacity analysis results show the need for an access change along TH 169 between TH 610 and 109th Avenue, as demand along TH 169 will prevent vehicles from being able to turn right out of 101st Avenue, particularly westbound to northbound in the p.m. peak period and eastbound to southbound in the a.m. peak period.
- Study intersections are not able to meet regional year 2030 traffic demand for the area and if 101st Avenue at TH 169 were closed as recommended, an interchange is needed to serve the development proposed in the project area.
- A new interchange would maintain or improve operations under all alternatives along TH 169 and would not result in a worsening of operations along the corridor. Operations improve similarly under all alternatives along TH 610, but Alternatives #2 and #4 provide the most benefit. Intersection operations would be improved at TH 169/109th Avenue and TH 610/W Broadway Avenue with a new interchange.
- Alternative #2 would be better suited to support the higher-intensity development within the study area, as compared to Alternative #7.
- If development occurred at a lower-intensity, traffic produced within the study area would strongly suggest the need for a new interchange.
- The detailed alternatives analysis established that all three alternatives represented feasible solutions to address identified transportation issues and needs, with the project cost being the primary difference.
- The project should continue forward to the second phase, which would include environmental documentation and preliminary design.

Interchange Recommendation

Alternative #2 (Folded Diamond Interchange at 101st Avenue) was identified as the SAC recommendation, but noted a few issues that would need to be addressed during the first steps of the next phase of the project. These issues included the following: (1) confirm that the spacing between TH 610 and the new interchange is acceptable, (2) determine if auxiliary lanes are needed on TH 169 between the new interchange and 109th Avenue, (3) identify potential drainage issues, and (4) identify impacts to the Three Rivers Park District property.

Supporting Roadway System Recommendations

Supporting roadway system improvements were evaluated and discussed with the SAC to determine if improvements identified in Brooklyn Park's Transportation Plan are still warranted (on a planning-level) with the presence of an interchange. The specific geometry or alignment of supporting roadway improvements will be coordinated with adjacent cities and/or related agencies in subsequent phases or as development necessitates.

The supporting roadway recommendations were summarized by type, which included both corridor and intersection improvements. A summary of the recommended improvements is provided below.

Corridor Improvements

- Expand 109th Avenue to a four-lane facility between TH 169 and Winnetka Avenue.
- Expand Winnetka Avenue to a four-lane facility between 101st Avenue/Oak Grove Parkway and 109th Avenue. It should be noted that expansion will be dictated by the future intensity of land use and site developments that occur to the west of the corridor. Forecasts indicated additional capacity will be needed along the corridor (potentially a three-lane), but the cross-section will be dictated by future development, the interchange option chosen, and other supporting roadways.
- Extend 101st Avenue/Oak Grove Parkway as a four-lane facility between Jefferson Highway and W Broadway Avenue.
- Provide a Xylon Avenue connection between 109th Avenue and 101st Avenue/Oak Grove Parkway. This issue will be resolved separately by the Cities of Brooklyn Park and Champlin. A technical memorandum summarizing the advantages and disadvantages of a Xylon Avenue connection between 101st Avenue/Oak Grove Parkway and 109th Avenue is provided in Appendix B – Forecasts and Operations.

Intersection Improvements

- W Broadway Avenue at 101st Avenue/Oak Grove Parkway
    - Construct dual northbound and southbound left-turn lanes.
    - Construct dual eastbound and northbound right-turn lanes.

  - Extend the northbound left-turn lane through the TH 610 north ramps intersection.
- W Broadway Avenue at TH 610 north ramps
  - Construct dual southbound left-turn lanes.
- W Broadway Avenue at TH 610 south ramps
  - Construct dual westbound right-turn lanes.
- TH 169 at 114th Avenue/Elm Creek Parkway
  - Construct dual westbound left-turn lanes.
- TH 169 at 109th Avenue
  - Construct dual left-turn lanes along all four approaches.
  - Extend eastbound and westbound right-turn lanes.
- Jefferson Highway at 109th Avenue
  - Install a traffic signal or a roundabout.
- Winnetka Avenue at 109th Avenue
  - Install northbound and southbound left-turn lanes.
  - Construct an eastbound right-turn lane.
- Winnetka Avenue at 114th Avenue
  - Install a traffic signal.
  - Construct northbound and southbound left-turn lanes.

Appendix D

Wetland Memorandum

SRF Consulting Group, Inc. | Engineers Planners Designers

Memorandum

SRF No. 8757

To: Brett Danner, Senior Associate
Kevin Jullie, Principal

From: Nicole Zappetillo, Senior Environmental Analyst

Date: August 10, 2015 *(Updated September 14, 2016)*

Subject: TH 169 / 101st Avenue Wetland Review
City of Brooklyn Park, Hennepin County, Minnesota
S.P. 2570-92

TH 169 / 101st Avenue Wetland Review

Introduction

This memo documents wetland assessment efforts for the proposed Trunk Highway (TH) 169 / 101st Avenue Interchange project in northeast Brooklyn Park, Minnesota (**Figure 1**). The proposed project would construct a folded diamond interchange at TH 169 / 101st Avenue. The project would also include reconstruction / construction of 101st Avenue from Jefferson Highway to future Xylon Avenue as a four-lane roadway, including pedestrian / bicycle facilities. Stormwater ponding sites will also be required as part of the project.

Methodology

SRF Consulting Group, Inc., on behalf of the City of Brooklyn Park reviewed off-site data sources including the National Wetland Inventory (NWI)[1], Natural Resource Conservation Service (NRCS) soil mapping, light detecting and ranging (LiDAR) 2-foot contour data, and recent aerial photography of the project area prior to completing a field review to document any existing wetlands within the proposed project area as depicted on **Figure 2**. The field review was conducted on May 19, 2015 and was based on a visual assessment of hydrology and vegetation within the project area. Due to the location of the project and associated safety and access concerns, areas along TH 169 were assessed from a distance. Portions of the project area located on private property were also assessed from a distance.

The Metropolitan Council completed wetland delineations for the area adjacent to 101st Avenue between TH 169 and County State Aid Highway (CSAH) 103 (West Broadway Avenue) as part of the environmental review process for the proposed Metro Blue Line Extension Project. The proposed Metro Blue Line light rail transit (LRT) extension follows CSAH 103 (West Broadway Avenue) through Brooklyn Park, terminating north of TH 610. The proposed operations and maintenance facility (OMF) is located west of CSAH 103 (West Broadway Avenue) along 101st

[1] Minnesota Department of Natural Resources (DNR) NWI update, 2013-present (on-going).

Avenue. The potential wetland areas described in this memorandum do not reflect the delineated wetland boundaries identified as part of the Metro Blue Line Extension Project.

There are existing stormwater ponds within the proposed project area. All aquatic resources were lumped into one "potential wetland area" category for purposes of the TH 169 / 101st Avenue wetland review (see **Figure 2**). Additional discussion regarding stormwater ponds is provided below. Wetlands should be grouped by resource types (e.g., wetland ditch, wetland, stormwater feature, etc.) as part of the future Level 2 wetland delineation and wetland permitting efforts following regulatory guidance and requirements in place at that time.

Results

Results of off-site data review:

- Hydric soils are mapped within the majority of the proposed project area – based on the NRCS soil mapping and Hydric Soils list for Hennepin County.
- Several NWI mapped wetlands and two DNR Public Water Wetlands (254W, bisected by 101st Avenue) are within or directly adjacent to the proposed project.

The on-site field review documented potential for eight wetlands within the project area (see **Figure 2** and **Site Photos**).[2] Cattails (*Typha sp.*), an obligate wetland plant, and reed canary grass (*Phalaris arundinacea*), a facultative wetland plant, were observed to be dominant within the wetlands. Some of the wetlands were also dominated by shrubs such as sandbar willow (*Salix interior*) and speckled alder (*Alnus incana*), both facultative wetland plants, and European buckthorn (*Rhamnus cathartica*), a facultative plant. The remainder of the reviewed area lacked apparent hydrological and vegetative indicators associated with wetlands as defined by the *1987 Corps of Engineers Wetlands Delineation Manual*, the *Midwest (V. 2.0) Regional Supplement*, and the *Northcentral and Northeast (V. 2.0) Regional Supplement*.[3] The majority of the reviewed area consists of highly altered urban roadway segments with ditches that are dominated by smooth brome (*Bromus inermis*), a facultative upland plant in the Midwest Region and an upland plant in the Northcentral and Northeast Region.

It is our assertion that two of the potential wetland areas depicted on **Figure 2** are outside of the scope of the Wetland Conservation Act (WCA) and Section 404 of the Clean Water Act (U.S. Army Corps of Engineers jurisdiction), as they appear to be isolated man-made stormwater ponds based on a brief historical aerial photo review (signature not present in 1991 aerial photography). One wetland is located southeast of the CSAH 103 (West Broadway Avenue) / Oak Grove Parkway intersection, and the other wetland is located in the northwest quadrant of the TH 169 / TH 610 interchange. The remaining wetlands may be within the scope of the WCA and Section 404. The two wetlands located north and south of 101st Avenue near Jefferson Highway are DNR Public Water Wetlands (254W) which were originally part of one larger wetland that was bisected by 101st

[2] The "Potential Wetland Area" boundaries shown on Figure 2 were arbitrarily terminated just outside the project limits.

[3] The project area is located within two USACE wetland regions. Approximately half of the project area is located in the Midwest Region and the other half is located within the Northcentral and Northeast Region.

Avenue in the past. SRF recommends a Level 2 wetland delineation of the entire project area and agency coordination prior to any construction activity to determine WCA, U.S. Army Corps of Engineers (USACE), Department of Natural Resources (DNR), and West Mississippi Watershed Management Organization jurisdiction of the wet areas.

Attachments:

Figure 1: Project Location

Figure 2: Potential Wetland Areas

TH 169 / 101st Avenue Site Photos

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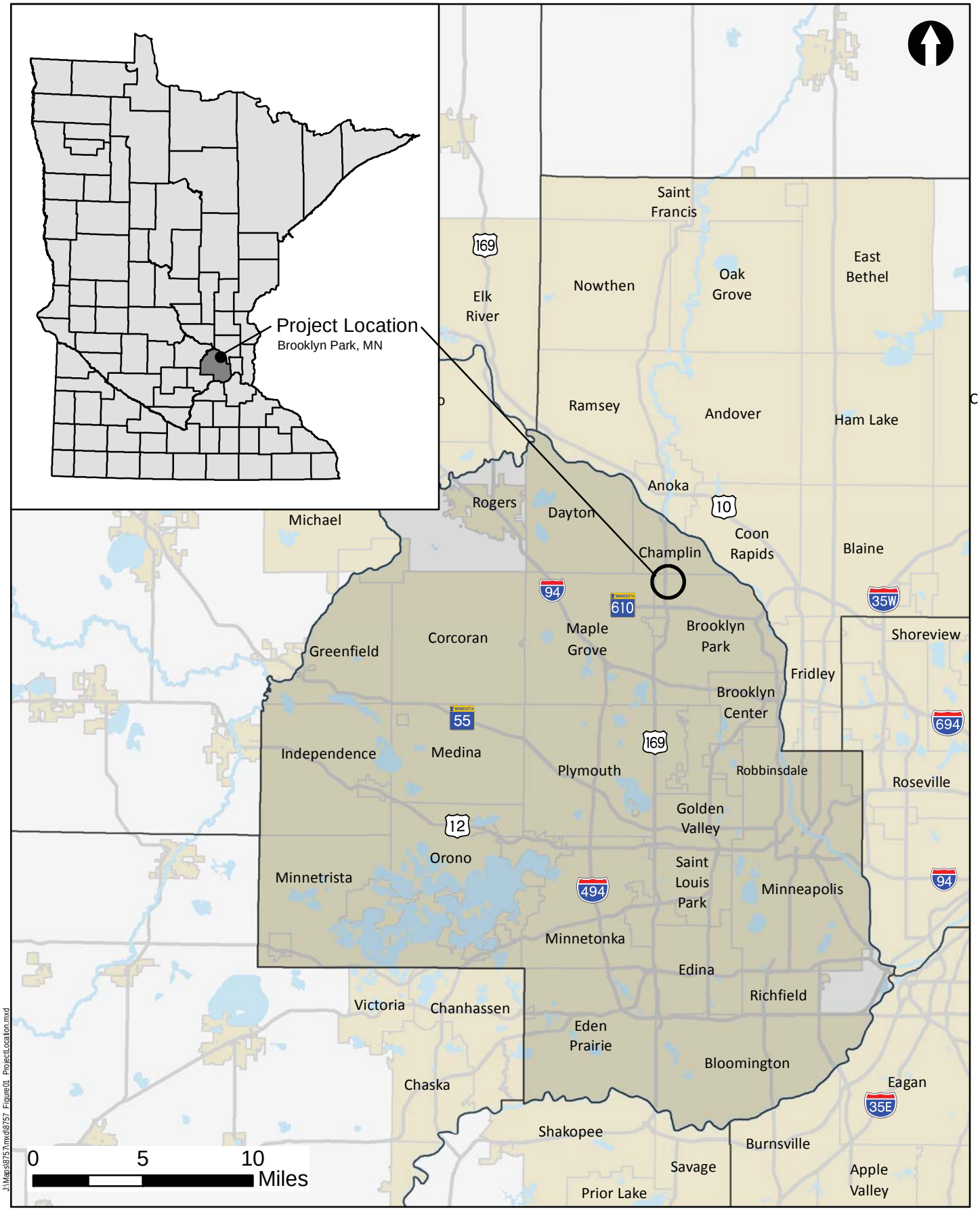
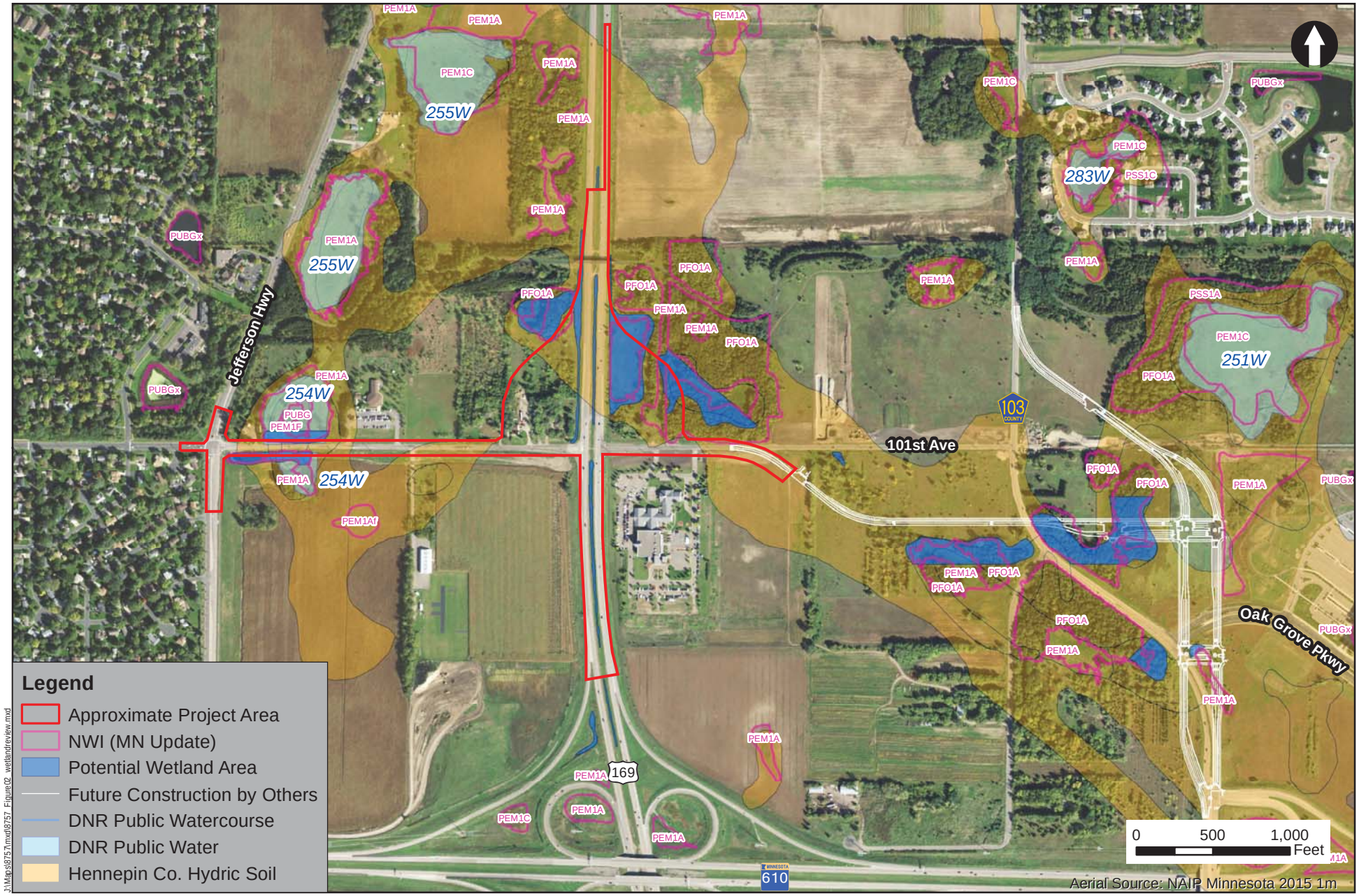


Project Location

TH 169 / 101st Avenue Interchange Project
City of Brooklyn Park

Figure 1



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Potential Wetland Areas

TH 169 / 101st Avenue Interchange Project

City of Brooklyn Park

Figure 2

TH 169 / 101st Avenue Site Photos

P-1: Photo facing southwest of Type 3 (shallow marsh) wetland located south of 101st Avenue and east of Jefferson Highway.

P-2: Photo facing northwest of Type 3 (shallow marsh) wetland located north of 101st Avenue and east of Jefferson Highway.

P-3: Photo facing north of Type 6 (shrub swamp) wetland located north of 101st Avenue and east of TH 169. Photo taken from westernmost access to Grace Fellowship Church.

P-4: Photo facing southeast of Type 6 (shrub swamp) wetland located south of 101st Avenue, approximately halfway between TH 169 and CSAH 103 (West Broadway Avenue).

P-5: Photo facing northwest of uplands adjacent to Winnetka Avenue, approximately halfway between CSAH 103 and TH 610.

P-6: Photo facing southwest of Type 6 (shrub swamp) wetland located across from Oak Grove Parkway, west of CSAH 103 (West Broadway Avenue).

P-7: Photo facing southeast of Type 6 (shrub swamp) wetland located south of 97th Avenue and east of CSAH 103. Wetland appears to have been created as a stormwater pond.

Appendix E

Traffic Noise Analysis Report

TH 169/101st Avenue Interchange Project

Traffic Noise Analysis Report

SP 2750-92

Report Version 2.0

City of Brooklyn Park, Minnesota

September 2016

Table of Contents

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Introduction

The purpose of this noise analysis is to evaluate and document the effect of the proposed Trunk Highway (TH) 169 and 101st Avenue Interchange Preliminary Design Project on traffic generated noise levels. The proposed project is not programmed for construction. Preliminary engineering and design are being completed at this time to develop a "shelf-ready" project should funding become available in the future. An Environmental Assessment Worksheet (EAW) will be prepared to address state environmental review requirements as the project meets the definition for a mandatory EAW under Minnesota Rules 4410.4300 Subpart 22 (B) (for construction of additional travel lanes on an existing road for a length of one or more miles). The project proposer is the City of Brooklyn Park. The responsible governmental unit (RGU) is the Minnesota Department of Transportation (MnDOT).

The project does not include federal-aid funding at this time; therefore, this traffic noise analysis addresses Minnesota state noise standards only. If federal-aid funding is secured in the future, then the traffic noise analysis will be updated to address Federal Highway Administration (FHWA) procedures and requirements.

This traffic noise analysis was completed following the procedures and guidance described in the Minnesota Department of Transportation (MnDOT) traffic noise policy (MnDOT Noise Policy for Type I Federal-aid Projects as per 23 CFR 772, effective June 15, 2015). [1] MnDOT's Highway Noise Policy applies to all projects under MnDOT authority that do not have federal-aid funds or require a federal approval action.

General Project Description

The project is located in the City of Brooklyn Park, Hennepin County, Minnesota (see **Figure 1** and **Figure 2**). The proposed project includes construction of a new folded diamond interchange at the TH 169/101st Avenue intersection. Auxiliary lanes would be constructed along northbound and southbound TH 169 between TH 610 and the proposed TH 169/101st Avenue interchange. 101st Avenue would be reconstructed as a four-lane roadway from Jefferson Highway at the Brooklyn Park/Maple Grove border

[1] The MnDOT Noise Policy is available online on the MnDOT Office of Environmental Stewardship website at http://www.dot.state.mn.us/environment/noise/pdf/mndot-2015-noise-policy.pdf.

to the 101st Avenue/Xylon Avenue intersection east of TH 169. Stormwater ponds would also be constructed adjacent to 101st Avenue and the proposed TH 169/101st Avenue interchange. The total project length along 101st Avenue is approximately 3,700 feet (approximately 0.7 miles). The total project length along TH 169 is approximately 4,000 feet (approximately 0.8 miles).

Background Information on Noise

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

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hours of the day and/or night that have the loudest traffic scenario. These numbers are identified as the L_{10} and L_{50} levels, respectively. The L_{10} value is the noise level that is exceeded for a total of 10 percent, or 6 minutes, of an hour. The L_{50} value is the noise level that is exceeded for a total of 50 percent, or 30 minutes, of an hour.

Figure 1. Area Location Map

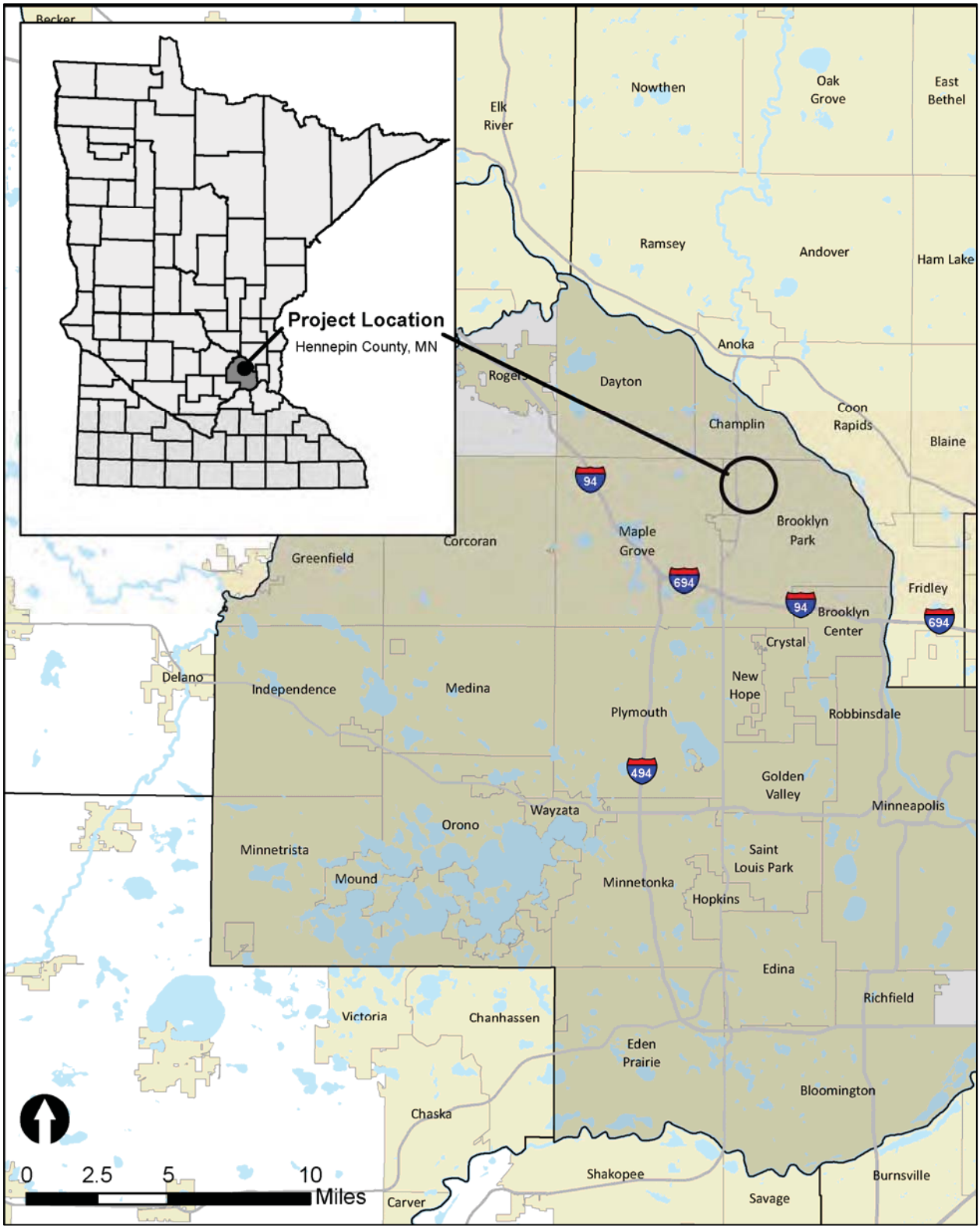


Figure 2. Project Location Map

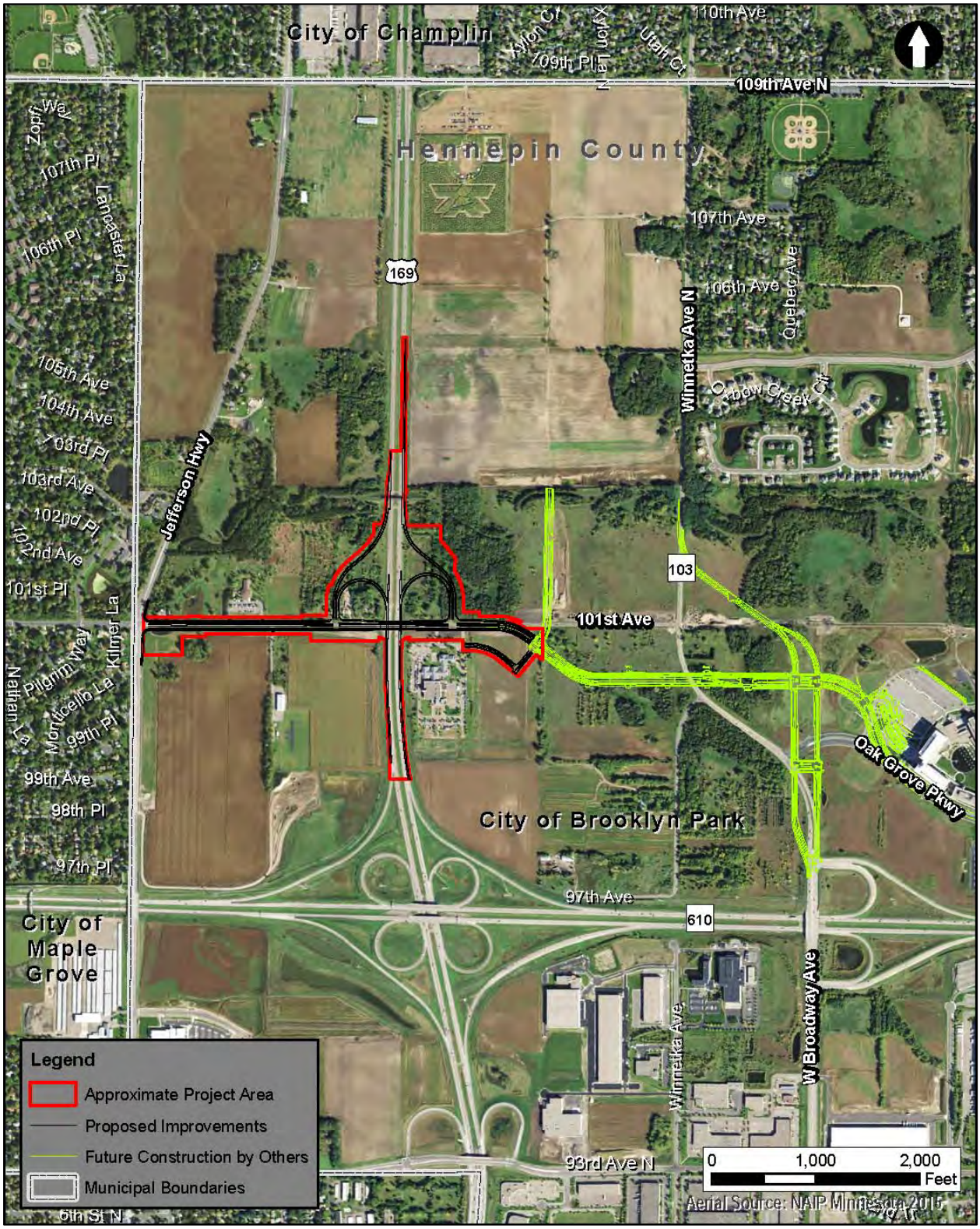
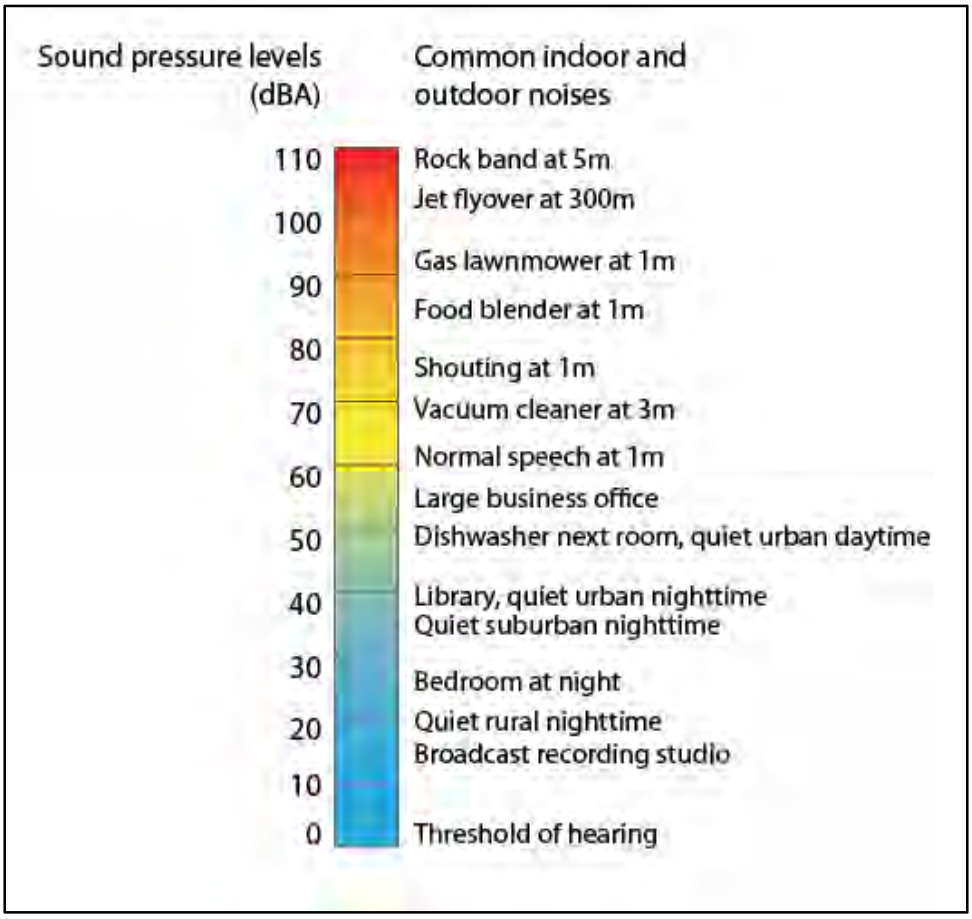


Figure 3 provides a rough comparison of the noise levels of some common noise sources.

Figure 3. Decibel Levels of Common Noise Sources



Source: Minnesota Pollution Control Agency. 2015. Noise Program accessed 13 September 2015 at http://www.pca.state.mn.us/index.php/air/air-monitoring-and-reporting/air-emissions-modeling-and-monitoring/noise-program.html.

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

Minnesota State Noise Standards

Minnesota state noise standards have been established for daytime and nighttime periods. For residential land uses (identified as Noise Area Classification 1 or NAC-1), the Minnesota state standards for L_{10} are 65 dBA for daytime and 55 dBA for nighttime; the standards for L_{50} are 60 dBA for daytime and 50 dBA for nighttime. The Minnesota Pollution Control Agency (MPCA) defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00 p.m. to 7:00 a.m. **Table 1** lists state noise standards. Minnesota state noise standards apply to the outdoor atmosphere (i.e., exterior noise levels).

Table 1. Minnesota State Noise Standards

Land Use	Code	Daytime L_{10} (4)	Daytime L_{50} (4)	Nighttime L_{10} (5)	Nighttime L_{50} (5)
Residential	NAC-1 (1)	65	60	55	50
Commercial	NAC-2 (2)	70	65	70	65
Industrial	NAC-3 (3)	80	75	80	75

(1) NAC-1 includes household units, transient lodging and hotels, educational, religious, cultural, entertainment, camping, and picnicking land uses.

(2) NAC-2 includes retail and restaurants, transportation terminals, professional offices, parks, recreational, and amusement land uses.

(3) NAC-3 includes industrial manufacturing, transportation facilities (except terminals), and utilities land uses.

(4) Daytime hours are from 7:00 a.m. to 10:00 p.m.

(5) Nighttime hours are from 10:00 p.m. to 7:00 a.m.

State noise standards apply to interstate highways and trunk highway facilities. The state noise standards apply to the project segment of TH 169 and the proposed TH 169/101st Avenue interchange. Exemptions to state noise standards are found in Minnesota Statutes 2000, Section 116.07 subd. (2a). There it is stated the conditions and roadway types that are exempt from the state noise standards.

Analysis Methodology

Affected Environment

The proposed TH 169/101st Avenue Interchange Project is located in Hennepin County in the City of Brooklyn Park. Existing lands adjacent to the project segment of 101st Avenue and the proposed TH 169/101st Avenue interchange are primarily undeveloped (agricultural and parkland/open space uses, see **Figure 2**). Rural residential land uses are located in the northwest quadrant of the TH 169/101st Avenue intersection. Two churches are located within the project area: one in the southeast quadrant of the TH 169/101st Avenue intersection, and another along the north side of 101st Avenue between Jefferson Highway and TH 169. The Rush Creek Regional Trail crosses over TH 169 north of the TH 169/101st Avenue intersection. Three Rivers Park District property is located in the northeast quadrant of the proposed TH 169/101st Avenue interchange. There are no other parklands or trails within the project area.

Noise Monitoring

Noise Level Monitoring Results

Noise level monitoring is commonly performed during a noise study to document existing noise levels and to validate the noise model for the project (see discussion of "Field Measurements and Predicted Noise Levels" below). Existing noise levels were monitored at two sites adjacent to the project limits along TH 169 and 101st Avenue. Noise monitoring locations are illustrated in **Figure 4** and described below.

- Monitoring Site 1 (M-1) is located at 8601 101st Avenue, Brooklyn Park. Monitoring Site 1 represents a place of worship (Grace Lutheran Church) located along the east side of TH 169, south of 101st Avenue.
- Monitoring Site 2 (M-2) is located at 9000 101st Avenue, Brooklyn Park. Monitoring Site 2 represents a place of worship (Crossroads Alliance Church) located along the north side of 101st Avenue, west of TH 169.

Daytime noise levels were collected in October 2015 at the two receptor locations described above. Noise levels were monitored at Site M-1 and Site M-2 twice; once during the morning and again during the afternoon. A trained noise monitoring technician was present at each session for the entire

field measurement session to ensure correct operation of the sound level meter (SLM). The morning and afternoon monitored levels are presented below in **Table 2**. Monitored daytime traffic noise levels ranged from 51.5 dBA (L_{10}) to 62.0 dBA (L_{10}).

Table 2. Field Measurement Summary Table

Receptor ID	Location Description	Start Time	End Time	Measured Level, L_{10}, dBA	Measured Level, L_{50}, dBA
M-1	Grace Fellowship Church (8601 101st Avenue, Brooklyn Park)	10:45 a.m.	11:18 a.m.	59.0	55.5
M-1	Grace Fellowship Church (8601 101st Avenue, Brooklyn Park)	12:36 p.m.	1:06 p.m.	62.0	57.0
M-2	Crossroads Alliance Church (9000 101st Avenue, Brooklyn Park)	11:45 a.m.	12:15 p.m.	51.5	44.0
M-2	Crossroads Alliance Church (9000 101st Avenue, Brooklyn Park)	1:50 p.m.	2:20 p.m.	51.5	42.5

Field Measurements and Predicted Noise Levels

Noise monitoring results are presented in **Table 3** along with the computer modeling results for existing daytime traffic noise levels. Computer modeling results are based on classified traffic (e.g., cars, medium trucks, and heavy trucks) observed during the field measurements. The speeds used for the model predictions were posted speeds (e.g., 55 miles per hour on northbound and southbound TH 169, 30 mph on 101st Avenue west of TH 169, 45 mph on 101st Avenue east of TH 169). Noise monitoring results presented in **Table 3** are an average of the applicable morning and afternoon field measurements described above.

Table 3. Field Measurements and Predicted Noise Levels

Receptor ID	Field, L_{10}, dBA	Predicted, L_{10}, dBA	Difference (Field – Predicted), L_{10}, dBA
M-1	60.8	64.2	3.4
M-2	51.5	53.2	1.7

A discrepancy equal to or less than 3.0 dBA between field measurements and predicted levels is considered acceptable for noise model validation. Field measurement traffic noise levels (L_{10}) varied from 3.4 dBA below predicted noise levels at Site M-1 to 1.7 dBA below predicted noise levels at Site M-2. The discrepancy between the field measurement and predicted level was greater than the 3.0 dBA threshold for Site M-1 by 0.4 dBA (L_{10}). It is considered better to over predict uncorrected traffic noise levels, which yields a worst-case scenario, than to under predict noise levels when determining traffic noise impacts and mitigation effectiveness. Therefore, the prediction model was utilized without corrections.

Worst Hourly Traffic Noise Analysis

In general, higher traffic volumes, vehicle speeds, and greater numbers of heavy trucks increase the loudness of highway traffic noise. The worst hourly traffic noise impact typically occurs when traffic is flowing more freely (e.g., level of service C conditions) and when heavy truck volumes are the greatest. For determining the worst-case traffic noise hour for the proposed project, traffic noise levels for five time periods were modeled at 16 representative receptor locations within the project study area under existing conditions, taking into account the appropriate classified traffic mix (i.e., cars, medium trucks, heavy trucks)[2], seasonal traffic variations where appropriate, and directional split in traffic volume (i.e., northbound TH 169 versus southbound TH 169). The speeds used for the model predictions were posted speeds.

The daytime L_{10} and L_{50} levels for each of the five modeled time periods are summarized in **Table 4**. Based on this analysis, it was determined that the 4:00 p.m. to 5:00 p.m. period represents the worst-case traffic noise hour during the daytime period. The 4:00 p.m. to 5:00 p.m. hour represents a period of higher overall traffic volumes on TH 169, combined with similar heavy truck volumes, compared to other times of the day. The 6:00 a.m. to 7:00 a.m. hour was identified as the loudest hour of the nighttime period because of higher traffic volumes just prior to the start of the morning peak period.

[2] Identification of the worst-case traffic noise hour based on November 2003 MnDOT vehicle classification counts for TH 169 south of TH 610 in Brooklyn Park (Site #7306) and September 2002 MnDOT vehicle classification counts at the TH 610 Mississippi River crossing (Site #7303).

Table 4. Worst Hourly Traffic Noise Summary (Existing Modeled Daytime Noise Levels By Time Period)

Receptor ID (1) (2)	Land Use	State NAC (3)	7:00 – 8:00 AM, L_{10}, dBA	9:00 – 10:00 AM, L_{10}, dBA	Noon – 1:00 PM, L_{10}, dBA	2:00 – 3:00 PM, L_{10}, dBA	4:00 – 5:00 PM, L_{10}, dBA
A (1)	Res	--	59.8	57.9	57.6	58.9	60.2
C (1)	Res	--	66.2	64.1	63.7	65.0	66.5
E (1)	Res	--	60.4	58.6	58.2	59.4	60.6
G (1)	Res	--	63.9	62.0	61.4	62.8	64.2
I (1)	Ch	--	55.6	54.8	54.8	55.6	56.1
K (1)	Res	1	64.3	63.5	63.6	64.2	64.7
M (1)	Ag	3	57.9	57.1	57.1	57.9	58.3
R1 (1)	Tr	--	58.8	57.0	56.7	57.9	59.1
R3 (1)	Tr	--	68.8	66.4	66.1	67.8	69.1
R5 (1)	Tr	--	69.3	66.9	66.6	68.2	69.6
R7 (1)	Tr	2	60.4	60.1	60.2	60.9	61.0
R9 (1)	Tr	2	68.3	68.1	68.0	68.6	68.7
R11 (1)	Tr	2	67.5	67.2	67.6	68.6	68.7
State Standard (NAC-1)	--	1	65	65	65	65	65
State Standard (NAC-2)	--	2	70	70	70	70	70
State Standard (NAC-3)	--	3	80	80	80	80	80

Bold numbers are above state daytime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

Table 4. Worst Hourly Traffic Noise Summary (Existing Modeled Daytime Noise Levels By Time Period)

Receptor ID (1) (2)	Land Use	State NAC (3)	7:00 – 8:00 AM, L_{10}, dBA	9:00 – 10:00 AM, L_{10}, dBA	Noon – 1:00 PM, L_{10}, dBA	2:00 – 3:00 PM, L_{10}, dBA	4:00 – 5:00 PM, L_{10}, dBA
R13 (1)	Tr	2	60.8	60.5	60.8	61.7	61.8
R15 (1)	Tr	2	57.5	57.1	57.3	58.1	58.4
MG2 (1)	Tr	--	62.5	60.4	60.2	61.7	62.8
State Standard (NAC-1)	--	1	65	65	65	65	65
State Standard (NAC-2)	--	2	70	70	70	70	70
State Standard (NAC-3)	--	3	80	80	80	80	80

Bold numbers are above state daytime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

Traffic Noise Modeling

Noise modeling was done using the noise prediction program "MINNOISEV31", a version of the FHWA "STAMINA" model adapted by MnDOT for use in Minnesota. This model uses traffic volumes, speed, class of vehicle, and the typical characteristics of the roadway being analyzed (e.g., roadway horizontal and vertical alignment). The noise modeling assumed free flow conditions through at-grade intersections on 101st Avenue (e.g., Jefferson Highway, proposed TH 169/101st Avenue ramp terminal intersections, future Xylon Avenue intersection). 101st Avenue is planned to be converted to a four-lane roadway; as such, the 101st Avenue/Jefferson Highway intersection would need to be modified to accommodate the additional lane on the westbound approach and an eastbound departure lane. Configuration of the Jefferson Highway/101st Avenue intersection will be determined by future development.

Traffic data for noise model input files included existing (2014)[3] and future (year 2030) No Build and Build forecast traffic volumes for TH 169, Trunk Highway (TH) 610, 101st Avenue, Jefferson Highway, and West Broadway Avenue. Year 2030 was identified as the future year for analysis for consistency with the TH 169/101st Avenue Interchange Study and to minimize confusion with year 2040 traffic volume forecasts developed for the Metro Transit Blue Line Final Environmental Impact Statement (FEIS) (see EAW Item 6: Project Description). The modeled speed on TH 169 for existing and future (No Build and Build) conditions was 55 miles per hour (mph). The modeled speed on 101st Avenue for existing conditions was 30 mph west of TH 169, and 45 mph east of TH 169. The modeled speed on 101st Avenue for future Build conditions was 40 mph.

The daytime hour of analysis was the 4:00 p.m. to 5:00 p.m. hour (see Worst Hourly Traffic Noise Analysis discussion above). The 4:00 p.m. to 5:00 p.m. hour was determined to represent approximately 8.4 percent of the daily traffic volumes for the project segment of TH 169. The nighttime hour of analysis was the 6:00 a.m. to 7:00 a.m. hour. The 6:00 a.m. to 7:00 a.m. hour was determined to represent approximately 7.1 percent of daily traffic volumes for the project segment of TH 169.

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[3] Existing traffic volumes from year 2014 annual average daily traffic (AADT) counts (Source: Minnesota Department of Transportation. Office of Transportation Data and Analysis. Traffic Data & Analysis. 2014 Publication Traffic Volumes Metro Street Series – Map 4F accessed 30 December 2015 at http://www.dot.state.mn.us/traffic/data/tma.html.)

Predicted Noise Levels and Noise Impacts

Noise Receptors

Traffic noise impacts were assessed by modeling noise levels at receptor sites likely to be affected by the proposed project. Traffic noise levels were modeled at 33 receptor locations within the project area representing residential, institutional (places of worship), recreational (Rush Creek Regional Trail and City of Maple Grove trail), and agricultural uses. Modeled receptor locations are illustrated in **Figure 4**. Land uses are also identified with each modeled receptor location in **Table 5** (daytime) and **Table 6** (nighttime).

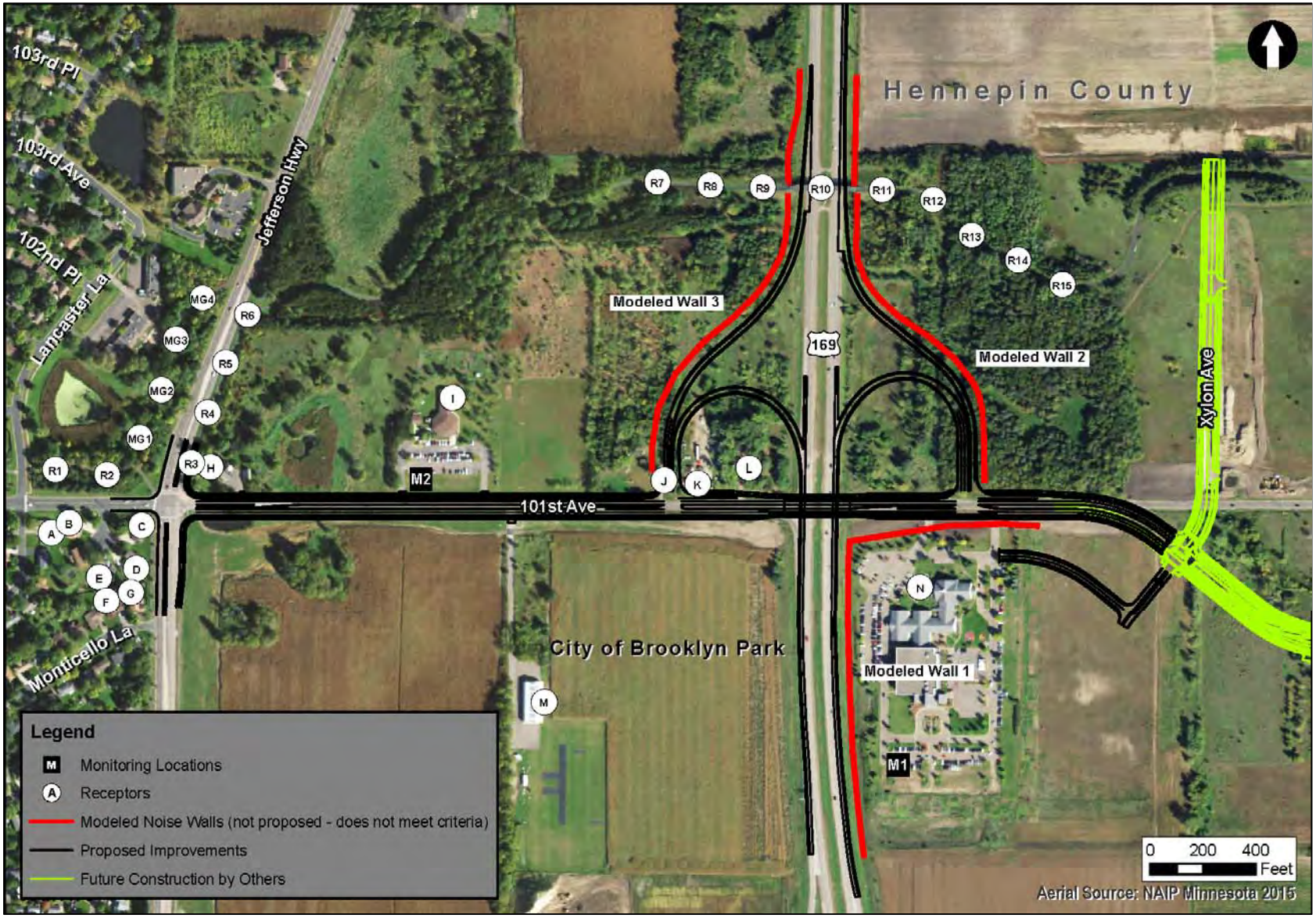
Noise Model Results

Results of the noise modeling analysis for existing (2014) conditions, the future (2030) No Build Alternative, and the future (2030) Build Alternative are tabulated in **Table 5** (daytime) and **Table 6** (nighttime). The results of the traffic noise modeling analysis are summarized below.

Existing Conditions Results

Existing daytime L_{10} noise levels at modeled receptor locations range from 56.1 dBA to 79.9 dBA, whereas L_{50} noise levels range from 52.5 dBA to 73.6 dBA. Existing nighttime L_{10} modeled noise levels range from 54.9 dBA to 78.2 dBA, whereas L_{50} noise levels range from 51.2 dBA to 71.9 dBA. Modeled daytime traffic noise levels exceed state daytime L_{10} standards at one receptor location, and exceed state daytime L_{50} standards at two receptor locations. Modeled nighttime traffic noise levels exceed state nighttime L_{10} standards at four receptor locations, and exceed state nighttime L_{50} standards at five receptor locations.

Figure 4. TH 169/101st Avenue Interchange. Modeled Receptor Locations.



No Build Alternative Results

Future (2030) daytime L_{10} modeled noise levels under the No Build Alternative are predicted to range from 58.2 dBA to 81.6 dBA, whereas L_{50} noise levels are predicted to range from 55.9 dBA to 76.1 dBA. Future nighttime L_{10} modeled noise levels under the No Build Alternative are predicted to range from 57.0 dBA to 80.0 dBA, whereas L_{50} noise levels are predicted to range from 54.6 dBA to 74.4 dBA. Modeled daytime traffic noise levels are predicted to increase by 1.5 dBA to 2.7 dBA (L_{10}) under the No Build Alternative compared to existing conditions. This increase is likely due to projected traffic growth within the project area.

Modeled daytime traffic noise levels are projected to exceed state daytime L_{10} and L_{50} standards at five modeled receptor locations under the future No Build Alternative conditions. Modeled nighttime traffic noise levels are projected to exceed state nighttime L_{10} standards at four modeled receptor locations under the future No Build Alternative, and exceed state nighttime L_{50} standards at six modeled receptor locations under the future No Build Alternative.

Build Alternative Results

Future (2030) daytime L_{10} modeled noise levels under the Build Alternative are predicted to range from 59.4 dBA to 81.5 dBA, and L_{50} modeled noise levels are projected to range from 55.1 dBA to 76.0 dBA. Future nighttime L_{10} modeled noise levels under the Build Alternative are predicted to range from 58.4 dBA to 79.8 dBA, and L_{50} modeled noise levels are predicted to range from 53.8 dBA to 74.2 dBA. Modeled daytime traffic noise levels are predicted to increase by 1.3 dBA to 3.3 dBA (L_{10}) under the Build Alternative compared to existing conditions.

Modeled L_{10} and L_{50} noise levels are predicted to exceed state daytime standards at four modeled receptor locations under the future Build Alternative. Modeled nighttime noise levels are predicted to exceed the state nighttime L_{10} standard at one modeled receptor location under the future Build Alternative, and exceed state nighttime L_{50} standards at three modeled receptor locations under the future Build Alternative.

Table 5. Traffic Noise Model Results (Daytime Levels)

Receptor ID (1) (2)	Land Use	State NAC (3)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
A (1)	Res	--	60.2	52.8	62.8	56.3	2.6	3.5	61.9	55.4	1.7	2.6
B (1)	Res	--	61.0	53.0	63.7	56.7	2.7	3.7	62.7	55.6	1.7	2.6
C (1)	Res	--	66.5	58.3	68.7	61.4	2.2	3.1	68.5	61.2	2.0	2.9
D (1)	Res	--	65.3	57.2	67.3	60.0	2.0	2.8	67.3	60.0	2.0	2.8
E (1)	Res	--	60.6	54.7	62.5	57.5	1.9	2.8	62.4	57.5	1.8	2.8
F (1)	Res	--	61.1	54.9	62.9	57.6	1.8	2.7	62.9	57.6	1.8	2.7
G (1)	Res	--	64.2	56.6	66.1	59.3	1.9	2.7	66.2	59.3	2.0	2.7
H (1)	Res	--	64.1	56.4	66.3	59.6	2.2	3.2	66.8	60.6	2.7	4.2
I (1)	Ch	--	56.1	54.5	58.2	56.8	2.1	2.3	59.4	57.5	3.3	3.0
J (1)	Res	1	63.1	59.3	**65.8**	**61.9**	2.7	2.6	N/A	N/A	N/A	N/A
K (1)	Res	1	64.7	**60.8**	**67.2**	**63.4**	2.5	2.6	N/A	N/A	N/A	N/A
State Standard (NAC-1)	--	1	65	60	65	60	65	60	65	60	65	60
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state daytime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Table 5. Traffic Noise Model Results (Daytime Levels)

Receptor ID (1) (2)	Land Use	State NAC (3)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
L (1)	Res	1	**67.9**	**64.2**	**69.5**	**66.5**	1.6	2.3	N/A	N/A	N/A	N/A
M (1)	Ag	3	58.3	56.9	60.0	58.9	1.7	2.0	60.1	59.0	1.8	2.1
N (1)	Ch	1	65.0	**62.3**	**66.9**	**64.7**	1.9	2.4	**66.9**	**64.6**	1.9	2.3
R1 (1)	Tr	--	59.1	52.5	61.6	55.9	2.5	3.4	60.7	55.1	1.6	2.6
R2 (1)	Tr	--	61.3	54.8	63.5	57.9	2.2	3.1	62.9	57.4	1.6	2.6
R3 (1)	Tr	--	69.1	58.9	71.2	61.7	2.1	2.8	70.8	61.3	1.7	2.4
R4 (1)	Tr	--	69.0	58.7	71.1	61.4	2.1	2.7	70.4	60.6	1.4	1.9
R5 (1)	Tr	--	69.6	59.2	71.6	61.9	2.0	2.7	70.9	60.9	1.3	1.7
R6 (1)	Tr	--	68.1	58.1	70.1	60.8	2.0	2.7	69.4	59.9	1.3	1.8
R7 (1)	Tr	2	61.0	58.6	62.6	60.6	1.6	2.0	62.6	60.7	1.6	2.1
R8 (1)	Tr	2	63.9	61.0	65.4	63.0	1.5	2.0	65.5	63.1	1.6	2.1
State Standard (NAC-1)	--	1	65	60	65	60	65	60	65	60	65	60
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state daytime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Table 5. Traffic Noise Model Results (Daytime Levels)

Receptor ID (1) (2)	Land Use	State NAC (3)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
R9 (1)	Tr	2	68.7	64.7	**70.3**	**66.8**	1.6	2.1	**70.3**	**67.0**	1.6	2.3
R10 (1)	Tr	2	**79.9**	**73.6**	**81.6**	**76.1**	1.7	2.5	**81.5**	**76.0**	1.6	2.4
R11 (1)	Tr	2	68.7	64.9	**70.2**	**67.1**	1.5	2.2	**70.2**	**67.1**	1.5	2.2
R12 (1)	Tr	2	64.0	61.2	65.6	63.3	1.6	2.1	65.6	63.3	1.6	2.1
R13 (1)	Tr	2	61.8	59.4	63.4	61.4	1.6	2.0	63.5	61.5	1.7	2.1
R14 (1)	Tr	2	59.8	57.7	61.5	59.8	1.7	2.1	61.6	60.0	1.8	2.3
R15 (1)	Tr	2	58.4	56.5	60.2	58.7	1.8	2.2	60.3	58.9	1.9	2.4
MG1 (1)	Tr	--	62.2	55.0	64.1	57.8	1.9	2.8	63.8	57.6	1.6	2.6
MG2 (1)	Tr	--	62.8	55.1	64.7	57.8	1.9	2.7	64.3	57.3	1.5	2.2
MG3 (1)	Tr	--	62.1	54.7	63.9	57.3	1.8	2.6	63.4	56.7	1.3	2.0
MG4 (1)	Tr	--	63.4	55.4	65.3	58.0	1.9	2.6	64.7	57.3	1.3	1.9
State Standard (NAC-1)	--	1	65	60	65	60	65	60	65	60	65	60
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state daytime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Table 6. Traffic Noise Model Results (Nighttime Levels)

Receptor ID (1) (2)	Land Use	State NAC (4)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
A (1)	Res	--	59.3	51.5	62.0	55.1	2.7	3.6	60.9	54.1	1.6	2.6
B (1)	Res	--	60.1	51.7	62.9	55.5	2.8	3.8	61.7	54.3	1.6	2.6
C (1)	Res	--	65.7	57.2	67.9	60.3	2.2	3.1	67.8	60.0	2.1	2.8
D (1)	Res	--	64.5	56.0	66.5	58.8	2.0	2.8	66.5	58.9	2.0	2.9
E (1)	Res	--	59.8	53.5	61.7	56.2	1.9	2.7	61.7	56.2	1.9	2.7
F (1)	Res	--	60.3	53.7	62.1	56.4	1.8	2.7	62.1	56.4	1.8	2.7
G (1)	Res	--	63.4	55.4	65.3	58.1	1.9	2.7	65.4	58.2	2.0	2.8
H (1)	Res	--	63.2	55.2	65.4	58.4	2.2	3.2	66.1	59.5	2.9	4.3
I (1)	Ch	--	54.9	53.1	57.0	55.4	2.1	2.3	58.4	56.1	3.5	3.0
J (1)	Res	1	**62.2**	**57.7**	**64.9**	**60.5**	2.7	2.8	N/A	N/A	N/A	N/A
State Standard (NAC-1) (3)	--	1	55	50	55	50	55	50	55	50	55	50
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state nighttime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) The daytime standards for noise area classification 1 shall be applied to NAC-1 during the nighttime if the land use activity does not include overnight lodging (Minnesota Rules 7030.0050, Subp. 3. Exceptions).

(4) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Table 6. Traffic Noise Model Results (Nighttime Levels)

Receptor ID (1) (2)	Land Use	State NAC (4)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
K (1)	Res	1	**63.8**	**59.4**	**66.4**	**62.1**	2.6	2.7	N/A	N/A	N/A	N/A
L (1)	Res	1	**66.9**	**63.4**	**68.6**	**65.7**	1.7	2.3	N/A	N/A	N/A	N/A
M (1)	Ag	3	56.8	55.4	58.5	57.3	1.7	1.9	58.6	57.4	1.8	2.0
N (1)	Ch	1	63.0	60.1	65.0	**62.7**	2.0	2.6	65.0	**62.7**	2.0	2.6
R1 (1)	Tr	--	58.3	51.2	60.8	54.6	2.5	3.4	59.8	53.8	1.5	2.6
R2 (1)	Tr	--	60.5	53.5	62.8	56.7	2.3	3.2	62.1	56.2	1.6	2.7
R3 (1)	Tr	--	68.2	57.8	70.4	60.5	2.2	2.7	70.0	60.2	1.8	2.4
R4 (1)	Tr	--	68.1	57.6	70.2	60.2	2.1	2.6	69.6	59.5	1.5	1.9
R5 (1)	Tr	--	68.7	58.1	70.7	60.7	2.0	2.6	70.0	59.8	1.3	1.7
R6 (1)	Tr	--	67.3	57.0	69.3	59.6	2.0	2.6	68.6	58.8	1.3	1.8
State Standard (NAC-1) (3)	--	1	55	50	55	50	55	50	55	50	55	50
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state nighttime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) The daytime standards for noise area classification 1 shall be applied to NAC-1 during the nighttime if the land use activity does not include overnight lodging (Minnesota Rules 7030.0050, Subp. 3. Exceptions).

(4) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Table 6. Traffic Noise Model Results (Nighttime Levels)

Receptor ID (1) (2)	Land Use	State NAC (4)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
R7 (1)	Tr	2	59.7	57.4	61.3	59.4	1.6	2.0	61.3	59.4	1.6	2.0
R8 (1)	Tr	2	62.7	59.9	64.3	61.9	1.6	2.0	64.2	62.0	1.5	2.1
R9 (1)	Tr	2	67.9	64.0	69.4	**66.2**	1.5	2.2	69.4	**66.2**	1.5	2.2
R10 (1)	Tr	2	**78.2**	**71.9**	**80.0**	**74.4**	1.8	2.5	**79.8**	**74.2**	1.6	2.3
R11 (1)	Tr	2	66.4	62.5	68.0	64.7	1.6	2.2	68.0	64.8	1.6	2.3
R12 (1)	Tr	2	62.0	59.1	63.6	61.2	1.6	2.1	63.6	61.3	1.6	2.2
R13 (1)	Tr	2	59.9	57.4	61.5	59.5	1.6	2.1	61.6	59.7	1.7	2.3
R14 (1)	Tr	2	58.0	55.8	59.7	58.0	1.7	2.2	59.9	58.3	1.9	2.5
R15 (1)	Tr	2	56.6	54.7	58.5	57.0	1.9	2.3	58.7	57.3	2.1	2.6
MG1 (1)	Tr	--	61.4	53.8	63.3	56.6	1.9	2.8	63.0	56.4	1.6	2.6
State Standard (NAC-1) (3)	--	1	55	50	55	50	55	50	55	50	55	50
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state nighttime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) The daytime standards for noise area classification 1 shall be applied to NAC-1 during the nighttime if the land use activity does not include overnight lodging (Minnesota Rules 7030.0050, Subp. 3. Exceptions).

(4) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Table 6. Traffic Noise Model Results (Nighttime Levels)

Receptor ID (1) (2)	Land Use	State NAC (4)	Existing (2014), L_{10}, dBA	Existing (2014), L_{50}, dBA	No Build (2030), L_{10}, dBA	No Build (2030), L_{50}, dBA	No Build – Existing, L_{10}, dBA	No Build – Existing, L_{50}, dBA	Build (2030), L_{10}, dBA	Build (2030), L_{50}, dBA	Build – Existing, L_{10}, dBA	Build – Existing, L_{50}, dBA
MG2 (1)	Tr	--	62.0	53.9	63.9	56.6	1.9	2.7	63.5	56.1	1.5	2.2
MG3 (1)	Tr	--	61.2	53.4	63.1	56.0	1.9	2.6	62.6	55.5	1.4	2.1
MG4 (1)	Tr	--	62.6	54.2	64.4	56.8	1.8	2.6	63.9	56.1	1.3	1.9
State Standard (NAC-1) (3)	--	1	55	50	55	50	55	50	55	50	55	50
State Standard (NAC-2)	--	2	70	65	70	65	70	65	70	65	70	65
State Standard (NAC-3)	--	3	80	75	80	75	80	75	80	75	80	75

Bold numbers are above state nighttime noise standards.

Res = Residential; Ch = Church; Tr = Trail; Ag = Agricultural

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

(2) R = Rush Creek Regional Trail, MG = City of Maple Grove Trail

(3) The daytime standards for noise area classification 1 shall be applied to NAC-1 during the nighttime if the land use activity does not include overnight lodging (Minnesota Rules 7030.0050, Subp. 3. Exceptions).

(4) 101st Avenue and Jefferson Highway are under the jurisdiction of local units of government and are exempt from state noise rules. Receptors A through I represent residential and institutional (church) land uses along 101st Avenue and Jefferson Highway. Receptors MG1 through MG4 and R1 through R6 represent pedestrian/bicycle trails along 101st Avenue and Jefferson Highway. State NAC are not listed for these receptor locations, and modeled traffic noise levels are not highlighted in bold.

N/A = not applicable. Modeled receptor locations identified as relocations with the proposed TH 169/101st Avenue interchange.

Consideration of Noise Abatement

The *MnDOT Highway Noise Policy* (June 2015) describes noise abatement measures that are to be considered when a traffic noise impact has been identified with a highway improvement project (i.e., modeled traffic noise levels exceed state daytime and/or nighttime standards). These noise abatement measures are described below.

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

Noise Barrier Evaluation

The policies and procedures for evaluating noise barrier feasibility and reasonableness are set forth in Section 5.2 (Feasibility) and Section 5.3 (Reasonableness) of the *MnDOT Highway Noise Policy* (June 2015). The factors for determining noise barrier feasibility and reasonableness as described in the *MnDOT Highway Noise Policy* are summarized below.

Noise Barrier Feasibility

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

- **Acoustic feasibility:** For a noise barrier to be considered acoustically effective, it must achieve a noise reduction of at least 5 dBA at the impacted receptors for those receptors to be considered benefited by a noise barrier. Not every impacted receptor must

receive this minimum 5 dBA reduction; however, at least one impacted receptor must meet the minimum 5 dBA reduction for a noise barrier to achieve acoustic feasibility.

- **Engineering feasibility:** Engineering feasibility addresses whether or not it is possible to design and construct a proposed noise abatement measure. A sample of potential constructability considerations includes safety, topography, drainage, utilities, and maintenance considerations. Engineering considerations are also taken into consideration in determining noise barrier height. MnDOT has established a maximum noise barrier height of 20 feet above the finished ground line at the noise barrier. In addition, MnDOT has established a maximum noise barrier height of 10 feet above the bridge deck when it is necessary for a noise barrier to be attached to a bridge structure.

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

Noise Barrier Reasonableness

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

Noise Reduction Design Goal

A minimum 7 dBA reduction must be achieved for at least one benefited receptor behind the noise barrier to meet noise reduction design goals.

Cost Effectiveness

To be considered cost-effective, the cost per individual benefited receptor (e.g., residence, commercial entity, industrial entity) should be equal to, or less than $43,500. In order to assess cost effectiveness, at least one benefited receptor behind the noise barrier must meet the noise reduction design goal

described above. The following formula is used to determine the cost-effectiveness of the barrier:

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

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

Viewpoint of Benefited Residents and Property Owners

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

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

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

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

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

Only those benefited property owners and residents, including individual units of multi-family residential buildings that are considered to be benefited receptors, regardless of floor location (e.g., first floor, second floor, etc.), have a vote according to the point system described above. Non-benefiting receptors do not receive points. The MnDOT Highway Noise Policy allows for up to two solicitation periods to request votes and determine the outcome regarding proposed noise abatement measures.

- **Initial Solicitation**: If 50 percent or more of all possible voting points from eligible voters are received after the initial request for votes, the majority of points (based upon the votes received) determine the outcome of the noise barrier. If less than 50 percent of the possible voting points for a barrier are received after this initial request, then a second ballot will be distributed to the benefited property owners who did not respond.
- **Second Request**: If 25 percent or more of all possible points for a barrier are received after the second request for votes, then the outcome is determined by the majority of votes received. If less than 25 percent of total possible points for a noise barrier are received after the second request for votes, then the barrier will not be constructed. If there is a tie, where there are equal numbers of points for and against a noise barrier, the noise barrier will be constructed.

Noise Wall Analysis Results

Noise barriers (i.e., noise walls) were evaluated at all modeled receptor locations adjacent to the TH 169/101st Avenue interchange where traffic noise levels are predicted to exceed state daytime and/or nighttime noise

standards under future (2030) Build Alternative conditions. The locations of modeled noise walls are illustrated in **Figure 4**.

Noise wall cost-effectiveness results are tabulated at the end of this report in **Appendix A**. Multiple noise wall configurations were evaluated (wall lengths and heights) where applicable. The results presented below represent the most acoustically effective and/or cost effective noise wall configurations. Results for a 20-foot high noise wall are described with each modeled wall first, followed by a discussion of additional wall heights less than 20 feet where applicable. The discussion of noise wall modeling results presented below includes only daytime results unless reasonableness was achieved during the nighttime exclusively. For reference, nighttime noise wall cost effectiveness results are also tabulated and presented at the end of this report in **Appendix A**. Results of daytime noise wall cost effectiveness for the project are consistent with noise wall cost effectiveness results for nighttime conditions. The following discussion of noise wall analysis results refers to L_{10} levels only.

101st Avenue and Jefferson Highway (Receptors A through I, R1 through R6, and MG1 through MG4)

Residential land uses, trails, and a church are located adjacent to the Jefferson Highway/101st Avenue intersection and along the north side of 101st Avenue west of the proposed TH 169/101st Avenue interchange. Jefferson Highway and 101st Avenue are local roadways under the jurisdiction of local units of government (e.g., City of Brooklyn Park, City of Maple Grove). These roadways are exempt from state noise rules; therefore, noise walls were not evaluated at these locations.[4]

Southwest Quadrant of TH 169/101st Avenue Interchange (Receptor M)

The southwest quadrant of the proposed TH 169/101st Avenue interchange is undeveloped and is currently in agricultural use. Modeled noise levels at Receptor F are projected to be below state daytime and nighttime standards for agricultural activities and related uses (NAC-3). Therefore, noise walls were not evaluated in the southwest quadrant of the TH 169/101st Avenue interchange.

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[4] Minnesota Pollution Control Agency. November 2015. *A Guide to Noise Control in Minnesota*. Section 1.3, Common Noise Concerns, Roads and Highways available at http://www.pca.state.mn.us/index.php/air/air-monitoring-and-reporting/air-emissions-modeling-and-monitoring/noise-program.html.

Modeled Noise Wall #1 (Southeast Quadrant of TH 169/101st Avenue Interchange) (Receptor N)

A church is located in the southeast quadrant of the TH 169/101st Avenue interchange. Modeled noise levels at Receptor N are projected to exceed state daytime (L_{10} and L_{50}) standards and nighttime standards (L_{50} only) for NAC-1 under future Build Alternative conditions.

An approximately 1,920-foot long, 20-foot high noise wall was modeled in the southeast quadrant of the proposed TH 169/101st Avenue interchange (see **Figure 4**). The approximately 1,920-foot long, 20-foot high noise wall provides a reduction in daytime modeled traffic noise levels of 5.6 dBA (see **Table A1, Appendix A**). The approximately 1,920-foot long, 20-foot high modeled noise wall does not meet MnDOT's minimum 7 dBA noise reduction design goal to be considered reasonable. Therefore, the analyzed noise wall is not proposed.

Modeled Noise Wall #2 (Northeast Quadrant of TH 169/101st Avenue Interchange) (Receptors R10, R11, R12, R13, R14 and R15)

Rush Creek Regional Trail crosses TH 169 north of the proposed TH 169/101st Avenue interchange. Receptor R10 represents a modeled receptor location on the existing trail bridge over TH 169 between the northbound and southbound travel lanes. Receptors R11, R12, R13, R14, and R15 represent the segment of the Rush Creek Regional Trail in the northeast quadrant of the TH 169/101st Avenue interchange. Modeled noise levels at Receptors R10 and R11 are projected to exceed state daytime standards for NAC-2 under future Build Alternative conditions, whereas modeled levels at R12 through R15 are projected to be below state daytime standards. Modeled noise levels at R10 are projected to exceed state nighttime standards for NAC-2 under future Build Alternative conditions, whereas modeled levels at R11 through R15 are projected be below state nighttime standards.

An approximately 1,695-foot long, 20-foot high noise wall was modeled in the northeast quadrant of the TH 169/101st Avenue interchange along proposed right of way limits (see **Figure 4**). A gap was included in the modeled noise wall to accommodate the regional trail crossing over TH 169. The approximately 1,695-foot long, 20-foot high noise wall provides a reduction in daytime modeled traffic noise levels of 0.0 dBA to 4.5 dBA (see **Table A3, Appendix A**). The approximately 1,695-foot long, 20-foot high modeled wall does not meet MnDOT's minimum 5 dBA noise reduction to be considered acoustically feasible. Therefore, the analyzed noise wall is not proposed.

Modeled Noise Wall #3 (Northwest Quadrant of TH 169/101st Avenue Interchange) (Receptors J, K, L, R7, R8, R9 and R10)

Three residential properties are located in the northwest quadrant of the proposed TH 169/101st Avenue interchange. These three residential properties are represented by Receptors J, K, and L (see **Figure 4**). These three properties would be acquired for right of way to accommodate the proposed TH 169/101st Avenue interchange.

Receptors R7, R8 and R9 represent the segment of the Rush Creek Regional Trail in the northwest quadrant of the TH 169/101st Avenue interchange. As noted above, Receptor R10 represents a modeled receptor location on the trail bridge over TH 169 between the northbound and southbound travel lanes. Modeled noise levels at Receptors R9 and R10 are projected to exceed state daytime standards for NAC-2 under future Build Alternative conditions, whereas modeled levels at Receptors R7 and R8 are projected to be below state daytime standards. Modeled noise levels at Receptor R10 are projected to exceed state nighttime standards for NAC-2 under future Build Alternative conditions, whereas modeled levels at Receptors R7, R8, and R9 are projected to be below state nighttime standards.

An approximately 1,705-foot long, 20-foot high noise wall was modeled in the northwest quadrant of the TH 169/101st Avenue interchange along proposed right of way limits (see **Figure 4**). A gap was included in the modeled noise wall to accommodate the regional trail crossing over TH 169. The approximately 1,705-foot long, 20-foot high noise wall provides a reduction in daytime modeled traffic noise levels of 0.0 dBA to 4.4 dBA (see **Table A5, Appendix A**). The approximately 1,705-foot long, 20-foot high modeled noise wall does not meet MnDOT's minimum 5 dBA noise reduction to be considered acoustically feasible. Therefore, the analyzed noise wall is not proposed.

Other Noise Mitigation Techniques

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

- **Traffic Management Measures**: These measures include such items as prohibition of certain vehicle types and time-use restrictions for certain vehicle types. These traffic management measures are not reasonable for the proposed TH 169/101st Avenue interchange. These measures would be inconsistent with the function of TH 169 as a principal arterial roadway and with the function of 101st Avenue as a minor arterial roadway.

- **Modified Speed Limits**: In general, a decrease in speed of approximately 20 mph is necessary for a noticeable decrease in noise levels. The existing posted speed limit on TH 169 is 55 miles per hour (mph). The existing posted speed limit on 101st Avenue west of TH 169 is 30 mph. The existing posted speed limit on 101st Avenue east of TH 169 is 45 mph. The future speed limit on 101st Avenue is anticipated to be 40 mph. Lowering speed limits on TH 169 and 101st Avenue would be inconsistent with their function as principal arterial and minor arterial roadways, respectively. In addition, motorists would likely not obey a substantially lower speed limit.
- **Vertical and Horizontal Alignment**: Substantial changes in the horizontal and vertical alignments of the project segment of TH 169 and 101st Avenue are not feasible. Changes in the vertical alignment of TH 169 are not part of the project scope. The proposed vertical alignment of 101st Avenue over TH 169 was identified to provide the required vertical clearance between the proposed 101st Avenue bridge and TH 169. Changes to the TH 169 horizontal alignment is also not part of the project scope. The proposed 101st Avenue follows the existing roadway alignment, minimizing right of way impacts to adjacent properties.
- **Landscaping/Natural Noise Screening**: Vegetation is only effective for reducing noise levels if it is at least 100 to 200 feet deep, a minimum of 15 feet above the line of sight, and dense enough that it cannot be seen through (e.g., evergreen vegetation, which maintains its foliage year round). It is not feasible to plant enough vegetation within existing and proposed right of way to achieve substantial noise level reductions. As such, vegetation is not a reasonable noise mitigation measure.
- **Exclusive Land Use Designations**: Buffer zones are undeveloped, open spaces adjacent to a roadway corridor. In general, lands adjacent to TH 169 and 101st Avenue are currently in undeveloped, agricultural uses. A church is located in the southeast quadrant of the proposed TH 169/101st Avenue interchange. Another church is located along the north side of 101st Avenue, west of TH 169. The Rush Creek Regional Trail is located north of the proposed interchange. Three Rivers Park District property is also located in the northeast quadrant of the proposed TH 169/101st Avenue interchange.

  Future land uses adjacent to the proposed TH 169/101st Avenue interchange are guided towards business park, mixed use, and parks and open space uses (City of Brooklyn Park. *2030 Comprehensive Plan*.

February 2008. Figure 3.3.2. 2030 Land Use Plan). Because of the large amount of land necessary to accommodate buffer zones, acquisition of land to create buffer zones is not feasible. See below for a discussion of land use planning and traffic noise ("Land Use Planning Analysis" section).

- **Noise Insulation of Non-Residential Buildings**: Under the MnDOT Highway Noise Policy, only non-residential buildings such as schools, hospitals, and places of worship should be considered for acoustical insulation if there are no exterior areas of frequent human use associated with the property. However, it is also important to note that acoustical insulation of non-residential buildings would not affect noise levels that exceed Minnesota state noise standards because Minnesota state noise standards are intended for exterior uses only.

  There are no schools or hospitals within the study area. Two churches are located within the study area: one along the north side of 101st Avenue and west of TH 169 (Modeled Receptor I) and one located in the southeast quadrant of the proposed TH 169/101st Avenue interchange (Modeled Receptor N). Analysis results for these two churches are summarized below.

  - *Modeled Receptor I*. Modeled Receptor I is located along the north side of 101st Avenue between Jefferson Highway and TH 169. Modeled Receptor I was located at the northeast corner of the church building at a playground area (see **Figure 4**). 101st Avenue is a local roadway under the jurisdiction of the City of Brooklyn Park and is exempt from state noise rules.
  - *Modeled Receptor N*. Exterior areas of frequent human uses are located in the northwest corner of the church property (basketball courts) and in the center of the property east of the church building (playground area). Modeled Receptor N was placed in the northwest corner of the property at the basketball courts because this location has a direct line of sight to TH 169 and the proposed TH 169/101st Avenue interchange (see **Figure 4**). A noise wall was evaluated in the southeast quadrant of the proposed TH 169/101st Avenue interchange. The modeled barrier does not meet MnDOT's minimum 7 dBA noise reduction design goal to be considered reasonable. Therefore, acoustical insulation was not considered for this property.

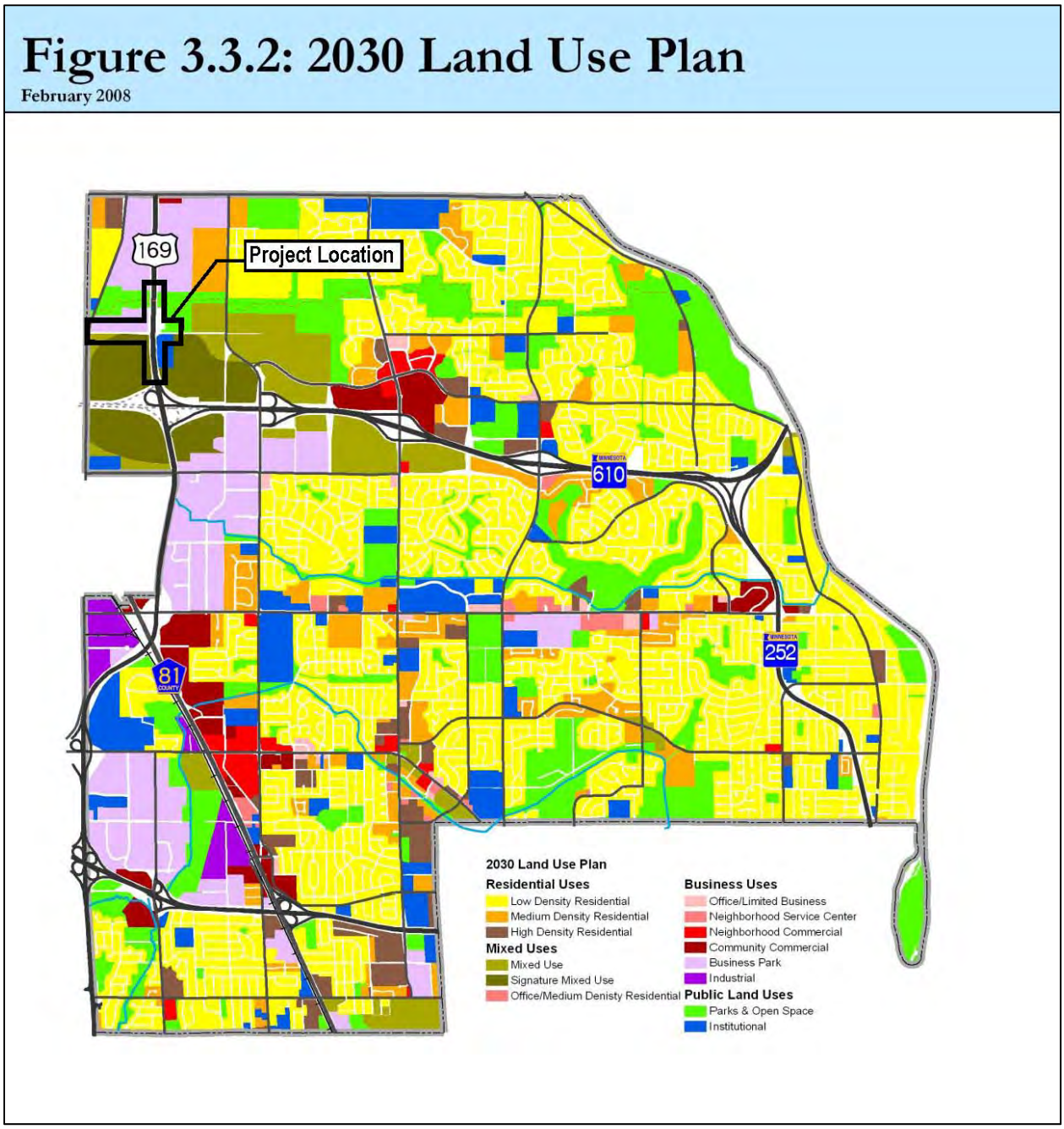
Land Use Planning Analysis

The prevention of future traffic noise impacts is an important component of noise control. Local governments, through their authority to regulate land development, can help prevent future traffic noise impacts by prohibiting noise-sensitive land uses from being located adjacent to a highway or by ensuring that developments are planned, designed, and implemented in such a way as to minimize noise impacts. The following analysis provides information regarding modeled noise levels adjacent to TH 169 and the TH 169/101st Avenue interchange for use in community and land use planning. This land use planning analysis was not prepared for the segment of 101st Avenue to the west of US 169 because 101st Avenue is a local roadway and is exempt from state noise standards.

Undeveloped land is located adjacent to TH 169 and the TH 169/101st Avenue interchange. This undeveloped land is guided towards mixed use and business/commercial uses (City of Brooklyn Park. *2030 Comprehensive Plan*. February 2008. Figure 3.3.2. 2030 Land Use Plan). Future planned land uses adjacent to TH 169 and the proposed TH 169/101st Avenue interchange are illustrated in **Figure 5**.

Traffic noise levels were modeled at representative receptor locations along TH 169 and 101st Avenue at incremental distances from existing and proposed right of way limits under future (2030) Build Alternative conditions (approximately 50 feet, 100 feet, 150 feet, 200 feet, 250 feet, 300 feet, 350 feet, 400 feet, 450 feet, and 500 feet from existing TH 169 or proposed TH 169/101st Avenue interchange right of way limits) (see modeled receptor locations in **Figure 6**). This analysis was based on existing topography adjacent to the proposed TH 169/101st Avenue interchange, and assumed no intervening barriers or structures between the modeled receptor locations or project area roadways. Results of the land use noise modeling analysis for future (year 2030) daytime and nighttime conditions are tabulated in **Table 7**.

Figure 5. City of Brooklyn Park. 2030 Land Use Plan.



Source: City of Brooklyn Park. 2030 Comprehensive Plan. Chapter 3: Land Use. Figure 3.2.2: 2030 Land Use Plan.

Figure 6. Land Use Planning Analysis. Modeled Receptor Locations.

Table 7. TH 169/101st Avenue Interchange Land Use Planning Analysis Results

Receptor ID	Future Build (2030) Daytime L_{10}	Future Build (2030) Daytime L_{50}	Future Build (2030) Nighttime L_{10}	Future Build (2030) Nighttime L_{50}
LUA50 (1)	66.2	61.5	64.4	60.3
LUA100 (1)	64.7	61.4	63.0	60.1
LUA150 (1)	63.5	61.1	62.0	59.7
LUA200 (1)	62.7	60.6	61.2	59.2
LUA250 (1)	62.1	60.2	60.6	58.8
LUA300 (1)	61.5	59.8	60.1	58.4
LUA350 (1)	61.1	59.4	59.6	58.0
LUA400 (1)	60.6	59.0	59.2	57.6
LUA450 (1)	60.1	58.6	58.7	57.3
LUA500 (1)	59.8	58.3	58.4	57.0
LUB50 (2)	**71.8**	**68.3**	**71.0**	**67.6**
LUB100 (2)	**69.9**	**66.9**	**68.9**	**66.0**
LUB150 (2)	**68.5**	**65.8**	**67.4**	**64.8**
LUB200 (2)	**67.3**	**64.9**	**66.2**	**63.7**
LUB250 (2)	**66.3**	**64.1**	**65.1**	**62.9**
LUB300 (2)	**65.5**	**63.4**	**64.2**	**62.1**
LUB350 (2)	64.7	**62.8**	**63.4**	**61.5**
LUB400 (2)	64.1	**62.2**	**62.7**	**60.9**
LUB450 (2)	63.4	**61.7**	**62.1**	**60.3**
LUB500 (2)	62.9	**61.3**	**61.5**	**59.8**
LUC50 (3)	**72.0**	**68.3**	69.5	**65.5**
LUC100 (3)	**70.1**	**66.8**	67.7	64.2
LUC150 (3)	68.5	**65.5**	66.2	63.2
LUC200 (3)	67.2	64.5	65.0	62.2
LUC250 (3)	66.1	63.6	64.0	61.4
LUC300 (3)	65.2	62.8	63.2	60.7
LUC350 (3)	64.3	62.1	62.3	60.0
LUC400 (3)	63.6	61.4	61.6	59.4
State Standard (NAC-1)	65	60	55	50
State Standard (NAC-2)	70	65	70	65
State Standard (NAC-3)	80	75	80	75

Table 7. TH 169/101st Avenue Interchange Land Use Planning Analysis Results

Receptor ID	Future Build (2030) Daytime L_{10}	Future Build (2030) Daytime L_{50}	Future Build (2030) Nighttime L_{10}	Future Build (2030) Nighttime L_{50}
LUC450 (3)	62.9	60.8	61.0	58.8
LUC500 (3)	62.3	60.3	60.4	58.3
LUD50 (4)	**71.4**	**67.5**	**70.7**	**67.0**
LUD100 (4)	69.5	**66.1**	68.7	**65.4**
LUD150 (4)	68.1	65.0	67.1	64.1
LUD200 (4)	66.8	64.0	65.8	63.0
LUD250 (4)	65.8	63.1	64.6	62.1
LUD300 (4)	64.8	62.3	63.7	61.2
LUD350 (4)	64.0	61.6	62.8	60.5
LUD400 (4)	63.2	61.0	62.0	59.8
LUD450 (4)	62.6	60.4	61.3	59.2
LUD500 (4)	61.9	59.8	60.6	58.6
State Standard (NAC-1)	65	60	55	50
State Standard (NAC-2)	70	65	70	65
State Standard (NAC-3)	80	75	80	75

Bold numbers exceed state daytime and nighttime standards for NAC-2 at representative receptor locations along TH 169 and in the northwest quadrant of the TH 169/101st Avenue interchange (LUA, LUC, and LUD receptors.

Bold numbers exceed state daytime and nighttime standards for NAC-1 at representative receptor locations along the west side of TH 169, south of 101st Avenue (planned mixed use land uses) (LUB receptors).

(1) LUA = Representative receptor locations in the northwest quadrant of the proposed TH 169/101st Avenue interchange.

(2) LUB = Representative receptor locations along west side of TH 169 between 101st Avenue and TH 610.

(3) LUC = Representative receptor locations along east side of TH 169, north of 101st Avenue.

(4) LUD = Representative receptor locations along west side of TH 169, north of 101st Avenue.

Results from the land use planning analysis at modeled receptor locations adjacent to 101st Avenue and TH 169 are summarized below.

- *Northwest Quadrant of TH 169/101st Avenue interchange ("LUA" receptors, see Figure 6 and Table 7).* Modeled daytime and nighttime noise levels were predicted to be below the 70 dBA (L_{10}) and the 65 dBA (L_{50}) state standard for commercial/retail land uses (NAC-2) at 50 feet from the proposed TH 169/101st Avenue interchange right of way limits.
- *West side of TH 169, south of 101st Avenue ("LUB" receptors, see Figure 6 and Table 7).* Representative receptor locations along the west side of TH 169, south of 101st Avenue were compared to state noise standards for NAC-1. Land uses in this quadrant of the TH 169/101st Avenue interchange are guided towards mixed uses, which may include residential properties.

  Modeled daytime noise levels were predicted to be below the 65 dBA (L_{10}) state standard for residential land uses (NAC-1) at 350 feet from the TH 169 right of way limits, and below the 60 dBA (L_{50}) state standard at some point beyond 500 feet from the TH 169 right of way limits. Modeled nighttime noise levels were predicted to be above the 55 dBA (L_{10}) and 50 dBA (L_{50}) state standard for residential uses (NAC-2) at more than 500 feet from the TH 169 right of way limits.
- *East side of TH 169, north of 101st Avenue ("LUC" receptors, see Figure 6 and Table 7).* Modeled daytime noise levels were predicted to be below the 70 dBA (L_{10}) state standards for commercial/retail land uses (NAC-2) at 150 feet from the TH 169 right of way limits, and below the 65 dBA (L_{50}) state standard at 200 feet from the TH 169 right of way limits. Modeled nighttime noise levels were predicted to be below the 70 dBA (L_{10}) state standard for commercial/retail land uses (NAC-2) at 50 feet from the TH 169 right of way limits, and below the 65 dBA (L_{50}) state standard at 100 feet from the TH 169 right of way limits.
- *West side of TH 169, north of 101st Avenue ("LUD" receptors, see Figure 6 and Table 7).* Modeled daytime and nighttime noise levels were predicted to be below the 70 dBA (L_{10}) state standards for commercial/retail land uses (NAC-2) at 100 feet from the TH 169 right of way limits, and below the 65 dBA (L_{50}) state standard at 150 feet from the TH 169 right of way limits.

It is important to note that these results are representative traffic noise levels, given the assumptions listed above (e.g., existing topography, no intervening

structures or barriers, etc.). The results of this analysis can be used as a guide for local governments responsible for land use planning and land use controls to help prevent future traffic noise impacts on currently undeveloped lands. These setback distances, along with other techniques (e.g., earthen berms, noise barriers, site plan elements/design), should be used to ensure that the desired compatibility between TH 169 and the TH 169/101st Avenue interchange and potential future development is achieved.

Conclusions and Recommendations

Modeled traffic noise levels with construction of the TH 169/101st Avenue interchange are anticipated to increase compared to existing conditions. Daytime L_{10} modeled noise levels are predicted to range from 59.4 dBA to 81.5 dBA with the future (2030) Build Alternative, whereas daytime L_{50} modeled noise levels are predicted to range from 57.5 dBA to 76.0 dBA. Daytime traffic noise levels are projected to increase by approximately 1.3 dBA to 3.3 dBA (L_{10}) compared to existing conditions. Nighttime L_{10} modeled noise levels are predicted to range from 58.4 dBA to 79.8 dBA with the future (2030) Build Alternative, whereas nighttime L_{50} modeled noise levels are predicted to range from 56.1 dBA to 74.2 dBA. Nighttime traffic noise levels are projected to increase by approximately 1.3 dBA to 3.5 dBA (L_{10}) compared to existing conditions.

Modeled noise levels are predicted to exceed state daytime L_{10} and L_{50} standards at four modeled receptor locations with the future Build Alternative. Modeled noise levels are predicted to exceed state nighttime L_{10} standards at one modeled receptor location, and exceed state nighttime L_{50} standards at three modeled receptor locations with the future Build Alternative.

Noise abatement measures were evaluated adjacent to the TH 169/101st Avenue interchange at modeled receptor locations that are projected to exceed state daytime and/or nighttime standards under future Build Alternative conditions. Modeled noise barriers were determined to be not acoustically feasible (i.e., did not meet MnDOT's minimum 5 dBA reduction) or reasonable (i.e., did not meet MnDOT's noise reduction design goal).

The proposed project is not funded for construction. If future federal-aid funding is received for construction of the TH 169/101st Avenue interchange, a traffic noise analysis will be prepared following the requirements and guidance of the MnDOT Highway Noise Policy and Federal Highway Administration (FHWA) in place at that time.

Appendix A: Cost Effectiveness Tables

Table A1. Noise Mitigation Cost Effectiveness Results (Daytime Levels) (Modeled Wall 1: Southeast Quadrant of TH 169/101st Avenue Interchange) (20-foot Tall Noise Wall)

Receptor ID	Daytime L_{10} Noise Level, Build year 2030 (no wall)	Daytime L_{10} Noise Level, Build year 2030 (with noise wall)	Reduction (in dBA) with noise wall	Number of residences, commercial or industrial establishments	Number of benefited residences, commercial or industrial establishments(1)	Design goal reduction >7 dBA (2)	Length of wall (feet)	Wall Area (sq ft) (3)	Total cost of wall $20/sq ft	Cost/ Benefited Receptor
N	**66.8**	**61.2**	5.6	1	1	0	1,920	37,700	$754,000	N/A

Bold numbers exceed state daytime standards.

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

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

(3) Barrier surface area includes tapers at barrier ends.

Table A2. Noise Mitigation Cost Effectiveness Results (Nighttime Levels) (Modeled Wall 1: Southeast Quadrant of TH 169/101st Avenue Interchange) (20-foot Tall Noise Wall)

Receptor ID	Nighttime L_{10} Noise Level, Build year 2030 (no wall)	Nighttime L_{10} Noise Level, Build year 2030 (with noise wall)	Reduction (in dBA) with noise wall	Number of residences, commercial or industrial establishments	Number of benefited residences, commercial or industrial establishments(1)	Design goal reduction >7 dBA (2)	Length of wall (feet)	Wall Area (sq ft) (3)	Total cost of wall $20/sq ft	Cost/ Benefited Receptor
N	65.0	60.1	4.9	1	0	0	1,920	37,700	$754,000	N/A

Bold numbers exceed state nighttime standards.

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

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

(3) Barrier surface area includes tapers at barrier ends.

Table A3. Noise Mitigation Cost Effectiveness Results (Daytime Levels) (Modeled Wall 2: Northeast Quadrant of TH 169/101st Avenue Interchange) (20-foot Tall Noise Wall)

Receptor ID *	Daytime L_{10} Noise Level, Build year 2030 (no wall)	Daytime L_{10} Noise Level, Build year 2030 (with noise wall)	Reduction (in dBA) with noise wall	Number of residences, commercial or industrial establishments	Number of benefited residences, commercial or industrial establishments(1)	Design goal reduction >7 dBA (2)	Length of wall (feet)	Wall Area (sq ft) (3)	Total cost of wall $20/sq ft	Cost/ Benefited Receptor
R10	**81.5**	**81.5**	0.0	1	0	0	1,695	33,200	$664,000	N/A
R11	**70.1**	65.6	4.5	1	0	0				
R12	65.5	61.3	4.2	1	0	0				
R13	63.4	60.4	3.0	1	0	0				
R14	61.6	59.3	2.3	1	0	0				
R15	60.3	58.8	1.5	1	0	0				

Bold numbers exceed state daytime standards.

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

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

(3) Barrier surface area includes tapers at barrier ends.

* R = Rush Creek Regional Trail

Table A4. Noise Mitigation Cost Effectiveness Results (Nighttime Levels) (Modeled Wall 2: Northeast Quadrant of TH 169/101st Avenue Interchange) (20-foot Tall Noise Wall)

Receptor ID *	Nighttime L_{10} Noise Level, Build year 2030 (no wall)	Nighttime L_{10} Noise Level, Build year 2030 (with noise wall)	Reduction (in dBA) with noise wall	Number of residences, commercial or industrial establishments	Number of benefited residences, commercial or industrial establishments(1)	Design goal reduction >7 dBA (2)	Length of wall (feet)	Wall Area (sq ft) (3)	Total cost of wall $20/sq ft	Cost/ Benefited Receptor
R10	**79.8**	**79.8**	0.0	1	0	0	1,695	33,200	$664,000	N/A
R11	67.9	63.5	4.4	1	0	0				
R12	63.6	59.5	4.1	1	0	0				
R13	61.6	58.6	3.0	1	0	0				
R14	59.9	57.7	2.2	1	0	0				
R15	58.7	57.3	1.4	1	0	0				

Bold numbers exceed state nighttime standards.

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

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

(3) Barrier surface area includes tapers at barrier ends.

* R = Rush Creek Regional Trail

Table A5. Noise Mitigation Cost Effectiveness Results (Daytime Levels) (Modeled Wall 3: Northwest Quadrant of TH 169/101st Avenue Interchange) (20-foot Tall Noise Wall)

Receptor ID *	Daytime L_{10} Noise Level, Build year 2030 (no wall)	Daytime L_{10} Noise Level, Build year 2030 (with noise wall)	Reduction (in dBA) with noise wall	Number of residences, commercial or industrial establishments	Number of benefited residences, commercial or industrial establishments(1)	Design goal reduction >7 dBA (2)	Length of wall (feet)	Wall Area (sq ft) (3)	Total cost of wall $20/sq ft	Cost/ Benefited Receptor
R7	62.5	59.5	3.0	1	0	0	1,705	33,400	$682,000	N/A
R8	65.3	61.2	4.1	1	0	0				
R9	**70.1**	65.7	4.4	1	0	0				
R10	**81.5**	**81.5**	0.0	1	0	0				

Bold numbers exceed state daytime standards.

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

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

(3) Barrier surface area includes tapers at barrier ends.

* R = Rush Creek Regional Trail

Table A6. Noise Mitigation Cost Effectiveness Results (Nighttime Levels) (Modeled Wall 3: Northwest Quadrant of TH 169/101st Avenue Interchange) (20-foot Tall Noise Wall)

Receptor ID *	Nighttime L_{10} Noise Level, Build year 2030 (no wall)	Nighttime L_{10} Noise Level, Build year 2030 (with noise wall)	Reduction (in dBA) with noise wall	Number of residences, commercial or industrial establishments	Number of benefited residences, commercial or industrial establishments(1)	Design goal reduction >7 dBA (2)	Length of wall (feet)	Wall Area (sq ft) (3)	Total cost of wall $20/sq ft	Cost/ Benefited Receptor
R7	61.2	57.9	3.3	1	0	0	1,705	33,400	$682,000	N/A
R8	64.1	59.7	4.4	1	0	0				
R9	69.1	64.5	4.6	1	0	0				
R10	**79.8**	**79.8**	0.0	1	0	0				

Bold numbers exceed state nighttime standards.

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

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

(3) Barrier surface area includes tapers at barrier ends.

* R = Rush Creek Regional Trail