

MAY, 2012 FINAL REPORT

60th Street North Planning and Feasibility Study

Sponsoring Agencies



PREPARED BY



60th Street North Planning and Feasibility Study

May 2012

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1.0 Management Summary

The South Dakota Department of Transportation (SDDOT) and the City of Sioux Falls (City) jointly instigated a study of the 60th Street North corridor in northern Sioux Falls. The study, which includes the area between I-29 and Timberline Avenue, is intended to determine the needed roadway improvements to serve traffic through 2035. The study also includes concept level design of corridor improvements.

The main goals of the study are to:

- Determine the benefits and costs of separated crossings of the BNSF Railroad, Big Sioux River, Silver Creek, and the D&I Railroad.
- Establish preliminary horizontal and vertical alignment of the corridor.
- Establish access management principals and locations throughout the corridor, including the supporting street network.
- Present information to the public, receive public input, and incorporate applicable input into future design and construction of the corridor.
- Prepare a final feasibility report summarizing the study with direction for improvements based on relative impacts and cost effectiveness.

The study has determined that future travel demand will require a six lane cross section between I-29 and Minnesota Avenue transitioning to a four lane cross section between 4th Avenue and the planned SD 100 corridor at the east end of the study area. Revised configurations are also recommended for major street intersections within the corridor. New bridges at the Big Sioux River and Silver Creek will be required to replace aging infrastructure and carry greater traffic demand.

Glide path requirements for the areas in alignment with the runways at the Sioux Falls Regional Airport will also affect future improvements on 60th Street North. The roadway will need to be lowered from its current grade between Westport Avenue and the Big Sioux River. Glide slope requirements may also influence the decision to build an overpass at the D&I Railroad crossing.

Concept design options were prepared; options reviewed two different typical sections, access management options, and grade separation of the identified railroad corridors. Both railroad overpasses are deemed to be needed, but the D&I overpass may be found to be infeasible due to the previously mentioned airport glide slope requirements.

Concept design layouts for the study areas are included on a CD bound into this report document and are listed in the List of Figures on page iii as Figures P-1 through Figure P-14. It is the intent of the study advisory team to carry forward both options reviewed during this study.

2.0 Introduction

2.1 Purpose and Need

Principal arterials are the backbone in the hierarchy of the city roadway system. The City of Sioux Falls (City) continues to expand their arterial street network to meet the needs of this growing community. As development continues along the 60th Street North corridor, so does the need for planning, coordination, and expansion. The South Dakota Department of Transportation has completed planning studies on I-29, I-90, I-229, and also for a proposed high speed urban arterial referred to as SD 100. The infrastructure being planned on those adjacent corridors will certainly influence the need for expansion of the 60th Street North Corridor. Along with reviewing the opportunities for expansion of 60th Street North, the feasibility of providing grade separation along 60th Street North at the BNSF and D&I rail lines will be evaluated. It is the intent of this study to review 60th Street North from I-29 to Timberline Avenue (location of the proposed SD 100 termini). The concept of expanding this arterial corridor is consistent with the City of Sioux Falls major streets plan and also with the planning documents prepared by the South Dakota Department of Transportation for the corridors referenced above.

The 60th Street North Feasibility study reviews aspects of design to the level required for assembling cost comparisons. The study provides alternative analysis discussion based on traffic capacity, safety, access, grade separation feasibility, drainage needs, and public comment. The analyzed alternatives are documented below.

Previously prepared plans such as the Long Range Transportation Plan for the Sioux Falls Metropolitan Planning Organization (MPO) and Shape Sioux Falls 2035 Comprehensive Plan provide insight into the considerations taken by the City of Sioux Falls Planning and Engineering Departments in regards to planned growth in and around the study area and the desire to plan for improvements along this corridor.

2.2 Goals and Objectives

The South Dakota Department of Transportation (SDDOT) and the City collaborated through this study to examine the future transportation needs for 60th Street North with the goal of determining the following:

- Determine the benefits and costs of separated crossings of the BNSF Railroad, Big Sioux River, Silver Creek, and the D&I Railroad.
- Establish preliminary horizontal and vertical alignment of the corridor.
- Establish access management principals and locations throughout the corridor, including the supporting street network.
- Present information to the public, receive public input, and incorporate applicable input into future design and construction of the corridor.
- Prepare a final feasibility report summarizing the study, with direction for improvements based on relative impacts and cost effectiveness.

This study provides direction regarding potential railroad overpass structures and bridges over waterways, roadway alignment, lane needs, access points and access accommodations, utilities, drainage, construction programming and construction costs. The study also considered the environmental effects and right-of-way needed for future

construction. The design elements were determined by a combination of technical analysis and involvement with landowners and the general public.

2.3 Authorization

In 2011, the SDDOT entered into a contract with HDR Engineering, Inc., with teaming partner HR Green, Inc., to analyze the feasibility of reconfiguring 60th Street North from I-29 to the proposed SD 100 corridor. The study is undertaken by SDDOT in collaboration with the City. Funding for the study includes resources provided by the Federal Highway Administration through Federal and State programs. Other funds are also provided by the City.

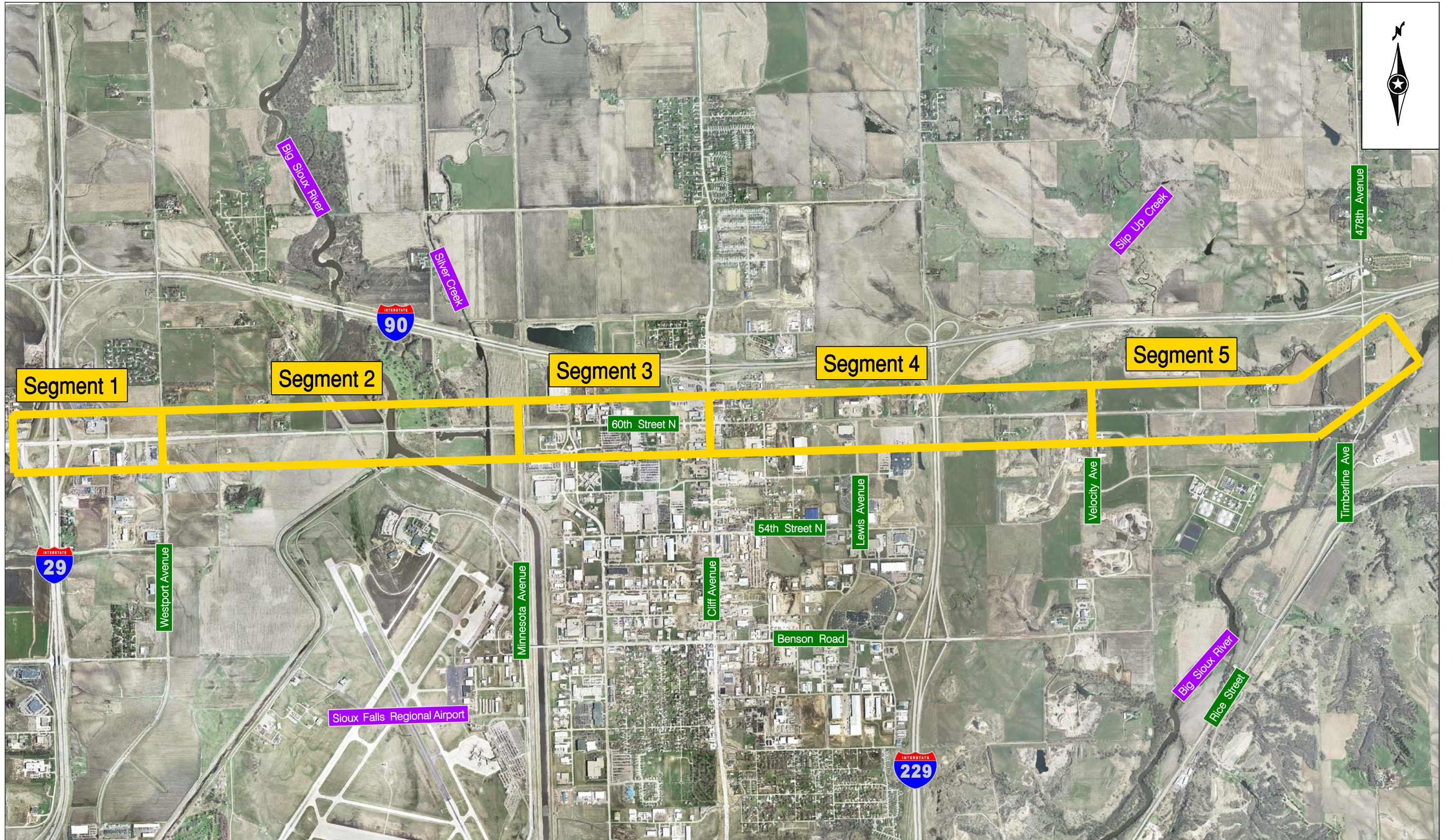
2.4 Study Area

The study corridor begins at I-29 on the west and ends near Timberline Avenue on the east. The east end termini of the study will be the SD 100 corridor currently in the planning stages. In order to effectively study this diverse corridor, the consultant team, with guidance from the study advisory team, created five segments each with logical termini along the 6.5 mile corridor. The segments are shown in Figure 2 and are defined below:

- Segment 1 – I-29 to Westport Avenue / Kiwanis Avenue
- Segment 2 – Westport Avenue / Kiwanis Avenue to Minnesota Avenue
- Segment 3 – Minnesota Avenue to Cliff Avenue
- Segment 4 – Cliff Avenue to Velocity Avenue
- Segment 5 – Velocity Avenue to Timberline Avenue (SD 100)

The study area also includes several crossings at the following locations:

- BNSF Rail Line
- Big Sioux River
- Silver Creek
- D&I Rail Line
- I-229
- Slip Up Creek



2.5 Project Scope

The study corridor includes 60th Street North and the surrounding area between I-29 and the proposed SD 100 alignment. Work items include:

- Project administration
- Quality control
- Data collection and review
- Surveys
 - Horizontal and vertical control surveys
 - Cross-section survey of Big Sioux River and Silver Creek crossings
- Creation of existing conditions base map
- Public and agency involvement
- Determination of roadway geometrics
 - Horizontal and vertical alignment
 - Access points (including corridor access plan)
 - Traffic demand and lane recommendations
 - Evaluation of separated railroad and waterway crossings
- Environmental review
- Hydraulic study of the Big Sioux River and Silver Creek
- Determination of drainage conceptual design
- Conceptual design of other utilities, lighting and signals
- Engineers estimate of probable cost
- Preparation of this final report

2.6 Feasibility Background Data and Resources

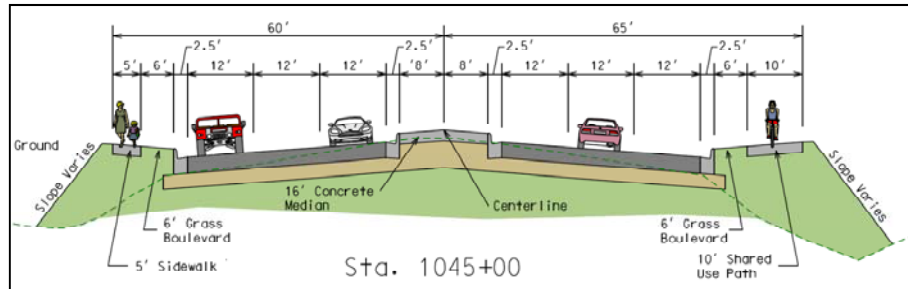
The following information resources were provided by SDDOT, the City of Sioux Falls, and other participating agencies:

- Existing public and private utility maps
- Existing property ownership and parcels
- GIS utility, contour, 2008 aerial data, parcel and other necessary GIS files
- Travel demand model output
- Crash records

3.0 Conceptual Design

Several alternatives were developed to satisfy future transportation needs in the 60th Street North corridor. The alternatives were characterized by different lane combinations, side street alignments and use of structures to span railroads and waterways. Detailed alternative analysis results are documented in the Technical Memoranda contained in the Appendix to this report.

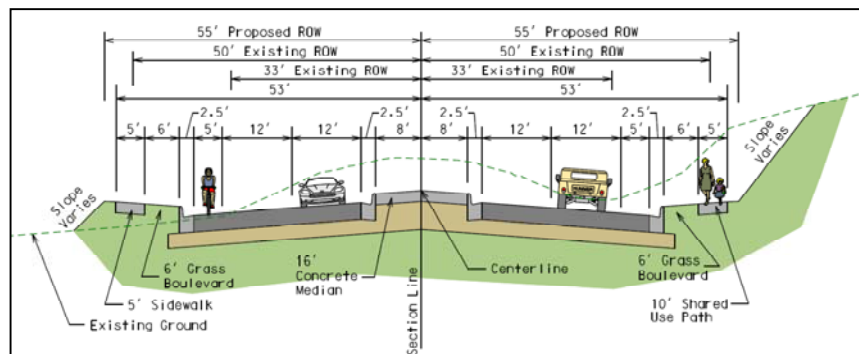
Two technically feasible options were determined based on the analysis and public input. Option 1 includes widening the existing roadway to a 6-lane median-divided cross-section from I-29 to Minnesota Avenue, transitioning to a 4-lane divided cross-section between 4th Avenue and proposed SD 100 with grade



Example of an Option 1 Typical Section

separations at the BNSF railroad. It should be noted in Segment 4 from Cliff Avenue to Lewis Avenue that it does not appear to be technically feasible to divide the 4-lane facility with a raised median due to the close proximity of the residential homes and lack of right-of-way.

Option 1 incorporates pedestrians and bikes via sidewalks and side paths. Option 2 is similar to Option 1 in horizontal alignment, but includes grade separation at the D&I railroad while



Example of an Option 2 Typical Section

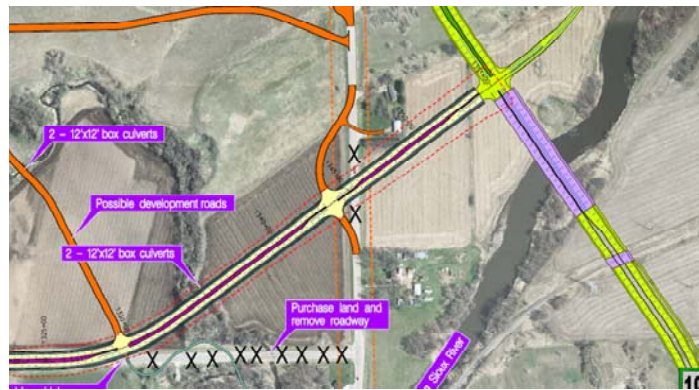
the BNSF rail line would remain at grade in Option 2. Option 2 further incorporates on-street bike lanes and sidewalks to assist in the mobility of non-vehicle users versus a widened side-path as shown in Option 1. Each segment along the corridor has differences which will be discussed under the appropriate sections below. The options were further refined through concept design and public input. The segment concept layouts are provided in the pockets following Section 5 of this report due to their size. The segment layouts illustrate the different design items addressed in Section 3 of this report. The segment concept layouts are labeled Figure P-1 through Figure P-14 as identified in the List of Figures on page iii and are included on a CD following Section 5. Elements of the concept design are discussed in the following sections. The following design parameters were used as minimum standards during this study:

- Lane Configurations – provide level of service (LOS) of C or better (LOS D only in critical areas where buyouts are required to obtain LOS C).

- Design Speed – provide a design speed of 45 mph.
 - Posted Speed of 40 mph in Segments 1,2,3, and 5.
 - Posted Speed of 30 mph for Option 1 in Segment 4 when residential driveway access exists between Cliff Avenue and Lewis Avenue.
- Pedestrians – provide for pedestrian use via sidewalks.
- Bikers – provide for bikers via a side-path or on-street bike lanes.
- Surfacing – concrete surfacing was used in cost estimating to be consistent with general practices on arterial streets in Sioux Falls.
- Railroad Grade Separation – provide when warranted and feasible through specific grade separation.
- Access Spacing – provide full access according to the City of Sioux Falls Current Access Management Policy located in the design standards; for 60th Street North full access would be allowed at ¼ mile locations, signals could be installed at these locations if warranted, and driveway access will be managed to the extent possible in areas of existing development. It is intended that this commissioned planning study will supersede the access standards put forth by the City of Sioux Falls.
- Roadway Sections – provide an urban arterial street meeting current design standards for storm water collection and turning radii for emergency vehicles
- Drainage – all roadway profiles and drainage structures shall be such that no overtopping of the roadway takes place during a major event as defined in the City of Sioux Falls design standards.

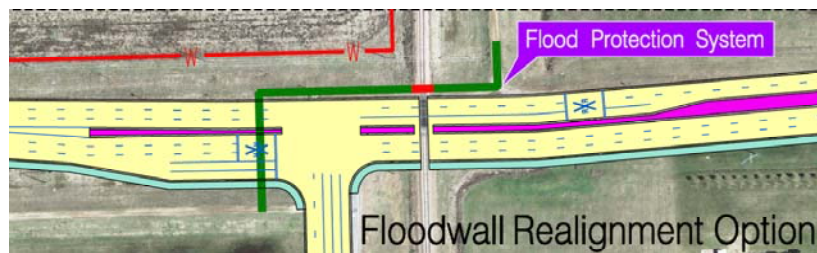
3.1 Horizontal Alignment

The horizontal alignment of all alternatives follows the existing alignment to the extent possible, except for the portion in Segment 5 at the east end of the corridor. In that area, previous planning has identified a shift northward to intersect with the future SD 100 alignment. This alignment is shown in all future alternatives for 60th Street North.



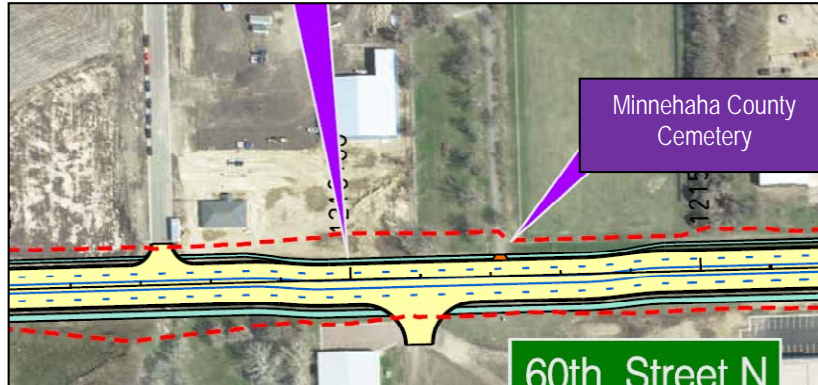
Segment 5 Horizontal Alignment shift of 60th Street North to Future SD 100

Other minor alignment shifts were considered in Segment 2 and Segment 4. In Segment 2, the alignment of Minnesota Avenue shifts to the west slightly when intersecting with 60th Street North. City traffic engineers did not provide a preference in regards to the intersection distance from the D&I rail crossing.



Horizontal Alignment change within Segment 2 to minimize impacts to the Wehde Property and Planned Floodwall Protection System

Minnesota Avenue could be moved further west during final design to provide additional separation if desired, but would then impact levee improvements previously completed. If Minnesota Avenue is extended north to provide a direct connection to Dike Place, keeping the Minnesota Avenue alignment more easterly will have less impact on the Wehde property. As illustrated on Figure 3, a horizontal alignment shift was also reviewed near the intersection of 60th Street and Minnesota Avenue. The alignment shift would allow for a planned floodwall and railroad flood structure to remain in place during the construction of Segment 2. This possible alignment alteration will reduce impacts on the north side of 60th Street North, but will have minor impacts on property along the south side of 60th Street North. In Segment 4, both residential homes and the Minnehaha County Cemetery caused slight shifts in the horizontal alignment.



Segment 4 Horizontal Alignment shift of 60th Street North at Minnehaha County Cemetery

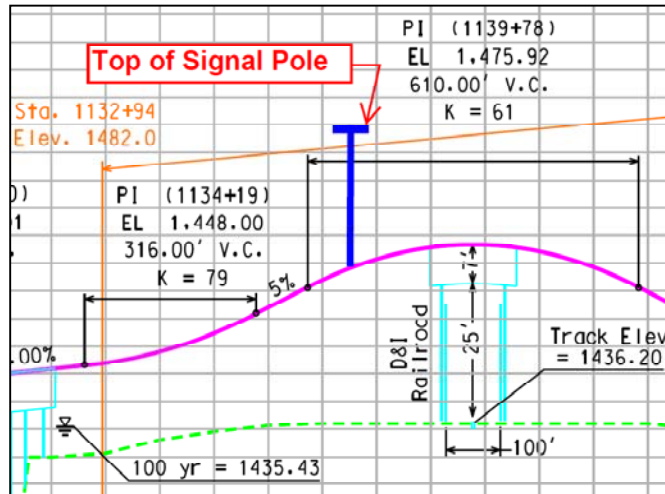
The shifts in the horizontal alignment were completed to minimize both property and environmental impacts. The shifts are very gentle in nature and still meet the intent of staying along the current alignment. No other horizontal alignments are envisioned for 60th Street North because any alignment shifts would create undesirable impacts on adjacent properties and are not required to meet other transportation needs. Segments 1 through 3 all have right-of-way widths in excess of 100 feet; this allows flexibility during final design within these segments to make any needed final adjustments to the horizontal alignment.

3.2 Vertical Alignment

A number of vertical alignment changes have been recommended through the 60th Street North corridor. It should be noted that a full topographic and utility survey was not completed during this study. The profiles were completed utilizing the 2 foot aerial contour mapping provided by the City of Sioux Falls. The study team did complete a centerline survey for comparison purposes. The grade change recommendations are outlined below:

- I-29 to Westport Avenue (Segment 1) – this segment was rebuilt in the 1990's and the vertical alignment was brought up to standard at that time. No significant grade change is anticipated in the future.
- Westport Avenue to Minnesota Avenue (Segment 2) – this segment will require significant changes in vertical alignment to meet differing needs. First, the roadway needs to be lowered to satisfy glide slope requirements of the Sioux Falls Regional Airport for Runway 15. The impacted area is in line with the existing northwest-southeast runway and results in a deeper cut in the vicinity of the existing hill between the high area near Westport Avenue and the low area near the BNSF rail line. Airport officials have provided insight that our profile should be a minimum of 17 feet below a proposed 62.5:1 glide slope (subject to change). For safety and lighting purposes, the profiles reviewed used a minimum clearance of 22 feet below the

identified glide slope to allow conventional lighting. The grade from Minnesota Avenue to just west of the BNSF rail line is raised in Option 1 to provide a grade separated crossing at the BNSF railroad and in both Option 1 and 2 a higher structure crossing of the Big Sioux River and Silver Creek floodways is required. The Corp of Engineers Omaha District is currently evaluating the flood risk threshold for the Big Sioux River near 60th Street with levees being raised to approximately 1440.50. Adjusting the profile to be higher than the levees within the floodplain will create additional impacted area and is not desirable. Adjusting the profile to allow no overtopping of the roadway during a major event (100 year storm event as defined by the City of Sioux Falls design standards) will allow a safe and reasonable access and will be in compliance with current standards. The segment of 60th Street North between the Big Sioux River and the D&I rail line will be subject to flooding during events that exceed a 100 year storm event.



Segment 2 Vertical adjustments for D&I grade separation along 60th Street

In Option 2 for this segment, grade separation was reviewed for the D&I rail line. Due to the relative close proximity of the Minnesota Avenue intersection, property owner impacts, possibilities with extending Minnesota Avenue north to Dike Place, and possible glide slope constraints from runway 21, providing grade separation does not appear to be technically feasible due to the impedance of the signal mast arms required to provide signalization. *It should be noted that the Federal Aviation Administration (FAA), late in the study, indicated that mandating the 62.5:1 glide slope requirements may not be feasible at the Sioux Falls Airport and they will be conducting further study to define what new requirements may be feasible. For this reason, grade separation at the D&I rail crossing should be considered if further exploration by the FAA indicates that the glide slope will be 50:1 or steeper. The timeline for completing that study is not known at this time.* Options of moving the intersection west would minimize glide slope impacts, but would impact existing levees and would cause significant additional bridge width at Silver Creek to accommodate the lane geometrics required at the intersection of 60th Street North and Minnesota Avenue. Although grade separation does not seem to be feasible at this time, a similar review should be conducted during final design and during the preparation of the environmental document to ensure grade separation does not become feasible through either policy changes by the Airport Authority, through increased rail traffic by the D&I, or by policy changes by the City of Sioux Falls on their evaluation criteria for such crossings.

- Minnesota Avenue to Cliff Avenue (Segment 3) – a proposed grade separation at the D&I railroad was found to be unlikely due to airport glide slope requirements. Option 1 includes a profile that matches closely the existing grade, but provides for a slightly

higher longitudinal slope to improve on-street drainage while Option 2 reviews the grade separation at the D&I rail line for reasons previously discussed. Both options provide means of conveying storm water through this segment from the east end to the west end.

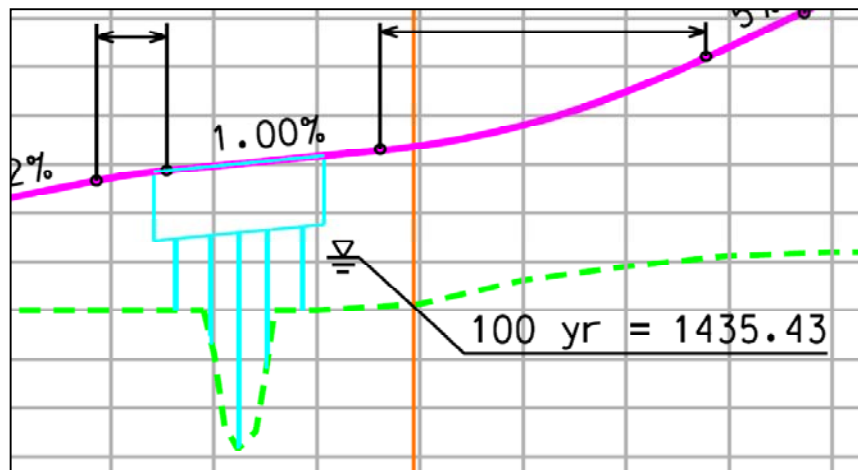
- Cliff Avenue to Velocity Avenue (Segment 4) – the existing two-lane rural section roadway is being replaced with a five-lane urban cross-section. The change to an urban design configuration results in a slight lowering of the grade for much of this corridor segment while obtaining appropriate design speeds. Otherwise, the planned grade generally follows the existing grade. If changes can be incorporated to better match existing elevations at footing locations, the project could see an overall cost savings. A slight grade raise is being proposed for a new I-229 overpass structure to ensure proper clearances are being achieved. Due to future interchange alternatives with I-229 and I-90, the actual bridge on 60th Street North may need to be designed to accommodate any of the possible options proposed as part of the study as the bridge will likely be replaced prior to a final decision on the appropriate interchange alternative. For that reason, the longest and widest bridge possible for any of the Segment 4 options was used for cost estimating.
- Velocity Avenue to SD 100 (Segment 5) – the existing two-lane rural roadway is being replaced with a four-lane divided urban cross-section to address capacity needs forecast to 2035. The change to an urban design configuration results in a slight lowering of the grade for much of this corridor segment while on the existing 60th Street North alignment. In order to meet arterial overtopping standards, a grade raise is being proposed in the vicinity of the Slip Up Creek crossing. From Slip Up Creek to the future SD 100 corridor, a significant grade raise is planned in order to match the grade of the proposed SD 100.

The concept design attempts to address earthwork balances to the extent possible along the corridor. Some sections will require the contractor to furnish borrow material to construct the roadway.

3.3 Bridges

The potential need for five new structures was one of the primary motivations for conducting this study and conceptual design. If needed and feasible, railroad grade separations would be placed at the BNSF crossing and D&I crossing in Segment 2.

Additional bridges were anticipated at the Big Sioux River crossing and the Silver Creek crossing in Segment 2 due to the need to widen the roadway for capacity and raise the roadway for flood protection. The



Segment 2 grade raise at Silver Creek to meet arterial overtopping requirements

existing bridge over I-229 is considered deficient and requires girder end repair work. The SDDOT intends on completing either repairs or replacing the structure in 2015.

General characteristics of bridges were evaluated in regards to possible options available to consider when moving into the design process for the corridor as documented in Structure Needs Memorandum in Appendix 3. The study found that a grade separation of the BNSF crossing was needed, justified and feasible. A grade separation of the D&I railroad, however, was found to be needed, but infeasible at this time due to conflicts with airport glide path requirements, costs, impacts to adjacent properties, etc.

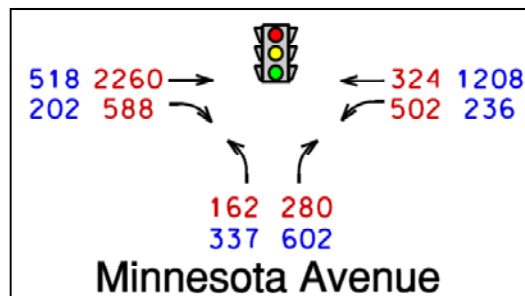
New bridges over the Big Sioux River and Silver Creek were also found to be needed to widen the crossings to provide for future traffic demand and raise the structures to meet floodplain and arterial standards. Future coordination will be needed with the City of Sioux Falls, Corp of Engineers Omaha District, and Federal Emergency Management Agency (FEMA) to ensure all floodplain requirements are being accurately addressed.

Findings indicate that a new bridge crossing over I-229 should be constructed to the maximum potential length and width as identified during this study if interchange alternatives have not been finalized. The bridge could be designed to be widened in the future if funding constraints do not allow for the build structure to be completed as designated with this study. The City and SDDOT officials should coordinate in the near future to determine whether the bridge should be replaced and widened in 2015 or if SDDOT should just complete the necessary rehabilitation. The I-229 Bridge was originally constructed in 1961.

The proposed bridges have been included on the concept design layouts.

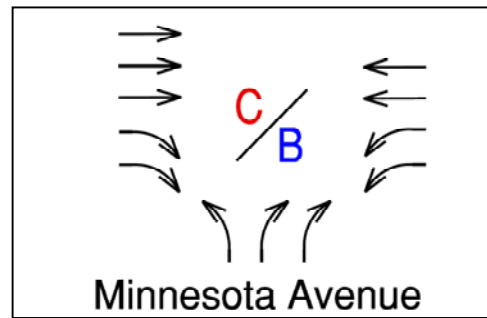
3.4 Traffic Volumes / Lane Geometrics

Current corridor traffic volumes range from about 1,900 vehicles per day east of Lewis Avenue to about 15,000 vehicles per day between I-29 and Westport Avenue. Traffic forecasts for 2035 were prepared using the regional travel demand model maintained by the City of Sioux Falls. Those forecasts indicate that 2035 traffic volumes will range from about 11,400 vehicles per day east of Lewis Avenue to 38,600 vehicles per day between I-29 and Westport Avenue. The forecasts indicate that traffic will continue with significant growth within the corridor and 60th Street North will continue to serve as an important arterial roadway in the future. Traffic analysis, including capacity analysis of corridor intersections is included in the Proposed Lane Geometrics Memorandum in the Appendix.

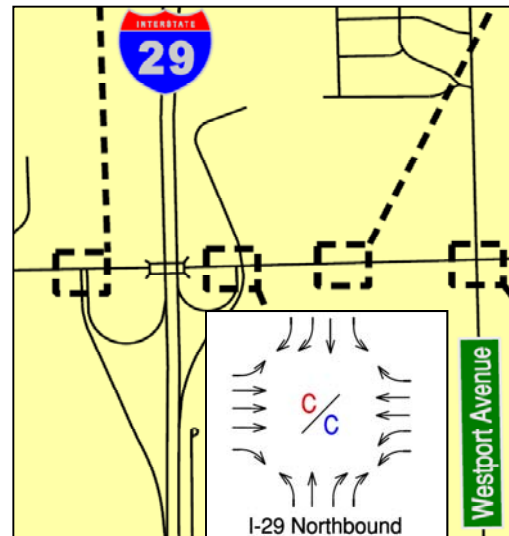


Future travel demand will require a six lane cross-section between I-29 and Minnesota Avenue with three through lanes in each direction and will transition to a four lane cross section between Minnesota Avenue and North 4th Avenue. From North 4th Avenue to the east, a four lane cross section is recommended to adequately manage the projected traffic volumes. A median is recommended for most of the corridor, except for the

section between Cliff Avenue and Lewis Avenue which is transitioning from rural residential development to urban industrial development. In that area, a five-lane cross-section will be needed unless the frontage residential properties are consolidated and replaced with larger commercial or industrial uses. It should be noted that much of Segment 4 and Segment 5 is still within the jurisdiction of the County, but is well within the planning jurisdiction for the City of Sioux Falls.



In the future, the I-29 interchange at 60th Street North will be altered with a northbound loop on-ramp (folded diamond configuration). This future modification of the interchange will allow for a potential access roadway to bring development traffic from the northeast quadrant of I-90/I-29 directly to this interchange or intersection location. The development roadway is labeled as the Redstone Access Roadway on the Segment 1 option layouts. Analysis of this configuration has also been included in the Proposed Lane Geometrics Memorandum in the Appendix. If this configuration is constructed as recommended, the same through-lane configuration of 60th Street North will still be recommended, but the intersection lane configurations of I-29 NB/60th St. N., and Granite Lane/60th St. N. will be altered.



3.5 Access Management

Traffic volumes range from slightly over 10,000 vehicles a day to 35,000 vehicles per day on different segments along this corridor in the year 2035. That magnitude of traffic warrants strict adherence to current access policies adopted by the City and supported by the SDDOT. The City, per chapter 8 of the Design Standards, requires the installation of medians on arterial streets such as 60th Street North. In general, median openings shall take place at minimum intervals of ¼ mile.

The City, per language in their design standards, allows for access management studies approved by the City Engineer and SDDOT to supersede written guidelines currently being implemented. Since all the segments have existing access locations that are not in compliance, this study focused on using the presence of the raised median, moving access locations, closing access locations, consolidating access locations, and providing rearage or frontage roads to improve the safety of the corridor. The segment concept layouts are contained within this section and are also included in the access management memoranda in Appendix 2. The access management plans if implemented would improve safety, preserve capacity, and be generally supported by the adjacent landowners.

Some of the key access management discussions and decisions will be discussed on following pages with additional information included in the technical memoranda in Appendix 2:

I-29 to Westport Avenue - Segment 1 (Figure 3-1a and 3-1b)

Segment Overview

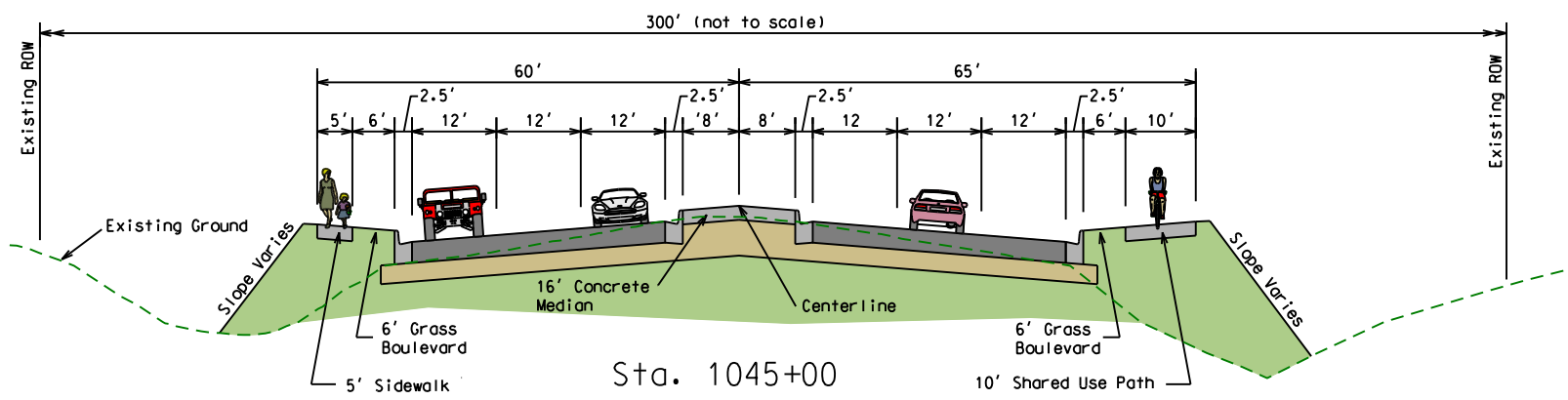
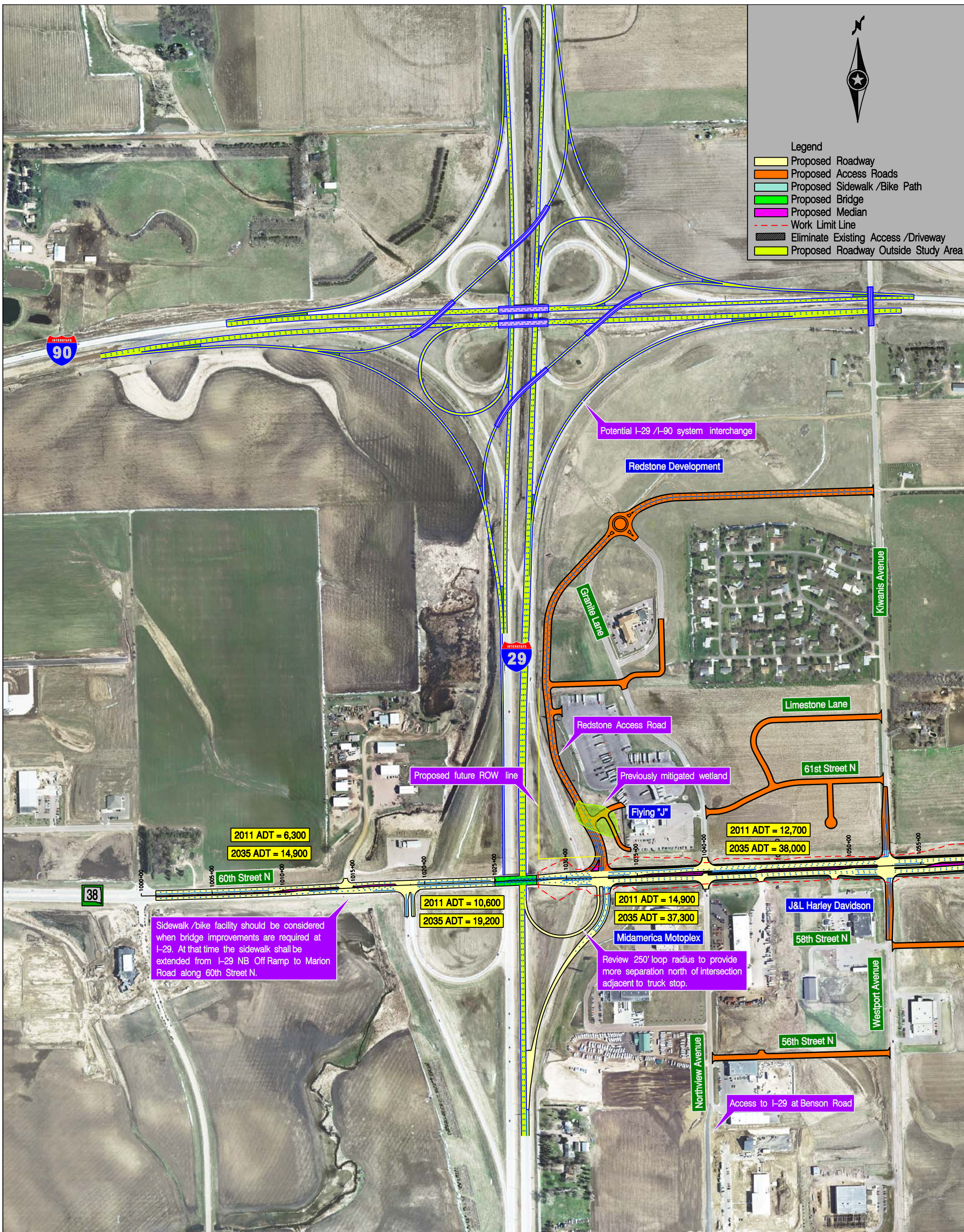
Segment 1 currently experiences traffic volumes exceeding 12,000 vehicles per day (vpd). This segment of 60th Street North carries commuter traffic directly to the industrial park within Segment 3 and has a high percentage of trucks due to the adjacent truck stop and industrial/commercial land uses it serves. Development planning within and near this area is certainly the highest among any of the corridor segments. The traffic forecasts prepared for the corridor and specifically for this segment indicate volumes exceeding 35,000 vpd in the year 2035.

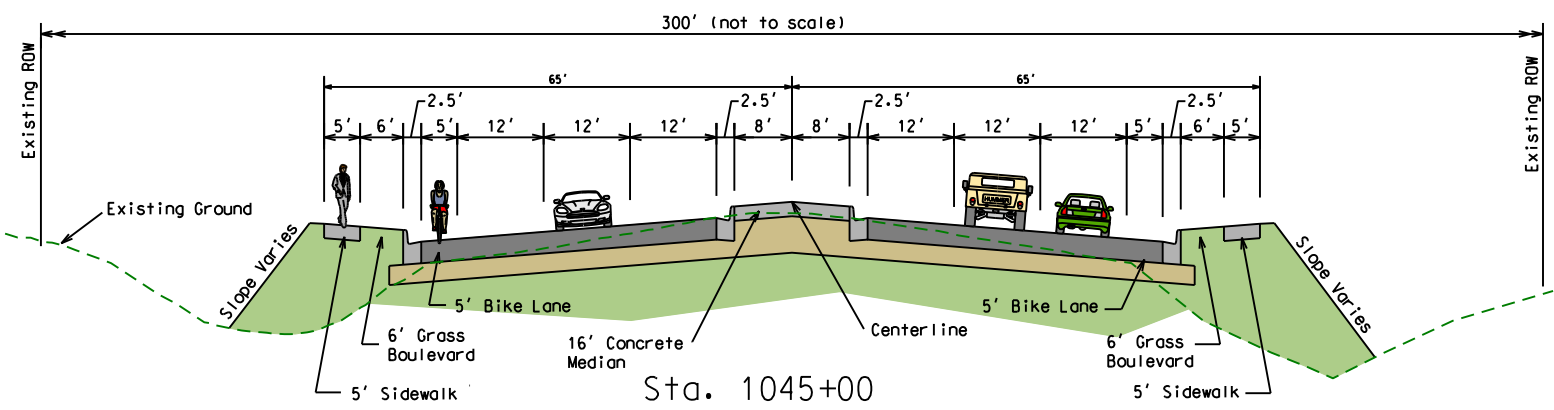
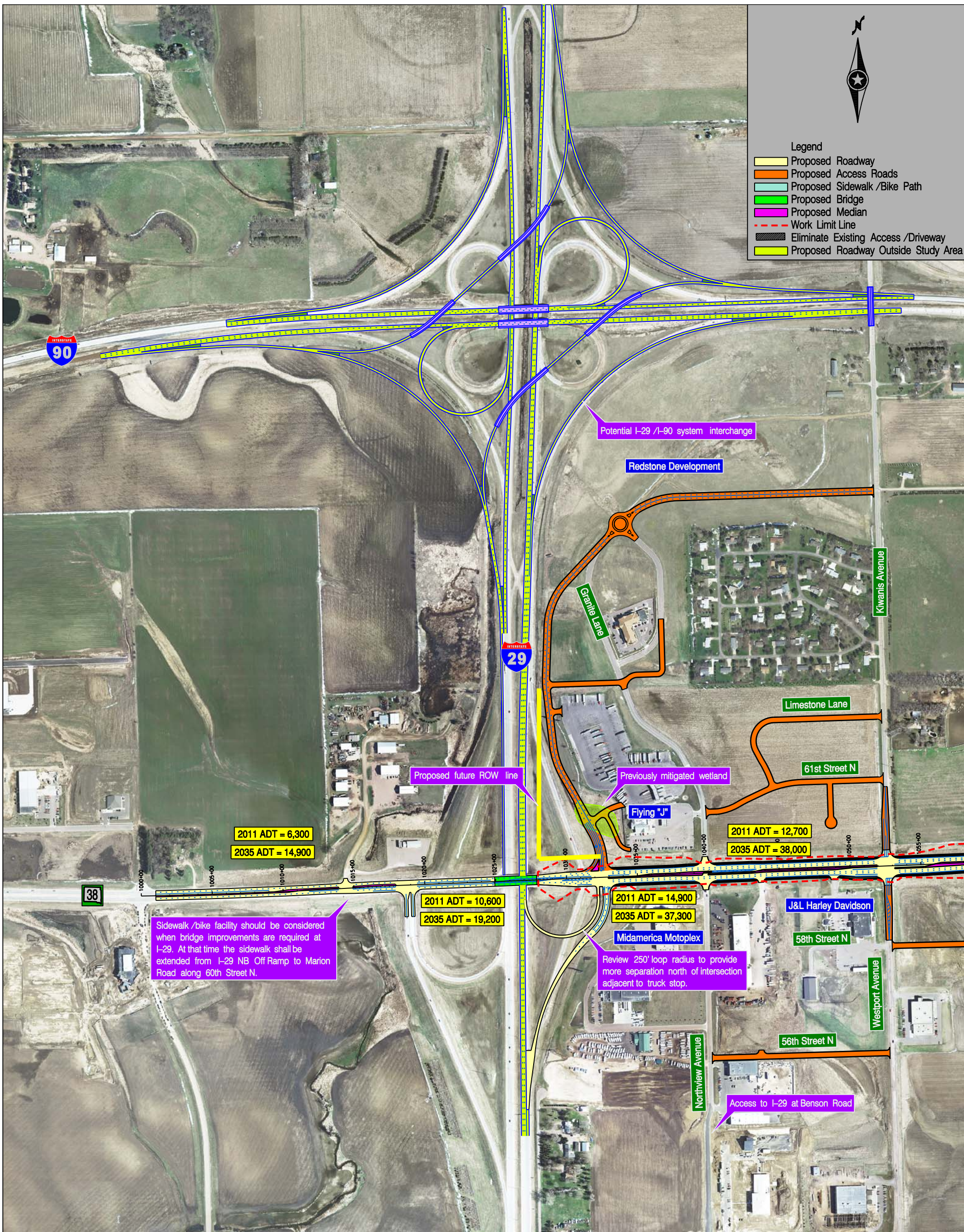
Direct access to the adjacent developments along this segment has been well managed. With exception of Interstate Trucking Center (IState) and J&L Harley, all other adjacent developed parcels are served from collector streets. The accident data reviewed indicates that the intersection of Granite Lane and 60th Street North has a crash rate that exceeds the critical rate as determined by the City on comparable intersections.

Segment Strategy

As identified in the crash analysis, the most significant concern along this segment is the intersection of Granite Lane / Northview Avenue and 60th Street North. The spacing of this intersection to the I-29 northbound off/on ramp intersection is well below City standards for signal spacing with plans by the SDDOT to reduce the spacing with future improvements to the interchange. Due to the spacing constraints, accident concerns, and high level of proposed traffic growth for Segment 1, the access management plan was tailored in preserving capacity and improving safety as development continues. The proposed access management techniques are defined below for Segment 1 and are illustrated in Figures 3-1a and 3-1b. Figures 3-1a and 3-1b differ only by the typical section proposed to handle pedestrians and bikes.

- Signalizing the intersection of Granite Lane/Northview Avenue and 60th Street is problematic due to spacing constraints with I-29. Constructing the Redstone Access roadway and restricting left turns from 60th Street to Granite Lane was deemed appropriate based on the safety and capacity challenges in this segment and will provide a level of service to the daily commuters and reasonable access to the adjacent developments.
- Due to the acceptable spacing between Westport Avenue and Northview Avenue, allowing a ¾ access (left-in, right-in, right-out) at Northview Avenue will provide reasonable access and will eliminate the left turn movement from Northview Avenue to 60th Street North westbound that is problematic.
- Construction of 56th Street North south of 60th Street North will provide a back access connection between Northview Avenue and Westport Avenue therefore providing a route for the adjacent businesses to access 60th Street North at a signalized intersection.





Westport Avenue to Minnesota Avenue - Segment 2 (Figures 3-2a and 3-2b)

Segment Overview

Segment 2 currently experiences traffic volumes exceeding 14,000 vehicles per day (vpd). This segment of 60th Street North carries commuter traffic directly to the industrial park within Segment 3 and experiences high levels of truck traffic. The adjacent property to Segment 2 is mostly undeveloped with large portions of land within the existing glide slopes of the Sioux Falls Regional Airport or within the Big Sioux River floodplain. The traffic forecasts prepared for the corridor and specifically for this segment indicate volumes exceeding 35,000 vpd in the year 2035.

Direct access to the adjacent developments along this segment consist mostly of residential driveways, field approaches for agricultural purpose, access to the Sioux Falls Flood Protection Levees, and access to North Ditch Road. There are no significant collector roadways or arterial roadways in Segment 2 between Westport Avenue and Minnesota. Crossings of the BNSF Railroad, Big Sioux River, Silver Creek, and the D&I Railroad exist within Segment 2 and will certainly affect the possibilities for future access along the corridor.

Development along this segment will mostly occur on the west end of Segment 2 outside the glide path of Runway 15. Other development will consist mostly of park and recreation use along this corridor segment.

When reviewing accidents within Segment 2, animal hits and accidents due to icy road conditions seemed to represent a majority of the crashes that currently take place. Access from the adjacent properties onto 60th Street North is very difficult due to the existing capacity constraints that exist.

Segment Strategy

Several constraints exist within Segment 2 in regards to future development, access, and safety. The primary areas of focus within Segment 2 consisted of the following:

- Providing access to the 60th Street North corridor between the BNSF Railroad and Westport Avenue for the purposes of proposed development.
- Determining the feasibility of grade separation at the railroad crossings.
- Maintaining access to North Ditch Road.
- Providing access to future park land.
- Maintaining access to the Flood Protection System.
- Maintaining access to existing agricultural property not conducive to development.

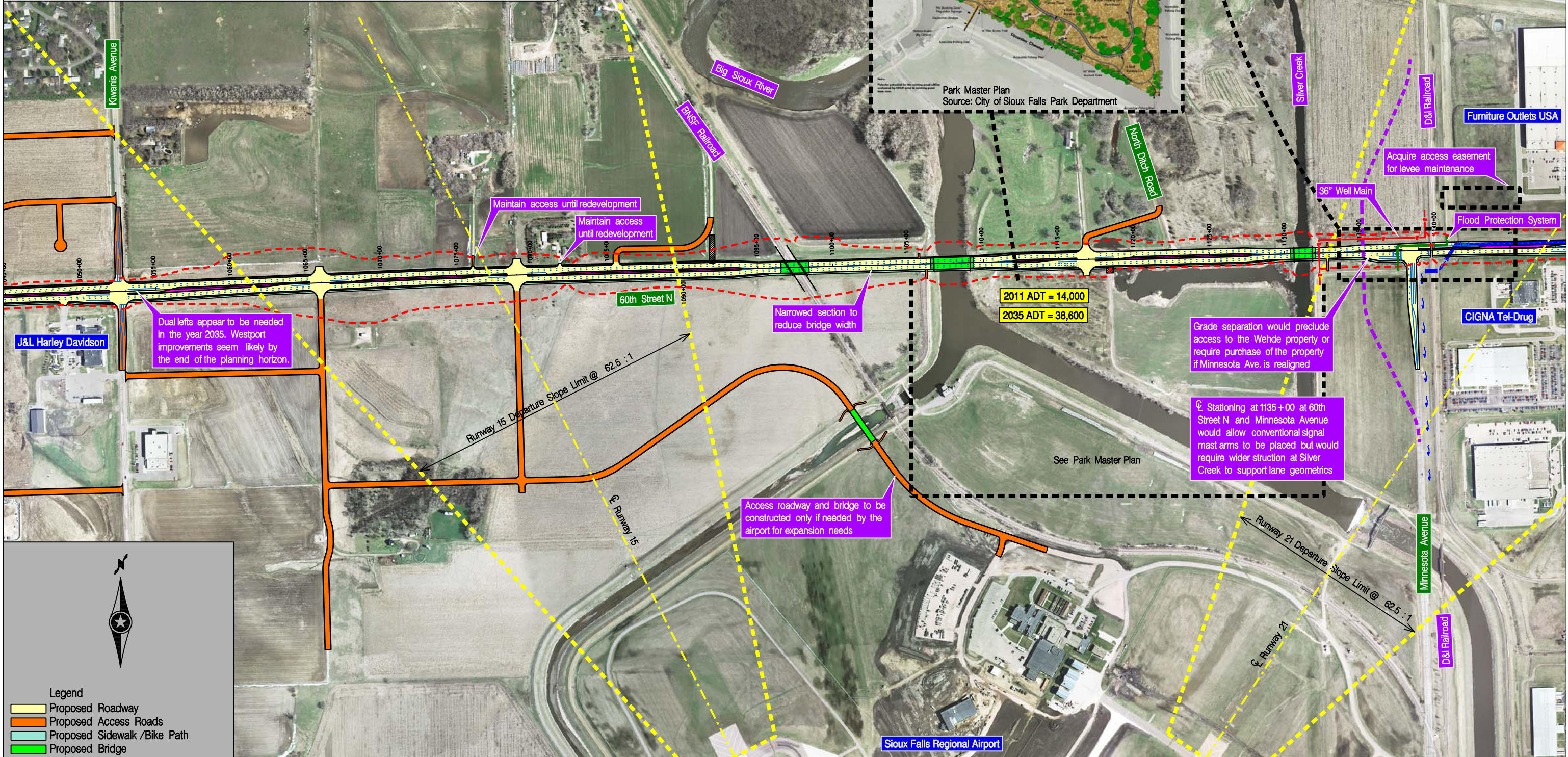
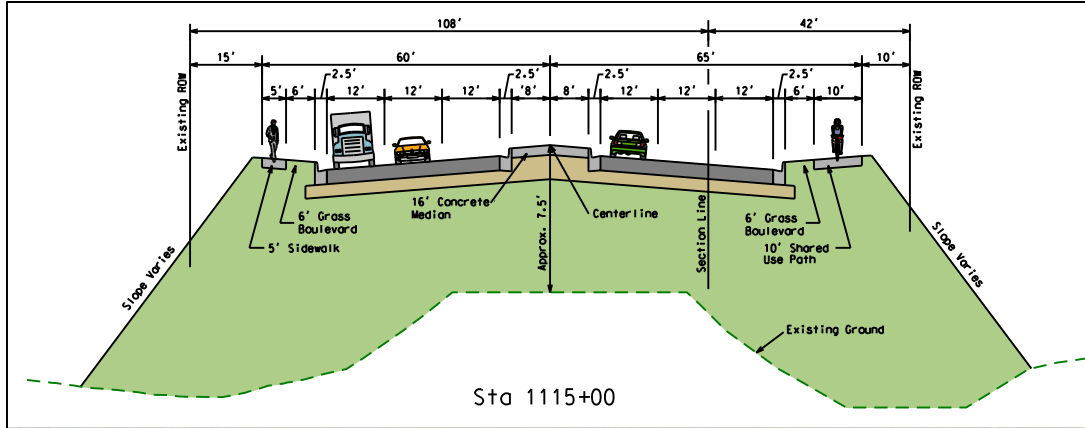
When reviewing grade separation at the rail crossings the following were determined:

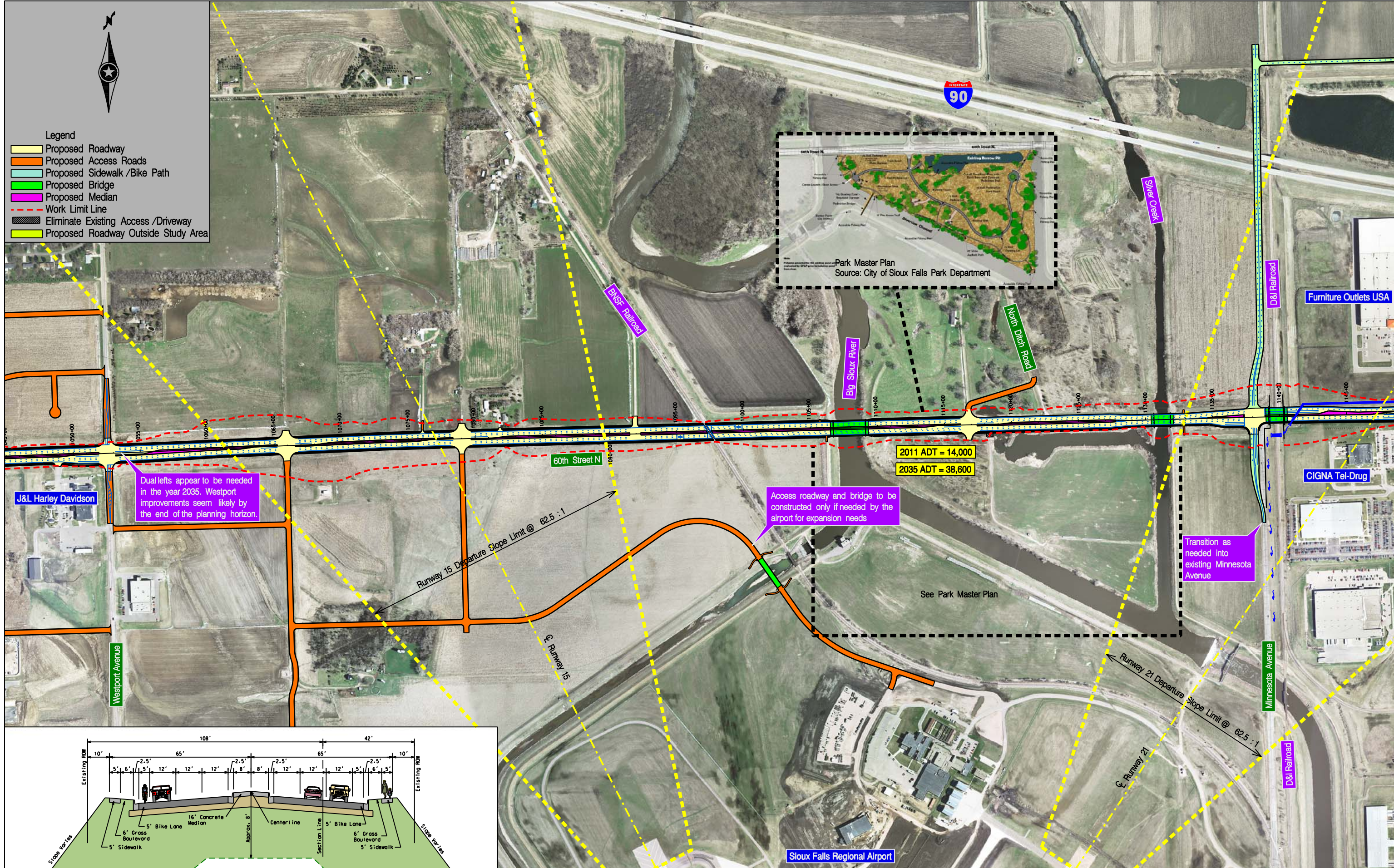
- Grade separation at the BNSF line was determined feasible and warranted and would not impede the glide path or proper slopes for Runway 15 under current guidelines provided to the study team.

- Grade separation at the D&I line is warranted but not feasible when evaluated against glide slope requirements of 62.5:1 or flatter. Grade separation with glide slope requirements of 50:1 or steeper appear feasible. The FAA will complete a study of the Sioux Falls Regional Airport to determine what the maximum feasible glide slope requirements to enforce should be starting sometime in the next year.

The proposed access management techniques are defined below for Segment 2 and are illustrated in Figures 3-2a and 3-2b. Figures 3-2a and 3-2b differ by the typical section proposed to handle pedestrians and bikes and how grade separation was handled at the rail crossings.

- Highlights of Option 1 as shown on Figure 3-2a are defined below:
 - Full access ¼ mile and ½ mile east of Westport Avenue.
 - Grade separation of the BNSF Railroad.
 - Full access for the future fishing park and relocated North Ditch Road.
 - Existing residential driveways can remain as right-in/right-out accesses until redevelopment takes place.
 - Access to the Sioux Falls Flood Protection System shall be maintained via narrow access driveways near the west end of the Big Sioux River bridge and near the east end of the Silver Creek bridge.
 - Access to agricultural properties shall be limited to locations where access can not be gained from a collector street and could be consolidated with the levee access locations on the west end of the Big Sioux River Bridge.
 - At-grade crossing with raised median and gate structures at the D&I Railroad.
- Highlights of Option 2 as shown on Figure 3-2b are defined below:
 - Full access ¼ mile and ½ mile east of Westport Avenue
 - At-grade crossing with raised median and gate structures at the BNSF Railroad.
 - Existing residential driveways can remain as right-in/right-out accesses until redevelopment takes place.
 - Access to the Sioux Falls Flood Protection System shall be maintained via narrow access driveways near the west end of the Big Sioux River bridge and near the east end of the Silver Creek bridge.
 - Access to agricultural properties shall be limited to locations where access can not be gained from a collector street and could be consolidated with the levee access locations on the west end of the Big Sioux River Bridge.
 - Grade separation of the D&I Railroad.





- Legend**
- Proposed Roadway
 - Proposed Access Roads
 - Proposed Sidewalk /Bike Path
 - Proposed Bridge
 - Proposed Median
 - Work Limit Line
 - Eliminate Existing Access /Driveway
 - Proposed Roadway Outside Study Area



Dual lefts appear to be needed in the year 2035. Westport improvements seem likely by the end of the planning horizon.

Access roadway and bridge to be constructed only if needed by the airport for expansion needs

Transition as needed into existing Minnesota Avenue

2011 ADT = 14,000
2035 ADT = 38,600

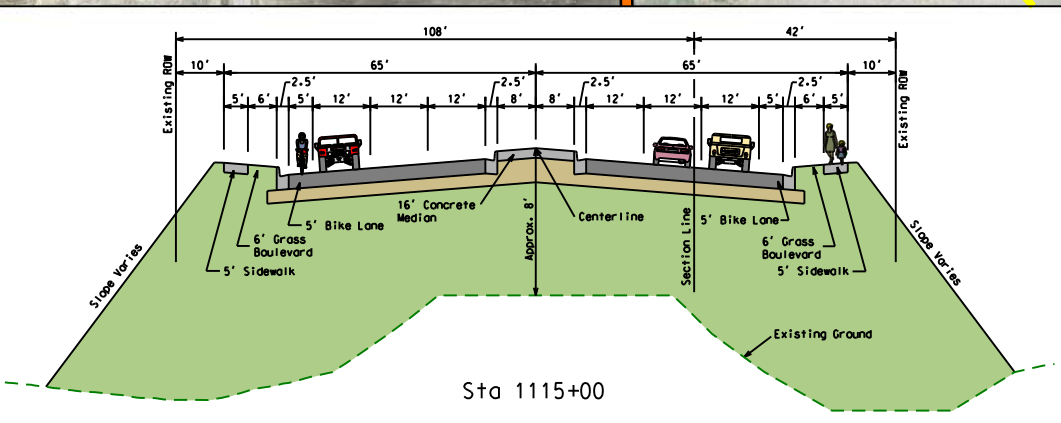


Figure 3-2b

Minnesota Avenue to Cliff Avenue - Segment 3 (Figures 3-3a and 3-3b)

Segment Overview

Segment 3 currently experiences traffic volumes exceeding 11,000 vehicles per day (vpd). This segment of 60th Street North is the main access from the north into one of the largest industrial parks within in the City. Traffic volumes in Segment 3 are projected to be near 30,000 vpd in 2035.

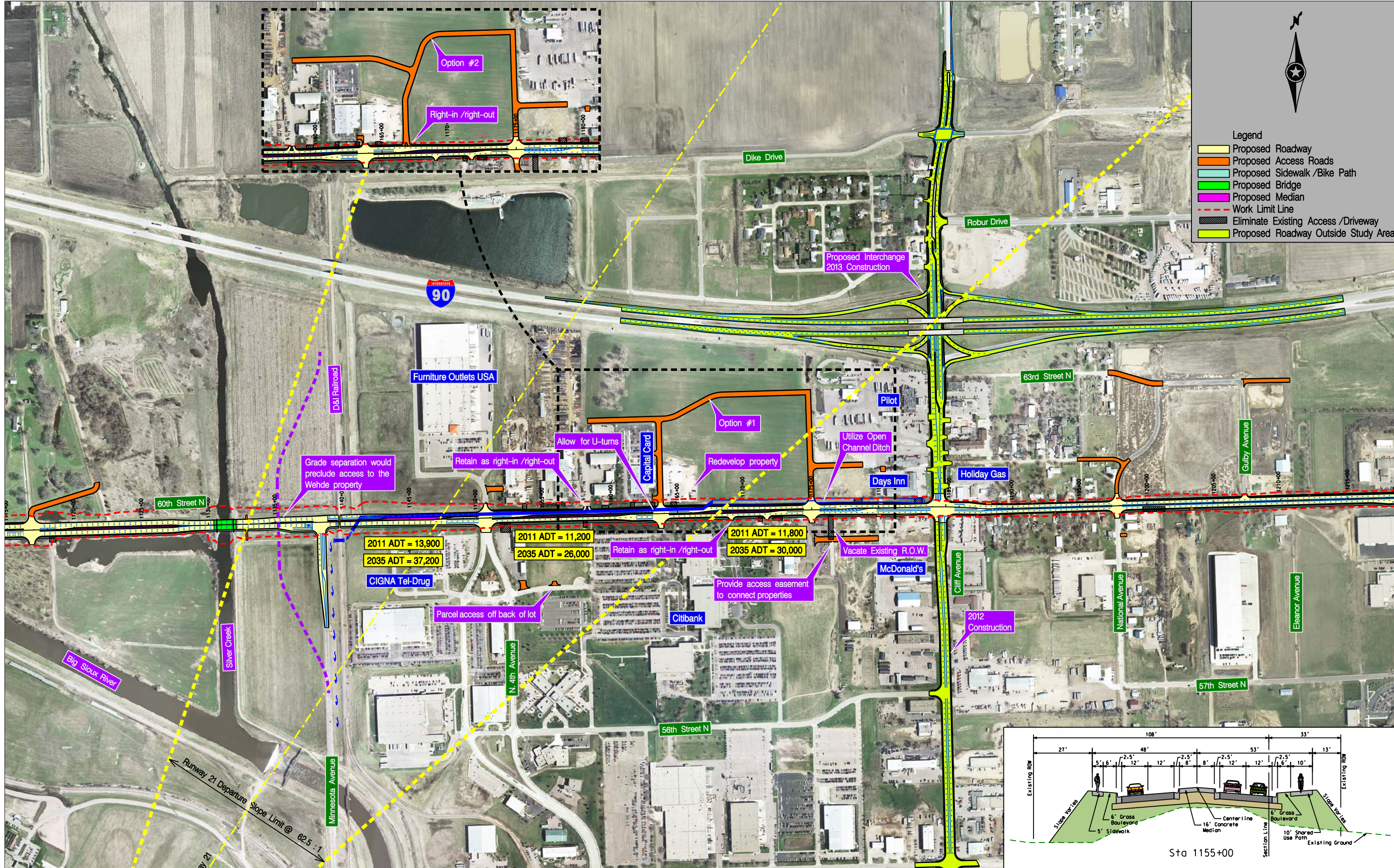
Direct access locations to the adjacent developments along this segment are abundant. Signalized intersections at North 4th Avenue and Citibank provide for safe and efficient operations according to the level of service (LOS) analysis and crash analysis. When reviewing Segment 3, all intersections operate with crash rates far below critical rates for similar intersections in the City.

A majority of the adjacent properties along Segment 3 are developed with the remaining open areas in the planning stages. Over the next 15 years all the adjacent land is planned for development.

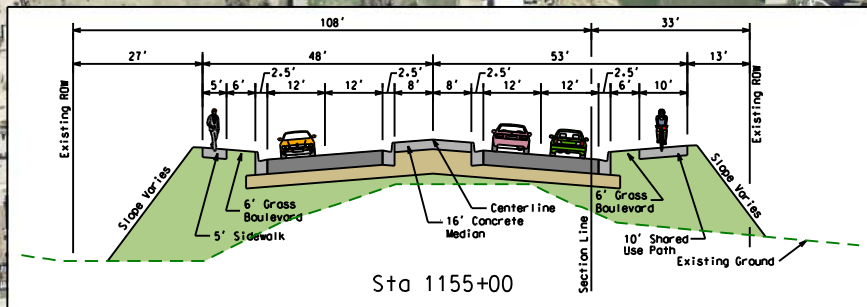
Segment Strategy

With abundant driveway access and the implementation of a raised median, providing back access from the existing businesses to a signalized intersection was the main goal in Segment 3. When back access was not available due to existing development, removing and consolidating driveways was investigated to improve safety along the corridor. The proposed access management techniques are defined below for Segment 3 and are illustrated in Figures 3-3a and 3-3b. Figures 3-3a and 3-b differ only by the typical section proposed to handle pedestrians and bikes.

- At the existing Citibank signalized intersection, access from the north side of 60th Street North could be developed by removing an existing metal building that is currently empty. This would create the opportunity to develop a collector street that could connect to several existing parking areas in order to provide direct access to a signalized intersection. This would allow the removal of several driveway connections to 60th Street North.
- Several driveways on the south side of 60th Street North between North 4th Avenue and Citibank could gain access off of an existing back access roadway that would direct traffic to North 4th Avenue and then to 60th Street North.
- Opportunities for driveway consolidation exist on both the north and south side of 60th Street North in Segment 3. Appendix 2 provides additional discussion on these locations.
- Develop a full access intersection approximately 1000' west of Cliff Avenue to serve undeveloped property on the north side of 60th Street North. A collector road going north from this future intersection can serve as back access for the properties fronting Cliff Avenue such as the existing motel in the northwest quadrant of 60th Street North and Cliff Avenue as well as the truck stop.



- Legend**
- Proposed Roadway
 - Proposed Access Roads
 - Proposed Sidewalk /Bike Path
 - Proposed Bridge
 - Proposed Median
 - Work Limit Line
 - Eliminate Existing Access /Driveway
 - Proposed Roadway Outside Study Area



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South Dakota DOT
Connecting South Dakota and the Nation

HDR

HRGreen

60th Street North Feasibility Study
Sioux Falls, South Dakota

Segment 3 Concept Design – Option 1
Minnesota Avenue to Cliff Avenue
Figure 3-3a

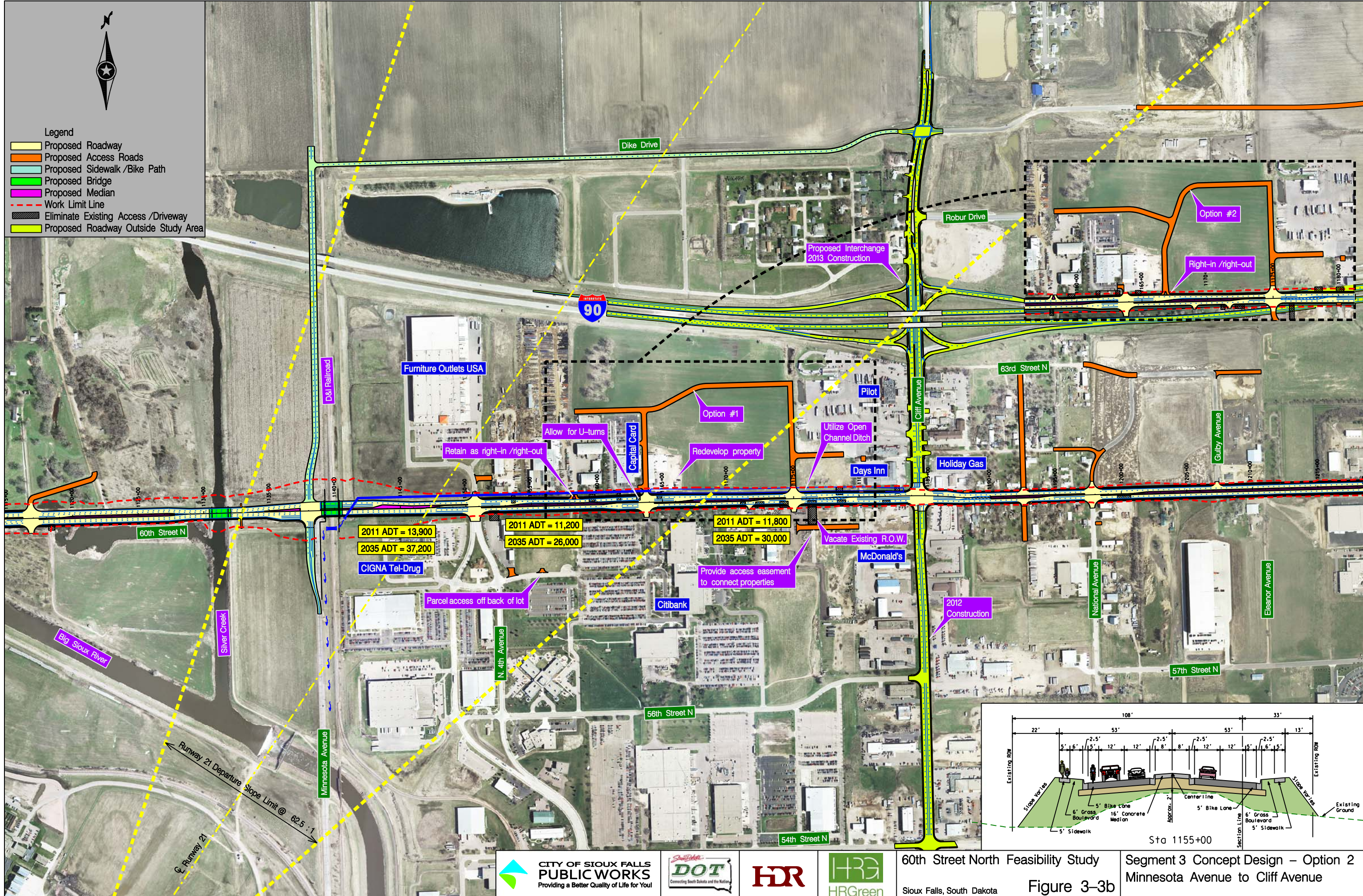


Figure 3-3b

Cliff Avenue to Velocity Avenue - Segment 4 (Figures 3-4a, 3-4b, 3-4c, 3-4d, 3-4e, and 3-4 f)

Segment Overview

Segment 4 currently experiences traffic volumes near 4,000 vehicles per day (vpd). This segment of 60th Street North serves as access to a variety of land uses including residential homes, commercial business, offices, and industrial sites. Traffic volumes in Segment 4 are projected to be near 20,000 vpd in 2035.

Segment 4 is unique as most of the existing adjacent land uses are currently under the jurisdiction of Minnehaha County. Property that has been annexed to the City mostly lies south of 60th Street North and east of National Avenue. Appendix 12 provides graphics for Segment 4 illustrating the land currently annexed into the City.

Another unique aspect of Segment 4 is the possibility of a connection to I-229. The SDDOT is currently in the process of developing alternatives to provide access from I-229 to 60th Street North as well as needed improvements to the I-229 / I-90 system interchange. The 60th Street North study is reviewing access options along the corridor to ensure that all interchange options still being reviewed by the SDDOT and FHWA are not inversely affected by decisions made during this study.

As land uses along the corridor continue to redevelop, the need for additional infrastructure becomes very important. The Bahnson Avenue extension from Benson Road to 60th Street North is currently in the planning stages which will be a vital collector road connection to the 60th Street North corridor. During this study the Bahnson Avenue termini with 60th Street North was evaluated to ensure acceptable spacing to the I-229 interchange alternatives currently being evaluated.

Segment Strategy

Developing appropriate typical sections within the constraints of the adjacent properties dictated the options reviewed. The proposed access management techniques are defined below for Segment 4 and are illustrated in Figures 3-4a, 3-4b, 3-4c, 3-4d, 3-4e, and 3-4f. The options reviewed vary by the typical section chosen, how bikes and pedestrians are handled, and how access is affected along the corridor by the different interchange alternatives being evaluated by the SDDOT:

- Highlights of Options 1a through 1c as shown on Figure 3-4a through 3-4c are defined below:
 - 60th Street North from Cliff Avenue to Lewis Avenue will be an undivided five-lane cross section to allow for driveway access for the residential homes adjacent to the corridor. Curbside sidewalk is proposed to reduce right-of-way needs.
 - Eleanor Avenue is in the process of vacation and direct access to the corridor will not be allowed at that location.

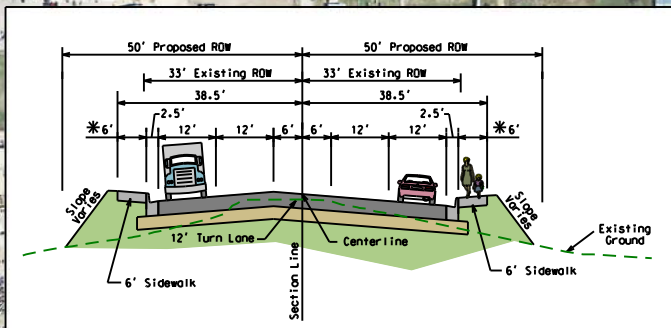
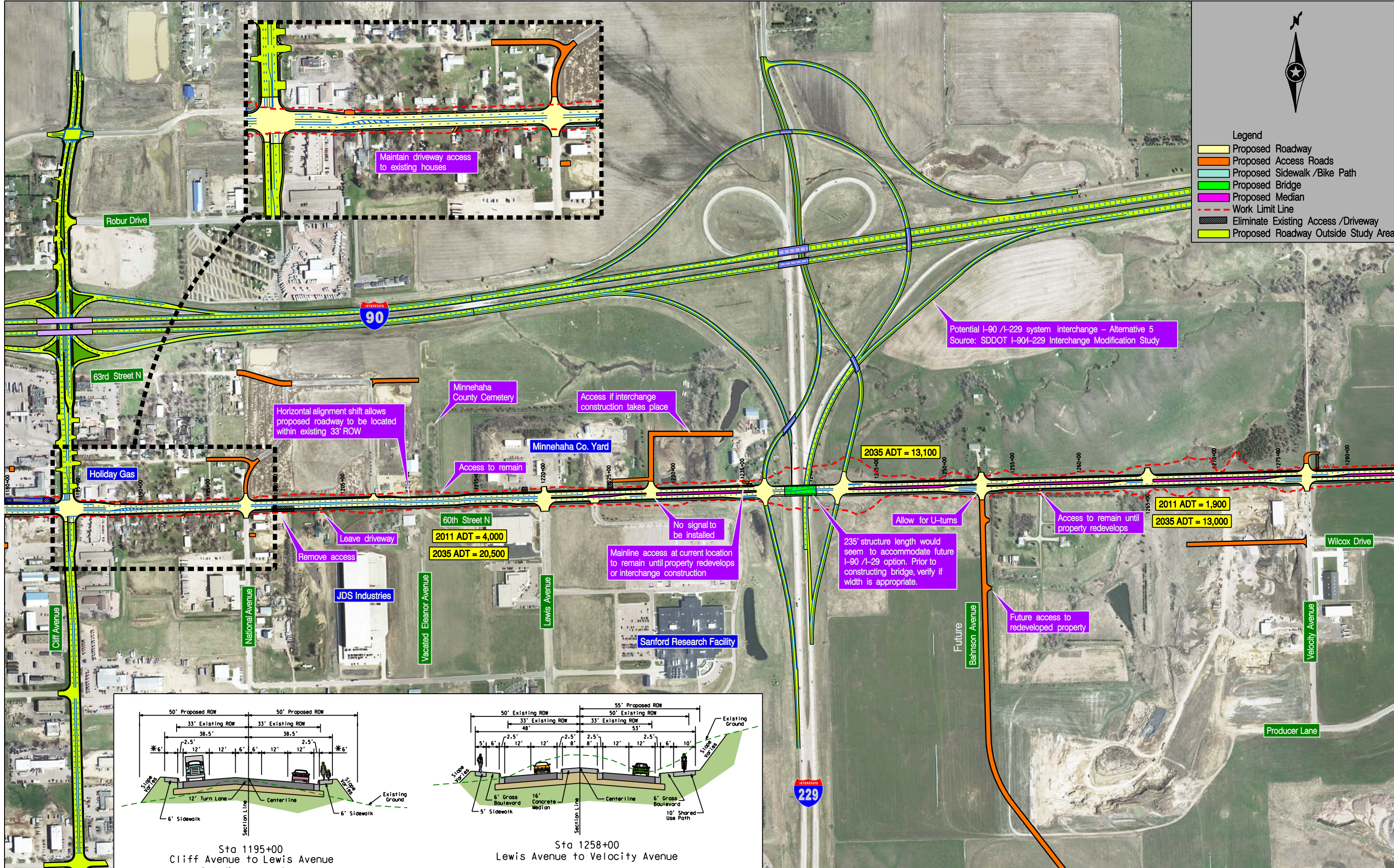
- 60th Street from Lewis Avenue to Velocity Avenue will incorporate a raised median and will utilize a divided four-lane cross section. The typical section allows for a 5' sidewalk on the north side of the roadway for pedestrian traffic and 10' shared use path on the south side of the roadway for pedestrian and bike use.
- In order to serve land currently undeveloped north of 60th Street North between Lewis Avenue and I-229, a full access intersection is proposed approximately 660' east of Lewis Avenue.
- Due to grade issues, the existing Sanford Research driveway would operate as a right-in/right-out driveway; provisions for u-turns should be allowed at Lewis Avenue for westbound to eastbound 60th Street North traffic to access the Sanford driveway.
- Figure 3-4a provides for a connection to I-229 via 60th Street North, the interchange alternative identified is noted as Alternative 5 to correspond to the SDDOT ongoing study. No direct connection to I-90 from 60th Street North will be provided with the interchange alternative.
- Figure 3-4b provides for a connection to I-229 via 60th Street North, the interchange alternative identified is noted as Alternative 4 to correspond to the SDDOT ongoing study. No direct connection to I-90 from 60th Street North will be provided with the interchange alternative.
- Figure 3-4c provides no direct connection to I-229 but does allow for access to the north side of I-90 by extending Lewis Avenue over I-90, this option corresponds to alternative 3 of the SDDOT ongoing study.
- Highlights of Options 2a through 2c as shown on Figure 3-4d through 3-4f are defined below:
 - 60th Street North from Cliff Avenue to Lewis Avenue will be a median divided four lane cross section; this option is technically feasible and should be considered only if redevelopment of the existing residential neighborhood takes place. This typical section would allow for sidewalks and on-street bikes lanes.
 - Eleanor Avenue is in the process of vacation and direct access to the corridor will not be allowed at that location.
 - 60th Street from Lewis Avenue to Velocity Avenue will incorporate a raised median and will utilize a divided four lane cross section. This typical section would allow for sidewalks and on-street bikes lanes.
 - In order to serve land currently undeveloped north of 60th Street North between Lewis Avenue and I-229, a full access intersection is proposed approximately 660' east of Lewis Avenue.
 - Due to grade issues, the existing Sanford Research driveway would operate as a right-in/right-out driveway; provisions for u-turns should be allowed at Lewis Avenue for westbound to

eastbound 60th Street North traffic to access the Sanford driveway.

- Figure 3-4d provides for a connection to I-229 via 60th Street North, the interchange alternative identified is noted as Alternative 5 to correspond to the SDDOT ongoing study. No direct connection to I-90 from 60th Street North will be provided with the interchange alternative.
- Figure 3-4e provides for a connection to I-229 via 60th Street North, the interchange alternative identified is noted as Alternative 4 to correspond to the SDDOT ongoing study. No direct connection to I-90 from 60th Street North will be provided with the interchange alternative.
- Figure 3-4f provides no direct connection to I-229 but does allow for access to the north side of I-90 by extending Lewis Avenue over I-90, this option corresponds to alternative 3 of the SDDOT ongoing study.

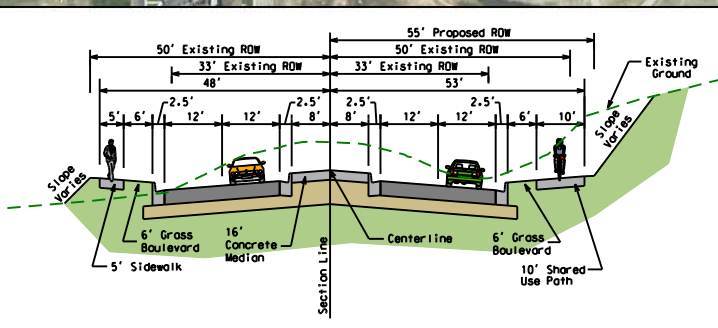


- Legend**
- Proposed Roadway
 - Proposed Access Roads
 - Proposed Sidewalk /Bike Path
 - Proposed Bridge
 - Proposed Median
 - Work Limit Line
 - Eliminate Existing Access /Driveway
 - Proposed Roadway Outside Study Area



Sta 1195+00
Cliff Avenue to Lewis Avenue

* Provide 6' boulevard east of National Avenue except at cemetery property

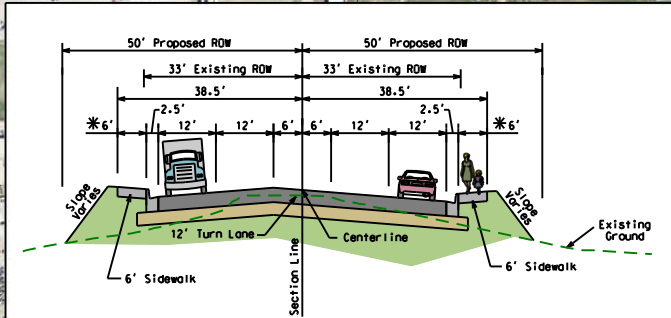
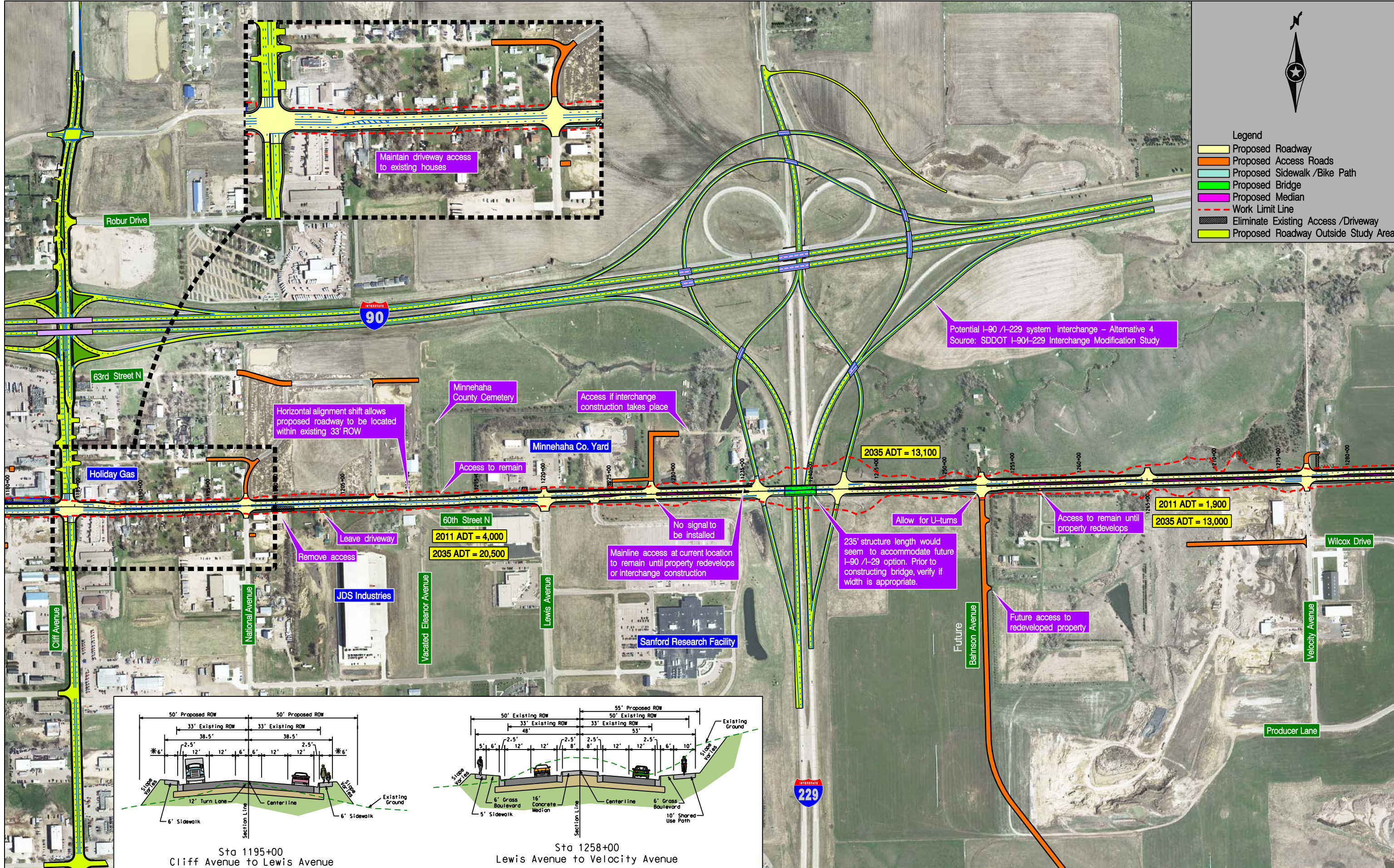


Sta 1258+00
Lewis Avenue to Velocity Avenue

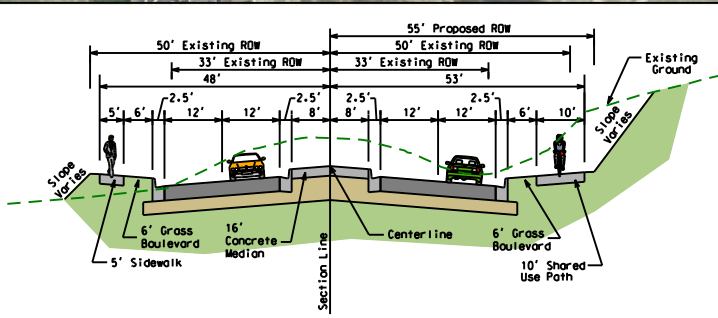




- Legend
- Proposed Roadway
 - Proposed Access Roads
 - Proposed Sidewalk /Bike Path
 - Proposed Bridge
 - Proposed Median
 - Work Limit Line
 - Eliminate Existing Access /Driveway
 - Proposed Roadway Outside Study Area



Sta 1195+00
Cliff Avenue to Lewis Avenue
* Provide 6' boulevard east of National Avenue except at cemetery property

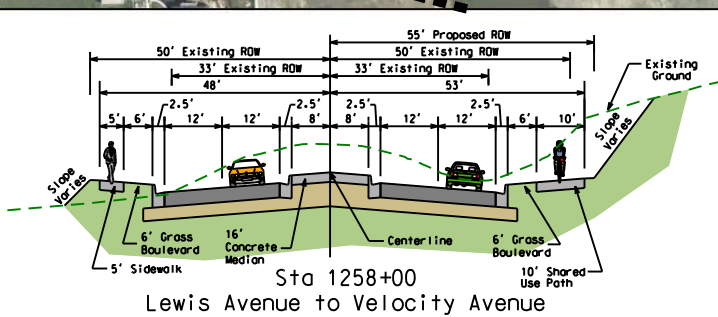
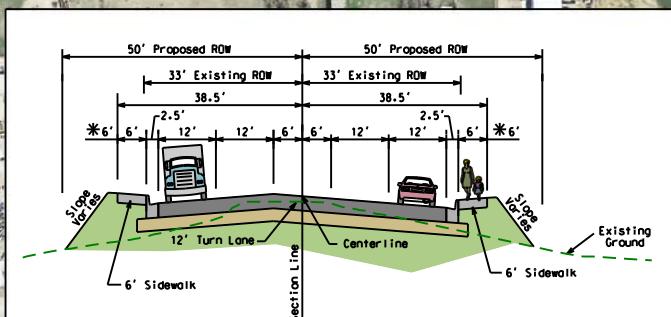
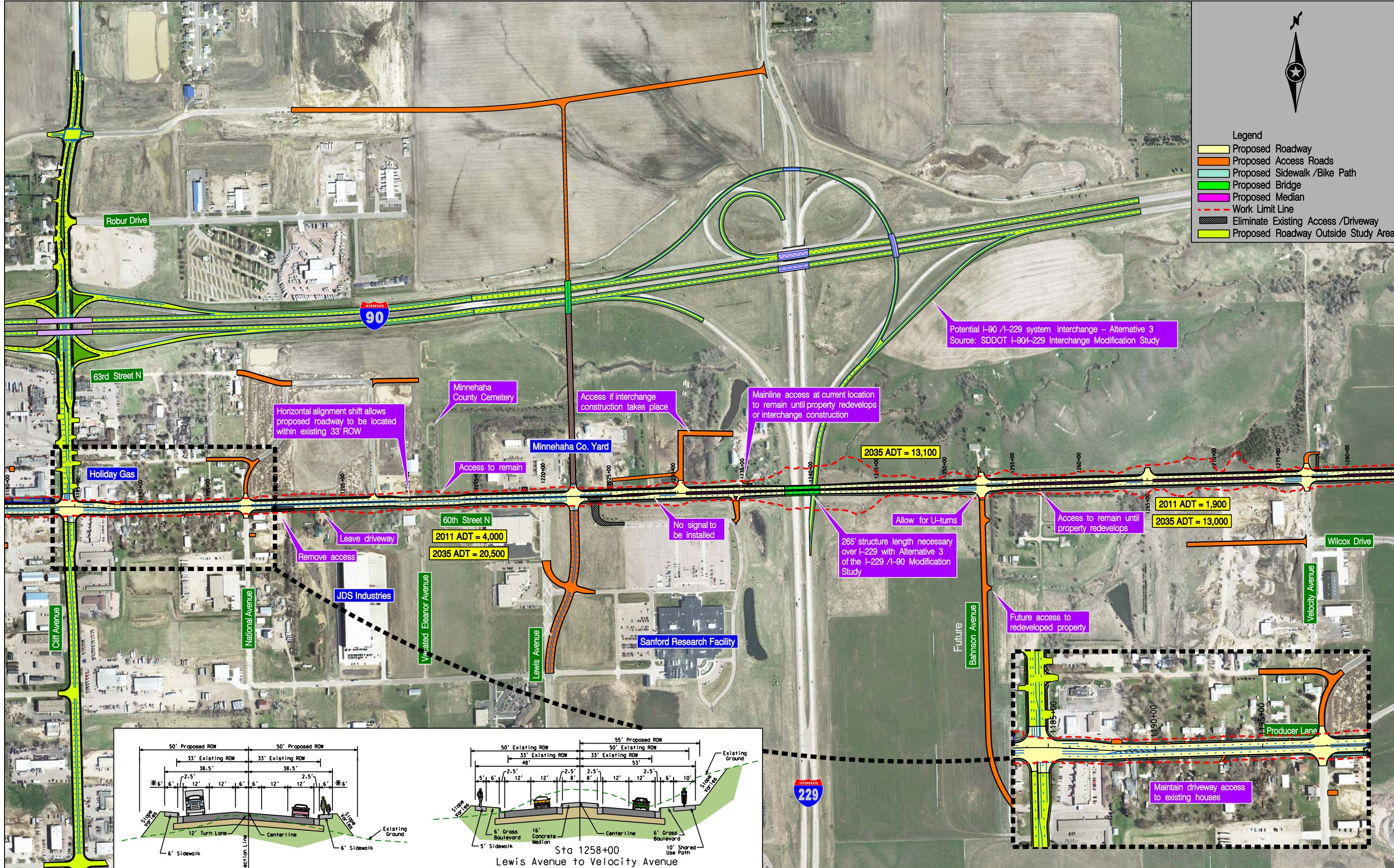


Sta 1258+00
Lewis Avenue to Velocity Avenue



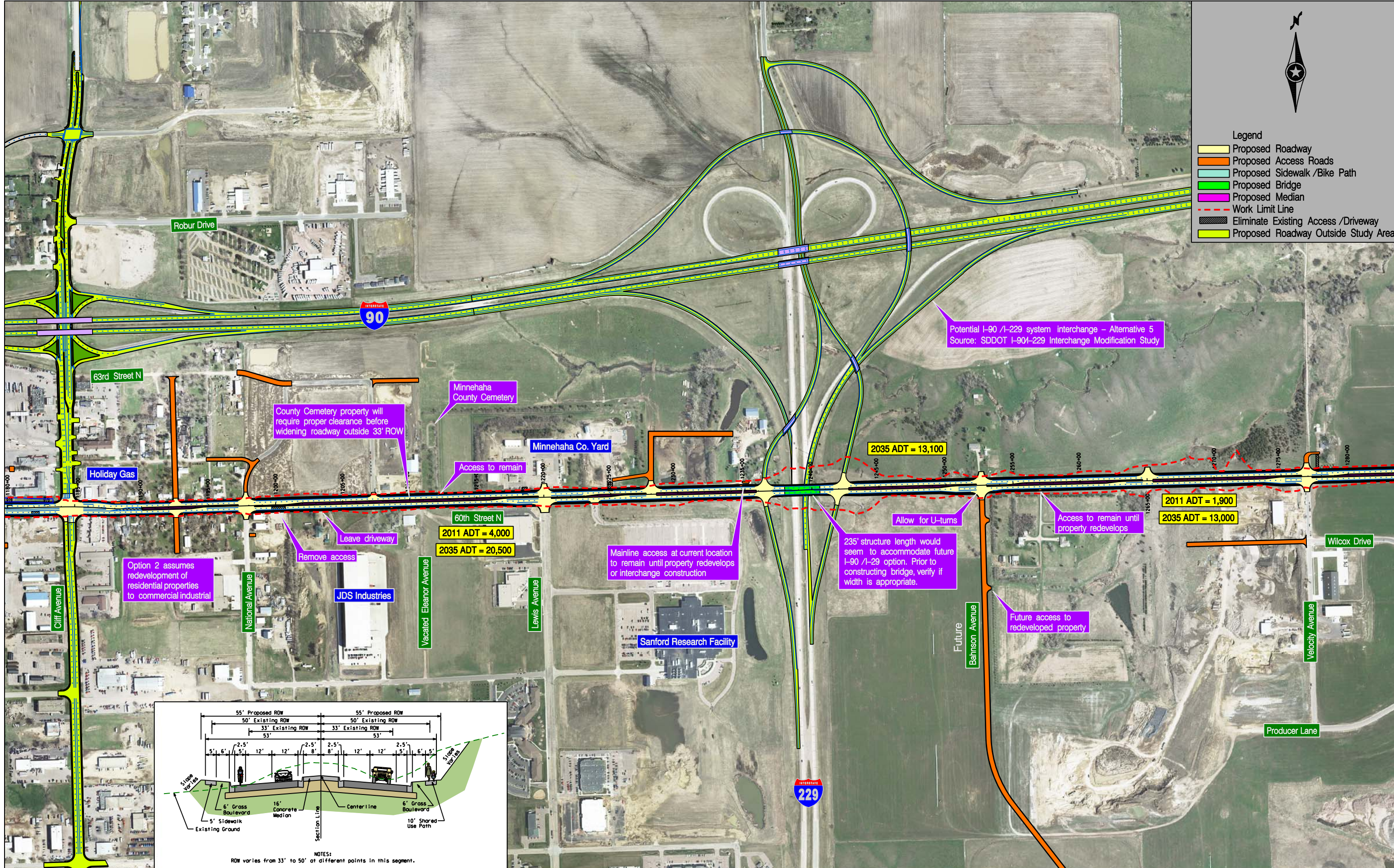


- Legend**
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 - Work Limit Line
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 - Proposed Roadway Outside Study Area





- Legend**
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Potential I-90 /I-229 system interchange – Alternative 5
Source: SDDOT I-90/I-229 Interchange Modification Study

County Cemetery property will require proper clearance before widening roadway outside 33' ROW

Minnehaha County Cemetery

Minnehaha Co. Yard

2035 ADT = 13,100

2011 ADT = 1,900
2035 ADT = 13,000

Option 2 assumes redevelopment of residential properties to commercial industrial

Leave driveway

2011 ADT = 4,000
2035 ADT = 20,500

Remove access

JDS Industries

Vacated Eleanor Avenue

Lewis Avenue

Mainline access at current location to remain until property redevelops or interchange construction

Sanford Research Facility

235' structure length would seem to accommodate future I-90 /I-29 option. Prior to constructing bridge, verify if width is appropriate.

Allow for U-turns

Access to remain until property redevelops

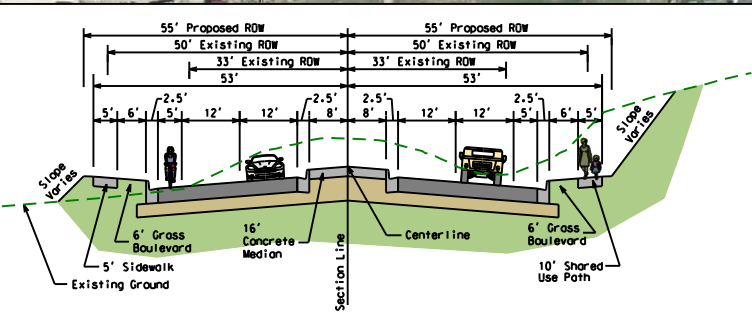
Future access to redeveloped property

Future
Bahmson Avenue

Wilcox Drive

Velocity Avenue

Producer Lane



NOTES:
ROW varies from 33' to 50' at different points in this segment.

- Proposed ROW for Existing 33' ROW
- Proposed ROW for Existing 33' ROW and Existing 50' ROW

Sta 1258+00
Lewis Avenue to Velocity Avenue

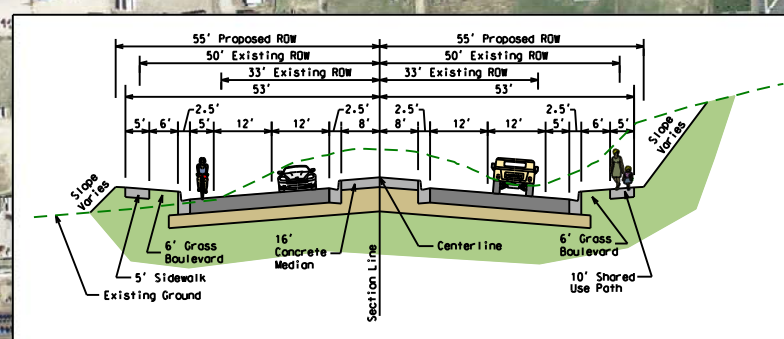
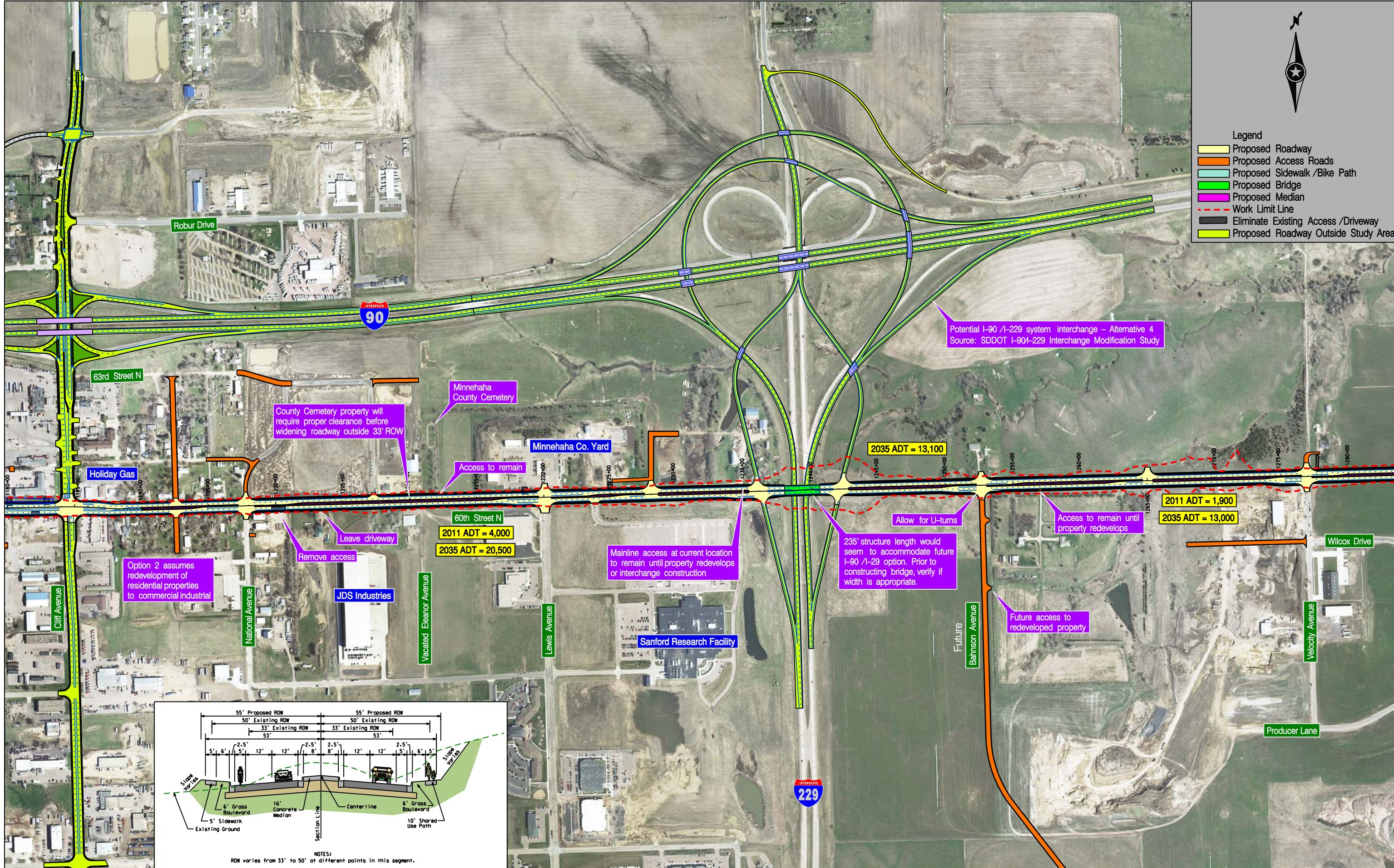


60th Street North Feasibility Study
Sioux Falls, South Dakota

Segment 4 Concept Design – Option 2a
Cliff Avenue to Velocity Avenue
Figure 3-4d



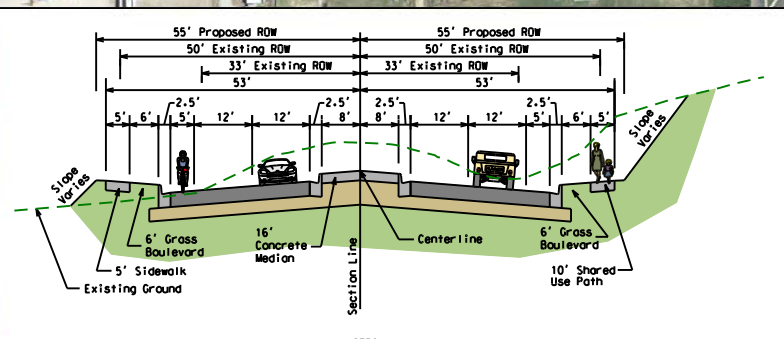
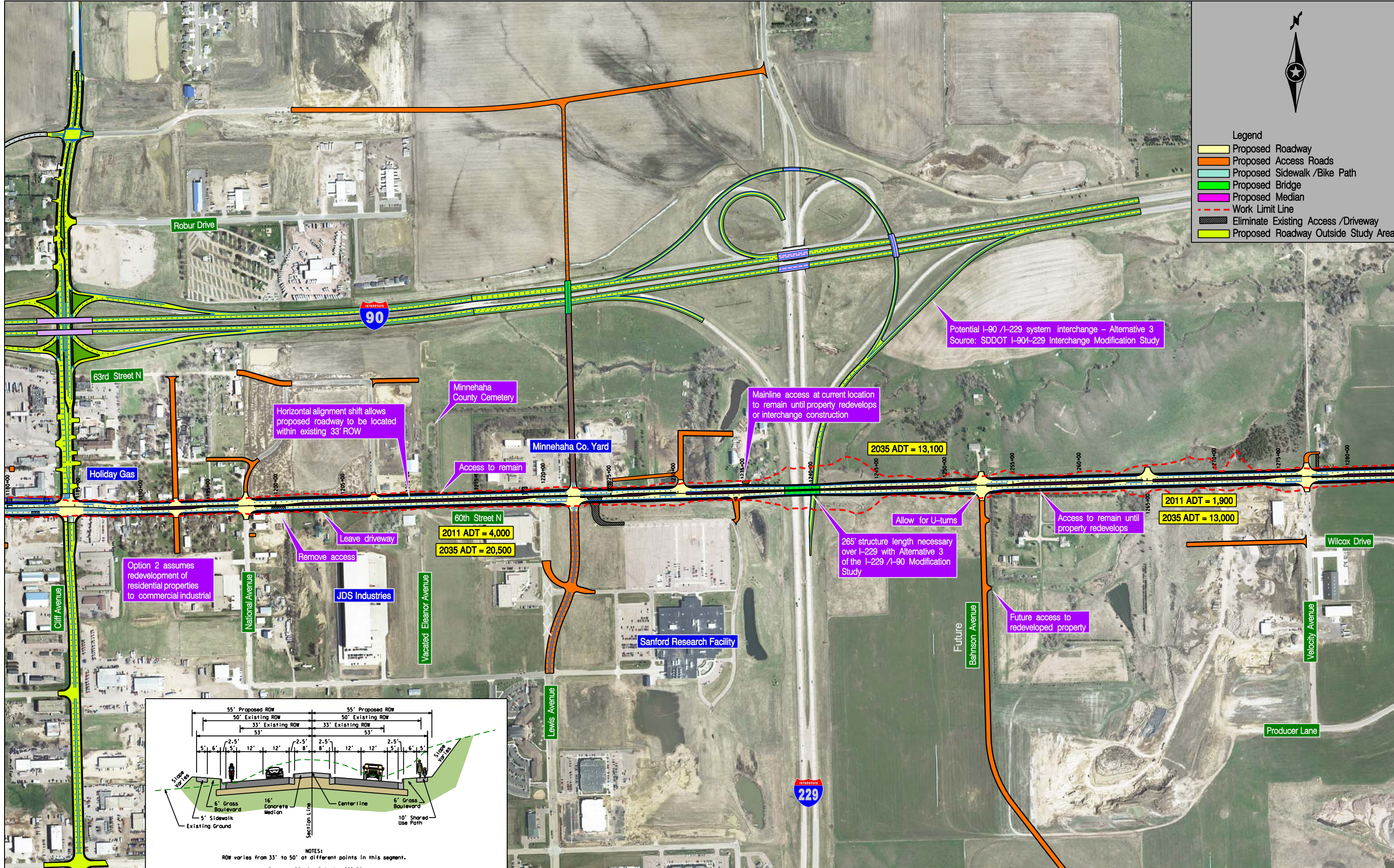
- Legend
- Proposed Roadway
 - Proposed Access Roads
 - Proposed Sidewalk /Bike Path
 - Proposed Bridge
 - Proposed Median
 - Work Limit Line
 - Eliminate Existing Access /Driveway
 - Proposed Roadway Outside Study Area



NOTES:
 ROW varies from 33' to 50' at different points in this segment.
 • Proposed ROW for Existing 33' ROW
 • Proposed ROW for Existing 33' ROW and Existing 50' ROW
 Sta 1258+00
 Lewis Avenue to Velocity Avenue



- Legend
- Proposed Roadway
 - Proposed Access Roads
 - Proposed Sidewalk /Bike Path
 - Proposed Bridge
 - Proposed Median
 - Work Limit Line
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 - Proposed Roadway Outside Study Area



NOTES:
 ROW varies from 33' to 50' at different points in this segment.
 ● Proposed ROW for Existing 33' ROW
 ●● Proposed ROW for Existing 33' ROW and Existing 50' ROW
 Sta 1258+00
 Lewis Avenue to Velocity Avenue



60th Street North Feasibility Study
 Sioux Falls, South Dakota

Segment 4 Concept Design – Option 2c
 Cliff Avenue to Velocity Avenue
 Figure 3-4f

Velocity Avenue to SD 100 - Segment 5 (Figures 3-5a and 3-5b)

Segment Overview

Segment 5 currently experiences traffic volumes near 1,900 vehicles per day (vpd). This segment of 60th Street North carries commuters from Brandon to the industrial park between Cliff Avenue and Minnesota Avenue and provides access to I-90 via Timberline Avenue. Development within this segment will be limited until utility infrastructure is available. Traffic volumes in Segment 5 are projected to be near 11,000 vpd in 2035.

The proximity of the SD 100 corridor and connection to I-90 will spur development when utilities can be brought out to this area. Most land is currently used for gravel mining and agricultural purposes along the segment of 60th Street North.

Currently, no known problems exist in regards to traffic capacity or safety. This segment does however flood on a regular basis when the Big Sioux River and Slip Up Creek floodways are full causing roadway users to find alternate routes.

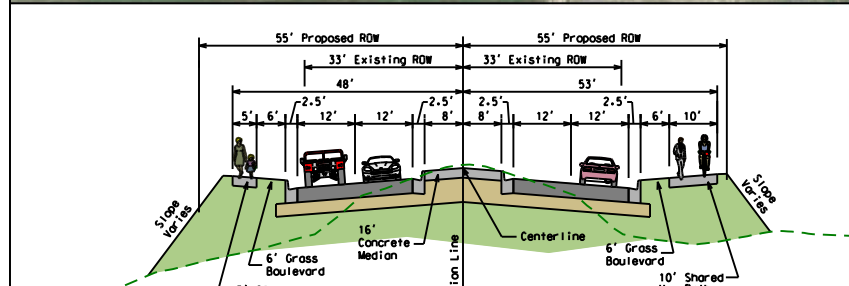
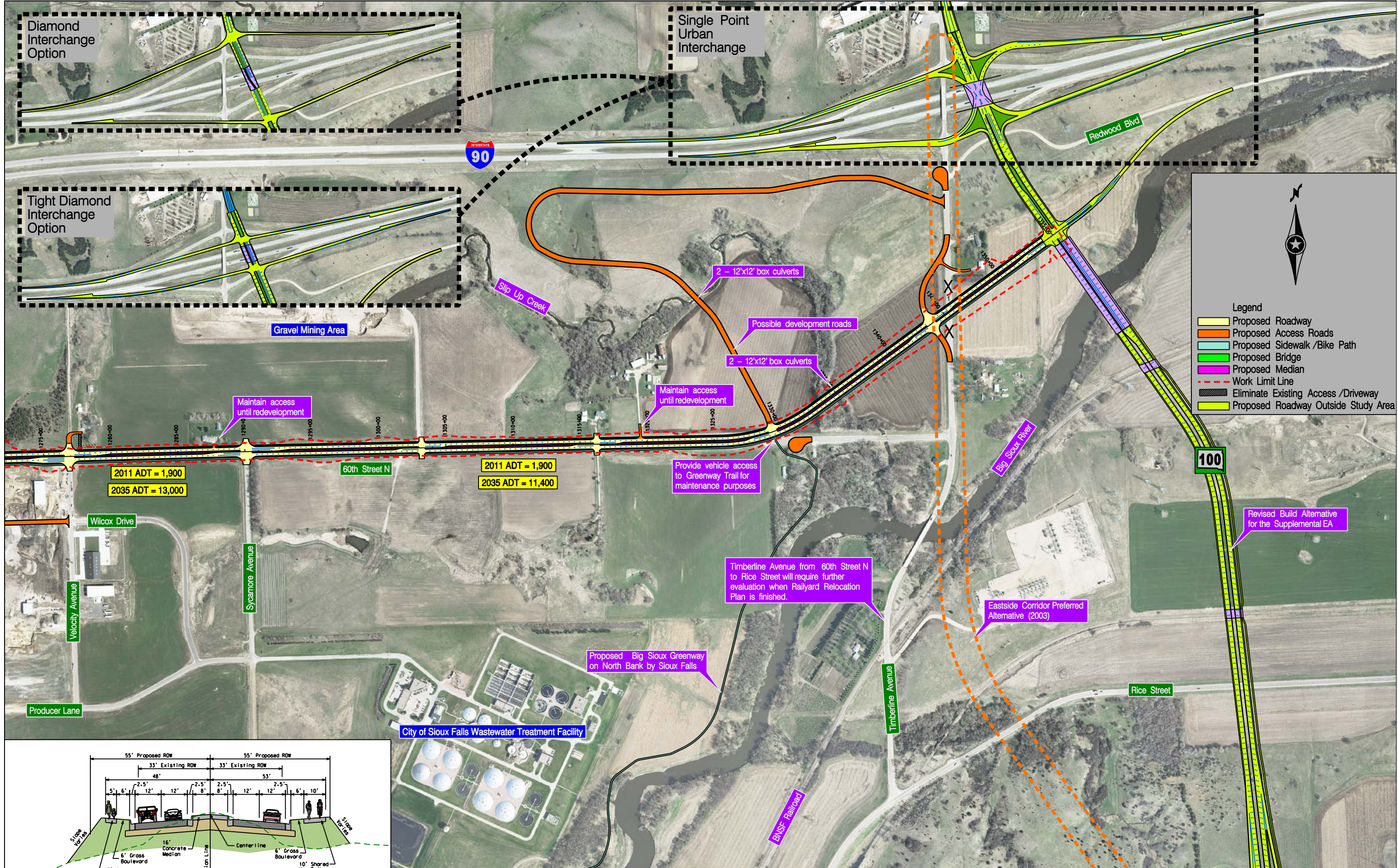
A realignment of 60th Street North is proposed in this segment to connect into SD 100 at a 90 degree angle and to reduce floodplain impacts; ongoing coordination with the property owners will be critical to ensure preservation of the alignment.

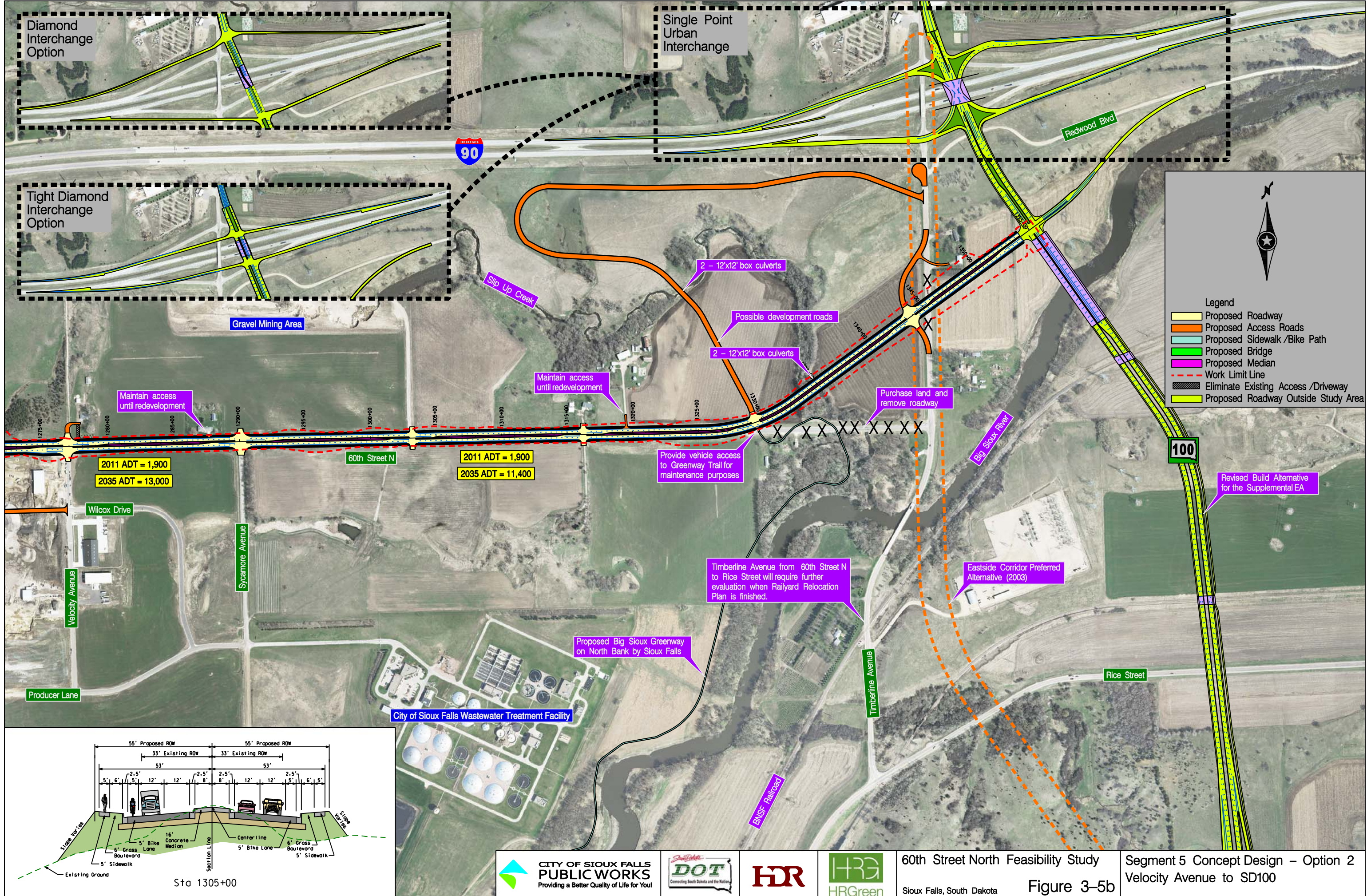
The future plans for Timberline Avenue remain unclear; the SD 100 corridor, when complete, will provide north/south connectivity eliminating the need to maintain the Timberline Avenue connection to Rice Street to accommodate traffic in this area. Coordination should continue after the completion of this study with Minnehaha County, SDDOT, and City to ensure that Rice Street traffic can be served by SD 100 via the Benson Road extension. If access is not allowed to Benson Road from Rice Street, maintaining the Timberline Avenue connection to 60th Street North may be required.

Segment Strategy

With limited existing development along the corridor, identifying locations where access can be gained for future development was the focus. Full access intersections at ¼ mile intervals work well with the existing topography and will serve the future land uses proposed. Many of the parcels along this segment are very large allowing for development plans to accommodate the access locations identified. The proposed access management techniques are defined below for Segment 5 and are illustrated in Figures 3-5a and 3-5b. Figures 3-5a and 3-5b differ only by the typical section proposed to handle pedestrians and bikes.

- Provide access to the corridor at ¼ mile intervals.
- Provide a connection to the Big Sioux Greenway from the 60th Street North Corridor ensuring connectivity and mobility for pedestrians and bikers.
- Coordination to continue with the SDDOT, Minnehaha County, and City in regards to the need for Timberline Avenue after 60th Street North and SD 100 are constructed.





3.6 Collector Street Network

A number of new collector streets have been shown in the corridor displays and Technical Memoranda to support the operation of 60th Street North and serve development along the corridor. Those collector street connections include:

- Segment 1 – provide east-west collector streets north and south of 60th Street North to allow traffic to reach Westport Avenue or Kiwanis Avenue. Also, provide a new collector street extending north from the I-29 northbound ramp terminal intersection that will provide access to the Flying J Truck Stop and Redstone Development.
- Segment 2 – provide an east-west collector street south of 60th Street North to allow traffic to reach Westport Avenue or National Guard Drive. It is not the intent to finalize the locations of the collector street, but to illustrate the locations for access to 60th Street North and to illustrate what was conveyed to the study team during the public involvement process.
- Segment 3 – complete previously planned collectors intersecting with 60th Street North. Locate collector streets in a manner consistent with the engineering design standards when not shown.
- Segment 4 – complete previously planned collectors intersecting with 60th Street North. Locate collector streets in a manner consistent with the engineering design standards when not shown.
- Segment 5 – complete previously planned collectors intersecting with 60th Street North. Locate collector streets in a manner consistent with the engineering design standards when not shown.

3.7 Utility Coordination (Private and Public)

Potential private utility impacts within the corridor were researched and documented in a Technical Memorandum included in Appendix 5. The research found that several private utility companies will be impacted by the proposed improvements identified for the corridor. Both Magellan Pipeline and Xcel Energy (Transmission) have facilities in privately held easements. Costs for the relocation or adjustments to those facilities are estimated within each segment for project funding. It should be noted that good practices shall be followed when completing the final design of the corridor and utilities should be incorporated into the final design so field adjustments and relocations can be minimized. It should also be noted that probable glide slope requirements (62.5:1) will require the roadway from the Big Sioux River to Westport Avenue to be lowered significantly. Above ground private utilities will need to meet the same standards to ensure no intrusions of the glide slope regardless of whether or not they are impacted by the lowering of the roadway.



Segment 3 Utility Maps provided by Xcel Energy during the study coordination efforts.

The need to install or replace public utilities with the 60th Street North project will allow for expanded development along the corridor. The City of Sioux Falls has previously completed master planning of their utilities such as water, sewer, and traffic signal



Segment 2 Utility Maps provided by Magellan indicating a large gas main crossing of 60th Street North near the BNSF rail crossing

interconnect. Those facilities have been reviewed and included in the project discussions, and summarized within a Technical Memorandum in Appendix 6. The cost estimates associated with each corridor segment include the required public utility infrastructure that will be constructed

with the various projects. Appendix 6 specifically identifies those needs based on discussions with City staff and through reviews of master plan documents.

3.8 Public Involvement

The general public and public agencies were involved throughout the study process, with public meetings, landowner meetings, and project website, and other techniques. Those techniques are documented below:

- **Public Meetings** – Public meetings were held February 2011, September 2011, and February 2012. The initial meeting introduced the project goals and solicited input from the public to help shape the master plan for the corridor. The second public meeting brought forth information to the public in regards to future traffic projections, corridor layouts, alternative access plans, and information regarding feasibility of grade separation at the rail crossings. The final public meeting brought refined ideas for the corridor to solicit input on the study recommendations.
- **Study Advisory Team** – The Study Advisory Team, comprised of representatives from the Federal Highway Administration (FHWA), South Dakota Department of Transportation, Minnehaha County, City of Sioux Falls, and the Sioux Falls Metropolitan Planning Organization, met on three occasions to assist in guiding the study process and to gain agency feedback.
- **Business/Landowner Group Meetings** - Small group meetings were held with the adjacent property owners along the 60th Street North corridor in March and September, 2011. Presentations were given by the study team to communicate issues encountered within the various segment of the corridor and to gain feedback on ideas presented.
- **Individual Landowner Meetings** – Several individual landowner meetings were held with concerned citizens and property owners regarding specific issues associated with the corridor options.
- **Website** – A study website was maintained by the City of Sioux Falls and provided a means of sharing information with the public during the study. The

website can be found at www.siouxfalls.org/PublicWorks/special_projects/60th_north_study and provides periodic updates to the study progress.

- Metropolitan Planning Organization (MPO) – The study team provided an informational presentation to the MPO committees in September 2011 and a second meeting presentation was provided to the committees in March 2012 and was approved by the MPO. The presentations consisted of an overview of the study findings and allowed for additional discussion and ideas regarding the corridor alternatives.

Documentation of the public involvement aspect of the project is provided in Appendix 11. The handouts, displays, comments, presentations, and meeting notes were included to document information provided and feedback gained throughout the study.

Public Meetings

February 17th, 2011 meeting at the Sioux Falls Convention Center – Notice of the meeting included:

- 208 letter invitations were sent to all of the property owners within the areas identified in Figure 3-8.
- The City of Sioux Falls issued press releases.
- Media Stations were notified and invited.
- The Sioux Falls MPO staff invited its committee members and interested parties.
- The notice of meeting was posted on the City of Sioux Falls website and MPO website.

The documented attendance at the meeting was 63.

September 8th, 2011 meeting at the Sioux Falls Convention Center – Notice of the meeting included:

- 208 letter invitations were sent to all of the property owners within the areas identified in Figure 3-8.
- The City of Sioux Falls issued press releases.
- Media Stations were notified and invited.
- The Sioux Falls MPO staff invited its committee members and interested parties.
- The notice of meeting was posted on the City of Sioux Falls website and MPO website.

The documented attendance at the meeting was 54.

February 2nd, 2012 meeting at the Sioux Falls Convention Center – Notice of the meeting included:

- 206 letter invitations were sent to all of the property owners within the areas identified in Figure 3-8.
- The City of Sioux Falls issued press releases.
- Media Stations were notified and invited.
- The Sioux Falls MPO staff invited its committee members and interested parties.
- The notice of meeting was posted on the City of Sioux Falls website and MPO website.

The documented attendance at the meeting was 50.

In general, the feedback from the public meetings indicated:

- Corridor improvements are necessary.
- Grade separation of the rail crossings was supported.
- Access plans provided for improved safety.
- Improving glide path issues was critical for Airport safety.
- Corridor improvements needed sooner than later.

Small Group Segment Meetings

These meetings gathered the adjacent landowner and business owners in each segment to discuss specific ideas or concerns that they may have with the corridor study. Two sets of meetings were held for each segment along the corridor. The small group meeting resulted in productive one-on-one discussions about problems or concerns they foresee with the corridor as growth takes place in and around the study area.

March 10th, 11th, 14th, & 15th meetings at the SDDOT Area Office – Notice of the meetings included:

- 93 letter invitations were sent to the adjacent landowners
- The documented attendance at the meeting was 46.

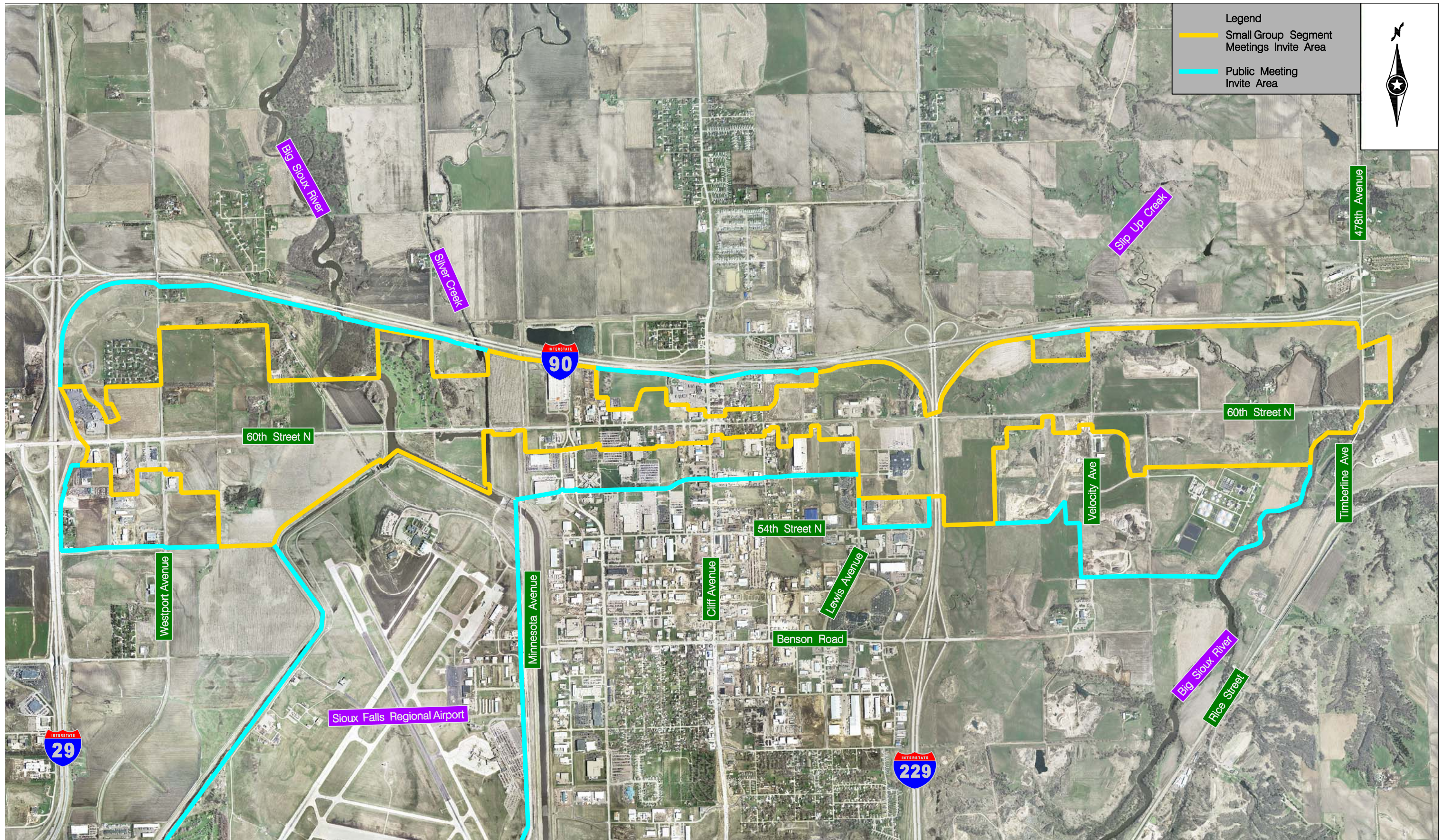
September 14th & 15th meetings at the SDDOT Area Office – Notice of the meetings included:

- 93 letter invitations were sent to the adjacent landowners
- Phone calls were placed to several business owners inviting them personally to the meeting.

The documented attendance at the meeting was 51.

In general, the feedback from the small group meetings indicated:

- Access to 60th Street North is currently difficult in Segments 1 through 3.
- Grade separation of the rail crossings was supported.
- Access plans need to provide reasonable access from adjacent properties.
- Business owners were not ultimately opposed to the raised median if alternative access could be provided.
- Corridor improvements needed sooner than later especially in Segment 2.



Legend

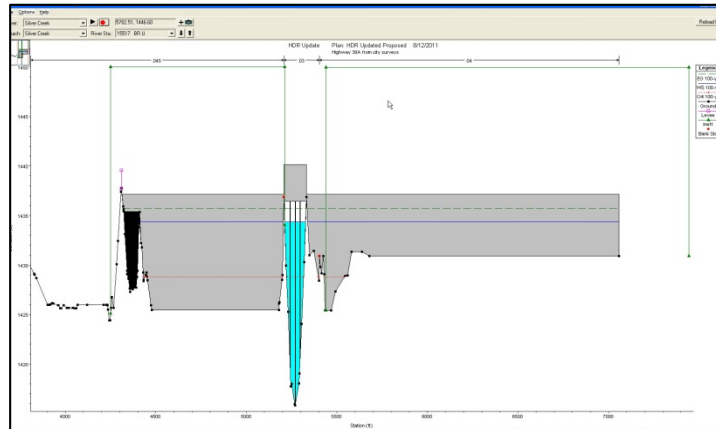
- Small Group Segment Meetings Invite Area
- Public Meeting Invite Area



3.9 Drainage

Surface water drainage throughout the corridor was analyzed based on previous drainage studies and new modeling was carried out as part of this study. The recommendations included in the Drainage Technical Memorandum contained in Appendix 7 show the use of a combination of storm sewer systems and ditches to convey drainage through the corridor. Portions of Segments 2 and 3 are particularly problematic as the corridor traverses across the Big Sioux River flood plain.

This area is characterized by very little relief and underlying bedrock that complicates the design and operation of drainage facilities. Conceptual drainage facilities are also shown in the concept design layouts. In order to conceptually look at profiles and bridge length requirements in Segment 2 for the Big Sioux River and Silver Creek, additional river modeling was conducted that provided insight on how to construct new bridges without impacting the existing floodways. Appendix 7 includes a hydraulic assessment for the Big Sioux River and Silver Creek based on the most current available models. During preliminary and final design, these models will need to be updated again to ensure that improvements that are currently underway are accurately accounted for. It should be noted that the levee system that exists near 60th Street North is currently under construction. The levee height (1440.50 NAVD 88) does not represent a design year event but was determined through a risk assessment calculation. The 60th Street North corridor will be lower than the levee in Segment 2.



Silver Creek Hydraulic modeling completed to determine 100 year flood elevation.

Within Segment 3, it was identified that either a large open channel ditch or multi-cell box culvert would be needed to convey the storm water from the east to the west along the segment. Although both systems would adequately convey the storm water, it was determined that placing a box structure below the roadway would likely have less impacts to utilities and would be cost reasonable versus purchasing property to build a ditch along the north side of 60th Street North.

3.10 Construction Phasing

Reconstruction of the 60th Street North corridor will need to take place in phases over multiple years due to construction complexity and the availability of funds. The following discussion will provide some brief insight on the various corridor segments in regards to construction phasing:

I-29 to Westport Avenue - Segment 1

The most immediate demand for improvements is in Segment 1 where high traffic volumes exist along with safety concerns. With public utilities in place, Segment 1 has the highest potential to see significant growth in the near term.

Westport Avenue to Minnesota Avenue – Segment 2

Construction in Segment 2 will also help improve air travel mobility by improving airport glide paths and will allow for the roadway to be raised within the floodplain to ensure travel is not impacted by roadway overtopping. Safety will be enhanced through grade separation of the roadway over the BNSF rail line thereby increasing corridor mobility and safety.

Segment 2 currently carries traffic volumes that exceed the available capacity that exists.

Ranking Categories	Roadway Segments				
	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5
Safety ⁽¹⁾	9	6	4	3	3
Remaining Capacity ⁽²⁾	6	9	8	4	2
Roadway Condition ⁽³⁾	2	3	3	4	2
Adjacent Development Consideration ⁽⁴⁾	5	2	4	3	1
Utility Needs (Storm, Sanitary, Water) ⁽⁵⁾	1	4	4	4	1
Special Considerations ⁽⁶⁾	4	3	2	2	1
Total Ranking (Total Possible 40):	27	27	25	20	10

Ranking Assessment for Construction Phasing of the 60th Street North Corridor

Minnesota Avenue to Cliff Avenue - Segment 3

Segment 3 is mostly developed with future improvements designated to reduce the drainage concerns that exist and increase safety and capacity.

Cliff Avenue to Velocity Avenue - Segment 4

Increasing development in the industrial park area east of Cliff Avenue will continue to influence the need for reconstruction in Segment 4. Because a significant portion of Segment 4 is still within the county, low traffic volumes and a desire by the residential homeowners to maintain the status quo, reconstruction of Segment 4 is anticipated further in the future than other corridor segments. Pavement improvements near the intersection of 60th Street North and Cliff Avenue will be addressed in the City of Sioux Falls Cliff Avenue project programmed in 2012.

Velocity Avenue to SD 100 - Segment 5

Segment 5 is starting to experience development, but lacks an immediate need for reconstruction. Future improvements designated on the SD 100 will likely be the main factor that influences when construction is programmed for this segment. Since public utilities do not exist in this area, development will continue to grow very slowly.

A likely priority for segment construction is shown below, although actual construction timeframes can be affected by several factors:

- *Priority 1 – Segment 1*
- *Priority 2 – Segment 2*

- *Priority 3 – Segment 3*
- *Priority 4 – Segment 4*
- *Priority 5 – Segment 5*

Table 1 provides a matrix approach to help define segment priority and construction estimations based on actual build years assuming inflation at a rate of 2% per year.

3.11 Estimated Construction Year and Cost

Opinions of estimated construction cost were prepared for each of the corridor segments and are provided in Appendix 8. Each estimate includes two concept design options. The segment costs are summarized as follows and are shown in current year (2011) estimates:

- Segment 1 – Option 1: \$4.2 million, Option 2: \$4.3 million
- Segment 2 – Option 1: \$21.3 million, Option 2: \$24.1 million
- Segment 3 – Option 1: \$8.7 million, Option 2: \$9.7 million
- Segment 4 – Option 1: \$15.1 million, Option 2: \$15.5 million
- Segment 5 – Option 1: \$10.2 million, Option 2: \$10.5 million

Construction phasing and budgeting calls for multiple projects over many years. Currently, the tentative 2012-2016 Statewide Transportation Improvements Program (STIP) and the tentative 2012-2016 Sioux Falls Capital Improvements Program (CIP) contain no projects in the 60th Street North corridor. Construction, therefore, will most likely occur in the planning mid-term period 2017-2021 for Segment 1 and possibly Segment 2. It should be noted that sidewalk assessments and utility hook-up assessments will be implemented along the corridor if no sidewalk exists on their property currently.

Programming of construction projects is always subject to the availability of funding. Congress is currently considering a new highway bill and until new legislation is completed, the overall funding outlook remains uncertain. Local and State funding sources for transportation remain fairly steady, but the majority of roadway funding in South Dakota still comes from federal sources. The following construction schedule has been determined reasonable by the study team:

- Segment 1 – Within 5 years
- Segment 2 – Within 7 years
- Segment 3 – Within 12 years
- Segment 4 – Within 15 years
- Segment 5 – Within 20 years

If the above construction schedule is followed, an overall cost with inflation to complete Segments 1 through 5 will reach 76 million dollars. This means approximately 4.0 million dollars (including design and construction) will need to be allocated yearly over the next 20 years for this corridor to be improved to the level identified during this study.

Construction Year	Constuction Cost
Within 5 Years	\$ 4,682,573
Within 7 Years	\$ 24,812,596.87
Within 12 Years	\$ 11,240,570.03
Within 15 years	\$ 20,327,272.65
Within 20 years	\$ 15,172,349.10
Total	\$ 76,235,362.06

Roadway Segments						Comments
Ranking Categories	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	
Safety ⁽¹⁾	9	6	4	3	3	Segment #1 Experiences Highest Number of Accidents
Remaining Capacity ⁽²⁾	6	9	8	4	2	Segment #2 is Greatly over Capacity for a Two Lane Roadway
Roadway Condition ⁽³⁾	2	3	3	4	2	Segment #2 through #4 require Surfacing Improvements
Adjacent Development Consideration ⁽⁴⁾	5	2	4	3	1	Segment #1 has Highest Relative Interest and On-Going Planning
Utility Needs (Storm, Sanitary, Water) ⁽⁵⁾	1	4	4	4	1	Segment #2 through #4 require Various Utility Improvements to Prepare for Additional Development
Special Considerations ⁽⁶⁾						Segment #1 - Alternative Access (Redstone Access Roadway and 56th Street North) will improve on-going safety concerns and will eliminate the need for a Temporary Signal at Granite Lane and 60th Street North. Segment #2 - Highest projected cost and more feasible in terms of constructability to construct prior significant development along corridor. Segment #3 - Drainage is an ongoing concern, reconstruction would minimize drainage concerns. Segment #4 - A significant portion of adjacent property within Segment is not annexed and therefore is not ready to develop. Segment #5 - Since a great portion of Segment #5 is off alignment and is dependant on utility infrastructure to be installed, SD 100 improvements will likely determine when improvements will be needed on this segment of the 60th Street North Corridor.
Total Ranking (Total Possible 40):	27	27	25	20	10	

Ranking Definition	⁽¹⁾ Ranking Based on Overall Safety of the Segment, refer to Access Memoranda for Crash Analysis -Rank 0 (Low) to 10 (High)
	⁽²⁾ Ranking Based on Remaining Traffic Capacity, refer to Proposed Lane Geometrics Memorandum for Existing Traffic Volumes Rank 0 (Excess Capacity) to 10 (Saturated)
	⁽³⁾ Ranking Based on Visual Roadway Condition Assessment - Rank 0 (Good Condition) to 5 (Repairs Warranted)
	⁽⁴⁾ Ranking Based on Development Potential or Areas Seeing Development Plans -Rank 0 (No Development Planning) to 5 (Adjacent Development On-Going)
	⁽⁵⁾ Ranking Based on Immediate Need to Install Infrastructure -Rank 0 (No Immediate Need) to 5 (Immediate Need)
	⁽⁶⁾ Ranking Based on a Special Condition - Rank 0 (No Identified Special Condition) to 5 (Special Conditions Recognized)

Roadway Segments Cost Projections						
Construction Year	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Totals
2011 Dollars (Study Estimate)	\$ 4,241,151	\$ 21,361,854	\$ 8,765,046	\$ 15,103,463	\$ 10,210,556	\$ 59,682,070
Inflation for 5 Years (2016)	\$ 4,682,573	\$ 23,585,213	\$ 9,677,319	\$ 16,675,444	\$ 11,273,279	\$ 65,893,828
Inflation for 10 Years (2021)	\$ 5,169,939	\$ 26,039,981	\$ 10,684,542	\$ 18,411,037	\$ 12,446,611	\$ 72,752,110
Inflation for 15 Years (2026)	\$ 5,708,031	\$ 28,750,243	\$ 11,796,598	\$ 20,327,273	\$ 13,742,064	\$ 80,324,208
Inflation for 20 Years (2031)	\$ 6,302,127	\$ 31,742,591	\$ 13,024,397	\$ 22,442,952	\$ 15,172,349	\$ 88,684,417

Construction Inflation @ 2% per year

Segment Priority	Identified Need	Priority	Construction Year	Constuction Cost
Segment #1	To improve safety and increase capacity, reconstruct to correct access concerns	#1	Within 5 Years	\$ 4,682,573
Segment #2	To improve surfacing, capacity, provide grade seperation at BNSF crossing, and to reduce flood potential	#2	Within 7 Years	\$ 24,812,596.87
Segment #3	To improve surfacing, capacity, drainage, and to improve accessibility through properly located signalized intersectio	#3	Within 12 Years	\$ 11,240,570.03
Segment #4	To improve surfacing, capacity, drainage, and improve access management, and provide utility infrastructure	#4	Within 15 years	\$ 20,327,272.65
Segment #5	To improve surfacing, capacity, connectivity to arterial network, and provide utility infrastructure	#5	Within 20 years	\$ 15,172,349.10
			Total	\$ 76,235,362.06

4.0 Environmental Review

A review of environmental issues was conducted as part of the corridor planning effort. The review identified a number of actions that need to take place as part of the formal environmental review prior to construction. The review did not address the following resources that were deemed to not be likely impacted: energy, air quality, visual impacts, and environmental justice. Regulated materials were also not addressed in the screening, but would be addressed in the subsequent formal investigation. The recommended actions include:

The City of Sioux Falls plans on using federal funds allocated through the state for the design and construction of the 60th Street North Corridor therefore the NEPA process will need to be followed. For the NEPA process, HDR recommends (and has concurrence from the study advisory team) completing the environmental documentation in separate documents by the following segments:

- Segment 1- From I-29 to Westport Avenue
- Segment 2- From Westport Avenue to Minnesota Avenue
- Segment 3- From Minnesota Avenue to Cliff Avenue
- Segment 4- From Cliff Avenue to Velocity Avenue
- Segment 5- From Velocity Avenue to future SD 100

Each segment has existing intersections that are logical termini. The segments will also be constructed at different times, therefore each should be considered separately for the NEPA process. It should be noted that several items may need to be studied for the entire corridor during the creation of each environmental document such as traffic and noise under this approach. The reason for this recommendation is due to the length of time needed to fund the projects. The study is projecting the corridor will be completed in segments over a 20 year timeline. In the environmental documents, HDR recommends the following items be considered in order to comply with the numerous laws, regulations, and guidance regarding environmental issues. If the consideration applies specifically to a segment it is noted.

Interstate Modification Justification Report (IMJR)

- An IMJR will need to be completed for modifications to the 60th Street North and I-29 Interchange (**Segment 1**). The reason for the IMJR is due to the new configuration with the Redstone Access Road.

56th Street N

- In order to address access for businesses on the south side of 60th Street and west of Westport Avenue, 56th Street North will need to be designed and constructed either as a separate project or as part of the environmental documentation (**Segment 1**). Due to funding responsibilities on 56th Street North; currently the City envisions completing the design and construction prior to the 60th Street North Segment 1 project and not having it as part of the environmental documentation.

ROW near I-29 Interchange

- The proposed Redstone Access road is intended to be part of the City street network. The current location of the access roadway would indicate that it lies within the Interstate right-of-way. Coordination will need to occur to determine if the right-of-way in the northeastern portion of the I-29 interchange can be conveyed to the City. The SDDOT will need to determine if the land was originally acquired in fee title. The SDDOT and City shall continue to coordinate on this issue. (**Segment 1**).

Public Facilities

- Consideration of the locations of public facilities, the potential impacts to public facilities, and access to the facilities should be considered as the project progresses.
- The Project would continue to coordinate with public utilities at the time of the preliminary design of the preferred Option.

Railroads

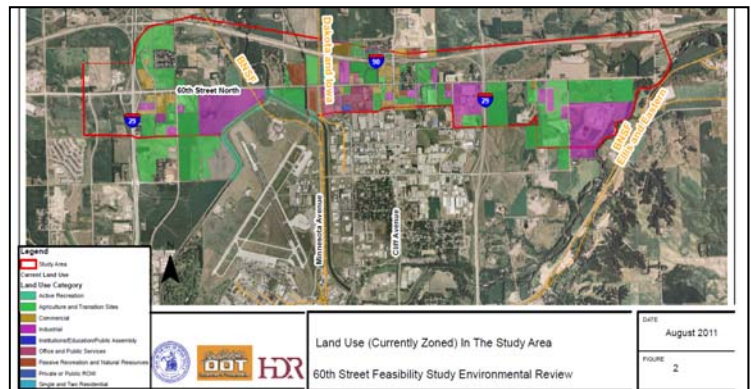
- Coordination with the rail companies that have active rail lines will be required as the project progresses (**Segments 2 and 3**).
- Coordination for the potential rail line overpass would be required with the Sioux Falls Regional Airport for both Options (**Segments 2 and 3**).
- Although glide slope requirements are not part of the NEPA process for evaluation, it is recommended that the Airport requirements for glide slopes be evaluated, verified, and documented to ensure compliance and safety.

Land Use

- Coordinate with the NRCS regarding farmland impacts.
- During final design, the impact to businesses and residences needs to be considered as well as the potential noise impacts of increasing traffic or widening the roadway.

Noise

- During the preliminary and final design phases, Options 1 and 2 would need to be considered for noise impacts. The existing noise levels near the residential area along 60th Street and east of Cliff Avenue would be measured and future noise levels would be modeled to determine if either Option would exceed the NAC noise levels for residences. Noise impacts to businesses would also need to be considered.



Park and Recreational Resources

- The existing Nursery Site and recreational trail, and the future Diversion Channel Fishing Access and recreational trail segment are potential Section 4(f) resources and require further evaluation for potential impacts (**Segment 2**).
- Coordination should continue with the City of Sioux Falls Parks and Recreational Department, coordination to date has allowed for the study identified geometrics for the roadway and required access modifications to the park entrance to be incorporated into the approved Diversion Channel Fishing Access Masterplan. The study identified geometrics are included on the Masterplan, therefore minimizing possible impacts to this future Section 4(f) resource (**Segment 2**).
- Coordination with the City of Sioux Falls Parks and Recreation Department is needed to determine whether Land and Water Conservation Funds (LWCF) were utilized for the park and recreational areas (**Segment 2**).
- Coordination should occur as the project progresses with the City of Sioux Falls Parks and Recreation Department.



Archaeological and Historic Resources

- Conduct a cultural resource survey on site within the study area. The survey should be specialized to include subsurface testing, and conducted under the guidance of an archaeological professional that meets the Secretary of Interior's qualification standards. Subsurface testing would lower, but not eliminate the risk of discovering previously unrecorded resources that lie beneath the upper levels of the soil profile during construction.
- Coordinate the results of the onsite cultural resource survey with SHPO and interested parties such as tribes. Due to the location of the study area, tribes should be consulted throughout the Section 106 process.
- Plan for the possible outcomes of the coordination with SHPO and interested parties. Due to the archaeological sensitivity of the study area such as Native American camping sites along the Big Sioux River, etc., construction monitoring for discoveries during construction may be necessary. An agreement with SHPO and tribes may be needed for treating significant cultural resources, including any human remains encountered prior to or during construction.

- Coordination will need to continue regarding the Minnehaha County Cemetery during the preliminary and final design phases (**Segment 4**).

Floodplain

- During the design process, the floodplain would need to be avoided or if encroached upon, would require analysis to determine if a no rise certificate or a map revision would be required. A Conditional Letter of Map Revision (CLOMR) would need to be acquired if a water surface level rise is determined (**Segments 2, 3, and 5**).

Wetlands and Waters of the U.S.

- Formal wetland delineation is recommended prior to final design. A Section 404 permit application would need to be submitted to USACE due to impacts to wetlands or crossing of a linear waterway anticipated to occur as part of the Project.

Wetland Impacts	
Option	Wetland Impacts (acres)*
1	7.9
2	7.9

Water Quality

- Impacts to the adjacent water bodies and groundwater need to be assessed for improving 60th Street North.

Threatened and Endangered Species

- Coordination is required with USFWS and SDGFP to determine the species of concern that may be present within the Study Area of the Project. Surveys and a biological evaluation may be required depending upon the location of the proposed transportation facility within the Study Area and the responses received from the resource agencies.

The above environmental issues will need to be explored, addressed, and mitigated if necessary in subsequent projects. Appendix 9 provides a technical memorandum that provides more detail in regards to each of the items identified above and also discusses our findings during this study.

5.0 Right- of-Way and Easements

The existing public right-of-way within the corridor varies greatly, from as narrow as 66' to as wide as 300'. Right-of-way and easement needs are outlined as follows:

- Segment 1 – 300' of right-of-way exists between I-29 and Westport Avenue. This appears to be sufficient for future roadway improvements.
- Segment 2 – the existing right-of-way varies from 100' to 230'. Future roadway improvements are expected to require between 130' and a 150' of right-of-way depending on the availability of the adjacent land for development. Right-of-way as wide as 400' may be necessary for the grade separation of the BNSF rail line to reduce the need for costly retaining walls. Construction easements will be needed for cut and fill operation throughout Segment 2.
- Segment 3 – 141' of right-of-way exists between Minnesota Avenue and Cliff Avenue. This appears to be sufficient for future roadway improvements, but will not be wide enough to account for the different drainage options that exist. Construction easements will be necessary to implement the recommended improvements.
- Segment 4 – The existing right-of-way varies from 66' to 100'. Future roadway improvements are expected to require no more than 105' of right-of-way. Construction easements will be necessary to implement the recommended improvements.
- Segment 5 – A variety of right-of-way widths exist along Segment 5. Future roadway improvements are expected to require between 100' and 110' of right of-way. Additional right-of-way will be required from Slip Up Creek to SD 100 since the alignment is not along the section line and the roadway fill sections are significant in order to match into the proposed SD 100 corridor. Right-of-way widths may be as wide as 200' in this area, actual widths will be determined through development planning and development grading plans.

Intersection improvement may require right-of-way beyond the amounts discussed above. Efforts were made to minimize the easement and relocation impacts on the large Xcel power line on the south side of 60th Street North. These efforts should be reviewed when actual ground survey is complete to determine if additional modifications can be made to reduce utility impacts.

The cost estimates in Appendix 8 reflect the estimated right-of-way and temporary easements that will be needed. These estimations may significantly change during final design based on actual survey data rather than aerial 2' contours. The costs associated with the easements and right-of-way needs were based on a variety of factors and may not represent accurately the final negotiated values. Landowner contact information and approximate property line locations are shown in Appendix 12.