

Preliminary Design Report

Executive Summary



I-494/I-35W Interchange Preliminary Design Project

Bloomington, MN

S.P. No. 2785-350

SEH No. MNTCO 107371

April 12, 2010



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Executive Summary

Background Information

The I-494 and I-35W corridors are major transportation corridors in the Twin Cities metropolitan area. The ability to effectively move the users of these transportation corridors to their destinations with reduced congestion and improved safety continues to be a challenge today and in the foreseeable future. The I-494 and I-35W interchange area consistently remains as one of the higher ranked locations for congestion and safety deficiencies in the metro area and the country; a 2010 study, based on Travel Time Index (TTI), ranked I-494 17th worst commute in the nation. This condition will continue to erode without the implementation of improvements in the corridor and at the interchange. Through the completion of the 2001 Final Environmental Impact Statement (FEIS) for the *I-494 Reconstruction: I-394 to the Minnesota River*, major improvement strategies for the I-494 corridor were identified. Recent improvements from that study, such as the Penn Avenue and Lyndale Avenue interchanges on I-494, reconstruction of the 76th Street bridge, construction of the Lyle Berg Bridge (American Boulevard), plus the 2009 Urban Partnership Agreement (UPA) improvements to I-35W and the on-going work at the I-35W and TH 62/ Crosstown Interchange will help to ease congestion and improve safety through these corridors.

Major interchange improvements were identified in the 2001 FEIS; including the reconstruction of the system-to-system interchange of I-494 and I-35W, the Portland Avenue interchange, which includes closure of the Nicollet Avenue and 12th Avenue interchanges along I-494, and ramp improvements to the Cedar Avenue (TH 77) and 34th Street interchanges.

The current state of the economy in Minnesota and the nation has hampered the resources of the funding programs at both the federal and state levels to support future major interstate improvement projects. The Minnesota Department of Transportation (Mn/DOT) faces significant challenges for implementing the remaining improvements. Recognizing these limitations Mn/DOT has embarked on a new philosophy towards addressing the deficiencies throughout the metro interstate system. This new philosophy seeks to target funding toward prioritized deficiencies, through reduced project scope or phased implementation of key project elements to provide the highest return on investment for the available funding resources.

In addition to the efforts in reducing project scopes and costs for the existing infrastructure, Bus Rapid Transit (BRT) has become a significant component of transportation system solutions for addressing congestion in major corridors on the interstate and state highways throughout the metro area. The I-35W corridor was enhanced with HOV/HOT lanes from Lakeville to downtown Minneapolis through the 2009 UPA. Construction is underway for a new in-line BRT station at the 46th Street overpass on I-35W in Minneapolis, with another station planned to be located just south of the I-494/I-35W interchange, near the American Boulevard overpass.

Study Purpose and Need

The I-494/I-35W Interchange Preliminary Design Project stemmed from the recognition that the remaining improvements identified in the 2001 FEIS were surpassing \$400 million in overall project costs. Without reconsideration of the scope of these projects, there exists a risk that no major improvements can be made in the next 20 years or beyond. The I-494/I-35W interchange, as a system-to-system interchange, was targeted for review due to its significance to the southern ring of the interstate system in the metro area. Current congested traffic operations and safety issues at this interchange will continue to create significant delays during peak periods and trigger crash incidents throughout the immediate I-494 corridor.

The main objectives of the I-494/I-35W Interchange Preliminary Design Project include:

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- Develop an interchange alternative that reduces the overall scope of the project or provides the most flexibility for staged implementation.
 - Develop an alternative that incorporates the provisions of an In-Line BRT station located at or between American Boulevard and 82nd Street.

The interchange alternative developed from the project would be considered for further evaluation leading into the development of a Level 1 Layout Approval by Mn/DOT and possible reevaluation of the 2001 FEIS.

Existing Conditions and Prioritized Deficiencies

Traffic congestion through the I-494 and I-35W corridors of the study area have been in existence and a major hindrance to efficient and safe traffic operations for many years. Field observations indicated significant congestion conditions for westbound I-494 in the AM and PM peak periods encompassing sections from 24th Street on the east limits of the study west to TH 100. I-35W experiences a directional split in volumes between the AM and PM peak periods and therefore congestion impacts are evident in the AM peak for northbound, and in the PM peak for southbound traffic. Indicators affecting the congested conditions on I-494 include the existing volumes that are over the basic capacity of the current three lanes for the majority of the eastbound traffic and west of I-35W for the westbound traffic. Heavy entering and exiting volumes at certain interchanges, and inadequate interchange and ramp spacing lead to significant weaving problems.

CORSIM traffic modeling was conducted to develop baseline models for AM and PM peak periods of the project study limits utilizing volume data from 2007. The models were calibrated based on the field observations and analysis conducted to identify the key points of congestion. The modeling results were able to replicate the field observations and were utilized for development of forecast models for the years 2020 and 2040 based on regional model information. The 2020 forecast model was also utilized to identify the operational deficiencies that will lead to added congested conditions in the future.

A system plan review of the major design features in the I-494 and I-35W corridors indicate a key inconsistency with the American Association of State Highway and Transportation Officials (AASHTO) criteria for interstate facilities in the area of interchange spacing. The desirable interchange spacing within urban areas is one mile. Between the Penn Avenue and TH 77 interchanges along the I-494 corridor, five interchanges exist with an approximate spacing between each of ½ mile. Along I-35W, three interchanges are positioned with a spacing of ½ mile or less, from the 76th Street interchange to the 82nd Street interchange.

The corresponding impacts of the closely spaced interchanges are reflected in the substandard ramp spacing and weaving distances. Due to the closely spaced interchanges described above, deficiencies exist within the I-494 and I-35W corridors where traffic operations and safety are compromised due to the short weave sections. Even with full auxiliary lanes developed between many of the closely spaced ramps, the negative impacts of the weave movements on the mainline traffic are very apparent in the observed congested conditions and crash history.

Crash data over a three year period (2006-2008) for the I-494/I-35W interchange indicates a total of 308 crashes were experienced. The corresponding crash and severity rates are 1.1 and 1.5 crashes per million vehicle miles (MVM) respectively. Mn/DOT Metro District average crash and severity rates for cloverleaf interchanges are 0.9 and 1.2. The I-494/I-35W interchange ranked as the 7th worst cloverleaf out of the 26 metro interchanges for crash incidents.

Through the consideration of the existing field conditions, modeling results, and crash history data a list of priorities were developed to address the main deficiencies in the corridor and specifically at the I-494/I-35W interchange. The main two prioritized deficiencies that are recommended for improvements to the interchange include:

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1. Northbound I-35W loop ramp to westbound I-494. High volumes and substandard weaving distances – involves three weaving operations. 50% of crash incidents at the interchange are related to this deficiency.
 2. Eastbound I-494 weave segment between the Penn Ave. entrance ramp and southbound I-35W exit ramp. High volumes and substandard weaving distance.

Concept Development

The development of alternative concepts for the I-494/I-35W interchange first involved the creation of a set of guiding principles, through stakeholder input, to establish the framework for these concepts. The goal of the alternative concept development effort was to create concepts for cost-effective capacity and safety improvements based on prioritized operational deficiencies. The process involved the review of the existing 2001 FEIS interchange layout for opportunities to stage the project components and to develop an alternative concept that was scaled-back in overall scope. Included in the development of these concepts was the provision for the following Design Elements:

- BRT station at American Boulevard
- Managed HOV/HOT Lanes on I-35W
- Basic Number of Lanes: Four on I-494 and three on I-35W (includes managed lanes)
- FEIS Access: Maintain 2001 FEIS layout access provisions
- Existing Infrastructure: Preserve recent infrastructure investments in the corridor

Alternatives concepts developed with the Guiding Principles and the Design Elements created three main concepts. All three concepts sought to scale back the overall scope of the interchange to reduce costs and to provide added flexibility for staging. The concepts would tie in to the Penn Avenue, Lyndale Avenue, 76th Street, and 82nd Street interchanges in the same manner as the 2001 FEIS layout, preserving the recently constructed infrastructure. The concepts will also preserve the 26 feet “Future Transportation Use” median area along I-494. The concept figures do not accurately reflect the I-494 median, but it is correctly incorporated into the more detailed layouts. In addition, the local street “box” network was maintained in the alternative concepts. Each concept would also provide space in the I-35W median near American Boulevard for a potential in-line BRT station. The BRT station at American Boulevard, one of three BRT concepts developed, had the most impact for the geometrics of the interchange layout and was therefore used to represent the worst-case scenario. The concepts developed sought to meet the objective for the scaled-back layout by reducing the number /size of, or by eliminating, flyovers in the interchange layout. The alternative concepts developed were as follows:

- Alternative 1 – 2001 FEIS Preferred Alternative (comparison layout)
- Alternative 2 – Three-Quad Cloverleaf Interchange
- Alternative 3 – Turbine Interchange

Each alternative concept developed followed the Guiding Principles and the objections of the Design Elements. Advantages and Disadvantages were developed for each concept. Recognizing the main element from the 2001 FEIS layout that impacted the cost were the flyover structures, the three alternatives were reviewed based on a comparative summary of the overall square feet of bridge deck in each layout. The findings of this basic screening indicated Alternative 3 - Turbine Interchange had the lowest amount of bridge deck square footage. In addition, the Turbine layout provided the most flexibility for staging, indicating a lower amount of work required to implement priority deficiency number 1. Northbound I-35W loop ramp to westbound I-494.

Based on these findings, Alternative 3 – Turbine Interchange was selected as the concept to be considered for further evaluation. A more detailed geometric layout was developed, including a BRT station at American Boulevard, to be utilized in the impact analysis compared to the original 2001 FEIS Preferred Alternative.

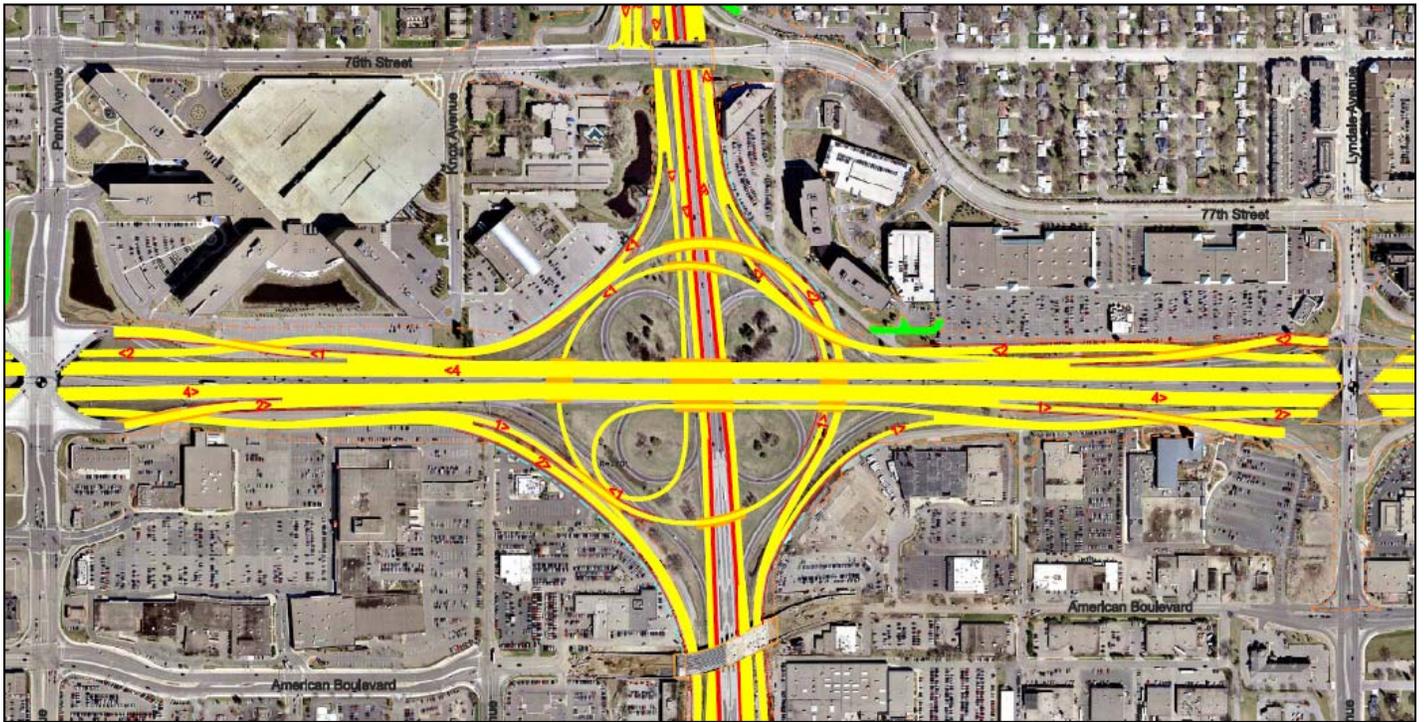


Figure 1 – Turbine Interchange Concept Layout

Modeling of the Turbine Interchange alternative concept for traffic operations was conducted for the 2020 and 2040 forecast conditions. In the 2040 model, due to the high volumes projected, certain bottlenecks on the outer limits of the models were mitigated to allow the traffic to reach the interchange unimpeded for this analysis. The 2040 forecast model indicates the Turbine concept would provide very similar operations in comparison to the 2001 FEIS. The AM peak hour shows acceptable operations for both eastbound and westbound traffic. The PM peak hour indicates congestion points exist in the models for both layouts at the France Avenue exit for eastbound I-494 resulting from the weaving movements between France Avenue and Penn Avenue ramps. The PM peak westbound traffic on I-494 experiences major congestion delays near the Portland Avenue interchange resulting from the high volumes and heavy weaving movements between Penn Avenue and Lyndale Avenue. The entrance ramp on I-494 from the northbound I-35W collector-distributor road also experiences some congestion as high entering volumes for this ramp and the Penn Avenue entrance ramp merge onto I-494. Modeling results for the I-35W corridor again indicate very similar operations between the two concepts and provide acceptable operations for both northbound and southbound traffic in the AM and PM peak periods.

The 2020 forecast modeling looked at various options to the phased layout of the Turbine Interchange concept that included the prioritized deficiencies of the northbound I-35W to westbound I-494 movement and the eastbound I-494 to southbound I-35W movement. These options also were evaluated with and without the BRT station at American Boulevard.

The results for these phasing options indicate the Turbine Interchange movement for the northbound I-35W to westbound I-494 provides a dramatic improvement for northbound and westbound traffic operations in both

the AM and PM peak periods at the interchange. The removal of the two weaving operations on westbound I-494 provides critical improvements in both traffic operations and safety conditions.

The evaluation of the eastbound I-494 to southbound I-35W movement indicates that there is a slight improvement for traffic operations specific to the I-35W exit ramp. However, traffic operations upstream of the I-35 interchange area are actually worse. This can be attributed to the effect of the exit ramp locations to Penn Avenue and I-35W in both the 2001 FEIS and the Turbine Interchange layouts. The weave distance between the France Avenue entrance ramp and the Penn Avenue exit ramp is shortened from an existing 3,250 ft. to 2,600 ft. in the new layouts. This reduction in weaving distance is enough to trigger worsened congestion impacts back to the TH 100 interchange.

Impact Analysis

The focus of the Impact Analysis centered on the differences between the 2001 FEIS Preferred Alternative layout and the Turbine Interchange layout. Those differences were assessed to determine impacts that would be greater than the 2001 FEIS layout and that could trigger additional evaluation of environmental impacts.

The refinement of the full layout for the Turbine Interchange concept involved the transfer of the conceptual layout developed on aerial photography into a Preliminary Geometric Layout. The horizontal and vertical design was completed based on a 40 mph design speed for the loop ramps. The proposed in-line BRT station located at American Boulevard was also incorporated with the interchange layout. Ramp connections were made to the Penn Avenue, Lyndale Avenue, 76th Street, and 82nd Street interchanges in the same manner as the 2001 FEIS.

Infrastructure Footprint

The results of the Turbine Interchange layout in comparison to the 2001 FEIS Preferred Alternative, both with the in-line BRT included, indicate a wider infrastructure footprint in three of the I-494/I-35W interchange quadrants; with the southeast quadrant having a reduced impact. The image below illustrates the areas where the comparison identifies either increased or decreased footprint impact. The red indicates areas of increased footprint limits beyond the 2001 FEIS Preferred Alternative (with BRT included). The blue shading indicates areas of decreased footprint limits from the 2001 FEIS Preferred Alternative (with BRT included). The two western quadrants have impacts to private properties, which are mainly associated with losses in parking spaces to commercial businesses.

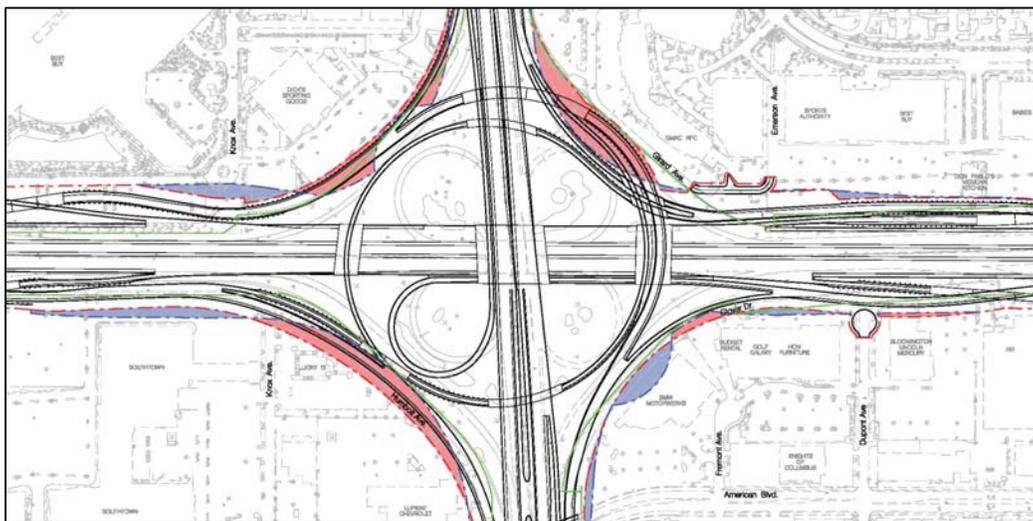


Figure 2 – Comparison of Footprint Impacts (See Figure D13B in Appendix D)

Options for reducing the impacts identified from the Turbine Interchange layout were evaluated (Figure D14 in Appendix D), and potential options are available for consideration in the next level of design detail for the interchange. Loop ramp design speeds less than 40 mph, with a minimum of 35 mph, may be allowable in certain locations to tighten the geometry and reduce the pavement and retaining wall impacts in the two western quadrants. The I-494/I-35W interchange movements with the lower ramp volumes were modified to 35 mph design speeds. The corresponding adjustments to the overall layout are able to provide reduced impacts in the two western quadrants of the interchange. In addition, an optional layout for the braid layout of the Lyndale Avenue westbound entrance ramp and I-35W ramps on I-494 was investigated. Further review of this option would be necessary to confirm the feasibility of the concept. See Section 6.4 for additional details of the Infrastructure Footprint analysis.

Impacts to private property resulting from the in-line BRT station to the infrastructure footprint are focused in the I-35W corridor. Frontage roads and parking lot areas on both sides of I-35W are impacted, with the east side having slightly increased impacts over the original 2001 FEIS layout. The Turbine Interchange layout actually provides a slightly reduced impact in comparison to the 2001 FEIS layout when the BRT station is included.

Utility Impacts

Utility impacts as a result of the Turbine Interchange, above that of which the 2001 FEIS Preferred Alternative would have impacted, are limited. Associated relocations or adjustments for sanitary sewers, watermain, fire hydrants, and other private utilities will be required throughout the project corridor. No major impacts that would significantly drive project costs were identified.

Water Resources Management

The evaluation of the impacts to the water resources management plan for the project corridor and interchange indicate, through the heightened regulatory requirements for stormwater treatment, the addition of strategically placed stormwater ponds and infiltration basins will assist in attempting to meet current regulations. Only four of the eight drainage areas within the project corridors are able to meet these regulations. Additional right-of-way may be required to provide space for additional ponds and infiltration basins for these areas.

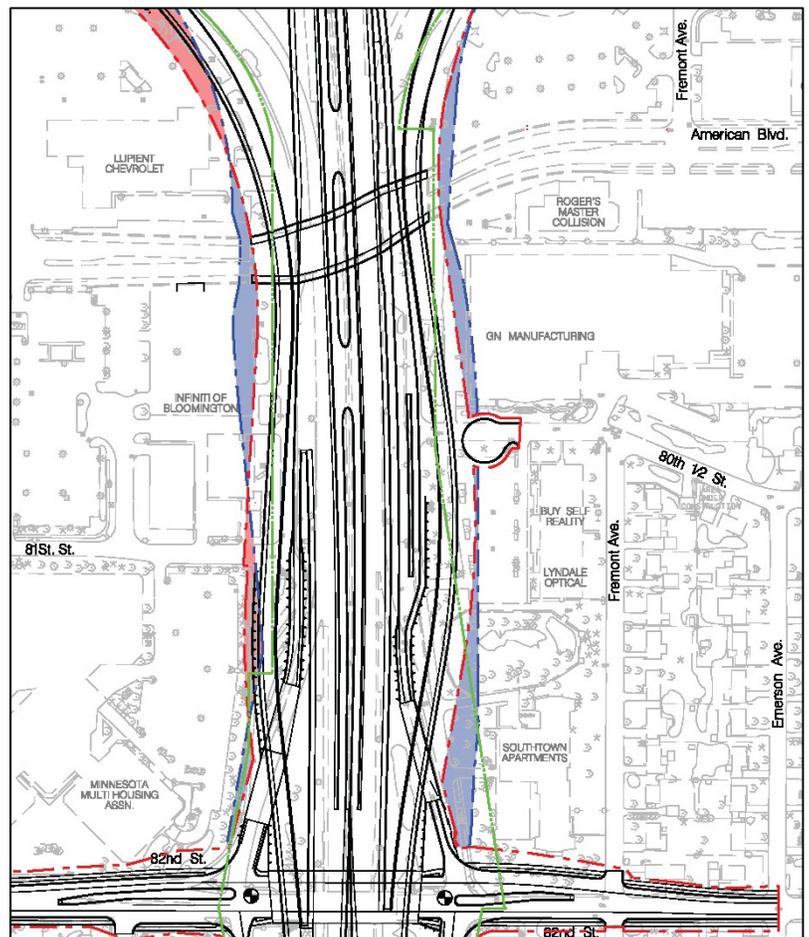


Figure 3 – Comparison of Footprint Impacts with BRT (See Figure D13B in Appendix D)

Local Street Network Impacts

The 2001 FEIS Preferred Alternative developed corridor improvements for interchange spacing that resulted in access limitations to I-494 and I-35W from the Penn Avenue, Lyndale Avenue, 76th Street, and 82nd Street interchanges. The access limitations created the “Box” circulation network for the immediate local arterial street system. The Turbine Interchange layout matches the 2001 FEIS layout with regards to the connections to these adjacent interchanges and therefore the function of the local arterial street system (Box) will be the same. An analysis done previously for the 2008 Lyndale Avenue Interstate Access Report (IAR) indicated acceptable operations through the local arterial street network “box” for the 2037 forecast year PM Peak, based on proposed street lane configurations. An additional analysis was completed for the forecast volumes provided by Mn/DOT and results indicated a slight increase in delay values for the Penn Avenue and Lyndale Avenue corridors. See Section 6.5 for additional details of this evaluation.

The impact of the proposed BRT station, and a potential park-and-ride facility, on the local arterial street network was also evaluated. Two options were evaluated for the location of a park-and-ride facility that would support the BRT station. These locations were adjacent to American Boulevard on the east and west side of I-35W. The evaluation of the traffic impacts to the local arterial street network indicated that the immediate intersections that provide access to each park-and-ride, Dupont Avenue/American Boulevard on the east and Knox Avenue/81st Street on the west, would require improvements to accommodate the new turning movements. The installation of a new traffic signal would be required at the Dupont Avenue/American Boulevard intersection and median closure and left turn-lane extension would be needed at Knox Avenue for westbound American Boulevard traffic.

Construction Phasing

The Turbine Interchange concept provides the most flexibility for implementation of an initial Phase 1 and subsequent phases. The layout for Phase 1 depicts both the interchange and the BRT improvement elements. In the event the BRT facility does not materialize in the same timeframe, interchange specific improvement for Phase 1 can be implemented with minimal disruption to existing traffic operations. Connections to existing ramps can be accomplished and either maintain or improve upon existing access spacing along I-494 and I-35W. The connections would be considered interim improvements and would be removed in the future to accommodate the full layout.



Figure 4 – Turbine Interchange, Phase 1 (See Figure D27 in Appendix D)

Project Costs and Benefit Received

Construction cost estimates were developed for the interchange layouts that were part of the 2001 FEIS and the Turbine Interchange layout. Costs for Phase 1 of the Turbine layout was also developed with and without the BRT station pavements included. These cost estimates were developed as comparative cost estimates, focusing on the major construction elements using Mn/DOT's LWD format. Major construction items for the interchange concept included roadway pavements, bridges, median barriers, and retaining walls. Right-of-way costs were not included in the estimates. However, 20% contingency risk factor was included with each cost estimate.

Findings show the full Turbine Interchange layout (\$237 million) recognizes savings of approximately \$33 million in overall costs compared to the 2001 FEIS layout (\$270 million). The bridge costs were the main item of savings for the Turbine layout.

The Phase 1 interchange improvements (interchange only) based on the comparative estimate indicate a construction cost of approximately \$26 million. Inclusion of the BRT station would add approximately \$45 million to the cost of the project, which includes approximately \$35 million for roadway improvements on I-35W and approximately \$10 million for the BRT station. The addition of a park-and-ride structure would add another \$7 million.

The calculation of a Benefit/Cost (B/C) ratio for the Phase 1 layout (interchange only) was conducted to assess the feasibility in implementing this stage of the project. The calculation included benefits received from improved traffic operations and safety conditions. The results of the B/C calculation provided a positive ratio of 2.87.

Recommendations

The objectives to develop an interchange alternative that reduces the overall scope of the project or provides the most flexibility for staged implementation and incorporates the provisions of an in-line BRT can be achieved with the Turbine Interchange layout. The flexibility provided in Phase 1 for the northbound I-35W to westbound I-494 movement was shown to provide positive B/C and addresses a key issue for the crash history at the interchange. The comparative cost estimate for construction of Phase 1 interchange improvements indicates a \$26 million investment for the improvement of operations and safety in the corridor. The Phase 1 project scope is a fiscally achievable project and should be considered for implementation.

Next Steps

In order to proceed with the design and construction of interchange improvements the following items must be completed:

1. Decide direction on Unresolved Issues ; Preferred BRT Concept and Lyndale Avenue Interchange Access to I-35W and Footprint Impacts.
2. Interstate Access Request (IAR)
3. Mn/DOT Staff Approved Geometric Layout
4. Appropriate Environmental Documentation
5. Municipal Consent

Due to the uniqueness of the I-494/I-35W interchange project and all the past work that was previously completed, it is recommended that a meeting be held between FHWA and Mn/DOT to determine the requirements and level of effort for each of those documents.

Appendix
Selected Items from the Final Report

Alternative 1 – FEIS Concept with BRT - Figure C1

Alternative 2 – Three-Quad Cloverleaf - Figure C2

Alternative 3 – Turbine Design (One Loop) - Figure C3

2001 FEIS Preferred Alternative - Figure D13

2001 FEIS Concept – BRT at American Boulevard – Figure D13A

Turbine – Full Build vs 2001 FEIS – BRT at American Boulevard – Figure D13B

Turbine – Full Build vs. Turbine with 35 mph Design- Figure D14

Turbine – Phase 1A – No BRT – Figure D27

Turbine – Phase 1B – BRT Only – Figure D28

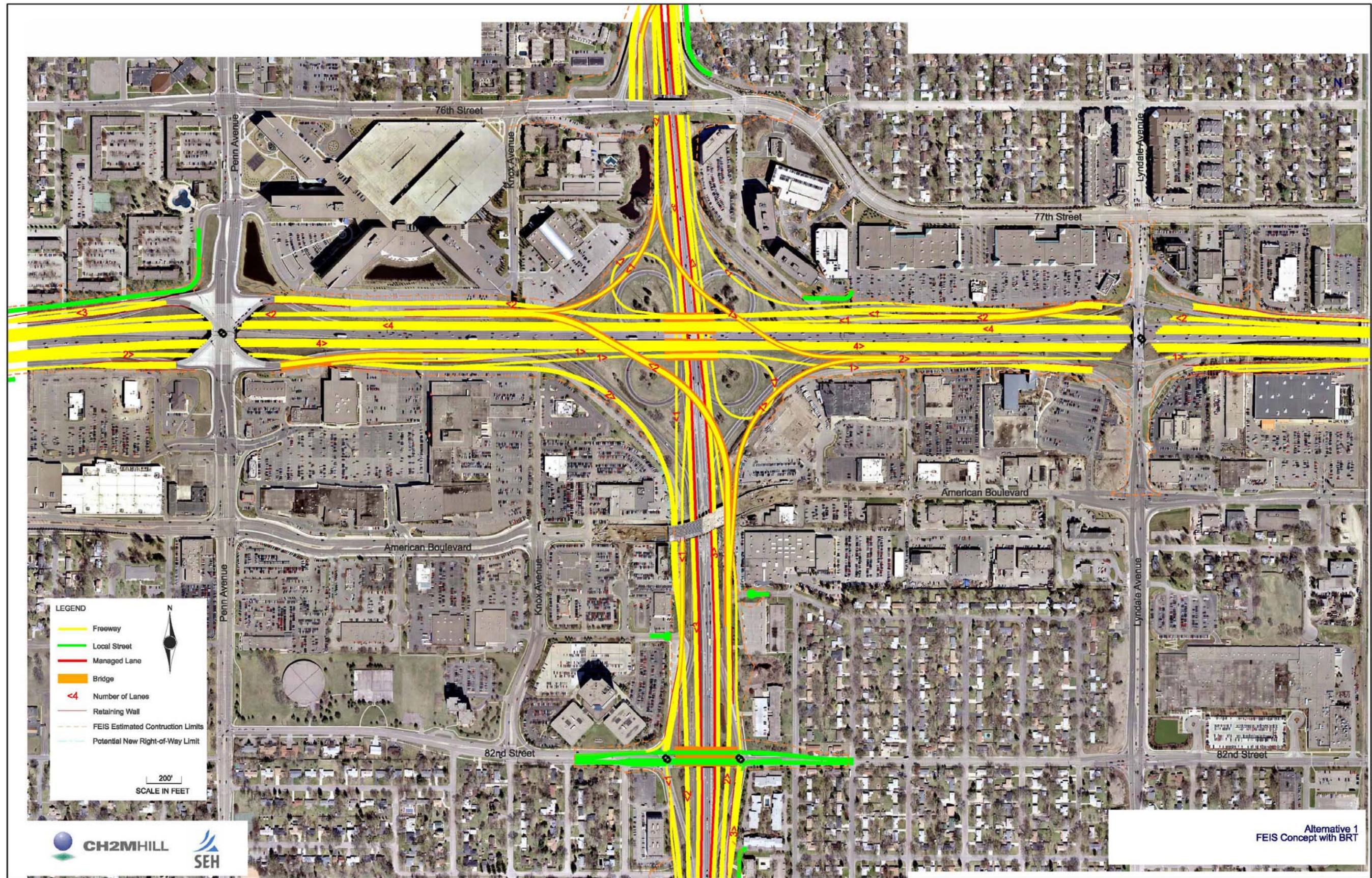
BRT – Single Platform with Weave - Figure E1

BRT – Dual Platforms without Weave - Figure E3

BRT – Offline T Concept - Figure E4

Table G9 Bus Rapid Transit Alternative Concepts Comparative Costs Summary

Comparative Cost Summary (Page 30 Final Report)

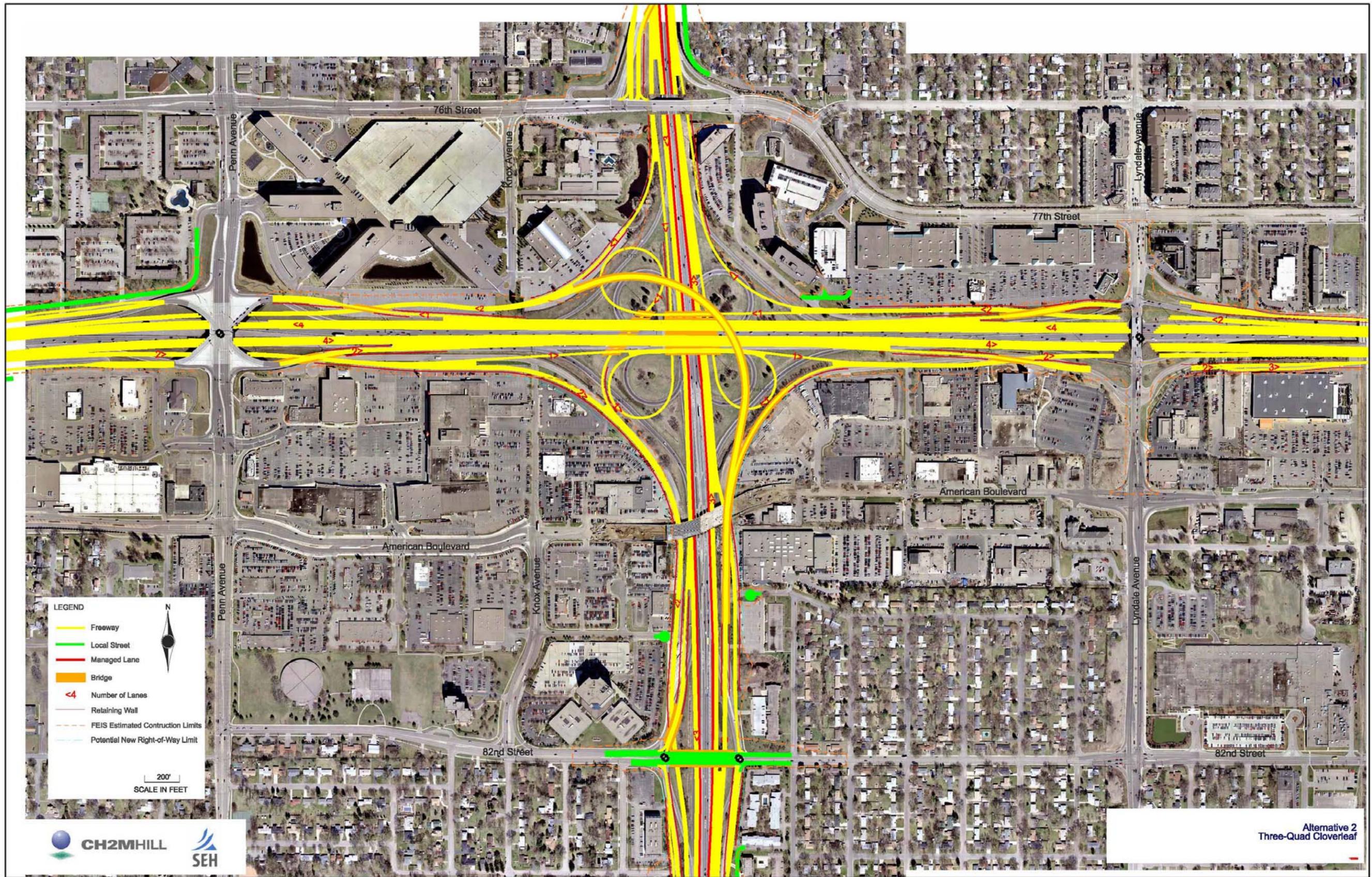


INTERCHANGE ALTERNATIVE CONCEPTS

I-494/35W INTERCHANGE PRELIMINARY DESIGN PROJECT

S.P. 2785-350

FIGURE C1

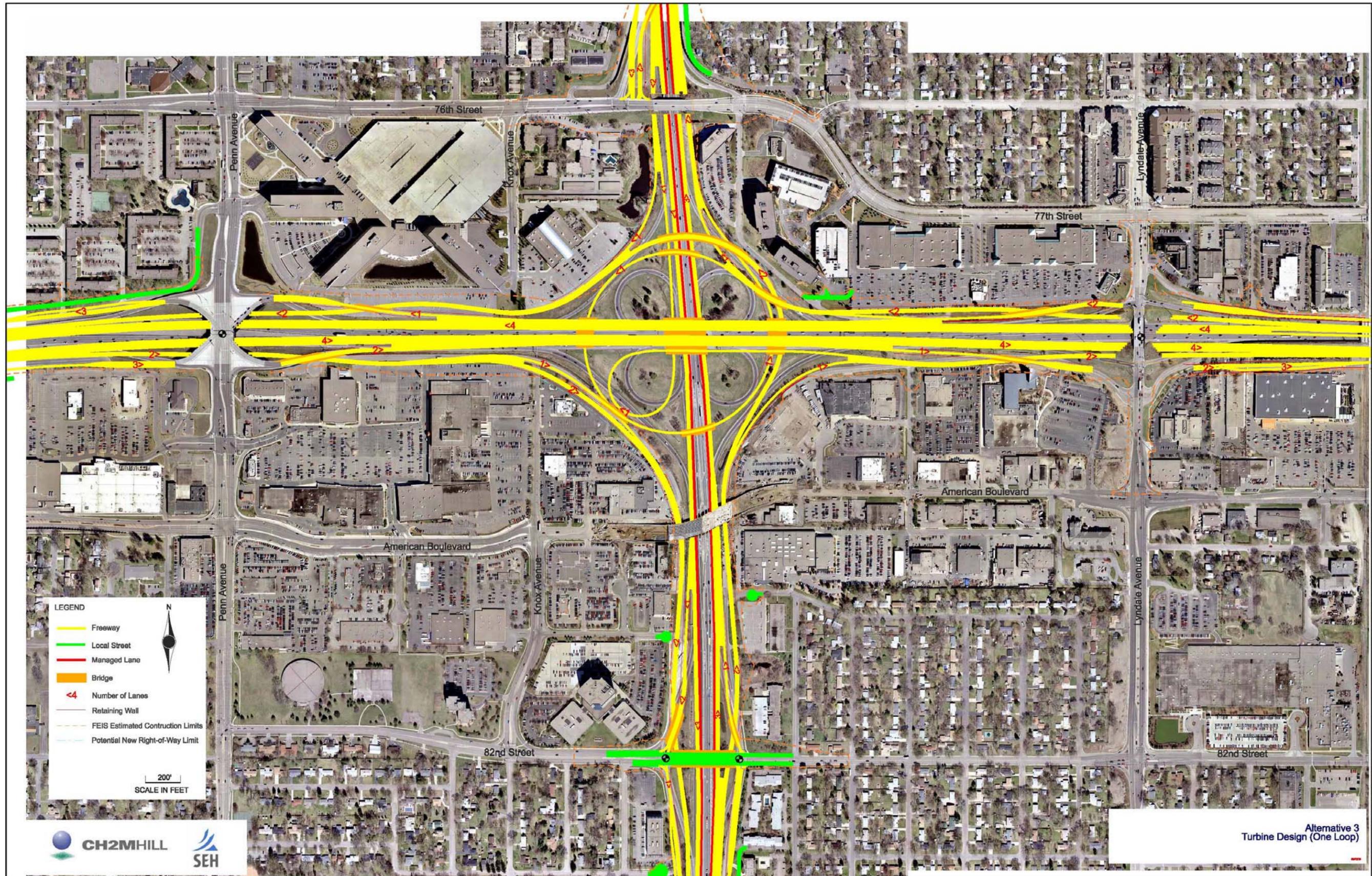


INTERCHANGE ALTERNATIVE CONCEPTS

I-494/35W INTERCHANGE PRELIMINARY DESIGN PROJECT

S.P. 2785-350

FIGURE C2

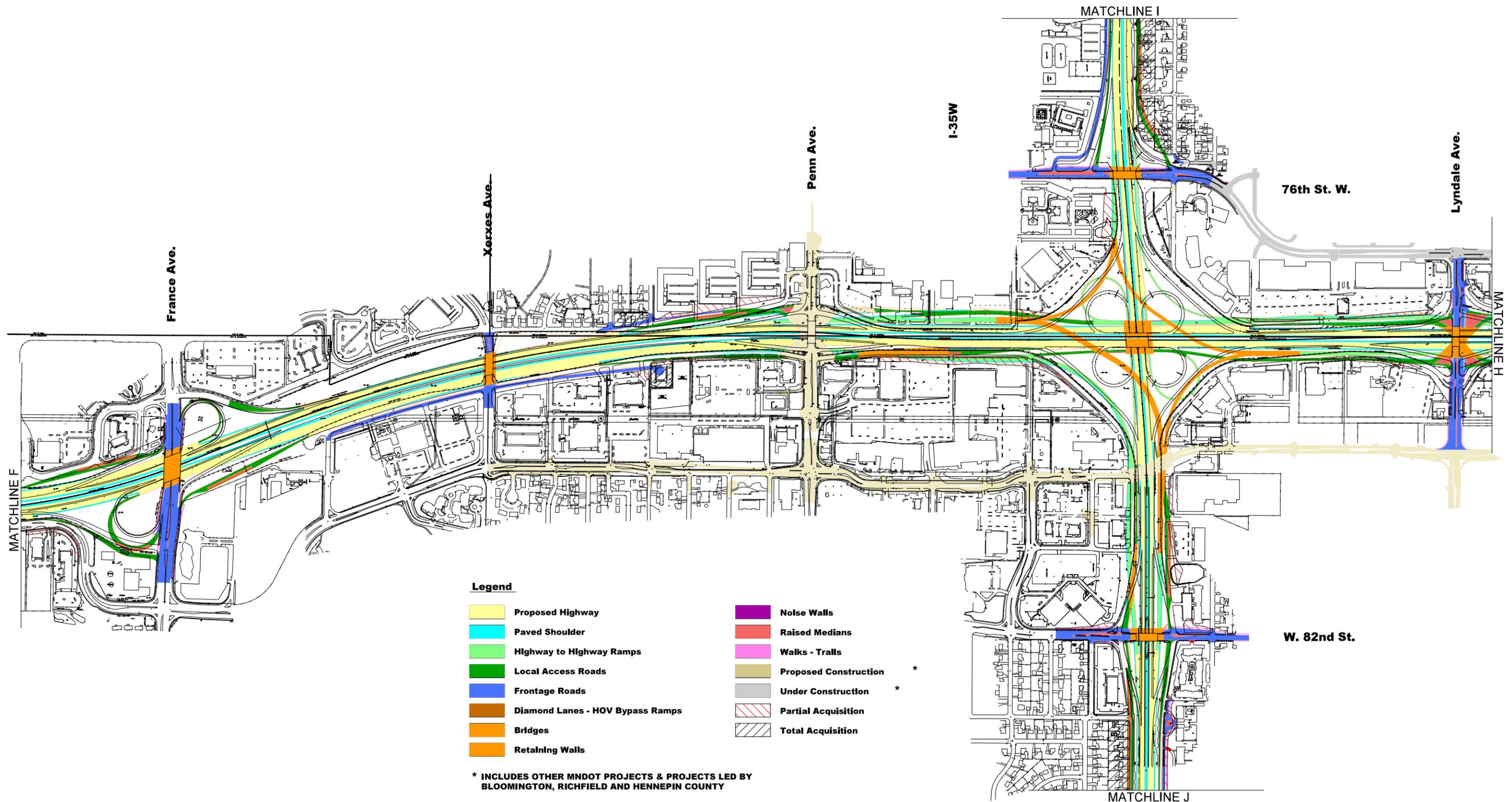


INTERCHANGE ALTERNATIVE CONCEPTS

I-494/35W INTERCHANGE PRELIMINARY DESIGN PROJECT

S.P. 2785-350

FIGURE C3

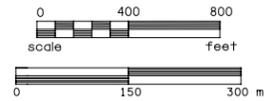


Legend

- | | | | |
|---|----------------------------------|---|-------------------------|
|  | Proposed Highway |  | Noise Walls |
|  | Paved Shoulder |  | Raised Medians |
|  | Highway to Highway Ramps |  | Walks - Trails |
|  | Local Access Roads |  | Proposed Construction * |
|  | Frontage Roads |  | Under Construction * |
|  | Diamond Lanes - HOV Bypass Ramps |  | Partial Acquisition |
|  | Bridges |  | Total Acquisition |
|  | Retaining Walls | | |

* INCLUDES OTHER MNDOT PROJECTS & PROJECTS LED BY BLOOMINGTON, RICHFIELD AND HENNEPIN COUNTY

**Preferred Alternative
Layout Sheet 8**



Key

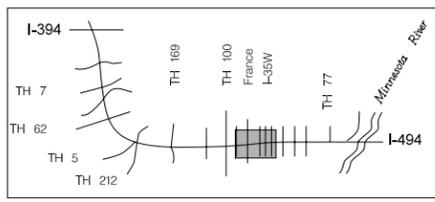
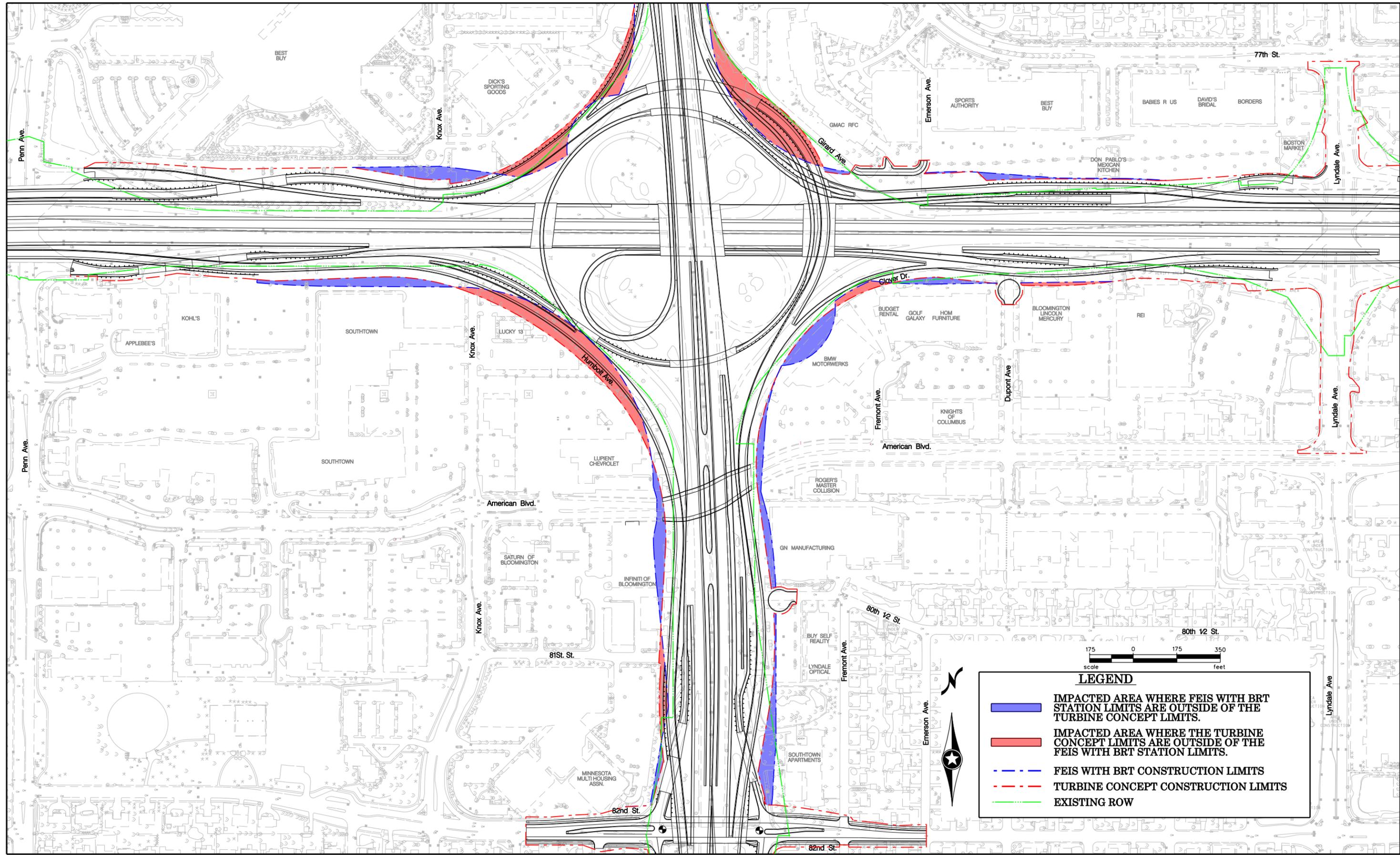


Figure 3.8

**Final Environmental
Impact Statement
I-494
Reconstruction
I-394 to the Minnesota River**



LEGEND

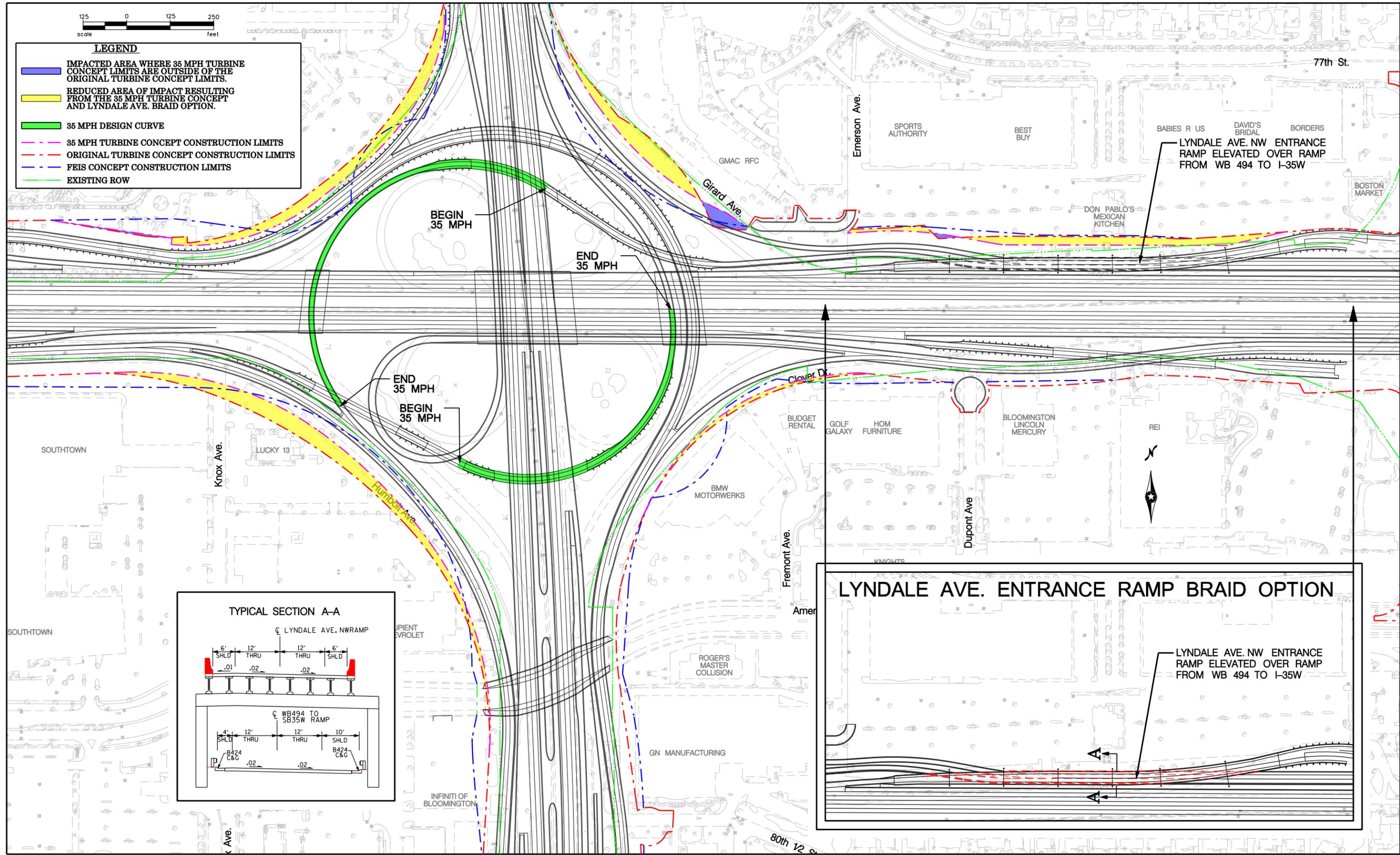
- IMPACTED AREA WHERE FEIS WITH BRT STATION LIMITS ARE OUTSIDE OF THE TURBINE CONCEPT LIMITS.
- IMPACTED AREA WHERE THE TURBINE CONCEPT LIMITS ARE OUTSIDE OF THE FEIS WITH BRT STATION LIMITS.
- FEIS WITH BRT CONSTRUCTION LIMITS
- TURBINE CONCEPT CONSTRUCTION LIMITS
- EXISTING ROW



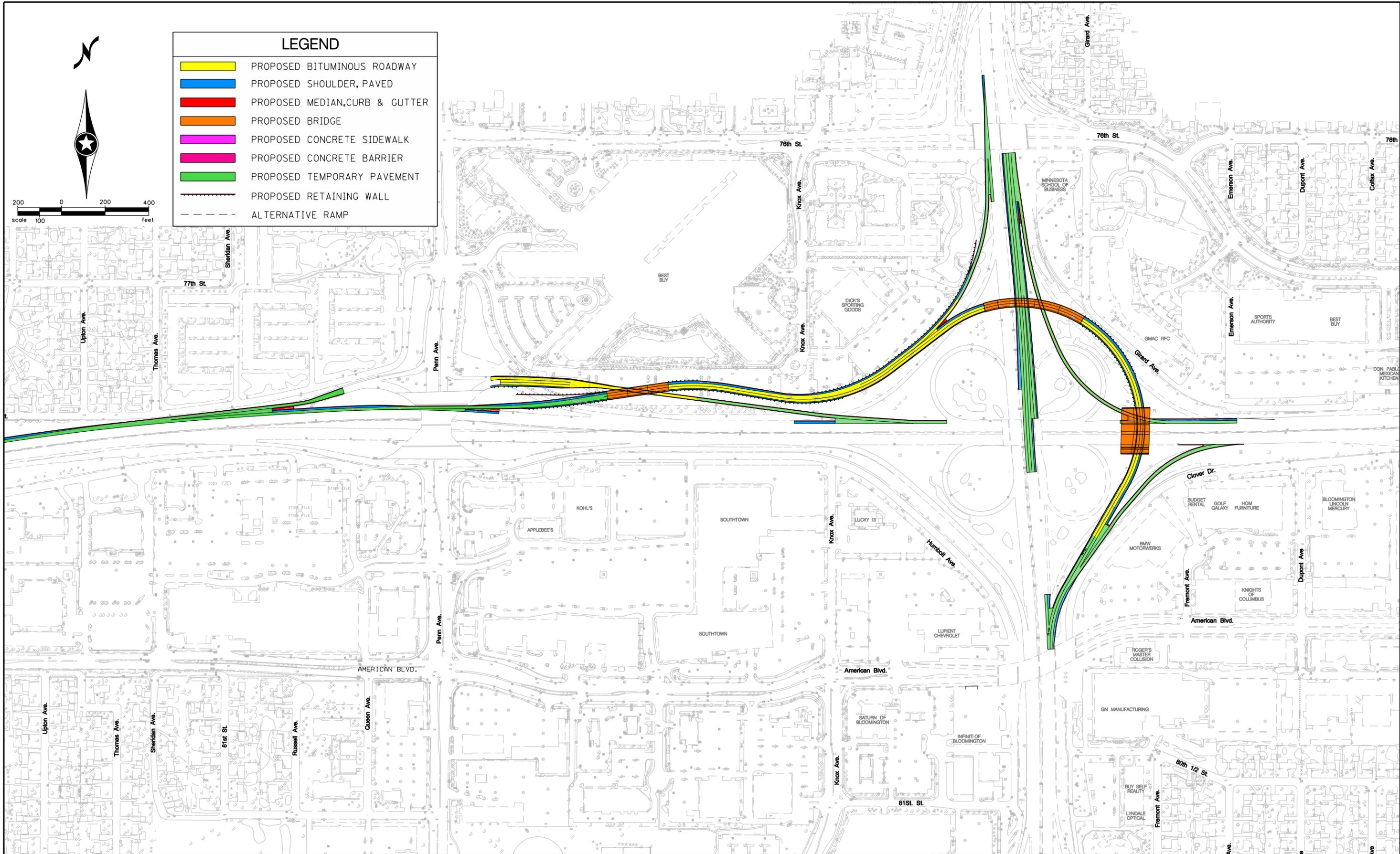
TURBINE-FULL BUILD (VS) FEIS CONCEPT: BRT AT AMERICAN BLVD.

I-494 /35W INTERCHANGE PRELIMINARY DESIGN PROJECT
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Turbine vs 35 MPH design



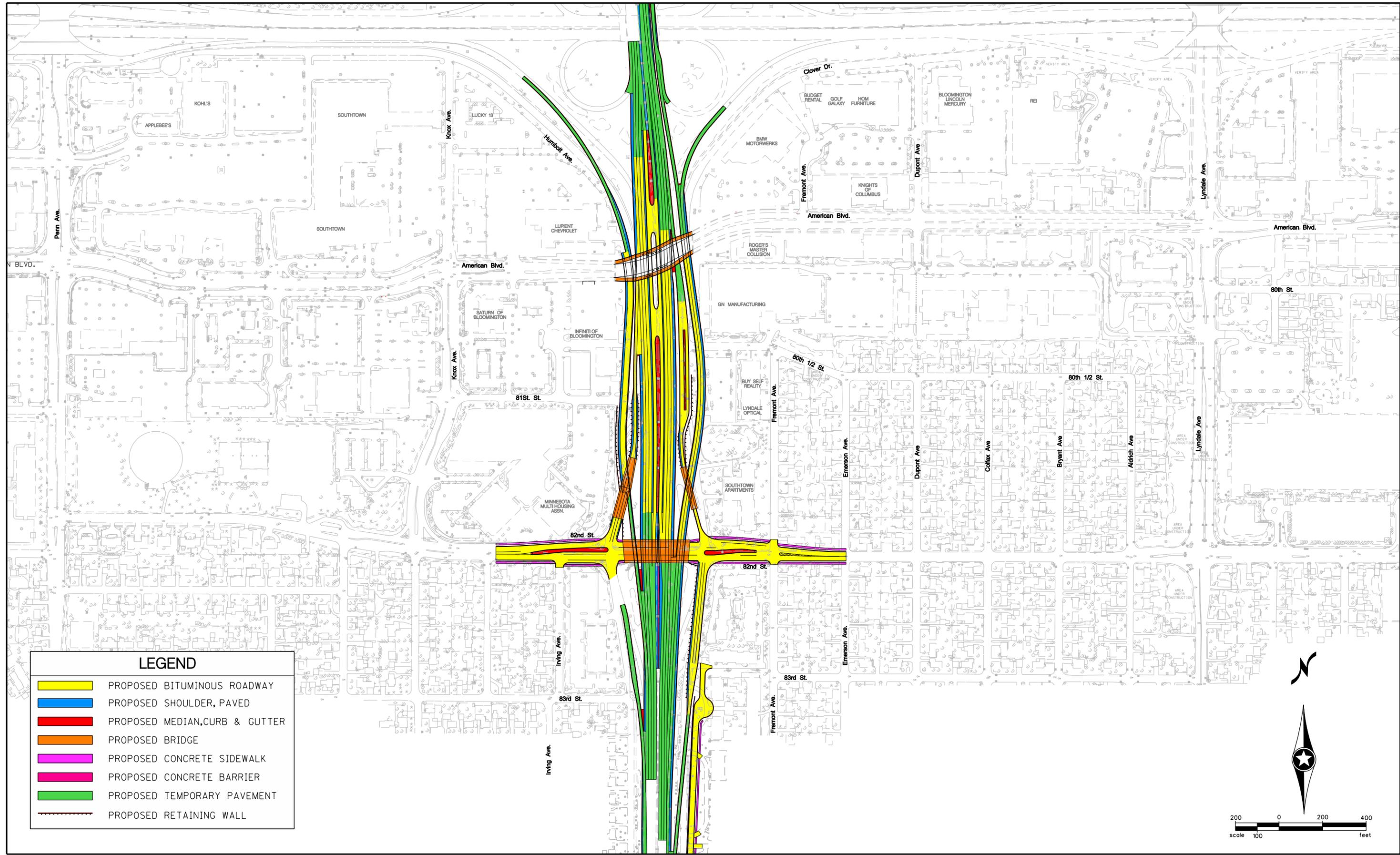
TURBINE-FULL BUILD (VS) TURBINE WITH 35 MPH DESIGN
I-494 /35W INTERCHANGE PRELIMINARY DESIGN PROJECT
S.P. 2785-350



TURBINE-PHASE 1A : NO BRT AT AMERICAN BLVD.

I-494 /35W INTERCHANGE PRELIMINARY DESIGN PROJECT
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FIGURE D27



LEGEND

- PROPOSED BITUMINOUS ROADWAY
- PROPOSED SHOULDER, PAVED
- PROPOSED MEDIAN, CURB & GUTTER
- PROPOSED BRIDGE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED CONCRETE BARRIER
- PROPOSED TEMPORARY PAVEMENT
- PROPOSED RETAINING WALL

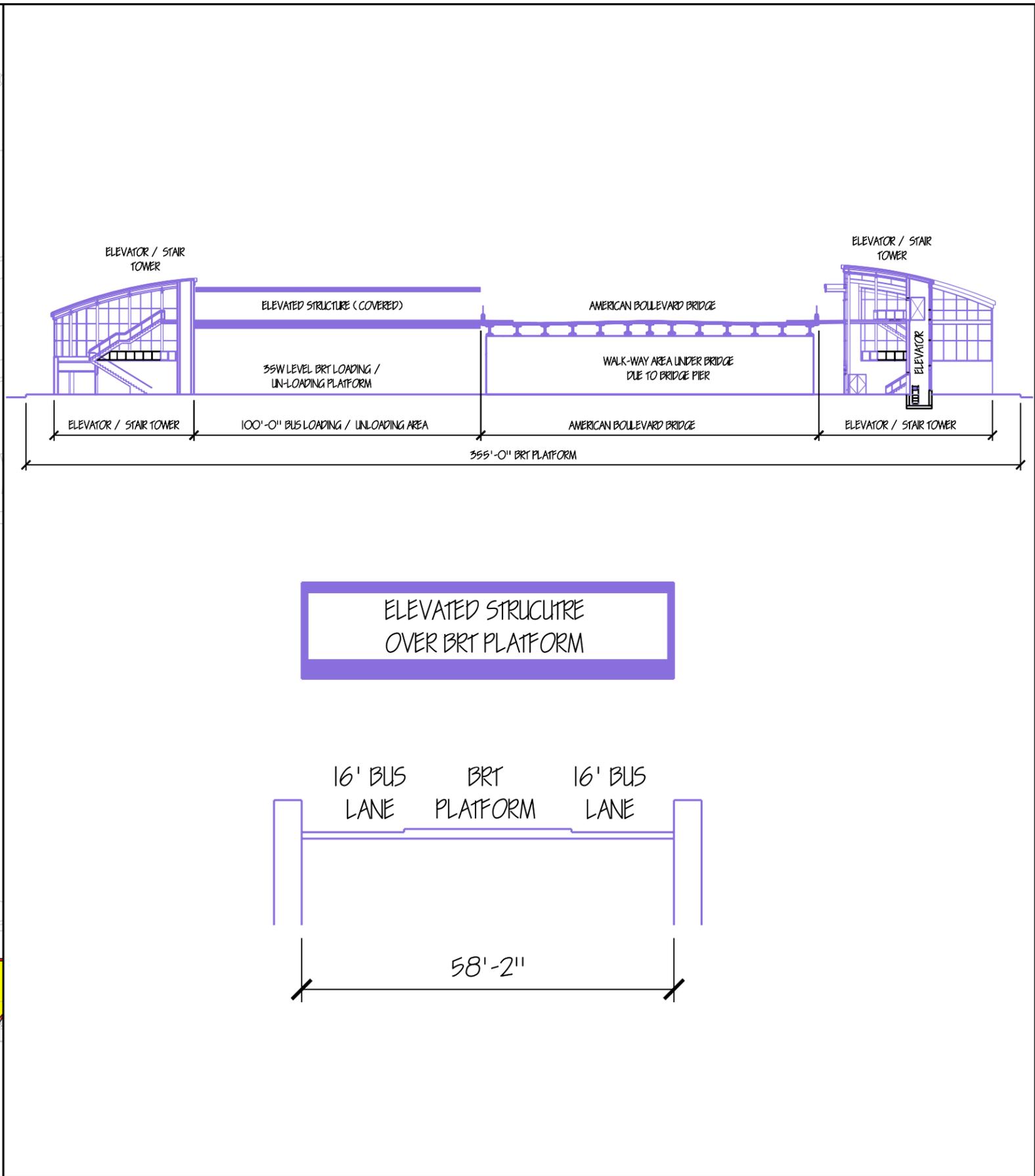
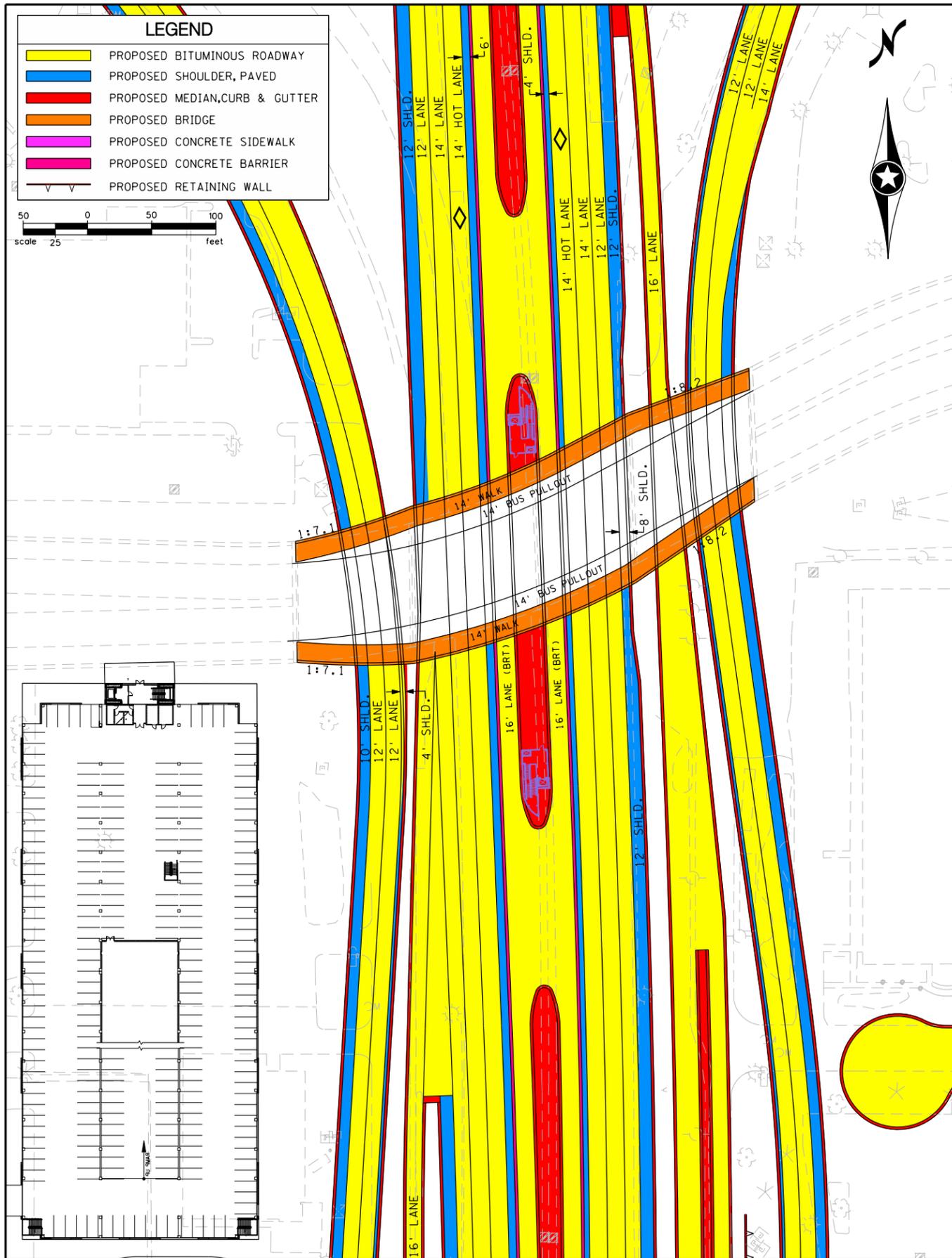
scale 100 200 400 feet



TURBINE-PHASE 1B : BRT ONLY AT AMERICAN BLVD.
 I-494 /35W INTERCHANGE PRELIMINARY DESIGN PROJECT
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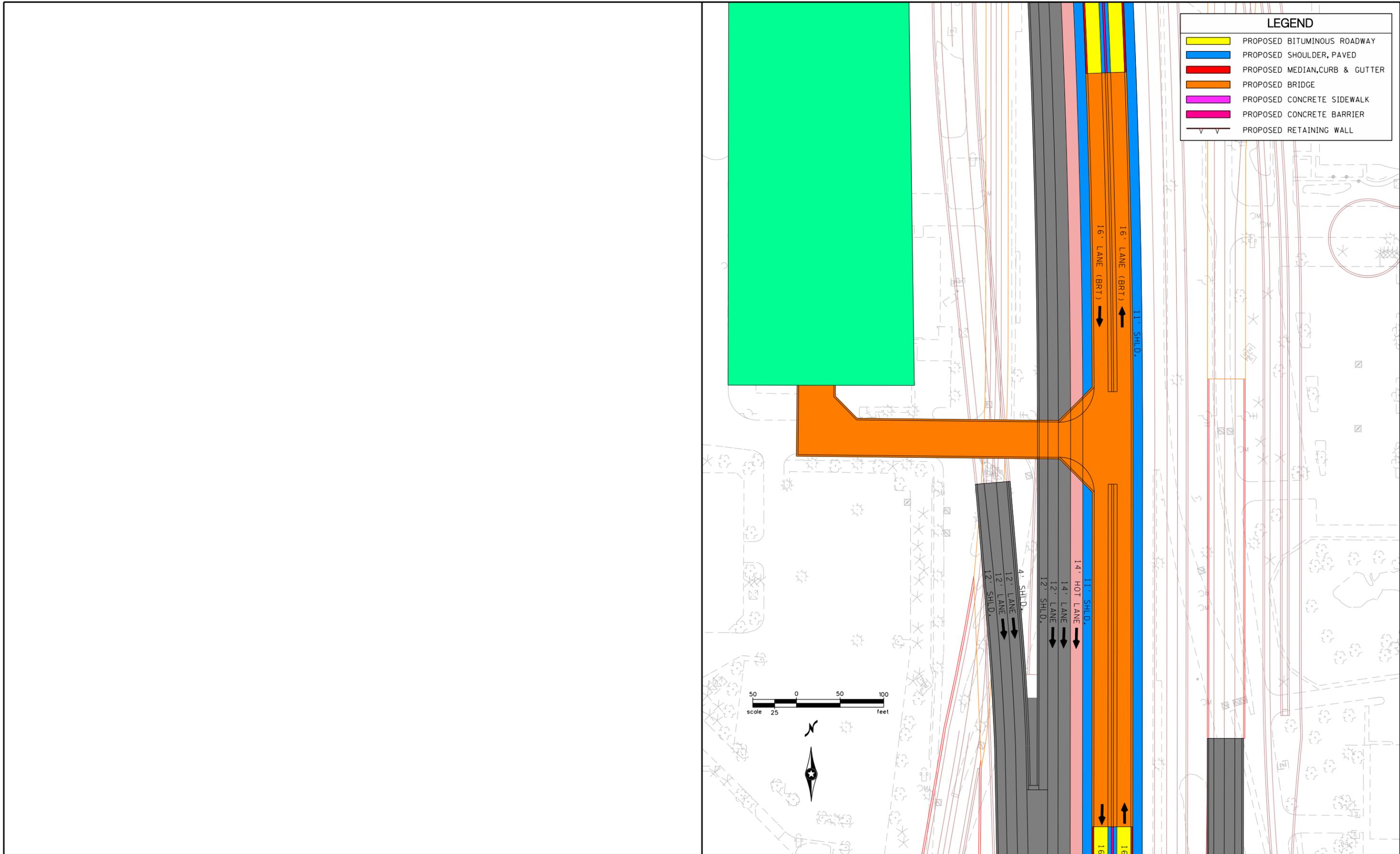
FIGURE D28

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SINGLE PLATFORM



BRT : SINGLE PLATFORM WITH WEAVE
I-494 /35W INTERCHANGE PRELIMINARY DESIGN PROJECT
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FIGURE E1



**Bus Rapid Transit
Alternative Concepts
Comparative Costs Summary**

TABLE G9

BRT Alternative	Bus Rapid Transit Cost Breakdowns								Park and Ride Cost Breakdowns					Total
	Building	Bus Platform Site	Roadway Access	Bus Bridge	Bridge Modifications	Skywalks	Contingency (20%)	Sub Total	Parking decks	Other decks	Facilities	Contingency (20%)	Subtotal	
Single Platform with weave	\$ 3,108,000	\$ 650,000	\$ 1,100,000	N/A	\$ 2,000,000	\$ 1,200,000	\$ 1,611,600	\$ 9,669,600	\$ 5,750,000	N/A	\$ 315,500	\$ 1,213,100	\$ 7,278,600	\$ 16,948,200
Dual Platforms with out weave, direct to Park and Ride	\$ 3,729,600	\$ 780,000	\$ 880,000	N/A	\$ -	\$ 3,000,000	\$ 1,677,920	\$ 10,067,520	\$ 5,750,000	N/A	\$ 315,500	\$ 1,213,100	\$ 7,278,600	\$ 17,346,120
Dual Platforms with out weave, direct to American	\$ 3,729,600	\$ 780,000	\$ 880,000	N/A	\$ 2,000,000	\$ 4,680,000	\$ 2,413,920	\$ 14,483,520	\$ 5,750,000	N/A	\$ 315,500	\$ 1,213,100	\$ 7,278,600	\$ 21,762,120
Off-Line T	N/A	\$ 650,000	\$ 1,045,000	\$ 3,066,000	N/A	\$ -	\$ 952,200	\$ 5,713,200	\$ 5,750,000	\$ 6,094,000	\$ 631,000	\$ 2,495,000	\$ 14,970,000	\$ 20,683,200

Notes:

From 46th St BRT
 Arch, Structural, Mech, Elec. Utilities, sidewalks, stormwater Accel/Decel Lanes

\$35 per sq per stall, 250 stalls per floor, 2 floors per structure \$75 per sq ft, used 250 stalls per floor to figure out sq ft of each floor main stairwell and elevator area

COMPARATIVE COST SUMMARY
Interchange Major Construction Elements

	2001 FEIS Preferred Alternative	Turbine Full Layout	Turbine Phase 1 w/ BRT	Turbine Phase 1 w/o BRT	Turbine BRT Only
Construction Cost	\$270,620,000	\$237,580,000	\$46,340,000	\$20,060,000	\$25,130,000
Interim Pavement Construction Cost			\$11,920,000	\$6,090,000	\$9,460,000
Total	\$270,620,000	\$237,580,000	\$58,260,000	\$26,150,000	\$34,590,000

Values rounded to the nearest ten thousand

Notes:

Cost estimates developed in Mn/DOT LWD format

Major construction elements include roadway pavements, bridges, median barriers, and retaining walls

Cost estimates include 20% contingency

Interim pavement would be removed to accommodate the full build layout



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