Trunk Highway (TH) 169/ TH 282/ County Road (CR) 9 Intersection Improvement Project

Environmental Assessment Worksheet

January 2020

Prepared for:

Scott

DEPARTMENT OF TRANSPORTATION

CITY OF JORDAN

Prepared by:

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July 2013 Version

Environmental Assessment Worksheet

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

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

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

1. Project Title

TH 169 / TH 282 / CR 9 Intersection Improvement Project

2. Proposer

Proposer: City of Jordan
Contact Person: Tom Nikunen
Title: Jordan City Administrator
Address: 210 East 1st Street
City, State, ZIP: Jordan, MN 55352
Phone: 952-492-2535
Email: tnikunen@jordanmn.gov

3. RGU

RGU: Scott County
Contact Person: Craig Jenson
Title: Transportation Planner Manager
Address: 600 County Trail East
City, State, ZIP: Jordan, MN 55352
Phone: 952-496-8329
Email: cjenson@co.scott.mn.us

4. Reason for EAW Preparation

Check one:

Required:
☐EIS Scoping
☒Mandatory EAW

Discretionary:
☐Citizen petition
☐RGU discretion
☐Proposer initiated

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

MN Rule 4410.4300, subpart 27. Wetlands and Public Waters

Part A. Project would impact one acre or more of Minnesota Department of Natural Resources Public Water Wetland.

5. Project Location

County: Scott
City/Township: Jordan
PLS Location (¼, ¼, Section, Township, Range): Sections 18 and 19 of Township 114, Range 23W and Section 24 of Township 114, Range 24W
Watershed (81 major watershed scale): Lower Minnesota Watershed District
At a minimum, attach each of the following to the EAW:

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

Figure 1: County Map Showing the Location of the Project

6. Project Description

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

The City of Jordan, in partnership with the Minnesota Department of Transportation (MnDOT) and Scott County, is proposing intersection and roadway improvements in the area of the TH 169, TH 282, and CR 9 intersection. The improvements include the construction of a new interchange, two bridges, access modifications, sidewalk, and a traffic signal in order to improve vehicle safety and mobility as well as pedestrian and bicycle connectivity.

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

TH 169 is a north/south Trunk Highway connecting Mankato and St. Peter, Mn to the Twin Cities and extends to Grand Rapids and other points north. However, the orientation of the actual intersection at the project location, TH 169 is aligned more east-west than north-south, thus CR 9 enters the intersection from the north and TH 282 from the south.

Proposed Project

The proposed project includes intersection and roadway improvements in the area of the TH 169/TH 282/CR 9 intersection. This includes a new roundabout intersection that connects CR 9 to the southbound TH 169 exit/entrance ramps, and Frontage Road; new bridges over TH 169 and the Union Pacific railroad; and the installation of a traffic signal at the intersection of TH 282/2nd Street West and the future off-ramp from northbound TH 169. The existing signal currently at TH 169/TH 282/CR 9 would be replaced by the new interchange.

A new sidewalk is proposed along both sides of CR 9/TH 282 from Ervin Industrial Blvd to Creek Lane.

Three stormwater ponds would be added as part of this project. A 1.5-acre stormwater pond would be located northwest of the proposed roundabout and a 0.8-acre stormwater pond would be located between the proposed southbound TH 169 exit ramp and Frontage Road. A 0.05-acre stormwater pond would be located south of the proposed northbound TH 169 exit ramp.

A center median is proposed along TH 282 and CR 9. Proposed access changes include:

- Removing the west driveway located at Wolf Motors and combine with the east driveway and turn into a ¾ access.
- Close accesses at the two private roads north of TH 169 on the west side of CR 9.
- Close the right-in/right-out at northbound TH 169 and Creek Lane and create an on ramp to northbound TH 169 from Creek Lane.

The proposed project layout is shown in Appendix A. The project is not currently funded; however, the City of Jordan, Scott County, and MnDOT plan to advance this project when funding becomes available. The purpose of this analysis is to identify the potential project impacts and provide the City, Scott County, and MnDOT an interchange footprint that can be used for future planning. Potential impacts discussed in this EAW are based on existing conditions and preliminary project limits as identified in Appendix A.

The project limits are defined as the 33.3 acres in which anticipated construction would occur.

Other Alternatives Considered

A wide variety of alternatives with differing geometric configurations have been considered over the past 20 years.

TH 169/TH 282/County Road 9 Memorandum (2012)

In 2012, these alternatives were reevaluated with a focus on relevance of criteria important to the City of Jordan. A subset of eight alternatives was presented to the community and local businesses. Evaluation criterial consisted of business and property impacts, property access, saving/creating jobs, preserving property for development/redevelopment, environmental impacts, community support, agency support, and cost. The following alternatives were evaluated:

- Concept A – Diamond
- Concept B – Folded Diamond
- Concept C – Tight Diamond
- Concept D – Partial Cloverleaf
- Concept E – Diamond
- Concept F – Offset Single Point – version 1
- Concept G – Offset Single Point – version 2

As a result of the evaluation, three alternatives were rated favorable by the City (C, F, and G) which included a tight diamond and two offset single-point diamond configurations.

TH 169/TH 282/CR 9 Interchange Concept Study (2018)

The TH 169/TH 282/CR 9 Interchange Concept Study (November 2018) started with the previously suggested concepts and expanded the study area to include the intersections at TH 282/Creek Lane and CR9/Valley View Drive. This analysis added a number of new concepts, including an at-grade intersection with an overpass, refined the previous concepts, and came to a locally supported alternative by the conclusion of the study. The 2018 evaluation criteria consisted of:

- Minimize Impacts to Business Access
- Improves TH 169 Operations
- Improves Safety
- Flexibility for Phased Implementation
- Construction Staging Flexibility
- Minimize Impacts to TH 169 Alignment

- Meets MnDOT and County Access Spacing Guidelines
- Improves Railroad Crossing Safety
- Safe Sidewalk/Trail Connections Across TH 169
- Serves Freight
- Reasonable to Maintain
- Wetland Impacts
- Floodplain Impacts
- Valley Green Neighborhood Impacts
- Right-of-Way Impacts
- Future Development Potential
- Business Visibility/Property Impacts
- Cost

Considering the criteria listed above, a number of the concepts were removed from further consideration. Some of these concepts included a single point urban interchange, an offset single point urban interchange, a tight diamond, and an at-grade intersection with an overpass. The City of Jordan, Scott County, and MnDOT agreed that five alternative concepts should move forward to further evaluation based on the established design criteria. These five alternatives included the following:

- Concept 1 – Roundabout/split diamond
- Concept 1a – Roundabout/split diamond with a bridge over the railroad tracks
- Concept 2 - Folded diamond/split diamond
- Concept 3 – TH 169 bridge over TH 282/CR 9
- Concept 3A – TH 169 bridge over TH 282/CR 9 with a bridge over Creek Lane

The split diamond (Concept 1) or the split diamond with a bridge over the railroad tracks (Concept 1a) were identified as the locally supported option due for the following reasons:

- Ability to accommodate a grade separation with the railroad tracks
- Ability to minimize impacts to the existing TH 169 alignment
- Flexibility for implementation and construction phasing/staging
- Cost

c. Project magnitude

Table 1: Project Magnitude

Measure	Magnitude
Total Project Acreage	33.3
Linear Project Length (Feet)	CR 9 & TH 282: 3,350 TH 169: 5,500

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

The purpose of the project is to identify a long-term solution to improve vehicle safety and vehicle/freight mobility, address operational concerns and improve connectivity along TH 169, TH 282, and CR 9. The TH 169/TH 282/CR 9 intersection is a component of a larger regional corridor between the City of Belle Plaine and Interstate 494 that has been recommended by MnDOT, Scott County, and other public partners[1] to transition TH 169 from a rural expressway to a controlled-access freeway. As part of that goal, the TH 169/TH 282/CR 9 intersection has long been identified in need of upgrades with the preferred improvement being an interchange. The agreed upon goals of the proposed interchange, as identified by MnDOT, Scott County, and the City of Jordan, is to preserve the right-of-way (ROW) along the north (undeveloped) side and limit impacts to private businesses on the south (developed) side of the current intersection. Enhancing pedestrian/bicycle connectivity and mobility is also an important goal of the project. TH 169 is the principal arterial connection through Jordan between southwest Twin Cities and Mankato, and the proposed project would eliminate one of the last remaining signalized intersections along this segment TH 169, benefitting both commuters and local traffic.

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.

N/A

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

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

The City of Jordan has plans in progress for the reconstruction of the TH 282/Creek Lane intersection, which would occur in 2021. The current intersection would be replaced with a roundabout to improve traffic flow and safety. This improvement project is being constructed independent of the TH 169/TH 282/CR 9 interchange project and is needed regardless of if or when the interchange is constructed.

7. Cover Types

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

Table 2: Cover Types

Cover Type	Before (Acres)	After (Acres)
Wetlands	3.0	0.0
Streams	0.5	0.1[2]
Wooded/Forest	3.8	0.0
Brush/Grassland	3.6	0.0

[1] State Highway 169 – Corridor Management Plan (May 2002)
[2] Impact is due to a portion of the stream being placed in a culvert, the stream length will not be shortened.

Cover Type	Before (Acres)	After (Acres)
Cropland	0.0	0.0
Lawn/Landscaping	11.6	15.9
Impervious Surface	10.8	15.0
Stormwater Pond	0.0	2.3
Total	33.3	33.3

8. Permits and Approvals Required

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

Table 3: Permits and Approvals Required

Unit of Government	Type of Application	Status
LOCAL		
Local Government Unit (TBD-Scott County, City of Jordan, and/or MnDOT)	Wetland Conservation Act Wetland Replacement Plan	To be requested
City of Jordan	Floodplain Permit	To be requested
STATE		
Minnesota Department of Transportation (MnDOT)	EIS Need Decision	In progress
MnDOT	Staff Approval of Layout	To be requested
MnDOT	Final Construction Plan Review	To be requested
Minnesota Department of Natural Resources (DNR)	Groundwater Appropriation Permit	To be requested
DNR	Public Waters Work Permit	To be requested
Minnesota Pollution Control Agency (MPCA)	National Pollutant Discharge Elimination Permit (NPDES)	To be requested
	Section 401 Certification (may be covered under USACE permit)	To be requested
FEDERAL		
US Army Corps of Engineers (USACE)	Section 404 Permit	To be requested
MnDOT Office of Environmental Stewardship (OES) on behalf of the Federal Highway Administration (FHWA)	Endangered Species Act Section 7 Determination	To be requested

Unit of Government	Type of Application	Status
MnDOT Cultural Resources Unit (CRU) on behalf of FHWA	Section 106 (Historic/Archaeological) Determination	To be requested
FHWA	National Environmental Policy Act (NEPA) documentation	To be requested
OTHER - PRIVATE		
Union Pacific Railroad	Railroad agreements	To be requested

9. Land Use

a. Describe:

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

Existing Land Use

According to the City of Jordan 2040 Comprehensive Plan[3], existing land use within and adjacent to the project limits is comprised of multiple uses including existing ROW, commercial, residential, industrial, agricultural, parks, and undeveloped land. Adjacent residential properties are located northeast of CR 9/Valley View Drive intersection, north of TH 169, and south of TH 169.

Sand Creek and an Unnamed DNR Public Watercourse (referred to in this document as Perennial Stream A) intersect the project limits. Sand Creek flows south to north and crosses the project limits at the proposed northbound TH 169 on ramp. Perennial Stream A runs southwest to northeast and crosses the project limits at the proposed northbound TH 169 off ramp and the proposed roundabout. Adjacent to Perennial Stream A are wetlands which intersect the project limits.

The project is not located near DNR Wildlife Management Areas, Waterfowl Production Areas, or Scientific and Natural Areas.

Parkland and Trails

There are no parklands within the project limits; however, Lions Park is directly adjacent to the project just east of Creek Lane. According to the City of Jordan 2040 Comprehensive Plan (Map 3-19: Existing Park and Recreation Areas) and the Scott County 2040 Comprehensive Plan (Existing Trail Inventory Map),[4] there are no existing regional trails identified in the project limits. There is currently sidewalk along the east side of TH 282/CR 9 through the project area.

Prime and Unique Farmlands

[3] Source: http://jordanmn.gov/wp-content/uploads/2018/06/Jordan-full-draft-comprehensive-plan-021219-for-web.pdf
[4] Source: https://www.scottcountymn.gov/DocumentCenter/View/9993/Trail-Inventory---Update-20171031

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, 48 percent of the project area is classified as prime farmland if drained and/or protected from flooding/not frequently flooded during the growing season.

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

Based on the City of Jordan's 2040 Comprehensive Plan (Map 2-4: Future Land Use), the land within and adjacent to the project is planned for ROW, commercial, industrial, residential, and parks. The proposed future land use along TH 282, CR 9, and TH 169 promote the area as a commercial corridor through the City of Jordan.

The project would replace the existing sidewalk along TH 282/CR 9 and would connect to planned regional trails identified within the City of Jordan 2040 Comprehensive Plan.

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

According to the City of Jordan zoning code, there are no wild and scenic rivers or critical areas within or adjacent to the project area.

A Shoreland Overlay District[5] follows Sand Creek through the project limits and a 100-year floodplain lies within and adjacent to the project limits (see Figure 4).

According to the City of Jordan's 2040 Comprehensive Plan (Map 2-4: Future Land Use), there are no agricultural preserves identified within or adjacent to the project limits.

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

The proposed roadway improvements are consistent with and support the existing and future land uses along the corridor. There is a Shoreland Overlay District, related to Sand Creek, within the project limits; however, the zoning regulations do not apply to a roadway improvement project.

The proposed project would be designed in accordance with the City of Jordan's Floodplain Ordinance which requires no-rise in floodplain elevation. Preliminary calculations estimate that approximately 54,400 cubic yards (CY) would be placed within the floodplain. To mitigate floodplain fill, the project would be required to meet the City's no-rise criteria. This may require the creation of storage area within or adjacent to the floodplain within the same reach as the impacts. The city has identified a potential location for creating new floodplain storage southwest of the proposed project. The ultimate location of the mitigation, if required, would be determined in final design. Any environmental impacts resulting from the mitigation would be avoided to the extent possible and addressed during the permitting process.

[5] Source: http://jordanmn.gov/wp-content/uploads/2019/11/Jordand_Zoning_Nov2019-1.pdf

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

No incompatibility has been identified; therefore, no mitigation is needed.

10. Geology, Soils, and Topography/Land Forms

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

According to the Geologic Atlas of Scott County,[6] bedrock geology of the project site consists of the St. Lawrence Formation and Ironton and Galesville Sandstones. The St. Lawrence Formation, typically 45 to 60 feet thick, is silty dolomite interbedded with siltstone, soft shale, and very fine grained quartzose sandstone. Ironton and Galesville Sandstones, typically 45 to 55 feet thick, are fine to very coarse grained quartzose sandstones with thin beds of soft shale.

Based on the Minnesota Geological Survey, the depth to bedrock ranges from 0-50 feet throughout the project limits. The surficial geology consists of Peat deposits (brown to very dark brown, well-decomposed, organic debris more than three feet thick), Alluvium deposits (gray to brown floodplain deposits; three feet to more than ten feet thick; variable texture, sorting, and bedding; clay and silt inter-bedded with sand and gravel), and Middle Terrace deposits (sand, gravelly sand, and loamy sand, overlain by thin deposits of silt, loam, or organic sediment).

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

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

According to the NRCS Web Soil Survey, there are 12 soil types within the project limits. Three soil types (Alluvial land, Sparta fine sand, and Comfrey silty clay loam) make up approximately 82 percent of the 33.3 acres within the project limits. Details on the soil types found within the project limits are included in Table 4.

The NRCS Erosion Hazard Ratings indicate the hazard of soil loss from off-road areas after disturbance activities that expose soil surface. Within the project limits, 33 acres (99

[6] Available at https://conservancy.umn.edu/handle/11299/58232

percent) have a "slight" rating, meaning that erosion is unlikely under normal climatic conditions. The remaining 0.3 acres within the project limits were not rated.

The proposed project would require approximately 40,000 cubic yards of excavation and 370,000 cubic yards of fill.

Table 4: Soil Types within the Project Limits

Map Unit Symbol	Map Unit Name	Erosion Hazard Rating	Percent of Project Limits
AaA	Alluvial land, 0 to 2 percent slopes	Slight	28.8
Ab	Alluvial land, frequent overflow, 0 to 6 percent slopes	Slight	5.2
Cc	Comfrey silty clay loam	Slight	14.0
De	Duelm variant, fine sandy loam	Slight	0.3
Dg	Dune land	Not rated	0.9
EbB2	Salida gravelly sandy loam, 0 to 6 percent slopes, moderately eroded	Slight	3.2
HdB	Sparta fine sand, 2 to 6 percent slopes	Slight	39.4
HdB2	Sparta fine sand, 2 to 6 percent slopes	Slight	0.4
HdC2	Sparta fine sand, 6 to 12 percent slopes	Slight	0.1
Ma	Marsh	Slight	3.7
PbA	Houghton muck, 0 to 1 percent slopes	Slight	3.9
W	Water	Not rated	0.1

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

11. Water Resources

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

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

Wetlands and Surface Waters

Aquatic resources within the project limits were delineated using a routine Level 2 delineation methodology[7] during the 2019 growing season. Six wetlands and two

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

tributaries were identified as part of the field delineations and are listed in Table 5 and Figure 5. The Wetland Conservation Act Notice of Decision for the wetland boundary and type approval is included in Appendix B. Per the Minnesota Wetland Conservation Act, the project limits cross two Local Government Units (LGU); MnDOT is the LGU within MnDOT ROW and the City of Jordan is the LGU for all other land within municipal boundaries. MnDOT has elected to defer to the city as the sole LGU per 8420.0200 Subp.1.F. since the majority of the delineated wetlands are within the city's jurisdiction and the city has zoning authority in this area.

Three of the delineated aquatic resources have been identified on the DNR Public Waters Inventory (PWI): Wetland 1 (PWI #70-220W), Sand Creek, and Perennial Stream A (unnamed tributary).

Table 5: Delineated Wetlands

Wetland/Tributary ID	DNR Water?	Size (acres)	Wetland Plant Community(ies)[8]
Wetland 1	Yes 70-220W	2.44	Shallow Marsh
Wetland 2	No	3.62	Fresh (Wet) Meadow/Shallow Marsh/Deep Marsh
Wetland Ditch 3	No	0.15	Seasonally Flooded Basin
Wetland Ditch 4	No	0.53	Seasonally Flooded Basin
Wetland Ditch 5	No	0.01	Seasonally Flooded Basin
Wetland 6	No	2.33	Seasonally Flooded Basin
Sand Creek Tributary	Yes	0.56	Riverine
Perennial Stream A	Yes	1.29	Riverine

Minnesota Pollution Control Agency 303d Impaired Waters List

Sand Creek and Perennial Stream A are listed on the MPCA's 303d 2020 Draft Impaired Waters list for several impairments, listed in Table 6. Currently there is only one Total Maximum Daily Load (TMDL) plan that applies to these waters, a chloride plan for Sand Creek.[9] The presence of chloride in Sand Creek is attributed to deicing salt placed on roads during winter for the purpose of providing a safe travel surface for the public. The TMDL plan calls for improving winter maintenance to limit deicing salt that is needed and is not applicable to this project specifically.

[8] According to *Wetland Plant and Plant Communities of Minnesota and Wisconsin, Version 3.1 (May 2014)*
[9] More information about the TMDL plan is available at: https://stormwater.pca.state.mn.us/index.php/TCMA_Chloride_Management_Plan_-_Appendix_A_%E2%80%93_TCMA_Chloride_TMDL

Table 6: MPCA 303d Impaired Waters within One Mile of Project Limits

Water Name	Beneficial Use	Water Quality Impairment	TMDL Plan
Sand Creek Tributary	Aquatic Life Aquatic Recreation	Benthic Macroinvertebrate Assessments Fish Bioassessments Chloride Nutrients Turbidity E. coli	Chloride
Perennial Stream A	Aquatic Life	Benthic Macroinvertebrate Assessments Fish Bioassessments	None

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

Groundwater Depth and Flow Direction

According to the geotechnical evaluation completed for the project, depth to groundwater observed in the soil borings ranged from 6 to 17.5 feet below the land surface. According to published geologic information,[10] the regional groundwater flow direction within the unconsolidated deposits in the corridor is to the northwest. The general groundwater flow direction within the uppermost bedrock aquifer in the project vicinity, the Franconia-Ironton-Galesville aquifer, is likely to the north-northwest.

Minnesota Department of Health Wellhead Protection Area and Drinking Water Supply Management Area

According to the Minnesota Well Index (MWI), the eastern edge of the project is located within the City of Jordan Wellhead Protection Area (WPA) and Drinking Water Supply Management Area (DWSMA). The Jordan DWSMA contains an area identified as low vulnerability. This rating indicates that there are no infiltration restrictions to stormwater management in this location. These areas are shown on Figure 6.

Wells

According to the MWI,[11] two private wells and three public/community supply wells were identified within 500 feet of the project limits. These are shown in Appendix C.

[10] Kanivetsky, R., & Palen, B., Supplement to the Scott County Geologic Atlas, "Hydrogeology of Scott County", Minnesota Geological Survey, 1982.

[11] Available at https://mnwellindex.web.health.state.mn.us/

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

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

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

Not applicable.

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

Not applicable.

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

Not applicable.

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

Existing Conditions

The project is within the Sand Creek Watershed which is within the jurisdiction of the Scott County Watershed Management Organization (WMO). Currently there are no stormwater management areas within the project limits. Existing drainage within the project vicinity primarily flows from the roadway into vegetated ditches or wetlands adjacent to the roadside before discharging to either Perennial Stream A or Sand Creek. Culverts connect the roadside ditches to these downstream waters. Drainage for the project area generally flows from southwest to northeast. All runoff within the project area ultimately reaches Sand Creek.

Proposed Stormwater Design

The project would result in approximately 4.6 acres of additional impervious surface. Due to the extent of disturbance and amount of impervious surface

increase, a Phase II NPDES permit would be required for the project. In addition, the project would be required to meet the requirements of the Scott County WMO. The project proposes three new stormwater Best Management Practices (BMPs) for runoff rate and volume control for the proposed construction. Potential locations of the proposed BMPs are shown in Appendix A. All project runoff would be routed to these BMPs prior to discharging to adjacent wetlands and tributaries.

Stormwater Pollution Prevention Plan

As part of the NPDES permit, a Stormwater Pollution Prevention Plan (SWPPP) will be developed for the project. The SWPPP will require temporary and permanent erosion control BMPs to be implemented by the contractor during all phases of construction.

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

Stormwater Pollution Prevention Plan

Water appropriation is anticipated to be required to complete the construction of retaining walls, abutments and culvert work near the wetlands and waterways. Dewatering BMPs would be identified in the SWPPP and a project dewatering plan would be included with the construction documents. Any locations that are determined to require dewatering by the contractor would follow the dewatering plan. If dewatering rates exceed 10,000 gallons per day or one-million gallons per year, a DNR water appropriation permit would be obtained by the contractor for these temporary activities.

Unidentified Wells

There are no known wells within the project limits. If unidentified wells are found, the MPCA and MDH must be contacted to determine the course of action which may include sealing, relocating, or preserving by a licensed well contractor according to Minnesota Rules Chapter 4725.

iv. Surface Waters

1) Wetlands – Describe any anticipated physical effects or alterations to wetland features, such as draining, filling, permanent inundation, dredging, and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered),

minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

Avoidance of Wetland Impacts

Given the location of the existing road infrastructure in relation to adjacent wetlands, it is not feasible to avoid all wetland impacts to accomplish the purpose of the project. In addition to wetlands, several factors were considered in development of the preferred alternative for the proposed interchange, including minimizing ROW acquisition, presence of existing railroad and road infrastructure, and the surrounding topography, as described below.

The project is being designed to minimize property acquisition, maintain or enhance local business access, and allow for the future development/redevelopment of adjacent land near the proposed interchange. The majority of the land south of the existing TH 169/TH 282/CR 9 intersection adjacent to the existing ROW is fully developed whereas the land north of the interchange is undeveloped private property. The relocation of the roadway network to avoid wetland impacts was determined to be not feasible or realistic.

The Union Pacific railroad has an existing at grade crossing of CR 9 approximately 750 feet north of the existing TH 169/TH 282/CR 9 intersection. The railroad does not currently operate a significant number of trains per day on this rail segment; however, there is potential for increased train traffic at this location in the future. The project design considered the safety for vehicles, freight, and non-motorized crossings of the Union Pacific tracks at CR 9.

The existing Frontage Rd along the north side of TH 169 provides a critical access point for private undeveloped parcels, residences to the northeast of the TH 169/TH 282/CR 9 intersection, and the City of Jordan Police Department. Given the current intersection of the Frontage Rd and CR 9 is three-legged, adding the proposed on and off ramps to the north side of TH 169 would result in a five-legged intersection, which creates challenging geometrics for a signalized intersection.

Based on the above, a five-legged roundabout north of the current TH 169/TH 282/CR 9 intersection was chosen as the locally supported alternative. The location of the roundabout is essentially fixed due to the proximity of the railroad tracks, the geometry of the current intersection, and location of wetlands/stream. Shifts east or west could potentially avoid some wetland impact on one side but increase it on the other. Additionally, shifting was not reasonable or feasible because major realignments of existing roadways on both sides of the current intersection and significant impacts to private property and businesses would be required while not resulting in a significant

change to wetland impacts. Shifting north or south was not reasonable or feasible because it would require the realignment of TH 169 or the existing railroad.

Given these considerations, wetland impacts are unavoidable.

Minimization of Wetland Impacts

Wetland impacts that are unavoidable have been minimized to the extent practicable given the current level of design. Several retaining walls are proposed along the TH 169 on and off ramps and the five-legged roundabout. These retaining walls considerably reduce the amount of fill within wetland areas. Additional minimization measures would be evaluated as design of the project progresses.

Preliminary Wetland Impacts

Based on preliminary project limits and the aquatic resource boundaries identified for the project, 3.0 acres of permanent wetland impact are anticipated (impacts are listed in Table 7). All impacts are the result of fill needed for the construction of the new interchange.

Table 7: Preliminary Wetland Impacts

Wetland ID	Preliminary Impact (acres)	Anticipated Compensatory Mitigation Requirements
Wetland 1	1.12	Minimum 2:1 replacement
Wetland 2	1.05	Minimum 2:1 replacement
Wetland Ditch 3	0.00	Assumed none
Wetland Ditch 4	0.24	Assumed none
Wetland Ditch 5	0.02	Assumed none
Wetland 6	0.57	Minimum 2:1 replacement
TOTAL	3.00	-

Wetland Conservation Act (WCA) Regulated Wetlands

Any wetland impact areas within MnDOT ROW would fall under MnDOT's jurisdiction and all areas outside MnDOT ROW would fall under the City of Jordan's jurisdiction as LGUs under WCA. Coordination with MnDOT and the CIty would occur during the permit review to determine if impacts to these areas are regulated and if so which LGU would issue required approvals. Some of the wetlands within the corridor were created in uplands when TH 169 was constructed. These wetlands are considered "incidental" and are not under WCA jurisdiction; thus, they do not require compensatory mitigation if impacted. An incidental determination is attached in Appendix B. The assumed replacement ratio for this project per WCA requirements is 2:1 for impacts requiring replacement. The mitigation would be provided by purchasing approved wetland bank credits within the same Bank Service Area (BSA).

USACE Regulated Wetlands

Preliminary coordination with the USACE is ongoing to determine wetland impact that is regulated by the agency. A Jurisdictional Determination (JD) would be coordinated with the USACE to determine which wetland impacts require mitigation. As the project design progresses, wetland impacts would be refined in accordance with USACE permitting requirements. Wetland impacts would be mitigated by purchasing USACE approved bank credits at a 2:1 replacement ratio within BSA 9, the same BSA as proposed impacts.

DNR Regulated Wetlands and Public Waters

As noted above, Wetland 1 is a DNR Public Water Wetland (PWI# 70-220W). Impacts below the Ordinary High Water Level for the wetland are under the jurisdiction of the DNR and would be coordinated through the DNR Public Waters Work Permit along with any impacts to Sand Creek or Perennial Stream A.

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

Based on preliminary project limits and the aquatic resource boundaries identified for the project, 0.45 acres of tributary impact are anticipated (impacts are listed in Table 8).

Table 8: Preliminary Tributary Impacts

Tributary ID	Preliminary Impact (acres)	Anticipated Compensatory Mitigation Requirements
Sand Creek Tributary	0.07	Mitigation to be determined
Perennial Stream A	0.38	Mitigation to be determined
TOTAL	0.45	-

Sand Creek crosses the project limits where TH 169 crosses over the creek with bridge #6802. The existing bridge is a single-span steel beam bridge. It is anticipated that the project would widen the bridge abutments and add new beams to the south of the existing crossing. This work may result in temporary and permanent impacts to Sand Creek, which would be coordinated and permitted through the DNR.

Perennial Stream A crosses the project limits in two locations, under TH 169 and under CR 9. Both culverts would be affected by the project and given

the stream is a DNR Public Watercourse, the impacts would be coordinated and permitted through the DNR.

- The existing culvert under TH 169 is approximately 120 feet long, 12-feet wide by 8-feet high box. It is proposed to be extended by approximately 26 feet to the south.
- The existing culvert under CR 9 is approximately 160 feet long, by 10-feet wide, and 8-feet high double box. This culvert would be replaced by a new approximately 560-foot long culvert. The dimensions of the new culvert would be determined during final hydraulic design.

12. Contamination/Hazardous Materials/Wastes

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

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

Braun Intertec conducted a Modified Phase I Environmental Site Assessment to determine if any known contaminated properties or potential environmental hazards are located within 500 feet of the project site. The report identifies 27 sites, which have been classified into high, medium, and low environmental risk levels (criteria established by MnDOT).

- High risk: In general, sites with high environmental risks are properties that have documented releases of chemicals or hazardous or regulated substances (e.g., active and inactive state and federal cleanup sites, active and inactive dump sites, and active leaking underground storage tank sites), strong evidence of contamination (e.g., soil staining, stressed vegetation), or storage of large volumes of petroleum or other chemicals (e.g., bulk storage tank facilities).
- Medium risk: Sites of medium environmental risk are properties where smaller volumes of petroleum, chemicals, or hazardous materials are frequently stored

and used (e.g., registered underground and aboveground storage tanks, vehicle repair facilities, metal working shops), but at which no evidence of spills or releases exists, or properties with documented releases that have been "closed" (signifying no further cleanup actions are deemed necessary) by the MPCA. Closed sites, such as closed leaking underground storage tank sites, are considered medium risks because residual soil or groundwater contamination may exist.

- Low risk: Low environmental risk sites include properties where minor volumes of chemicals or hazardous materials have been used or stored (e.g., hazardous waste generators, and possibly some farmsteads and residences).
- De Minimis: Include sites that do not qualify by definition as low, medium, or high risk potential for contamination and are unlikely to be considered contaminated.

Of the 27 sites identified, seven are classified as having low potential for contamination, 19 are classified as having medium potential for contamination, and one is classified as having a high potential for contamination. Additionally, 38 additional sites were classified as d*e minimis* sites. Sites are listed in Table 9 and shown in Appendix C.

Table 9: Phase I ESA Sites Within 500 Feet of Project Limits

Site Number	Site Name	Activity	Active?	Potential for Contamination
5	WW Will & Sons Distribution & Sportsman's Brand Meats	Hazardous waste	Yes	Low
8	S. M. Hentges Storage Yard	Hazardous waste	Yes	Low
9	Railroad Tracks	Railroad tracks	Yes	Low
11	Former Railroad Depot	Railroad tracks	Yes	Low
20	Jordan Truck & Car Wash	Hazardous waste	Yes	Low
25	TH 169, ROW, & Valley Green	Railroad track, barn	No	Low
26	Chiropractic Specialists & Residence	Hazardous waste	Yes	Low
1	Quatman Auto Service	Above ground storage tanks (ASTs)	Yes	Medium
2	Quatman Farm	ASTs	Unknown	Medium
3	Scrap Yard & Residences	Hazardous waste	Yes	Medium
4	Minger Construction	ASTs, Underground Storage Tank (UST)	Yes	Medium
6	E.A.T.I.	Hazardous waste	Yes	Medium
7	S. M. Hentges & Sons	ASTs, USTs	Yes	Medium

Site Number	Site Name	Activity	Active?	Potential for Contamination
10	352/353 Creek Lane Residence & Garage	Hazardous waste	Unknown	Medium
12	19300 Valley View Drive Residence	AST	Unknown	Medium
13	Wolf Ford	ASTs, USTs, hazardous waste	Yes	Medium
14	Radermacher's/Ace Hardware/Jordan Veterinary	USTs, closed spill site, hazardous waste	Yes	Medium
15	Holiday	USTs, closed spill site, closed tank release site	Yes	Medium
17	Jordan Wine & Spirits	Hazardous waste	No	Medium
18	Clancy's Pizza	Hazardous waste	No	Medium
19	Quality Motor Sales	Auto sales and repair facility	Yes	Medium
21	Jordan Police Department	AST, USTs, closed tank release site, hazardous waste	No	Medium
22	Valley Green	Closed spill site	Unknown	Medium
23	611 West Street Residence	USTs	Unknown	Medium
24	601-613 Varner Street Residences	Railroad track, electric light works, bulk grain site	No	Medium
27	NAPA Auto Parts/Dance Studio/ Child Care	Hazardous waste	Yes	Medium
16	Taco Bell	ASTs, USTs, closed tank release site, inactive Petroleum Brownfields Program site, inactive Voluntary Investigation and Cleanup Program site, hazardous waste	No	High

Future drilling investigation activities, including the collection and analysis of soil and groundwater samples, are recommended, specifically where a High Potential for Contamination Site or Medium Potential for Contamination Site is both adjacent to or in close proximity to the TH 169/TH 282/CR 9 intersection, where significant amounts of fill materials would be excavated during future construction, or where acquisition of contaminated (identified or potential) properties are planned.

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

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

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

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

If during construction contaminated soils are encountered, the response would be handled consistent with MPCA requirements.

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

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

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

from the generation/storage of hazardous wastes including source reduction and recycling.

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

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

- Products would be kept in their original containers unless they cannot be resealed. Original labels and Material Safety Data Sheets would be retained on site and would be accessible at all times as they contain important product and safety information. If surplus product must be disposed of, manufacturers' or local and state recommended methods for proper disposal would be followed. An effort would be made to store only enough products required to do the job.
- All materials stored onsite would be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure with secondary containment.
- Substances would not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product would be used up before disposing of the container.
- Manufacturers' recommendations for proper use and disposal would be followed.

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

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

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

The majority of the land within the project area has been previously disturbed through construction of roadways and areas adjacent development. Habitats in the project area include small wooded areas, grassland, wetland, and lawn.

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

The project limits are just outside of a low potential zone of the rusty patched bumble bee; however, the entire project is within its historic range, meaning the rusty patched

bumble bee has not been observed or collected in these areas since before the year 2000 and presumed to not be present.[12]

The northern long-eared bat roosts underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal is proposed as part of this project, but the project limits are not located within a township containing any documented northern long-eared bat maternity roost trees or hibernacula entrances.[13]

There are no lakes within the project limits; however, there are two streams (Sand Creek and Perennial Stream A) with adjacent wetland areas that cross the project limits. It is likely that the streams and connected wetlands possess some fish species or fish habitat.

A regionally significant ecological area (RSEA) overlaps a portion of the project limits, covering 15 of the site's 33 acres (see Figure 7).

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 and/or correspondence number (ERDB) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe results.

A review of the DNR Natural Heritage Inventory System (NHIS) database was conducted (License Agreement-965) for the area within approximately one mile of the project and 11 species were identified. Table 10 lists all the state-listed species or species of special concern within one mile of the project boundary. Correspondence with the DNR is included in Appendix D.

The Minnesota County Biological Survey sites of high, moderate, and below biodiversity significance exist within one-mile of the proposed project limits. Sites of biodiversity significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. The project limits cross two sites of biodiversity significance, both ranked as moderate, indicating the sites contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. The two sites include the following:

- Dry Barrens Prairie (Southern)[14] located approximately 100 feet southwest of the project limits along the Union Pacific Rail corridor

[12] Rusty Patched Bumble Bee Map. Available at https://www.fws.gov/midwest/endangered/insects/rpbb/rpbbmap.html.
[13] Townships Containing Documented Northern Long-Eared Bat Maternity Roost Trees and/or Hibernacula Entrances in Minnesota. DNR and USFS, April 1, 2018. Available at https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf.
[14] More information about the Dry Barrens (Southern) native plant community is available at https://files.dnr.state.mn.us/natural_resources/npc/upland_prairie/ups13.pdf

- Sedge Meadow[15] within the project limits southwest of the current TH 169/TH 282/CR 9 intersection

These areas are shown on Figure 7. There are no high or below ranked sites within the project limits.

[15] More information about the Sedge Meadow native plant community is available at https://files.dnr.state.mn.us/natural_resources/npc/wet_meadow_carr/wmn82.pdf

Table 10: NHIS Recorded Species Within 1-Mile of the Project Limits

Species	Type	Status	Last Recorded Date	Habitat	In Project Limits?	Potential Impact?	Potential Mitigation Measures
Black Sandshell	Mussel	Special Concern	1989	Sandy or gravely bottom of a medium to large river	No	No	N/A
Blue Sucker	Fish	Special Concern	2010	Large rivers with swift, deep channels that have sand, gravel, or rubble bottoms	No	No	N/A
Gopher Snake	Reptile	Special Concern	2002	Well-drained, loose sandy and gravel soils such as prairies	Yes	No	Biodegradable erosion/ sediment control netting would be used during construction
Henslow's Sparrow	Bird	Endangered	1999	Grasslands with sufficient litter layer and herbaceous stems for perching	No	No	Removal of trees and shrubs outside the critical breeding/nesting season
Kitten-tails	Plant	Threatened	1996	Oak savanna, dry prairies, and oak woodlands	No	No	N/A
Loggerhead Shrike	Bird	Endangered	1997	Grassy open areas with scattered trees and shrubs	No	No	Removal of trees and shrubs outside the critical breeding/nesting season
Louisiana Broomrape	Plant	Threatened	2009	Dry prairies and dry savannas	No	No	Coordinate with the DNR to determine whether any mitigation is necessary
Mucket	Mussel	Threatened	1989	Medium to large rivers that have coarse sand and gravel bottoms	No	No	N/A
Rhombic Evening Primrose	Plant	Special Concern	1995	Dry, sandy prairies and dunes	No	No	N/A
Sandy Stream Tiger Beetle	Insect	Special Concern	2002	Stream banks and sandbars of very fine sand	No	No	N/A
White Wild Indigo	Plant	Special Concern	1996	Mesic tallgrass prairies, dry, sandy prairies, savannas, and open, upland woods	No	No	N/A

Federally-Listed Species

The rusty patched bumble bee is an endangered species that prefers grassland with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter. The project limits are outside both the low and high potential rusty-patched bumble bee zones, meaning it is presumed that the species is not present within the project limits.

No known northern long-eared bat hibernacula or maternity roost trees are located in the project area.

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

The project would involve grading and ground disturbance within the project limits. Much of this land has been previously disturbed due to residential and commercial development, infrastructure such as utilities and roadways, and agricultural practices. The following discusses how the project may affect the species identified above.

State-Listed Species

A total of 5 of the 11 species listings identified in the NHIS review area are associated with the Minnesota River and adjacent lands which would not be impacted by the project. These include the Black Sandshell, Blue Sucker, Mucket, Rhombic Evening Primrose, Sandy Stream Tiger Beetle.

The NHIS review area contained one listing for Kitten-Tails (*Besseya bullii*) was recorded north of the proposed project limits adjacent to the Minnesota River. The record was located along a north-northwest facing bluff along the river. According to the Minnesota DNR rare species guide,[16] the majority of plant populations of Kitten-Tails are restricted to bluffs and terraces of major river valleys. It is not anticipated that this species exists within the project limits; therefore, species impact is not anticipated.

The NHIS review area contained seven listings for Gopher Snake (*Pituophis catenifer*),[17] two of which were sightings within the project limits in 1997 and 2002. Gopher Snakes are not state listed but are a watch list species. Since a large portion of the project location already exists as a nonpermeable surface and the gopher snake habitat is of low quality, species impact is possible but not anticipated.

[16] More information about Kitten-Tails is available at the Minnesota DNR rare species guide at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDSCR09030

[17] More information about Gopher Snakes is available at the Minnesota DNR rare species guide at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ARADB26020

The NHIS review area contained one listing for Loggerhead Shrike (*Lanius ludovicianus*)[18] and one listing for Henlow's Sparrow (*Ammodramus henslowii*)[19] within the vicinity of the project limits in the late 1990's (west and northwest of the project limits, respectively). Both bird species require grassland habitat with specific characteristics. Loggerhead Shrikes use grassy open areas with scattered trees and shrubs such as grassy roadsides. Henlow's Sparrow require grasslands with sufficient litter layer and herbaceous stems for perching. Although neither species has been identified within the project limits, there are approximately 2 acres of brush/grassland vegetation within the project limits which could provide marginal habitat for both species (shown in Figure 8). If present; the habitat modified by the project would be minimal and is not considered critical or high quality habitat for either species.

The NHIS review area contained one listing for Louisiana Broomrape (*Orobanche ludoviciana var. ludoviciana*)[20] documented in Dry Barrens Prairie (Southern) native plant community type located approximately 100 feet southwest of the project limits along the Union Pacific Rail corridor. The project is not anticipated to affect the plant community nor the species. As the project proceeds into final design, the City would coordinate with the DNR to determine whether any measures are warranted to minimize potential impacts if present.

The NHIS review area contained one listing for White Wild Indigo (*Baptisia lactea var. lactea*)[21] documented north of the project limits. The status of species is of state special concern. White Wild Indigo is most often found in mesic tall grass prairie remnants. Due to the disturbed nature of the project limits (i.e. history of agriculture and development), it is not anticipated that this species exists within the project limits; therefore, species impact is not anticipated.

Federally-Listed Species

Anticipated tree removal within the project limits could potentially affect the northern long-eared bat; however, no roost trees or hibernacula have been identified in the surrounding area.

RSEA, Sites of Biodiversity Significance, and Native Plant Communities

The project is anticipated to impact Wetland 1 (DNR Public Water #70-220W), which is within an RSEA and a moderate site of biodiversity significance as a sedge meadow plant community. During the wetland survey completed for the project, the proposed wetland impact area consisted of mostly monotypic vegetation of cattails and reed

[18] More information about Loggerhead Shrike is available at the Minnesota DNR rare species guide at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBR01030
[19] More information about Henlow's Sparrow is available at the Minnesota DNR rare species guide at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBXA0030
[20] More information about Louisiana Broomrape is available at the Minnesota DNR rare species guide at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDORO04071
[21] More information about White Wild Indigo is available at the Minnesota DNR rare species guide at https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDFAB0G011

canary grass; thus, appears to be disturbed. The remaining RSEA mapped within the project limits are already developed or highly disturbed.

Invasive Species

There are no mapped areas of noxious weeds identified in the project area. State requirements necessitate the control and spread of state listed noxious weeds[22] and/or invasive weeds if encountered prior to construction. Disturbed areas would be reestablished using appropriate native and stabilization seed mixes.

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

State-Listed Species

To mitigate potential impacts such as entanglement issues with small animals (e.g. Gopher Snake), use of erosion control blankets would be limited to bio-netting or natural netting types; specifically, no products containing plastic mesh netting or other plastic components, as noted in the 2016 and 2018 MnDOT Standards Specifications for Construction. Any mulch products containing synthetic fiber additives would not be used in areas that drain to public waters.

When the project moves forward into final design, the City and County would consider measures to minimize potential habitat impacts of rare species (shrike, sparrow, and bat) such as removal of trees and shrubs outside the critical breeding/nesting season, typically April through July. By removing habitat before nesting/breeding use occurs would eliminate incidental taking of rare species that could use the habitat.

Sites of Biodiversity Significance

To minimize disturbance to the site of biodiversity significance, the following recommendations would be considered during project design:

- Minimize vehicular disturbance in the site (allow only vehicles/equipment necessary for construction activities)
- Prohibit parking of equipment or stockpiling supplies in the site
- Prohibit placement of spoil within the site
- Retain a buffer between proposed activities and the site.
- If possible, conduct the work under frozen ground conditions
- Use effective erosion prevention and sediment control measures
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species
- As much as possible, operate within already-disturbed areas

[22] More information about State listed noxious weeds available at https://www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf

- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible
- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern are birdsfoot trefoil (Lotus corniculatus) and crown vetch (Coronilla varia), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.

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.

A Phase I Archaeological Survey (September 2019, Bolton & Menk) was conducted for the project site. The Survey Area depicted in the report included all areas of expected disturbance, including grading limits, staging areas, and a potential stream re-route. The report is included as Appendix E and found eight recorded archaeological sites within one mile of the study area, four of which are unconfirmed sties. One new archaeological site, Quaker Avenue Site – 21SC0111, comprised of an isolated lithic flake, was identified. Based on these findings no further archaeological investigations were recommended for the project.

The Phase I Survey is in compliance with the Minnesota Environmental Policy Act, the Minnesota Field Archaeology Act, Historic Sites Act and the Private Cemeteries Act. The project may require review under Section 106 of the National Historic Preservation Act if federal funds are allocated or federal permits are required.

15. Visual

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

The project area is an existing roadway corridor that is not near any unique scenic views or vistas. The proposed project would modify the existing roadway by adding bridges on CR 9/TH 282 over TH 169 and the Union Pacific railroad tracks, a roundabout north of TH 169, and roadway improvements along TH 282 and Triangle Lane. Views to and from TH 169, TH 282, and CR 9 would be different than today as the bridge over TH 169 would be approximately 23 feet higher, the roundabout would be 30 feet higher, and the bridge over the railroad would be 31 feet higher than current elevations.

The need to maintain business visibility was identified as a priority through a public engagement process as part of an earlier study for the project. The proposed project would change the visual quality of the road by raising the interchange 20 to 30 feet; however, any visual impacts to the surrounding area are minor. Ongoing public involvement would

continue as design advances to identify any potential mitigation for the bridge design and other visual elements of the project.

16. Air

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

   Not applicable.

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

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

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

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

   The second criterion compares the project area to the locations of 10 intersections that the MPCA has identified as having the highest volumes in the metro area. If any of these 10 intersections were affected by the project, then analysis would be required. The nearest of these intersections is over 10 miles away, at the intersection of TH 7 and County Road 101 in Minnetonka; therefore, the second criterion is not met, and no hot spot analysis is needed.

c. Dust and Odors – Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under Item 16a). Discuss the effect of dust and odors in the vicinity of the

project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

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

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

17. Noise

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

Construction Noise

The construction of the project is expected to generate noise through both the removal of the old road and installation of the new road. Equipment expected to be used includes haul trucks, jackhammers, loaders, pavers, etc. Elevated noise levels would be unavoidable at times due to the nature of the construction work associated with the project. To alleviate construction noise issues, all equipment would be in proper working order and properly muffled. Advanced notice would be given to nearby residences prior to any abnormally loud activities such as pavement sawing, jack hammering, or operations of heavy construction vehicles. Notice should be provided at least seven days before the commencement of noisy construction operations.

The City of Jordan would require that construction equipment be properly muffled and in proper working order. The City of Jordan and its contractor(s) would comply with applicable noise restrictions and local noise ordinances to the extent that is reasonable. This project is expected to be under construction for 24 months.

Traffic Noise Analysis

This project is considered a Federal Type I project[23] requiring a traffic noise analysis due to the substantial vertical alternation and construction of an interchange. The following is a summary of the *Traffic Noise Analysis Report (Noise Report)*. The Noise Report includes background information on noise, information regarding federal traffic noise regulations and Minnesota Pollution Control Agency (MPCA) state noise standards, a discussion of the traffic

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

noise analysis methodology, documentation of the potential traffic noise impacts associated with the proposed project, and an evaluation of noise abatement measures.

Federal Requirements

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

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

Methodology

Field measurements of existing noise levels were measured at three locations in the project area. These locations were identified because they are representative of the surrounding area and the typical cross section for that section of highway. Noise level measurements were completed to be compared to the output obtained from a computer noise model. The modeled noise levels were within 3.0 dBA of the field measurements thus validating the computer noise model.

Traffic noise modeling was completed using the FHWA approved Traffic Noise Model 2.5 (TNM 2.5). Traffic noise levels were modeled for existing conditions, future (2040) No Build conditions, and future (2040) Build conditions. Using a combination of a high-level analysis and TNM modeling, it was determined that the 9:00 AM to 10:00 AM hour on a typical weekday is the loudest hour in the project area.

There were 234 receptors identified within the project area that were reviewed for traffic noise impacts. Additional details regarding the noise modeling methodology are described in the Noise Report, available upon request from the City.

Findings

The results of the detailed analysis for each modeled receptor location are summarized below. The detailed analysis results can be found in the Noise Report.

- The existing L_{eq} noise levels at modeled receptors varied between 42.7 dBA and 69.0 dBA.
- Future 2040 No Build L_{eq} noise levels were predicted to range between 45.9 dBA and 70.5 dBA.

- Future 2040 Build L_{eq} noise levels were predicted to range between 47.0 dBA and 73.2 dBA with 134 receptors identified as impacted receptors. Impacted receptors noise levels approach or exceed the federal noise abatement criteria (NAC) or experience a substantial noise increase (an increase in noise levels of at least five dBA).

The receptors that are impacted are shown in the figures in the Appendix F.

Potential Noise Abatement

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

Noise wall analysis was completed for nine potential wall locations along the corridor. Of the wall locations that were analyzed in the noise analysis, two walls preliminarily meet the acoustic feasibility criteria, the noise reduction design goal and may be cost effective.

The traffic noise analysis for the noise walls is based upon preliminary design studies completed at the time the noise analysis was performed. Final noise mitigation decisions would be subject to final design considerations and the viewpoint of benefited residents and property owners.

18. Transportation

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

Existing Traffic Volumes and Forecast

A Traffic Forecasting, Safety, and Operations Analysis Memorandum was completed for the project in 2018 and identified the Average Annual Daily Traffic (AADT) on roads within the project area as approximately 21,000 to 21,500 vehicles per day (vpd) on TH 169, 10,600 vpd on TH 282, and 6,000 to 7,900 vpd on CR 9. The supporting analysis for traffic volumes and forecasts can be found in Appendix G.

The project does not generate traffic; however, Scott County's 2040 Comprehensive Plan shows that traffic volumes on TH 282 at TH 169 are forecasted to be over capacity by 2040.[24] Specifically, future (2040) traffic forecasts for the roadways are anticipated to increase to approximately 30,500 to 35,000 vpd on TH 169, 20,000 vpd on TH 282, and 18,500 vpd on CR 9.

Walkability/Bikeability

Pedestrians have difficulty crossing TH 169 due to the distance across the TH 169/TH 282/CR 9 intersection, the high volume of turning movements, and the extended green time dedicated to moving traffic through TH 169. Sidewalks are proposed along both

[24] Source: https://www.scottcountymn.gov/DocumentCenter/View/9908/Chapter-06-Transportation?bidId=

sides of CR 9, TH 282, Triangle Lane, and Frontage Road as part of the roadway improvements.

Parking

Parking is currently not permitted along TH 169, TH 282, or CR 9; therefore, none is planned as part of this project. The project would add a parking lane in the eastbound direction of Triangle Lane.

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 Transportati**on's** Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.

An intersection capacity analysis was performed for the No-Build and 2040 Build AM and PM peak hours using Synchro/SimTraffic software to inform the intersection control and geometric design for the improvements.

The traffic analysis showed that there is already a relatively high right-turn volume from Creek Lane to northbound TH 169 during the AM peak period. This shows that many drivers are avoiding the signalized intersection at TH 169/TH 282/CR 9. Overall, the intersections in the study area were found to operate acceptably under existing conditions during the weekday AM and PM peak hours; however, there are some turning movements that are experiencing an undesirable level-of-service (LOS) and delay. The intersections of TH 169/TH 282/CR 9 and TH 282/Triangle Lane both are experiencing crash issues due to those intersections being closely spaced full movement intersections.

Under existing conditions, all individual turning movements are operating at LOS D or better for both the AM and PM peak hours except for the eastbound and westbound lefts at TH 169 and TH 282, which are operating at LOS E during the AM and PM peak hours. Although TH 282 and Creek Lane operate at acceptable LOS during the peak hour, there are periods of congestion and complaints regarding traffic at the TH 169/TH 282/CR 9 intersection in part due to traffic traveling to and from the Jordan schools. The traffic memorandum in Appendix G provides a summary of the delay (seconds/vehicle) and LOS at the study intersections.

Based on the analysis, there are a significant number of intersections that are anticipated to operate at overall LOS E or LOS F during the AM and PM peak hours by 2040. These intersections include the following:

- CR 9 & 190th Street West/Valley View Drive (PM peak hour)
- CR 9 & Frontage Road (AM and PM peak hours)
- TH 169 / CR 9 / TH 282 (PM peak hour)
- TH 282 & Triangle Lane North (PM peak hour)
- Creek Lane North & Triangle Lane North (AM peak hour)
- TH 169 & Creek Lane North (PM peak hour)

Due to a significant number of intersections that are anticipated to operate below the acceptable LOS for Design Year (2040) No-Action conditions, improvements along the study corridor would be necessary to provide acceptable LOS into the future. The continued deterioration of LOS between today and future conditions are anticipated to result in additional crash concerns along the corridor.

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

The purpose of the proposed project is to improve safety and operational concerns throughout the TH 169/TH 282/CR 9 area by constructing an interchange at the existing at-grade intersection. As a result, mitigation is not necessary or required.

19. Cumulative Potential Effects

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

Cumulative effects result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The geographic area considered for cumulative potential effects is the area proximate to the project limits.

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

There is one other reconstruction project adjacent to the proposed TH 169 Intersection Improvement project. It includes the roadway reconstruction of TH 282/2nd Street from east of Triangle Lane to east of Sand Creek, and along Creek Lane from Triangle Lane to El Dorado Drive. A roundabout would be installed at the TH 282/2nd Street and Creek Lane intersection. This project is being led by the City of Jordan and would be complete before the TH 169 Intersections Improvement project begins.

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.

There are no other major development projects that have been identified within the project area. Environmental effects resulting from the TH 282/2nd Street and Creek Lane reconstruction would affect the same environmental resources as the TH 169 Intersection Improvement project. These impacts would be addressed via regulatory permitting and approval processes; therefore, they would be individually mitigated to ensure minimal cumulative impacts occur.

20. Other Potential Environmental Effects

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

All known potentially adverse environmental effects are addressed in the preceding sections.

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 Lisa Freese Digitally signed by Lisa Freese DN: C=US, E=lfreese@co.scott.mn.us, O=Scott County Transportation Services, OU=Director, CN=Lisa Freese Date: 2020.01.23 06:34:22-06'00' Date _____

Title _____

Figures

Figure 2: Project Limits Shown on USGS Topographic Map

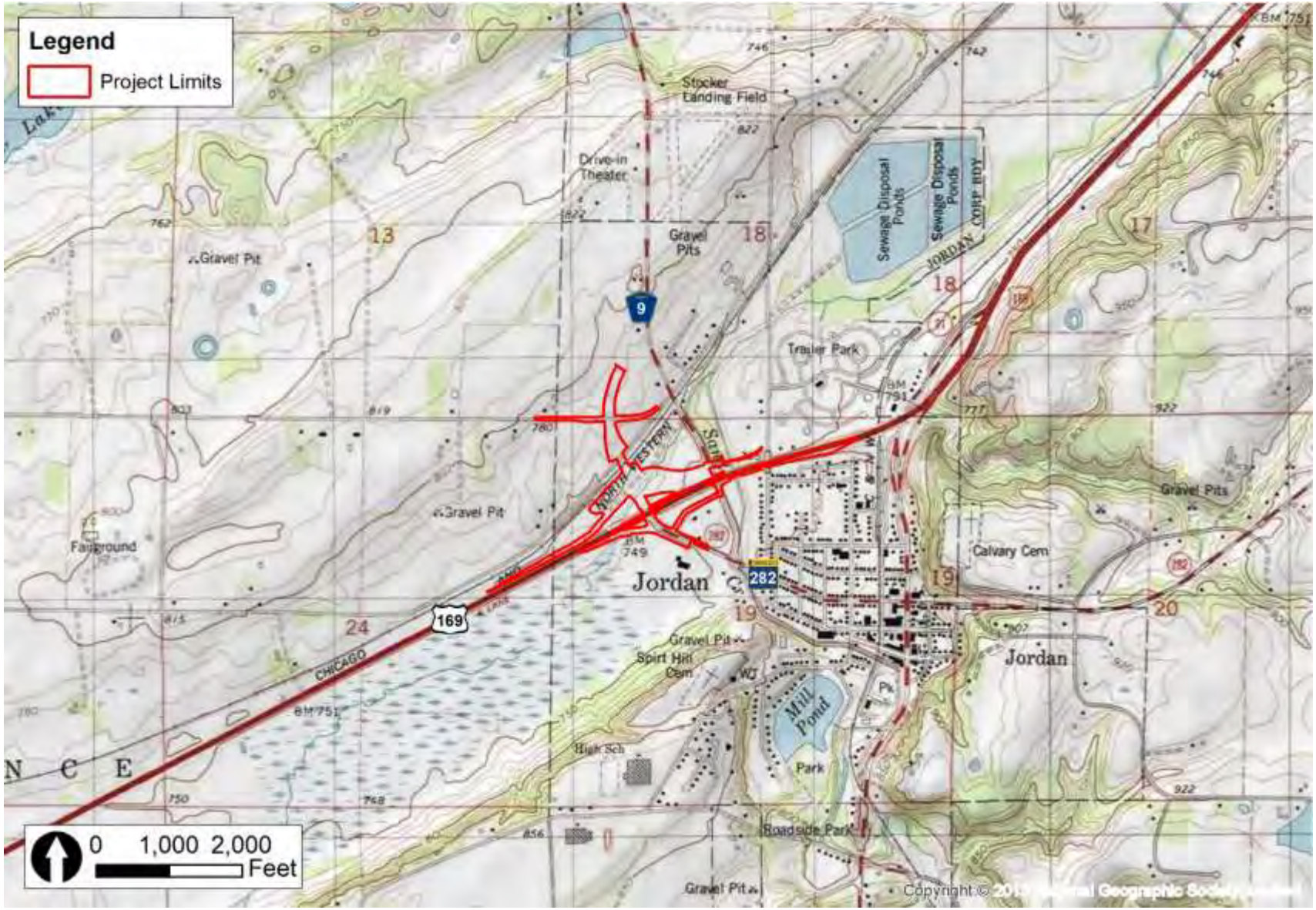


Figure 3: Project Limits Shown on Aerial Background

Figure 4: FEMA 100-Year Floodplain and Shoreland Overlay District for Sand Creek

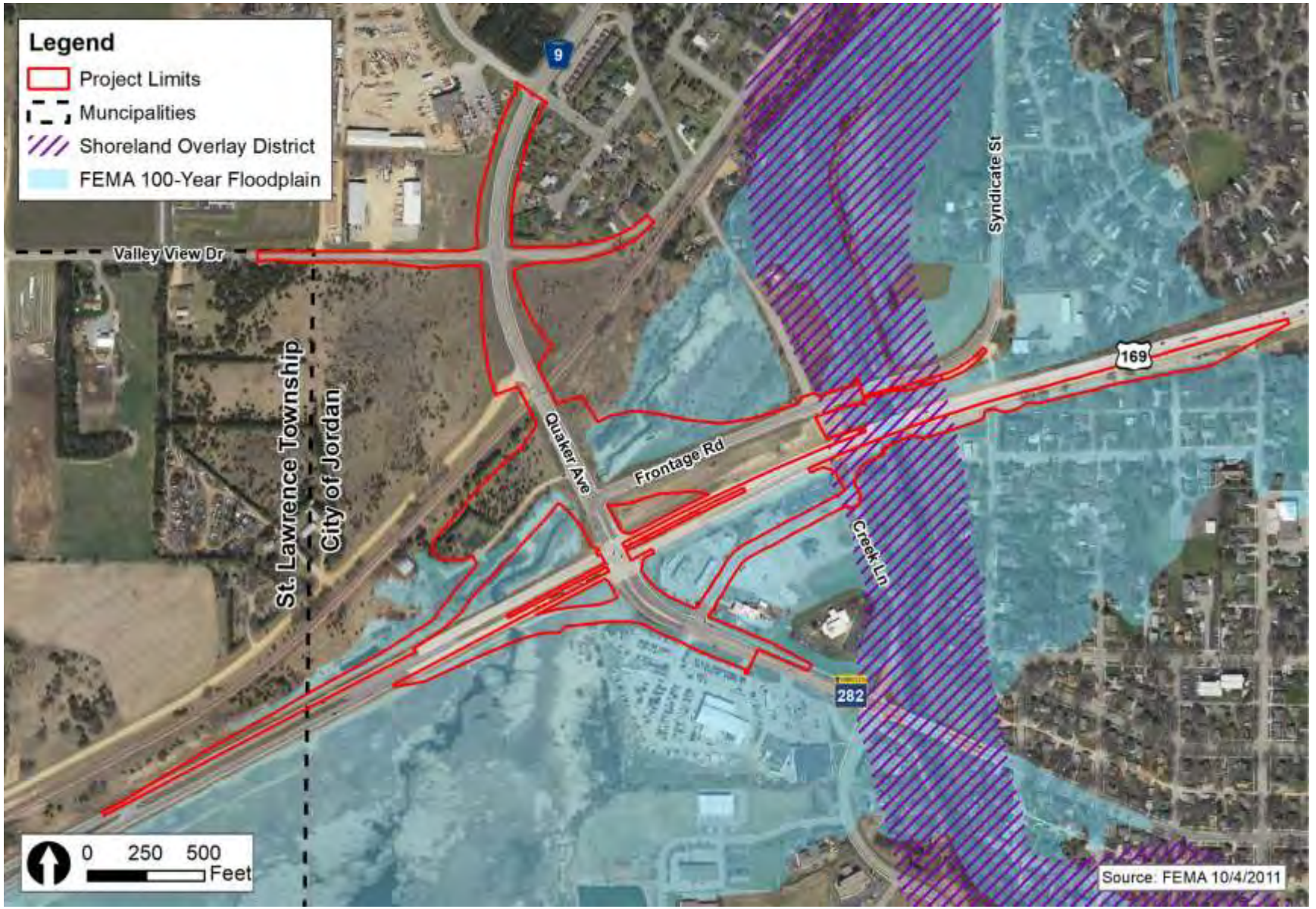


Figure 5: Delineated Aquatic Resources and Preliminary Impacts

Figure 6: Drinking Water Supply Management Area and Wellhead Protection Area

Figure 7: Regionally Significant Ecological Areas, Sites of Biodiversity Significance, and Native Plant Communities

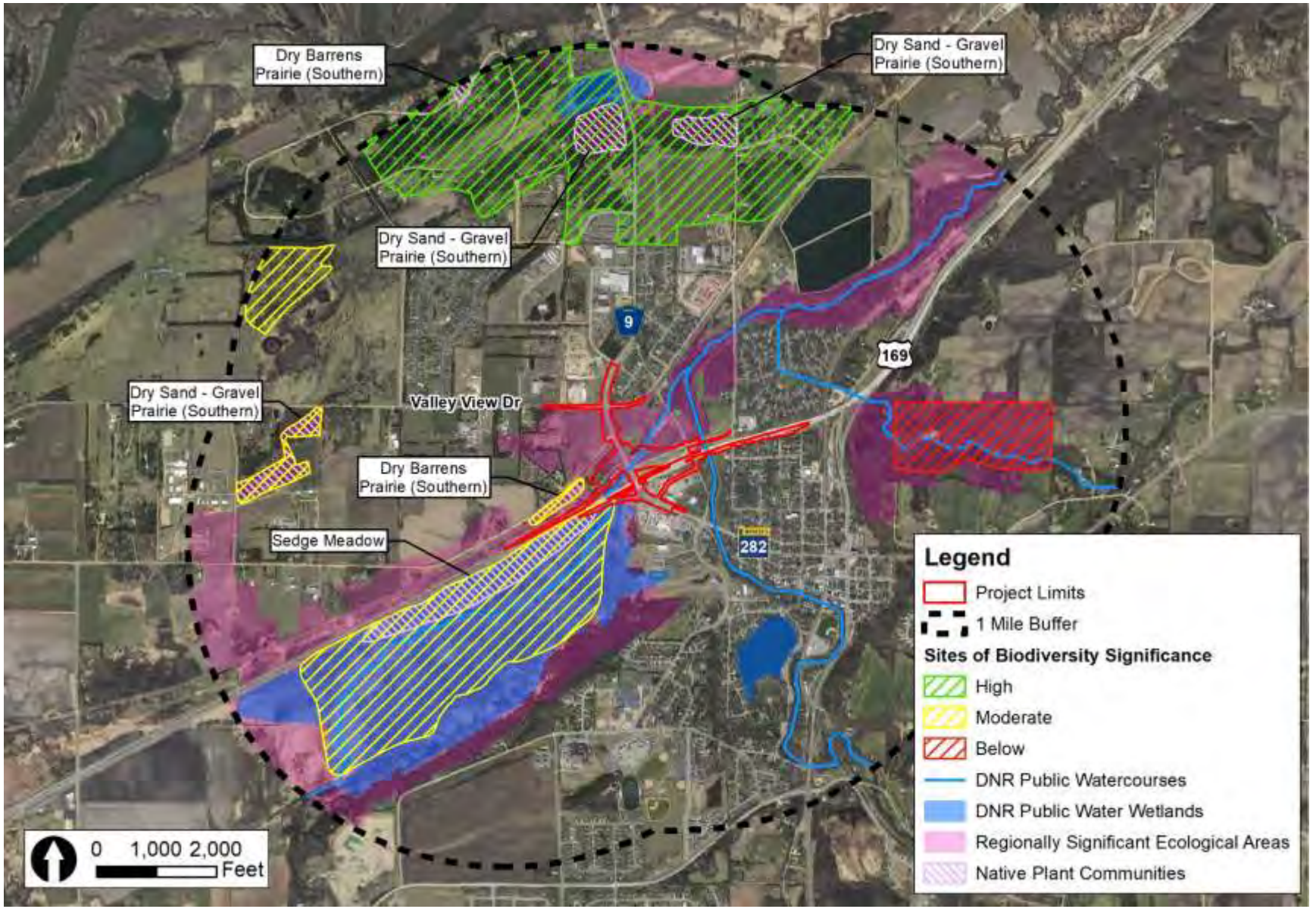
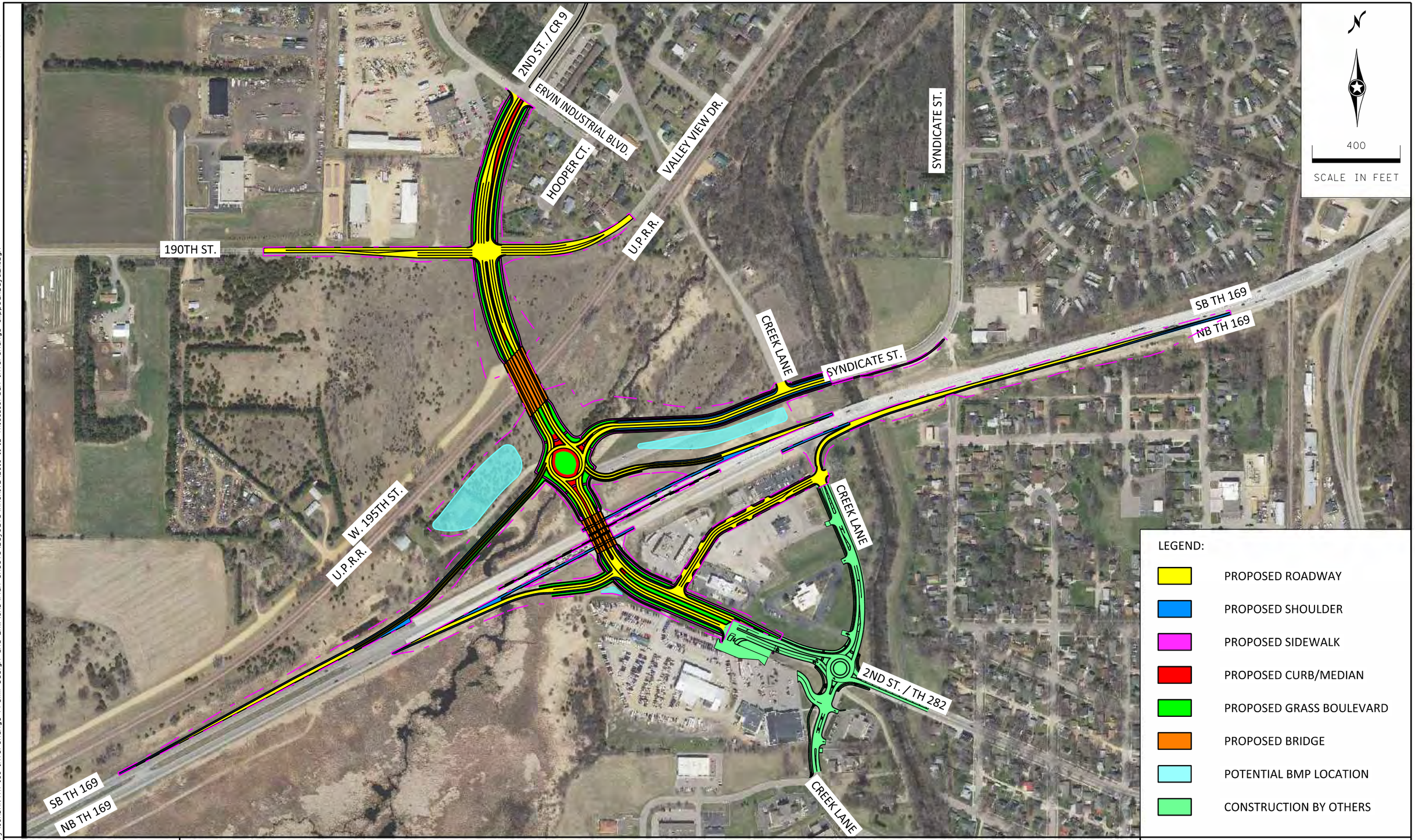


Figure 8: Potentially Suitable Brush/Grassland Habitat for the Henlow's Sparrow and Loggerhead Shrike

Appendix A

Project Layout



Kimley»Horn
767 EUSTIS STREET, SUITE 100
SAINT PAUL, MINNESOTA 55114
Ph: 651-645-4197 www.kimley-horn.com

JORDAN INTERCHANGE PROJECT AREA

11/18/2019

Appendix B

Minnesota Conservation Act Notice of Decision

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU)	Address
City of Jordan	**210 East First Street** **Jordan, MN 55352**

1. PROJECT INFORMATION

Applicant Name	Project Name	Date of Application	Application Number
City of Jordan	**TH169/TH282/CR9 Intersection Improvements Project**	**8/22/19**	**JORD1-19**

☒ **Attach site locator map.**

Type of Decision:

☒ **Wetland Boundary or Type** ☐ No-Loss ☐ Exemption ☐ Sequencing
☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel Findings and Recommendation (if any):

☐ Approve ☐ Approve with conditions ☐ Deny

Summary (or attach):

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: **9/26/19**

☒ **Approved** ☐ Approved with conditions (include below) ☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

Kimley-Horn has submitted a Type and Boundary application on behalf of the City of Jordan for the TH169/TH282/CR9 Intersection Improvements project. The report identifies six wetlands. The applicant is requesting a type and boundary concurrence through the WCA.

A TEP meeting was held on September 10, 2019 with representatives from the SCWD, BWSR, City and applicant present. The types and boundaries presented in the report were found to be accurate. A discussion on the incidental status of wet ditches 3, 4 and 5 led to Kimley-Horn submitting an Attachment B with evidence leading to verification that these wet ditches are not historical wetlands. Attached are the location map, wetland table, Attachment B and final wetland figure.

This decision does not reflect any decisions being made through section 404 of the CWA.

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.		
Name **Dan Donayre**	Title **Wetland Specilaist**	
Signature 	Date **9/26/19**	Phone Number and E-mail **507-625-4171 ext 2646** **dando@bolton-menk.com**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☒ Appeal of an LGU staff decision. Send petition and $**500.00** fee (if applicable) to: **City of Jordan** **210 East First Street** **Jordan, MN 55352**	☐ Appeal of LGU governing body decision. Send petition and $500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155

4. LIST OF ADDRESSEES

☒ **SWCD TEP member: Colin Schoenecker**
☒ **BWSR TEP member: Ben Carlson**
☐ LGU TEP member (if different than LGU Contact):
☒ DNR TEP member: **Leslie Parris**
☐ DNR Regional Office (if different than DNR TEP member)
☐ WD or WMO (if applicable):
☒ **Applicant and Landowner (if different)**
☐ Members of the public who requested notice:

☒ **Corps of Engineers Project Manager: David Studenski**
☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

➢ For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf

➢ For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf

➢ Department of Natural Resources Regional Offices:

NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

➢ For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687 or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

➢ For Wetland Bank Plan applications, also send a copy of the application to:

Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:
☒ **Location Map**
☒ **Wetland Table**
☒ **Attachment B**
☒ **Final Delineation Figure**
☐

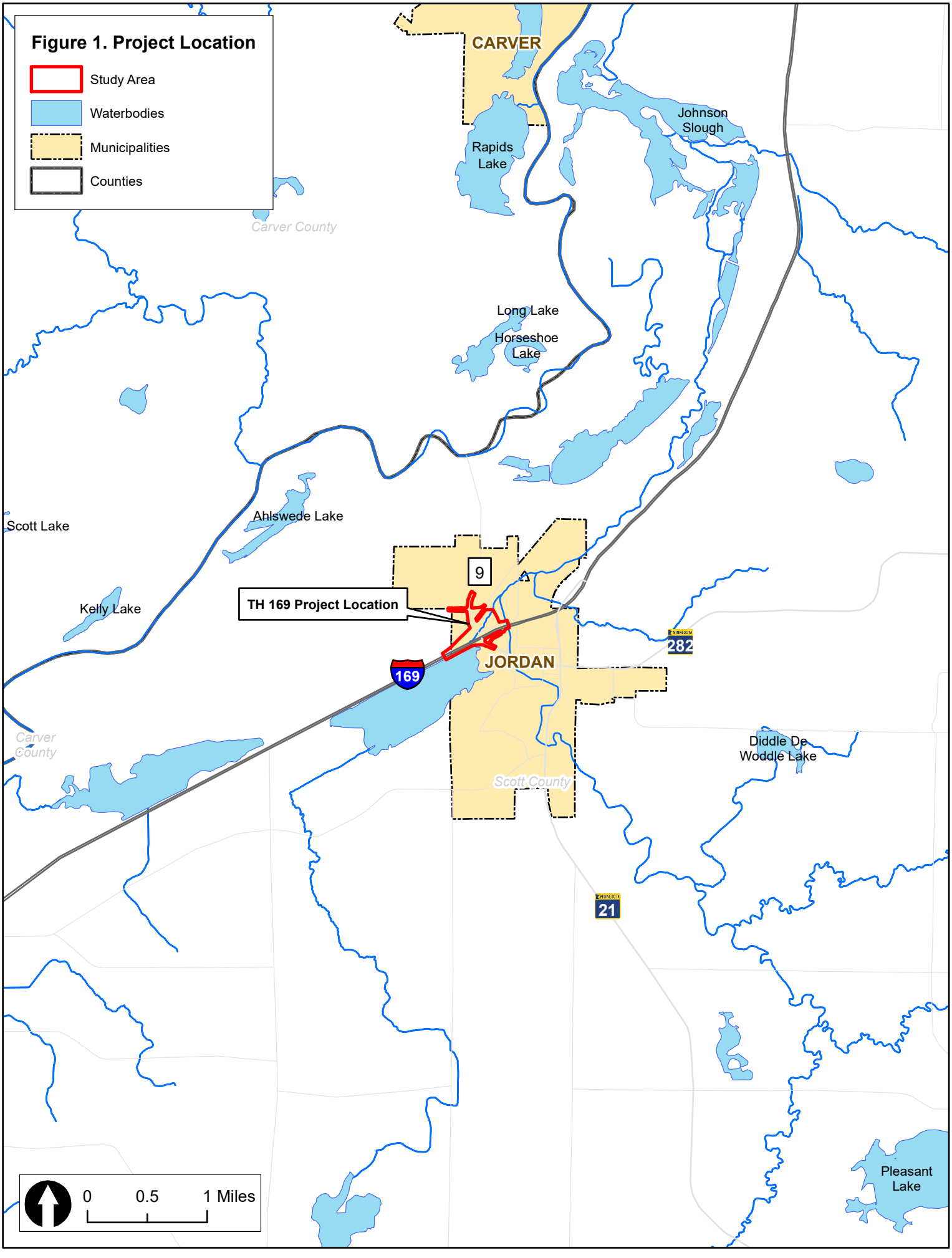


Figure 1. Project Location
Study Area
Waterbodies
Municipalities
Counties
CARVER
Carver County
Rapids Lake
Johnson Slough
Long Lake
Horseshoe Lake
Scott Lake
Ahlswede Lake
Kelly Lake
9
TH 169 Project Location
169
JORDAN
282
Carver County
Scott County
Diddle De Woddle Lake
21
Pleasant Lake
0
0.5
1 Miles

Table 1: Wetland Characteristics

Wetland ID	Figure Number(s)	Wetland Plant Community	C-39 Type	Size (acres)[1]	Representative Sample Points		Photo No.	NOTES
					Wetland	Upland		
Wetland 1*	3-2	Shallow Marsh	3	2.44	SP-12	SP-11	Photo 1, Photo 2	Wetland 1 is located southwest of the intersection of TH 169/TH282/CR9. This wetland area was located within a mapped DNR PWI/NWI wetland and hydric soil map unit according to the Scott County soil survey. The wetland is a large shallow marsh located within the floodplain of a perennial stream. The wetland boundary was at the TH 169 toe of slope and extended beyond the study area. This wetland is a DNR Public Water wetland, number 70-220W. The delineated portion of the wetland is completely within MnDOT ROW.
Wetland 2	3-2	Fresh (Wet) Meadow / Shallow Marsh / Deep Marsh	2/3/4	3.62	SP-7 SP-9	SP-8 SP-10	Photo 3, Photo 4, Photo 5, Photo 6, Photo 7, Photo 8	Wetland 2 is located northwest of the intersection of TH 169/TH282/CR9. This wetland area was located within a mapped NWI wetland and hydric soil map unit according to the Scott County soil survey. The wetland complex consists of three separate plant communities and is located within the floodplain of a perennial stream. The shallow marsh plant community is located in the northeastern portion of the wetland and was dominated by cattails and slough sedge. The fresh (wet) meadow plant community is located in the southwest portion of the wetland and was dominated by reed canary grass, sensitive fern, and giant goldenrod; this community also extended beyond the study area. Three pockets of the wetland complex contained a deep marsh plant community. This wetland complex is partially within MnDOT ROW and partially on private property.
Wetland Ditch 3	3-1	Seasonally Flooded Basin	1	0.15	SP-1	SP-2	Photo 9, Photo 10	Wetland Ditch 3 is a linear roadside ditch located between TH 169 and frontage road businesses southeast of the intersection of TH 169/TH282/CR9. The wetland was not located within a mapped NWI wetland nor a hydric soil map unit according to the Scott County soil survey. This wetland is completely within MnDOT ROW.
Wetland Ditch 4	3-1	Seasonally Flooded Basin	1	0.53	SP-1	SP-2 SP-3	Photo 11, Photo 12, Photo 13	Wetland Ditch 4 is seasonally flooded basin wetland located within a wide ditch between TH169 and the Frontage Rd northeast of the intersection of TH 169/TH282/CR9. This wetland area was located within a mapped NWI wetland and hydric soil map unit according to the Scott County soil survey. The majority of the wetland was located within Scott County ROW.
Wetland Ditch 5	3-1	Seasonally Flooded Basin	1	0.01	SP-1	SP-2	Photo 14	Wetland Ditch 5 is a small roadside ditch located southeast of the intersection of TH 169 and Creek Lane. The wetland was not located within a mapped NWI wetland nor a hydric soil map unit according to the Scott County soil survey. This wetland is completely within MnDOT ROW.
Wetland 6	3-1	Seasonally Flooded Basin	1	2.33	SP-5 SP-13 SP-14	SP-6 SP-15 SP-16	Photo 15, Photo 16, Photo 17	Wetland 6 is located northeast of the intersection of CR 9 and the Frontage Road. This wetland area was located within a mapped DNR PWI/NWI wetland and hydric soil map unit according to the Scott County soil survey. The wetland is a large seasonally flooded basin located within the floodplain of a perennial stream. The wetland is completely located on private property.

***Denotes DNR Public Water**

[1] Size of the wetland within the study area, some wetlands extend beyond the study area; all wetland sizes rounded to nearest hundredth acre

Attachment B
Supporting Information for Applications Involving Exemptions, No Loss Determinations, and Activities Not Requiring Mitigation

Complete this part ***if*** you maintain that the identified aquatic resource impacts in Part Four do not require wetland replacement/compensatory mitigation OR ***if*** you are seeking verification that the proposed water resource impacts are either exempt from replacement or are not under CWA/WCA jurisdiction.

Identify the specific exemption or no-loss provision for which you believe your project or site qualifies:

WCA: 8420.0105, Subpart 2, Part D: Identified wetlands located in the bottom of roadside ditches are "Incidental".

Section 404 of the Clean Water Act: Excluded Waters (Non-Waters of the U.S.) paragraph (b)(3)(i): Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.

Provide a detailed explanation of how your project or site qualifies for the above. Be specific and provide and refer to attachments and exhibits that support your contention. Applicants should refer to rules (e.g. WCA rules), guidance documents (e.g. BWSR guidance, Corps guidance letters/public notices), and permit conditions (e.g. Corps General Permit conditions) to determine the necessary information to support the application. Applicants are strongly encouraged to contact the WCA LGU and Corps Project Manager prior to submitting an application if they are unsure of what type of information to provide:

<u>WCA 8420.0105, Subpart 2, Part D – Incidental Wetlands</u>

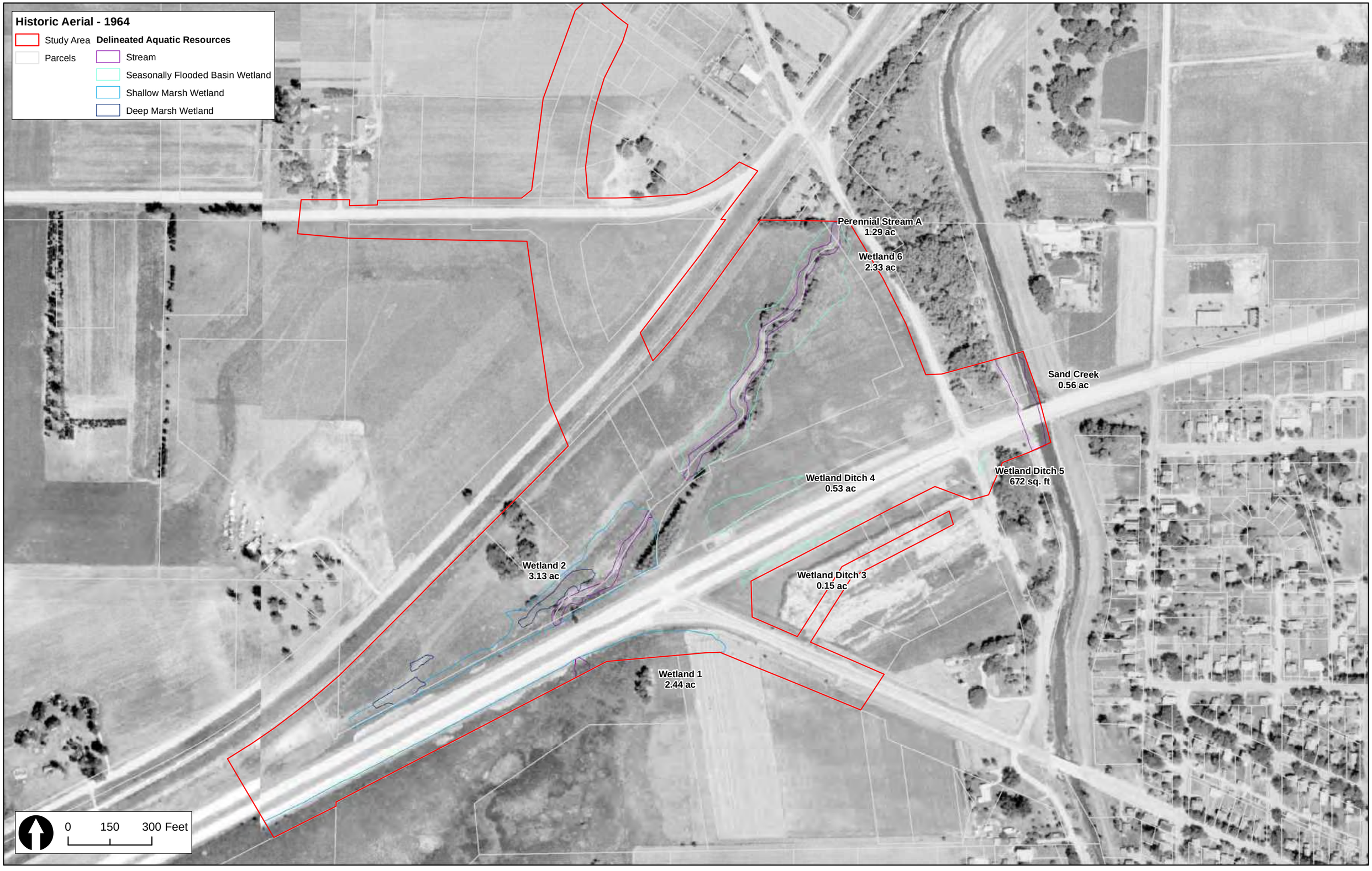
Wetland Ditch 3, 4 and 5 are located in the bottom of roadside ditches. These wetlands meet the definition of "incidental" (as identified in 8420.0105, Subpart 2, Part D) as they have been created in historically upland areas and are dependent on the adjacent roadway runoff for their hydrology; therefore, we assume that the roadside ditches are incidental and not regulated under WCA.

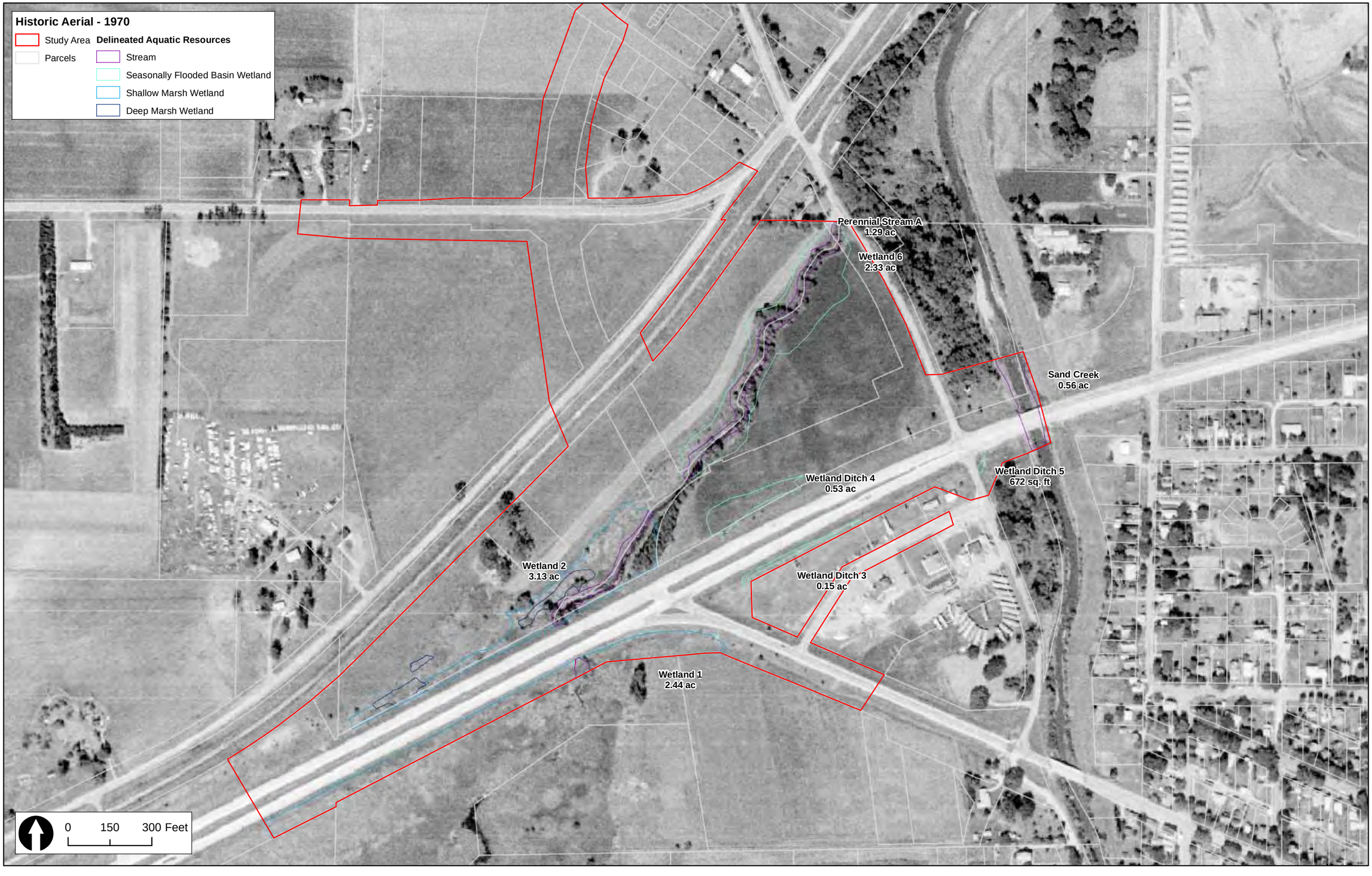
<u>Section 404 of the Clean Water Act: Excluded Waters (Non-Waters of the U.S.)</u>

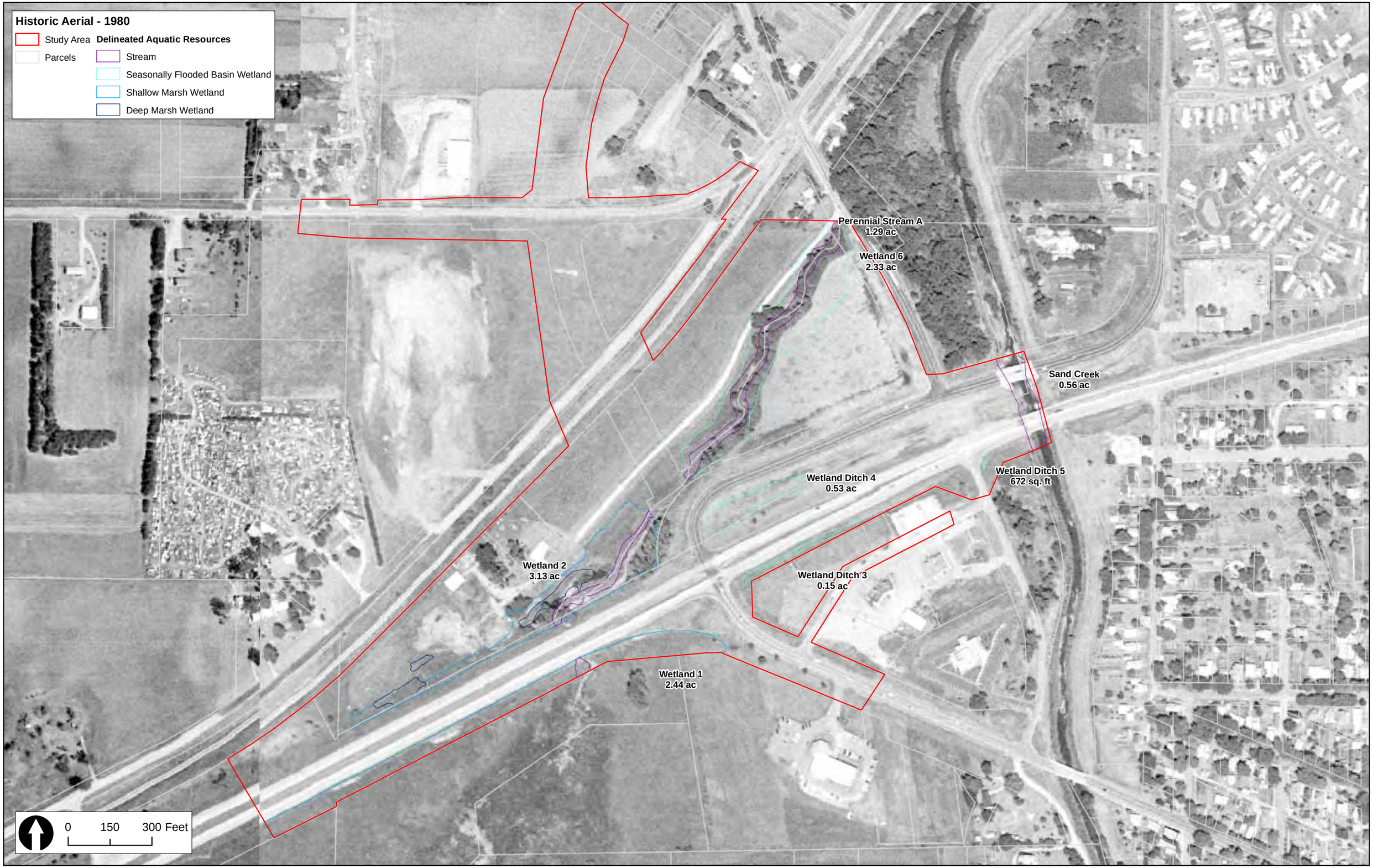
Wetland Ditch 3, 4, 5 were located in the bottom of roadside ditches. These wetlands would be considered excluded from consideration from being Waters of the US based on the criteria outlined in (b)(3)(i): Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary. These conclusions are based on the rationale that they are constructed features that only exhibit ephemeral flow and are not relocated tributary or excavated tributary. See attached for historic aerial photos.


Historic Aerial - 1937
Study Area
Parcels
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Perennial Stream A
1.29 ac
Wetland 6
2.33 ac
Sand Creek
0.56 ac
Wetland Ditch 5
672 sq. ft
Wetland Ditch 4
0.53 ac
Wetland Ditch 3
0.15 ac
Wetland 2
3.13 ac
Wetland 1
2.44 ac
0
150
300 Feet


Historic Aerial - 1957
Study Area
Parcels
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Perennial Stream A
1.29 ac
Wetland 6
2.33 ac
Sand Creek
0.56 ac
Wetland Ditch 4
0.53 ac
Wetland Ditch 5
672 sq. ft
Wetland 2
3.13 ac
Wetland Ditch 3
0.15 ac
Wetland 1
2.44 ac
0
150
300 Feet


Historic Aerial - 1964
Study Area
Parcels
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Perennial Stream A
1.29 ac
Wetland 6
2.33 ac
Sand Creek
0.56 ac
Wetland Ditch 4
0.53 ac
Wetland Ditch 5
672 sq. ft
Wetland 2
3.13 ac
Wetland Ditch 3
0.15 ac
Wetland 1
2.44 ac
0
150
300 Feet


Historic Aerial - 1970
Study Area
Parcels
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Perennial Stream A
1.29 ac
Wetland 6
2.33 ac
Sand Creek
0.56 ac
Wetland Ditch 4
0.53 ac
Wetland Ditch 5
672 sq. ft
Wetland 2
3.13 ac
Wetland Ditch 3
0.15 ac
Wetland 1
2.44 ac
0
150
300 Feet


Historic Aerial - 1980
Study Area
Parcels
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Perennial Stream A
1.29 ac
Wetland 6
2.33 ac
Sand Creek
0.56 ac
Wetland Ditch 4
0.53 ac
Wetland Ditch 5
672 sq. ft
Wetland 2
3.13 ac
Wetland Ditch 3
0.15 ac
Wetland 1
2.44 ac
0
150
300 Feet

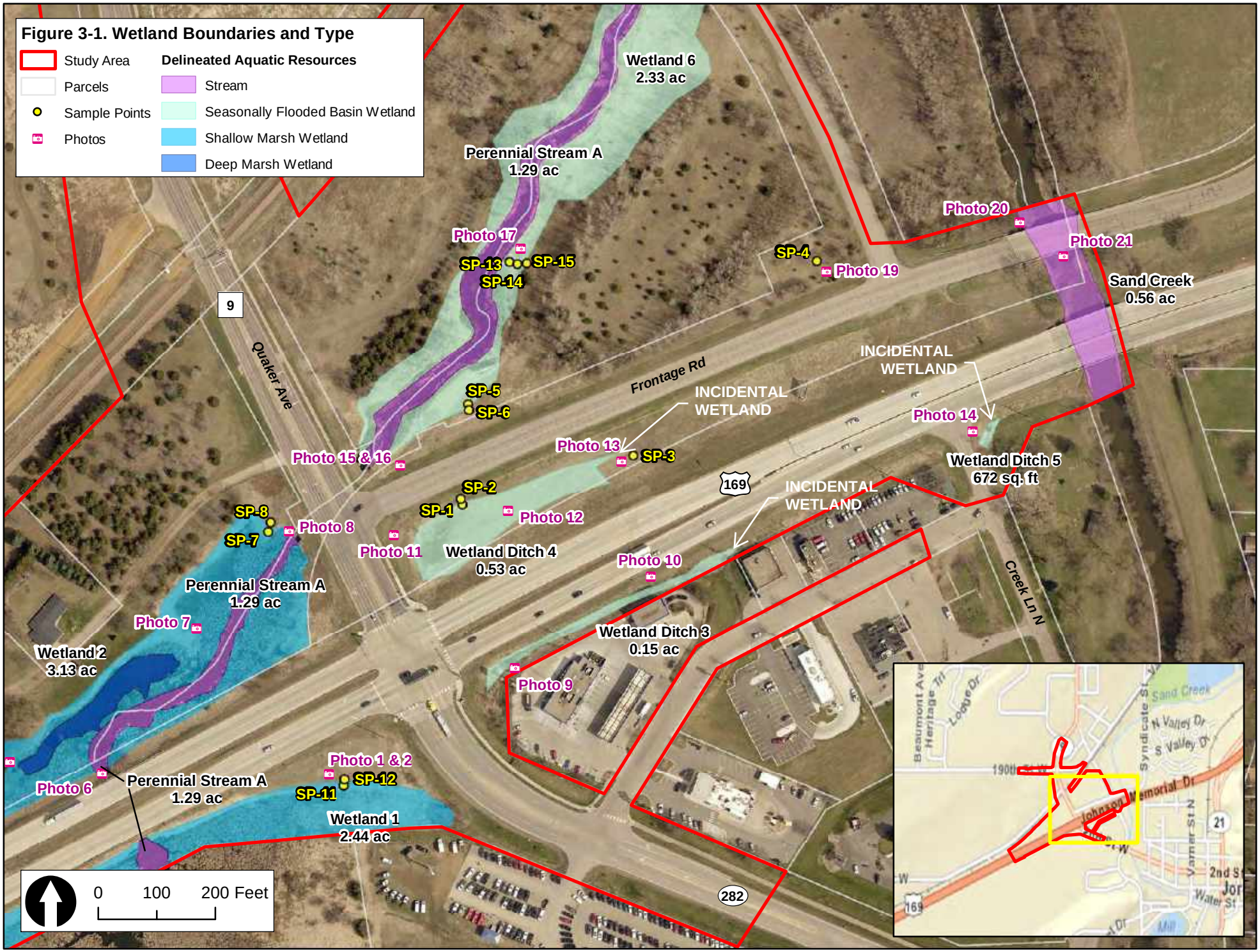


Figure 3-1. Wetland Boundaries and Type
Study Area
Parcels
Sample Points
Photos
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Wetland 6
2.33 ac
Perennial Stream A
1.29 ac
Photo 17
SP-13
SP-15
SP-14
SP-4
Photo 19
Photo 20
Photo 21
Sand Creek
0.56 ac
9
Quaker Ave
Frontage Rd
INCIDENTAL
WETLAND
SP-5
SP-6
Photo 14
Photo 13
SP-3
Photo 15 & 16
Wetland Ditch 5
672 sq. ft
169
SP-2
SP-1
SP-8
SP-7
Photo 8
Photo 12
Photo 11
Wetland Ditch 4
0.53 ac
Photo 10
Creek Ln N
Perennial Stream A
1.29 ac
Photo 7
Wetland 2
3.13 ac
Wetland Ditch 3
0.15 ac
Photo 9
Photo 1 & 2
SP-12
SP-11
Photo 6
Perennial Stream A
1.29 ac
Wetland 1
2.44 ac
282
0
100
200 Feet

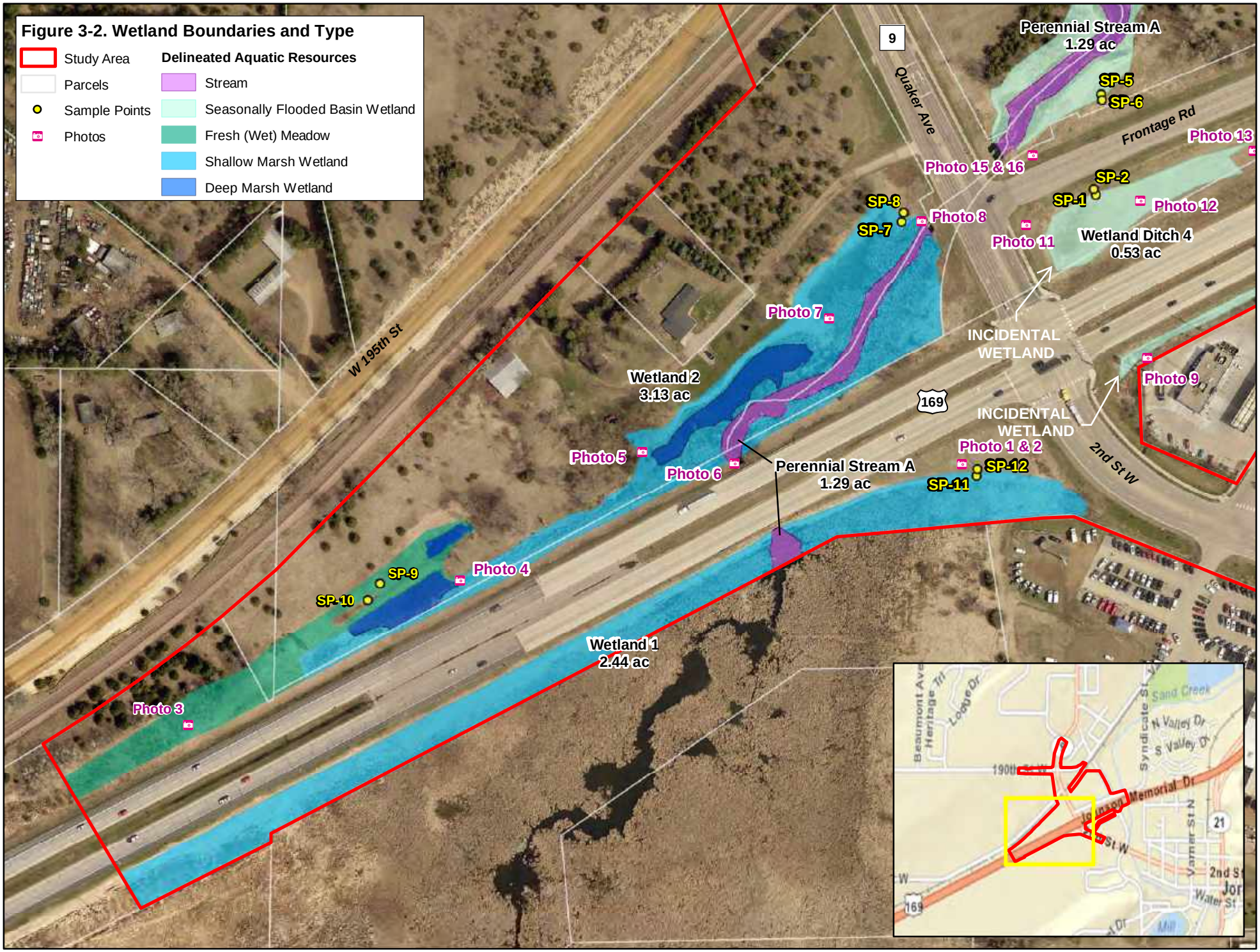


Figure 3-2. Wetland Boundaries and Type
Study Area
Parcels
Sample Points
Photos
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Fresh (Wet) Meadow
Shallow Marsh Wetland
Deep Marsh Wetland
9
Quaker Ave
Perennial Stream A
1.29 ac
SP-5
SP-6
Frontage Rd
Photo 13
Photo 15 & 16
SP-2
SP-1
Photo 12
SP-8
Photo 8
SP-7
Photo 11
Wetland Ditch 4
0.53 ac
INCIDENTAL
WETLAND
Photo 7
W 195th St
Wetland 2
3.13 ac
169
Photo 9
INCIDENTAL
WETLAND
Photo 1 & 2
SP-12
2nd St W
Photo 5
Photo 6
Perennial Stream A
1.29 ac
SP-11
SP-9
Photo 4
SP-10
Wetland 1
2.44 ac
Photo 3
Sand Creek
N Valley Dr
S Valley Dr
Memorial Dr
21
Water St

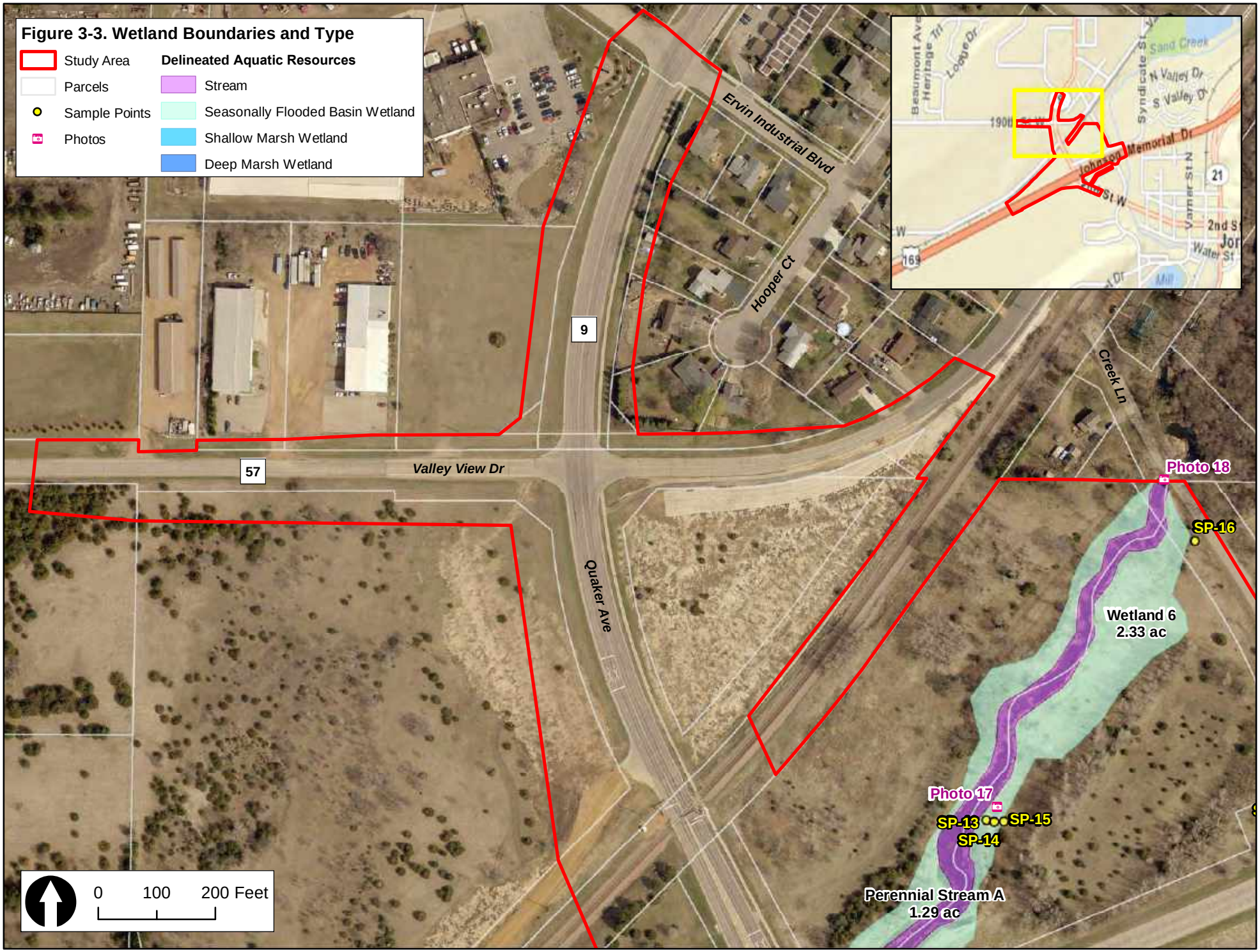
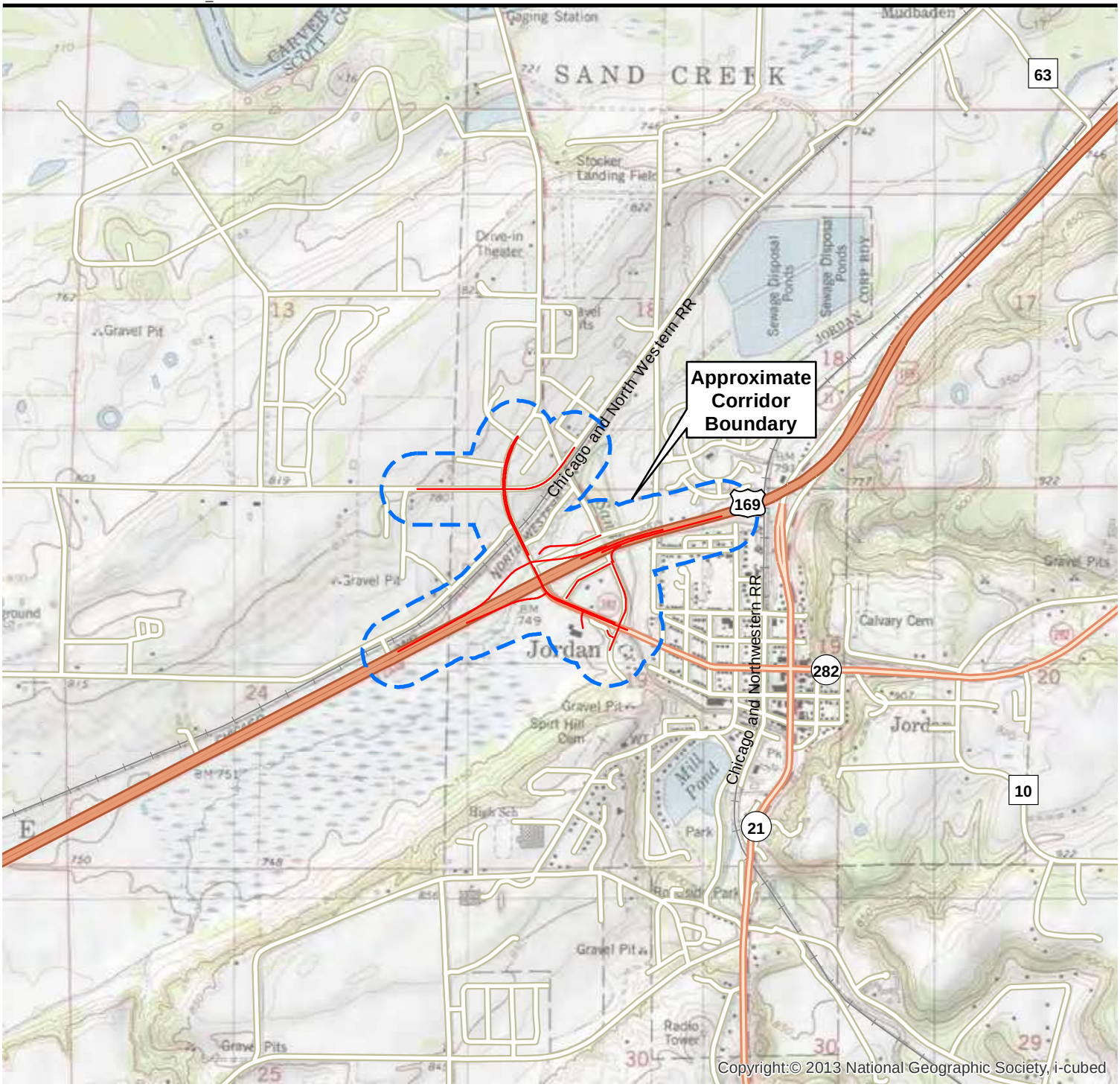


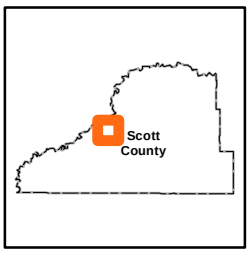
Figure 3-3. Wetland Boundaries and Type
Study Area
Parcels
Sample Points
Photos
Delineated Aquatic Resources
Stream
Seasonally Flooded Basin Wetland
Shallow Marsh Wetland
Deep Marsh Wetland
Ervin Industrial Blvd
Hooper Ct
9
57
Valley View Dr
Quaker Ave
Creek Ln
Photo 18
SP-16
Wetland 6
2.33 ac
Photo 17
SP-13
SP-15
SP-14
Perennial Stream A
1.29 ac
0
100
200 Feet

Appendix C

Figures from the Modified Phase I Environmental Site Assessment

F:\2019\B1901723\GIS\B1901723_SiteLoc.mxd





Approximate Alignment

500' Buffer

N

0 1,000 2,000 Feet

1 inch = 2,000 feet

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Date Drawn:	3/20/2019
Checked By:	JLB
Last Modified:	7/15/2019

Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor Location Map

Figure 1

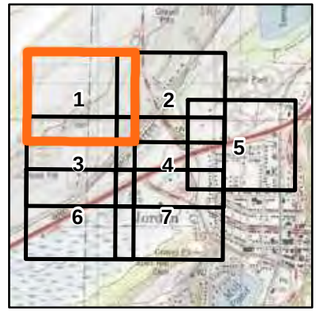
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM01	Cultivated Cropland	De Minimis
DM02	Stormwater Pond	De Minimis
DM03	Jordan Mini Storage	De Minimis
DM04	Bobby & Steve's Auto World Property	De Minimis
DM05	Undeveloped Lot	De Minimis
DM06	820 Quaker Avenue Residence	De Minimis
DM07	CR 9/Quaker Avenue	De Minimis
DM08	Hooper Court Residences	De Minimis
DM09	701 Hooper Court Residence	De Minimis
DM10	Hooper Street & 7th/8th/9th Street Residences	De Minimis

N

0 100 200 Feet

1 inch = 200 feet



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Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

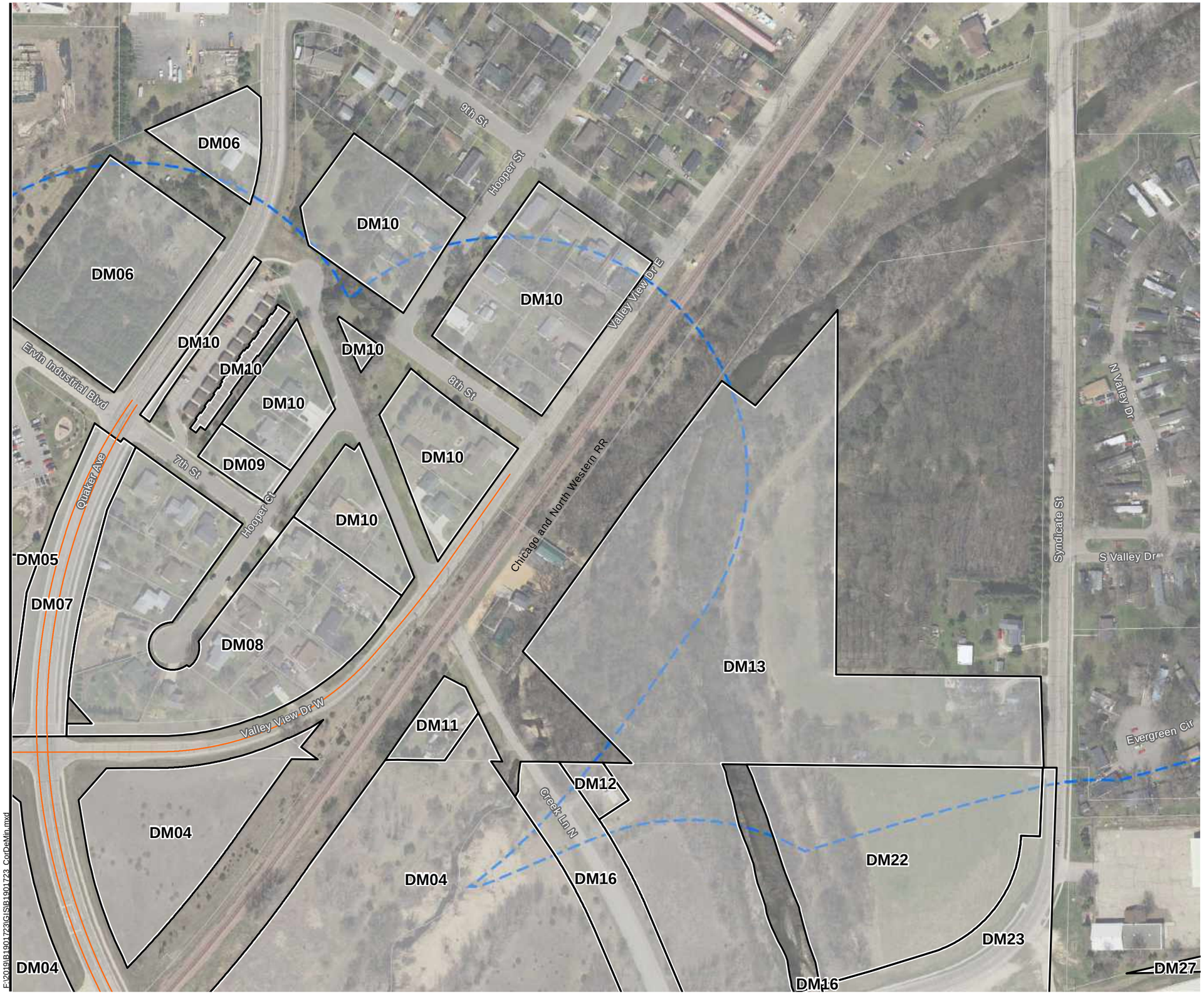
Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 1 of 7

Figure 2

F:\2019\B1901723\GIS\B1901723_CorDeMin.mxd



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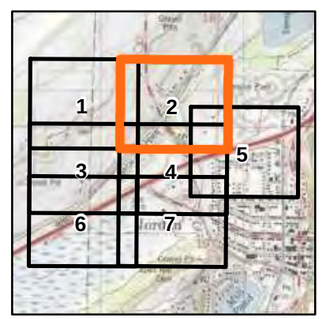
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM04	Bobby & Steve's Auto World Property	De Minimis
DM05	Undeveloped Lot	De Minimis
DM06	820 Quaker Avenue Residence	De Minimis
DM07	CR 9/Quaker Avenue	De Minimis
DM08	Hooper Court Residences	De Minimis
DM09	701 Hooper Court Residence	De Minimis
DM10	Hooper Street & 7th/8th/9th Street Residences	De Minimis
DM11	350 Creek Lane Residence	De Minimis
DM12	Consolidated Communications	De Minimis
DM13	716 Syndicate Street Residence & Wooded Land	De Minimis
DM16	ROW, Frontage Road, & Creek Lane	De Minimis
DM22	Undeveloped Lot	De Minimis
DM23	ROW, Frontage Road, & Syndicate Street	De Minimis
DM27	TH 169 & ROW	De Minimis

N

0 100 200 Feet

1 inch = 200 feet



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Project Information

Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 2 of 7

Figure 2

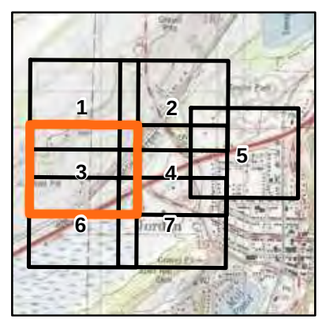
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM01	Cultivated Cropland	De Minimis
DM02	Stormwater Pond	De Minimis
DM03	Jordan Mini Storage	De Minimis
DM04	Bobby & Steve's Auto World Property	De Minimis
DM05	Undeveloped Lot	De Minimis
DM07	CR 9/Quaker Avenue	De Minimis
DM08	Hooper Court Residences	De Minimis
DM14	Cultivated Cropland & Wetlands	De Minimis
DM15	Undeveloped Land & Wetlands	De Minimis

N

0 100 200
Feet

1 inch = 200 feet



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Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 3 of 7

Figure 2

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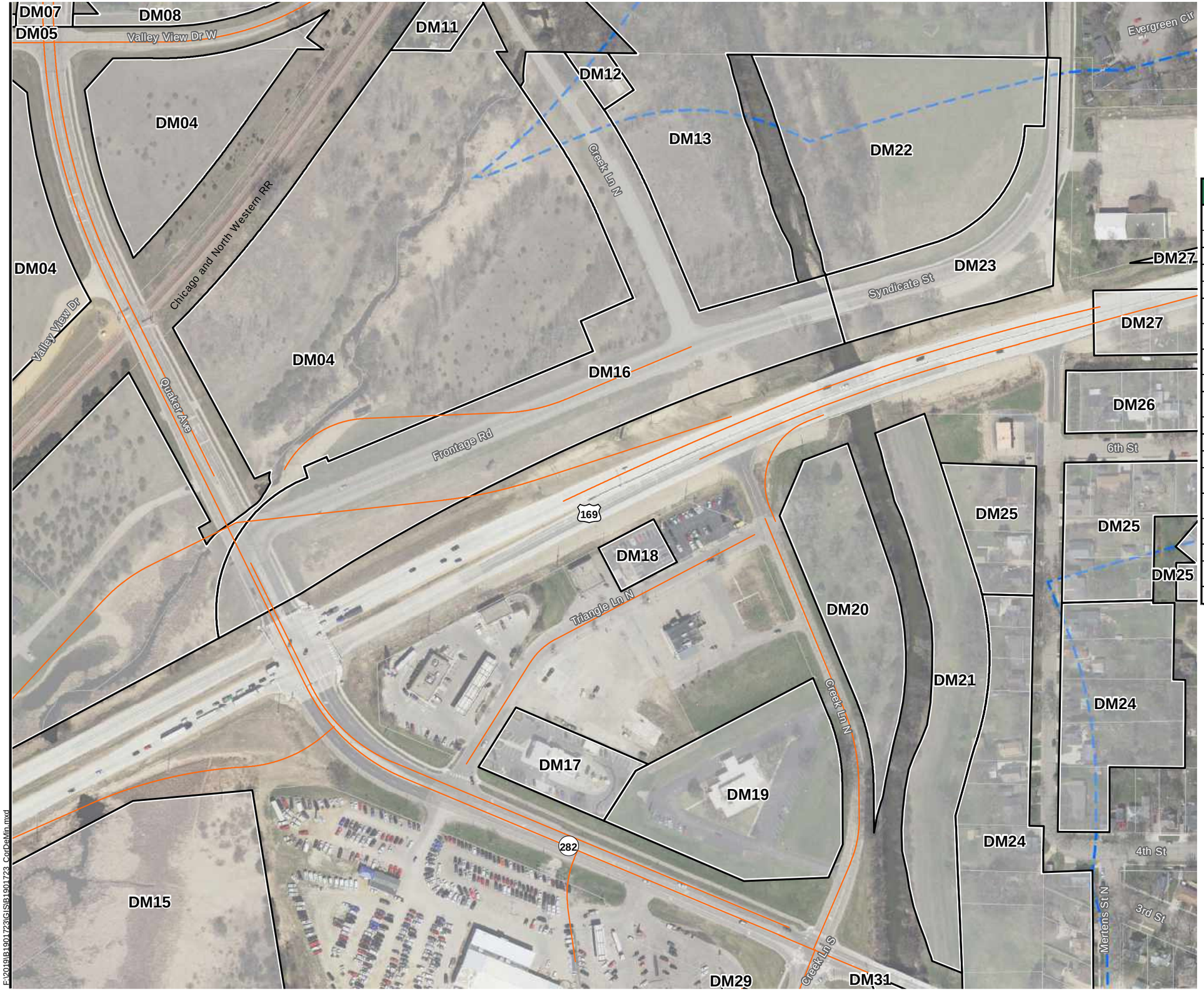


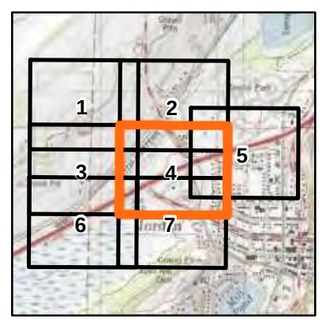
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM04	Bobby & Steve's Auto World Property	De Minimis
DM05	Undeveloped Lot	De Minimis
DM07	CR 9/Quaker Avenue	De Minimis
DM08	Hooper Court Residences	De Minimis
DM11	350 Creek Lane Residence	De Minimis
DM12	Consolidated Communications	De Minimis
DM13	716 Syndicate Street Residence & Wooded Land	De Minimis
DM15	Undeveloped Land & Wetlands	De Minimis
DM17	McDonald's	De Minimis
DM18	Vacant Commercial Building	De Minimis
DM19	Frandsen Bank & Trust	De Minimis
DM20	Riesgraf-Lions Park	De Minimis
DM21	Levee	De Minimis
DM24	Mertens & Syndicate Street Residences	De Minimis
DM25	Syndicate & 6th Street Residences	De Minimis
DM26	Varner & 6th Street Residences	De Minimis
DM27	TH 169 & ROW	De Minimis
DM29	Natural Gas Pipeline Valve System & Creek Lane South	De Minimis
DM31	Sand Creek	De Minimis

N

0 100 200 Feet

1 inch = 200 feet



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Project Information

Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 4 of 7

Figure 2

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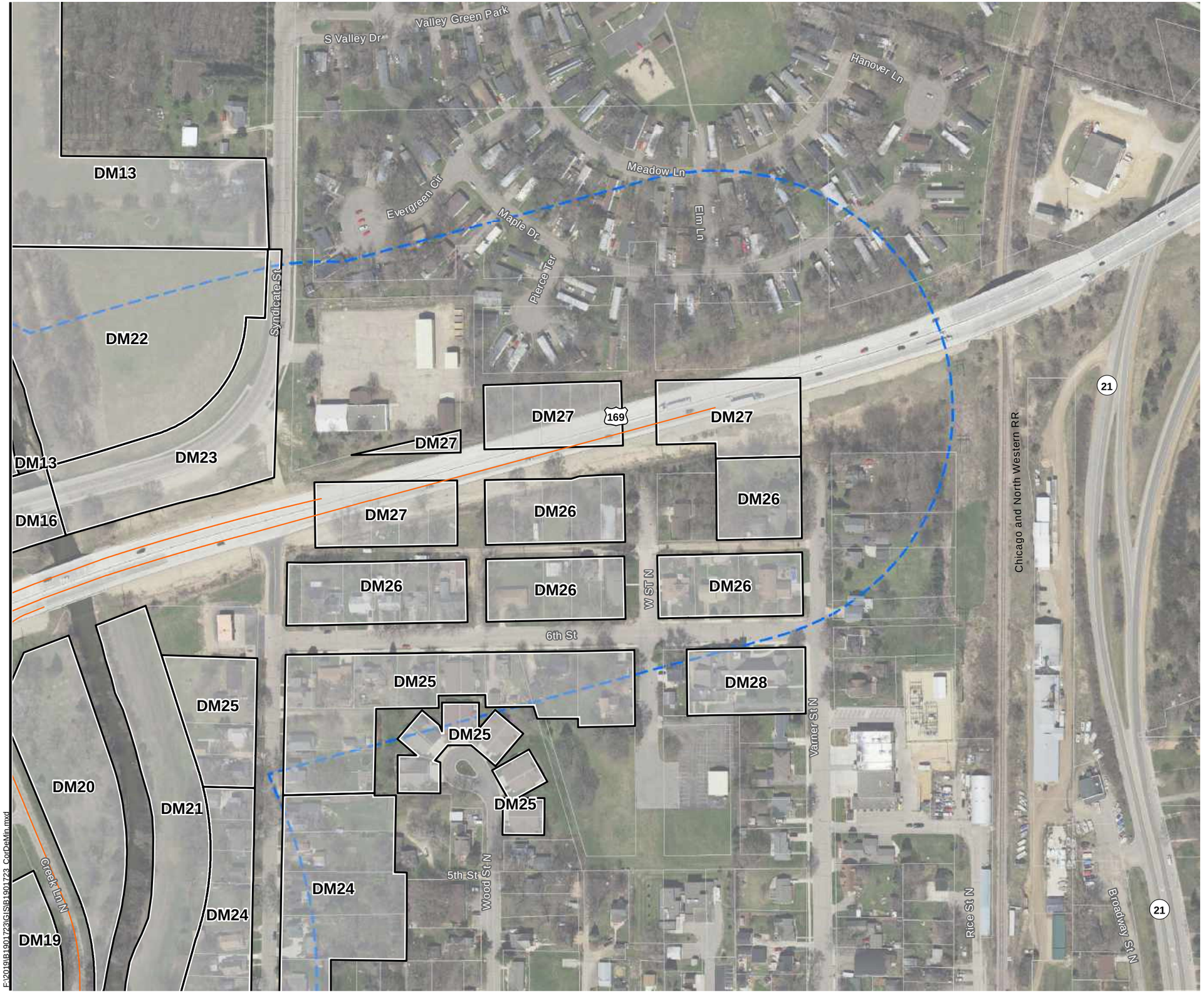


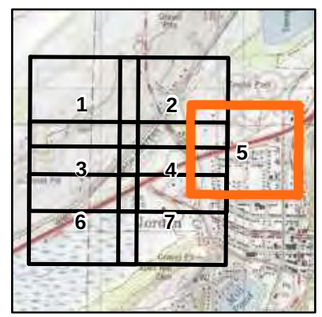
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM13	716 Syndicate Street Residence & Wooded Land	De Minimis
DM16	ROW, Frontage Road, & Creek Lane	De Minimis
DM19	Frandsen Bank & Trust	De Minimis
DM20	Riesgraf-Lions Park	De Minimis
DM21	Levee	De Minimis
DM22	Undeveloped Lot	De Minimis
DM23	ROW, Frontage Road, & Syndicate Street	De Minimis
DM24	Mertens & Syndicate Street Residences	De Minimis
DM25	Syndicate & 6th Street Residences	De Minimis
DM26	Varner & 6th Street Residences	De Minimis
DM27	TH 169 & ROW	De Minimis
DM28	St. Paul's Lutheran Church	De Minimis

N

0 100 200
Feet

1 inch = 200 feet



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Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 5 of 7

Figure 2

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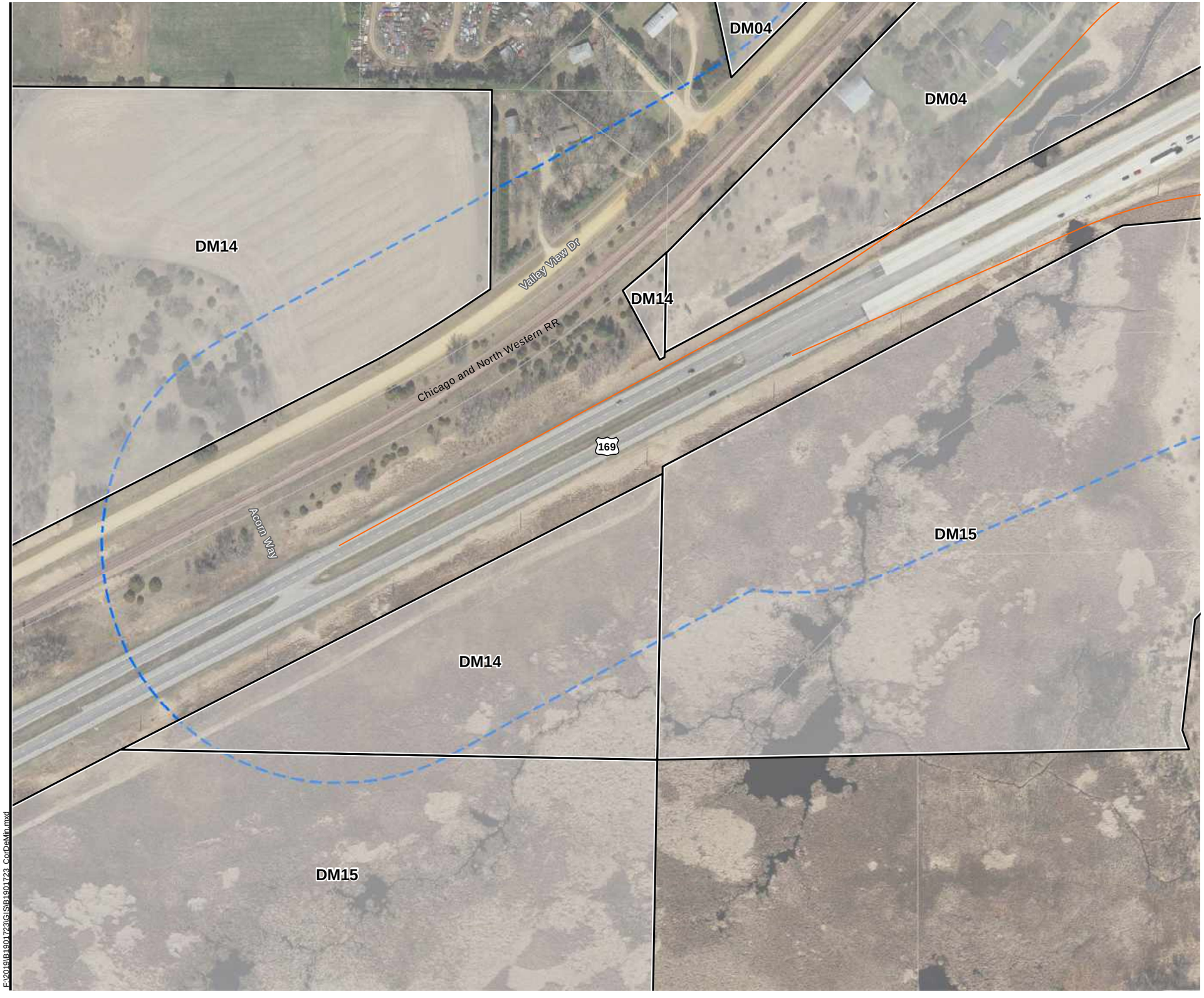


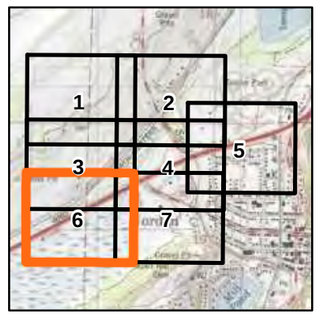
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM04	Bobby & Steve's Auto World Property	De Minimis
DM14	Cultivated Cropland & Wetlands	De Minimis
DM15	Undeveloped Land & Wetlands	De Minimis

N

0 100 200 Feet

1 inch = 200 feet



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Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 6 of 7

Figure 2

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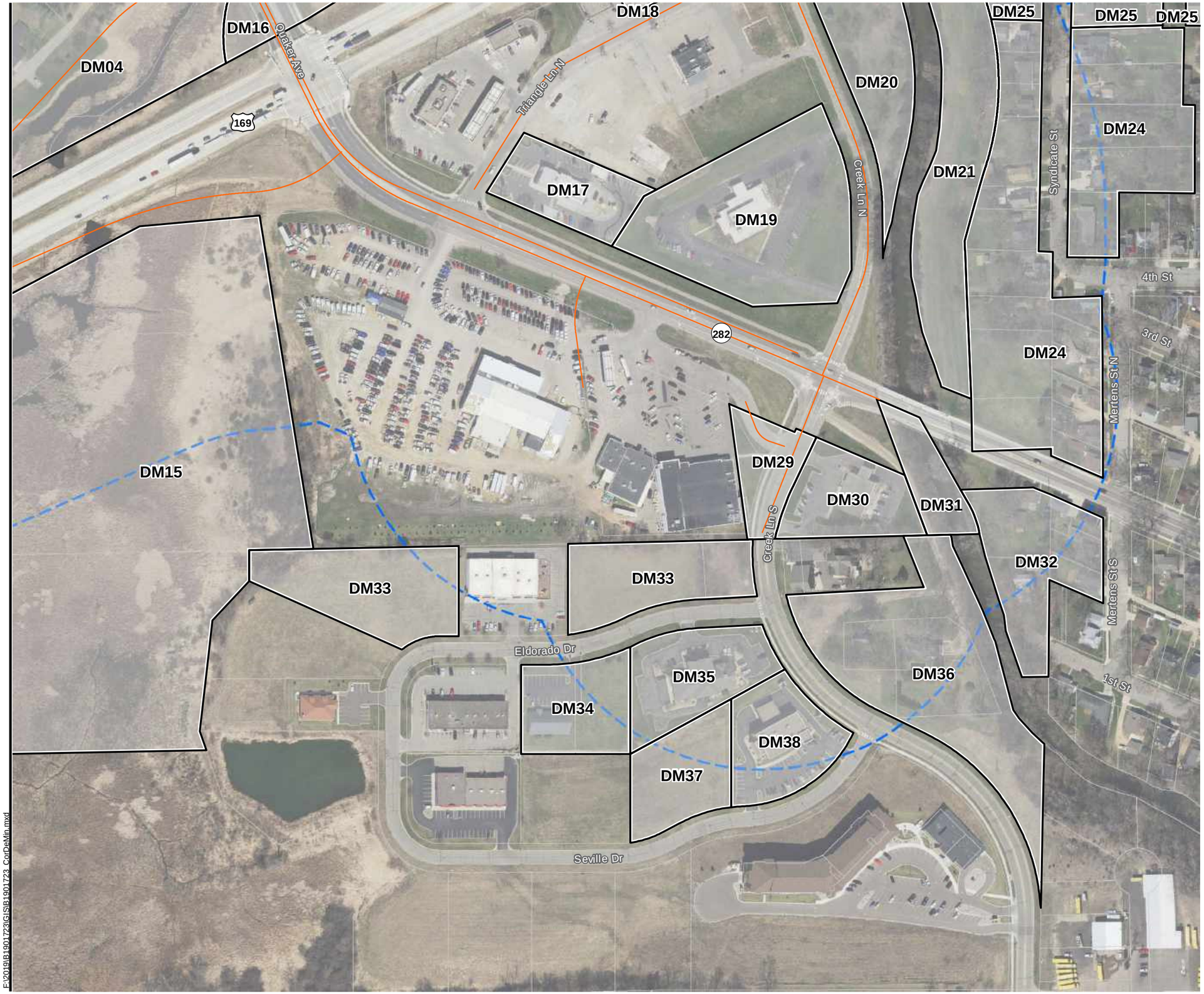


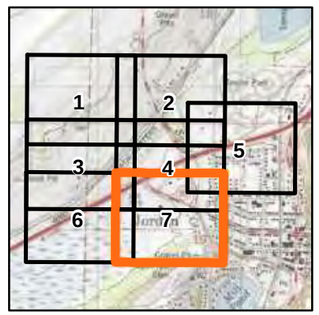
De Minimis Parcels
Approximate Alignment
500' Buffer

Site Number	Site Name	Potential for Contamination
DM04	Bobby & Steve's Auto World Property	De Minimis
DM15	Undeveloped Land & Wetlands	De Minimis
DM16	ROW, Frontage Road, & Creek Lane	De Minimis
DM17	McDonald's	De Minimis
DM18	Vacant Commercial Building	De Minimis
DM19	Frandsen Bank & Trust	De Minimis
DM20	Riesgraf-Lions Park	De Minimis
DM21	Levee	De Minimis
DM24	Mertens & Syndicate Street Residences	De Minimis
DM25	Syndicate & 6th Street Residences	De Minimis
DM29	Natural Gas Pipeline Valve System & Creek Lane South	De Minimis
DM30	Hometown Bank	De Minimis
DM31	Sand Creek	De Minimis
DM32	Mertens & 1st Street Residences	De Minimis
DM33	Undeveloped Lots	De Minimis
DM34	Bauer Fine Arts Academy	De Minimis
DM35	Iris Valley/ Glowing Hearth & Home	De Minimis
DM36	Creek Lane Residences & Undeveloped Land	De Minimis
DM37	Undeveloped Lot	De Minimis
DM38	Riverland Bank	De Minimis

N

0 100 200 Feet

1 inch = 200 feet



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Drawing No: B1901723_CorDeMin

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Drawn Drawn: 5/8/2019
Checked By: JB
Last Modified: 7/15/2019

Project Information

Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

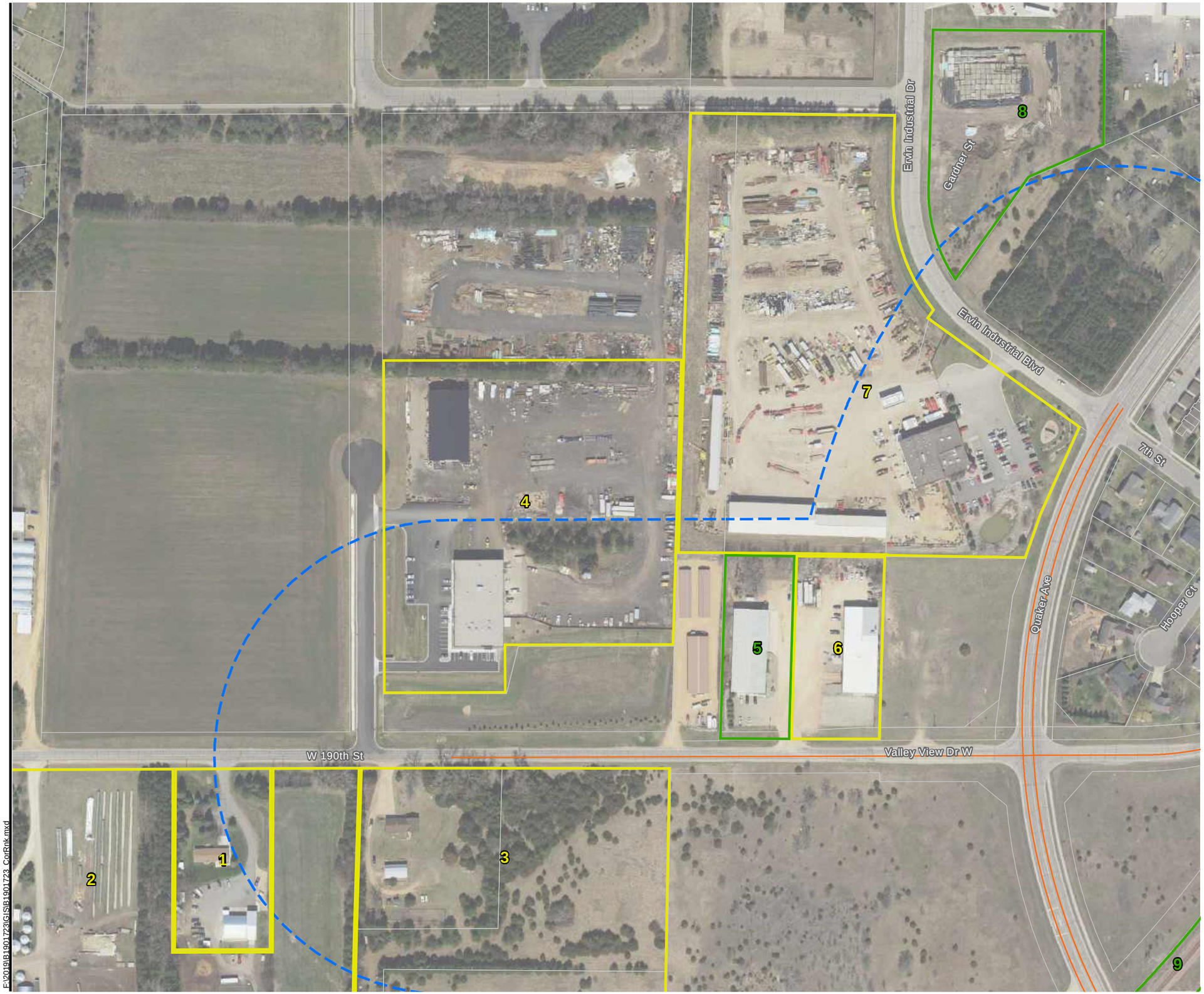
Jordan, Minnesota

Corridor De Minimis Site Map

Sheet: 7 of 7

Figure 2

F:\2019\B1901723\GIS\B1901723_CorDeMin.mxd



Potential for Contamination

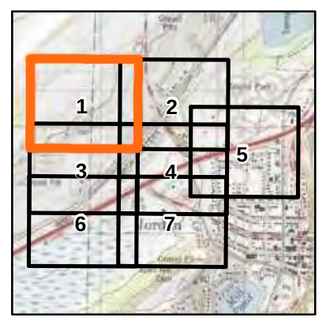
- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
1	Quatman Auto Service	Medium
2	Quatman Farm	Medium
3	Scrap Yard & Residences	Medium
4	Minger Construction	Medium
5	WW Will & Sons Distribution & Sportsman's Brand Meats	Low
6	E.A.T.I.	Medium
7	S. M. Hentges & Sons	Medium

N

0 100 200 Feet

1 inch = 200 feet



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Checked By:	JB
Last Modified:	7/15/2019

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Phase I ESA

TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor Site Ranking Map

Sheet: 1 of 7

Figure 3

E:\2019\B1901723\GIS\B1901723_CorRnk.mxd

Potential for Contamination

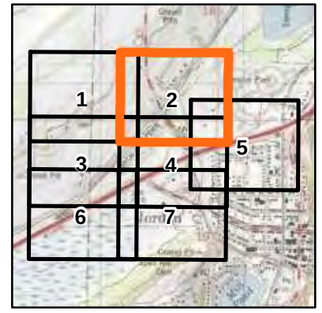
- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
7	S. M. Hentges & Sons	Medium
8	S. M. Hentges Storage Yard	Low
9	Railroad Tracks	Low
10	352/353 Creek Lane Residence & Garage	Medium
11	Former Railroad Depot	Low
21	Jordan Police Department	Medium
22	Valley Green	Medium

N

0 100 200 Feet

1 inch = 200 feet



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Jordan, Minnesota

Corridor Site Ranking Map

Sheet: 2 of 7

Figure 3

E:\2019\B1901723\GIS\B1901723_CorRnk.mxd

Potential for Contamination

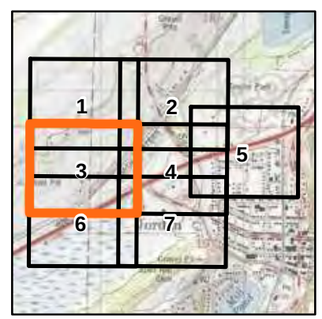
- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
1	Quatman Auto Service	Medium
2	Quatman Farm	Medium
3	Scrap Yard & Residences	Medium
5	WW Will & Sons Distribution & Sportsman's Brand Meats	Low
6	E.A.T.I.	Medium
9	Railroad Tracks	Low

N

0 100 200 Feet

1 inch = 200 feet



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Corridor Site Ranking Map

Sheet: 3 of 7

Figure 3

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Potential for Contamination

- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
9	Railroad Tracks	Low
13	Wolf Ford	Medium
14	Radermacher's/Ace Hardware/Jordan Veterinary	Medium
15	Holiday	Medium
16	Taco Bell	High
17	Jordan Wine & Spirits	Medium
18	Clancy's Pizza	Medium
19	Quality Motor Sales	Medium
20	Jordan Truck & Car Wash	Low
21	Jordan Police Department	Medium
22	Valley Green	Medium

N

0 100 200 Feet

1 inch = 200 feet

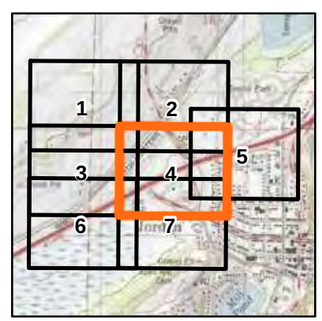

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Figure 3

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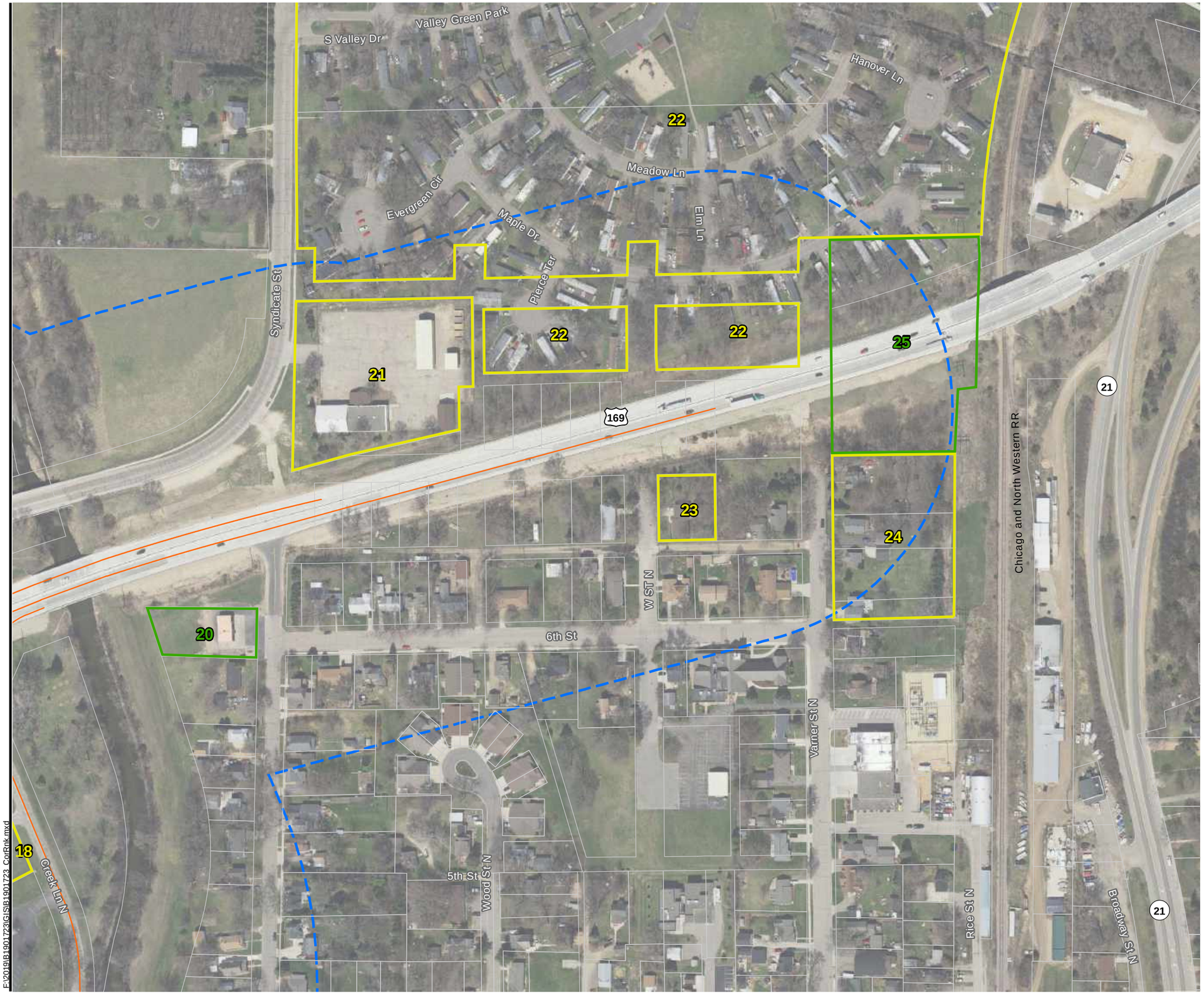


Potential for Contamination

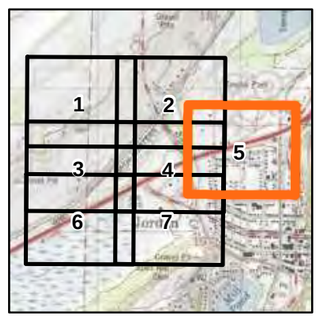
- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
18	Clancy's Pizza	Medium
20	Jordan Truck & Car Wash	Low
21	Jordan Police Department	Medium
22	Valley Green	Medium
23	611 West Street Residence	Medium
24	601-613 Varner Street Residences	Medium
25	TH 169, ROW, & Valley Green	Low

N

0 100 200 Feet

1 inch = 200 feet



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Corridor Site Ranking Map

Sheet: 5 of 7

Figure 3

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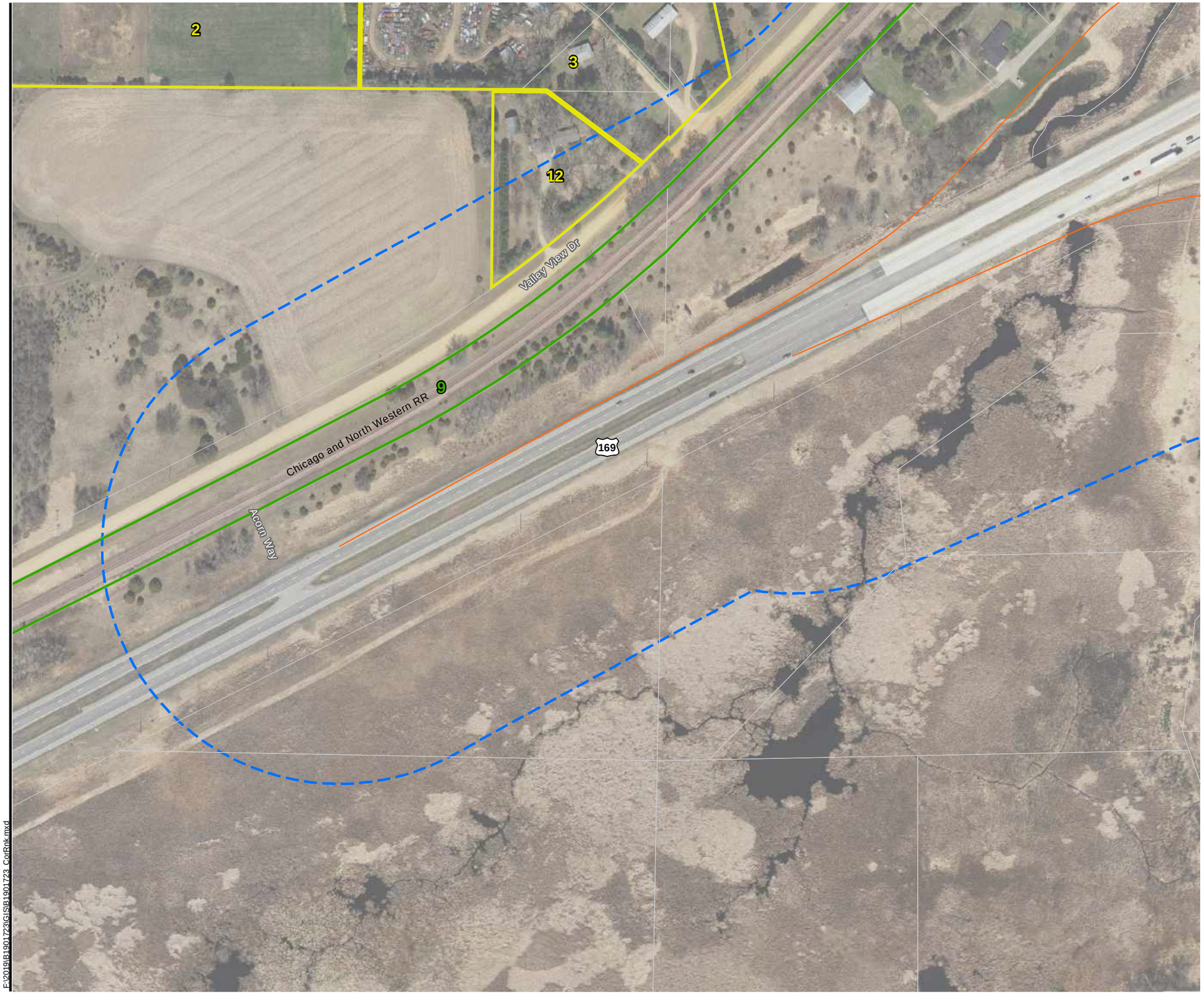


Potential for Contamination

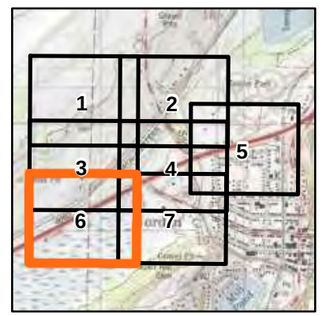
- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
2	Quatman Farm	Medium
3	Scrap Yard & Residences	Medium
9	Railroad Tracks	Low
12	19300 Valley View Drive Residence	Medium

N

0 100 200 Feet

1 inch = 200 feet



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TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor Site Ranking Map

Sheet: 6 of 7

Figure 3

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Potential for Contamination
- High
- Medium
- Low
- Approximate Alignment
- 500' Buffer

Site Number	Site Name	Potential for Contamination
13	Wolf Ford	Medium
14	Radermacher's/Ace Hardware/Jordan Veterinary	Medium
15	Holiday	Medium
16	Taco Bell	High
17	Jordan Wine & Spirits	Medium
18	Clancy's Pizza	Medium
26	Chiropractic Specialists & Residence	Low
27	NAPA Auto Parts/Dance Studio/Child Care	Medium

N

0 100 200 Feet

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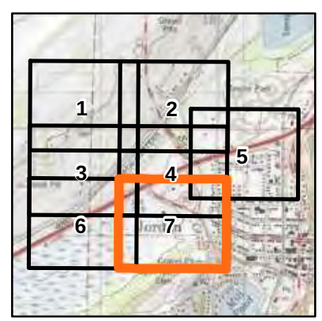

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TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor Site Ranking Map

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Figure 3

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Minnesota Well Index

- Domestic Well
- Industrial Well
- Monitor Well
- Community Supply (municipal) Well
- Public Supply/Non-Comm. -Non-Transient Well
- Test Well
- Wellhead Protection Areas (WHPA)
- Approximate Alignment
- 500' Buffer
- Scott County Parcels within 500'

N

0 100 200 Feet

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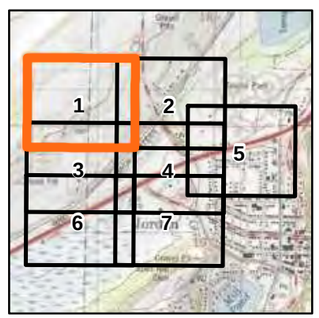

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TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor Wells and Wellhead Protection Areas

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Figure 4

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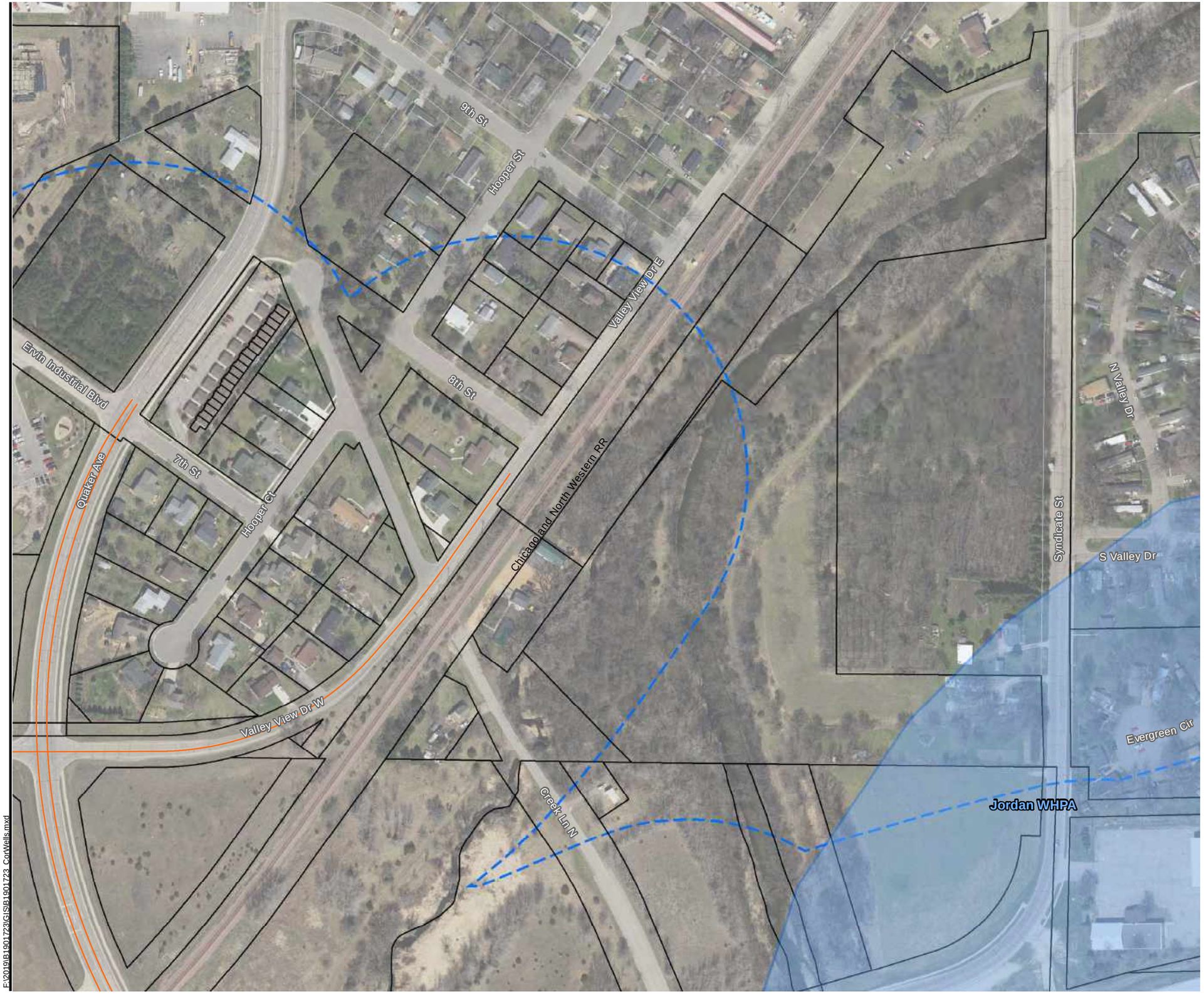

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- Scott County Parcels within 500'

N

0 100 200 Feet

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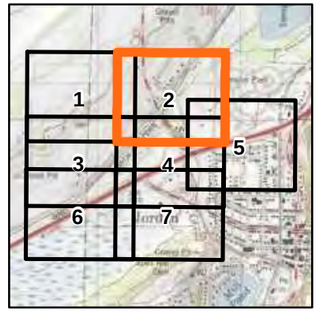

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TH 169/TH 282/CR 9 Intersection Area

Jordan, Minnesota

Corridor Wells and Wellhead Protection Areas

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Figure 4

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- Domestic Well
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N

0 100 200 Feet

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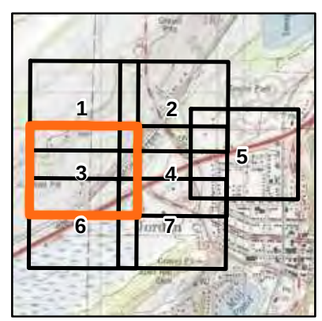

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Jordan, Minnesota

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Figure 4

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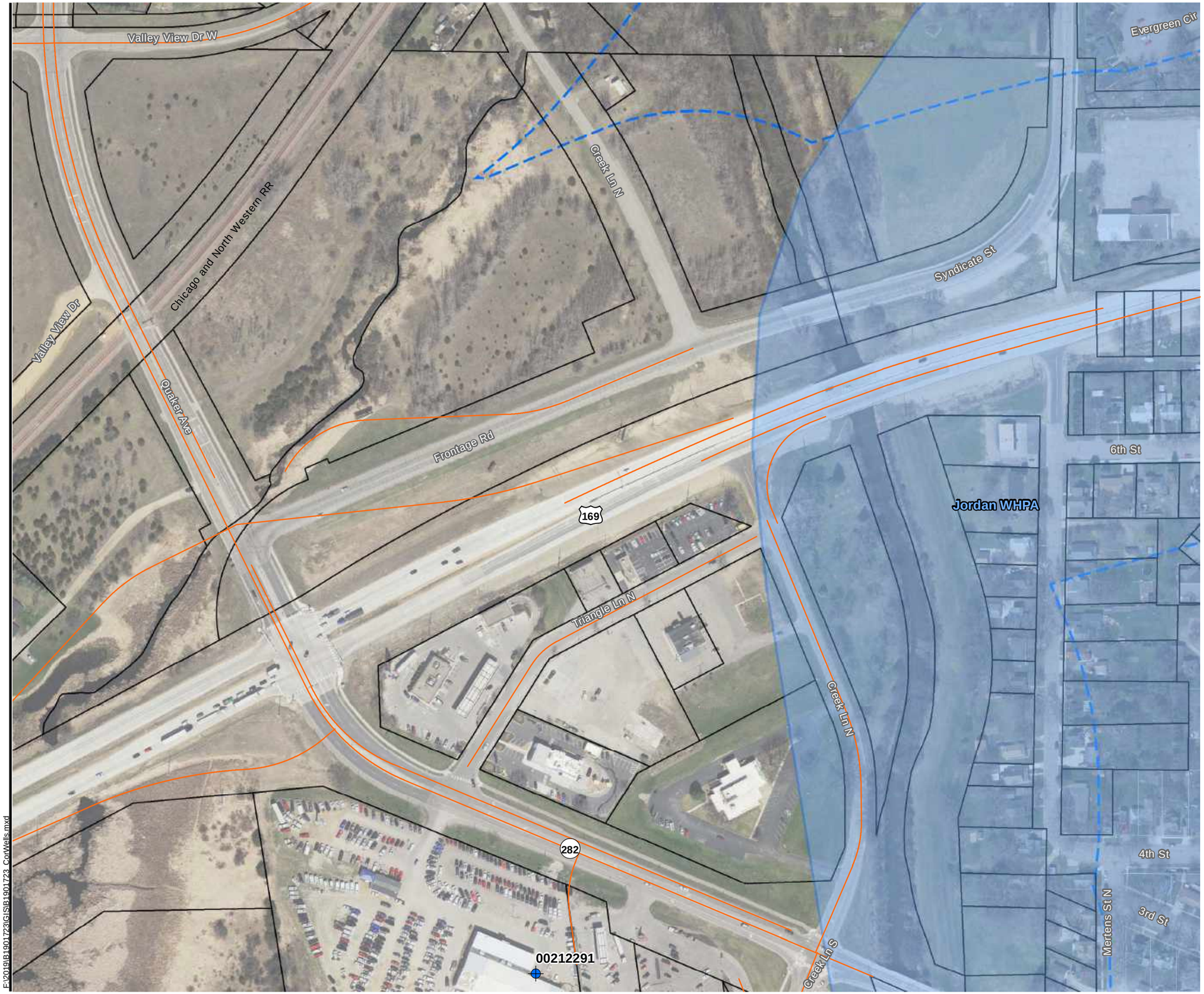

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N

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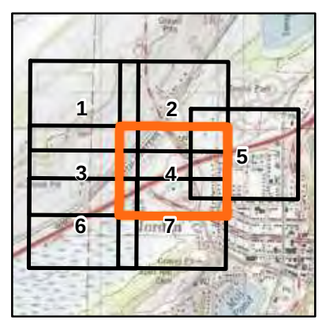

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Corridor Wells and Wellhead Protection Areas

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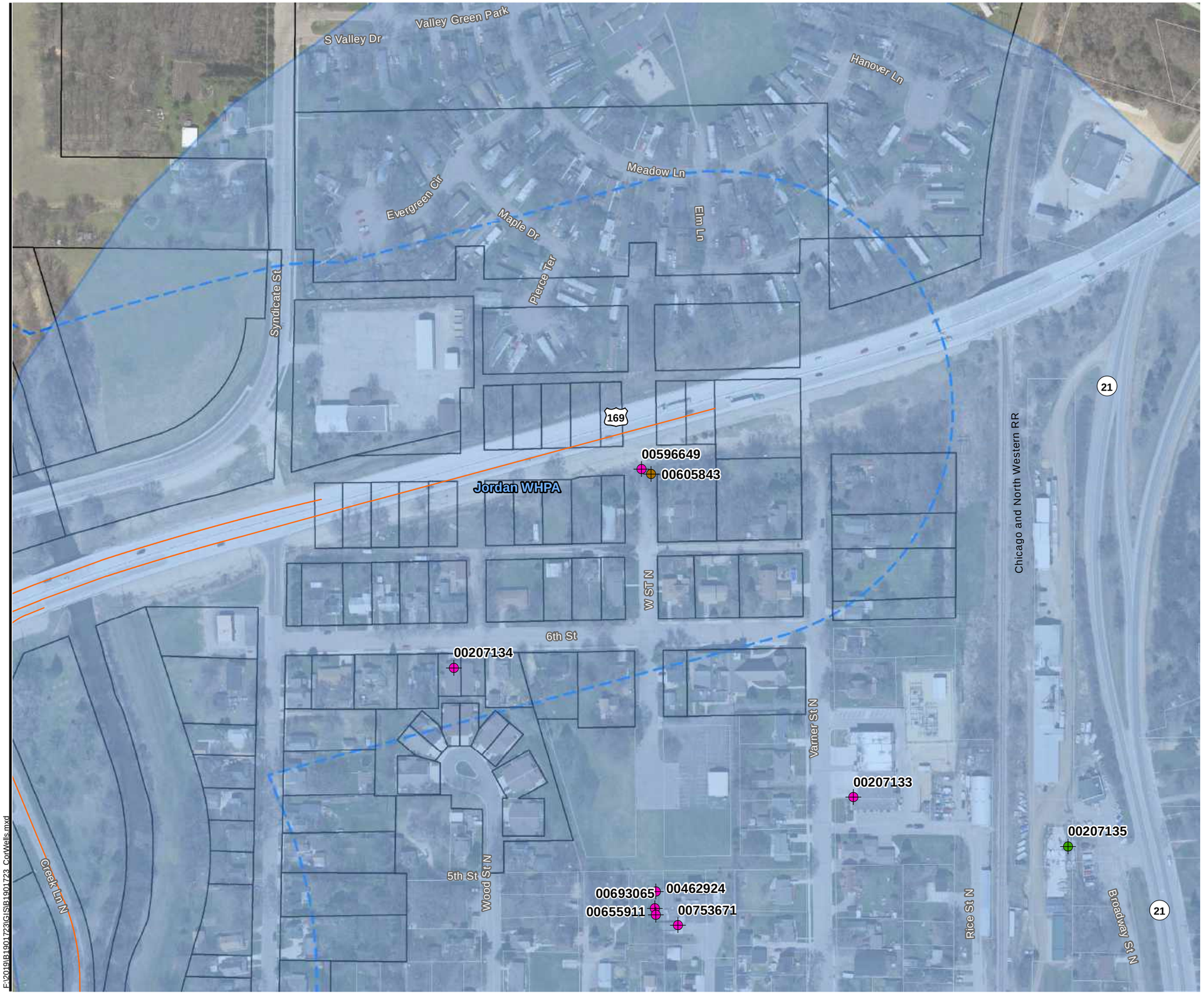
Figure 4



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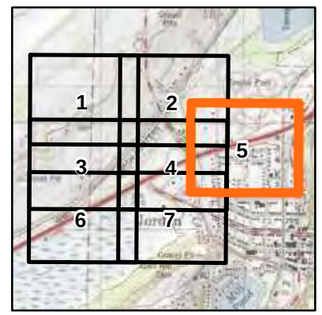

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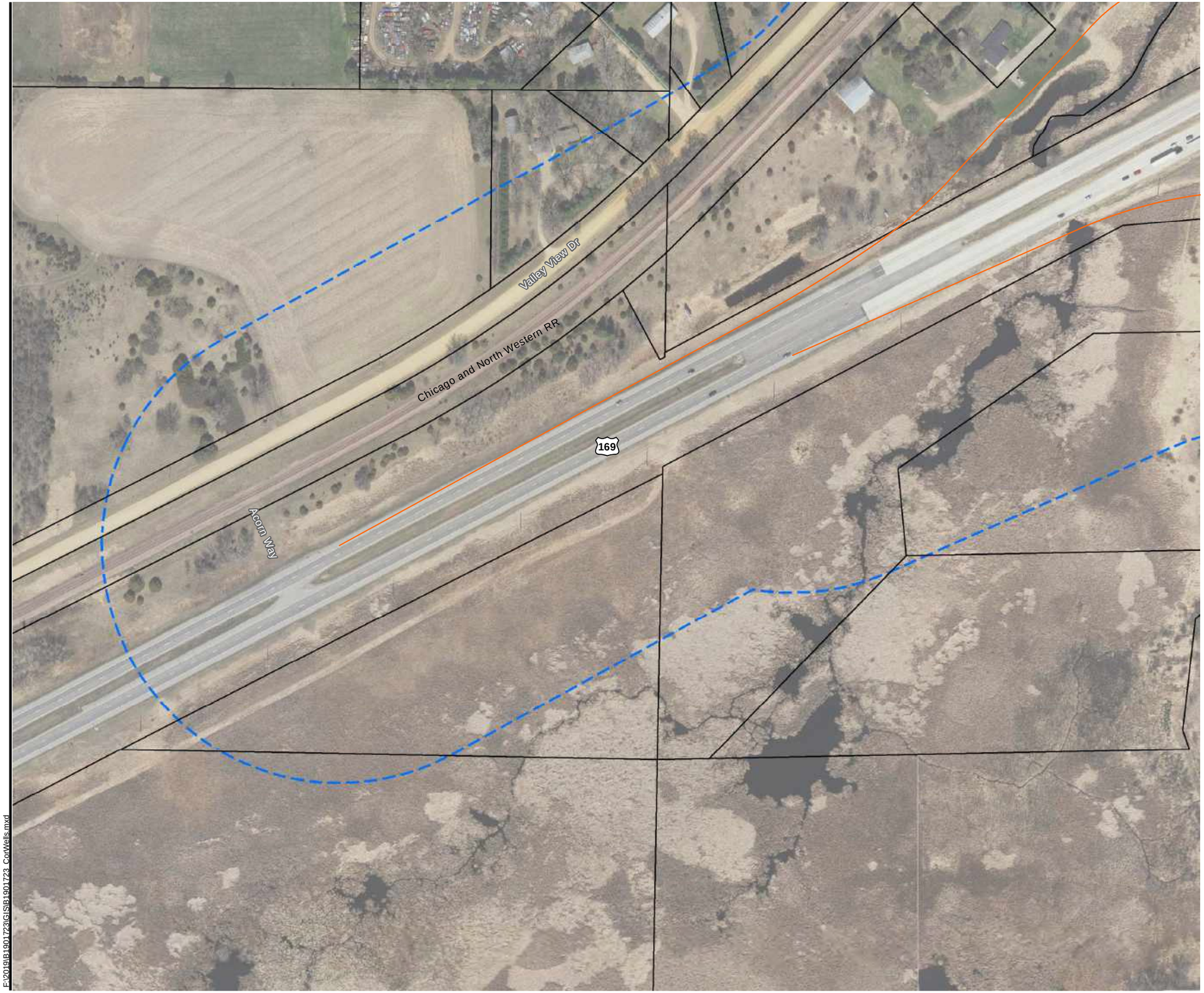
Figure 4



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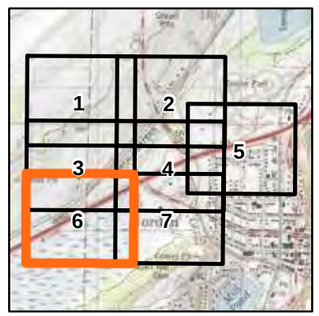

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Figure 4

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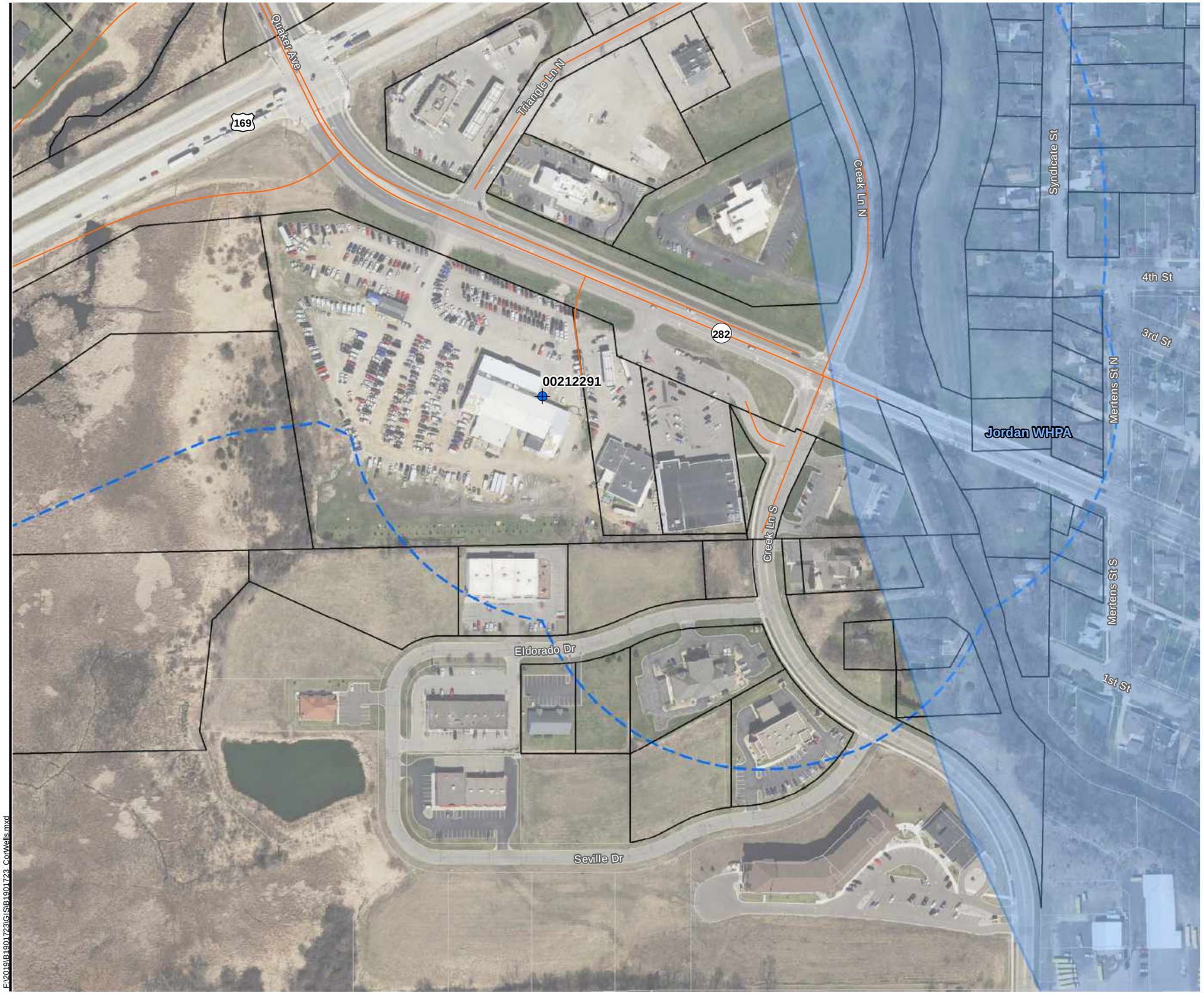

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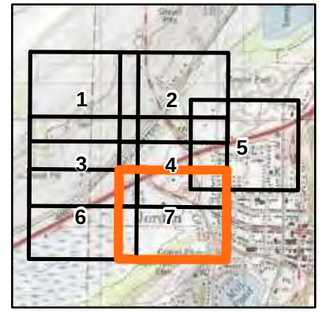

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Corridor Wells and Wellhead Protection Areas

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Figure 4

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Appendix D

Minnesota Department of Natural Resources Correspondence

From: Bump, Samantha (DNR)
To: Stolte, Aaron
Cc: Parris, Leslie (DNR); Elstad-Haveles, Kit (DNR)
Subject: RE: Jordan Interchange Study, Scott County - NHIS Review
Date: Wednesday, November 27, 2019 11:53:53 AM
Attachments: image003.png
image004.png
image005.png
image002.png
NHIS-RSEAs.pdf
2019 Rare Species Survey Process.pdf

Hi Aaron,

I have reviewed the attached assessment of the potential for the above project to impact rare features and have the following additional comments:

- The Minnesota Biological Survey (MBS) has identified multiple Sites of *Moderate* Biodiversity Significance within and adjacent to the proposed project. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. Dry Barrens Prairie (Southern) and Sedge Meadow native plant communities have been documented within these Sites. (GIS shapefiles of MBS Sites of Biodiversity Significance and DNR Native Plant Communities can be downloaded from the MN Geospatial Commons. Please contact me if you do not have access to the appropriate mapping services.)

  We encourage you to consider project alternatives that would avoid or minimize disturbance to these ecologically significant sites. Actions to minimize disturbance may include, but are not limited to, the following recommendations:

  - Minimize vehicular disturbance in the MBS Sites (allow only vehicles/equipment necessary for construction activities);
  - Do not park equipment or stockpile supplies in the MBS Sites;
  - Do not place spoil within MBS Sites or other sensitive areas;
  - Retain a buffer between proposed activities and the MBS Sites;
  - If possible, conduct the work under frozen ground conditions;
  - Use effective erosion prevention and sediment control measures;
  - Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species;
  - As much as possible, operate within already-disturbed areas;
  - Revegetate disturbed soil with native species suitable to the local habitat as soon after

construction as possible; and

- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern are birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.

- Louisiana broomrape (*Orobanche ludoviciana* var. *ludoviciana*), a state-listed threatened plant species, has been documented in multiple locations in the vicinity of the project. Specifically, this species was documented within a Dry Barrens Prairie (Southern) native plant community in close proximity to the proposed project. Minnesota's Endangered Species Statute (MS 84.0895) and associated Rules (Chapter 6212.1800 - 6212.2300 and 6134) prohibit the take of endangered or threatened species, including their parts or seeds, without a permit. As such, **the Dry Barrens Prairie (Southern) native plant community must be avoided to avoid a potential take of Louisiana broomrape**. Please consult with the Regional Plant Ecologist, Kit Elstad-Haveles (kit.elstad-haveles or 651-259-5793), with any questions regarding this community.If avoidance is not feasible, please contact the Endangered Species Environmental Review Coordinator, Lisa Joyal (lisa.joyal@state.mn.us or 651-259-5109), as a botanical survey may likely be required.

  Also, we recommended a qualified surveyor determine whether any potential habitat for this species exists within the project footprint. If it is determined there is suitable habitat for this rare plant, a botanical survey may be required prior to any construction activities. Surveys must follow the standards contained in the attached Rare Species Survey Process and Rare Plant Guidance. Project planning should take into account that any botanical survey needs to be conducted during the appropriate time of the year, which may be limited. Please consult with Lisa Joyal regarding this process.

- As Henslow's Sparrow (*Ammodramus henslowii*), a state-listed endangered bird species, has been documented in the area, initial disturbance to suitable nesting habitat should not occur during their breeding season, between May 15th and July 15th. If this is not feasible, please contact me as further action may be needed.

- Please contact me if plans change and there will be tree and shrub removal during Loggerhead Shrike (*Lanius ludovicianus*) breeding season, typically April through July, as further action may be needed.

- Given the presence of the gopher snake (*Pituophis catenifer*), a state-listed species of special concern, the DNR recommends that the use of erosion control mesh, be limited to wildlife-friendly materials. Also, we recommend specifically not using products containing plastic mesh netting or other plastic components. Be aware that hydro-mulch products may contain small synthetic (plastic) fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. As such, please review mulch products and not allow any materials with synthetic (plastic) fiber additives in areas that drain to Public Waters.

The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a takings permit will be needed for any of the above protected species.

Please note, the map you provided with the locations of state-listed species contains legally protected data and cannot be included in any public document, including the EAW. The map showing the MBS Sites (attached) can be included in any public document, as it is public data, and I would recommend including DNR Native Plant Community data as well. Thank you for notifying us of this project, and for the opportunity to provide comments.

Have a great day,

Samantha Bump
NHIS Review Specialist | Ecological & Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155
Phone: 651-259-5091
Samantha.Bump@state.mn.us

Links/Resources:

MBS Sites of Biodiversity Significance
http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html
DNR Native Plant Communities
http://www.dnr.state.mn.us/npc/index.html
MN Geospatial Commons
https://gisdata.mn.gov/
BWSR Native Vegetation/Seed Mixes
http://www.bwsr.state.mn.us/native_vegetation/
Wildlife Friendly Erosion Control
http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf

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From: Stolte, Aaron <Aaron.Stolte@kimley-horn.com>
Sent: Wednesday, September 18, 2019 2:08 PM
To: MN_NHIS, Review (DNR) <Review.NHIS@state.mn.us>
Subject: Jordan Interchange Study, Scott County - NHIS Review

Hello,

Kimley-Horn has been contracted to complete an EAW for the TH 169 Intersection Improvement

Study located in Jordan, Scott County, MN. The City of Jordan is proposing a series of intersection and roadway improvements at the TH 169, MN 282, and CR 9 intersection. The improvements include:

- Construction of a roundabout at the intersection of CR 9/Quaker Avenue and Frontage Road/Syndicate Street which may require modifications to an unnamed DNR Public Watercourse.
- Construction of two new bridges over TH 169 and the Union Pacific railroad
- Installation of traffic signals at the intersection of CR 9/Quaker Avenue and Valley View Drive/190th Street West
- Installation of traffic signals at the intersection of MN 282/2nd Street West and the future off-ramp from TH 169

A review of the DNR Natural Heritage Inventory System database was conducted for the project study area, which is defined as the area within 1-mile of the project's preliminary construction limits ("project limits"). The following includes identified records within the project study area and an evaluation of potential impacts on the record.

- One record for Big Tick Trefoil was located within the project limits in 1946. The Big Tick Trefoil is a state-listed threatened plant species. Due to the date of the last sighting, as well as its NHIS ranking as historical, no adverse impacts are anticipated on this species.
- Seven records for the Gopher Snake were located within the project study area (two of which are within the project limits). The status of Gopher Snake is of state special concern. Potential habitat (well-drained, loose sandy and gravel soils) exists within and/or near the project site; however, it is of low quality. Impacts to Gopher Snake is possible, but not anticipated. In an effort to mitigate potential impacts, it will be recommended that biodegrable (i.e. natural) erosion/sediment control netting is used during construction.
- One record for Black Sandshell (a freshwater mussel) was located within the study area north of the project limits. The status of Black Sandshell is of state special concern. The project will not have any direct effect on the Minnesota River, which is where this species was identified; therefore, the proposed project is not anticipated to have an impact on the species.
- One record for Blue Sucker was located within the study area north of the project limits. The status of Blue Sucker is of state special concern. The project will not have any direct effect on the Minnesota River, which is where this species was identified; therefore, the proposed project is not anticipated to have an impact on the species.
- One record for Henslow's Sparrow was located within the study area northwest of the project limits. Henslow's Sparrow is a state-listed endangered species. Potential habitat exists within the study area; however, there is no suitable habitat within the project limits; thus, the proposed project is not anticipated to have an impact on the species.

- One record for Kitten-tails was located within the study area north of the project limits. Kitten-tails is a state-listed threatened species. The project will not have any direct effect on the Minnesota River bank, where this species was identified to the north of the project limits. Therefore, the proposed project is not anticipated to have an impact on the species.

- One record for Loggerhead Shrike was located within the study area west of the project limits. Loggerhead Shrike is a state-listed endangered species. Potential habitat exists within and/or near the project limits; however, it is of low quality. Thus, impacts to loggerhead shrike are possible, but not anticipated. In an effort to mitigate any potential impacts, it will be recommended that any tree removal within potentially suitable habitat take place outside the breeding season (typically April through July).

- Two records for Louisiana Broomrape were located within the study area, one located just southwest of the project limits, one located to the north). Louisiana Broomrape is a state-listed threatened species. Potential habitat exists within the study area; however, there is no suitable habitat within the project limits; therefore, the proposed project is not anticipated to have an impact on the species.

- One record for Mucket was located within the study area north of the project limits. Mucket is a state-listed threatened mussel species. The project will not have any direct effect on the Minnesota River, which is where this species was identified; therefore, the proposed project is not anticipated to have an impact on the species.

- One record for Rhombic Evening Primrose was located within the study area north of the project limits. The status of Rhombic Evening Primrose is of state special concern. The project site will not have any direct effect on dry prairie adjacent to the Minnesota River, which is where this species was identified; therefore, the proposed project is not anticipated to have an impact on the species.

- One record for Sandy Stream Tiger Beetle was located within the study area north of the project limits. The status of Sandy Stream Tiger Beetle is of state special concern. The project site will not have any direct effect on the Minnesota River, which is where this species was identified; therefore, the proposed project is not anticipated to have an impact on the species.

- One record for White Wild Indigo was located within the study area north of the project limits. The status of White Wild Indigo is of state special concern. Potential habitat exists within the study area; however, due to the disturbed nature of the project limits, the species is unlikely present. Therefore, species impact is not anticipated.

See below for a summary in table format:

Species	Type	Status	Last Recorded Date	Habitat	In Project Limits?	Potential Impact?	Mitigation
Big Tick Trefoil	Plant	Threatened	1946	Mesic forests	Yes	No	N/A

Black Sandshell	Mussel	Special Concern	1989	Sandy or gravely bottom of a medium to large river	No	No	N/A
Blue Sucker	Fish	Special Concern	2010	Large rivers with swift, deep channels that have sand, gravel, or rubble bottoms	No	No	N/A
Gopher Snake	Reptile	Special Concern	2002	Well-drained, loose sandy and gravel soils such as prairies	Yes	No	Biodegradable erosion/ sediment control netting will be used during construction
Henslow's Sparrow	Bird	Endangered	1999	Grasslands with sufficient litter layer and herbaceous stems for perching	No	No	N/A
Kitten-tails	Plant	Threatened	1996	Oak savanna, dry prairies, and oak woodlands	No	No	N/A
Loggerhead Shrike	Bird	Endangered	1997	Upland grasslands	No	No	Tree removal within potentially suitable habitat will take place outside breeding season (April – July)
Louisiana Broomrape	Plant	Threatened	2009	Dry prairies and dry savannas	No	No	N/A
Mucket	Mussel	Threatened	1989	Medium to large rivers that have coarse sand and gravel bottoms	No	No	N/A

Rhombic Evening Primrose	Plant	Special Concern	1995	Dry, sandy prairies and dunes	No	No	N/A
Sandy Stream Tiger Beetle	Insect	Special Concern	2002	Stream banks and sandbars of very fine sand	No	No	N/A
White Wild Indigo	Plant	Special Concern	1996	Mesic tallgrass prairies, dry, sandy prairies, savannas, and open, upland woods	No	No	N/A

Ten mapped regionally significant ecological areas (RSEA) are located within the project study area, one of which intersects the project limits. The RSEA runs through the center of the project limits from northeast to southwest and is associated with an unnamed DNR Public Watercourse. Impact to the RSEA is possible; however, would be minor.

DNR Public Watercourses located in the project study area include Sand Creek and three unnamed streams, none of which are considered trout streams. DNR Public Water basins located in the project study area include Mill Pond and three unnamed water basins. Only Sand Creek, one of its unnamed tributaries, and an unnamed water basin are located within the project limits.

Based on the information listed above, no adverse impacts are anticipated to the species identified through the NHIS records search. Impacts to RSEA areas will be minimized and avoided to the extent practicable and all design will meet local and state requirements. Please confirm our conclusions and let us know if you have any questions.

Thanks!

Aaron Stolte
Kimley-Horn | 767 Eustis Street, Suite 100, St. Paul, MN 55114
Direct: 612 326 9510 | Mobile: 651 491 4798 | www.kimley-horn.com

NATURAL HERITAGE REVIEW: A RARE SPECIES SURVEY IS REQUESTED. NOW WHAT?

Questions? Contact Lisa Joyal, Endangered Species Review Coordinator
Lisa.Joyal@state.mn.us or 651-259-5109

Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) prohibit the taking of threatened or endangered species without a permit. Given the potential for the proposed project to negatively impact a state-listed threatened or endangered species, a rare species survey has been requested. The Minnesota Department of Natural Resources' Division of Ecological and Water Resources (DNR) relies upon the results of endangered and threatened species surveys to conserve these species through its conservation, management, environmental review, and permitting responsibilities. When surveys for rare species are requested as part of the environmental review process, the DNR makes every effort to coordinate closely with surveyors to ensure high quality survey results and to avoid any potential project delays due to miscommunication, inappropriate survey protocol, or misidentified threatened or endangered species.

WHAT NEEDS TO BE DONE PRIOR TO THE SURVEY?

CHOOSE A SURVEYOR

The DNR maintains a List of Surveyors (attached) that are considered qualified to conduct rare species surveys in Minnesota. Using a surveyor from this list minimizes the time needed to obtain a collection permit and the time needed to review survey proposals.

➤ *Documents to send to the Endangered Species Review Coordinator* ➤ If you would like to choose an individual that is not on the attached list, the DNR would like to review his/her qualifications prior to any survey work. Please see the attached Surveyor Criteria document for details.

DETERMINE IF A PERMIT IS REQUIRED TO CONDUCT THE SURVEY

A permit is required to collect specimen vouchers of state-listed threatened or endangered species. All plant surveyors should have a collection permit prior to conducting any survey work. A permit is also required to survey for bats, turtles, mussels, or butterflies. Please visit the DNR Endangered Species Permits website for information on how to apply for a "Permit for the Use of Endangered or Threatened Species in a Scientific Study."

PREPARE A SURVEY PROPOSAL

- Refer to the attached Rare Species Survey Proposals and Reports for information to include in the survey proposal.
- Refer to the DNR Rare Species Guide for suitable habitat and appropriate survey periods for the target species.
- Review the rare species data spreadsheet templates for Submitting Data to the NHIS.
- For plant surveys, follow the procedures in the attached Rare Plant Guidance.
- For mussel surveys, follow the procedures in the attached Mussel Survey and Relocation Protocol.

➤ *Documents to send to the Endangered Species Review Coordinator* ➤ Please submit the survey proposal for DNR review. Please anticipate an approximate two week turnaround for DNR comments.

WHAT NEEDS TO BE DONE DURING THE SURVEY?

- For plant surveys, follow the procedures in the attached Rare Plant Guidance.
- For mussel surveys, follow the procedures in the attached Mussel Survey and Relocation Protocol.
- Identify any suitable habitat for target species within the potential project footprint.
- Survey for target species within any suitable habitat that may be impacted by the project.
- If any threatened or endangered species are found, delineate extent of population or at least extent of population within the potential project footprint. Consider flagging the population for avoidance purposes. If you are considering applying for a takings permit, conduct a count of individual plants that you are proposing to take.

WHAT NEEDS TO BE DONE AFTER THE SURVEY IS COMPLETED?

VERIFY SPECIMEN IDENTIFICATION FOR STATE-LISTED SPECIES

Prior to submitting data, please contact the appropriate DNR staff (see list on NHIS website) to verify specimen identifications of **state-listed species or suspected state-listed species**. Your request should clearly identify the project name and must include a label that meets the Bell Museum standards (see attached Rare Plant Guidance for example of plant labels).

COMPLETE A REPORT ON THE RESULTS OF THE SURVEY

Refer to *Rare Species Survey Proposals and Reports* on the NHIS website for information to include in the survey report. The survey report should include detailed information for any state-listed species that are found during the survey.

SUBMIT REPORT AND DATA TO THE NHIS

Submit cover sheet, survey report, email verifying specimen id, GIS shapefile, and spreadsheet to Reports.NHIS@state.mn.us.

Important! *Please ensure that the unique identifier for each record is the same in the GIS shapefile, the spreadsheet, the report's tables and figures, and the information submitted with the specimens.*

WHAT IF A THREATENED OR ENDANGERED SPECIES IS FOUND?

The project proposer should consider project alternatives that would avoid impacting these species. If there are any questions as to what constitutes avoidance, please contact the Endangered Species Review Coordinator.

➤ *Documents to send to the Endangered Species Review Coordinator* ➤ Please submit an avoidance plan for DNR review. The plan should identify measures that will be taken to avoid and minimize disturbance.

WHAT IF A THREATENED OR ENDANGERED SPECIES CANNOT BE AVOIDED?

The project proposer will need to apply for a takings permit. For more information on the endangered species permitting process, please visit the DNR Endangered Species Permits website or contact Rich Baker, Endangered Species Coordinator, at Richard.Baker@state.mn.us or 651-259-5073.

Appendix E

Phase I Archaeological Survey

Phase I Archaeological Survey of the TH 169, TH 282, and CSAH 9 Interchange, City of Jordan, Scott County, Minnesota

Prepared for City of Jordan and Scott County

Principal Investigator

Austin Jenkins, MS

Authors

Jammi Ladwig

Austin Jenkins

Prepared by:
Bolton & Menk, Inc.
12224 Nicollet Avenue
Burnsville, MN 55337

September 2019

ABSTRACT

The following report contains the results of a Phase I Archaeological Survey conducted on behalf of the City of Jordan and Scott County in support of the Environmental Assessment Worksheet being prepared for proposed interchange conversion at TH 282 and CSAH 9 along TH 169. The proposed activities include:

- Construct an interchange to carry TH 282/CSAH 9 over TH 169
- Improve Frontage/Syndicate Street intersection and onramp
- Reconstruct Creek Lane/TH 169 T-intersection as an acceleration lane
- Improve local streets

The improvements are within Sections 18 and 19, T114N, R23W and Section 24, T114N, R24W, Scott County, Minnesota. The Study Area is within State Historic Preservation Office (SHPO) Archaeological Region 2e.

The Bolton & Menk, Inc. Cultural Resources Team, led by Austin Jenkins, conducted a Phase I Archaeological Survey of local and county road right-of-way and on private land within the survey area over 12 days between May 30 and July 23, 2019. Areas of right-of-way along TH 169 and TH 282 appears heavily disturbed and no intensive survey was deemed required there. Project personnel included Austin Jenkins, Principal Investigator, and Jammi Ladwig, Archaeological Field Director.

The survey follows the guidelines set forth in both the *SHPO* and the OSA *Manual for Archaeological Projects in Minnesota*. It is responsive to the archaeological probability, past land use, and geomorphology of the area. Land use is a mixture of former agricultural fields now fallow and/or replanted with prairie grasses, roadway and railroad right-of-way, rural residential lots, along with commercial, and public recreational property. Land cover includes maintained and unmaintained tall and short grasses, forested/shrub areas, shrub wetlands, and existing roads.

Intensive survey consisted exclusively of shovel testing. A total of eight recorded archaeological sites are located within one mile of the Study Area, four of which are alpha (unconfirmed) sites. One new archaeological site, Quaker Avenue Site – 21SC0111, comprised of an isolated lithic flake, was identified. Bolton & Menk, Inc. recommends no further archaeological investigations for the project, as described and depicted herein.

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INTRODUCTION

PROJECT INFORMATION

The City of Jordan and Scott County propose intersection improvements along TH 169, TH 282, and CSAH 9 (**Figure 1**). The project is in Sections 18 and 19, T114N, R23W and Section 24, T114N, R24W, Scott County, Minnesota (**Figure 2**). The project is being reviewed for compliance with the Minnesota Field Archaeology Act and may serve future Section 106 needs depending on project participation.

SETTING

The Survey Area is situated within the City of Jordan, centered along TH 169. The Minnesota River is located approximately 1 mile north of the northernmost portion of the Study Area. Sand Creek is east of Creek Lane N, in the eastern portion of the Study Area. The Study Area extends along Quaker Avenue (CSAH 9) for 0.4 miles, 830 feet along 190th Street W, 0.5 miles west just south of the railroad tracks running parallel to W 195th Street, 880 feet along Valley View Drive, 0.13 miles along 2nd Street W, 0.17 miles along Triangle Lane, and for 175 feet along Creek Lane N north of TH 169 and south of the railroad (**Figure 1**). Land cover in the vicinity is comprised of previously cultivated areas, rural residential, commercial and business areas, and park lands. Surrounding land use is also generally cultivated and rural residential.

GEOLOGICAL & ENVIRONMENTAL CONTEXTS

Bedrock geology in the region is composed of the St. Lawrence Formation, which is tan, white, or gray sandstone and siltstone (Minnesota Geological Survey 2006A). Surficial geology is characterized as alluvial fan sediment (loam to loamy fine-grained sand) in the central portion of the Survey Area, deposits associated with the Langdon Terrace north of the railroad tracks, and peat/bog sediment (clay, silt, and organic debris) on the south side of TH 169 in the western portion of the Survey Area (Minnesota Geological Survey 2006B).

Portions of the Survey Area occur within and just outside of Langdon Terrace sediments and a relict channel of the Minnesota River (**Figure 3**; Lusardi 2006). The Langdon Terrace is a Late Pleistocene landform typified by sandy soils and commonly dissected by former minor channels. Alluvial fans extending from the southern margin of the Minnesota River Valley have partially filled the channel (Lusardi 2006) and appear to form a basin for the wetland complex adjacent to the Study Area.

According to the Web Soil Survey available by the USDA website, soils in the eastern portion of the Survey Area are comprised of Alluvial land and Comfrey silty clay loam, those to the north and northwest are Sparta fine sand, Faxon silty clay loam, Salida gravelly sandy loam, Duelm variant fine sandy loam, and Dune land, and finally those in the southwestern portion are Marsh and Houghton and Klossner muck. Parent material corresponds to soil types, with alluvium in the east, outwash and minor amounts of alluvium over bedrock and eolian sand in the north and northwest, and organic material in the southwest.

The Survey Area is in SHPO Region 2e, Prairie Lakes east. Vegetation at the time of Euro-American settlement was dominated by tallgrass prairie, with river-bottom forests and oak woods along the river valleys (Gibbon et al. 2002). Late Holocene period subsistence resources would have included white-tailed deer, bison in upland areas, with fish, waterfowl, and small quantities of wild rice near bodies of water (Gibbon et al. 2002).

RECENT DISTURBANCE

Within the Survey Area there has been a substantial amount of disturbance through time, mostly caused by the construction of TH 169, as revealed by 1951 and 1957 historic aerial imagery. The railroad is already present in the earliest aerial image dating to 1937. From 1964 to the present a substantial amount of development has taken place within the Study Area, particularly north along Valley View Drive, and south along TH 282. Sometime between 1964 and 1979 Syndicate Street and Bridge 70509 (crossing Sand Creek) were constructed, causing additional grading and disturbance within the area.

Figure 1: 2018 Aerial Photograph & Results

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Map Document: \\arcserver1\gis\KIMLEYHO_PRJT19118300\ESRIMaps\F1_Results.mxd | Date Saved: 8/16/2019 2:04:33 PM

Figure 2: USGS Location

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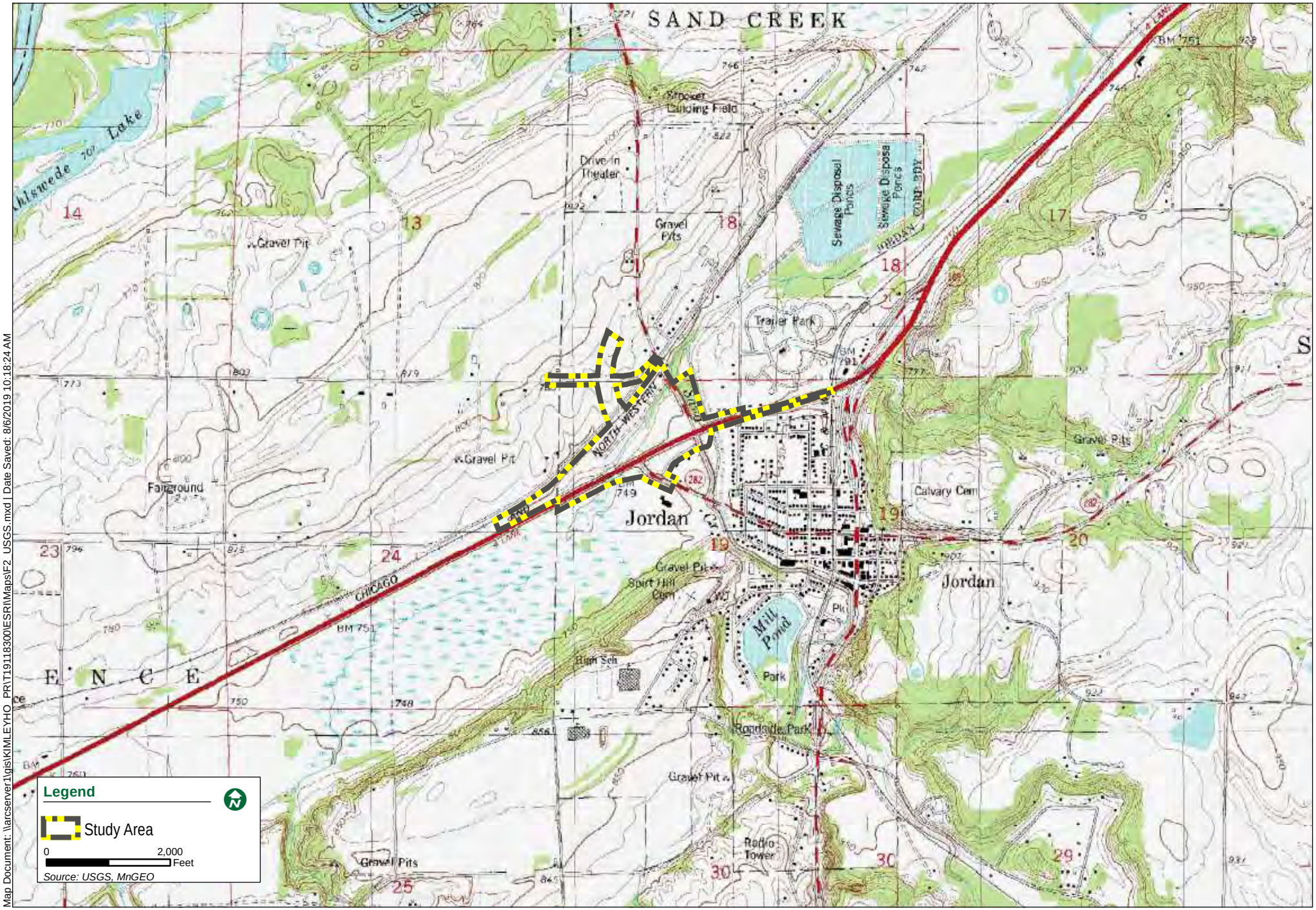
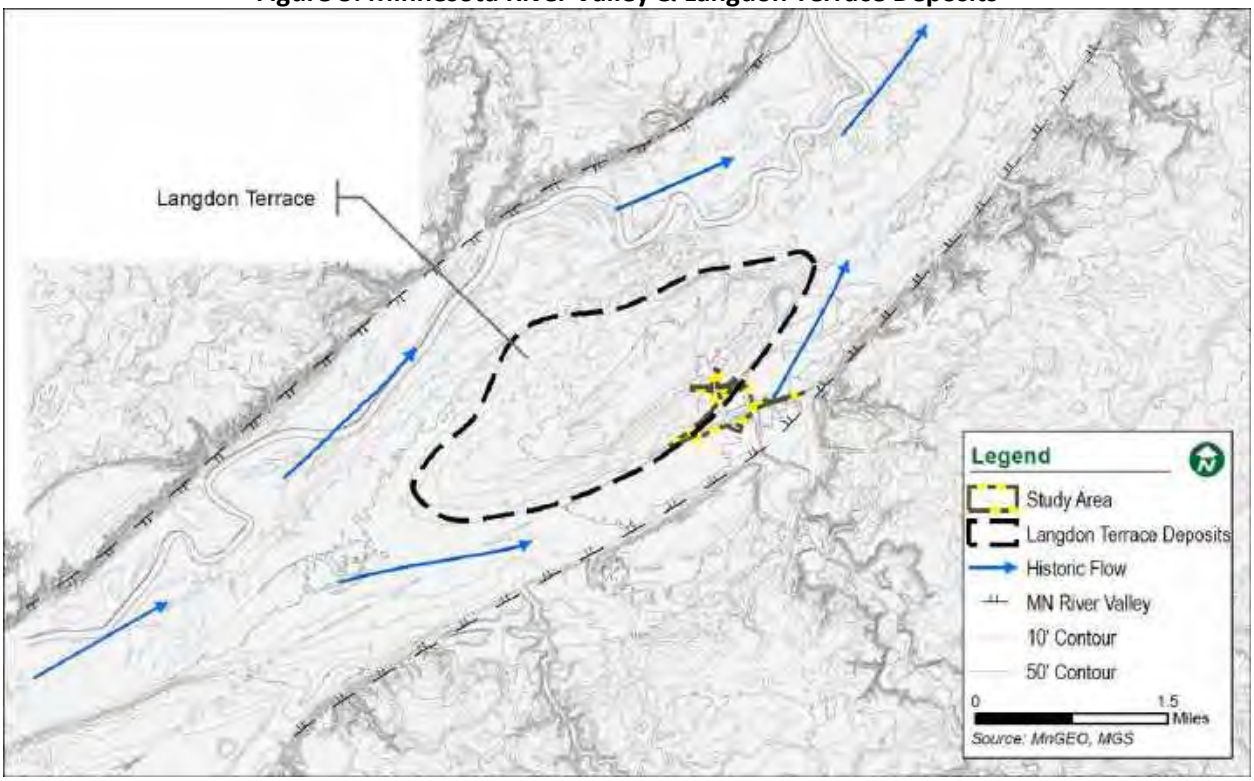


Figure 3: Minnesota River Valley & Langdon Terrace Deposits



METHODOLOGY

SURVEY AREA

The Survey Area is bounded to the north by 7th Street, to the east by Sand Creek, and where 169 crosses over the railroad tracks, to the west by Acorn Way, and to the south along 2nd Street W (TH 282) for a length of 0.13 miles and Triangle Lane N for 0.17 miles. Upon visual inspection, the Survey Area was divided into eight sub-areas (see **Figure 1**) to describe landforms and locations which merited testing (**Figure 1**; see discussion in **Archaeological Field Survey**).

LITERATURE SEARCH

The Office of the State Archaeologist (OSA) Portal was utilized to identify cultural resources within one mile of the Study Area through June 2019. Trunk Highway and Municipal and County Highway reports were reviewed, along with other reports available at SHPO.

ARCHAEOLOGICAL FIELD SURVEY & TESTING

The survey follows the guidelines set forth in the SHPO and the *OSA Manual for Archaeological Projects in Minnesota* and is responsive to the archaeological probability and geomorphology of the area. Ground surface visibility in the survey area was generally poor due to manicured lawn or other ground cover (**Figures 4** and **5**). Shovel testing was employed to test the sub-areas within the Survey Area which appeared to be moderately to minimally disturbed (**Figure 1**). The area appears to have low to moderate probability to contain archaeological sites in the western half of the Study Area, and moderate to high probability in the eastern half, particularly on slightly elevated positions nearer to Sand Creek and its tributary. Shovel tests were excavated at 30-meter intervals in low/moderate probability areas and 15-meter intervals where probability was moderate/high, and 5-meter intervals to delineate find spot(s).

Figure 4: Valley View Drive W Setting

Built-up roadway and natural area to the south. Facing East.

Figure 5: Creek Lane N/Reisgraf-Lions Park Setting

West of Sand Creek. Facing northeast.

PRE-CONTACT CONTEXTS

PALEOINDIAN TRADITION

The Paleoindian Tradition occurred from approximately 13,500 to 9,000 years before present (BP, present defined as 1950 upon the development of radiocarbon dating methods). The Paleoindian Tradition in Minnesota is primarily known based on isolated finds of projectile points found in the course of uncontrolled surface collection, primarily by non-professional archaeologists (Buhta et al 2011: 15). As Buhta *et al*. (2011: 10) write, very little progress in our understanding of the Paleoindian occupation in Minnesota has taken place since documentation of the Browns Valley burial. This dearth of information is largely due to the fact that systematic sampling has failed to yield single component Paleoindian assemblages of any size (Buhta et al 2011:15).

The Paleoindian Tradition in Minnesota is further divided into two cultural groups which are based primarily on their point typology (Higginbottom 1996). It is divided into early, Llano, and late, Plano. Llano points are fluted, with Clovis being the earliest documented complex (Gibbon 2012). Folsom is the most commonly occurring Paleoindian complex. Many other Paleoindian projectile point types are reported (Buhta et al 2011: 15). Toolkits would have minimally included spear points, scrapers, drills, gravers, and hammerstones. It may have also included bone and wooden tools (Mississippi Valley Archaeology Center 2004A).

With little more reported than isolated artifact find spots, the Paleoindian contexts in Minnesota are understood through paleoecological reconstructions and by extending what is known about Paleoindian lifeways elsewhere in North America to the Upper Midwest (Buhta et al 2011: 91-99). Paleoindian subsistence appears to have been reliant upon a combination of large game hunting, including caribou, bison, deer, moose, mammoth, and fish and floral resources (Buhta et al 2011: 91-99). Buhta et al (2011: 80-88) demonstrate that floral resources returned to previously glaciated regions shortly after ice retreated, possibly attracting large grazing animals.

Paleoindian settlement pattern is poorly understood, although it is hypothesized that the hunters and gatherers may have lived in small family groups, traveling to find food and resources for sustenance (Office of the State Archaeologist 2010; Mississippi Valley Archaeology Center 2004B).

There are no excavated archaeological materials that can be definitely attributed to the makers of Clovis or Folsom projectile points in Minnesota. Although there have been a number of finds of wooly mammoth skeletal parts and teeth at Minnesota localities; none has ever been indisputably associated with human activity (Johnson 1988:6). Although parts of Minnesota would have been inhabitable throughout the Wisconsinan glaciation, SHPO Region 4s would have been ice free by 12,000 and inhabitable very soon after (Buhta et al. 2011: 32).

ARCHAIC TRADITION

The time span between the Paleoindian and Woodland encompasses several thousand years which has all been attributed to the Archaic. The Archaic (ca. 9,500 – 2,500 BP) was originally defined based on the lack of distinct materials from the preceding Paleoindian Tradition and the subsequent Woodland Tradition. As the Archaic became better understood, it was also defined in terms of a tradition, based on subsistence and settlement patterns, technological and cultural practices, and other factors that differed from the traditions before and after (McElrath et al. 2009; Emerson & McElrath 2009).

The Archaic occurred during pronounced post-glacial environmental changes, which included the extinction of the large Pleistocene mammals. In Minnesota this period was marked by drastic climatic shifts and corresponding change in vegetation and resources for its occupants. During the early Archaic, forest dominated the landscape and forest resources were utilized by the landscape's occupants. The mid-Holocene saw the expansion of drier conditions and prairie environments expanded to cover even the northernmost extents of Minnesota, eventually giving way to deciduous, and finally conifer, forests (Buhta et al. 2017). The prairie and oak savannas reached their maximum during the mid-Holocene, concurrent and likely intensified by the catastrophic drainage of Lake Agassiz.

The makeup of forests also shifted before and after the prairie period. Before the prairie expansion less fire-resistant forests dominated, while after the prairie's retreat more fire-resistant woodland species dominated (such as oaks and oak savannahs). While deer have been and continued to be an important resource, the spreading of grassland environments also made the utilization of bison possible, though the extent to which they were utilized as a resource is not well understood. In addition to climate, fire may have been one of the primary controls on vegetation during the period. Given that humans use fire for hunting and other activities, it is possible that they had considerable influence over vegetation change (Clark et al. 2001; Grimm 1984; Nelson et al. 2006). By the late Archaic, the stabilization of the climate and vegetation to modern conditions (the three distinct biomes of prairie, deciduous forest, and coniferous forest) allowed for the intensified utilization of particular resources, and the development of

distinctive lifeways based on these adaptations (Gibbon 2012). Environmental changes and the resultant geographic shifts in biomes have caused changes in the territories between the different Archaic adaptations – and thus overlapping and commingled archaeological deposits.

Known technological changes to occur during the Archaic time period include the development of ground stone and copper tools, as well as early horticulture of plants such as squash. The Archaic also marks a technological shift from larger hafted, bifacially-worked lanceolate artifacts to smaller lithic specimens, namely stemmed and notched points. This shift in lithic usage is thought to be indicative of a technological shift: the application of atlatl technology (Buhta et al. 2017). In aquatic settings throughout the Midwest, the use of seine weights has been observed (Struever and Holton 2000).

Other information regarding changes in subsistence, settlement patterns, demographics, social hierarchy, economic structure, political relationships, and religious practices are largely unknown. Most sites that are affiliated with the Archaic time period are often multi-component, and most of these sites have experienced considerable amounts of mixing due to rodent and agricultural activity. Some of the known Archaic sites are deeply buried, with some even found below the present water table. Few datable and/or diagnostic artifacts have been found within discrete Archaic horizons (Board 2016). Only three single-component Archaic sites that have been excavated in Minnesota have associated radiocarbon dates, and only five sites include both diagnostic artifacts and radiocarbon dates (Buhta et al. 2017).

WOODLAND TRADITION

The Woodland Tradition in Minnesota spans from 1000 BC to AD 1650 (Arzigian 2008; Gibbon 2012). The beginning of this period does not represent a sudden nor drastic change from the preceding Archaic period, but rather a continued intensification of local resource bases and regionalization of peoples on the landscape. The Woodland in Minnesota was once thought to represent the simultaneous adoption of ceramic technology, mound interment, and plant cultivation (Anfinson 1979; Buhta et al. 2014); however, the transition from Archaic to Woodland was more complicated, with societies selectively accepting and rejecting of these practices and technologies at different times (Theler & Boszhardt 2005). Still, the presence of pottery is generally used to identify Woodland and later contexts (Arzigian 2008).

During this period there was the adoption of new technologies such as ceramics and the bow-and-arrow. Residents were able to more intensively utilize local resources and develop unique and distinct ways of extracting these resources, attributed largely to the continued stabilization of local environments. Also, during this period, the use of new resource bases (i.e. cultivation of domesticated crops) led to greater sedentism (Gibbon 2012). Thus, while the tools and implements of Woodland peoples were much like those of the preceding Archaic cultures, a modification of material culture types found in the archaeological record occurred because of specific modes of resource extraction adapted to local environments, and associated cultural change.

Intensified local resource extraction can be seen in the material culture recovered in the archaeological record, though the use of some material types did not change drastically. In terms of lithics, projectile points varied more in form than those seen in the Archaic, with stemmed points becoming rare and side-and corner-notched points of several varieties supplanting them. Scrapers, knives, drills, awls, and punches of chipped stone persisted, and as well as ground-stone implements. Grinding stones began to make an appearance on the landscape, associated largely with the prairie regions, and are indicative of plant processing activities. Ceramics in the Woodland vary in their composition and decoration by complex, but some of the earliest examples in the state come from thick-walled and conical vessels. Through time ceramic vessels generally become thinner and more globular, and new tempering agents were utilized such as shell, which allows for a more water-tight/less permeable vessel (Arzigian 2008). Copper continued to be used for awls or piercing tools and ornaments, although the frequency of copper articles lessened from that evidenced during the Archaic period.

During the late (Terminal) Woodland, after AD 500, the continued intensification of local resources through time led to highly individualized local cultural manifestations. During the Terminal Woodland, population size increased, as did the size and number of habitation sites. Regional environmental adaptations based on intensive resource extraction and associated cultural changes can be seen throughout Minnesota: the appearance of agricultural societies focused on maize horticulture and residing in associated palisaded villages in Southern Minnesota (Plains Village Tradition), the Effigy Mound complex in the Upper Mississippi River valley, and semi-sedentary villages focused on intensive wild rice harvesting in Northern Minnesota (Psinomani Complex).

At the same time this regionalization was taking place on the landscape, contact with peoples from far-removed societies also occurred, whether through trade-networks or movements of peoples on the landscape. The Mississippian/Oneota Tradition in Minnesota evidences influence from Middle Mississippian societies in Cahokia

(centered in present-day Illinois), for example. This expanded interaction sphere is evidenced in the archaeological record in the occurrence of exotic items such as galena, obsidian, and shark teeth, to name a few, along with changes in ceramic stylistic attributes. At the end of the Woodland period, the indigenous people of Minnesota were more-or-less organized into the tribal societies encountered by some of the first European explorers to enter the region (Gibbon 2012).

CONTACT PERIOD

While the territory now known as Minnesota was legally under the control of Spain from 1763 to 1800, French and British presence predated the United States' acquisition of the territory with the Louisiana Purchase in 1803. The French presence in Minnesota began with the exploration of the Great Lakes in the early 1600's (Dobbs 1988). The fur trade served as the major catalyst of the French interest in Minnesota. The French influence in Minnesota essentially ended with the French and Indian War (1760), which is when the presence of the British intensified. The founding of the major fur trade companies (Hudsons Bay and the North West Company) solidified the British interest in Minnesota (Dobbs 1988).

While the United States' political presence in the territory that would become Minnesota began in 1803, it more appropriately began with the first permanent US military presence: the founding of Fort Snelling in 1819 (Dobbs 1988). Zebulon Pike claimed to have secured 100,000 acres from the Dakota in 1805 for the erection of a US fort, and the confluence of the Minnesota and Mississippi Rivers was selected for this purpose. The function of the Fort initially was to secure the control of US interests in the fur trade and to quell hostilities between indigenous groups and the encroaching settlers moving westward (Cassady and DeCarlo 2018).

HISTORIC PERIOD

Major land cessations began in 1837 between the US government and the two major indigenous groups in the area: the Dakota and the Ojibwe (Anfinson 1994a). By 1851 the Dakota had ceded all of their land in Minnesota in the Treaty of Traverse des Sioux (Lass 1998). The Dakota were assured a swath of land, 10 miles wide, on either side of the Minnesota River following the cessations. The "Upper Sioux" (Sisseton and Wahpeton) settled above the Yellow Medicine River and the "Lower Sioux" (Mdewakanton and Wahpekute) settled below the river. In 1858, the same year that Minnesota was granted Statehood, an additional treaty allowed for Euro-American settlers to occupy the land on the north side of the Minnesota River. Annuities to the Lower Sioux Agency were delayed in 1862, and a portion of the starving, mistreated, and frustrated Dakota retaliated, leading to the start of the US-Dakota War. Following the war, only a small number of Dakota remained in Minnesota (MHS 2018). For all intent and purposes, by 1863 due to the government abrogating all Dakota treaties, it was illegal to be Dakota in the state of Minnesota (Anfinson 1994a).

RESULTS

LITERATURE REVIEW

The OSA Portal was searched for archaeological sites recorded through June 2019, within one mile of the survey area. A portion of the survey area, near the train tracks in the northern portion of the Study Area, has been previously surveyed (Jenkins and Aulwes 2017). The remaining portion of the Study Area has not been previously surveyed.

A total of eight sites are located within approximately 1 mile of the Study Area, four of which are alpha (unconfirmed) sites. The nearest previously recorded site, 21SCac, is located approximately 300 feet from the survey area to the southeast (**Table 1**; **Figure 2**). As an alpha site, the presence and actual location of the site has not been confirmed. In his notes from May 1957, Wilford notes that he was made aware of a possible camp site, 21SCac, at Jordan by Paul Klammer. The site was recorded to be in the local park and Wilford notes that "[it] would make a good camp site" (21SCac Site Form).

Precontact habitation sites near the Study Area are located on terraces near the Minnesota River, approximately 1 mile north of the Study Area.

Based upon prior investigations and predictive models, the survey area appears to have low to moderate probability to contain archaeological sites in the west half of the Study Area, and moderate to high probability in the east half of the Study Area.

Table 1: Archaeological Sites within (or close to) 1 Mile of Survey Area

Site Number	Known Site Acreage	Site Description	Prior Management Recommendation	Distance to Survey Area	Potential Effects
21SC0017	0	Earthwork (mounds)	N/A	0.35 miles	None
21SC0032	13	Farmstead / Habitation (Thompson Ferry)	N/A	1 mile	None
21SC0038	2.5	Artifact Scatter	N/A	>1 mile	None
21SC0092	0.1	Single Artifact (single PDC flake)	N/A	>1 mile	None
21SCe	0	Ghost Town (Brentwood)	N/A	0.25 miles	None
21SCv	0	Historic Documentation (P.P. Wells)	N/A	0.85 miles	None
21SCac	0	Artifact Scatter (possible camp site)	N/A	300 feet	None
21SCad	0	Artifact Scatter (possible habitation)	N/A	0.85 miles	None

ARCHAEOLOGICAL FIELD SURVEY

The survey began with a visual inspection of the survey area on May 1, 2019, to assess those areas that appeared to have been minimally disturbed and those that were clearly subjected to past disturbance in order to determine where survey efforts were best allocated. The results of the visual assessment and subsequent testing are discussed individually below by project sub-areas. A total of 94 shovel tests were excavated in the course of the survey.

Sub-area 1: Quaker Avenue (CSAH 9) – Between 190th Street W & 7th Street

The northernmost sub-area extends for a length of approximately 700 feet between 190th Street W and 7th Street. A sidewalk is present within CSAH 9 roadway right-of-way (R/W) on the right (east) side of the road (**Figure 6**). The left (west) side of the roadway appears to have been previously ditched and/or graded and contains many utilities (**Figure 7**). Limited shovel testing took place within this project sub-area given the likely disturbance.

A total of five shovel tests were excavated in this project sub-area, with four tests on the east side of the roadway, and one on the west side of roadway R/W (**Figure 1**). All tests yielded disturbed soil profiles with no potential for the preservation of past soil layers yielding cultural materials.

Figure 6: Quaker Avenue Setting

North of 190th Street W, east side of roadway R/W. Facing north.

Figure 7: Quaker Avenue Setting

North of 190th Street W, west side of roadway R/W, demonstrating utilities/grading. Facing south.

Sub-area 2: 190th Street (West) & Valley View Drive (East) – Quaker Avenue (CSAH 9) Intersection

This sub-area extends approximately 830 feet west along 190th Street, and approximately 880 feet east along Valley View Drive, from the intersection with Quaker Avenue (CSAH 9) (**Figures 8** and **9**). The northern portion of roadway R/W on the north side of 190th Street has been previously disturbed by ditching and was not surveyed (**Figure 8**). The area to the south, however, appeared potentially undisturbed (**Figure 4**). Given the low to moderate archaeological probability for this area, shovel tests were spaced at a 30-meter interval along the south side of 190th Street. A total of four shovel tests were excavated in this area (**Figure 1**).

Shovel test profiles revealed disturbance to at least 50 centimeters below the surface (cmbs) evidenced by the presence of slag and limestone fragments from previous roadway work and/or railroad activities (not natural).

Roadway R/W along Valley View Drive contains a trail along the south side of roadway R/W and is sloped, and the area to the north has been previously graded, contains utilities, and is sloped (**Figure 9**). No survey was conducted along Valley View Drive given this extensive previous disturbance.

Figure 8: 190th Street W Setting

East side of roadway R/W, demonstrating utilities/grading. Facing west.

Figure 9: Valley View Drive Setting

Trail to south of roadway and slope. Facing east.

Sub-area 3: Quaker Avenue (CSAH 9) – Between 190th Street W & TH 169 Intersection

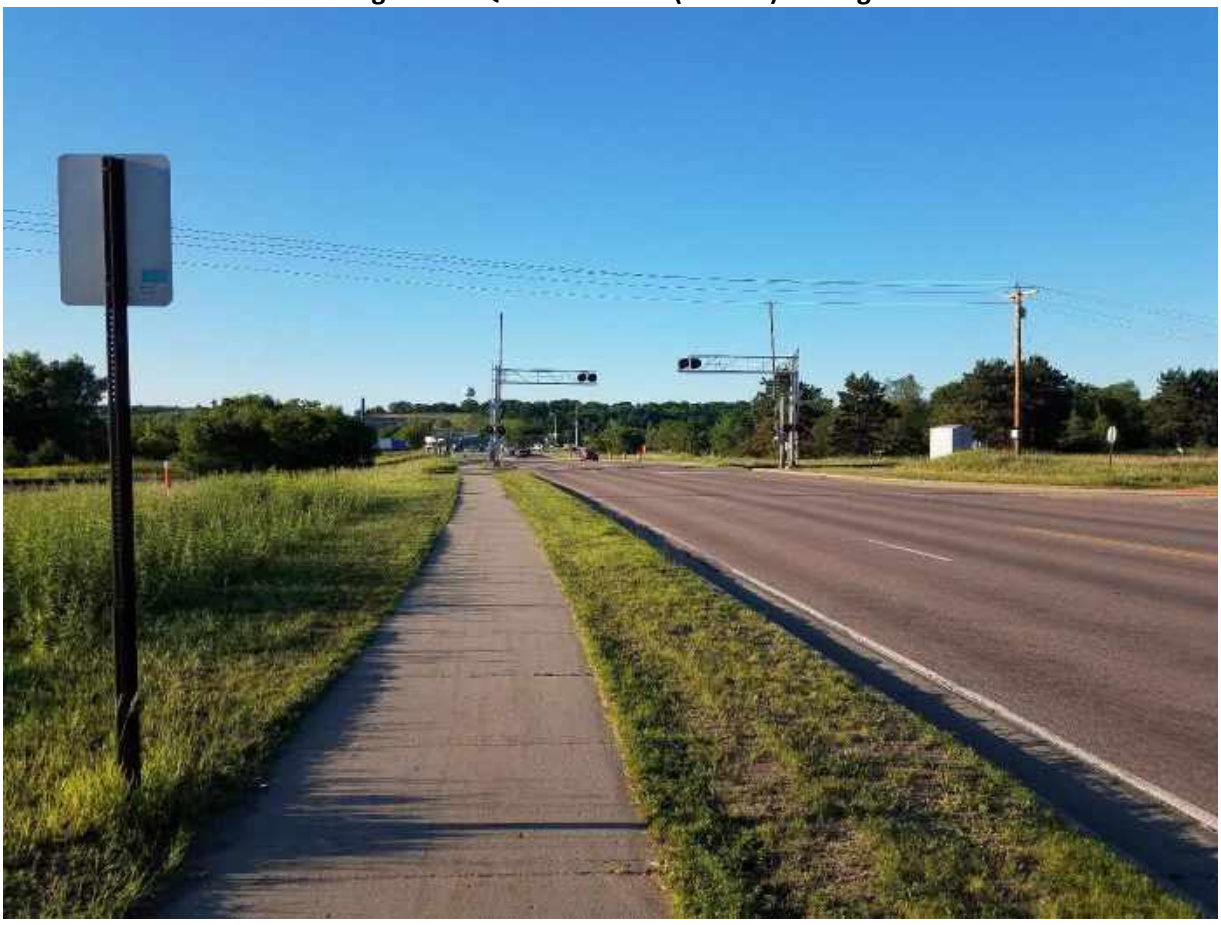
This sub-area is within the central portion of the Survey Area. Ground disturbance in this area will take place along Quaker Avenue (CSAH 9) for a length of 0.25 miles, with improvements extending along Frontage Road to the east and following 195th Street to the west (**Figure 10**). Roadway R/W along Quaker Avenue (CSAH 9) was tested on the east and west sides of the roadway R/W in areas that appeared previously undisturbed. Shovel tests on the west side of the roadway demonstrated natural profiles to the north, with more disturbance moving southward , and on the east side of the roadway all soil profiles proved to be previously disturbed (**Figure 1**).

The area of proposed ground disturbance north of the creek and Bridge #97464 appeared to be relatively undisturbed and was therefore surveyed. ST 20 contained one lithic flake distal fragment of Hixton Quartzite (21SC0111). The shovel test was delineated where possible given slope and previous disturbance, but all radial tests were negative for cultural materials.

Further to the east of Quaker Avenue, north of the creek/wetland contained an old driveway and disturbance was present throughout the survey sub-area, including the wooded area south of the train tracks and north of the creek/wetland. With the exception of a small area south of the home on the west side of Creek Lane North covered in tall grasses, this area has been extensively previously disturbed. A total of 30 shovel tests were excavated east of Quaker Avenue, south of the train tracks, north of the creek/wetland, and west of Creek Lane North (**Figure 1**).

The area on the west side of Quaker Avenue (CSAH 9) is low and wet and appears previously disturbed along W 195th Street. The railroad runs through this portion of the Study Area and considering disturbance associated with the railroad and other landscaping, and the low and wet topography, the area was deemed not suitable for testing within current roadway R/W.

Figure 10: Quaker Avenue (CSAH 9) Setting



East side of road. Facing south.

Figure 11: 21SC0111 Setting

East of Quaker Avenue (CSAH 9), north of creek, location of STs 20 – 28.

Figure 12: Frontage Road Setting

South side of Frontage Road, showing ditched and wet area north of TH 169. Facing east.

Sub-area 4: Creek Lane N – North of Syndicate Street and East of Roadway

This sub-area is located east of Creek Lane N and north of Syndicate Street in the eastern portion of the Survey Area. This sub-area is approximately 600 feet in length and 250 feet in width and is immediately wet of Sand Creek (**Figure 13**). A total of 11 shovel tests were excavated in this project sub-area. Soil profiles in the southern portion of the sub-area evidenced a seasonally-flooded landscape based upon the presence of alluvial sediments. The shovel test located in the northern portion of the project sub-area, revealed wetland soils. Shovel tests in the remaining portion of the Study Area contained sub-soil on the surface, and continuing to the termination of the test, evidencing previous grading. Given previous grading activities, no potential past living surfaces have been preserved in this sub-area.

Figure 13: Creek Lane N Setting

Facing south-southeast.

Sub-area 5: Creek Lane N – North of Syndicate Street, West of Roadway, South of Creek/Wetland Complex

This sub-area is located west of Creek Lane N, north of Syndicate Street, and south of the existing creek and wetland area. This sub-area is approximately 950 feet in length and 450 feet in width. Low and wet areas limited testing of this sub-area. A total of 5 shovel tests were excavated in this project sub-area. Soil profiles in this area contained sub-soil on the surface, that continued to the termination of the test (no buried natural soil horizons), evidencing previous grading. One shovel test was excavated in the area south of the creek/wetland and north of Frontage Road (**Figure 1**, **Figure 5**). The soil profile contained wetland soils (gley), indicating the area had been a wetland for a substantial amount of time and therefore unlikely to contain archaeological sites. Given previous grading activities and the presence of low and wet areas, no potential past living surfaces have been preserved in this sub-area.

Sub-area 6: Quaker Avenue (CSAH 9) – South of Railroad Tracks & North of TH 169 Intersection

This project sub-area is located west of Quaker Avenue (CSAH 9), south of the existing railroad tracks, and north of the TH 169 intersection. This sub-area is approximately 0.5 miles in length, with a maximum width of 620 feet, and is located on private property (**Figures 14**). This project sub-area was tested to the east, north, and west of the

existing homestead and outbuildings. To the south is an existing wetland and is topographically low and therefore was not tested. A total of 23 shovel tests were excavated in this project sub-area. Profiles within this area generally appeared natural, comprised of a very dark brown (10YR 2/2) silty sand loam with roots over a dark brown (10YR 3/2-3/3) sand, which overlay a yellowish brown (10YR 5/6) sand to a depth of 100 cmbs. Transportation of materials within the soil column was evidenced by the presence of slag, slate, charcoal, and cinders throughout the soil profile, particularly in those tests nearest to the railroad tracks. Two shovel tests (STs 85 and 87) were disturbed to a maximum depth of 75 cmbs. The westernmost shovel tests revealed that the berm running parallel to and south of the railroad tracks was disturbed and artificial, likely created by the construction of the tracks (**Figure 14**).

Figure 14: Railroad Tracks West of CSAH 9 – View to Northeast

View to the northeast along railroad west of CSAH 9, showing artificial berm (right).

Sub-area 7: 2nd Street W (TH 282) & Triangle Lane – South of TH 169

This project sub-area is located south of TH 169, along 2nd Street W (TH 282) and Triangle Lane, extending for 0.13 and 0.17 miles, respectively. The roadway R/W in this portion of the survey area has been previously extensively disturbed by a trail, ditching, grading, and utility installation (**Figure 15**). Given the extensive disturbance and development within this area, this portion of the survey area was deemed unfit for testing.

Figure 15: 2nd Street W (TH 282) – View to Northwest

View to the northwest along 2nd Street W (TH 282), showing trail and ditch.

OTHER SURVEYED AREAS

Additional areas were tested or visually inspected that are now outside of the current Study Area, as described below.

Sub-area 8: Creek Lane N – South of TH 169

The majority of this sub-area is no longer included within the Survey Area. It is located south of TH 169 and along Creek Lane N, for a length of 0.25 miles. The roadway R/W on the right (east) side of Creek Lane N includes part of Riesgraf-Lions Park, located on the western shore of Sand Creek (**Figure 16**). The roadway appears to have been previously built-up, but the landform appeared to be potentially undisturbed. A total of three shovel tests were excavated across the landform. All tests revealed soil profiles previously disturbed by past activities to a depth of up to 90 cmbs. An additional shovel test was excavated in the northeastern portion of the park and was similarly found to be disturbed.

The roadway R/W of the left (west) side of the roadway in this survey sub-area has been previously extensively disturbed by stormwater features, utility installation, and previous grading (**Figure 17**). This area was deemed not conducive to testing.

To the south of the intersection with 2nd Street W (TH 282), the roadway R/W has been disturbed by past grading and utility installation, along with trail and roadway construction activities (**Figures 18** and **19**). Given the extensive past disturbance within this area, no testing took place.

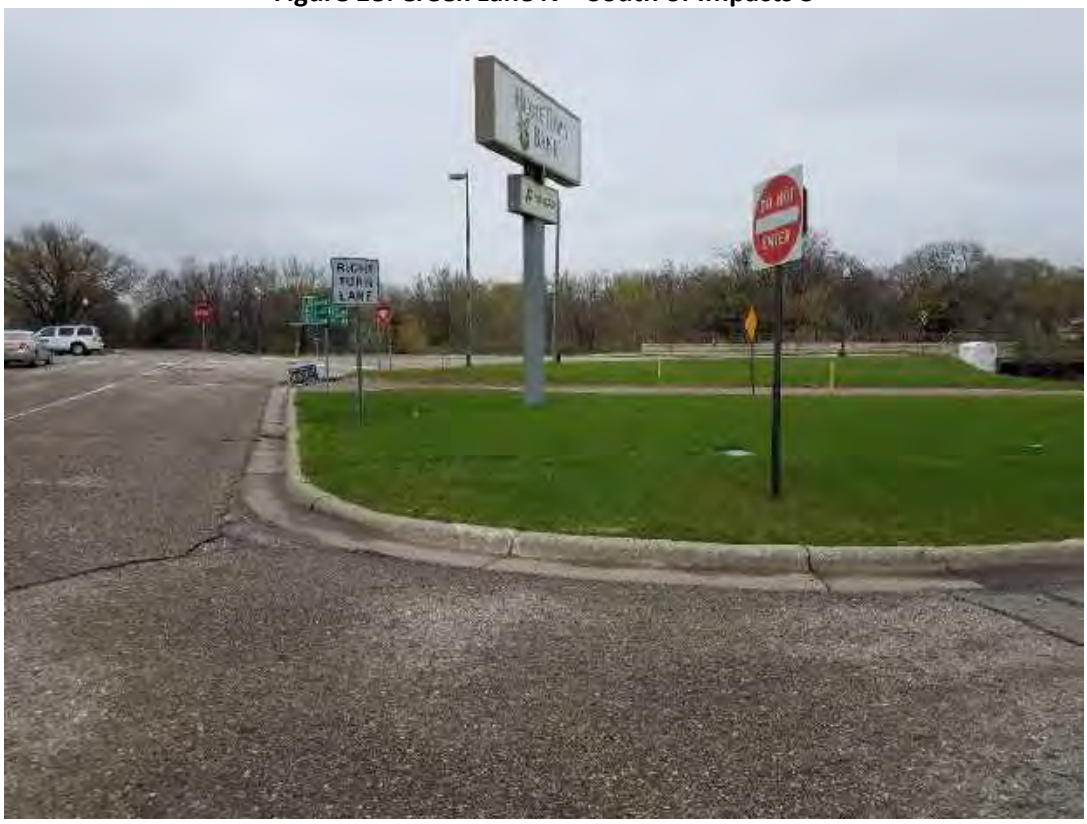
Figure 16: Creek Lane N –South of Impacts 1

Creek Lane N, south of proposed impacts. Facing south.

Figure 17: Creek Lane N – South of Impacts 2

Creek Lane N, south of proposed impacts, showing ditching and existing utilities east of roadway. Facing north.

Figure 18: Creek Lane N – South of Impacts 3



Showing trail and existing utilities. Facing north from Home Town Bank Entrance.

Figure 19: East of Home Town Bank Parking Lot

Showing dirt roadway, parking lot, and likely graded area. Facing southeast.

SUMMARY & RECOMMENDATIONS

A Phase I Archaeological Survey was completed on May 30 – 31, and June 10, 12, 17, 25, 26, and July 3, 15 – 16, and 22 – 23, 2019. Of 94 shovel tests, a single test (ST 20) contained a lithic flake distal fragment of Hixton Quartzite, constituting site 21SC0111, Quaker Avenue Site. Site 21SC0111 is recorded as a single artifact. A single artifact find spot is generally not considered eligible to the National Register of Historic Places (Anfinson 1994b). Bolton & Menk, Inc. recommends no further investigation for the proposed intersection improvements.

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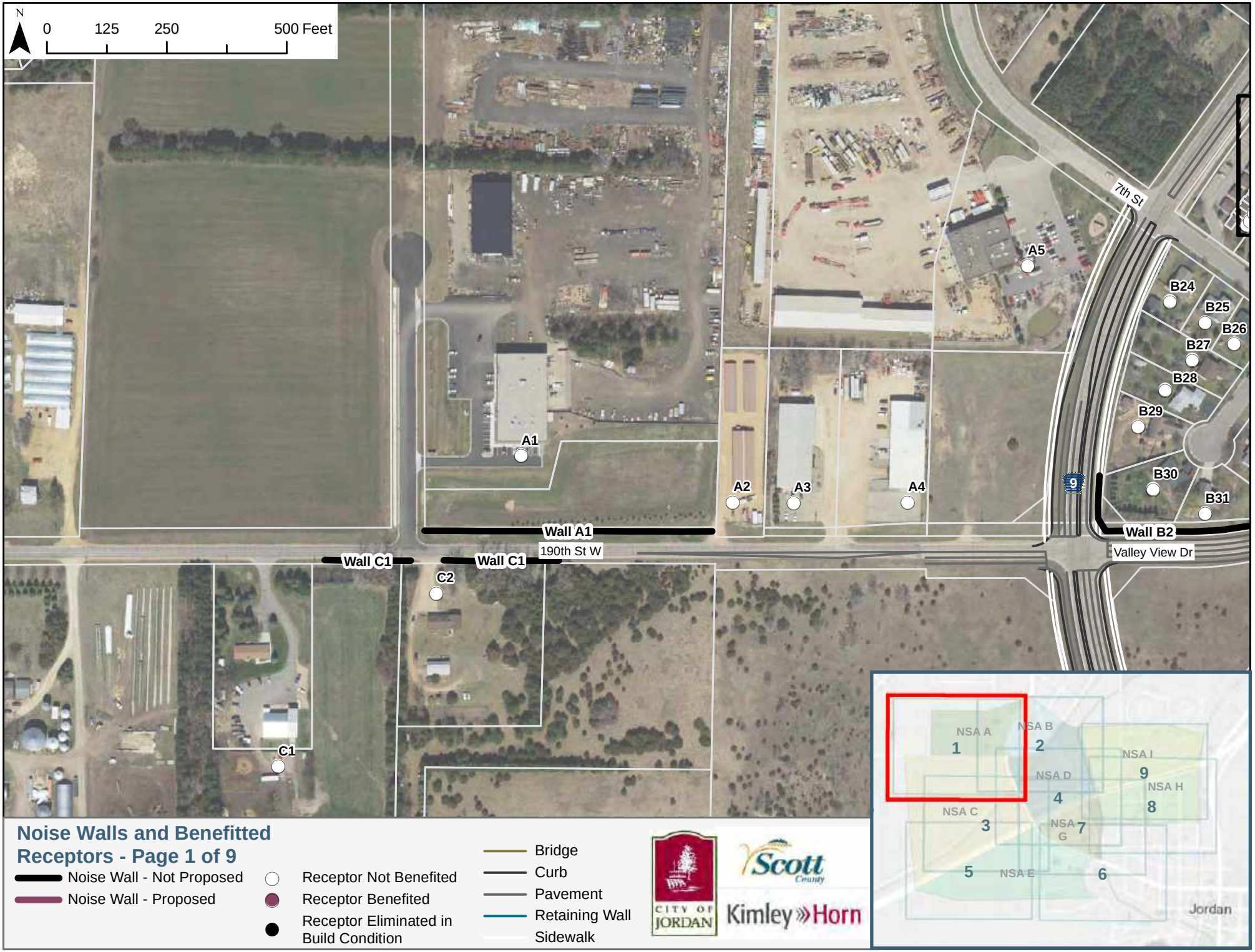
Appendix F

Traffic Noise Analysis Exhibits and Tables



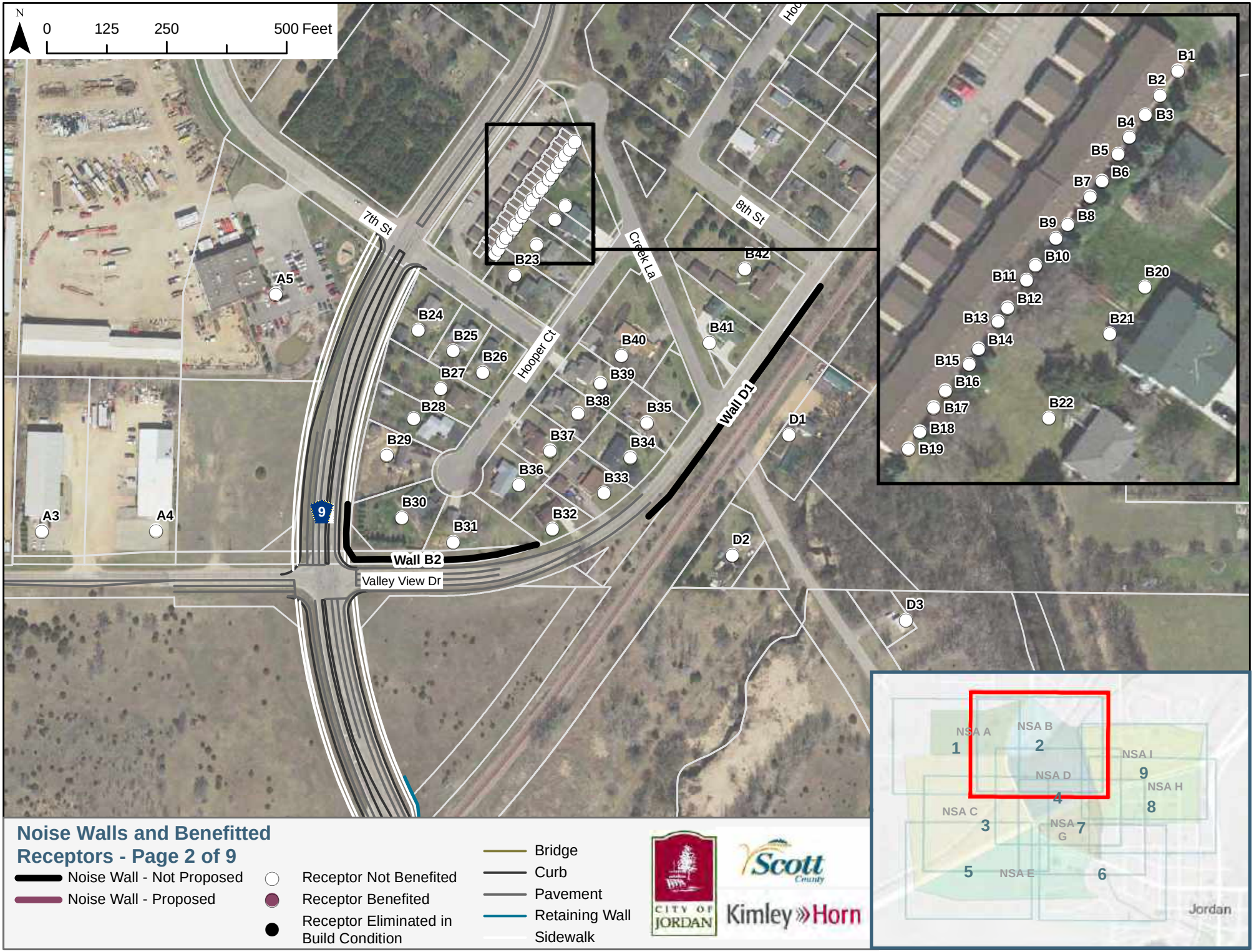
Noise Walls and Benefitted Receptors - Page 1 of 9

- Noise Wall - Not Proposed
- Noise Wall - Proposed
- Receptor Not Benefited
- Receptor Benefited
- Receptor Eliminated in Build Condition
- Bridge
- Curb
- Pavement
- Retaining Wall
- Sidewalk

CITY OF JORDAN

Scott County

Kimley»Horn



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- Noise Wall - Proposed
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- Pavement
- Retaining Wall
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CITY OF JORDAN

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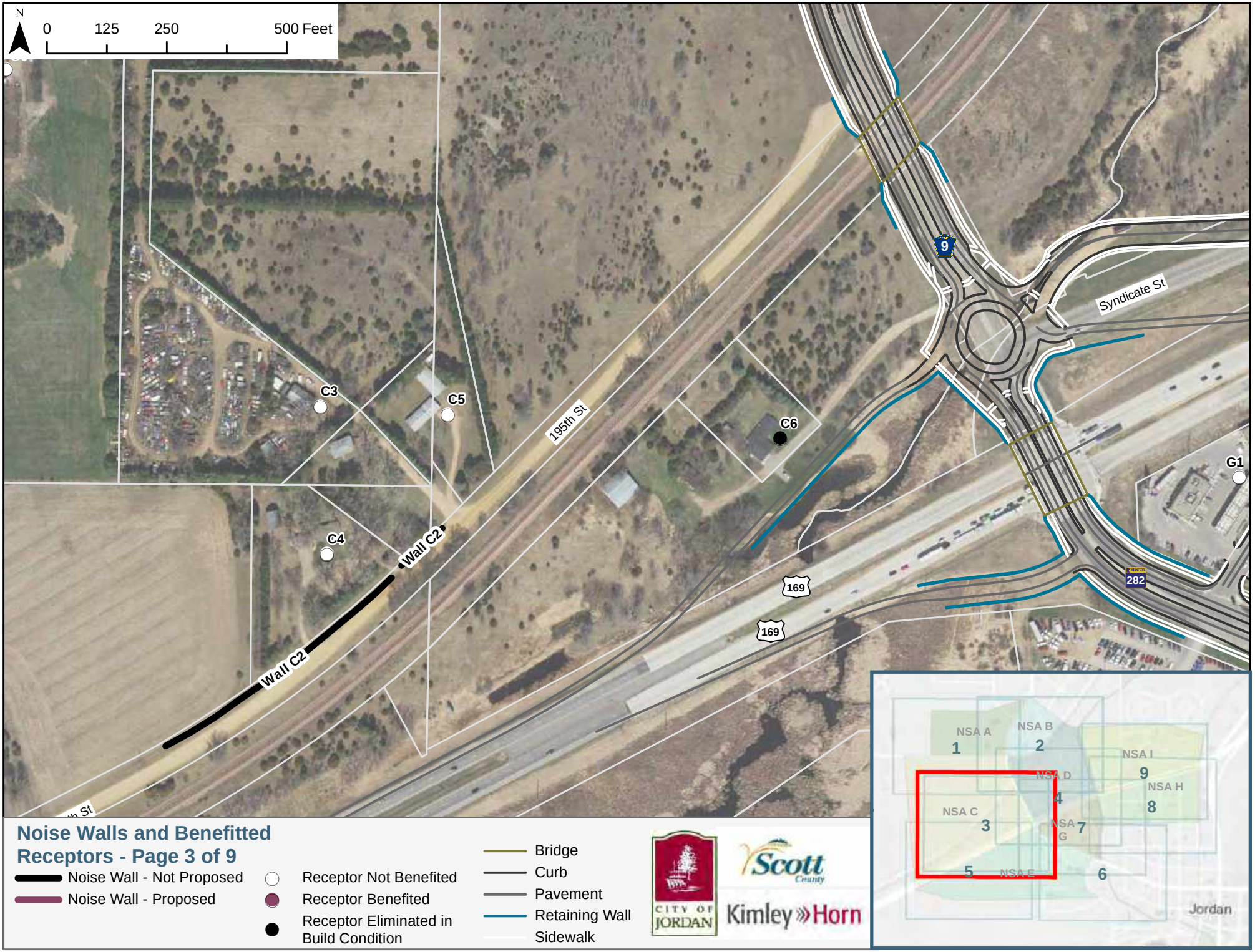

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CITY OF JORDAN

Scott County

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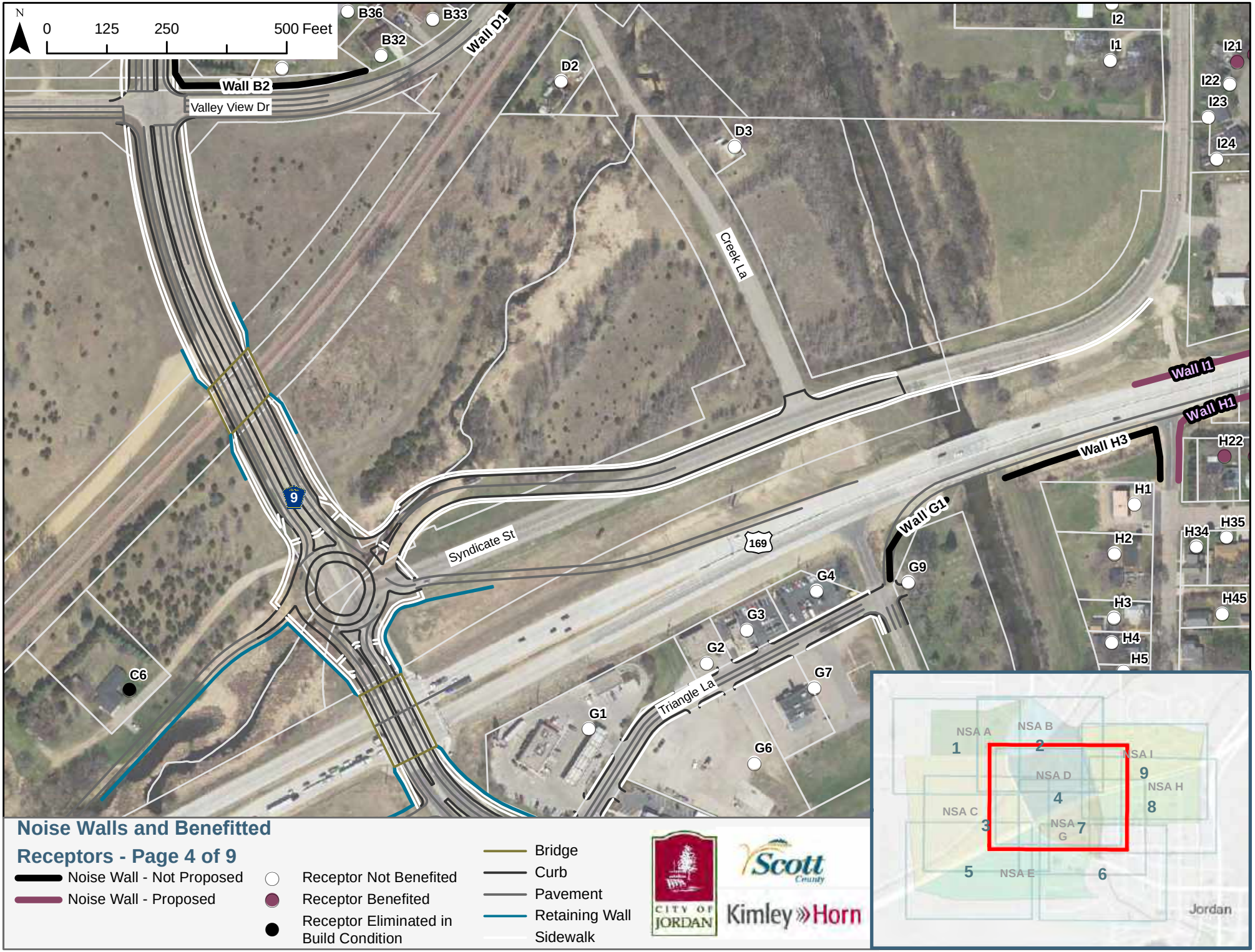

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- Receptor Benefited
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- Bridge
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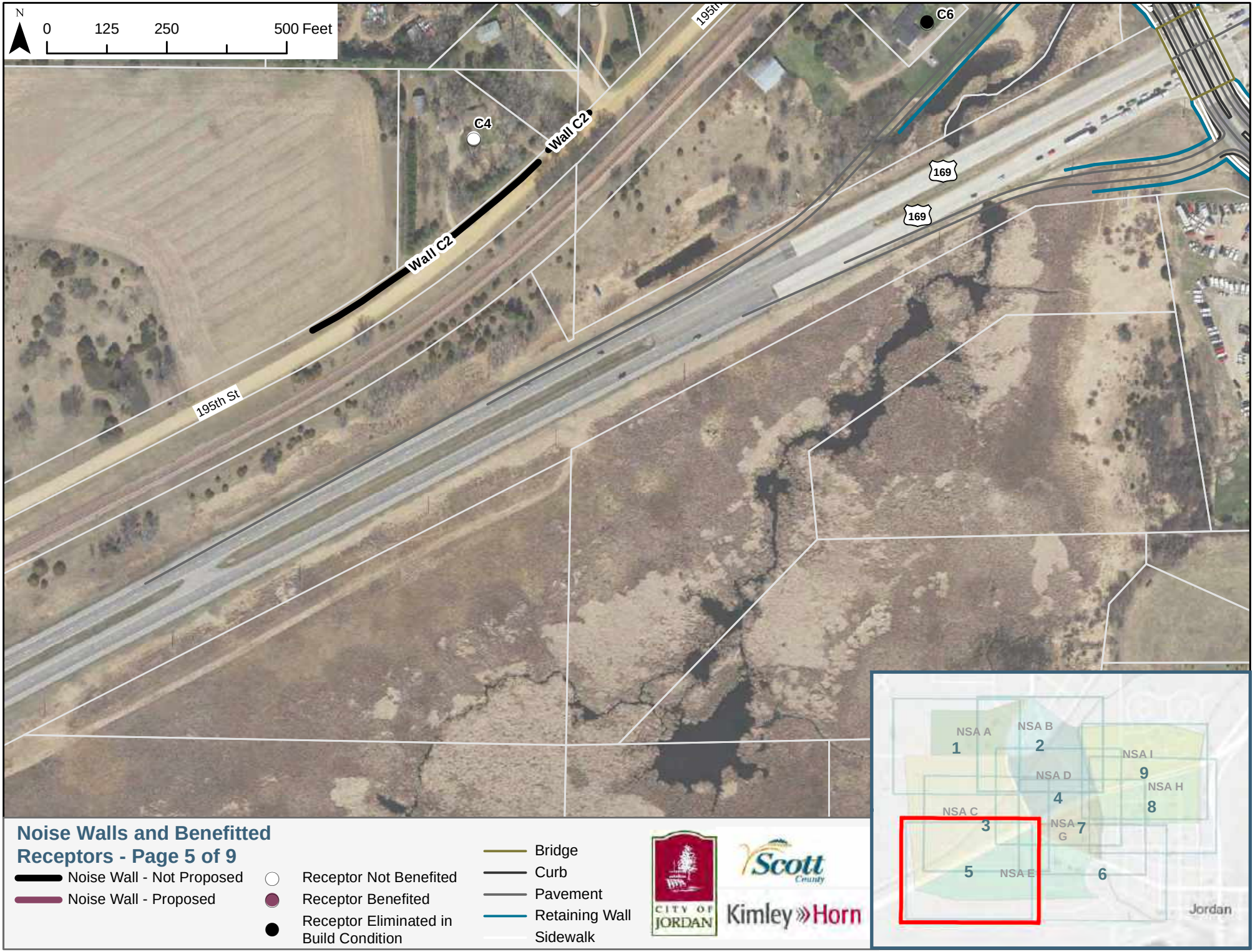
CITY OF JORDAN

Scott County

Kimley»Horn



Noise Walls and Benefitted Receptors - Page 5 of 9

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- Noise Wall - Proposed
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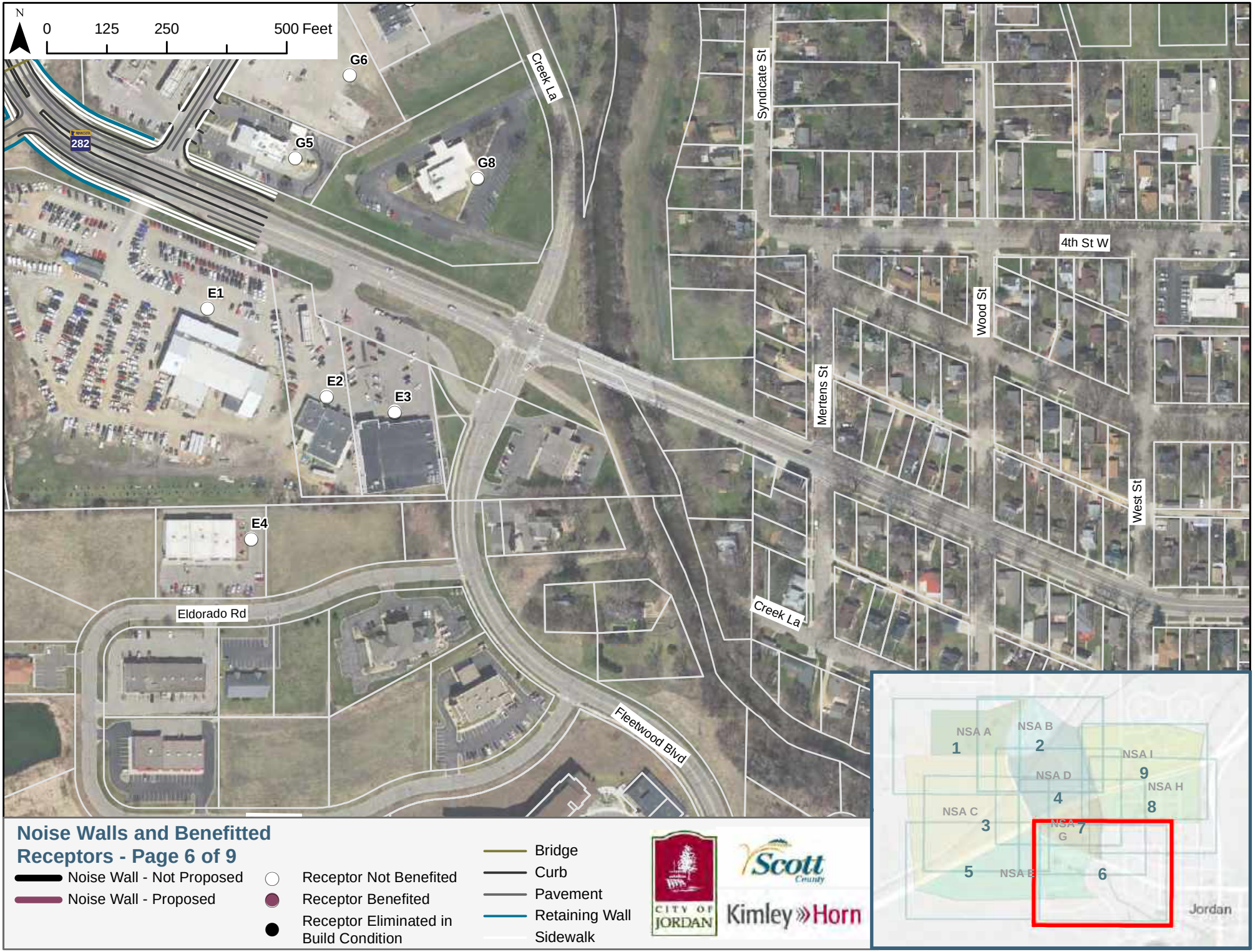
- Receptor Benefited
- Receptor Eliminated in Build Condition
- Bridge
- Curb
- Pavement
- Retaining Wall
- Sidewalk

CITY OF JORDAN

Scott County

Kimley»Horn



Noise Walls and Benefitted Receptors - Page 6 of 9

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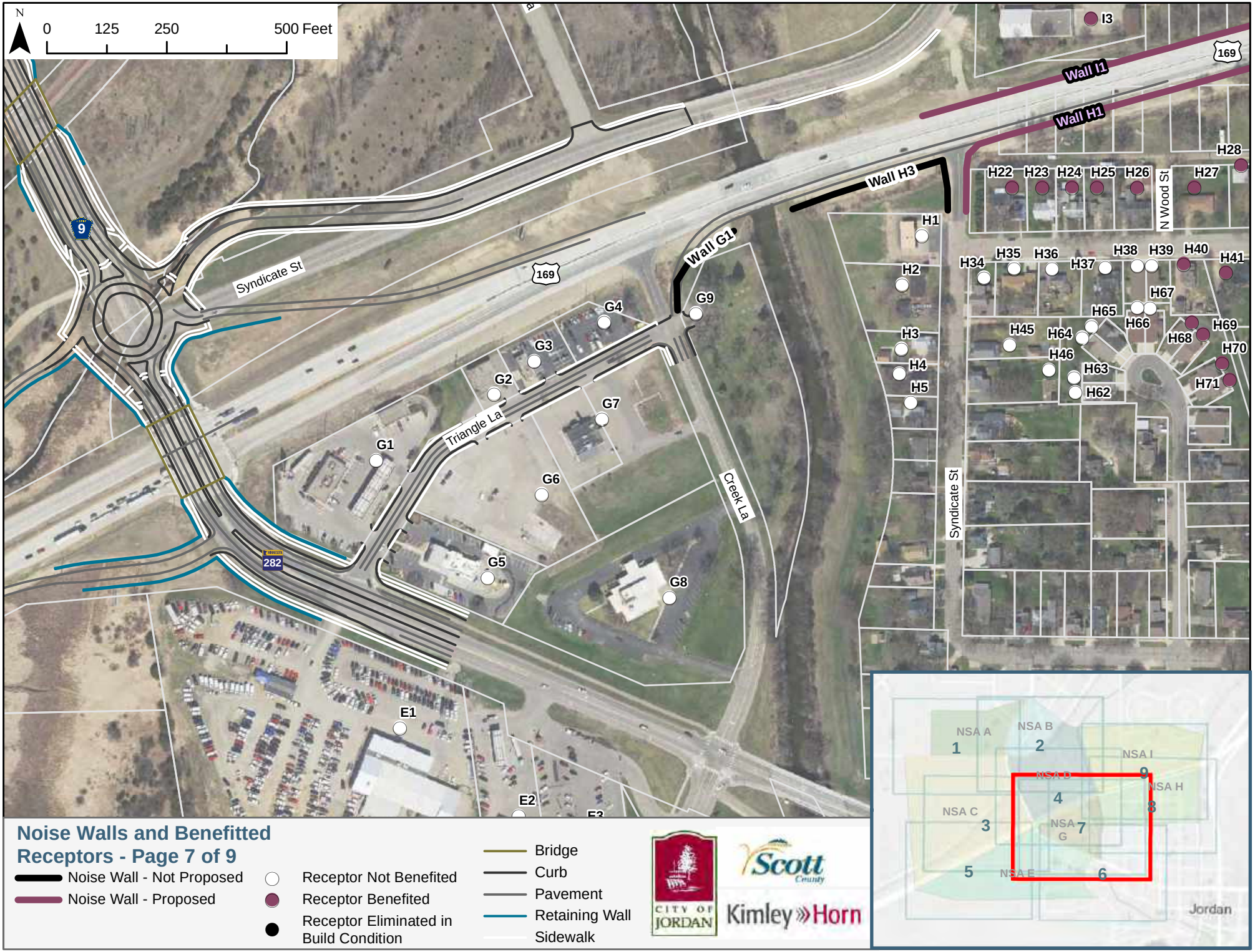
CITY OF JORDAN

Scott County

Kimley»Horn



Noise Walls and Benefitted Receptors - Page 7 of 9

- Noise Wall - Not Proposed
- Noise Wall - Proposed
- Receptor Not Benefited
- Receptor Benefited
- Receptor Eliminated in Build Condition
- Bridge
- Curb
- Pavement
- Retaining Wall
- Sidewalk

CITY OF JORDAN

Scott County

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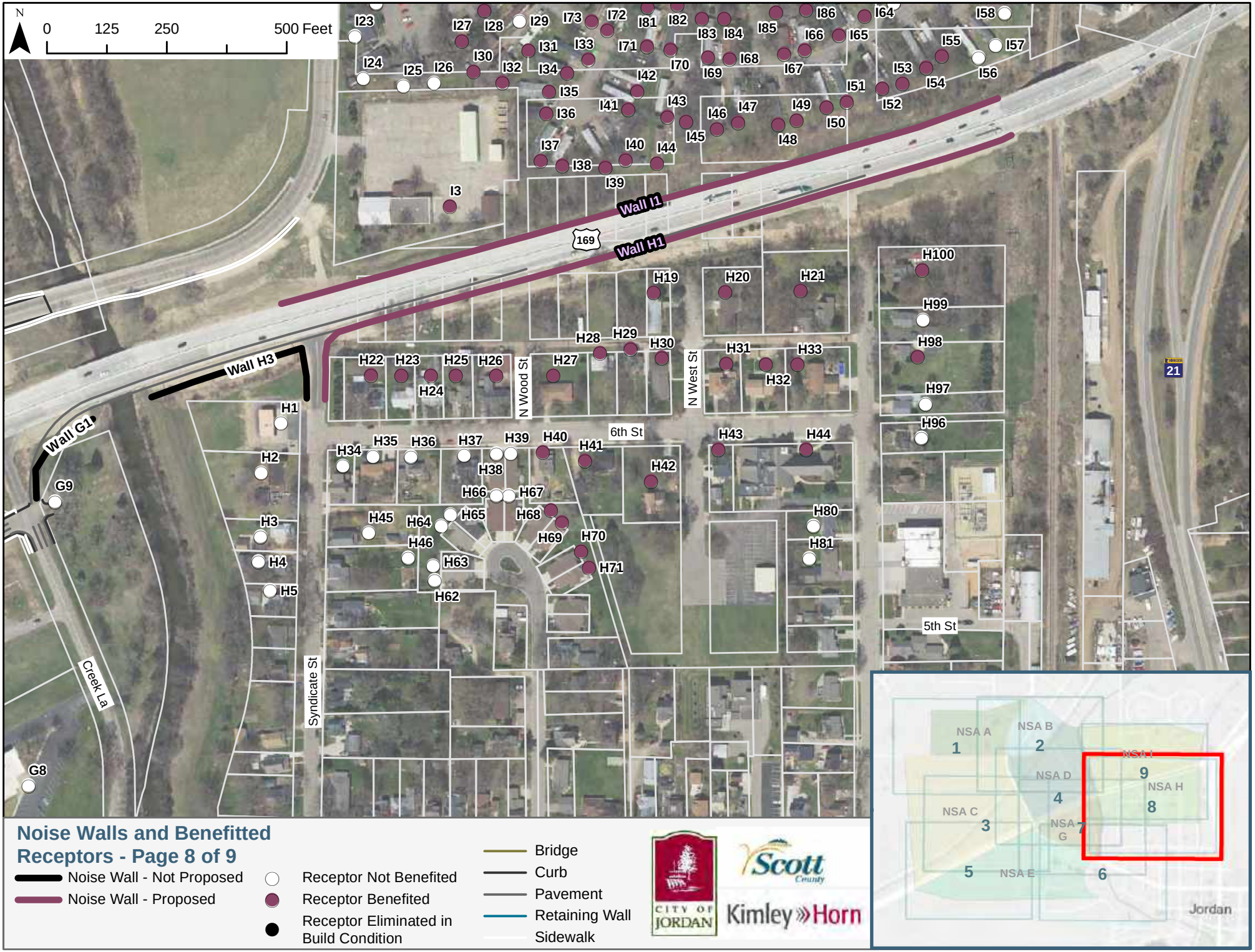
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Wall H1
Wall H3
Wall G1
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21
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N West St
6th St
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H100
Noise Walls and Benefitted Receptors - Page 8 of 9
Noise Wall - Not Proposed
Noise Wall - Proposed
Receptor Not Benefited
Receptor Benefited
Receptor Eliminated in Build Condition
Bridge
Curb
Pavement
Retaining Wall
Sidewalk
CITY OF JORDAN
Scott County
Kimley»Horn
NSA A
NSA B
NSA C
NSA D
NSA E
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NSA H
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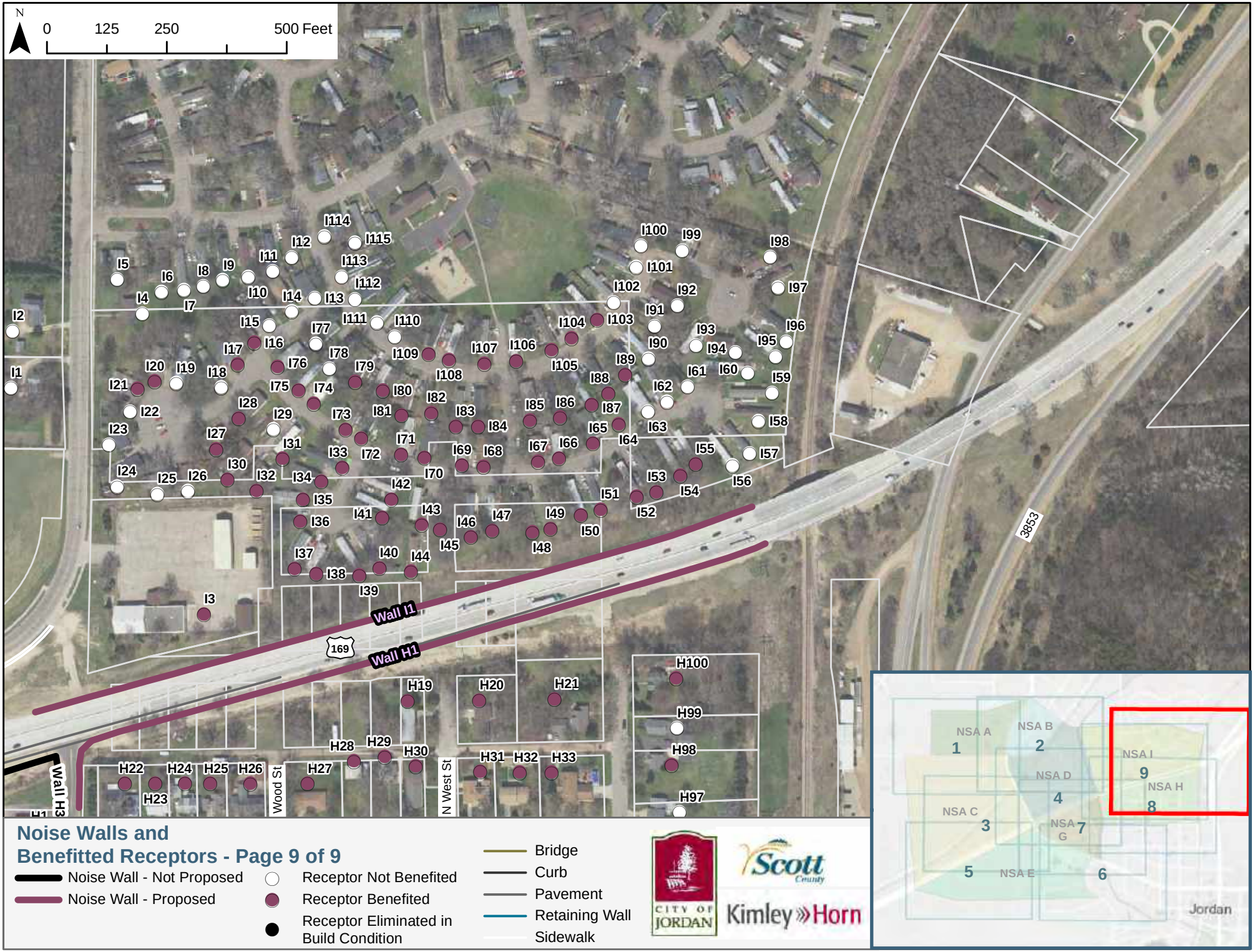

Noise Walls and Benefitted Receptors - Page 9 of 9

- Noise Wall - Not Proposed
- Noise Wall - Proposed
- Receptor Not Benefited
- Receptor Benefited
- Receptor Eliminated in Build Condition
- Bridge
- Curb
- Pavement
- Retaining Wall
- Sidewalk

CITY OF JORDAN

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Noise Analysis Summary
Existing and Future Scenarios

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

Receptor		FHWA Noise Abatement Criteria		2019 Existing Condition	2040 No Build Conditions	Difference - Existing and No Build	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
A1	1	E	72	50.3	55.3	5.0	55.6	5.3
A2	1	F	N/A	54.8	60.5	5.7	60.5	5.7
A3	1	F	N/A	54.7	60.5	5.8	60.5	5.8
A4	1	F	N/A	55.8	61.3	5.5	61.7	5.9
A5	1	E	72	55.2	58.3	3.1	58.8	3.6
B1	1	B	67	48.5	50.7	2.2	53.1	4.6
B2	1	B	67	48.7	50.9	2.2	53.3	4.6
B3	1	B	67	48.7	50.9	2.2	53.3	4.6
B4	1	B	67	48.6	50.9	2.3	53.3	4.7
B5	1	B	67	48.5	50.8	2.3	53.2	4.7
B6	1	B	67	48.3	50.6	2.3	53.0	4.7
B7	1	B	67	48.0	50.4	2.4	52.7	4.7
B8	1	B	67	47.6	50.0	2.4	52.3	4.7
B9	1	B	67	47.2	49.7	2.5	51.8	4.6
B10	1	B	67	46.4	49.2	2.8	51.1	4.7
B11	1	B	67	46.6	49.3	2.7	51.1	4.5
B12	1	B	67	47.1	49.8	2.7	51.6	4.5
B13	1	B	67	47.1	49.7	2.6	51.7	4.6
B14	1	B	67	47.3	49.9	2.6	52.0	4.7
B15	1	B	67	47.2	49.9	2.7	51.8	4.6
B16	1	B	67	46.9	49.7	2.8	51.3	4.4
B17	1	B	67	46.8	49.6	2.8	51.3	4.5
B18	1	B	67	47.4	50.2	2.8	51.7	4.3
B19	1	B	67	48.1	51.0	2.9	52.4	4.3
B20	1	B	67	42.8	46.0	3.2	47.1	4.3
B21	1	B	67	42.7	45.9	3.2	47.0	4.3
B22	1	B	67	44.1	47.3	3.2	48.6	4.5
B23	1	B	67	47.5	50.4	2.9	51.4	3.9
B24	1	B	67	56.0	59.3	3.3	59.2	3.2
B25	1	B	67	50.5	53.8	3.3	54.7	4.2
B26	1	B	67	48.9	51.9	3.0	53.0	4.1
B27	1	B	67	50.1	53.6	3.5	54.7	4.6
B28	1	B	67	54.2	57.6	3.4	58.0	3.8
B29	1	B	67	57.7	61.4	3.7	61.9	4.2
B30	1	B	67	57.4	61.7	4.3	62.4	5.0
B31	1	B	67	56.0	60.6	4.6	61.1	5.1
B32	1	B	67	57.3	62.2	4.9	62.5	5.2
B33	1	B	67	56.2	61.0	4.8	61.2	5.0
B34	1	B	67	55.5	60.1	4.6	60.5	5.0
B35	1	B	67	54.2	58.6	4.4	59.3	5.1
B36	1	B	67	52.4	56.0	3.6	56.8	4.4
B37	1	B	67	50.4	53.6	3.2	55.6	5.2
B38	1	B	67	48.5	51.7	3.2	53.9	5.4
B39	1	B	67	49.4	52.4	3.0	55.1	5.7
B40	1	B	67	49.7	52.4	2.7	55.0	5.3
B41	1	B	67	53.5	57.8	4.3	58.5	5.0
B42	1	B	67	46.0	50.5	4.5	51.7	5.7

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Noise Analysis Summary
Existing and Future Scenarios

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

Receptor		FHWA Noise Abatement Criteria		2019 Existing Condition	2040 No Build Conditions	Difference - Existing and No Build	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
C1	1	F	N/A	49.8	52.1	2.3	54.0	4.2
C2	1	B	67	54.3	61.0	6.7	60.8	6.5
C3	1	B	67	54.1	56.3	2.2	58.7	4.6
C4	1	B	67	61.6	63.5	1.9	66.2	4.6
C5	1	B	67	58.4	60.5	2.1	63.2	4.8
C6	1	B	67	65.3	67.2	1.9	*	*
D1	1	B	67	51.7	55.5	3.8	57.3	5.6
D2	1	B	67	54.7	57.1	2.4	57.8	3.1
D3	1	B	67	54.4	55.8	1.4	58.7	4.3
E1	1	F	N/A	61.3	64.3	3.0	64.2	2.9
E2	1	F	N/A	58.7	62.1	3.4	62.1	3.4
E3	1	F	N/A	59.1	62.6	3.5	62.5	3.4
E4	1	F	N/A	51.5	54.1	2.6	54.5	3.0
G1	1	F	N/A	67.0	68.6	1.6	71.0	4.0
G2	1	F	N/A	62.1	63.6	1.5	65.4	3.3
G3	1	F	N/A	67.5	69.0	1.5	71.8	4.3
G4	1	F	N/A	69.0	70.5	1.5	73.2	4.2
G5	1	E	72	59.2	62.5	3.3	63.7	4.5
G6	1	E	72	58.1	60.3	2.2	61.8	3.7
G7	1	E	72	61.7	63.2	1.5	66.0	4.3
G8	1	F	N/A	57.3	60.5	3.2	61.3	4.0
G9	1	C	67	66.0	67.6	1.6	70.3	4.3
H1	1	E	72	64.4	66.0	1.6	69.8	5.4
H2	1	B	67	62.2	63.8	1.6	66.9	4.7
H3	1	B	67	59.3	60.8	1.5	63.9	4.6
H4	1	B	67	54.7	56.3	1.6	59.6	4.9
H5	1	B	67	55.7	57.3	1.6	60.1	4.4
H19	1	B	67	64.8	66.0	1.2	70.4	5.6
H20	1	B	67	63.1	64.3	1.2	68.8	5.7
H21	1	B	67	61.8	62.9	1.1	67.5	5.7
H22	1	B	67	67.9	69.4	1.5	73.1	5.2
H23	1	B	67	67.0	68.6	1.6	72.5	5.5
H24	1	B	67	65.2	66.8	1.6	70.9	5.7
H25	1	B	67	65.6	67.2	1.6	71.4	5.8
H26	1	B	67	63.5	65.1	1.6	69.2	5.7
H27	1	B	67	62.8	64.3	1.5	68.8	6.0
H28	1	B	67	62.6	63.9	1.3	68.5	5.9
H29	1	B	67	61.3	62.6	1.3	67.3	6.0
H30	1	B	67	60.2	61.5	1.3	65.8	5.6
H31	1	B	67	58.8	59.9	1.1	64.2	5.4
H32	1	B	67	57.2	58.4	1.2	62.9	5.7
H33	1	B	67	56.6	57.8	1.2	62.0	5.4
H34	1	B	67	60.8	62.3	1.5	66.1	5.3
H35	1	B	67	60.9	62.4	1.5	66.1	5.2
H36	1	B	67	58.7	60.1	1.4	63.9	5.2
H37	1	B	67	57.3	58.7	1.4	62.7	5.4
H38	1	B	67	57.5	58.9	1.4	63.1	5.6

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Noise Analysis Summary
Existing and Future Scenarios

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

Receptor		FHWA Noise Abatement Criteria		2019 Existing Condition	2040 No Build Conditions	Difference - Existing and No Build	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
H39	1	B	67	57.4	58.8	1.4	63.1	5.7
H40	1	B	67	57.1	58.5	1.4	62.6	5.5
H41	1	B	67	56.6	58.0	1.4	62.4	5.8
H42	1	B	67	55.5	56.9	1.4	61.1	5.6
H43	1	B	67	54.6	56.0	1.4	60.0	5.4
H44	1	C	67	54.1	55.5	1.4	59.3	5.2
H45	1	B	67	55.1	56.6	1.5	60.1	5.0
H46	1	B	67	50.3	52.2	1.9	55.1	4.8
H62	1	B	67	51.7	53.6	1.9	56.3	4.6
H63	1	B	67	52.2	54.0	1.8	56.9	4.7
H64	1	B	67	54.0	55.6	1.6	58.7	4.7
H65	1	B	67	53.6	55.1	1.5	58.5	4.9
H66	1	B	67	49.3	50.7	1.4	54.6	5.3
H67	1	B	67	48.6	49.9	1.3	53.8	5.2
H68	1	B	67	53.2	54.5	1.3	59.0	5.8
H69	1	B	67	52.4	53.7	1.3	58.2	5.8
H70	1	B	67	52.3	53.6	1.3	58.0	5.7
H71	1	B	67	52.7	54.0	1.3	58.4	5.7
H80	1	B	67	47.2	48.9	1.7	52.5	5.3
H81	1	B	67	49.2	50.8	1.6	54.4	5.2
H96	1	B	67	53.5	54.7	1.2	58.9	5.4
H97	1	B	67	54.1	55.3	1.2	59.7	5.6
H98	1	B	67	51.9	53.1	1.2	57.8	5.9
H99	1	B	67	56.8	57.9	1.1	62.5	5.7
H100	1	B	67	60.2	61.4	1.2	66.1	5.9
I1	1	B	67	54.4	56.0	1.6	58.4	4.0
I2	1	B	67	51.9	53.4	1.5	56.2	4.3
I3	1	B	67	64.8	66.0	1.2	70.2	5.4
I4	1	B	67	48.8	50.1	1.3	53.5	4.7
I5	1	B	67	54.7	56.5	1.8	58.0	3.3
I6	1	B	67	51.8	53.2	1.4	56.1	4.3
I7	1	B	67	51.8	53.2	1.4	56.2	4.4
I8	1	B	67	50.7	52.2	1.5	55.1	4.4
I9	1	B	67	50.1	51.6	1.5	54.6	4.5
I10	1	B	67	49.1	50.5	1.4	53.9	4.8
I11	1	B	67	47.5	48.9	1.4	52.6	5.1
I12	1	B	67	52.2	53.5	1.3	57.2	5.0
I13	1	B	67	52.8	54.0	1.2	57.7	4.9
I14	1	B	67	50.4	51.7	1.3	55.4	5.0
I15	1	B	67	49.8	51.0	1.2	54.7	4.9
I16	1	B	67	51.6	52.8	1.2	56.6	5.0
I17	1	B	67	52.9	54.1	1.2	57.8	4.9
I18	1	B	67	51.7	53.0	1.3	56.3	4.6
I19	1	B	67	53.0	54.3	1.3	57.4	4.4
I20	1	B	67	53.3	54.6	1.3	57.9	4.6
I21	1	B	67	52.2	53.4	1.2	57.1	4.9
I22	1	B	67	53.2	54.7	1.5	57.4	4.2

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Noise Analysis Summary
Existing and Future Scenarios

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

Receptor		FHWA Noise Abatement Criteria		2019 Existing Condition	2040 No Build Conditions	Difference - Existing and No Build	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
I23	1	B	67	57.0	58.7	1.7	59.9	2.9
I24	1	B	67	58.3	59.7	1.4	62.2	3.9
I25	1	B	67	57.9	59.2	1.3	62.4	4.5
I26	1	B	67	58.3	59.5	1.2	62.7	4.4
I27	1	B	67	52.2	53.4	1.2	57.1	4.9
I28	1	B	67	50.5	51.8	1.3	55.3	4.8
I29	1	B	67	50.6	51.8	1.2	55.5	4.9
I30	1	B	67	57.0	58.3	1.3	61.5	4.5
I31	1	B	67	52.3	53.5	1.2	57.2	4.9
I32	1	B	67	56.9	58.2	1.3	61.6	4.7
I33	1	B	67	57.3	58.4	1.1	62.2	4.9
I34	1	B	67	58.2	59.3	1.1	63.5	5.3
I35	1	B	67	57.6	58.7	1.1	62.7	5.1
I36	1	B	67	56.5	57.6	1.1	61.4	4.9
I37	1	B	67	62.9	64.1	1.2	69.1	6.2
I38	1	B	67	64.0	65.2	1.2	70.5	6.5
I39	1	B	67	64.9	66.0	1.1	70.1	5.2
I40	1	B	67	64.6	65.7	1.1	69.8	5.2
I41	1	B	67	59.6	60.8	1.2	64.7	5.1
I42	1	B	67	57.7	58.9	1.2	62.8	5.1
I43	1	B	67	61.5	62.7	1.2	66.8	5.3
I44	1	B	67	65.1	66.3	1.2	70.5	5.4
I45	1	B	67	62.5	63.6	1.1	67.8	5.3
I46	1	B	67	64.2	65.3	1.1	69.3	5.1
I47	1	B	67	64.0	65.2	1.2	69.2	5.2
I48	1	B	67	64.3	65.6	1.3	69.5	5.2
I49	1	B	67	64.4	65.6	1.2	69.5	5.1
I50	1	B	67	64.3	65.5	1.2	69.8	5.5
I51	1	B	67	64.3	65.5	1.2	69.8	5.5
I52	1	B	67	64.5	65.7	1.2	69.9	5.4
I53	1	B	67	64.5	65.6	1.1	69.9	5.4
I54	1	B	67	64.2	65.3	1.1	69.5	5.3
I55	1	B	67	63.6	64.8	1.2	69.0	5.4
I56	1	B	67	64.7	65.9	1.2	69.9	5.2
I57	1	B	67	64.4	65.6	1.2	69.5	5.1
I58	1	B	67	62.3	63.5	1.2	67.3	5.0
I59	1	B	67	61.0	62.1	1.1	66.2	5.2
I60	1	B	67	58.1	59.2	1.1	63.3	5.2
I61	1	B	67	60.0	61.2	1.2	65.1	5.1
I62	1	B	67	59.9	61.1	1.2	65.2	5.3
I63	1	B	67	59.7	60.9	1.2	65.2	5.5
I64	1	B	67	59.8	60.9	1.1	65.6	5.8
I65	1	B	67	59.8	60.9	1.1	65.1	5.3
I66	1	B	67	60.1	61.2	1.1	65.4	5.3
I67	1	B	67	59.6	60.7	1.1	64.7	5.1
I68	1	B	67	59.2	60.3	1.1	64.2	5.0
I69	1	B	67	59.0	60.2	1.2	64.0	5.0

"*" is shown for receptors that are elimniated with the proposed project.

Noise Analysis Summary
Existing and Future Scenarios

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

Receptor		FHWA Noise Abatement Criteria		2019 Existing Condition	2040 No Build Conditions	Difference - Existing and No Build	2040 Build Conditions	Difference - Existing and Build
ID	Number of Units	Criteria	Leq	Leq	Leq	Leq	Leq	Leq
I70	1	B	67	58.4	59.5	1.1	63.5	5.1
I71	1	B	67	57.4	58.6	1.2	62.8	5.4
I72	1	B	67	56.6	57.7	1.1	61.6	5.0
I73	1	B	67	55.8	57.0	1.2	60.9	5.1
I74	1	B	67	54.3	55.5	1.2	59.2	4.9
I75	1	B	67	53.1	54.3	1.2	58.1	5.0
I76	1	B	67	52.5	53.8	1.3	57.1	4.6
I77	1	B	67	48.9	50.1	1.2	53.9	5.0
I78	1	B	67	50.3	51.5	1.2	55.4	5.1
I79	1	B	67	50.0	51.2	1.2	55.1	5.1
I80	1	B	67	52.8	53.9	1.1	57.9	5.1
I81	1	B	67	52.5	53.6	1.1	57.4	4.9
I82	1	B	67	53.7	54.9	1.2	58.8	5.1
I83	1	B	67	55.0	56.2	1.2	60.3	5.3
I84	1	B	67	55.0	56.2	1.2	60.5	5.5
I85	1	B	67	55.3	56.5	1.2	60.5	5.2
I86	1	B	67	55.2	56.3	1.1	61.2	6.0
I87	1	B	67	57.7	58.8	1.1	64.0	6.3
I88	1	B	67	57.8	59.0	1.2	64.2	6.4
I89	1	B	67	54.4	55.6	1.2	59.6	5.2
I90	1	B	67	54.9	56.0	1.1	59.9	5.0
I91	1	B	67	53.8	55.0	1.2	58.6	4.8
I92	1	B	67	53.6	54.8	1.2	58.6	5.0
I93	1	B	67	57.1	58.3	1.2	63.1	6.0
I94	1	B	67	57.3	58.4	1.1	62.3	5.0
I95	1	B	67	60.9	62.0	1.1	66.0	5.1
I96	1	B	67	60.8	62.0	1.2	66.0	5.2
I97	1	B	67	58.8	60.0	1.2	63.8	5.0
I98	1	B	67	55.2	56.4	1.2	60.4	5.2
I99	1	B	67	55.6	56.8	1.2	60.4	4.8
I100	1	B	67	54.9	56.1	1.2	59.6	4.7
I101	1	B	67	53.9	55.1	1.2	58.9	5.0
I102	1	B	67	54.3	55.5	1.2	59.1	4.8
I103	1	B	67	54.8	56.0	1.2	59.8	5.0
I104	1	B	67	55.4	56.5	1.1	60.5	5.1
I105	1	B	67	54.8	56.0	1.2	60.0	5.2
I106	1	B	67	54.2	55.4	1.2	59.3	5.1
I107	1	B	67	54.3	55.5	1.2	59.6	5.3
I108	1	B	67	53.7	54.9	1.2	59.0	5.3
I109	1	B	67	53.8	55.0	1.2	58.9	5.1
I110	1	B	67	54.0	55.2	1.2	58.9	4.9
I111	1	B	67	53.6	54.8	1.2	58.7	5.1
I112	1	B	67	53.7	54.9	1.2	58.7	5.0
I113	1	B	67	54.3	55.5	1.2	59.2	4.9
I114	1	B	67	54.1	55.3	1.2	59.0	4.9
I115	1	B	67	54.7	55.9	1.2	59.6	4.9

"*" is shown for receptors that are elimniated with the proposed project.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C1
Build Noise Barrier Cost Effectiveness - Wall A1 - 20 Foot Noise Barrier at 600 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall A1	A1	E	1	72	55.6	50.8	4.8	0	No	No	20	600	11,216	$403,776	N/A	Does Not Meet Noise Reduction Design Goal

Table C2
Build Noise Barrier Cost Effectiveness - Wall B2 - 20 Foot Noise Barrier at 505 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall B2	B27	B	1	67	54.7	54.7	0.0	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B28	B	1	67	58.0	57.7	0.3	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B29	B	1	67	61.9	60.2	1.7	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B30	B	1	67	62.4	55.8	**6.6**	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B31	B	1	67	61.1	51.8	**9.3**	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B32	B	1	67	62.5	62.0	0.5	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B36	B	1	67	56.8	53.1	3.7	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective
Wall B2	B37	B	1	67	55.6	54.2	1.4	2	Yes	Yes	20	505	9,316	$335,376	$167,688	Not Cost Effective

Table C3
Build Noise Barrier Cost Effectiveness - Wall B2 - 15 Foot Noise Barrier at 505 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall B2	B27	B	1	67	54.7	54.7	0.0	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B28	B	1	67	58.0	57.7	0.3	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B29	B	1	67	61.9	60.4	1.5	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B30	B	1	67	62.4	56.6	**5.8**	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B31	B	1	67	61.1	53.3	**7.8**	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B32	B	1	67	62.5	62.0	0.5	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B36	B	1	67	56.8	54.2	2.6	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective
Wall B2	B37	B	1	67	55.6	54.6	1.0	2	Yes	Yes	15	505	7,251	$261,036	$130,518	Not Cost Effective

1. Barrier area includes a taper at each end of the barrier.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C4

Build Noise Barrier Cost Effectiveness - Wall B2 - 10 Foot Noise Barrier at 505 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall B2	B27	B	1	67	54.7	54.7	0.0	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B28	B	1	67	58.0	57.8	0.2	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B29	B	1	67	61.9	60.8	1.1	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B30	B	1	67	62.4	58.9	3.5	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B31	B	1	67	61.1	57.1	4.0	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B32	B	1	67	62.5	62.2	0.3	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B36	B	1	67	56.8	55.8	1.0	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B37	B	1	67	55.6	55.2	0.4	0	No	No	10	505	4,986	$179,496	N/A	Does Not Meet Noise Reduction Design Goal

Table C5

Build Noise Barrier Cost Effectiveness - Wall B2 - 20 Foot Noise Barrier at 300 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall B2	B27	B	1	67	54.7	54.8	-0.1	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B28	B	1	67	58.0	57.7	0.3	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B29	B	1	67	61.9	60.2	1.7	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B30	B	1	67	62.4	56.5	**5.9**	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B31	B	1	67	61.1	60.3	0.8	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B32	B	1	67	62.5	62.4	0.1	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B36	B	1	67	56.8	56.7	0.1	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B37	B	1	67	55.6	55.6	0.0	1	Yes	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal

Table C6

Build Noise Barrier Cost Effectiveness - Wall B2 - 20 Foot Noise Barrier at 300 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall B2	B27	B	1	67	54.7	54.8	-0.1	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B28	B	1	67	58.0	57.9	0.1	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B29	B	1	67	61.9	60.6	1.3	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B30	B	1	67	62.4	57.5	4.9	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B31	B	1	67	61.1	56.7	4.4	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B32	B	1	67	62.5	62.4	0.1	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B36	B	1	67	56.8	56.2	0.6	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall B2	B37	B	1	67	55.6	55.3	0.3	0	No	No	20	300	5,216	$187,776	N/A	Does Not Meet Noise Reduction Design Goal

1. Barrier area includes a taper at each end of the barrier.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C7

Build Noise Barrier Cost Effectiveness - Wall C1 - 20 Foot Noise Barrier at 420 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall C1	C2	B	1	67	60.8	57.9	2.9	0	No	No	20	420	7,616	$274,176	N/A	Does Not Meet Noise Reduction Design Goal

Table C8

Build Noise Barrier Cost Effectiveness - Wall C2 - 20 Foot Noise Barrier at 705 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall C2	C3	B	1	67	58.7	58.4	0.3	1	Yes	No	20	705	13,316	$479,376	N/A	Does Not Meet Noise Reduction Design Goal
Wall C2	C4	B	1	67	66.2	61.1	**5.1**	1	Yes	No	20	705	13,316	$479,376	N/A	Does Not Meet Noise Reduction Design Goal
Wall C2	C5	B	1	67	63.2	62.9	0.3	1	Yes	No	20	705	13,316	$479,376	N/A	Does Not Meet Noise Reduction Design Goal

Table C9

Build Noise Barrier Cost Effectiveness - Wall D1 - 20 Foot Noise Barrier at 600 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall D1	D1	B	1	67	57.3	54.6	2.7	0	No	No	20	600	11,216	$403,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall D1	D2	B	1	67	57.8	57.3	0.5	0	No	No	20	600	11,216	$403,776	N/A	Does Not Meet Noise Reduction Design Goal
Wall D1	D3	B	1	67	58.7	58.7	0.0	0	No	No	20	600	11,216	$403,776	N/A	Does Not Meet Noise Reduction Design Goal

Table C10

Build Noise Barrier Cost Effectiveness - Wall G1 - 20 Foot Noise Barrier at 220 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall G1	G9	C	1	67	70.3	67.4	2.9	0	No	No	20	220	3,616	$130,176	N/A	Does Not Meet Noise Reduction Design Goal

1. Barrier area includes a taper at each end of the barrier.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C11

Build Noise Barrier Cost Effectiveness - Wall H1 - 20 Foot Noise Barrier at 1590 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall H1	H1	E	1	72	69.8	68.5	1.3	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H2	B	1	67	66.9	67.3	-0.4	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H3	B	1	67	63.9	63.8	0.1	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H4	B	1	67	59.6	59.6	0.0	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H5	B	1	67	60.1	60.1	0.0	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H19	B	1	67	70.4	59.1	**11.3**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H20	B	1	67	68.8	57.1	**11.7**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H21	B	1	67	67.5	57.0	**10.5**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H22	B	1	67	73.1	63.2	**9.9**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H23	B	1	67	72.5	62.8	**9.7**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H24	B	1	67	70.9	57.1	**13.8**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H25	B	1	67	71.4	59.0	**12.4**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H26	B	1	67	69.2	58.1	**11.1**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H27	B	1	67	68.8	56.5	**12.3**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H28	B	1	67	68.5	56.7	**11.8**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H29	B	1	67	67.3	56.2	**11.1**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H30	B	1	67	65.8	54.4	**11.4**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H31	B	1	67	64.2	54.5	**9.7**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H32	B	1	67	62.9	52.7	**10.2**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H33	B	1	67	62.0	53.0	**9.0**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H34	B	1	67	66.1	64.5	1.6	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H35	B	1	67	66.1	63.7	2.4	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H36	B	1	67	63.9	62.0	1.9	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H37	B	1	67	62.7	59.7	3.0	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H38	B	1	67	63.1	58.7	4.4	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H39	B	1	67	63.1	58.2	4.9	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H40	B	1	67	62.6	56.9	**5.7**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H41	B	1	67	62.4	54.6	**7.8**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H42	B	1	67	61.1	52.3	**8.8**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H43	B	1	67	60.0	53.4	**6.6**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H44	C	1	67	59.3	53.4	**5.9**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H45	B	1	67	60.1	57.4	2.7	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H46	B	1	67	55.1	52.3	2.8	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H62	B	1	67	56.3	54.0	2.3	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H63	B	1	67	56.9	54.6	2.3	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H64	B	1	67	58.7	55.4	3.3	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H65	B	1	67	58.5	55.8	2.7	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H66	B	1	67	54.6	51.7	2.9	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H67	B	1	67	53.8	50.4	3.4	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H68	B	1	67	59.0	50.3	**8.7**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H69	B	1	67	58.2	50.2	**8.0**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H70	B	1	67	58.0	50.4	**7.6**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H71	B	1	67	58.4	49.7	**8.7**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H80	B	1	67	52.5	48.7	3.8	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H81	B	1	67	54.4	50.0	4.4	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H96	B	1	67	58.9	56.4	2.5	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H97	B	1	67	59.7	56.6	3.1	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H98	B	1	67	57.8	50.6	**7.2**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H99	B	1	67	62.5	58.5	4.0	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct
Wall H1	H100	B	1	67	66.1	59.6	**6.5**	26	Yes	Yes	20	1,590	31,016	$1,116,576	$42,945	Propose to Construct

Table C12

Build Noise Barrier Cost Effectiveness - Wall H3 - 20 Foot Noise Barrier at 435 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall H3	H1	E	1	72	69.8	64.6	**5.2**	1	Yes	No	20	435	7,916	$284,976	N/A	Does Not Meet Noise Reduction Design Goal
Wall H3	H2	B	1	67	66.9	63.4	3.5	1	Yes	No	20	435	7,916	$284,976	N/A	Does Not Meet Noise Reduction Design Goal
Wall H3	H3	B	1	67	63.9	62.6	1.3	1	Yes	No	20	435	7,916	$284,976	N/A	Does Not Meet Noise Reduction Design Goal
Wall H3	H4	B	1	67	59.6	55.9	3.7	1	Yes	No	20	435	7,916	$284,976	N/A	Does Not Meet Noise Reduction Design Goal
Wall H3	H5	B	1	67	60.1	58.5	1.6	1	Yes	No	20	435	7,916	$284,976	N/A	Does Not Meet Noise Reduction Design Goal

1. Barrier area includes a taper at each end of the barrier.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C13

Build Noise Barrier Cost Effectiveness - Wall I1 - 20 Foot Noise Barrier at 1560 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall I1	I1	B	1	67	58.4	56.0	2.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I2	B	1	67	56.2	53.8	2.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I3	B	1	67	70.2	56.8	**13.4**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I4	B	1	67	53.5	50.1	3.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I5	B	1	67	58.0	56.6	1.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I6	B	1	67	56.1	52.7	3.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I7	B	1	67	56.2	52.2	4.0	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I8	B	1	67	55.1	51.5	3.6	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I9	B	1	67	54.6	50.4	4.2	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I10	B	1	67	53.9	49.7	4.2	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I11	B	1	67	52.6	49.2	3.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I12	B	1	67	57.2	53.5	3.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I13	B	1	67	57.7	54.0	3.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I14	B	1	67	55.4	52.0	3.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I15	B	1	67	54.7	50.7	4.0	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I16	B	1	67	56.6	51.0	**5.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I17	B	1	67	57.8	51.3	**6.5**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I18	B	1	67	56.3	52.7	3.6	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I19	B	1	67	57.4	52.7	4.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I20	B	1	67	57.9	52.9	**5.0**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I21	B	1	67	57.1	51.5	**5.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I22	B	1	67	57.4	53.6	3.8	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I23	B	1	67	59.9	58.6	1.3	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I24	B	1	67	62.2	58.6	3.6	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I25	B	1	67	62.4	57.9	4.5	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I26	B	1	67	62.7	57.8	4.9	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I27	B	1	67	57.1	50.5	**6.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I28	B	1	67	55.3	48.9	**6.4**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I29	B	1	67	55.5	51.0	4.5	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I30	B	1	67	61.5	56.5	**5.0**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I31	B	1	67	57.2	50.9	**6.3**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I32	B	1	67	61.6	55.7	**5.9**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I33	B	1	67	62.2	54.5	**7.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I34	B	1	67	63.5	54.4	**9.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I35	B	1	67	62.7	53.5	**9.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I36	B	1	67	61.4	53.3	**8.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I37	B	1	67	69.1	55.9	**13.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I38	B	1	67	70.5	57.4	**13.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I39	B	1	67	70.1	58.0	**12.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I40	B	1	67	69.8	57.6	**12.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I41	B	1	67	64.7	54.2	**10.5**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I42	B	1	67	62.8	52.5	**10.3**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I43	B	1	67	66.8	54.6	**12.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I44	B	1	67	70.5	58.9	**11.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I45	B	1	67	67.8	55.6	**12.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I46	B	1	67	69.3	57.4	**11.9**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I47	B	1	67	69.2	57.1	**12.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I48	B	1	67	69.5	58.9	**10.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I49	B	1	67	69.5	59.1	**10.4**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I50	B	1	67	69.8	59.6	**10.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I51	B	1	67	69.8	60.0	**9.8**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I52	B	1	67	69.9	61.2	**8.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I53	B	1	67	69.9	61.9	**8.0**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I54	B	1	67	69.5	63.5	**6.0**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I55	B	1	67	69.0	63.6	**5.4**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I56	B	1	67	69.9	66.9	3.0	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I57	B	1	67	69.5	66.8	2.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I58	B	1	67	67.3	65.4	1.9	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I59	B	1	67	66.2	64.6	1.6	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I60	B	1	67	63.3	62.2	1.1	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I61	B	1	67	65.1	61.4	3.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I62	B	1	67	65.2	61.5	3.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I63	B	1	67	65.2	60.3	4.9	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I64	B	1	67	65.6	59.0	**6.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct

1. Barrier area includes a taper at each end of the barrier.

Noise Level Comparison	
XX	Approaches or Exceeds FHWA Noise Abatement Criteria

Table C13 Continued

Build Noise Barrier Cost Effectiveness - Wall I1 - 20 Foot Noise Barrier at 1560 feet

Noise Barrier	Receptor	Activty Category	Number of Units	Leq Noise Level (dBA)			Noise Reduction (dBA)	Total Benefited Receptors	Acoustically Effective	Design Goal Reduction (>7 dBA)	Height of Barrier (ft)	Length of Barrier (ft)	Barrier Area[1] (sq ft)	Total Cost of Barrier ($36/sq ft)	Cost Per Benefited Receptor	Noise Barrier Results
				FHWA Noise Criteria	Build Year 2040 No Noise Barrier	Build Year 2040 With Noise Barrier										
Wall I1	I65	B	1	67	65.1	57.5	**7.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I66	B	1	67	65.4	56.9	**8.5**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I67	B	1	67	64.7	56.0	**8.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I68	B	1	67	64.2	55.5	**8.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I69	B	1	67	64.0	54.9	**9.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I70	B	1	67	63.5	54.3	**9.2**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I71	B	1	67	62.8	53.4	**9.4**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I72	B	1	67	61.6	52.8	**8.8**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I73	B	1	67	60.9	51.5	**9.4**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I74	B	1	67	59.2	52.5	**6.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I75	B	1	67	58.1	50.3	**7.8**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I76	B	1	67	57.1	50.2	**6.9**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I77	B	1	67	53.9	49.4	4.5	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I78	B	1	67	55.4	50.5	4.9	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I79	B	1	67	55.1	50.0	**5.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I80	B	1	67	57.9	50.0	**7.9**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I81	B	1	67	57.4	51.9	**5.5**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I82	B	1	67	58.8	51.0	**7.8**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I83	B	1	67	60.3	52.3	**8.0**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I84	B	1	67	60.5	52.4	**8.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I85	B	1	67	60.5	53.0	**7.5**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I86	B	1	67	61.2	52.4	**8.8**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I87	B	1	67	64.0	58.3	**5.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I88	B	1	67	64.2	56.5	**7.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I89	B	1	67	59.6	53.9	**5.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I90	B	1	67	59.9	56.5	3.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I91	B	1	67	58.6	54.8	3.8	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I92	B	1	67	58.6	56.9	1.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I93	B	1	67	63.1	59.3	3.8	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I94	B	1	67	62.3	61.2	1.1	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I95	B	1	67	66.0	64.4	1.6	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I96	B	1	67	66.0	64.6	1.4	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I97	B	1	67	63.8	63.1	0.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I98	B	1	67	60.4	59.9	0.5	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I99	B	1	67	60.4	58.2	2.2	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I100	B	1	67	59.6	55.9	3.7	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I101	B	1	67	58.9	56.4	2.5	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I102	B	1	67	59.1	55.2	3.9	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I103	B	1	67	59.8	54.5	**5.3**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I104	B	1	67	60.5	54.6	**5.9**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I105	B	1	67	60.0	54.4	**5.6**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I106	B	1	67	59.3	53.0	**6.3**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I107	B	1	67	59.6	52.9	**6.7**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I108	B	1	67	59.0	52.9	**6.1**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I109	B	1	67	58.9	53.0	**5.9**	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I110	B	1	67	58.9	54.1	4.8	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I111	B	1	67	58.7	54.4	4.3	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I112	B	1	67	58.7	54.5	4.2	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I113	B	1	67	59.2	54.9	4.3	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I114	B	1	67	59.0	54.4	4.6	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct
Wall I1	I115	B	1	67	59.6	54.8	4.8	64	Yes	Yes	20	1,560	30,416	$1,094,976	$17,109	Propose to Construct

1. Barrier area includes a taper at each end of the barrier.

Appendix G

2018 Traffic Forecasting, Safety, and Operations Analysis

MEMORANDUM

To: Tom Nikunen, ICMA-CM
City Administrator
City of Jordan

Tony Winiecki, P.E.
County Engineer
Scott County Highway Department

Jon Solberg
South Area Manager
Minnesota Department of Transportation

From: Brandon Bourdon, P.E.
Kimley-Horn and Associates, Inc

Date: November 28, 2018

Re: TH 169 / TH 282 / CR 9 Interchange
Forecasting, Safety and Operations Analysis

Introduction

Kimley-Horn has been hired by the City of Jordan, as part of a joint project between the City, Scott County and MnDOT, to provide traffic engineering, concept design, and stakeholder engagement services for the TH 169 / TH 282 / CR 9 interchange area. As part of the traffic engineering services, an operations analysis was performed at critical intersections within the study area to support interchange concept development and determine the most appropriate intersection control and geometry to accommodate existing and future traffic.

This memorandum provides a summary of historic crash data along the study corridor, intersection capacity analysis for Existing and Design Year conditions, and a discussion on potential roadway and intersection improvement alternatives.

Existing Conditions Analysis

The traffic study was centered around potential interchange improvements at TH 169 / CR 9 / TH 282. From that intersection, the study area extended north on CR 9 to 190th Street West/Valley View Drive and south on TH 282 to Creek Lane North. The study area also included the section of TH 169 from TH 282 to Creek Lane, Creek Lane North from TH 169 to TH 282 and Triangle Lane North from TH 282 to Creek Lane. The following provides a description of the roadways that were included within the study area:

- TH 169 is a northeast-southwest roadway that runs through the northwest edge of Scott County just south of the Minnesota River. Within the study area, TH 169 is four-lane divided roadway and has a posted speed limit of 55 mph. TH 169 is classified as a Principal Arterial by MnDOT.
- CR 9 is a north-south roadway that runs between the County Line (to the north where it changes to Carver County Road 11) to TH 169 (to the south where it becomes TH 282), and is one of the only major north-south roadways in the area that offers a river crossing over the Minnesota River. CR 9 is a two-lane undivided roadway between the Minnesota River and 9th Street; a four-lane undivided roadway between 9th Street and Frontage Road; and a four-lane divided roadway just north of the Frontage Road to TH 169. The roadway has a posted speed limit of 50 mph between the Minnesota River and Jennifer Lane (the north intersection) and 40 mph between Jennifer Lane and TH 169. CR 9 is classified as a Minor Arterial by Scott County.
- TH 282 is an east-west roadway that connects TH 169 (to the west) to TH 21 (Broadway Street). Within the study area, TH 282 is four-lane divided near TH 169 and two-lane undivided east of Triangle Lane. The roadway has a posted speed limit of 30 mph and is classified as a Minor Arterial.
- 190th Street West/Valley View Drive is a northeast-southwest roadway that connects 173rd Street W (to the northeast) to TH 169 (to the southwest) between the Minnesota River (to the north) and TH 169 (to the south). The roadway is two-lane undivided with a posted speed limit of 30 mph east of CR 9 and 45 mph west of CR 9.
- Triangle Lane North is a short local road that runs parallel to TH 169 that connects Creek Lane (to the east) to TH 282 (to the west).
- Creek Lane North is a local roadway that connects to TH 169 (to the north) and Sunset Drive (to the south). The roadway is two-lane undivided with a posted speed limit of 30 mph. This roadway is one of the primary roads used to reach Jordan Elementary, Middle, and High Schools.
- Frontage Road is a local roadway that runs parallel to TH 169 and to the east of CR 9 that connects Syndicate Street (to the east) to CR 9 (to the west). The roadway is two-lane undivided with a posted speed limit of 30 mph. This roadway is the primary access to the Jordan Police Department.
- CR 9 Railroad Crossing is an at-grade railroad crossing located between TH 169 and 190th Street West/Valley View Drive along CR 9. Based on a review of MnDOT's Twin Cities Area Freight Railroad Map, this railroad is operated by Union Pacific. It has a maximum operating speed of 49 MPH and there are six trains per day at this crossing. The actual rail-crossing train volume was counted on May 16, 2018 and there were four trains that crossed CR 9 during a 24-hour period. The duration of the train crossings were between 1:15 and 2:15 minutes and traffic queues on CR 9 dissipated within 45 seconds after the gate arms raised.

Exhibit 1 provides the existing lane geometry and intersection control for the study area. The study intersections included the following:

- CR 9 & 190th Street West/Valley View Drive
- CR 9 & Frontage Road
- TH 169 / CR 9 / TH 282
- TH 169 & Creek Lane North
- TH 282 & Triangle Lane North
- TH 282 & Business Access
- TH 282 & Creek Lane North
- Triangle Lane North & Creek Lane North

Existing Traffic Volumes

Intersection traffic count data for most the intersections was provided to Kimley-Horn by the City of Jordan because they were collected recently (November 2016). New traffic counts were collected at the intersections of TH 169 & Creek Lane North, Triangle Lane North & Creek Lane North, and TH 282 & Business Access (May 2018). Daily roadway volumes, reported as Average Annual Daily Traffic (AADT), was provided by the Minnesota Department of Transportation's Traffic Mapping Application.

Exhibit 2 provides a summary of the roadway AADT information as well as the AM and PM peak hour turning movement volumes.

N

NOT TO SCALE

190th Street W

Valley View Drive

9

Frontage Road

169

Triangle Lane N

Creek Lane N

282

LEGEND

- Channelized Right Turn
- Study Intersections
- Existing Signal Control
- Existing Stop Control

EXHIBIT 1

EXISTING INTERSECTION CONTROL AND GEOMETRY
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

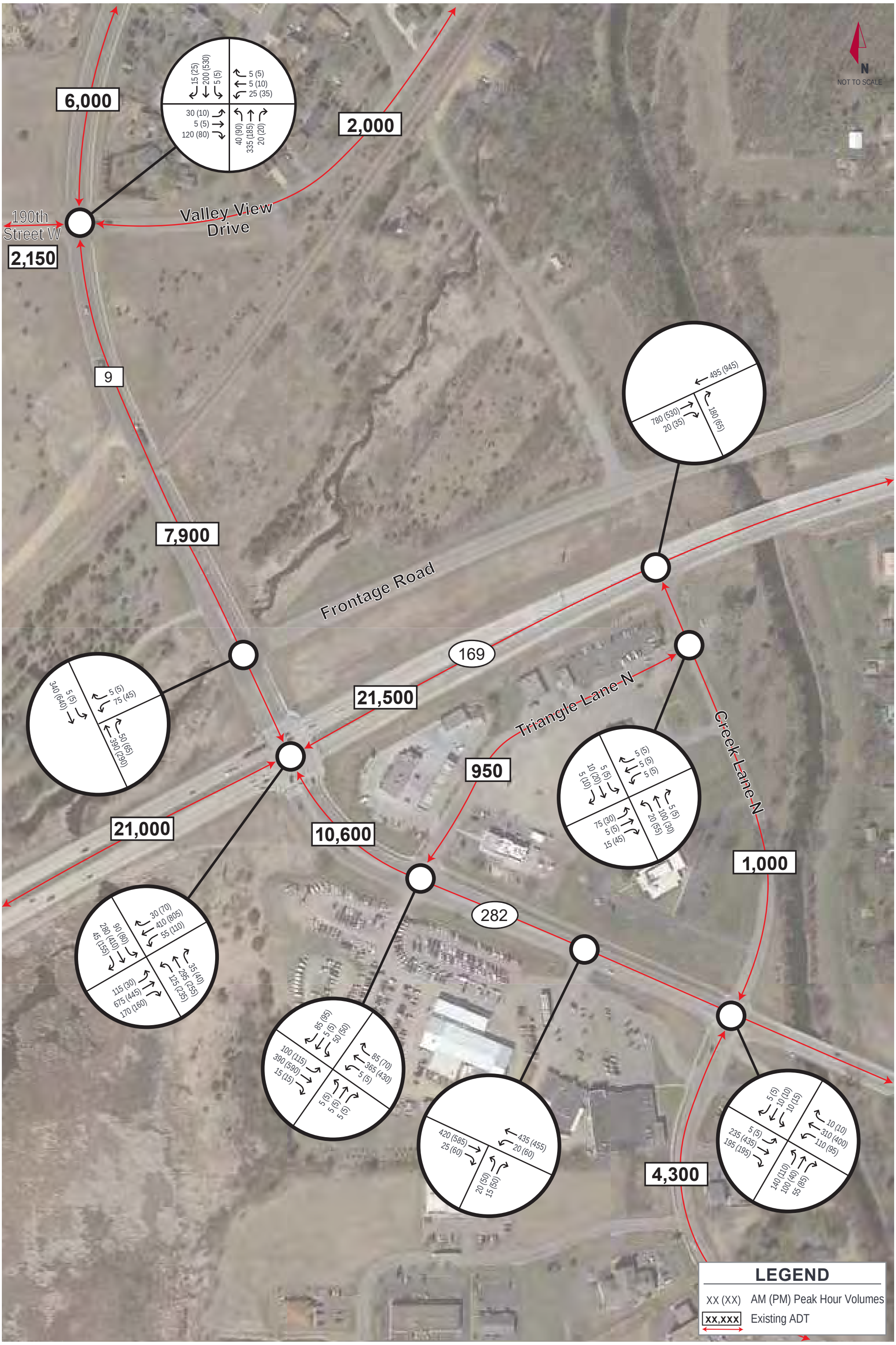

EXHIBIT 2

EXISTING TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Existing Intersection Operations

An intersection capacity analysis was performed at the study intersections using the weekday AM and PM peak hour turning movement volumes that were provided in Exhibit 2. The capacity analysis was performed using Synchro/SimTraffic software to determine the baseline Level of Service (LOS), delay, and queueing at the study intersections.

The LOS boundaries, as documented in the *Highway Capacity Manual* for signalized and unsignalized intersections, are shown in Table 1. For this study, LOS A through LOS D are considered to be acceptable levels of operation for both signalized and unsignalized intersections.

Table 1: Level of Service Boundaries

Level of Service	Average Control Delay per Vehicle (sec/veh)		Description
	Signalized	Unsignalized	
A and B	≤ 10 (A) > 10 and ≤ 20 (B)	≤ 10 (A) > 10 and ≤ 15 (B)	No delays at intersections with continuous flow traffic. Uncongested operations; high frequency of long gaps available for all left and right-turning traffic; no observable queues.
C	> 20 and ≤ 35	> 15 and ≤ 25	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches.
D	> 35 and ≤ 55	> 25 and ≤ 35	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No long standing lines formed.
E	> 55 and ≤ 80	> 35 and ≤ 50	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limit of stable flow.
F	> 80	> 50	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

Table 2 provides a summary of the delay (seconds per vehicle) and LOS for each individual movement of the study intersections. The LOS information is also summarized by movement in Exhibit 3. Based on the Existing Conditions (2017) capacity analysis, all intersections are currently operating at an acceptable LOS during the weekday AM and PM peak hours. Additionally, all individual movements are operating at LOS D or better for both the AM and PM peak hours except for the eastbound and westbound lefts at TH 169 and TH 282, which are operating at LOS E during the AM and PM peak hours. Although TH 282 and Creek Lane operate at acceptable LOS during the peak hour, there are periods of congestion and complaints regarding traffic at this intersection in part due to traffic traveling to and from the Jordan schools. The SimTraffic reports are included in the Appendix.

Table 2: Existing Year (2017) Peak Hour Delay and Level of Service Results

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Stop Controlled	EB Approach	9.3	A	12.1	B	4.2	A	2.3	A	8.7	A	13.6	B	4.9	A	2.3	A
		WB Approach	8.9	A	11.2	B	3.9	A			11.3	B	12.3	B	6.5	A		
		NB Approach	3.6	A	1.3	A	1.6	A			6.7	A	1.3	A	1.1	A		
		SB Approach	1.2	A	0.4	A	0.2	A			1.6	A	0.6	A	0.3	A		
CR 9 (Quaker Avenue) & Frontage Rd	Stop Controlled	WB Approach	10.8	B	-	-	4.7	A	2.4	A	22.6	C	-	-	4.2	A	5.4	A
		NB Approach	-	-	1.8	A	1.5	A			-	-	1.7	A	1.7	A		
		SB Approach	2.8	A	1.3	A	-	-			3.5	A	6.4	A	-	-		
TH 169 & CR 9 (Quaker Avenue)/TH 282 (2nd Street W)	Signalized	EB Approach	58.9	E	27.0	C	6.4	A	30.2	C	73.1	E	38.6	D	7.8	A	34.7	C
		WB Approach	57.7	E	28.9	C	3.1	A			64.4	E	34.0	C	4.4	A		
		NB Approach	26.0	C	33.7	C	22.0	C			34.5	C	29.4	C	15.7	B		
		SB Approach	29.1	C	39.5	D	25.2	C			27.7	C	44.3	D	32.9	C		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	6.8	A	2.9	A	1.9	A	3.5	A	9.4	A	4.6	A	2.4	A	5.0	A
		WB Approach	4.4	A	0.4	A	0.4	A			4.5	A	0.6	A	0.5	A		
		NB Approach	17.9	C	17.9	C	3.2	A			16.1	C	24.2	C	8.3	A		
		SB Approach	17.3	C	17.0	C	8.6	A			24.3	C	22.1	C	13.8	B		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.7	A	0.6	A	1.0	A	-	-	1.2	A	0.6	A	2.1	A
		WB Approach	3.7	A	0.6	A	-	-			7.2	A	0.6	A	-	-		
		NB Approach	10.8	B	-	-	3.5	A			19.1	C	-	-	4.2	A		
TH 282 (2nd Street W) & Creek Lane	Stop Controlled	EB Approach	2.9	A	0.4	A	2.6	A	3.7	A	3.3	A	0.7	A	2.4	A	3.5	A
		WB Approach	2.8	A	0.6	A	0.2	A			4.8	A	0.7	A	0.2	A		
		NB Approach	12.7	B	11.2	B	1.7	A			20.4	C	13.5	B	1.7	A		
		SB Approach	9.5	A	10.3	B	5.6	A			14.9	B	16.4	C	5.5	A		
Creek Ln N & Triangle Lane N	Stop Controlled	EB Approach	6.7	A	6.2	A	4.7	A	3.1	A	5.0	A	6.5	A	2.9	A	2.2	A
		WB Approach	3.4	A	4.4	A	5.0	A			3.9	A	4.8	A	2.5	A		
		NB Approach	1.9	A	1.0	A	0.3	A			2.0	A	0.5	A	0.2	A		
		SB Approach	1.2	A	0.1	A	0.1	A			1.0	A	0.2	A	0.1	A		
TH 169 & Creek Ln N	Stop Controlled	WB Approach	-	-	-	-	-	-	8.4	A	-	-	-	-	-	-	4.6	A
		NB Approach	-	-	-	-	15.5	C			-	-	-	-	7.9	A		

N
NOT TO SCALE

190th Street W

Valley View Drive

9

Frontage Road

169

282

Triangle Lane N

Creek Lane N

A / A
0.2/A [0.3/A]
0.4/A [0.6/A]
1.2/A [1.6/A]
3.9/A [6.5/A]
11.2/B [12.3/B]
8.9/A [11.3/B]
9.3/A [8.7/A]
12.1/B [13.6/B]
4.2/A [4.9/A]
3.6/A [6.7/A]
1.3/A [1.3/A]
1.6/A [1.1/A]

A / A
2.8/A [3.5/A]
1.3/A [6.4/A]
4.7/A [4.2/A]
10.8/B [22.6/C]
1.5/A [1.7/A]
1.8/A [1.7/A]

A / A
-- [--]
-- [--]
15.5/C [7.9/A]

C / C
29.1/C [27.7/C]
39.5/D [44.3/D]
25.2/C [32.9/D]
3.1/A [4.4/A]
28.9/C [34.0/D]
57.7/E [64.4/E]
58.9/E [73.1/E]
27.0/C [38.6/D]
6.4/A [7.8/A]
22.0/C [15.7/B]
33.7/C [29.4/C]
26.0/C [34.5/C]

A / A
1.2/A [1.0/A]
0.1/A [0.2/A]
0.1/A [0.1/A]
5.0/A [2.5/A]
4.4/A [4.8/A]
3.4/A [3.9/A]
6.7/A [5.0/A]
6.2/A [6.5/A]
4.7/A [2.9/A]
0.3/A [0.2/A]
1.0/A [0.5/A]
1.9/A [2.0/A]

A / A
8.6/A [13.8/B]
17.0/C [22.1/C]
17.3/C [24.3/C]
6.8/A [9.4/A]
2.9/A [4.6/A]
1.9/A [2.4A]
0.4/A [0.5/A]
0.4/A [0.6/A]
4.4/A [4.5/A]
17.9/C [16.1/C]
17.9/C [24.2/C]
3.2/A [8.3/A]

A / A
0.7/A [1.2/A]
0.6/A [0.6A]
0.6/A [0.6/A]
3.7/A [7.2/A]
10.8/B [19.1/C]
3.5/A [4.2/A]

A / A
5.6/A [5.5/A]
10.3/B [16.4/C]
9.5/A [14.9/B]
2.9/A [3.3/A]
0.4/A [0.7/A]
2.6/A [2.4/A]
0.2/A [0.2/A]
0.6/A [0.7/A]
2.8/A [4.8/A]
12.7/B [20.4/C]
11.2/B [13.5/B]
1.7/A [1.7/A]

LEGEND

A / A	AM / PM Intersection LOS
XX.X/A [XX.X/A]	AM [PM] Delay/LOS

EXHIBIT 3

EXISTING DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

In addition to intersection LOS and delay, the existing turn lane queue lengths were reviewed based on the SimTraffic analysis. Table 3 provides the existing 95th percentile queue lengths for turning movements at the study intersection turn lanes for both the AM and PM peak hours. The existing storage lengths were based on a review of aerial photography. Based on the review of the 95th percentile queues, the existing turn lanes are anticipated to accommodate the queues except for the northbound left-turn at the intersections of TH 169 / CR 9 / TH 282 and TH 282 & Creek Lane North. The existing southbound through queue at the intersection of TH 169 / CR 9 / TH 282 extends through the intersection of CR 9 & Frontage Road during the PM peak hour. In addition, the southbound approach at TH 282 & Triangle Lane North and northbound right and left-turn lanes at TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively.

Table 3: Existing Year (2017) 95th Percentile Queue Summary

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB	>500	72	60
	WB	>500	49	58
	NB Left	>500	33	79
	SB Left	>500	5	8
TH 169 & CR 9 (Quaker Avenue)/TH 282 (2nd Street W)	EB Left	260	162	70
	EB Right	300	66	74
	WB Left	550	94	165
	WB Right	350	31	51
	NB Left	90	115	199
	SB Left	125	88	90
TH 282 (2nd Street W) & Triangle Lane N	WB Left	150	15	11
	WB Right	85	11	9
	NB	55	36	35
	SB	65	94	123
TH 282 (2nd Street W) & Business Access	WB Left	100	28	57
	NB Left	40	42	60
	NB Right	40	35	53
TH 282 (2nd Street W) & Creek Lane	EB Left	100	12	9
	EB Right	300	80	55
	WB Left	200	46	60
	NB Left	85	87	96
	NB Right	85	0	24
	SB Left	85	35	41
TH 169 & Creek Ln N	NB Right	120	114	43
Queue lengths are the 95th Percentile Queue as calculated in SimTraffic.				

Crash Analysis

Historical crash data was obtained for the previous five (5) year period (2011 – 2015) using MnDOT's Crash Mapping Analysis Tool (MnCMAT). A review of the crash data showed that there was a total of 100 crashes at study intersections. Of the 100 crashes, there were 2 fatalities, 0 incapacitating injuries, 4 non-incapacitating injuries, 19 possible injuries, and 75 property damage only crashes.

Table 4 provides a summary of the intersection crash analysis, and includes the number and type of crashes, observed crash rate, statewide average and critical crash rates, and the critical index. Crash rates

provide an indication of the number of crashes that can be expected per entering vehicle over a given analysis period. Using MnDOT's 2015 "Green Sheets," intersection crash rates were calculated and compared against statewide average values to develop a critical index value. This value is used to determine if an intersection is operating outside of the expected normal range, where a critical index value over 1.0 means the intersection is outside of the normal range.

The review of the crash analysis shows that the intersections of TH 169 / CR 9 / TH 282 and TH 282 & Triangle Lane North have a critical index of greater than 1.0, meaning that these two intersections are operating outside of the normal, expected range (i.e. there is a crash issue at these intersections today). At the intersection of TH 169 / CR 9 / TH 282, the most common crash type was rear-end collisions (39 total over the five-year period). A fatal crash also occurred at TH 169 / CR 9 / TH 282. The most common crash types at the intersection of TH 282 & Triangle Lane North were rear-end crashes (5) and sideswipe crashes (3). The crash data indicates that two contributing factors are having a traffic signal on a high-speed, high-volume facility (TH 169) and the queuing from this signal and the associated impacts due to the inadequate intersection spacing between Triangle Lane N and TH 169. The number of crashes, crash rate, critical crash rate, and critical index information is summarized in Exhibit 4.

Table 4: Crash Summary

Intersection	Total Number of Crashes	Crash Type					Observed Crash Rate	State-wide Average	Critical Crash Rate	Critical Index
		PD	C	B	A	K				
CR 9 (Quaker Avenue) & 190th Street West/Valley View Drive	3	2	0	0	0	1	0.20	0.25	0.62	0.32
CR 9 (Quaker Avenue) & Frontage Road	2	0	1	1	0	0	0.13	0.25	0.62	0.21
TH 169 & CR 9 (Quaker Avenue)/ TH 282 (2nd Street West)	62	47	13	1	0	1	1.11	0.45	0.69	1.61
TH 282 (2nd Street West) & Triangle Lane	15	12	2	1	0	0	0.76	0.25	0.57	1.33
TH 282 (2nd Street West) & Creek Lane North	8	6	2	0	0	0	0.33	0.25	0.54	0.61
TH 169 & Creek Lane North	10	8	1	1	0	0	0.25	0.25	0.47	0.53

EXHIBIT 4

CRASH RATES (2011-2015)
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Design Year (2040) No-Action Intersection Analysis

A capacity analysis was performed at the study intersections for the Design Year (2040) to get an idea of operating conditions along the corridor in the future and use that information to determine necessary roadway and intersection improvements to provide acceptable LOS through the Design Year (2040). Below is a summary of the Design Year (2040) volume development and anticipated operating conditions during the AM and PM peak hours at the study intersections.

Design Year (2040) Volume Forecast

Existing turning movement volumes and AADTs identified previously along with prior planning efforts were used to development Design Year (2040) traffic forecasts. There were two sets of future ADT forecasts available that were used including:

- 2040 Scott County Transportation Plan Update
- 190th Street & CSAH 9 Traffic Study

The Scott County traffic forecasts were developed as a part of the regional planning process that begins with Metropolitan Council growth projections and requires a travel demand model update based on the Metropolitan Council projections. There was also forecasting completed by the City of Jordan that considered the full development potential of three land use scenarios on the north side of TH 169 as documented in the 190th Street & CSAH 9 Traffic Study, completed in 2017, which involved growth anticipated by the City beyond the Metropolitan Council forecasts. The concern by the City was that very little growth was assumed on the north side of TH 169 as a part of the Metropolitan Council forecasts. Scott County and MnDOT had concerns that concepts may be overdesigned if the forecasts were too aggressive and deviated significantly from the comprehensive planning process. There was dialog between the parties and the following process was used to develop the 2040 traffic forecasts:

- One-half of the ultimate development potential north of TH 169 as documented in the 190th Street & CSAH 9 Traffic Study is to occur by 2040. The traffic generated east of Fairview Lane will generally travel to CR 9 to get to the regional roadway network. Conversely, traffic generated west of Fairview Lane will travel to Delaware Avenue to gain access to the regional roadway network.
- We assumed that background growth on 190th Street West shown in the 2040 Scott County Forecasts was due to development assumed in the 190th Street & CR 9 Traffic Study (i.e. some of the growth in the study did get included in the forecasts previously presented).
- We assumed that land uses with seasonal events will be handled through event traffic management plans rather than designing the transportation system to accommodate these events (Renaissance Festival, Scott-Carver Threshers, Scott County Fairgrounds). Therefore, we did not include those event trips in the forecasts.

- This resulted in the 2040 Scott County Plan ADTs being adjusted to include an additional 9,500 trips that were distributed onto the roadway network (1/2 of 22,000 minus 1,500 that was already accounted for in the Scott County model).

The forecasts developed as a part of this study along with the existing AADTs and Scott County 2040 and 190th Street Growth Area full build forecasts are shown on Exhibit 5.

The developed 2040 ADT forecasts, existing traffic counts, and future forecasts documented in the 190th Street & CR 9 Traffic Study were all used in combination to develop 2040 turning movement counts shown in Exhibit 6.

Design Year (2040) No-Action Intersection Capacity Analysis

Using the forecasted Design Year (2040) AM and PM peak hour turning movement volumes, a capacity analysis was performed at the study intersections to determine baseline operating conditions in 2040. Existing intersection control and geometries were assumed for this No-Action analysis, except for the intersections of CR 9 & 190th Street West/Valley View Drive and TH 282 & Creek Lane North, where traffic signal control was assumed.

Table 5 provides a summary of the delay (seconds/vehicle) and LOS at the study intersections. Exhibit 7 also provides a summary of the delay and LOS for each individual movement at the study intersections. Based on the analysis, there are a significant number of intersections that are anticipated to operate at overall LOS E or LOS F during the AM and PM peak hours. These intersections include the following:

- CR 9 & 190th Street West/Valley View Drive (PM peak hour)
- CR 9 & Frontage Road (AM and PM peak hours)
- TH 169 / CR 9 / TH 282 (PM peak hour)
- TH 282 & Triangle Lane North (PM peak hour)
- Creek Lane North & Triangle Lane North (AM peak hour)
- TH 169 & Creek Lane North (PM peak hour)

Due to a significant number of intersection that are anticipated to operate below the acceptable LOS for Design Year (2040) No-Action conditions, improvements along the study corridor will be necessary to provide acceptable LOS into the future. The continued deterioration of LOS between today and future conditions is anticipated to result in additional crash concerns along the corridor.

CITY OF JORDAN · Scott County · DEPARTMENT OF TRANSPORTATION · Kimley»Horn

EXHIBIT 5

FUTURE VOLUME FORECASTING
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

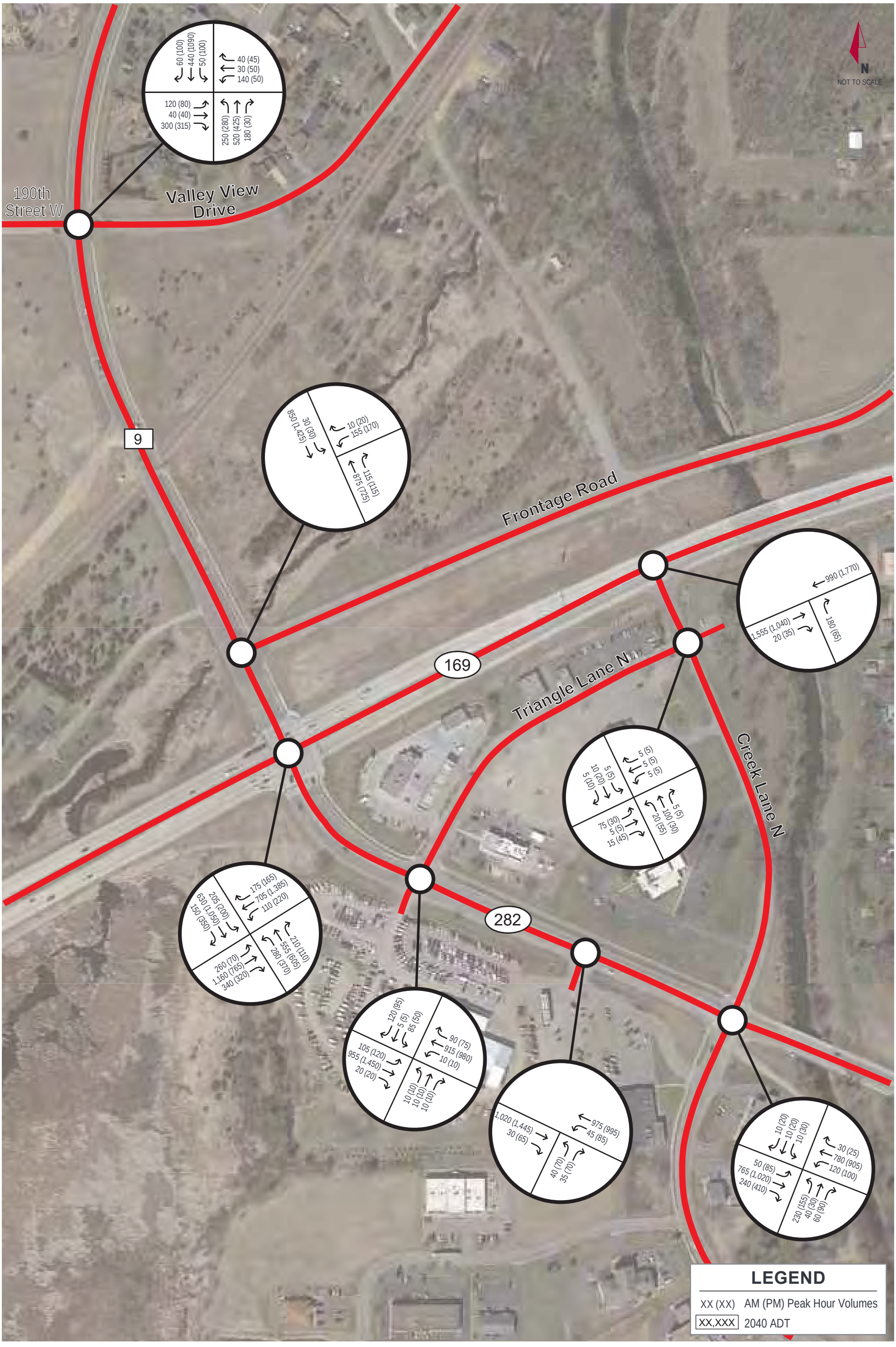

EXHIBIT 6

DESIGN YEAR (2040) NO-ACTION TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Table 5: Design Year (2040) No-Action Capacity Analysis Summary

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	56.6	E	59.3	E	44.9	D	31.2	C	*	F	*	F	*	F	91.4	F
		WB Approach	39.8	D	39.5	D	32.4	C			54.5	D	50.6	D	35.7	D		
		NB Approach	36.3	D	23.3	C	17.2	B			84.6	F	14.9	B	14.5	B		
		SB Approach	44.6	D	23.6	C	6.1	A			*	F	*	F	*	F		
CR 9 (Quaker Avenue) & Frontage Rd	Stop Controlled	WB Approach	*	F	-	-	*	F	94.9	F	*	F	-	-	*	F	*	F
		NB Approach	-	-	1.9	A	2.0	A			-	-	1.8	A	1.9	A		
		SB Approach	42.3	E	60.0	F	-	-			*	F	*	F	-	-		
TH 169 & CR 9 (Quaker Avenue)/TH 282 (2nd Street W)	Signalized	EB Approach	75.3	E	58.8	E	21.8	C	52.0	D	*	F	60.4	E	26.7	C	87.1	F
		WB Approach	77.5	E	43.9	D	8.9	A			*	F	*	F	62.4	E		
		NB Approach	58.7	E	41.0	D	40.5	D			*	F	46.1	D	42.1	D		
		SB Approach	60.4	E	72.2	E	57.2	E			55.8	E	65.5	E	50.3	D		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	28.9	D	13.1	B	5.7	A	32.2	D	40.0	E	20.1	C	7.3	A	57.4	F
		WB Approach	10.5	B	1.5	A	1.0	A			20.5	C	31.3	D	14.7	B		
		NB Approach	*	F	*	F	93.9	F			*	F	*	F	*	F		
		SB Approach	*	F	*	F	*	F			*	F	*	F	*	F		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	4.7	A	0.8	A	4.8	A	-	-	5.9	A	0.7	A	30.5	D
		WB Approach	12.0	B	2.1	A	-	-			26.2	D	18.3	C	-	-		
		NB Approach	56.1	F	-	-	15.4	C			*	F	-	-	52.6	F		
TH 282 (2nd Street W) & Creek Lane	Signalized	EB Approach	52.3	D	19.6	B	2.1	A	22.7	C	94.2	F	16.1	B	2.0	A	40.9	D
		WB Approach	50.4	D	23.3	C	17.4	B			59.8	E	40.9	D	35.5	D		
		NB Approach	34.3	C	25.7	C	2.3	A			*	F	79.0	E	39.9	D		
		SB Approach	22.8	C	27.0	C	17.7	B			39.8	D	59.1	E	51.3	D		
Creek Ln N & Triangle Lane N	Stop Controlled	EB Approach	*	F	*	F	*	F	*	F	5.3	A	6.0	A	2.9	A	2.3	A
		WB Approach	35.8	E	86.2	F	*	F			3.0	A	4.9	A	2.2	A		
		NB Approach	74.4	F	94.5	F	85.0	F			1.9	A	0.7	A	0.3	A		
		SB Approach	1.1	A	0.1	A	0.1	A			0.9	A	0.2	A	0.1	A		
TH 169 & Creek Ln N	Stop Controlled	WB Approach	-	-	0.9	A	-	-	16.0	C	-	-	67.0	F	-	-	47.4	E
		NB Approach	-	-	-	-	91.6	F			-	-	-	-	17.0	C		

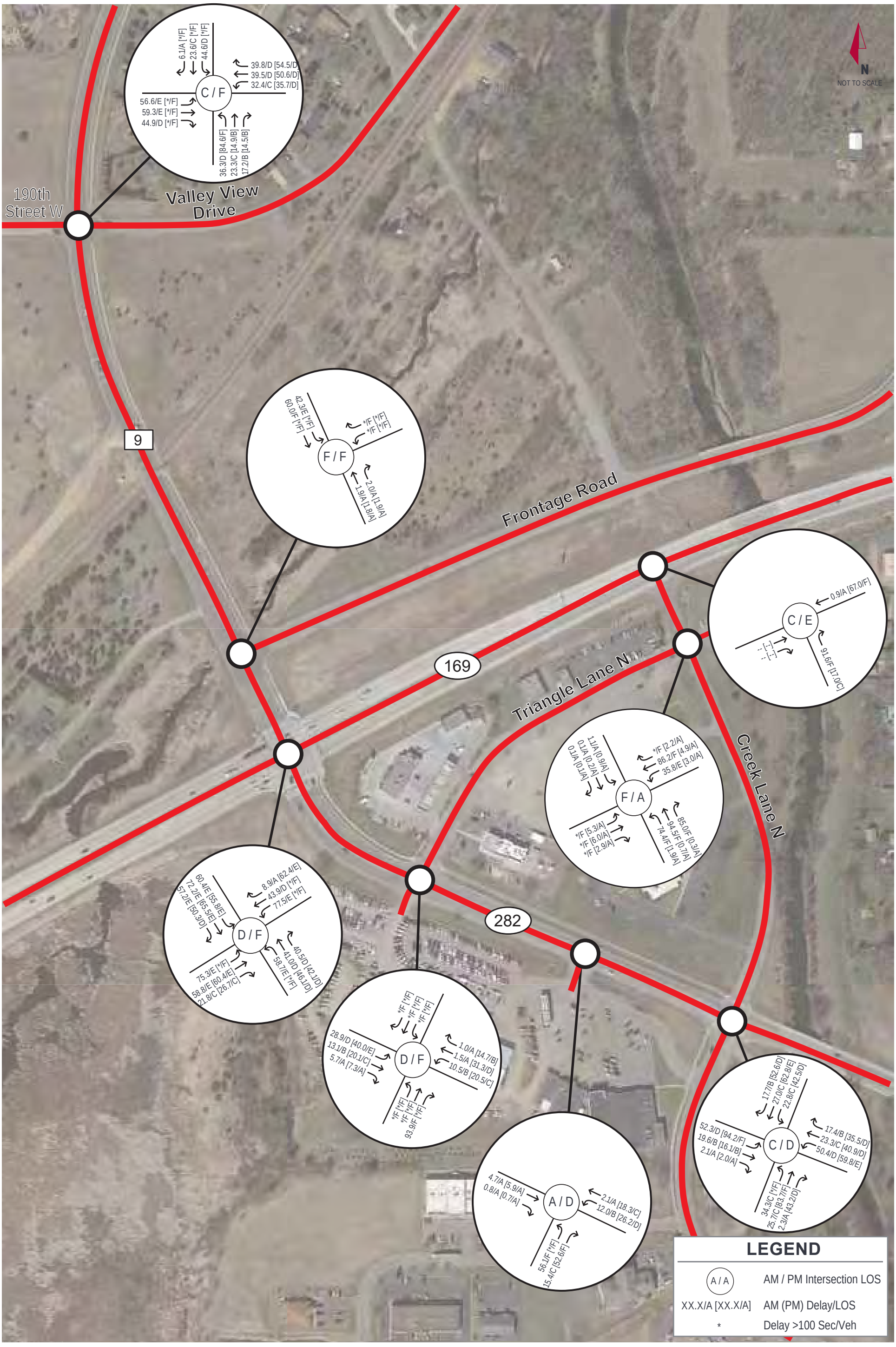

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EXHIBIT 7

NO-ACTION (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Design Year (2040) Roadway and Intersection Conditions

To improve operating conditions along the corridor, improve safety, and provide sufficient capacity for future growth in traffic volumes, several interchange, roadway and intersection improvements were considered within the project study area. Several concepts were considered through the planning process, and based on input from the City, County and MnDOT three (3) preferred concepts were considered for further review and consideration as part of the traffic analysis. The following section provides a description of each of the three (3) preferred concepts.

Concept 1

With Concept 1, CR 9 / TH 282 is proposed to be reconstructed as a four-lane divided roadway from 190th Street West/Valley View Drive to Creek Lane North. In conjunction with the widening, a split diamond interchange is proposed at the intersection of TH 169 / CR 9 / TH 282. The following provides a description of proposed improvements at the study intersections in the project's study area:

- CR 9 & 190th Street West/Valley View Drive – The intersection is proposed to be expanded to provide three (3) lanes (one through lane and dedicated left and right-turn lanes) for the northbound, eastbound and westbound approaches and four (4) lanes (two through lanes and dedicated left and right-turn lanes) for the southbound approach. The intersection is proposed to be signal controlled. Although additional analysis would be required, a roundabout could also be considered at this intersection.

- CR 9 & TH 169 Westbound Ramps – The intersection is proposed to be a five-legged intersection and serve the existing frontage road traffic in addition to the TH 169 westbound ramps. The northbound and southbound approaches will provide two (2) lanes (shared through-left and shared through-right). The westbound off-ramp approach will provide two (2) lanes (shared left-through-right and shared right/u-turn). The frontage road approach will provide one (1) shared lane. The intersection is proposed to be a roundabout.

- TH 282 & TH 169 Eastbound Ramps – The intersection is proposed to be a three-legged intersection to serve the TH 169 eastbound off-ramp. The northbound and southbound approaches will provide two (2) through lanes, and the eastbound approach will provide two (2) lanes (dedicated left and right-turn lanes). The intersection is proposed to be signal controlled.

- TH 282 & Triangle Lane North – Due to existing crash concerns and access spacing requirements, the intersection is proposed to be a three-legged intersection that serves TH 282 and Triangle Lane North. The Wolf Motors access to the south is proposed to be combined with the Radermacher's access located to the east. Access for Triangle Lane North will be restricted to right-in and right-out. The westbound approach will provide three (3) lanes (two through lanes and dedicated right-turn lane) and the eastbound approach will provide two (2) through lanes. The southbound approach will provide a single right-turn lane. The intersection is proposed to be side-street stop controlled.

- TH 282 & Business Access – The intersection is proposed to be a three-legged three-quarter movement intersection that serves TH 282 and businesses along the south side of TH 282. Access for eastbound movements to/from the business access will be restricted to right-in and right-out

movements only. The westbound approach will provide three (3) lanes (two through lanes and dedicated left-turn lane) and the eastbound approach will provide three (3) lanes (two through lanes and dedicated right-turn lane). The northbound approach will provide a single right-turn lane. The intersection is proposed to be side-street stop controlled.

- TH 282 & Creek Lane North – The intersection is proposed to be improved to provide two (2) lanes for the westbound and three (3) lanes for the eastbound approaches, with the westbound approach having a shared through-left and shared through-right lane and the eastbound approach having a dedicated left-turn, through and right-turn lane. Both the northbound and southbound approaches will provide one (1) shared lane. The intersection is proposed to be a roundabout. The roundabout will provide improved access for travelers accessing the local businesses due to the access restrictions at TH 282 & Triangle Lane North and TH 282 & Business access intersections.

  The concept shows the roundabout configuration that would be required if the 2040 traffic forecasts materialize. MnDOT has stated this roundabout will need to be phased so that the initial roundabout is not oversized opening day. This will require that an interim configuration be constructed for both the initial roundabout and potentially adjacent segments of TH 282. The ultimate interim configuration required at and adjacent to this intersection will need to be determined considering both interim traffic operations and construction phasing impacts.

- Creek Lane North & Triangle Lane North – The intersection is proposed to provide direct access to TH 169 eastbound. The northbound approach will provide two (2) lanes with a dedicated left-turn and shared through-right lane. The eastbound approach will provide two (2) lanes with a dedicated left-turn lane and a shared through-right lane. The westbound approach will provide a one (1) lane approach. The intersection is proposed to be side-street stop controlled.

Exhibit 8 provides the proposed roadway layout as well as intersection control and geometry for Concept 1.

Using the Design Year (2040) No-Action turning movement volumes as a base, traffic volumes were developed for Concept 1 to take into consideration the change in access at the study intersections. The following provides more detail about the traffic volume adjustments that were made:

- Traffic traveling eastbound on TH 169 from CR 9 and TH 282 (i.e. northbound right-turn and southbound left-turn movements at the intersection of TH 169 / CR 9 / TH 282) were redistributed to Creek Lane North.
- Traffic traveling to/from Wolf Motors that access TH 282 (northbound approach) at the intersection of TH 282 & Triangle Lane North were redistributed to the TH 282 and Business Access.
- Traffic traveling southbound on TH 282 from Triangle Lane North (southbound left-turn movement) were redistributed to Creek Lane North.

Exhibit 9 provides the Design Year (2040) AM and PM peak hour traffic volumes for Concept 1.

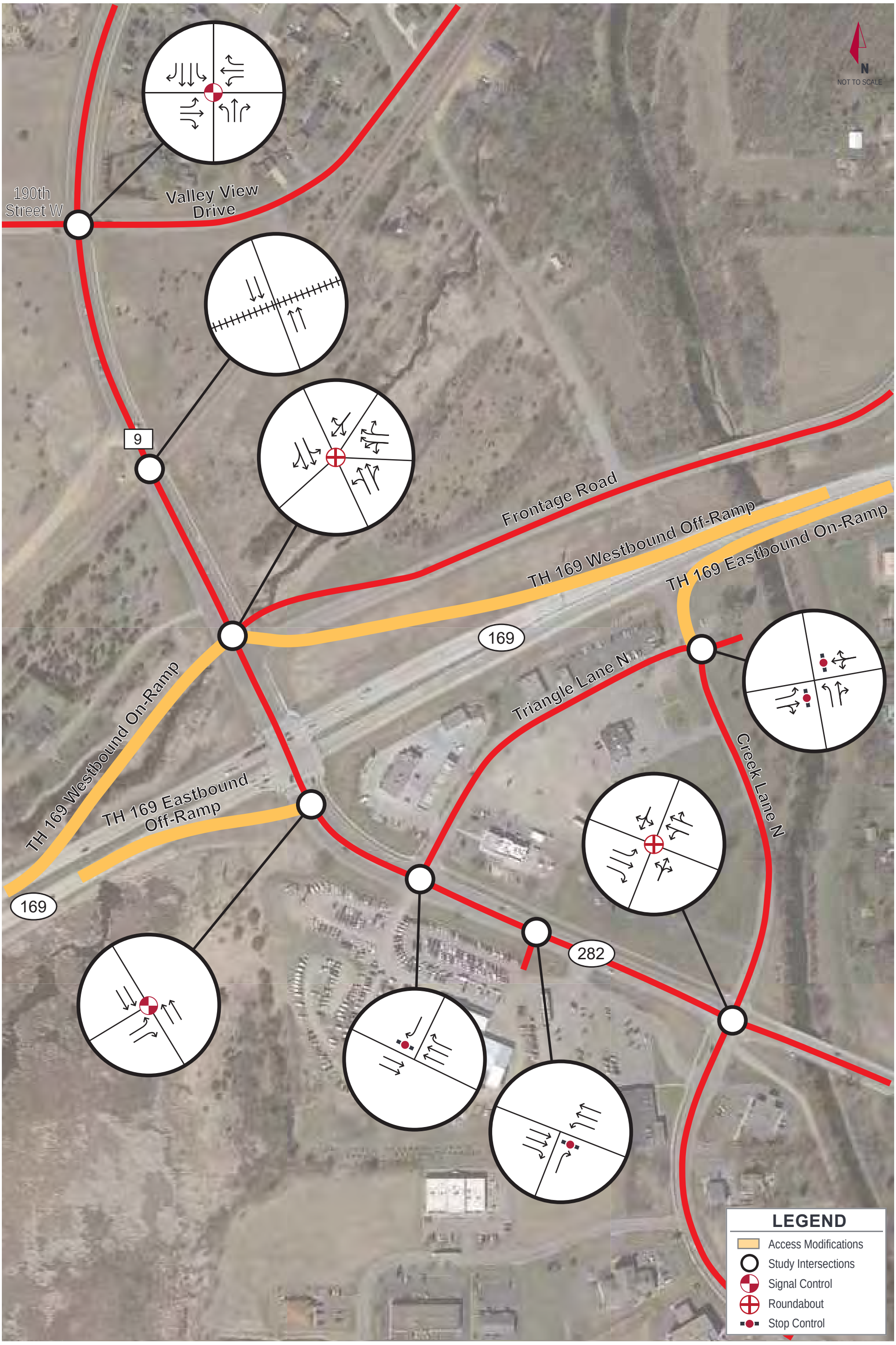

EXHIBIT 8

CONCEPT 1 INTERSECTION CONTROL AND GEOMETRICS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

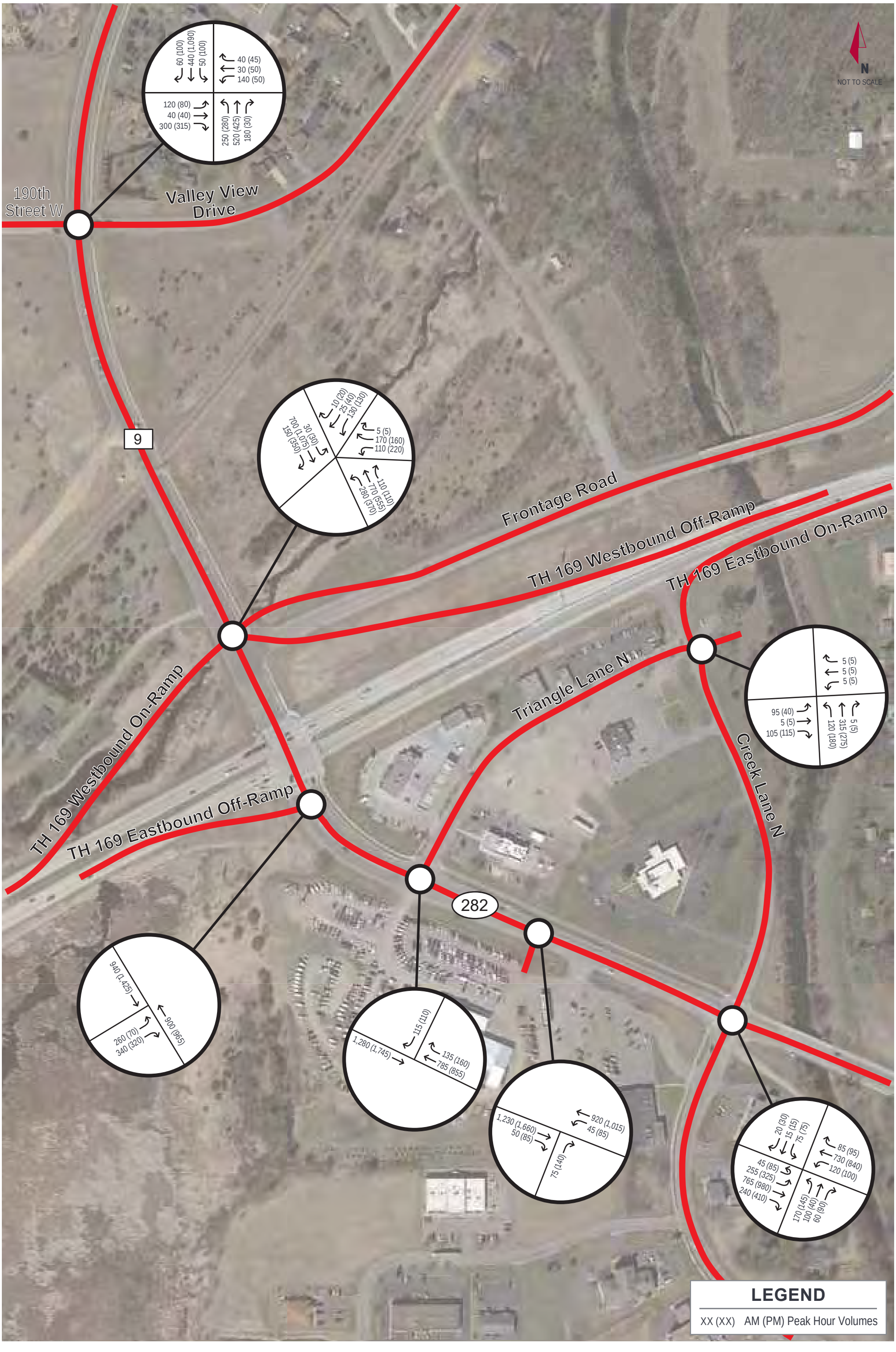

EXHIBIT 9

CONCEPT 1 - DESIGN YEAR (2040) TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Concept 2

With Concept 2, CR 9 / TH 282 is proposed to be reconstructed as a four-lane divided roadway from 190th Street West/Valley View Drive to Creek Lane North. In conjunction with the widening, a folded diamond/split diamond interchange is proposed at the intersection of TH 169 / CR 9 / TH 282. The following provides a description of proposed improvements at the study intersections in the project's study area:

- CR 9 & 190th Street West/Valley View Drive – The intersection geometry and control type is proposed to be the same as Concept 1.
- CR 9 & TH 169 Westbound Ramps – The intersection is proposed to be expanded to provide four (4) lanes (two through lanes and dedicated left and right-turn lanes) for the northbound and southbound approaches and three (3) lanes (one through lane and dedicated left and right-turn lanes) for the eastbound and westbound approaches. The intersection is proposed to be signal controlled.
- TH 282 & TH 169 Eastbound Ramps– The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & Triangle Lane North – The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & Business Access – The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & Creek Lane North – The intersection geometry and control type is proposed to be the same as Concept 1.
- Creek Lane North & Triangle Lane North – The intersection geometry and control type is proposed to be the same as Concept 1.

Exhibit 10 provides the proposed roadway layout as well as intersection control and geometry for Concept 2.

Using the Design Year (2040) No-Build turning movement volumes as a base, traffic volumes were developed for Concept 2 to take into consideration the change in access at the study intersections. The following provides more detail about the traffic volume adjustments that were made:

- Traffic traveling eastbound on TH 169 from CR 9 and TH 282 (northbound right-turn and southbound left-turn movements at the intersection of TH 169 / CR 9 / TH 282) were redistributed to Creek Lane North.
- Traffic traveling to/from Wolf Motors that access TH 282 (northbound approach) at the intersection of TH 282 & Triangle Lane North were redistributed to the TH 282 & Business Access.
- Traffic traveling southbound on TH 282 from Triangle Lane North (southbound left-turn movement) were redistributed to Creek Lane North.

Exhibit 11 provides the Design Year (2040) AM and PM peak hour traffic volumes for Concept 2.

N

NOT TO SCALE

190th Street W

Valley View Drive

9

Frontage Road

TH 169 Westbound On-Ramp

TH 169 Eastbound On-Ramp

169

Triangle Lane N

Creek Lane N

TH 169 Westbound Off-Ramp

TH 169 Eastbound Off-Ramp

169

282

LEGEND

- Access Modifications
- Study Intersections
- Signal Control
- Roundabout
- Stop Control

EXHIBIT 10

CONCEPT 2 INTERSECTION CONTROL AND GEOMETRICS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

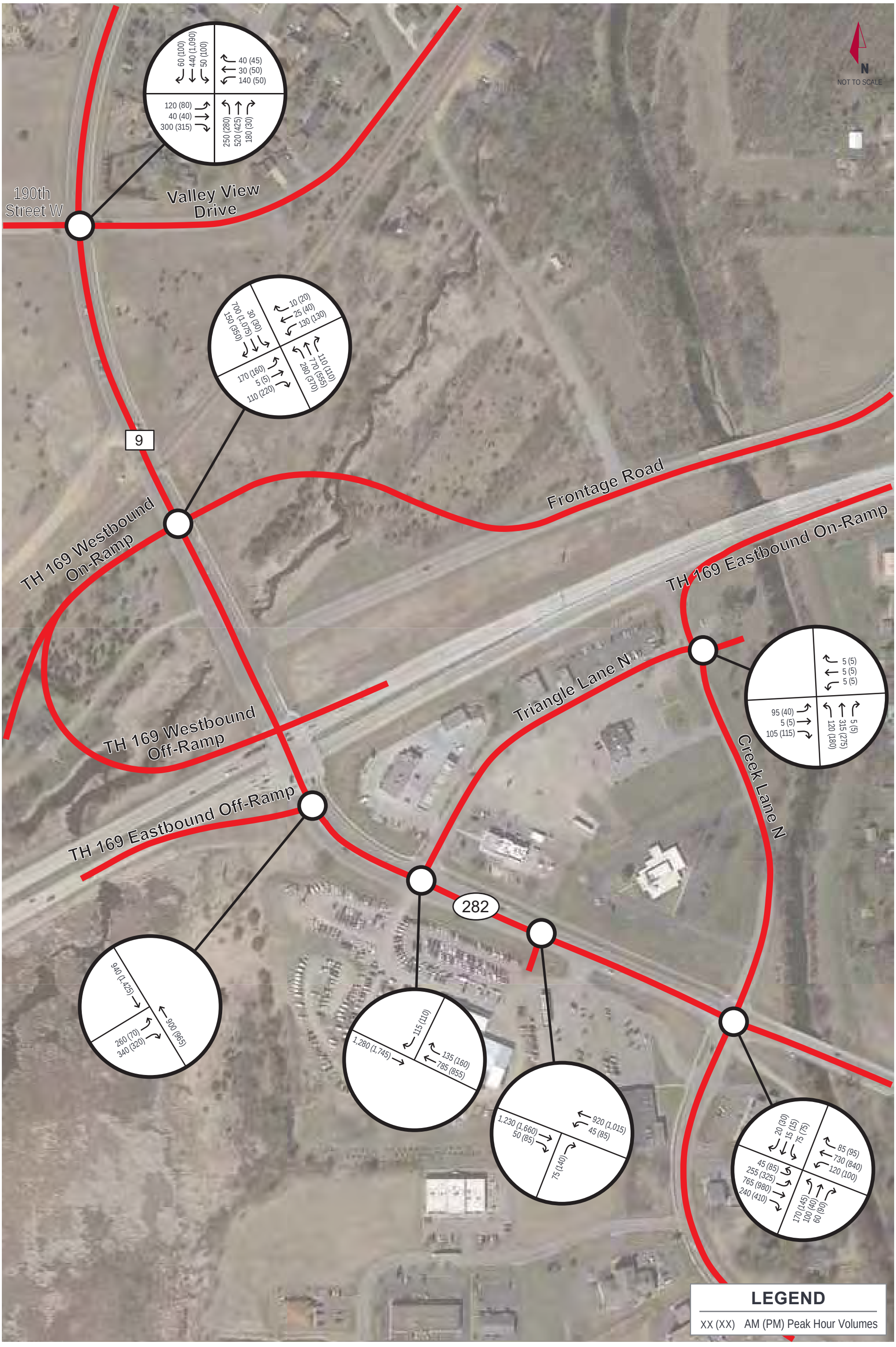

EXHIBIT 11

CONCEPT 2 - DESIGN YEAR (2040) TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Concept 3

With Concept 3, CR 9 / TH 282 is proposed to be reconstructed as a four-lane divided roadway from 190th Street West/Valley View Drive to Creek Lane North. In conjunction with the widening, a traditional diamond interchange is proposed at the intersection of TH 169 / CR 9 / TH 282 and TH 169 is proposed to be reconstructed so it goes over CR 9 / TH 282. The following provides a description of proposed improvements at the study intersections in the project's study area:

- CR 9 & 190th Street West/Valley View Drive – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- CR 9 & TH 169 Westbound Ramps – The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & TH 169 Eastbound Ramps – The intersection is proposed to be expanded to a four-legged intersection to serve the TH 169 eastbound ramps. The northbound approach will provide three (3) lanes (two through lanes and a dedicated right-turn lane) and the southbound approach will provide three (3) lanes (two through lanes and a dedicated left-turn lane). The eastbound approach will provide two (2) lanes (shared left-through and a dedicated right-turn lane). The intersection is proposed to be signal controlled.
- TH 282 & Triangle Lane North – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- TH 282 & Business Access – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- TH 282 & Creek Lane North – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- Creek Lane North & Triangle Lane North – The intersection is proposed to eliminate access to/from TH 169 eastbound. The southeast bound approach will provide two (2) lanes with a dedicated left-turn and shared through-right lane. The northwest bound approach will provide a shared through-right lane. The westbound approach will provide a one (1) lane approach. The intersection is proposed to be side-street stop controlled.

Exhibit 12 provides the proposed roadway layout, intersection control and geometry for Concept 3.

Using the Design Year (2040) No-Build turning movement volumes as a base, traffic volumes were developed for Concept 3 to take into consideration the change in access at some of the study intersections. The following provides more detail about the traffic diversion that was assumed:

- Traffic traveling to/from Wolf Motors that access TH 282 (northbound approach) at the intersection of TH 282 & Triangle Lane North were redistributed to the intersection of TH 282 and Business Access.
- Traffic traveling southbound on TH 282 from Triangle Lane North (southbound left-turn movement) were redistributed to Creek Lane.

N

NOT TO SCALE

190th Street W

Valley View Drive

9

Frontage Road

TH 169 Westbound Off-Ramp

169

TH 169 Westbound On-Ramp

TH 169 Eastbound On-Ramp

TH 169 Eastbound Off-Ramp

Triangle Lane N

Creek Lane N

282

169

LEGEND

- Access Modifications
- Study Intersections
- Signal Control
- Roundabout
- Stop Control

EXHIBIT 12

CONCEPT 3 INTERSECTION CONTROL AND GEOMETRICS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

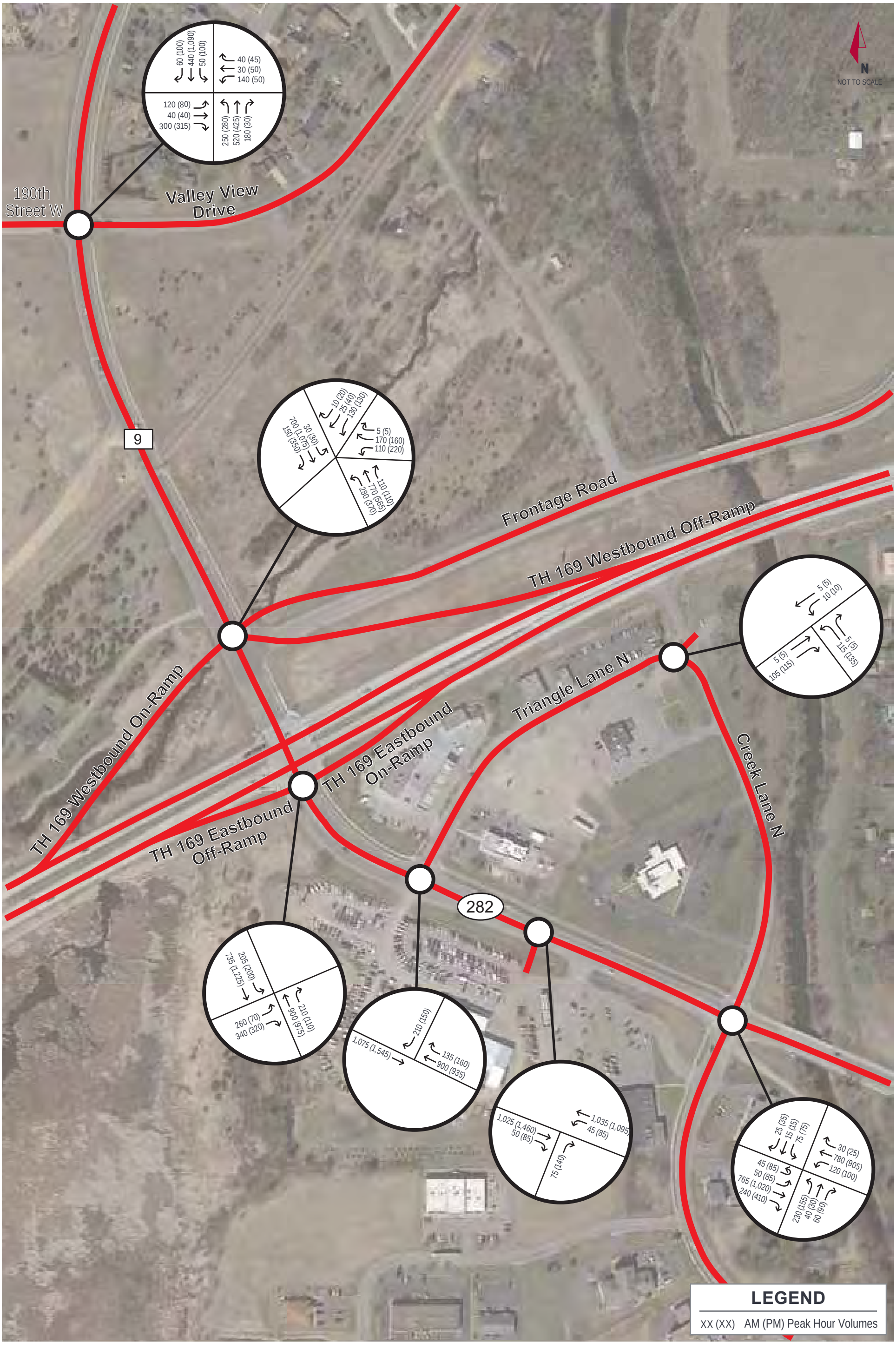

EXHIBIT 13

CONCEPT 3 - DESIGN YEAR (2040) TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

- Traffic traveling to TH 169 eastbound via Creek Lane North were redistributed to the TH 169 / TH 282 / CR 9 eastbound ramp terminals.

Exhibit 13 provides the Design Year (2040) AM and PM peak hour traffic volumes for Concept 3.

Design Year (2040) Build Intersection Alternatives Analysis

Intersection operating conditions at the study intersections were analyzed using Synchro/SimTraffic during the AM and PM peak hours for all three concepts listed in the previous section. The proposed intersection control and geometries provided in Exhibit 8 (Concept 1), Exhibit 10 (Concept 2), and Exhibit 12 (Concept 3) were assumed for the Design Year (2040) Build analysis. Forecasted traffic volumes for the three Concepts provided in Exhibit 9 (Concept 1), Exhibit 11 (Concept 2), and Exhibit 13 (Concept 3) were used for the intersection capacity analysis. The following provides a summary of intersection operating conditions for the Design Year (2040) Build AM and PM peak hours, including intersection LOS, delay, and queues.

Design Year (2040) Build Capacity Analysis

Table 6 provides a summary of vehicle delay and LOS at the study intersections for Concept 1. Based on the analysis, all intersections are anticipated to operate at LOS B or better during the AM and PM peak hours with the proposed improvements. Additionally, all movements are anticipated to operate at LOS D or better during the AM and PM peak hours.

Exhibit 14 provides a summary of the intersection delay and LOS at the study intersections for Concept 1. The SimTraffic and RODEL reports for Concept 1 are provided in the Appendix.

Table 7 provides a summary of vehicle delay and LOS at the study intersections for Concept 2. Based on the analysis, all intersections are anticipated to operate at an acceptable LOS. Additionally, all individual movements are anticipated to operate at an acceptable LOS (LOS D or better) except for the following:

- Northbound left-turn and southbound through movements at the intersection of CR 9 & TH 169 Westbound Ramp during the PM peak hour.
- Westbound left-turn movement at the intersection of TH 282 & Business Access during the PM peak hour.

Exhibit 15 provides a summary of the intersection delay and LOS at the study intersections for Concept 2. The SimTraffic and RODEL reports for Concept 2 are provided in the Appendix.

Table 8 provides a summary of vehicle delay and LOS at the study intersections for Concept 3. Based on the analysis, all intersections are anticipated to operate at LOS B or better during the AM and PM peak hours with the proposed improvements. Additionally, all movements are anticipated to operate at LOS D or better during the AM and PM peak hours.

Exhibit 16 provides a summary of the intersection delay and LOS at the study intersections for Concept 3. The SimTraffic and RODEL reports for Concept 3 are provided in the Appendix.

Table 6: Design Year (2040) Capacity Analysis Summary (Concept 1)

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	22.8	C	33.1	C	7.5	A	13.6	B	37.8	D	44.2	D	15.6	B	19.5	B
		WB Approach	21.3	C	25.7	C	8.7	A			39.5	D	40.2	D	6.8	A		
		NB Approach	13.5	B	12.5	B	3.4	A			23.4	C	8.7	A	2.3	A		
		SB Approach	15.3	B	16.4	B	4.7	A			13.8	B	22.0	C	7.4	A		
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	Roundabout	NW Approach	4.6	A	4.6	A	4.6	A	4.3	A	5.0	A	5.0	A	5.0	A	8.8	A
		SW Approach	5.6	A	5.6	A	5.6	A			5.8	A	5.8	A	5.8	A		
		NB Approach	4.2	A	4.2	A	4.2	A			4.5	A	4.5	A	4.5	A		
		SB Approach	4.0	A	4.0	A	4.0	A			13.4	B	13.4	B	13.4	B		
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	Signalized	EB Approach	45.1	D	-	-	17.2	B	10.9	B	50.2	D	-	-	21.5	C	10.5	B
		NB Approach	-	-	4.2	A	-	-			-	-	3.8	A	-	-		
		SB Approach	-	-	5.7	A	-	-			-	-	10.7	B	-	-		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	-	-	0.8	A	-	-	1.8	A	-	-	1.3	A	-	-	1.6	A
		WB Approach	-	-	1.3	A	1.4	A			-	-	1.1	A	1.2	A		
		SB Approach	-	-	-	-	16.4	C			-	-	-	-	13.1	B		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.5	A	0.4	A	2.6	A	-	-	1.2	A	0.9	A	3.8	A
		WB Approach	18.8	C	4.0	A	-	-			34.7	D	3.5	A	-	-		
		NB Approach	-	-	-	-	8.9	A			-	-	-	-	20.9	C		
TH 282 (2nd Street W) & Creek Lane	Roundabout	EB Approach	4.9	A	4.9	A	4.9	A	5.6	A	7.1	A	7.1	A	7.1	A	7.1	A
		WB Approach	5.3	A	5.3	A	5.3	A			6.2	A	6.2	A	6.2	A		
		NB Approach	9.0	A	9.0	A	9.0	A			10.9	B	10.9	B	10.9	B		
		SB Approach	5.5	A	5.5	A	5.5	A			6.0	A	6.0	A	6.0	A		
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	Stop Controlled	EB Approach	8.9	A	7.6	A	3.1	A	2.9	A	8.5	A	8.6	A	3.3	A	2.6	A
		WB Approach	6.2	A	6.6	A	4.7	A			10.7	B	5.6	A	4.9	A		
		NB Approach	2.2	A	0.9	A	0.3	A			2.5	A	1.1	A	0.6	A		

Table 7: Design Year (2040) Capacity Analysis Summary (Concept 2)

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	21.2	C	29.0	C	7.5	A	13.2	B	46.3	D	40.6	D	23.0	C	21.0	C
		WB Approach	21.6	C	29.9	C	9.8	A			43.2	D	41.7	D	7.1	A		
		NB Approach	13.8	B	12.4	B	3.7	A			26.0	C	9.9	A	1.8	A		
		SB Approach	13.7	B	15.9	B	4.3	A			12.9	B	22.0	C	7.9	A		
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	Signalized	EB Approach	21.9	C	22.3	C	8.6	A	16.9	B	33.7	C	32.5	C	18.5	B	43.8	D
		WB Approach	22.1	C	30.0	C	8.0	A			37.6	D	45.2	D	7.4	A		
		NB Approach	24.4	C	12.6	B	2.3	A			83.9	F	23.2	C	4.8	A		
		SB Approach	18.0	B	19.2	B	6.7	A			33.4	C	58.4	E	26.8	C		
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	Signalized	EB Approach	44.3	D	-	-	15.4	B	12.1	B	49.7	D	-	-	28.6	C	13.3	B
		NB Approach	-	-	3.9	A	-	-			-	-	6.5	A	-	-		
		SB Approach	-	-	9.9	A	-	-			-	-	12.4	B	-	-		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	-	-	1.0	A	-	-	1.4	A	-	-	1.8	A	-	-	2.7	A
		WB Approach	-	-	0.9	A	0.8	A			-	-	2.4	A	1.1	A		
		SB Approach	-	-	-	-	10.1	B			-	-	-	-	22.3	C		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.5	A	0.4	A	2.1	A	-	-	1.3	A	1.0	A	4.1	A
		WB Approach	18.4	C	2.9	A	-	-			40.3	E	3.4	A	-	-		
		NB Approach	-	-	-	-	10.2	B			-	-	-	-	22.8	C		
TH 282 (2nd Street W) & Creek Lane	Roundabout	EB Approach	4.9	A	4.9	A	4.9	A	5.6	A	7.1	A	7.1	A	7.1	A	7.1	A
		WB Approach	5.3	A	5.3	A	5.3	A			6.2	A	6.2	A	6.2	A		
		NB Approach	9.0	A	9.0	A	9.0	A			10.9	B	10.9	B	10.9	B		
		SB Approach	5.5	A	5.5	A	5.5	A			6.0	A	6.0	A	6.0	A		
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	Stop Controlled	EB Approach	9.7	A	8.8	A	3.0	A	3.0	A	8.9	A	7.4	A	3.6	A	2.8	A
		WB Approach	8.7	A	10.6	B	5.0	A			7.6	A	8.7	A	3.7	A		
		NB Approach	2.2	A	1.0	A	0.2	A			2.6	A	1.3	A	0.6	A		

Table 8: Design Year (2040) Capacity Analysis Summary (Concept 3)

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	22.4	C	29.3	C	8.0	A	14.0	B	42.7	D	43.0	D	17.6	B	19.5	B
		WB Approach	22.0	C	30.5	C	8.8	A			36.5	D	39.5	D	6.7	A		
		NB Approach	15.7	B	12.9	B	3.7	A			25.5	C	8.5	A	3.0	A		
		SB Approach	15.3	B	16.0	B	4.3	A			14.0	B	21.0	C	7.2	A		
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	Roundabout	NW Approach	4.6	A	4.6	A	4.6	A	4.3	A	5.0	A	5.0	A	5.0	A	8.8	A
		SW Approach	5.6	A	5.6	A	5.6	A			5.8	A	5.8	A	5.8	A		
		NB Approach	4.2	A	4.2	A	4.2	A			4.5	A	4.5	A	4.5	A		
		SB Approach	4.0	A	4.0	A	4.0	A			13.4	B	13.4	B	13.4	B		
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound On/Off Ramp	Signalized	EB Approach	48.8	D	-	-	15.5	B	17.9	B	50.4	D	-	-	25.9	C	12.3	B
		NB Approach	-	-	16.6	B	4.7	A			-	-	10.6	B	2.7	A		
		SB Approach	28.9	C	10.1	B	-	-			25.6	C	6.9	A	-	-		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	-	-	1.0	A	-	-	3.3	A	-	-	1.1	A	-	-	3.2	A
		WB Approach	-	-	3.8	A	1.3	A			-	-	3.4	A	2.3	A		
		SB Approach	-	-	-	-	14.3	B			-	-	-	-	25.7	D		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.5	A	0.4	A	1.8	A	-	-	1.2	A	0.9	A	3.4	A
		WB Approach	11.0	B	2.5	A	-	-			22.4	C	3.4	A	-	-		
		NB Approach	-	-	-	-	7.9	A			-	-	-	-	18.6	C		
TH 282 (2nd Street W) & Creek Lane	Roundabout	EB Approach	3.7	A	3.7	A	3.7	A	4.5	A	5.1	A	5.1	A	5.1	A	5.2	A
		WB Approach	4.1	A	4.1	A	4.1	A			4.4	A	4.4	A	4.4	A		
		NB Approach	7.5	A	7.5	A	7.5	A			8.9	A	8.9	A	8.9	A		
		SB Approach	5.9	A	5.9	A	5.9	A			6.3	A	6.3	A	6.3	A		
Creek Ln N & Triangle Lane N	Stop Controlled	EB Approach	-	-	-	-	-	-	1.0	A	-	-	-	-	-	-	0.7	A
		WB Approach	9.6	A	9.6	A	9.6	A			9.0	-	9.0	A	9.0	A		
		NB Approach	-	-	-	-	-	-			-	-	-	-	-	-		

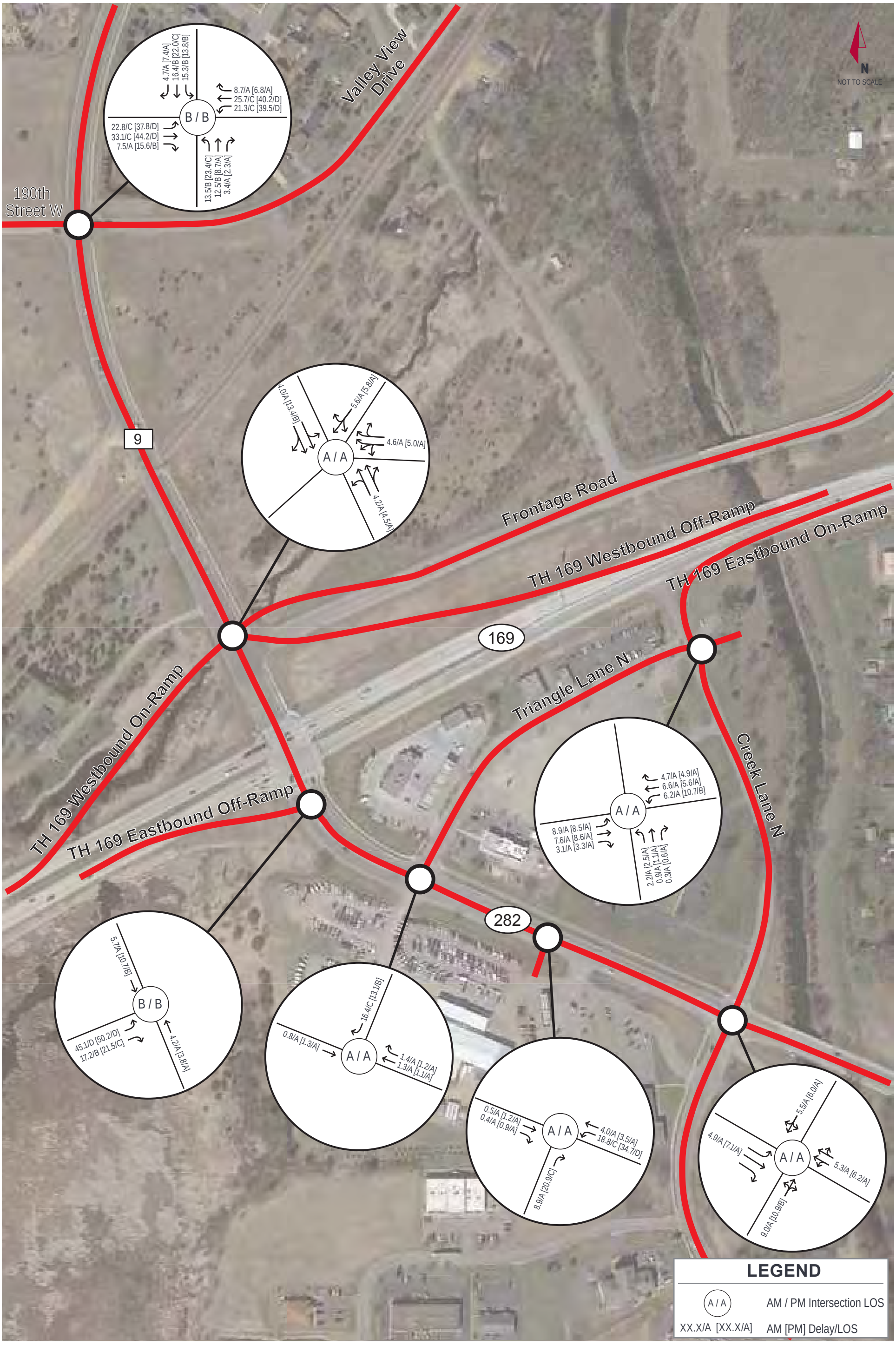

EXHIBIT 14

CONCEPT 1 - DESIGN YEAR (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

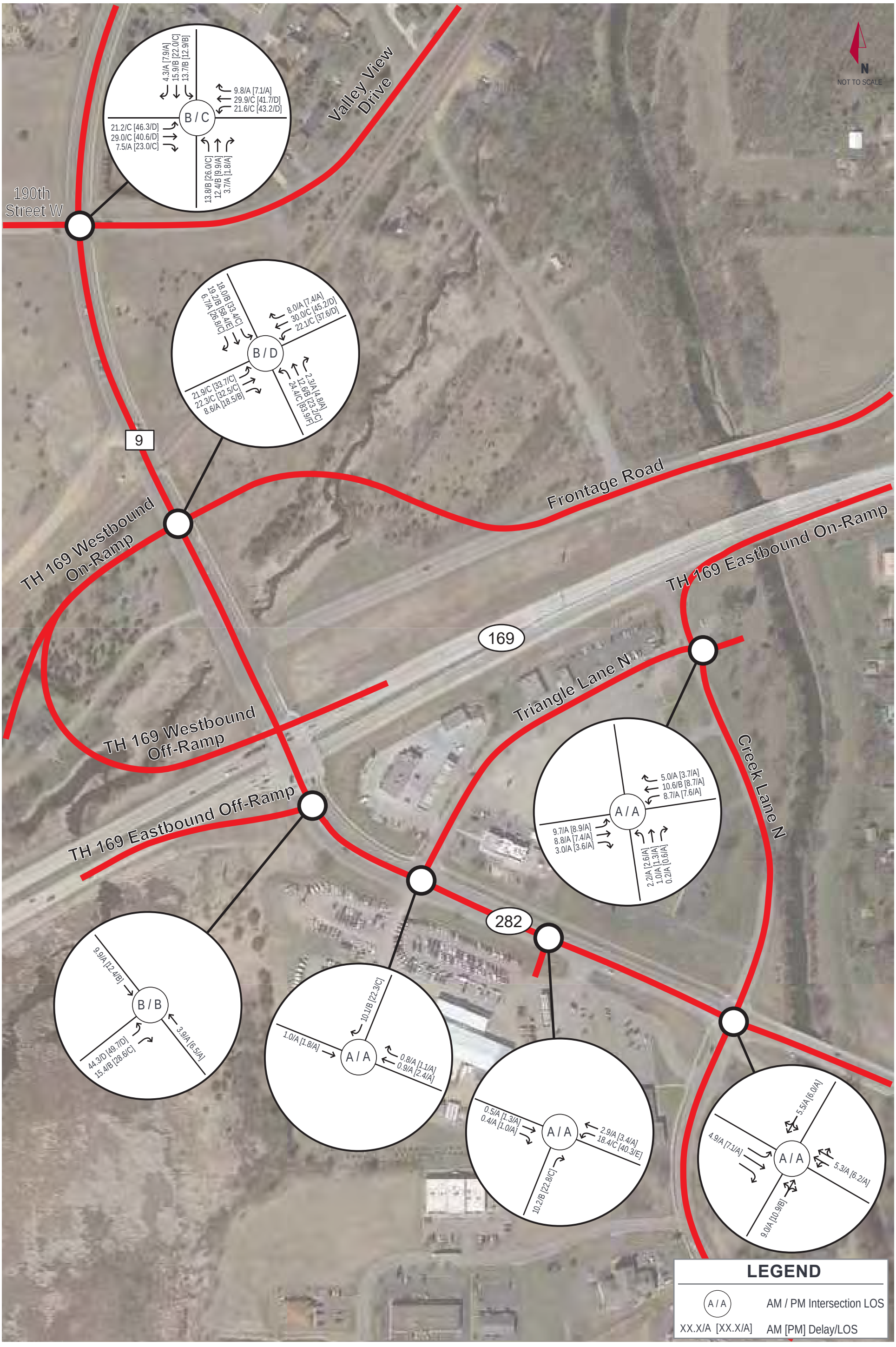

EXHIBIT 15

CONCEPT 2 - DESIGN YEAR (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

N
NOT TO SCALE

Valley View Drive

190th Street W

9

Frontage Road

TH 169 Westbound Off-Ramp

169

TH 169 Westbound On-Ramp

TH 169 Eastbound On-Ramp

TH 169 Eastbound Off-Ramp

Triangle Lane N

Creek Lane N

282

B / B
4.3/A [7.2/A]
16.0/B [21.0/C]
15.3/B [14.0/B]
8.8/A [6.7/A]
30.5/C [39.5/D]
22.0/C [36.5/D]
22.4/C [42.7/D]
29.3/C [43.0/D]
8.0/A [17.6/B]
15.7/B [25.5/C]
12.9/B [8.5/A]
3.7/A [3.0/A]

A / A
4.0/A [13.4/B]
5.6/A [5.8/A]
4.6/A [5.0/A]
4.2/A [4.5/A]

A / A
9.6/A [9.0/A]

B / B
28.9/C [25.6/C]
10.1/B [6.9/A]
48.8/D [50.4/D]
15.5/B [25.9/C]
4.7/A [2.7/A]
16.6/B [10.6/B]

A / A
14.3/B [25.7/D]
1.0/A [1.1/A]
1.3/A [2.3/A]
3.8/A [3.4/A]

A / A
0.5/A [1.2/A]
0.4/A [0.9/A]
2.5/A [3.4/A]
11.0/B [22.4/C]
7.9/A [18.6/C]

A / A
5.9/A [6.3/A]
3.7/A [5.1/A]
4.1/A [4.4/A]
7.5/A [8.9/A]

LEGEND

A / A	AM / PM Intersection LOS
XX.X/A [XX.X/A]	AM [PM] Delay/LOS

EXHIBIT 16

CONCEPT 3 - DESIGN YEAR (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Design Year (2040) Build Queue Analysis

Design Year (2040) Build conditions vehicle queuing was reviewed based on the SimTraffic and RODEL analysis for all three concepts. Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle was assumed).

Table 9 provides a summary of Design Year (2040) Build AM and PM peak hour queue lengths based on the Synchro/SimTraffic and RODEL analysis for Concept 1. Based on the analysis, the southbound right turn at TH 282 & Triangle Lane North and northbound right from the TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively. The access to McDonald's and Holiday is experiencing impacts under existing conditions and since the McDonald's access is a one-way entry access and Holiday has two access points no major impacts are anticipated at TH 282 & Triangle Lane North. The northbound queue extending into Radermacher's is experienced under existing conditions. Even though it is an existing condition, as part of the conversion to a ¾ intersection, modifications within the parking lot should be considered to improve operations near this access. The southbound through movement at the CR 9 & TH 169 Westbound Ramps is operating at an acceptable level of service and will result in a moving queue so no major concerns occur at this location except that long-term queuing over the railroad tracks for a Concept 1 scenario that is not grade separated long term is a potential long-term safety concern.

Table 10 provides a summary of Design Year (2040) Build AM and PM peak hour queue lengths based on the Synchro/SimTraffic and RODEL analysis for Concept 2. Based on the analysis, all turn lanes are anticipated to accommodate the 95th percentile queue except for the northbound left-turn lane and southbound right-turn lane at the intersection of CR 9 & TH 169 Westbound Ramps. The northbound and southbound storage lengths at this intersection have room to be extended to accommodate the queue so that modification will be made to Concept 2 if it is the locally preferred alternative. Based on the analysis, the southbound right turn at TH 282 & Triangle Lane North and northbound right from the TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively. The access to McDonald's and Holiday is experiencing impacts under existing conditions and since the McDonald's access is a one-way entry access and Holiday has two access points no major impacts are anticipated at TH 282 & Triangle Lane North. The northbound queue extending into Radermacher's is experienced under existing conditions. Even though it is an existing condition, as part of the conversion to a ¾ intersection, modifications within the parking lot should be considered to improve operations near this access.

Table 9: Design Year (2040) 95th Percentile Queue Summary (Concept 1)

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB Left	250	111	111
	EB Right	250	108	161
	WB Left	300	147	144
	WB Right	300	45	37
	NB Left	300	129	203
	NB Right	>500	71	47
	SB Left	280	58	63
	SB Right	275	31	86
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	NW	120	29	42
	SW	>500	21	25
	NB	360	108	100
	SB	>500	79	554
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	EB Left	280	258	112
	EB Right	280	213	209
TH 282 (2nd Street W) & Triangle Lane N	WB Right	150	20	6
	SB Right	50	99	87
TH 282 (2nd Street W) & Business Access	EB Right	135	16	10
	WB Left	120	74	118
	NB Right	50	59	123
TH 282 (2nd Street W) & Creek Lane	EB	330	116	233
	WB	>500	120	161
	NB	85	73	78
	SB	90	14	16
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	EB Left	100	64	46
	NB Left	160	7	33
Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle is assumed).				

Table 10: Design Year (2040) 95th Percentile Queue Summary (Concept 2)

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB Left	250	101	125
	EB Right	250	123	229
	WB Left	300	108	66
	WB Right	300	44	41
	NB Left	300	129	199
	NB Right	>500	58	14
	SB Left	280	51	103
	SB Right	275	34	96
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	EB Left	280	147	164
	EB Right	280	70	152
	WB Left	265	114	154
	WB Right	265	30	38
	NB Left	290	199	385
	NB Right	290	27	32
	SB Left	225	46	154
	SB Right	280	61	417
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	EB Left	280	270	145
	EB Right	280	181	246
TH 282 (2nd Street W) & Triangle Lane N	WB Right	150	4	26
	SB Right	50	85	126
TH 282 (2nd Street W) & Business Access	EB Right	135	11	29
	WB Left	120	60	118
	NB Right	50	65	135
TH 282 (2nd Street W) & Creek Lane	EB	330	116	233
	WB	>500	120	161
	NB	85	73	78
	SB	90	14	16
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	EB Left	100	67	48
	NB Left	160	4	7
Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle is assumed).				

Table 11 provides a summary of Design Year (2040) Build AM and PM peak hour queue lengths based on the Synchro/SimTraffic and RODEL analysis for Concept 3. Based on the analysis, all turn lanes are anticipated to accommodate the 95th percentile queue except for the southbound approach at the intersection of CR 9 & TH 169 Westbound Ramps and the southbound left-turn lane, eastbound left-turn lane, and northbound right-turn lane at the intersection of CR 9 & TH 169 Eastbound Ramps. The southbound left-turn lane, eastbound left-turn lane, and northbound right-turn lane at this intersection have room to be extended to accommodate the queue so that modification will be made to Concept 3 if

it is the locally preferred alternative. The southbound through movement at the CR 9 & TH 169 Westbound Ramps is operating at an acceptable level of service and will result in a moving queue so no major concerns occur at this location except that long-term queuing over the railroad tracks is anticipated and given that the railroad crossing cannot be grade separated in the future due to the close spacing between the roundabout at the Westbound TH 169 Ramps and railroad tracks results in a potential long-term safety concern. Based on the analysis, the southbound right turn at TH 282 & Triangle Lane North and northbound right from the TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively. The access to McDonald's and Holiday is experiencing impacts under existing conditions and since the McDonald's access is a one-way entry access and Holiday has two access points no major impacts are anticipated at TH 282 & Triangle Lane North. The northbound queue extending into Radermacher's is experienced under existing conditions. Even though it is an existing condition, as part of the conversion to a ¾ intersection, modifications within the parking lot should be considered to improve operations near this access.

Table 11: Design Year (2040) 95th Percentile Queue Summary (Concept 3)

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB Left	250	104	129
	EB Right	250	114	177
	WB Left	300	151	131
	WB Right	300	40	40
	NB Left	300	147	205
	NB Right	>500	68	57
	SB Left	280	51	55
	SB Right	275	32	98
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	NW	120	29	42
	SW	>500	21	25
	NB	360	108	100
	SB	>500	79	554
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound On/Off Ramp	EB Left	280	313	107
	EB Right	280	195	227
	NB Right	160	177	118
	SB Left	155	186	198
TH 282 (2nd Street W) & Triangle Lane N	WB Right	150	38	68
	SB Right	50	120	135
TH 282 (2nd Street W) & Business Access	EB Right	135	4	18
	WB Left	110	54	92
	NB Right	50	59	123
TH 282 (2nd Street W) & Creek Lane	EB	330	62	127
	WB	>500	88	105
	NB	85	58	60
	SB	90	16	18
Creek Ln N & Triangle Lane N	WB	50	31	31

Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle is assumed).

Conclusions and Recommendations

This traffic analysis was completed as part of a joint project between the City, Scott County and MnDOT, and included traffic engineering, concept design, and stakeholder engagement services for the TH 169 / TH 282 / CR 9 interchange area. As part of the traffic engineering services, an operations analysis was performed at critical intersections within the study area to support interchange concept development and determine the most appropriate intersection control and geometry to accommodate existing and future traffic. The traffic analysis included a summary of historic crash data along the study corridor, intersection capacity analysis for Existing and Design Year conditions, and a discussion on potential roadway and intersection improvement alternatives.

The conclusions of the analysis are summarized below:

- Analysis of existing traffic operations show that all intersections are currently operating at an acceptable LOS during the weekday AM and PM peak hours. Additionally, all individual movements are operating at LOS D or better for both the AM and PM peak hours except for the eastbound and westbound lefts at TH 169 and TH 282, which are operating at LOS E during the AM and PM peak hours.
- The review of the existing crash data shows that the intersections of TH 169 / CR 9 / TH 282 and TH 282 & Triangle Lane North have a critical index of greater than 1.0, meaning that these two intersections are worse than the normal, expected range (i.e. there is a crash issue at these intersections today). The crash data indicates that two contributing factors are having a traffic signal on a high-speed, high-volume facility (TH 169) and the queuing from this signal and the associated impacts due to the inadequate intersection spacing between Triangle Lane North and TH 169.
- An analysis of forecast 2040 No-Action conditions shows the following intersections are anticipated to operate at an overall LOS E or LOS F during the AM and PM peak hours:
    - CR 9 & 190th Street West/Valley View Drive (PM peak hour)
    - CR 9 & Frontage Road (AM and PM peak hours)
    - TH 169 / CR 9 / TH 282 (PM peak hour)
    - TH 282 & Triangle Lane North (PM peak hour)
    - Creek Lane North & Triangle Lane North (AM peak hour)
    - TH 169 & Creek Lane North (PM peak hour)

  Due the significant number of intersection that are anticipated to operate below the acceptable LOS for Design Year (2040) No-Action conditions, improvements along the study corridor will be necessary to provide acceptable LOS into the future. The continued deterioration of LOS between today and future conditions is also anticipated to result in additional crash concerns along the corridor.
- Several interchange and roadway concepts were considered through the planning process, and based on input from the City, County and MnDOT, the following three (3) preferred concepts were considered as part of the traffic analysis:
    - Concept 1 – Roundabout / Split Diamond
    - Concept 2 – Folded Diamond / Split Diamond

    - Concept 3 – Diamond Interchange with TH 169 over TH 282 & CR 9
- There were no significant differences between the three concepts from a traffic operations perspective.
- All concepts will reasonably serve 2040 traffic from operations and safety perspective. Other screening criteria will need to be used to decide on the locally preferred interchange alternative.