US 69 PRE-PLANNING ANALYSIS
SUMMARY MEMORANDUM

March 2020

Presented to:
City of Overland Park
Kansas Turnpike Authority
Kansas Department of Transportation

Presented by:
HNTB Corporation

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US 69 Pre-Planning Analysis
Executive Summary

Purpose of US 69 Pre-Planning Analysis

The purpose of the US 69 Pre-Planning Analysis conducted by the City of Overland Park is to assist the partner agencies of the Kansas Department of Transportation (KDOT) and the Kansas Turnpike Authority (KTA) to answer two primary questions for the US 69 corridor: 1.) How much gross toll revenue can express toll lanes generate and 2.) Are the revenues from express toll lanes able to support construction, maintenance, and/or operations of the US 69 corridor?

The partner agencies discussed desired objectives with potential US 69 express toll lane implementation and developed the following objectives in order of priority:

1. Corridor safety
2. Trip reliability
3. Corridor sustainability
4. Mobility
5. Revenue generation
6. Promotion of transit and/or multi-occupant trips
7. Technology

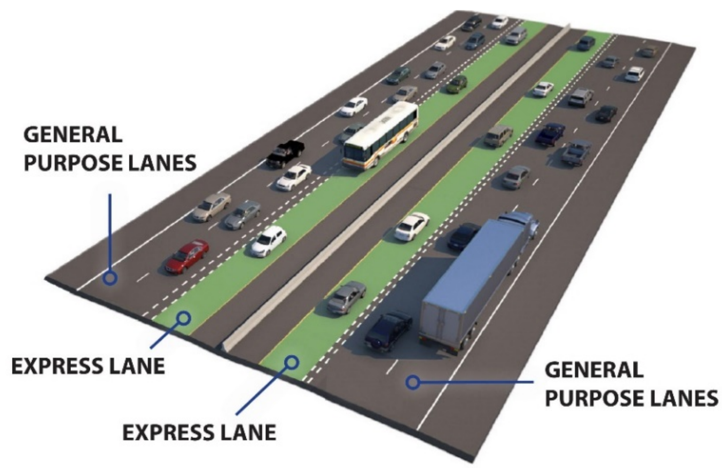
Background

In 2016 the City of Overland Park, in coordination with KDOT, initiated the US 69 Corridor Study. The US 69 Corridor Study, completed in June 2018, recommended expanding the US 69 mainline from two to three through lanes in each direction from 179th St. to 103rd St. along with a number of other improvements.

The US 69 Corridor Study did not consider all potential improvement strategies that could be employed, nor did it include all preparatory activities necessary to advance improvements to construction. In the 2019 legislative session, the Kansas Legislature passed, and Governor Laura Kelly signed into law, HB2369. HB2369 grants additional authority to KDOT to use tolling on a limited basis. With the additional authority provided to KDOT through HB2369, the City of Overland Park initiated this pre-planning analysis to better understand the range of potential revenue generation from express toll lanes on US 69.

Express Toll Lane Concept

This study considered the incorporation of express toll lanes into the configurations previously developed with the US 69 Corridor Study. The image below illustrates conceptually the addition of express toll lanes into the US 69 corridor.



Two Improvement Scenarios were considered as part of this analysis.

- Scenario 1 – Add one express toll lane in each direction from 103rd St. to 179th St.
- Scenario 2 – Add one express toll lane in each direction from 103rd St. to 151st St.

Capital cost estimates were developed for the two improvement scenarios for toll-free and express toll lane configurations. Estimates for both toll-free and express toll lane configurations assume the existing general purpose lanes are reconstructed within the limits of each Improvement Scenario. Scenario 1 represents a full-build scenario where the ultimate improvements are constructed from 103rd St to 179th St. Scenario 2 represents a partial-build scenario within the anticipated limits of an initial construction project from 103rd St. to 151st St.

US 69 Pre-Planning Analysis
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The total Capital Cost (2025 Dollars) for both Improvement Scenarios under tolled and toll-free conditions are shown in the table below.

Capital Cost Estimates (2025 Dollars)

	Scenario 1 Full Build	Scenario 2 Partial Build
Toll-Free	**$547M**	**$258M**
Express Toll Lanes	**$565M**	**$299M**

Processing of toll transactions, collection of toll revenues, maintenance, and periodic replacement of the roadside toll systems all have costs above those of a toll-free facility. Estimates of these costs over a 30-year period are shown below for the two improvement scenarios:

- Scenario 1 = $266M
- Scenario 2 = $192M

US 69 Traffic and Revenue

Toll traffic, gross revenue, and net revenue estimates were developed for the two improvement scenarios.

Revenue Comparison
(30-Years, 2025 – 2055)

	Scenario 1 Full Build	Scenario 2 Partial Build
Gross Revenue	**$504M**	**$435M**
Toll and Roadway Operations and Maintenance and Replacement Reserves	-$266M	-$192M
Net Revenue	**$238M**	**$243M**

Source: HNTB

Net revenue calculations show that both Scenarios 1 and 2 are anticipated to have positive net revenue over the assumed 30-year period and can support ongoing costs for operations, maintenance, and replacement reserves. Scenario 2 is expected to produce slightly higher net revenue despite generating lower anticipated gross revenue.

Conclusions

This pre-planning analysis, conducted at a sketch-planning level, yields the following answers to the partner agencies' two primary questions:

- **How much gross toll revenue can express toll lanes generate?** The US 69 corridor express toll lanes can generate approximately $504M (Scenario 1) and $435M (Scenario 2) gross toll revenue between 2025 and 2055.

- **Are the revenues from express toll lanes able to support construction, maintenance, and/or operations of the US 69 corridor?** Yes, anticipated revenues from express toll lanes are able to support toll system and roadway operations, maintenance and replacement reserves. In addition, Scenario 2 could pay for a portion of the project's capital costs with toll revenue financing.

Results from this pre-planning analysis yield the following additional conclusions:

1. Express toll lanes are feasible from an engineering perspective.
2. Both Improvement Scenarios 1 and 2 are net revenue positive and likely can fully support ongoing O&M.
3. Scenario 2 has higher anticipated net revenues. Scenario 2 is a more viable initial express toll lane project.
4. While net revenues are positive over a 30-year period, net revenues in the first 10 years of operation are anticipated to be low.
5. Several factors indicate that the overall financial results may be more favorable with further study.

In summary, the results from the pre-planning analysis are positive and warrant additional study.

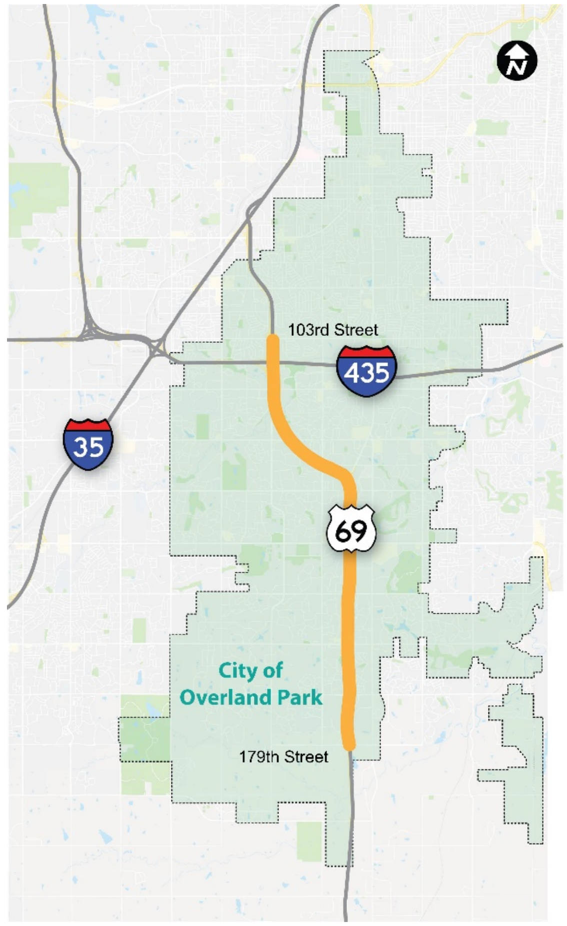
1.0 Introduction

1.1 Purpose

The purpose of this summary memorandum is to document the methodology, analysis, conclusions, and recommendations of the US 69 Pre-Planning Analysis. This analysis conducted by the City of Overland Park is intended to assist the partner agencies of the Kansas Department of Transportation (KDOT) and the Kansas Turnpike Authority (KTA) to answer two primary questions for the US 69 corridor:

- How much gross toll revenue can express toll lanes generate?
- Are the revenues from express toll lanes able to support construction, maintenance, and/or operations of the US 69 corridor?

Figure 1: US 69 Corridor

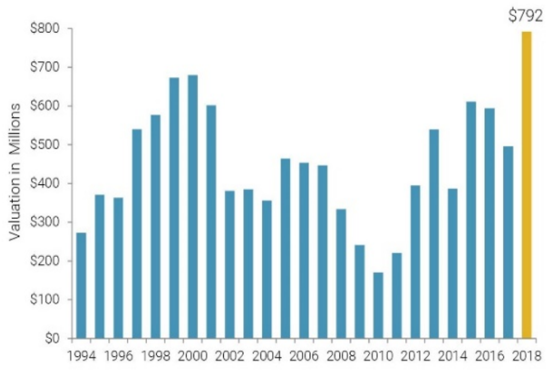


1.2 Background and Previous Studies

US 69 is a vital component of the transportation network in the City of Overland Park, the Kansas City metropolitan area and eastern Kansas. Often referred to as the backbone of Overland Park, US 69 extends through the City between the junction with Interstate 35 (I-35) to the southern city limit. It connects many of the primary east-west arterial streets in the City providing connectivity to major employment centers and residential areas. More than 225,000 people and 10,000 businesses are located within five miles of US 69. Additionally, Overland Park is a growing community. Since 2015, new private development in the City of Overland Park has exceeded $500M per year - with a new all-time high of $792M in 2018.

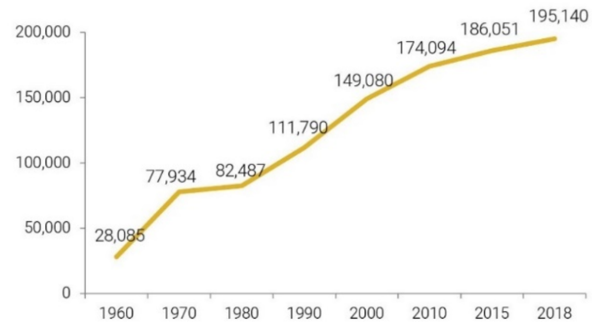
Overland Park also continues to be one of the fastest growing communities in the state of Kansas and the Kansas City metropolitan area. Between 2013 and 2017 Overland Park population grew at a rate of approximately 5.5% per year adding nearly 10,000 new residents.

Figure 2: Overland Park New Construction Annual Valuation (1994-2018)



Source: City of Overland Park Building Permit Data

Figure 3: Overland Park Population Growth (1960 – 2018)



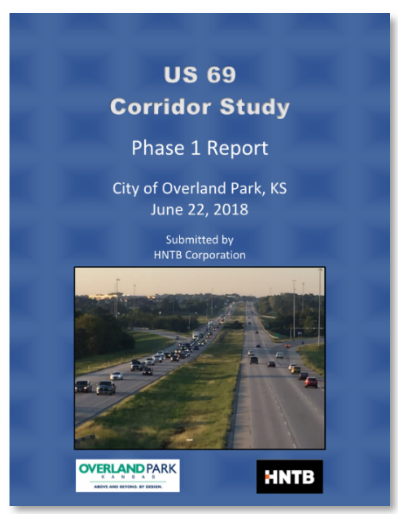
Source: US Census; City of Overland Park Population Estimates (2010-current)

However, the resulting traffic demand generated by ongoing development and increasing population continues to deteriorate operational conditions in the US 69 corridor. In 2016 the City, in coordination with KDOT, initiated the US 69 Corridor Study in order to:

- Understand the existing problems within the corridor from a traffic operations and safety perspective, as well as understand the condition of the existing infrastructure;
- Evaluate the effects of continued traffic growth if no improvements are made in the corridor;
- Revisit and update the improvement concepts last studied as part of the 1999 I-35/US 69 Major Impact Study; and
- Explore various phased implementation strategies for the corridor.

The US 69 Corridor Study, completed in June 2018, recommended the following improvements in the corridor:

- Expand the US 69 mainline from two to three through lanes in each direction from 179th Street to 103rd Street;
- Reconstruct the existing pavement and bridges;
- Construct a braided ramp to eliminate the left entrance of southbound Blue Valley Parkway to southbound US 69;
- Construct Collector-Distributor roads in segments with high weave volumes;
- Construct auxiliary lanes between interchanges in lower volume segments; and
- Construct various improvements to ramps and arterial streets at the interchanges within the corridor.



However, the Corridor Study did not consider all potential improvement strategies that could be employed, nor did it include all preparatory activities necessary to advance improvements to construction. Rather, the study team recommended the following next steps a part of a future, more comprehensive evaluation:

- Conduct NEPA and a Break-in-Access study;
- More thoroughly evaluate other improvement strategies including multimodal alternatives and non-highway solutions;
- Engage stakeholders and the public in the evaluation of various improvement alternatives;
- Conduct an economic impact analysis to support the need for improvements in the corridor; and
- Evaluate alternatives for funding future improvements.

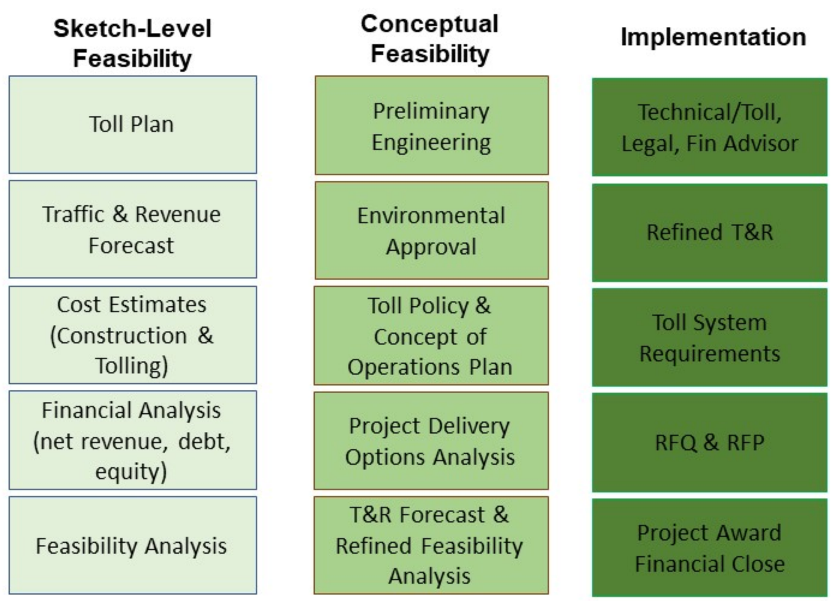
In the 2019 legislative session, the Kansas Legislature passed, and Governor Laura Kelly signed into law, HB2369. HB2369 grants additional authority to KDOT to use tolling on a limited basis. Key components of HB2369 include:

- Authority to use tolling to offset a *portion* of a project's costs for construction, maintenance, and operations;
- Limitations on tolling only new roadways or bridges or *only additional capacity* on existing roadways; and
- Establishes a process for review and approval of any new toll project.

With the additional authority provided to KDOT through HB2369, the City of Overland Park initiated this pre-planning analysis to better understand the range of potential revenue generation from express toll lanes (ETL) on US 69. The results of the pre-planning analysis are discussed in the following pages of this memorandum.

This pre-planning analysis was conducted at a sketch-planning level based on industry best practices for toll traffic and revenue feasibility assessments and is the first of potentially three phases of feasibility analysis. Subsequent levels of feasibility analysis typically include activities shown in **Figure 4**. The pre-planning analysis was not developed at a level necessary to meet investment-grade traffic and revenue and cost requirements in support of actual toll revenue bond financing. Rather, it was developed at a sufficient precision level to provide the City of Overland Park, KTA and KDOT a level of confidence on whether various tolling scenarios are worthy of further study.

Figure 4: Levels of Toll Feasibility Analysis



2.0 Methodology

This section discusses the study methodology for the following pre-planning tasks:

Task 1 – Establish Baseline Conditions
Task 2 – Corridor Concepts and Cost Estimates
Task 3 – High-level Financial Analysis
Task 4 – Scenario Evaluation and Screening

2.1 Establish Baseline Conditions

Task 1 activities included a review of the toll-free traffic forecasts developed during the 2018 US 69 Corridor Study and establishment of design criteria for corridor improvements concepts. Additionally, the partner agencies discussed desired objectives with potential express toll lane implementation and developed the following objectives in order of priority:

1. Corridor safety
2. Trip reliability
3. Corridor sustainability
4. Mobility
5. Revenue generation
6. Promotion of transit and/or multi-occupant trips
7. Technology

The remainder of the pre-planning analysis, in particular the traffic and revenue and resulting financial analysis, was guided by the partner agencies' prioritization of trip reliability and mobility above revenue generation.

2.2 Corridor Concepts and Cost Estimates

The conceptual engineering concepts and layouts previously developed through the US 69 Corridor Study served as a starting point for express toll lane concepts. Evaluation of express toll lane concepts was limited and considered two alternative improvement strategies:

- **Alternative 1** - Incorporation of one express toll lane in each direction into the configurations previously developed with the US 69 Corridor Study.

- **Alternative 2** - A reduced-scope, lower-cost alternative for incorporation of one express toll lane in each direction in the corridor while reusing as much existing infrastructure as practical.

For the purpose of this pre-planning analysis, the reduced-scope, Alternative 2, was dismissed by the partner agencies and activities focused on incorporation of express toll lanes into the previously developed improvement concepts. Alternative 2 was not considered further because (1) it did not replace the existing 50-year old pavement and bridges and (2) did not fully address safety and congestion concerns between 135th Street and Blue Valley Parkway including the left southbound on-ramp from Blue Valley Parkway. While Alternative 2 was eliminated for the pre-planning analysis, additional alternatives would be analyzed during the NEPA phase.

With this direction, two scenarios were developed for Alternative 1, with cost estimates, traffic and revenue projections, revenue analysis, and financial analysis developed for two scenarios shown in the table below.

Table 1: Scenarios Evaluated

Scenario Number	Limits	Type	Comments
1	103rd St to 179th St (10.5 miles)	Express Toll Lanes	Add one express toll lane in each direction from south of 103rd St to 179th St
2	103rd St to 151st St (7.0 miles)	Express Toll Lanes	Add one express toll lane in each direction from south of 103rd St to 151st St

Scenario 1 represents a full-build scenario where the ultimate improvements are constructed from 103rd Street to 179th Street. Scenario 2 represents a partial-build scenario within the anticipated limits of an initial construction project from 103rd Street to 151st Street.

2.3 High-level Financial Analysis

Toll-free traffic forecasts developed for the US 69 Corridor Study were used to establish tolled daily traffic projections for a 30-year period. Tolled projections were developed to represent an opening year of 2025 and a bonding year of 2055.

Tolled traffic and toll revenue estimates were developed for the two improvement scenarios shown in **Table 1** on an annualized basis. The following assumptions were the primary drivers of forecasted tolled traffic and revenue:

- Traffic will be managed to a target Level of Service of C or better in the express toll lane;
- Pricing in the express toll lane will be variable and adjusted to maintain the desired Level of Service;
- Pricing for the express toll lane was calculated using a value of time corresponding to a median household income of $81,000/year (U.S. Census); and
- No high-occupancy vehicle (HOV) or discounted trips.

Using the forecasted 30-year gross revenue, estimates of anticipated net revenue were developed accounting for annual costs for toll collection and toll operations, maintenance of the toll systems and express toll lanes, and anticipated replacement costs over the 30-year period. The resulting 30-year net revenue was then analyzed to determine proceeds potentially available through toll revenue bonding to finance the initial construction. Projected bond proceeds were developed for both a stand-alone toll project as well as with gross revenue and net revenue system pledges, whereby a shortfall in actual toll revenues is backed by revenue from other sources.

A number of traffic and revenue assumptions were reviewed with the partner agencies and then used in the analysis to develop reasonable ranges of forecasts representing the likely order-of-magnitude toll traffic volumes and toll revenue. These assumptions are shown in **Table 2**.

Table 2: Traffic and Revenue Assumptions

Number of Lanes	One express toll lane in each direction
Permitted Users	Passenger cars, transit vehicles, and emergency responders permitted Commercial trucks and cars with trailers prohibited
Toll-Free/Tolled Usage	All passenger vehicles pay the full toll rate; No discount for HOV Transit and emergency vehicles permitted toll-free
Toll Collection	Tolls collected through electronic toll collection (ETC) only All vehicles must have a K-TAG or similar, interoperable transponder Cash and video license plate tolling not accepted
Maximum Volume in Express Toll Lanes	Traffic managed through variable pricing to target LOS C or better operations in the express toll lane
Toll Rates	\$0.30 - \$0.40 / mile during peak demand periods \$0.01 - \$0.10 / mile during off-peak periods
Value of Time	Value of time corresponding to median household income of ~\$81,000 (Johnson County, KS). Sources: US Census
Revenue Adjustments	Revenue projections assume uncollected revenue (leakage) of 5%
Annualization Factors	Traffic and revenue annualized using 300 equivalent weekdays

2.4 Scenario Evaluation and Screening

Using the cost estimates and results from the revenue analysis and financial analysis, the two improvement scenarios were compared against each other using a combination of quantitative and qualitative factors. This is summarized in **Section 6** of this memorandum.

3.0 Concepts and Cost Estimates

The following section discusses the express toll lane concepts and cost estimates.

3.1 General Corridor Improvements

As was noted in **Section 1**, the engineering concepts and layouts previously developed for the US 69 Corridor Study served as a starting point for express toll lane concepts. Concepts developed for this pre-planning analysis maintain similar recommended improvements but with the additional mainline through lanes (one lane each direction) constructed as express toll lanes. **Figure 5** below illustrates the typical lane configuration present on US 69 today consisting of 2 toll-free, general purpose lanes in each direction. **Figure 6** illustrates the express toll lane concept with the additional mainline through lanes added as express toll lanes. Note that the same number of general-purpose lanes as exist today would remain toll-free.

Figure 5: Existing US 69 Typical Section

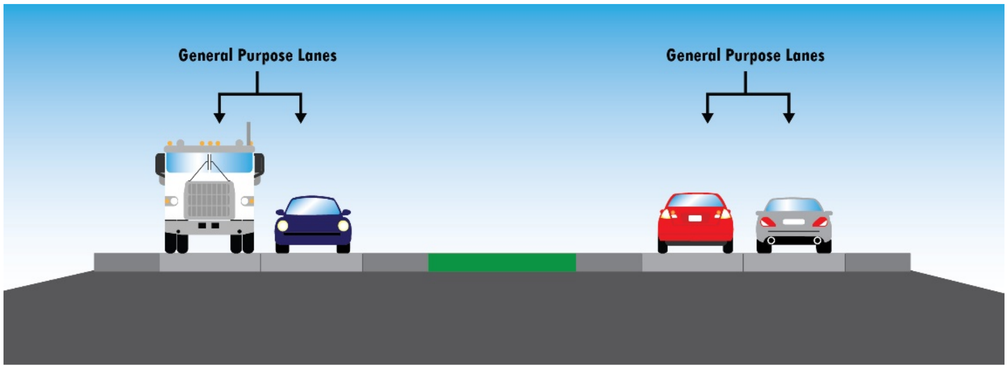
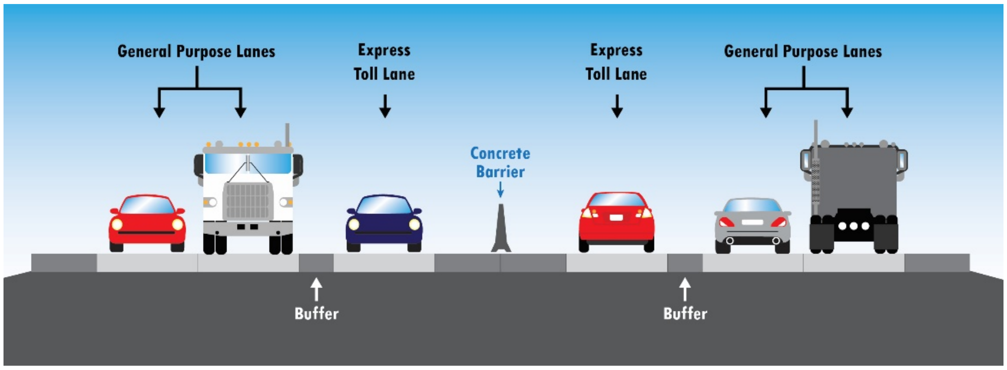


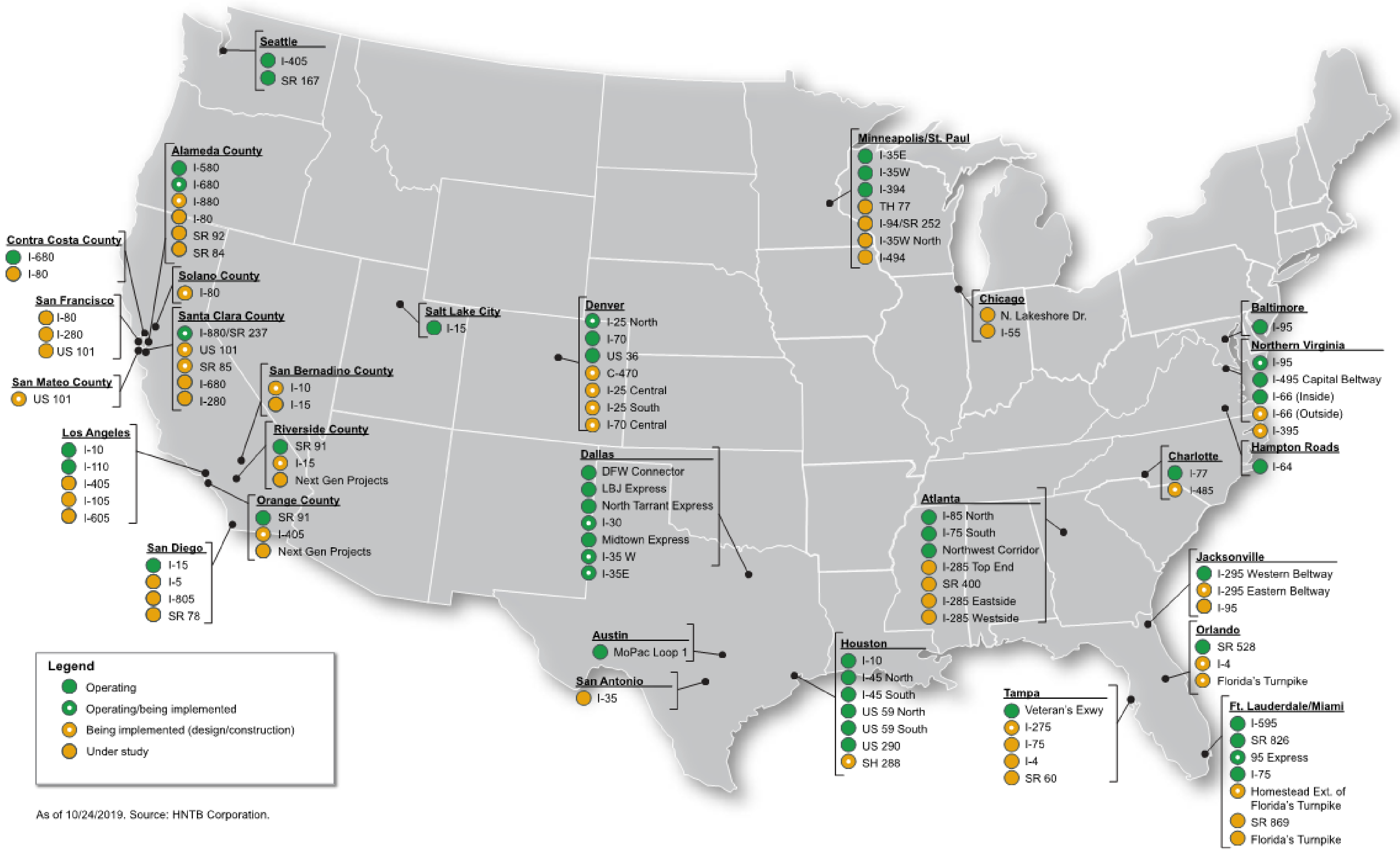
Figure 6: US 69 Express Toll Lane Typical Section



3.2 Express Toll Lane Configuration

The number of operational express toll lanes across the United States is growing with more in various stages of study, planning, and project development as shown by **Figure 7.**

Figure 7: Express Toll Lanes Across the United States



As of 10/24/2019. Source: HNTB Corporation.

Configurations, permitted usage, toll collection method, and pricing structure vary significantly based on the objectives of the operating agency, traffic characteristics, surrounding environment, and other factors. For the purpose of this analysis the partner team was presented with alternative roadway configurations for elements that have the greatest impact on capital cost. Those include:

- Separation type
- Access Type

Separation Type

Separation between the express toll lanes and the general purpose (toll-free) lanes is commonly accomplished in one of three ways:

- Positive separation using concrete safety barrier or another barrier system;
- Delineation with flexible markers; and
- Buffer separation with pavement markings only – no physical barrier.

Examples of each approach are shown in **Figure 8**. Separation using concrete safety barrier is the most expensive approach and has the greatest impact on roadway footprint due to the addition of required shoulders on both sides of the barrier. However, because of the physical separation that prevents users from entering or exiting the express toll lanes except where permitted, enforcement and toll collection are simplified.

Delineation with flexible markers is a common solution that is less expensive than hard barrier, has less impact on roadway footprint, and still deters drivers from entering or existing the express toll lanes except where permitted. However, in states where snowfall is common, snow removal operations often damage the flexible markers creating a perpetual maintenance challenge for the operating agency.

Buffer separation is the least expensive alternative and has the least impact on roadway footprint. However, since there is no physical barrier that prevents users from entering or exiting the express toll lanes, enforcement is more difficult and requires a higher level of technology deployment. Uncollected toll revenue, or leakage, is also typically higher with buffer separation.

Figure 8: ETL Separation Examples

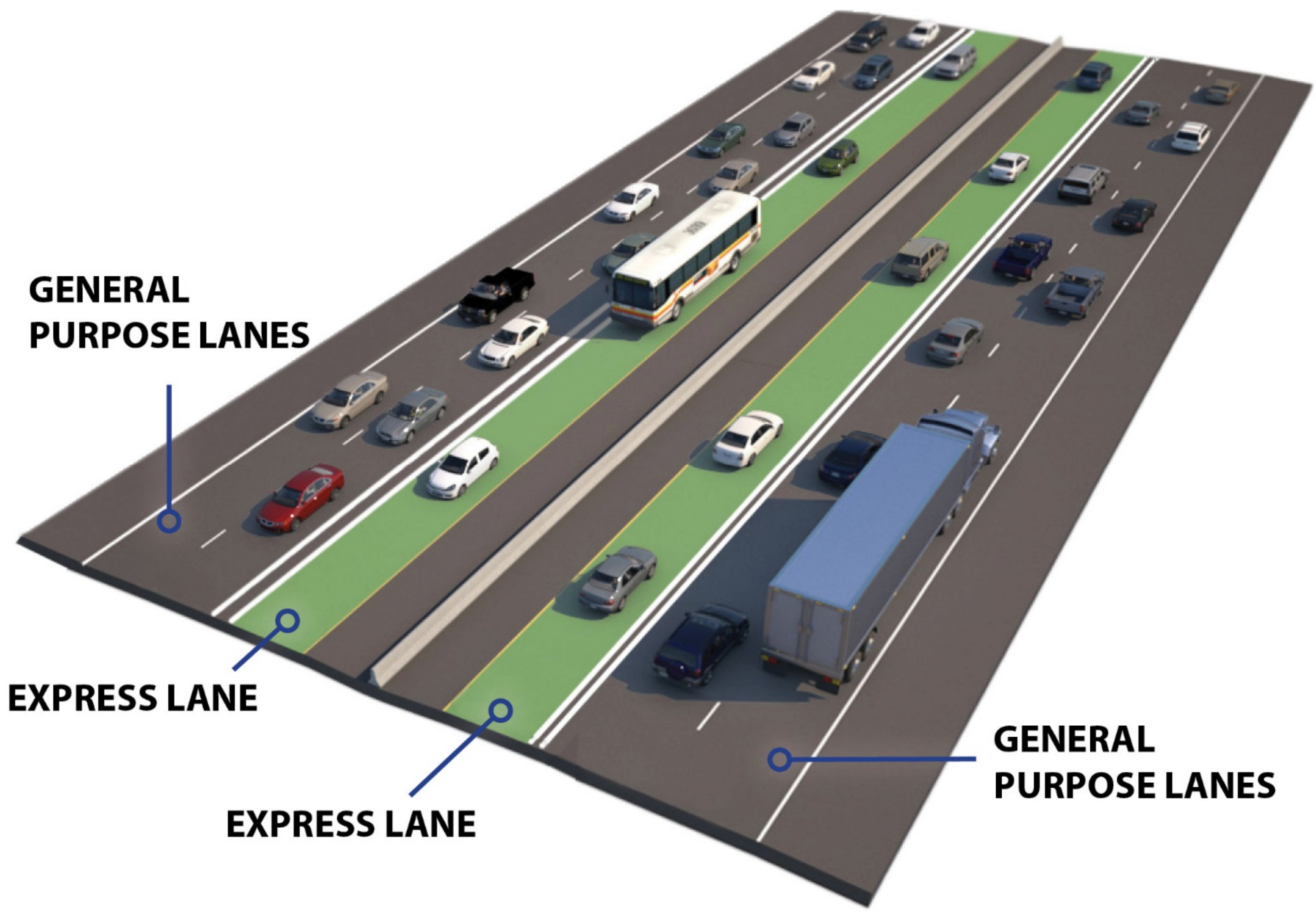
Concrete Safety Barrier

Flexible Markers

Buffer Separation

Considering factors including cost, ease of routine maintenance, and physical restrictions, for the purposes of this analysis, the partner agencies selected buffer separation as the preferred separation approach. **Figure 9** shows the typical express lane layout selected for this analysis.

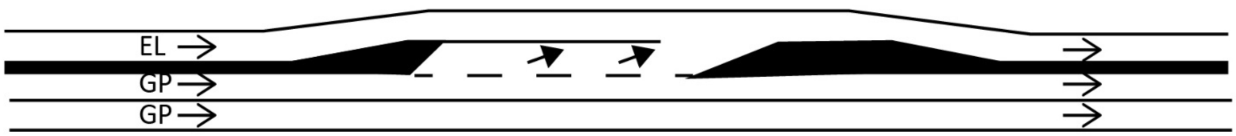
Figure 9: Express Toll Lane Typical Layout



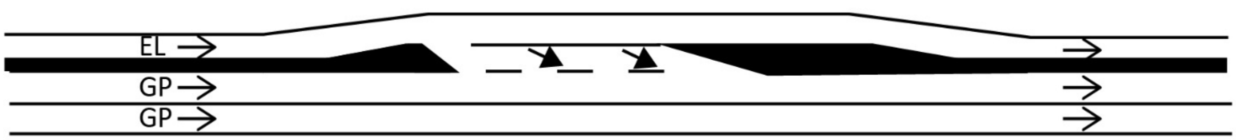
Access Type

Access strategy can also dramatically impact project cost. Common access approaches include at-grade access where vehicles enter and exit the express toll lanes from the adjacent general-purpose lanes, and grade-separated access with direct connections to and from the express toll lanes. The partner agencies selected at-grade access as the preferred approach as this the most economical. There are a variety of ways at-grade access can be provided as shown schematically in **Figure 10**.

Figure 10: Typical Express Toll Lane Access Configurations

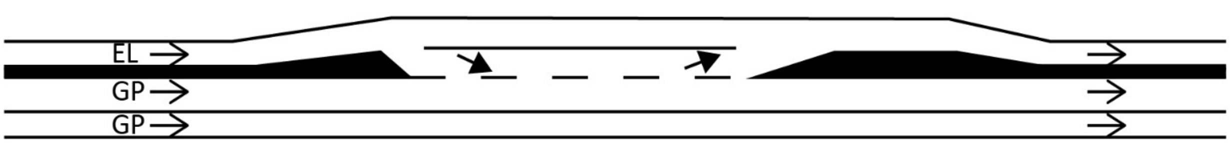


Typical Ingress Only



Typical Egress Only

Typical Combined Ingress / Egress Weave Zone



Typical Combined Ingress / Egress Weave Lane

Access configurations should be carefully selected based on considerations for safety, operational performance, right-of-way limitations, and cost. The partner agencies selected at-grade weave zone access as the preferred approach for this analysis because it provided the most economical approach and requires the least amount of revision of the previously developed toll-free improvement concepts. Note that no operational analysis or safety analysis of this configuration was performed.

The spacing needed to safely introduce weaving between the express toll lanes and the general-purpose lanes limits locations to corridor segments with interchanges spaced greater than 1.5 miles apart. Below are the anticipated US 69 weave zone locations within the limits of this analysis:

- Between 179th Street and 167th Street
- Between 151st Street and 135th Street
- Between Blue Valley Parkway & 119th Street
- Between 119th Street & I-435 (Northbound Only)

Improvement Scenario 1 includes all weave zone locations listed above. Scenario 2 would not include the weave zone between 179th Street and 167th Street as this is beyond the southern limit of Scenario 2. Weave zone locations are shown in greater detail in the Appendix for the two improvement scenarios.

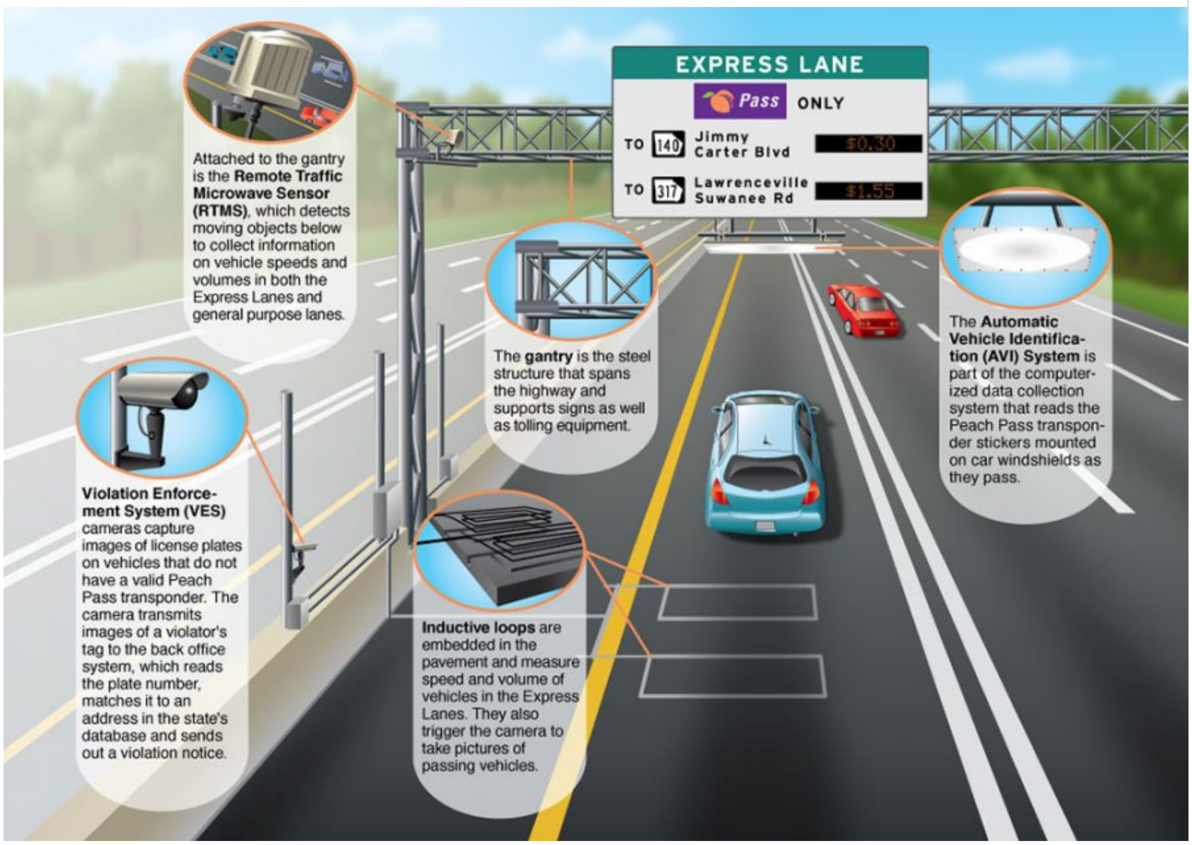
3.3 Roadside Toll Systems & Signing

Express toll lane roadside toll systems typically include the following components:

- Automatic Vehicle Identification Systems (AVI) for reading electronic toll tags, such as KTA's K-TAG;
- Cameras to capture images of vehicle license plates - typically front and rear facing;
- Sensors for detecting vehicle speeds and density;
- Dynamic signs for communicating pricing;
- Static signs communicating distances to various access points;
- Structures or gantries to support toll equipment and signing;
- Cabinets housing controllers for the roadside equipment; and
- Fiber optic cable.

Figure 11 is an illustrative example from the I-85 Express Lanes in Atlanta, GA and is similar to the configuration anticipated for US 69. The selected access configuration (buffer-separated, at-grade weave zone access) typically requires more frequent spacing of roadside toll equipment in order to deter unwanted movement into and out of the express toll lane. This analysis assumed roadside toll system installations spaced every half mile through the segments where ingress/egress is prohibited.

Figure 11: Roadside Toll System & Signing Illustrative Example



Source: Georgia DOT, I-85 Express Lanes in Atlanta, GA

3.4 Capital Cost Estimates

Capital cost estimates were developed using the US 69 Corridor Study as a baseline. The partner agencies' decision to maintain the same overall roadway improvement scope as was developed during the US 69 Corridor Study, and decisions relative to express toll lane separation and access, meant that the estimates from the previous study could be used with minor modification.

Capital cost estimates were developed for the two improvement scenarios. Scenario 1 represents a full-build scenario where the ultimate improvements are constructed from 103rd Street to 179th Street. Scenario 2 represents a partial-build scenario within the anticipated limits of an initial construction project from 103rd Street to 151st Street. Capital costs for all scenarios were inflated at 2.5% per year to Year 2025 dollars for consistency with estimates developed by KDOT for the 2019 local consult meetings. Improvements included in Scenario 2 are similar in scope to a combination of two projects discussed during the 2019 local consult meetings:

- US 69 Johnson County: 119th Street North to I-435 (Project ID #809)
- US 69 Johnson County: 119th Street South to 159th Street in Overland Park (Project ID # 835)

Capital cost estimates include contingencies of 35% for the toll systems and for roadway improvements south of 119th Street where no design has been completed, and 7% for roadway improvements north of 119th Street where some design has been completed. Capital costs for both improvement scenarios under tolled and toll-free conditions are summarized in **Table 3**.

Table 3: Capital Cost Estimates

Item	Toll-Free		Express Toll Lanes	
	Scenario 1 (Full-Build)	Scenario 2 (Partial-Build)	Scenario 1 (Full-Build)	Scenario 2 (Partial-Build)
Roadway Construction (2016 Dollars)	$441,000,000	$208,000,000[1]	$441,000,000	$232,000,000[1]
Inflation	$34,000,000	$16,000,000	$34,000,000	$18,000,000
Roadway Construction (2019 Dollars)	$475,000,000	$224,000,000	$475,000,000	$250,000,000
Toll Systems (2019 Dollars)	$0	$0	$16,000,000	$10,000,000
Total Capital Cost (2019 Dollars)	**$475,000,000**	**$224,000,000**	**$491,000,000**	**$260,000,000**
Inflation	$72,000,000	$34,000,000	$74,000,000	$39,000,000
Total Capital Cost (2025 Dollars)	**$547,000,000**	**$258,000,000**	**$565,000,000**	**$299,000,000**

Source: HNTB preliminary costs.
[1]The partial-build toll-free project from the US 69 Corridor Study ($208M) did not include additional through lanes to 151st St. The partial-build tolled project does include additional through lanes to 151st St, thus the additional cost.

3.5 Operations, Maintenance, and Replacement Reserve Cost Estimates

Processing of toll transactions, collection of toll revenues, maintenance and periodic replacement of the roadside toll systems all have costs above those of a toll-free facility. Estimates of these costs over a 30-year period were developed for the two scenarios based on the following assumptions:

- Toll transaction processing costs = $0.07/ETC toll tag transaction
- Maintenance of the roadside toll systems = $10,000/year/gantry
- Toll system replacement costs = 75% of the initial capital cost every 10 years

Additionally, it was assumed that toll revenues would be used to offset the roadway maintenance and replacement reserve costs for the express toll lanes only. Costs for maintenance and replacement of the toll-free infrastructure would continue to be covered from other KDOT revenues. Costs for roadway maintenance and roadway replacement reserve were developed for the two scenarios based on the following assumptions:

- Roadway maintenance costs
  - Years 1-10 = $6,000/lane-mile/year
  - Years 11+ = $20,000/lane-mile/year

- Roadway replacement reserve costs
  - Years 1-10 = $0/year
  - Years 11+ = variable percentage of initial roadway capital cost ranging from 0.05%/year to 0.75%/year

Cost assumptions listed above are shown in 2025 dollars. A 2% per year cost escalation is incorporated into the 30-year anticipated operations, maintenance, and replacement reserve costs summarized in **Table 4** for the two improvement scenarios.

Table 4: Operations, Maintenance, and Replacement Reserve Cost Estimates
Aggregate over a 30-year operating period

Item	Express Toll Lanes	
	Scenario 1 (Full-Build)	Scenario 2 (Partial-Build)
Toll Transaction Processing	$133,000,000	$104,000,000
Toll Systems Maintenance	$18,000,000	$11,000,000
Toll Systems Replacement Reserve	$80,000,000	$53,000,000
Roadway Maintenance (express toll lanes only)	$16,000,000	$10,000,000
Roadway Replacement Reserve (express toll lanes only)	$19,000,000	$14,000,000
Total Operations, Maintenance, and Replacement Reserve Costs	**$266,000,000**	**$192,000,000**

Source: HNTB preliminary costs.

4.0 Traffic and Revenue

This section describes the methodology and results of the preliminary traffic and revenue estimates for the proposed US 69 express toll lanes. These traffic and revenue projections along with the corridor program costs are the primary data inputs into the toll feasibility financial analysis. The data and analysis used for the traffic and revenue estimation is preliminary in nature. As such, the estimates included herein are not suitable for use directly in project financing. A more comprehensive data collection and analysis (including additional stated-preference surveys and an independent economic analysis of the region) would need to be undertaken for this purpose.

The traffic and revenue estimation process included the development of future toll-free traffic estimates, a high-level assessment of toll traffic volumes on the express lanes by time of day, and the estimation of the total toll revenue potential of the US 69 corridor for two different scenarios. The outcome of the traffic and revenue estimation process is an annual traffic and revenue forecast from the opening year 2025 to year 2055 for the two scenarios.

4.1 Traffic

Traffic forecasts developed in the 2018 US 69 Corridor Study were used to establish toll-free daily traffic projections for the US 69 corridor between 2025 and 2055. The Corridor Study assumed an average annual global traffic growth rate of 2% per year. Since the Corridor Study was started in 2016, actual traffic growth was reviewed using KDOT daily traffic counts. KDOT's historical AADT (Annual Average Daily Traffic) data was used to produce current traffic growth between the years of 2015 to 2017. Over the two-year period, the average increase in traffic volume was 7,600 vehicles (6.5%), with the highest traffic growth of 15,400 vehicles (10.6%) between College Boulevard and 119th Street, as shown in **Table 5**. The corridor annual average growth rate of 6.5% is well above the 2% average growth rate assumed in the

Corridor Study. The original 2% annual growth rate north of 135th Street and 4.2% annual growth south of 135th Street was maintained for the pre-planning analysis. However, future feasibility analysis should revisit these growth assumptions and, in coordination with Mid-America Regional Council, develop more detailed, non-linear traffic forecasts.

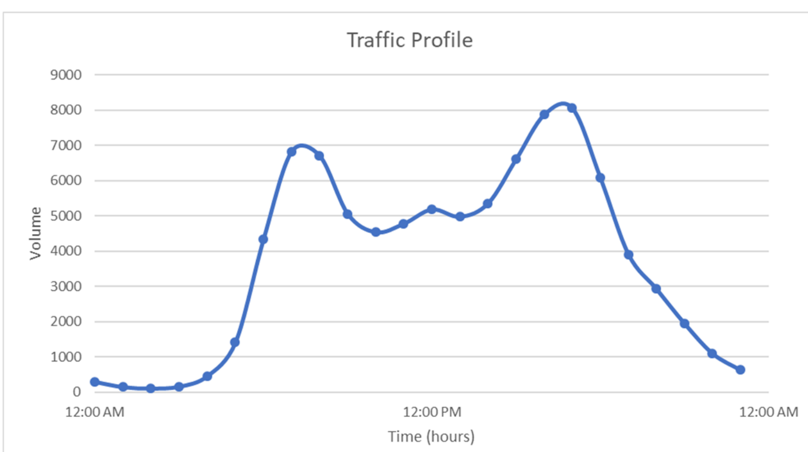
Table 5: US 69 Historical Two-Way Daily Traffic

US 69 Segment	KDOT Calendar Year AADT			Total Two-Year Volume Increase	Annual Average Percent Increase
	2015	2016	2017		
103rd to I-435	80,400	83,100	84,600	4,200	2.5%
I-435 to College	79,800	82,500	84,000	4,200	2.6%
College to 119th	72,900	75,400	88,300	15,400	10.6%
119th to BVP	57,900	59,900	66,400	8,500	7.3%
BVPW to 135th	75,600	78,200	88,300	12,700	8.4%
135th to 151st	53,400	56,700	59,400	6,000	5.6%
151st to 167th	33,600	34,700	40,900	7,300	10.9%
167th to 179th	25,400	26,200	27,700	2,300	4.2%
			Average	**7,600**	**6.5%**

Source: KDOT Historical traffic count.

In order to better understand the current US 69 traffic demand and daily traffic profile along US 69, a single 24-hour traffic count was collected in October 2019 between Blue Valley Parkway and 135th Street. The October two-way daily traffic volume was 89,514 vehicles. This is a one-day count but is in line with the KDOT AADT traffic growth projections at this location shown in **Table 5** above. Review of the data indicates that the AM peak hour is 7.7% and the PM peak hour is 9.1% of the total daily volume. These values are indicative of congestion and peak-hour spreading occurring in the corridor.

Figure 12: US 69 2019 Two-Way Daily Traffic Profile between Blue Valley Parkway and 135th Street



Source: October 2019 US 69 traffic count between Blue Valley Parkway and 135th Street.

Table 6 below shows the global traffic demand in the US 69 corridor for future year 2025 and 2040. This future corridor demand was estimated by applying growth rates (based off traffic growth assumptions from the 2018 US 69 Corridor Study, 2% north 135th Street and 4.2% south of 135th Street) to the existing 2016 counts in the Corridor Study. The volumes show the global toll-free demand for the opening year 2025 and future year 2040 for key sections of the US 69 corridor. Beyond 2040, the express lane traffic was extrapolated at 50% of the annual growth rate through 2055. The same global demand estimates were assumed for both Scenario 1 and 2.

Table 6: US 69 Two-Way Daily Toll-Free Traffic Volumes

Segment	2025	2040
103rd St - College Blvd	98,400	116,200
College Blvd - Blue Valley Pkwy	69,600	82,400
Blue Valley Pkwy - 151st St	70,000	92,600
151st St - 179th St	30,000	45,300

Rounded to nearest 100.

4.2 Gross Annual Traffic and Revenue Estimates

Toll traffic and revenue estimates were developed for the two improvement scenarios. First, the share of the corridor global demand that is anticipated to use the proposed express lanes was estimated by time period for each scenario. The average weekday tolled transactions and revenue for each scenario were then annualized by applying an annualization factor of 300 to the average weekday express lanes traffic and revenue estimates. The first two years are expected to have slightly lower revenue due to toll use ramp-up, with the subsequent years showing no-ramp up. For every forecast year, a revenue leakage of 5% was assumed. A comprehensive list of other traffic and revenue assumptions was included previously in **Table 2**.

Gross revenue was calculated for the two improvement scenarios based on the traffic forecasts and assumptions described above. The resulting aggregate gross revenues between years 2025 and 2055 are shown below (in nominal dollars):

- Scenario 1 = $504M
- Scenario 2 = $435M

Calculated annual gross revenue and total annual toll transactions are shown in graphically in **Figure 13** for Scenario 1 and **Figure 14** for Scenario 2.

Figure 13: Scenario 1 (Full Build)

Source: HNTB

Figure 14: Scenario 2 (Partial Build)

Source: HNTB

4.3 Net Revenue

As was noted in **Section 3.5**, operating an express toll facility has additional expenses for operations, maintenance, and replacement reserves. Net revenue is the remaining revenue once these additional costs have been covered from the gross toll revenues collected. **Table 7** below summarizes the gross revenue and anticipated net revenues for the two improvement scenarios.

Table 7: Net Revenue Comparison
Aggregate over a 30-year operating period

	Scenario 1 Full Build	Scenario 2 Partial Build
Gross Revenue	**$504M**	**$435M**
Toll Transaction Processing	-$133M	-$104M
Toll System Maintenance	-$18M	-$11M
Toll System Replacement Reserve	-$80M	-$53M
Roadway Maintenance	-$16M	-$10M
Roadway Replacement Reserve	-$19M	-$14M
Net Revenue	**$238M**	**$243M**

Source: HNTB

Net revenue calculations in **Table 7** show that both Scenarios 1 and 2 have positive net revenue over the assumed 30-year period and can support ongoing costs for operations, maintenance, and replacement reserves. Scenario 2 produces a slightly higher net revenue despite generating a lower anticipated gross revenue. This can be attributed to two causes:

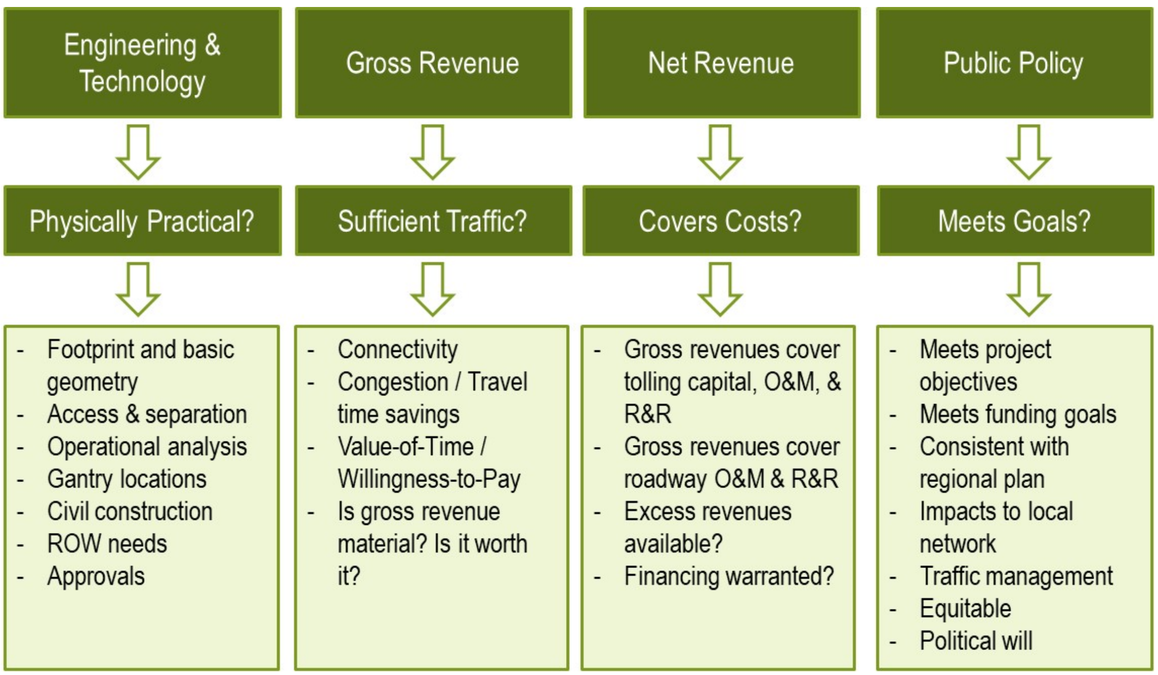
- The southern limit of Scenario 2 is 151st Street and therefore has fewer miles of express toll lanes in operation. This results in lower costs for operations, maintenance, and replacement reserve, as compared to Scenario 1.
- Projected traffic volumes are lower in the segments south of 151St Street. Lower volumes result in less congestion, and less incentive for motorists to use the express toll lanes. Therefore, there is less gross revenue produced to offset the costs of operating additional lane miles.

5.0 Financial Feasibility

Policy objectives and operating decisions directly influence the revenue and cost forecasts for a potential toll facility. This section summarizes the upfront financing potential of the forecasted gross and net revenues to provide a preliminary indication of toll revenue bonding proceeds that can offset a portion of the project's capital costs.

However, feasibility of a toll project is not solely a function of financing potential. Analysis of a potential toll project must consider the feasibility and practicality from an engineering perspective, the traffic volumes and characteristics in the corridor, and various public policy objectives. **Figure 15** below summarizes several of the components that factor into an overall feasibility evaluation.

Figure 15: Feasibility Components



Source: HNTB

This pre-planning financial feasibility analysis evaluated the scenario's ability to (1) support operations and maintenance (O&M) and lifecycle costs with toll revenue and (2) the level of upfront financing proceeds that each scenario can generate towards capital construction costs. All analysis was conducted at a sketch-planning level and is not intended to represent or recommend a toll financing plan, but rather to identify whether one or more scenarios warrant more detailed toll feasibility analysis and further refinement in future studies.

HNTB used an in-house proprietary financial model to evaluate various debt instruments and structuring options. The model is designed to evaluate preliminary feasibility by structuring debt against a net revenue stream. As an outcome, Scenario 1 does not generate enough net revenues in the early years of operation to support a toll revenue financing. Only Scenario 2 generates positive and more stable annual cash flows to sufficiently support annual roadway and tolling O&M costs, periodic replacement and reserve (R&R) needs in all years and can partially contribute to toll financings for the upfront capital costs.

Two revenue pledge scenarios were evaluated for Scenario 2:

- Net Revenue Pledge: this revenue pledge assumes the project supports its own O&M and R&R costs before repaying its debt service obligations.
- Gross Revenue Pledge: this revenue pledge provides more upfront bonding capacity because it assumes the project repays its debt service obligations first before supporting O&M and R&R costs. A third party is required to pay for or "back-stop" O&M and R&R costs if toll revenues are insufficient to cover all annual obligations.

Two types of debt instruments commonly used for toll projects were analyzed: current interest bonds (CIBs) and Capital Appreciation Bonds (CABs). CIBs interest is paid semi-annually and can be capitalized during construction. CABs, or zero-coupon bonds, accrete the interest and pay it upon maturity of the bonds. CABs are commonly used to maximize the amount of debt that can be issued for a greenfield project since revenues are constrained during the ramp-up phase but grow over time.

Financing assumptions for debt instruments consider the current market conditions and a conservative, stressed interest rate environment to allow for upward interest rate movement. Debt service coverage ratio (ratio of annual net or gross revenue to the annual debt service) is the primary metric used to measure the amount of debt a project can support. **Table 8** provides a summary of financing structures and assumptions, interest rates and financial metrics.

Table 8: Financing Scenario Assumptions

Item	Assumption
Traditional Toll Debt	35-year CIBs & CABs; Capitalized Interest, Reserve Funds, Costs of Issuance
Toll Bond Rate	Current Market: 4.0%; Conservative Market: 5.0%
Coverage	1.75x – 2.25x
Range of Financing Results	Lower bound reflects conservative market rates and conservative 2.25x coverage Upper bound reflects current (attractive) market rates at 1.75x coverage (optimistic)

Under the net revenue pledge scenario, Scenario 2 net revenues can support between $22 and $36 million of financing through CABs issuances. The overall upfront capital cost for Scenario 2 is $299M in 2025 dollars which includes costs for both tolled and non-tolled infrastructure. Of the $299M, approximately $106M can be attributed to the express toll lanes and the roadside toll systems. Considering only the express toll lanes and roadside toll systems, Scenario 2 net revenues can support between 21% and 34% of the $106M upfront capital costs for those elements. Additional funding will be required to support remaining construction costs. While the results illustrate that tolling can cover all roadway and tolling O&M and lifecycle costs and contribute to some of the capital costs, a small toll financing with all CABs is likely not marketable in the capital markets. Investors might not be attracted due to the size of the transaction.

Under the gross revenue pledge scenario, Scenario 2 can support significantly more debt, with up to $72 million in proceeds from combined CIBs and CABs issuances. The gross revenue pledge scenario indicates that the project can support between 42% and 68% of the $106M upfront capital costs, depending on market rates and selected debt instruments. With the gross pledge, the larger pledge of gross toll revenues produces more toll financing proceeds, but a public entity would be responsible for back-stopping all O&M and R&R costs if toll revenues are insufficient to fund them. While the results illustrate that tolling can provide upfront capital costs, a small toll financing with a considerable share of CABs might not be marketable in the capital markets. In addition, it is projected that the gross revenue pledge will require $12-$19 million of R&R subsidy in the first 15 years.

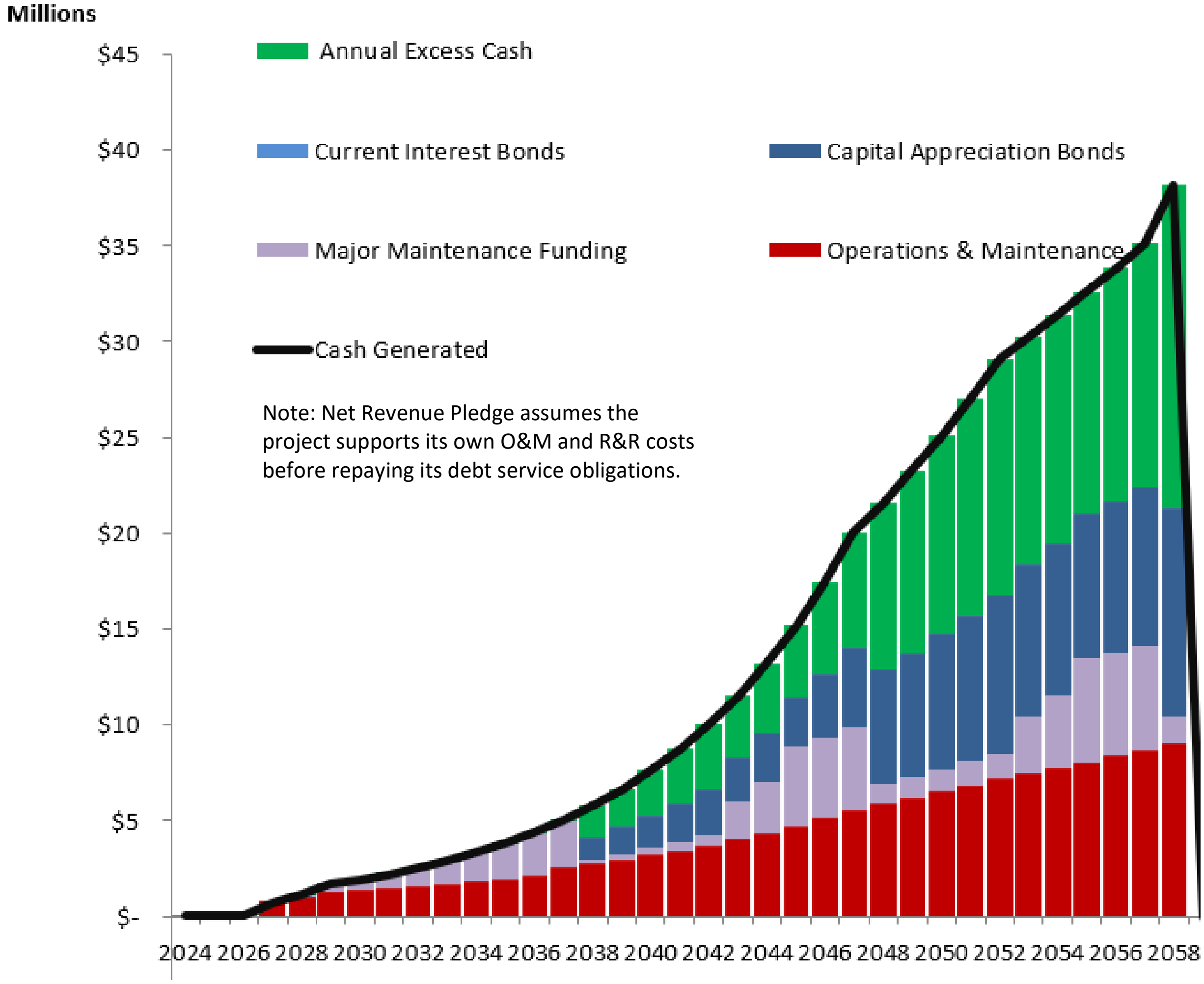
Table 9 shows financial feasibility results and **Figures 16** and **17** show the annual net revenue components of Scenario 2.

Table 9: Financial Feasibility Results

	Net Revenue Pledge	Gross Revenue Pledge
Debt Instrument	CABs	CIBs and CABs
Capital Cost (Express Toll Lanes Only)	$106M	$106M
Bond Proceeds	$22M - $36M	$44M - $72M
Gap Funding	$70M - $84M	$34M - $62M
Financial Feasibility	21% - 34%	42% - 68%
Findings	• Small toll financing with all CABs is likely not marketable • Size of transaction not likely to attract investors	• Small toll financing with considerable CABs might not be marketable • Requires $12-$19 million of R&R subsidy in the first 15 years

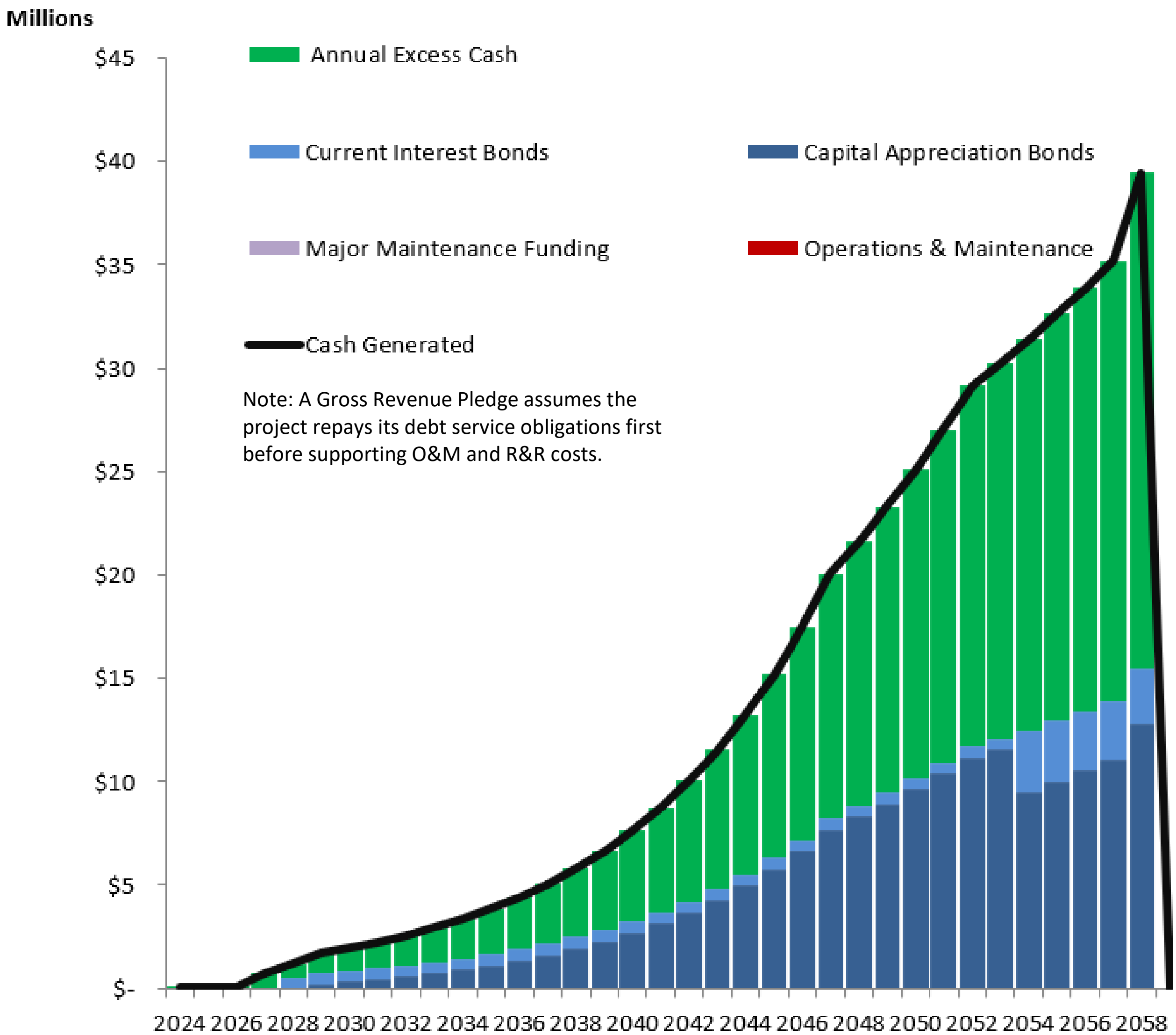
Notes and Disclaimers. All nominal dollars. Financing proceeds presented as a range for each scenario (conservative and current market). Illustrative results intended to provide preliminary planning-level feasibility indication. Results do not represent or recommend a financing structure.

Figure 16: Net Revenue Pledge



Source: HNTB

Figure 17: Gross Revenue Pledge



Source: HNTB

6.0 Scenario Evaluation and Screening

At the beginning of the pre-planning analysis, the agency partners defined a prioritized set of desired objectives for improving the US 69 corridor. The objectives are centered around improving safety and mobility for the long term. **Table 10** summarizes how the express toll lane concepts evaluated through the pre-planning analysis address the desired objectives.

Table 10: US 69 Corridor Objectives Assessment

Corridor Objectives	How the Objective was met
1. Corridor safety	The primary US 69 safety problem of stop and go congestion is addressed with the express toll lanes. However, additional access points are introduced into the corridor with the express toll lanes which could affect safety. These access points would be further evaluated during the NEPA phase.
2. Trip reliability	Trip reliability will be provided in the corridor with the express toll lanes because traffic volumes on express toll lanes are metered to ensure superior, consistent, and reliable travel times, particularly during peak travel periods.
3. Corridor sustainability	Corridor sustainability is achieved by increasing person throughput by allowing transit users to use the express toll lanes for free at a desirable travel speed. Sustainability is achieved by maintaining a congestion-free travel lane as overall corridor traffic volumes increase. Improved travel speeds in the express lanes also provides an air quality benefit.
4. Mobility	The express toll lane will provide improved mobility for motorists in the corridor by providing improved trip-time reliability, higher speeds, travel-time savings, and transit improvements.
5. Revenue generation	The express toll lanes are anticipated to generate net revenues between $238M and $243M over 30 years between the Partial Build and Full Build Scenarios.
6. Promotion of transit and/or multi-occupant trips	The express lane promotes transit by providing transit users a free and high-speed travel lane. At this time, multi-occupant trips are not anticipated to receive a discount.
7. Technology	New toll technology will be incorporated into the express lanes that will allow high speed cashless toll collection.

Using the results from the gross and net revenue analysis, financial analysis, and the corridor objective assessment, the two improvement scenarios were evaluated using a combination of quantitative and qualitative factors. For the purpose of this comparison all costs were adjusted to 2025 dollars and the net revenue potential aggregated for the first 30 years of operation. **Table 11** summarizes the scenario evaluation of the two scenarios against these factors.

Table 11: Scenario Evaluation

Evaluation Factors	Scenario 1 Full Build	Scenario 2 Partial Build
Capital Costs (2025 Dollars)		
All Improvements	$565 M	$299 M
Toll Lanes and Systems Only	$152 M	$106 M
30-Year Toll Revenue		
Gross Revenue	$504 M	$435 M
Net Revenue	$238 M	$243 M
Financial Feasibility		
Net Revenue Pledge	N/A	21% - 34%
Gross Revenue Pledge	N/A	42% - 68%
Corridor Objectives		
Corridor Safety	⊙ ⊙ ⊙	⊙ ⊙
Trip Reliability	⊙ ⊙ ⊙	⊙ ⊙
Corridor Sustainability	⊙ ⊙ ⊙	⊙ ⊙
Mobility	⊙ ⊙ ⊙	⊙ ⊙
Revenue Generation	⊙ ⊙ ⊙	⊙ ⊙
Promotion of Transit and/or Multi-Occupant Trips	⊙ ⊙	⊙
Technology	⊙ ⊙ ⊙	⊙ ⊙

Legend: ⊙ Improvement ⊙ ⊙ Substantial Improvement ⊙ ⊙ ⊙ Significant Improvement

Table 11 illustrates how Scenarios 1 and 2 both provide positive net revenue. Scenario 2 provides a positive financial feasibility as a percentage of the $106M capital cost for the toll lanes and toll system. The table also shows that the seven desired express toll lane objectives are addressed and that those objectives are more completely met by Scenario 1. Promotion of Transit and/or Multi-Occupant Trips was rated down one level for both Scenarios because in this analysis high occupancy vehicles were not analyzed with a free or discounted trip.

7.0 Conclusions

The pre-planning analysis was conducted at a sketch-planning level based on industry toll traffic and revenue feasibility assessment best practices and is the first of potentially three phases of feasibility analysis. The pre-planning analysis was intended to assist the partner agencies with answers to two primary questions:

- **How much gross toll revenue can express toll lanes generate?**
    - The US 69 corridor express toll lanes can generate approximately $504M (Scenario 1) and $435M (Scenario 2) gross toll revenue between 2025 and 2055.

- **Are the revenues from the express toll lanes able to support construction, maintenance, and/or operations of the US 69 corridor?**
    - Yes, anticipated revenues from express toll lanes are able to support toll system and roadway operations, maintenance and recovery. In addition, Scenario 2 is able to pay for a portion of the project's capital costs with toll revenue bond financing.

Results from this pre-planning analysis yield the following conclusions:

1. Express toll lanes are feasible from an engineering perspective and can be incorporated into safety, geometric and capacity improvements in the US 69 Corridor. However, since no operational analysis was performed, the mobility and trip reliability benefits of the express toll lanes cannot be quantified from this pre-planning analysis. Additionally, this analysis did not include a comprehensive evaluation or value engineering of improvement concepts. Further evaluation by the study team may determine that overall mobility and trip reliability objectives can be achieved through the incorporation of express toll lanes in coordination with a reduction in overall project scope as compared to what was evaluated during the prior US 69 Corridor Study.

2. Both Scenarios 1 and 2 are net revenue positive and likely could fully support ongoing operations, maintenance, and replacement reserve costs for the express lanes from toll revenues.

3. Scenario 2 has higher anticipated net revenues for the reasons discussed in section 4.3. When considering the significantly lower capital costs, Scenario 2 is a more financially viable initial express toll lane project but may not provide the maximum corridor improvements.

4. While net revenues are positive over a 30-year period, net revenues in the first 10 years are low with the assumptions made. This significantly limits the feasibility of financing through toll revenue bonding.

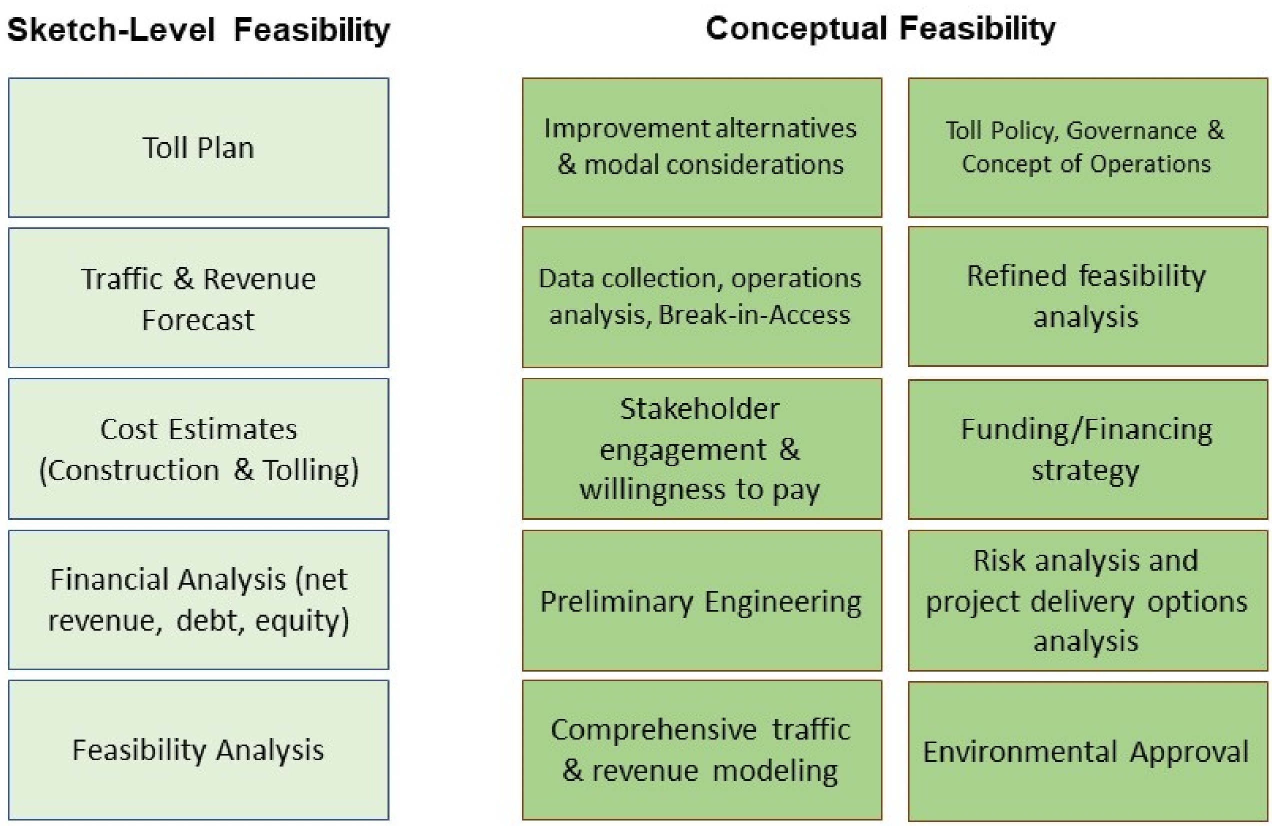
5. Several factors indicate that the overall financial results may improve with more detailed traffic and revenue analysis. These factors include:

    a. Traffic growth in the corridor is currently growing faster than the 2% and 4% linear projection used in this analysis. Development of a non-linear traffic forecast, consistent with the observed recent growth, will likely result in higher revenues in the first 10 years of operation as well as throughout the 30-year outlook of the project.

b. Pricing in the express toll lanes was based on a simplified value of time calculation rather than on traveler preference surveys or engagement with likely users on their wiliness to pay. The partner agencies anticipate the willingness to pay during peak periods may be higher than the $0.30-$0.40 per mile rates used in the revenue calculations.

In summary, the pre-planning analysis was performed at a sketch-planning level and intended to inform the partner agencies in future decision-making. The initial results are positive and warrant additional study through all or part of the activities shown below in **Figure 18** under “Conceptual Feasibility” which represents the potential next steps in the toll feasibility process.

Figure 18: Sketch-Level and Conceptual Feasibility



Appendix

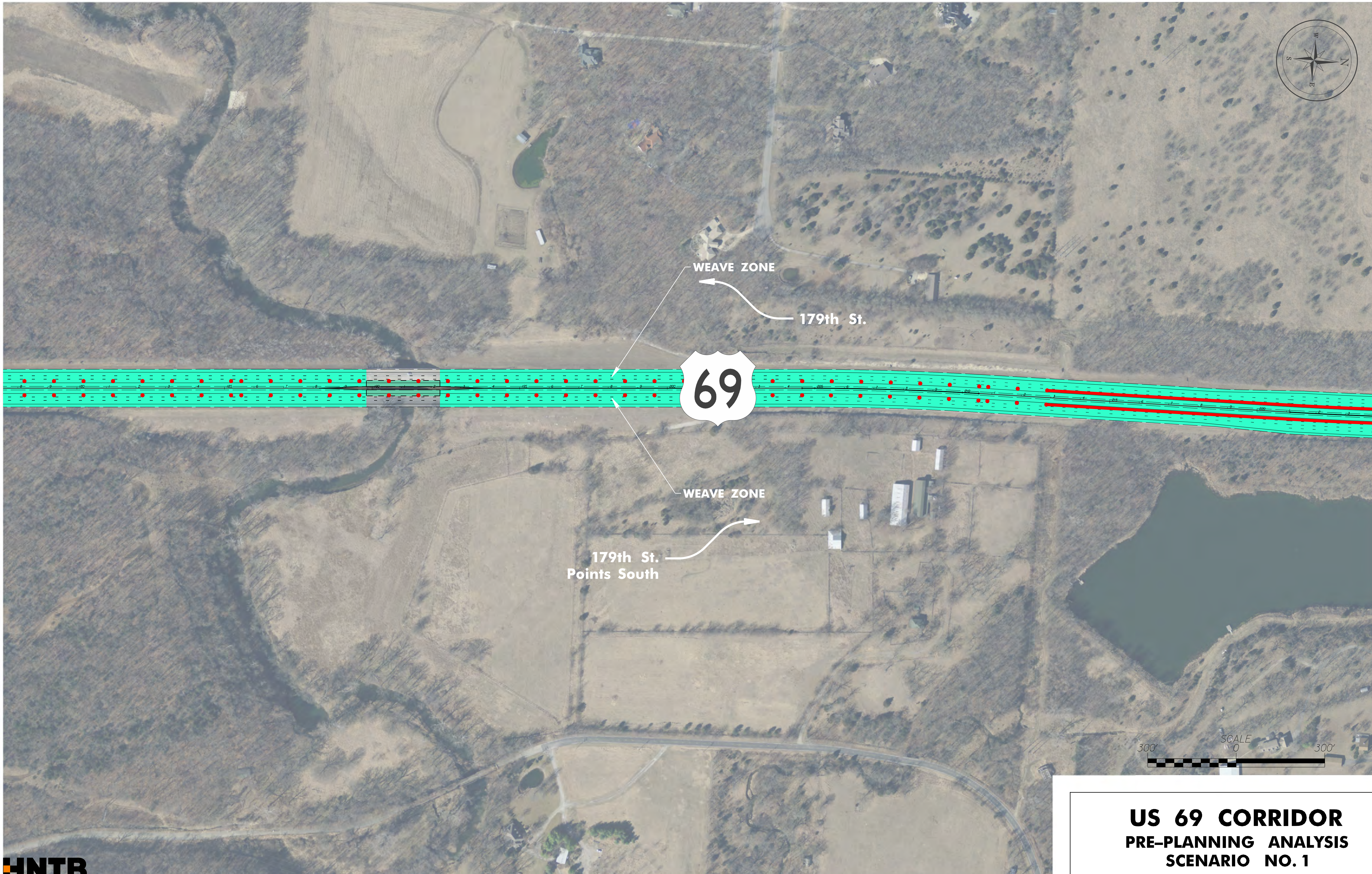
- Plan Plates – Scenario 1
- Plan Plates – Scenario 2

HNTB

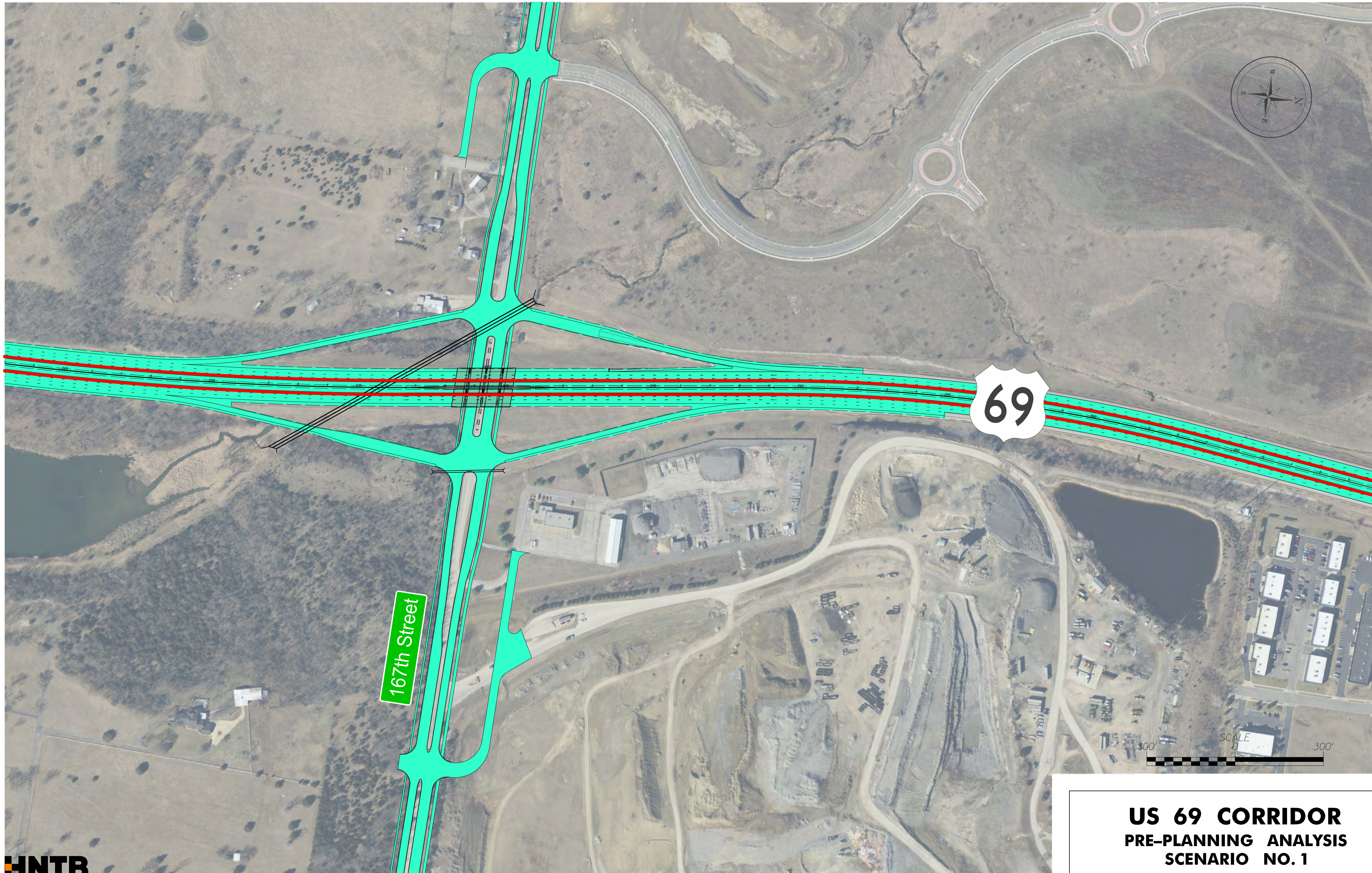
US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 1

PLATE NO. 1



US 69 CORRIDOR
PRE–PLANNING ANALYSIS
SCENARIO NO. 1
PLATE NO. 2



US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 1

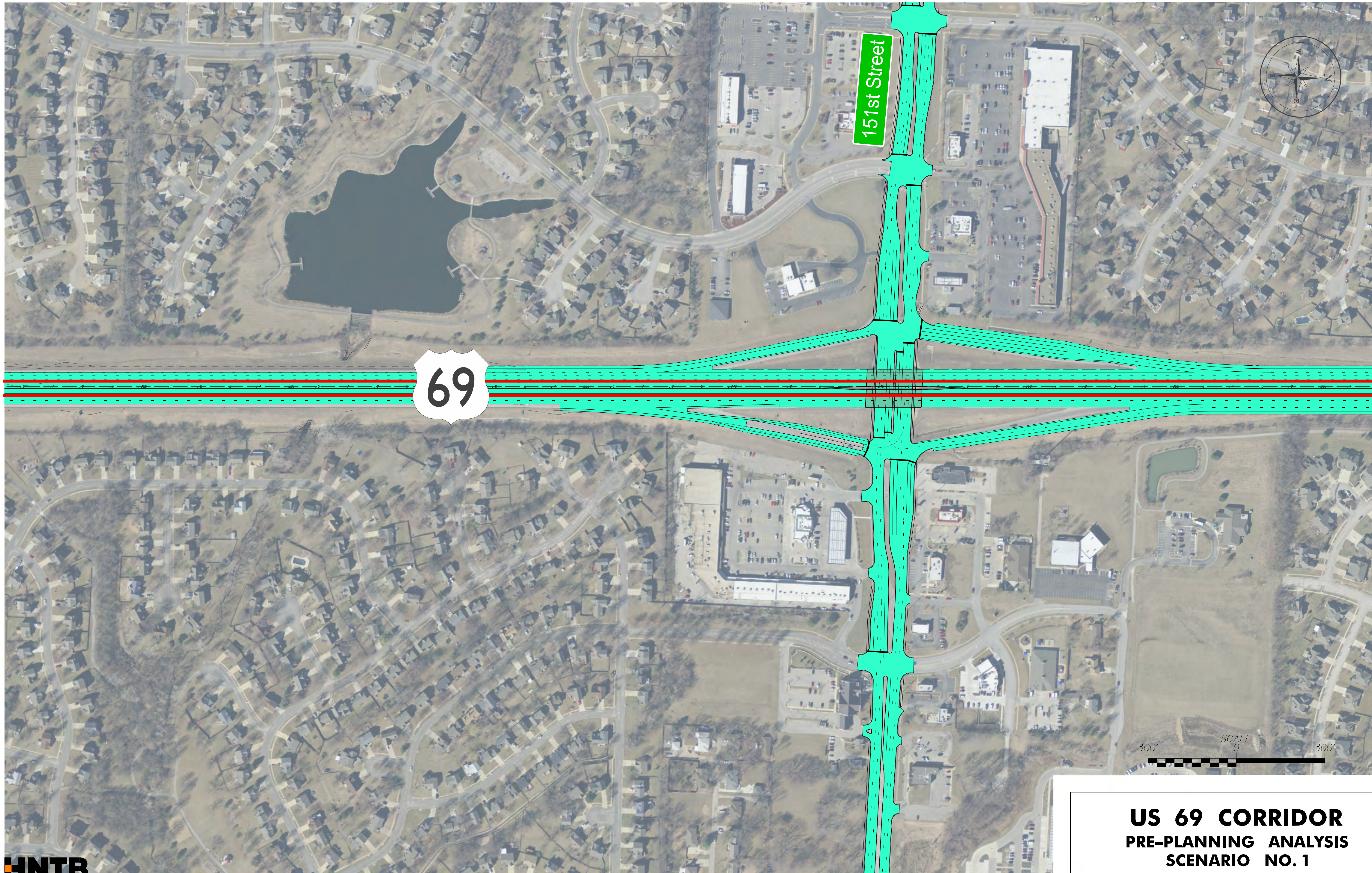
PLATE NO. 3

US 69 CORRIDOR

PRE–PLANNING ANALYSIS

SCENARIO NO. 1

PLATE NO. 4

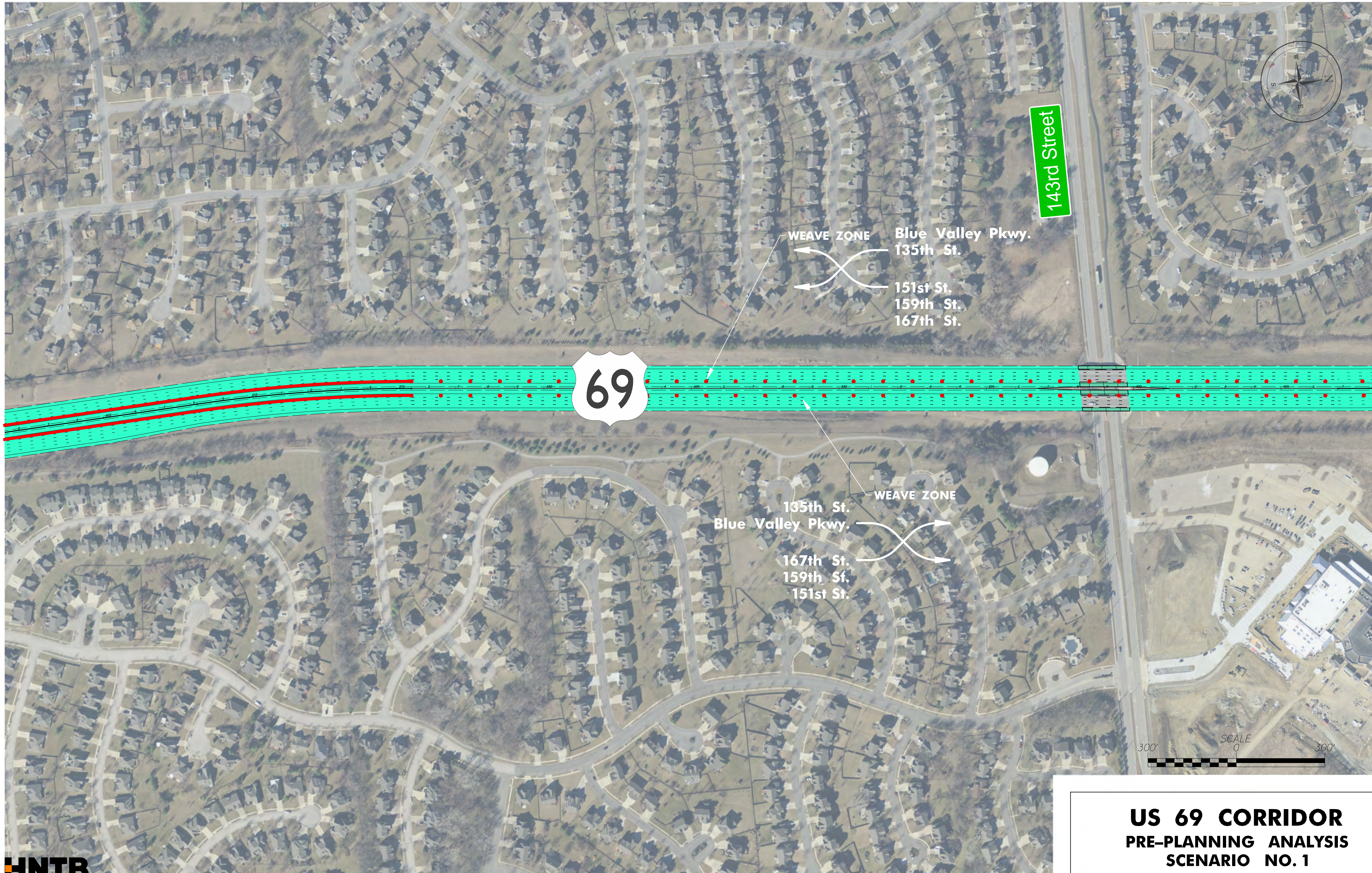


US 69 CORRIDOR

PRE–PLANNING ANALYSIS

SCENARIO NO. 1

PLATE NO. 5



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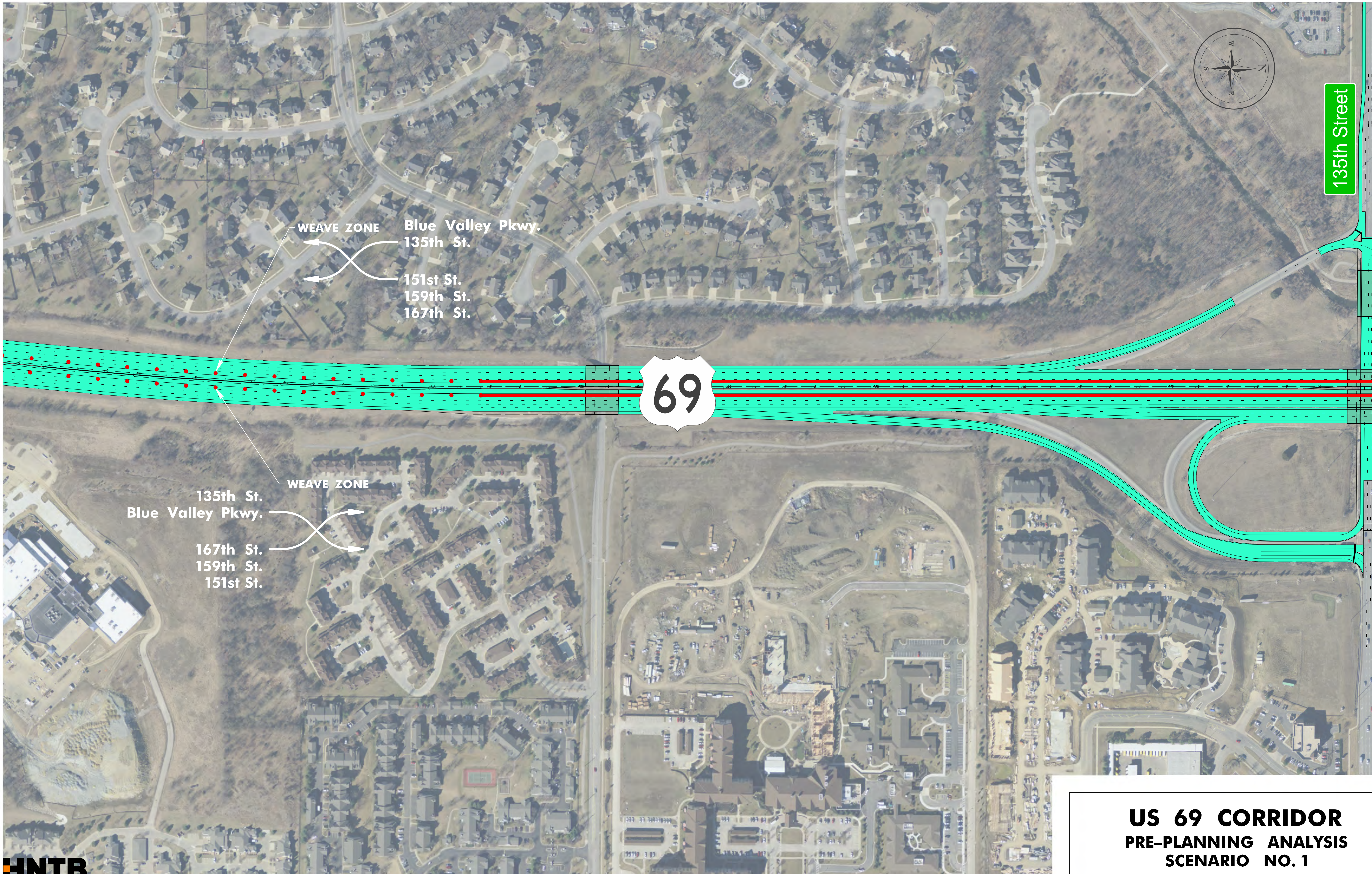
US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 1
PLATE NO. 6

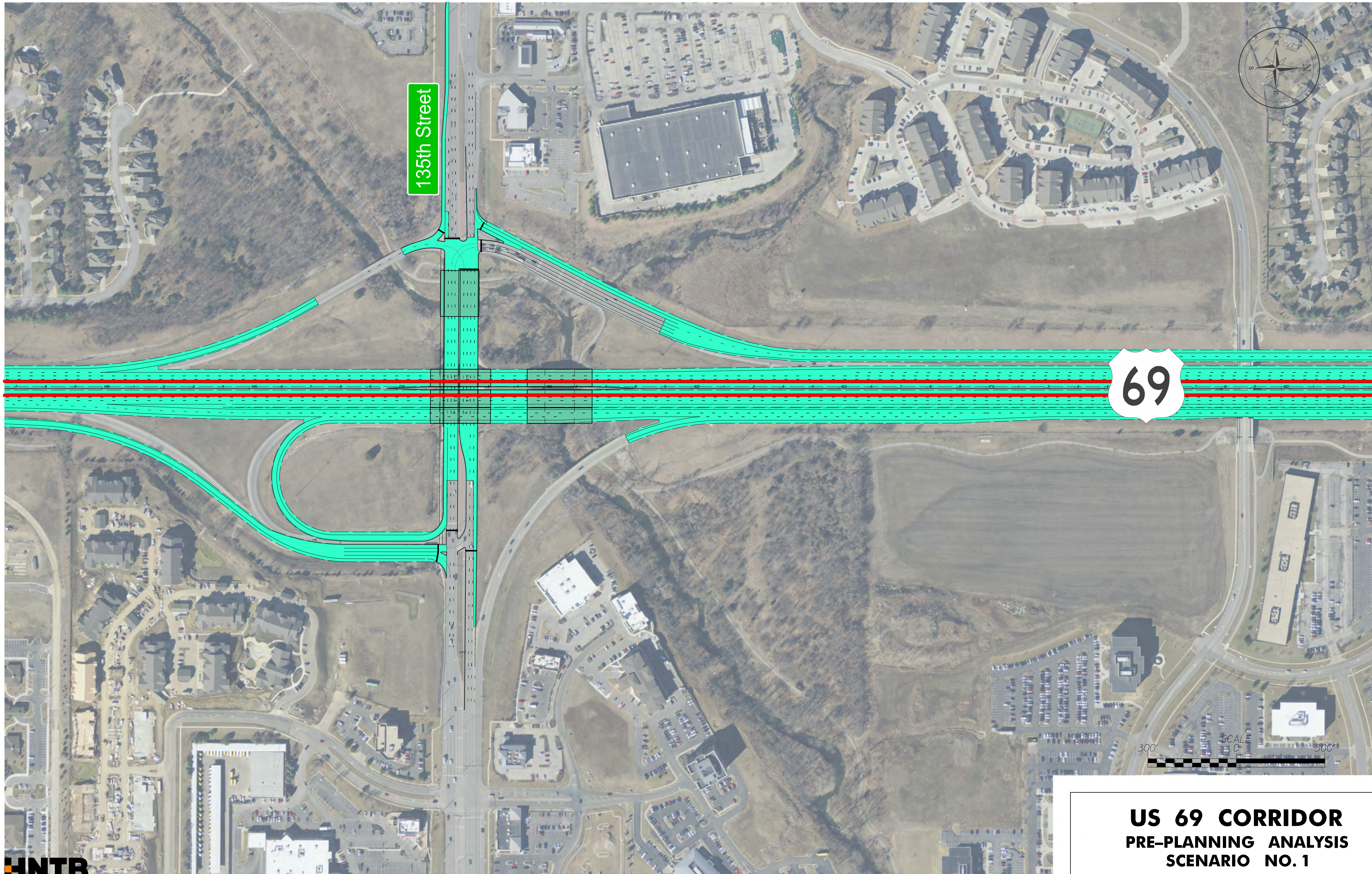


US 69 CORRIDOR

PRE–PLANNING ANALYSIS

SCENARIO NO. 1

PLATE NO. 7



US 69 CORRIDOR

PRE-PLANNING ANALYSIS
SCENARIO NO. 1

PLATE NO. 8

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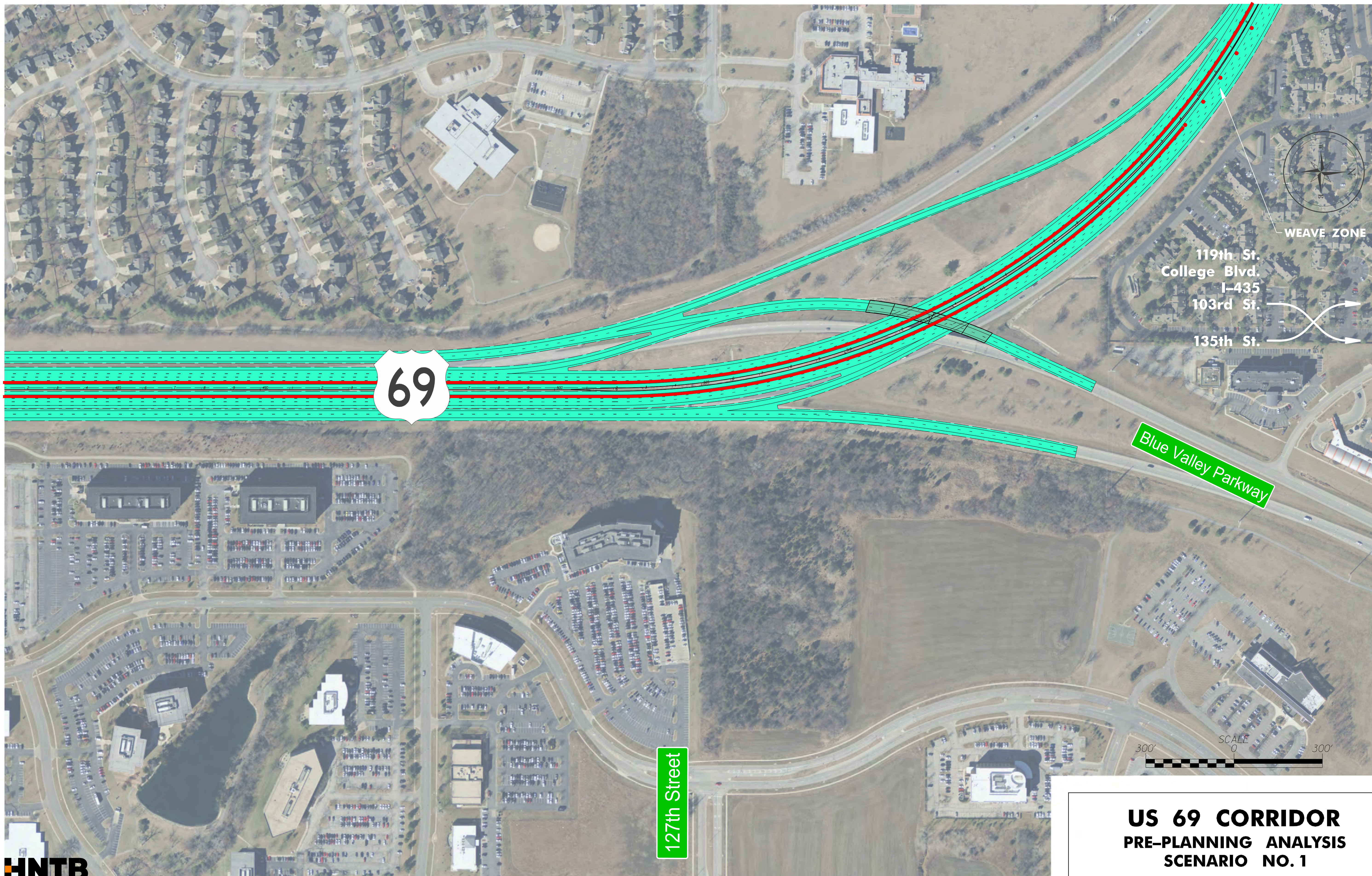
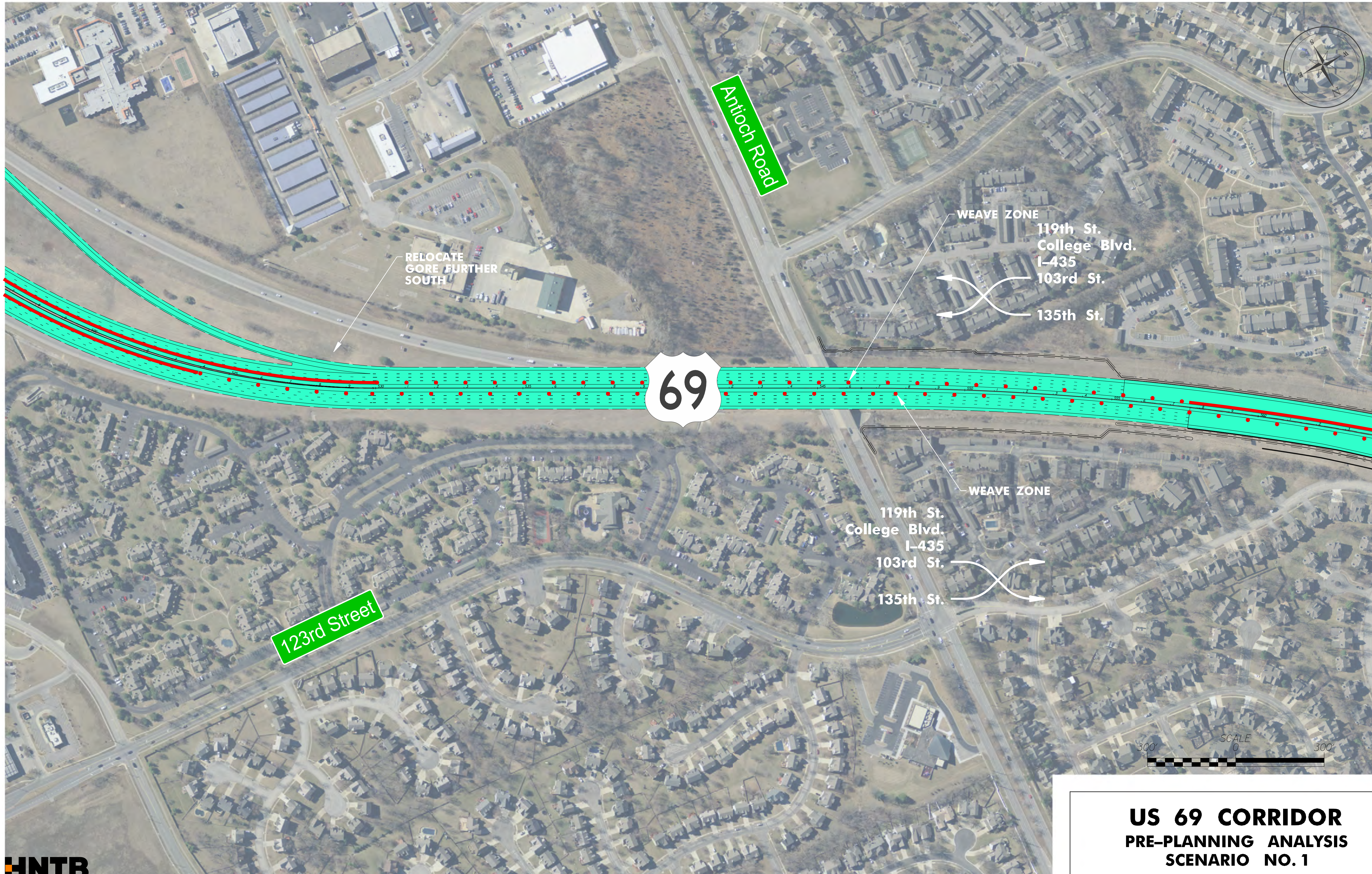


US 69 CORRIDOR

PRE-PLANNING ANALYSIS
SCENARIO NO. 1

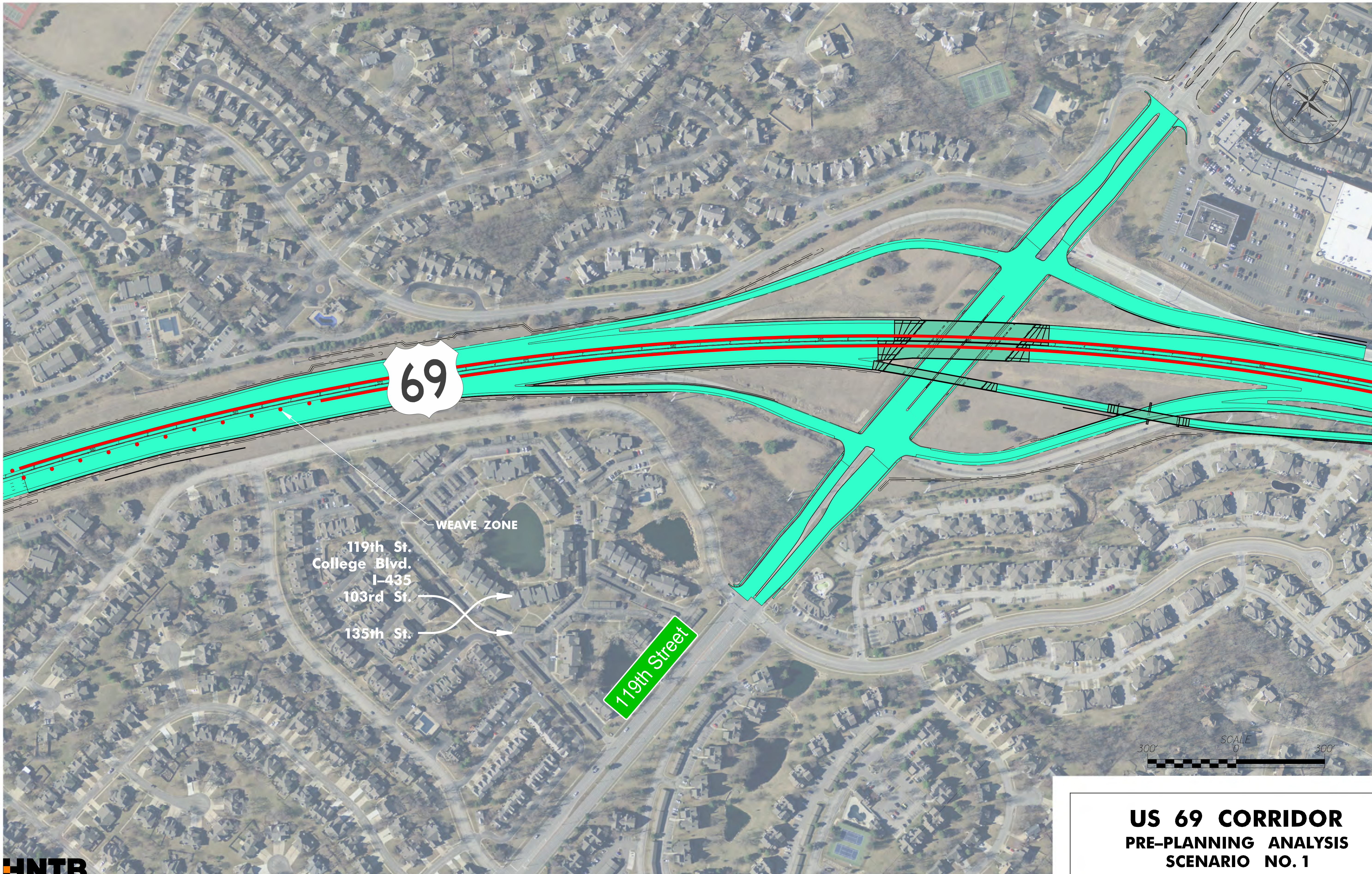
PLATE NO. 9



US 69 CORRIDOR

PRE-PLANNING ANALYSIS
SCENARIO NO. 1

PLATE NO. 10

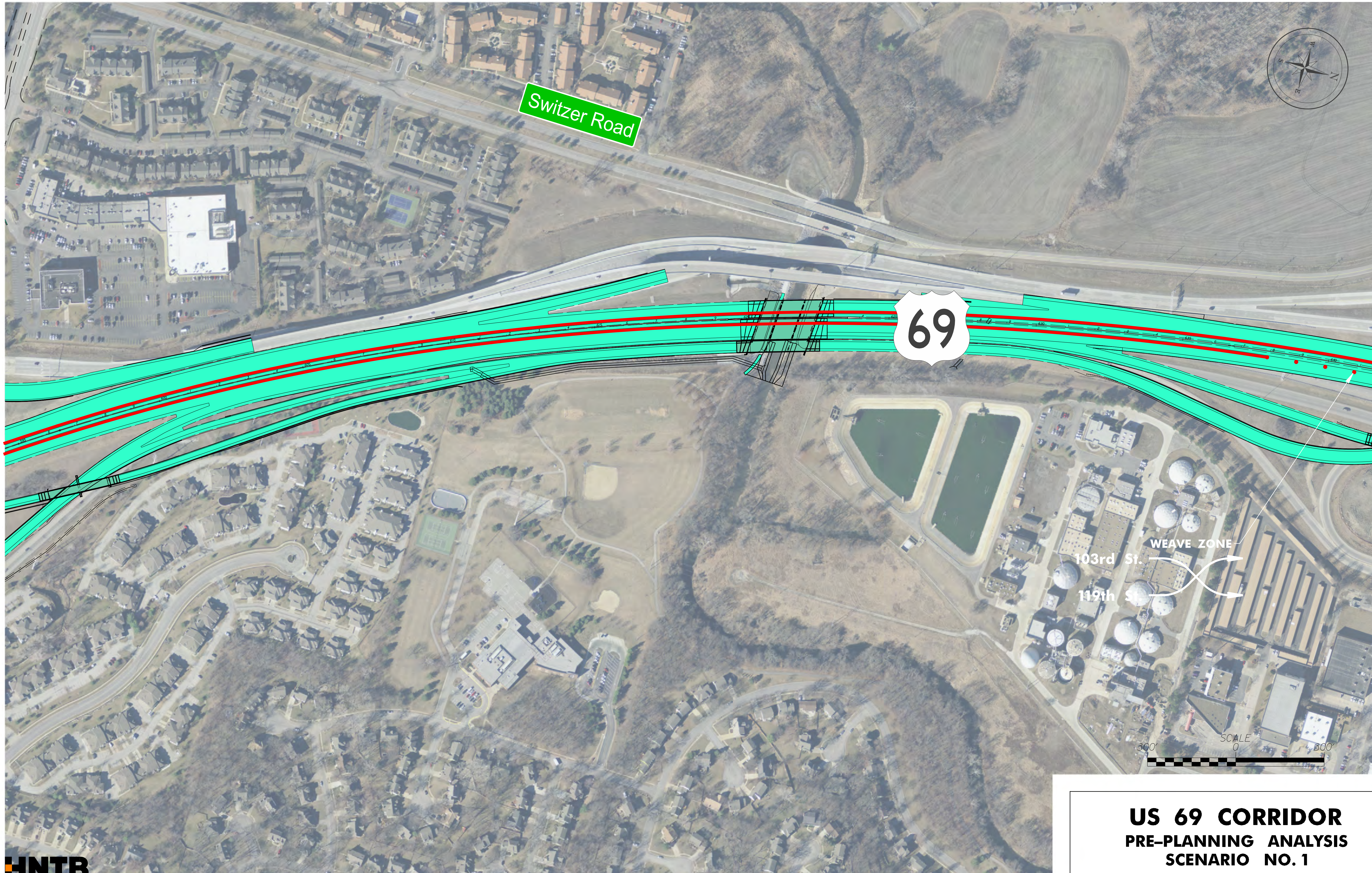


US 69 CORRIDOR

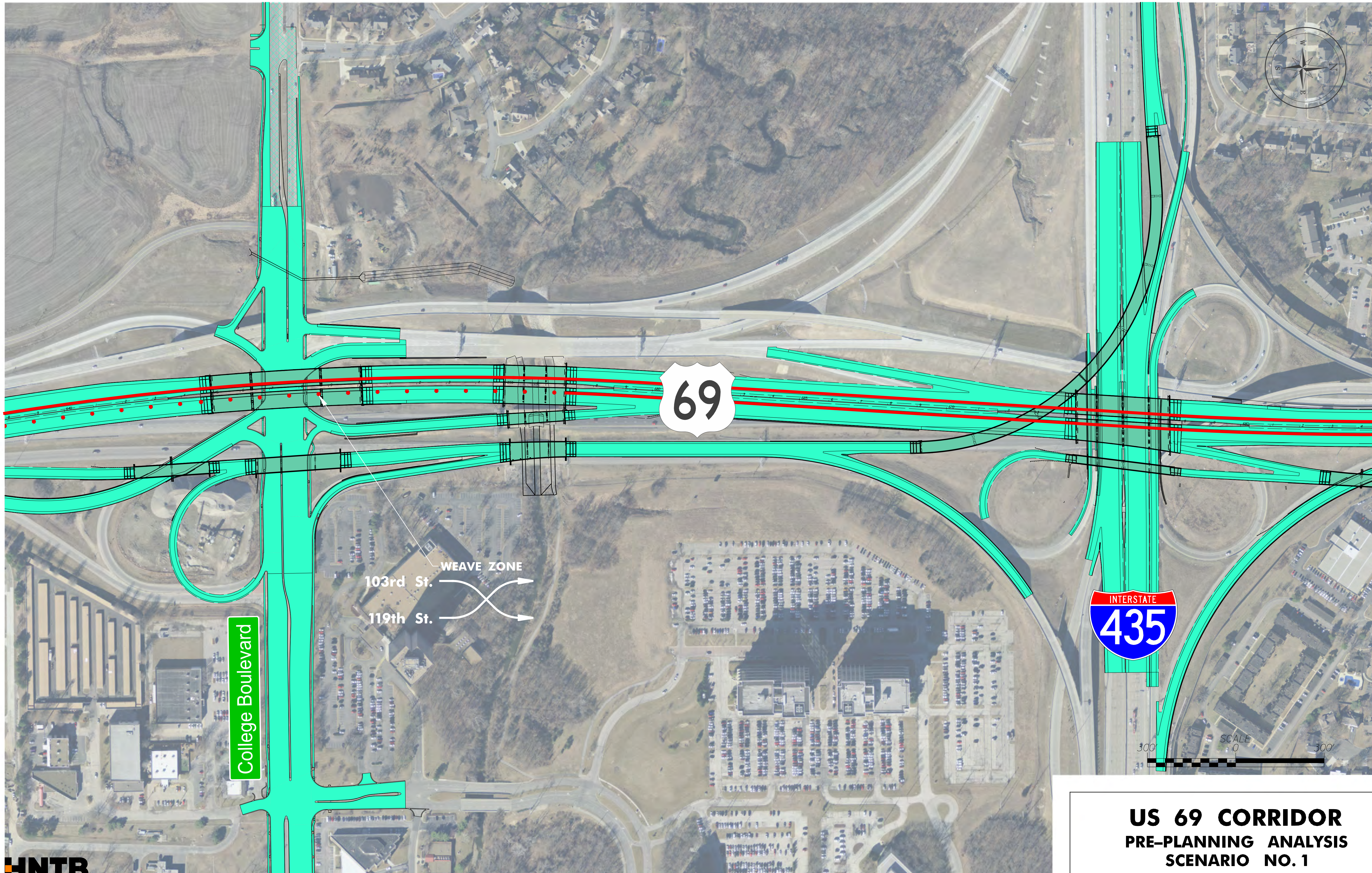
PRE-PLANNING ANALYSIS
SCENARIO NO. 1

PLATE NO. 11

HNTB



US 69 CORRIDOR
PRE–PLANNING ANALYSIS
SCENARIO NO. 1
PLATE NO. 12



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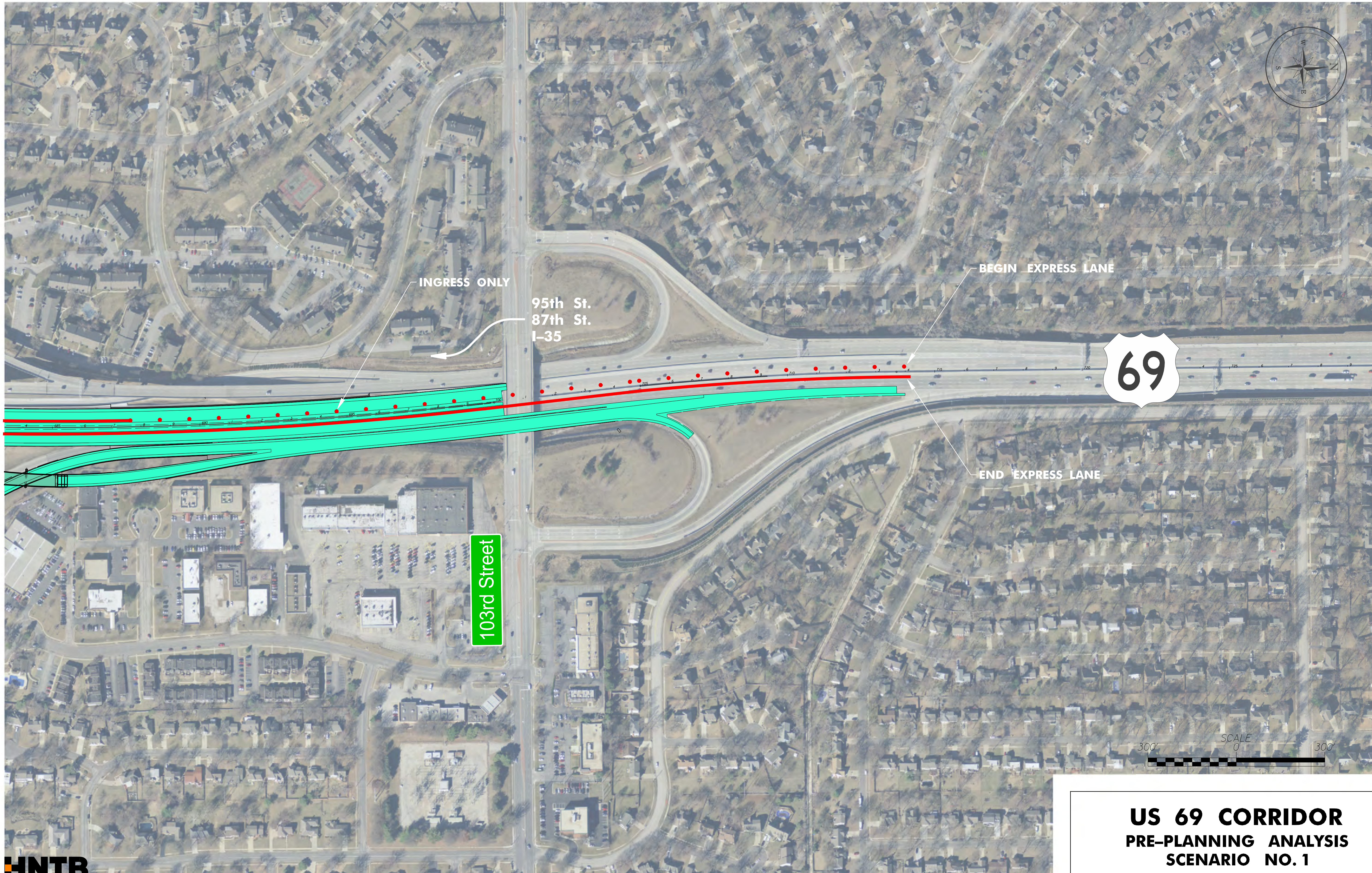
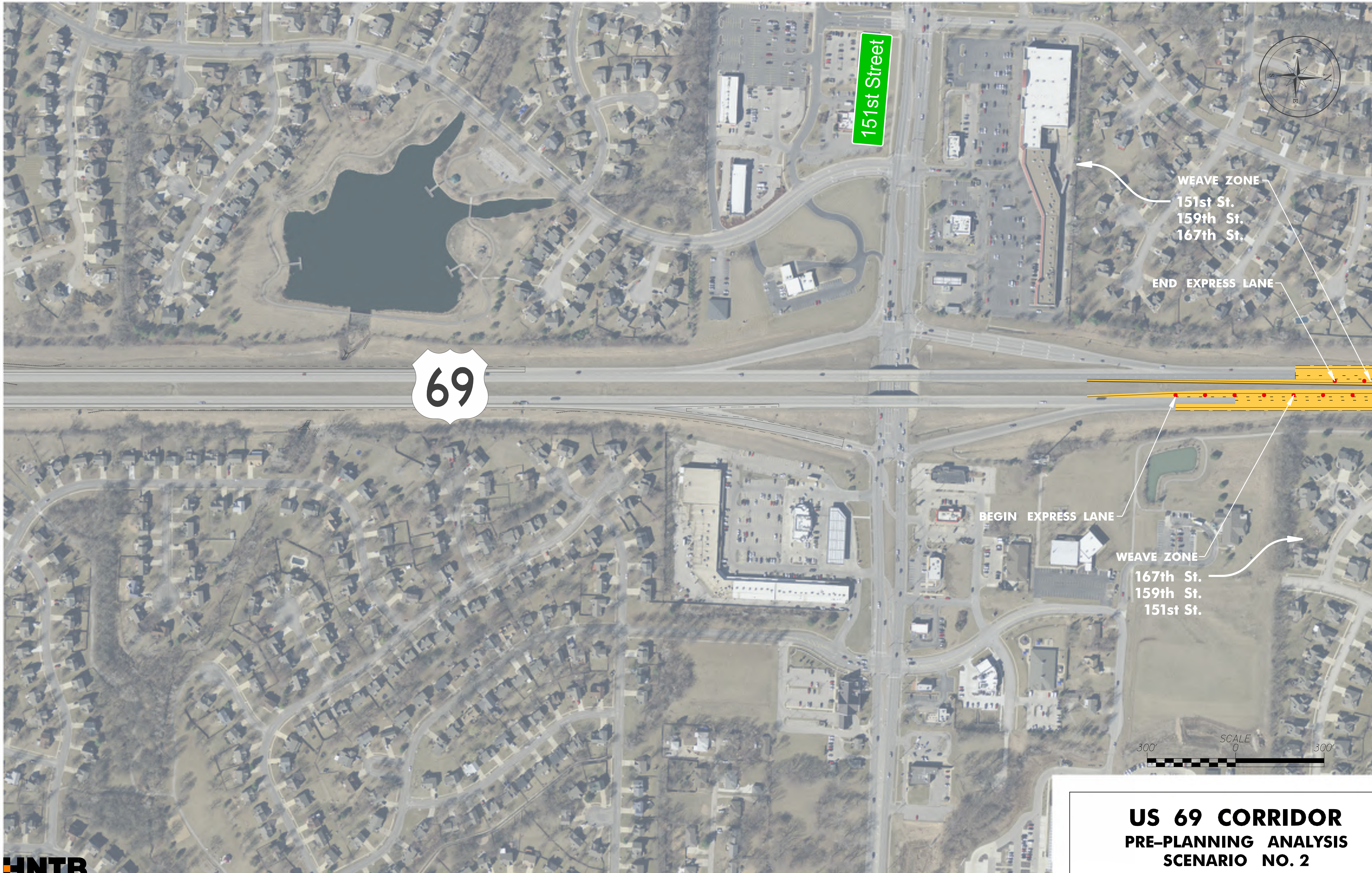
US 69 CORRIDOR
PRE–PLANNING ANALYSIS
SCENARIO NO. 1
PLATE NO. 13



US 69 CORRIDOR

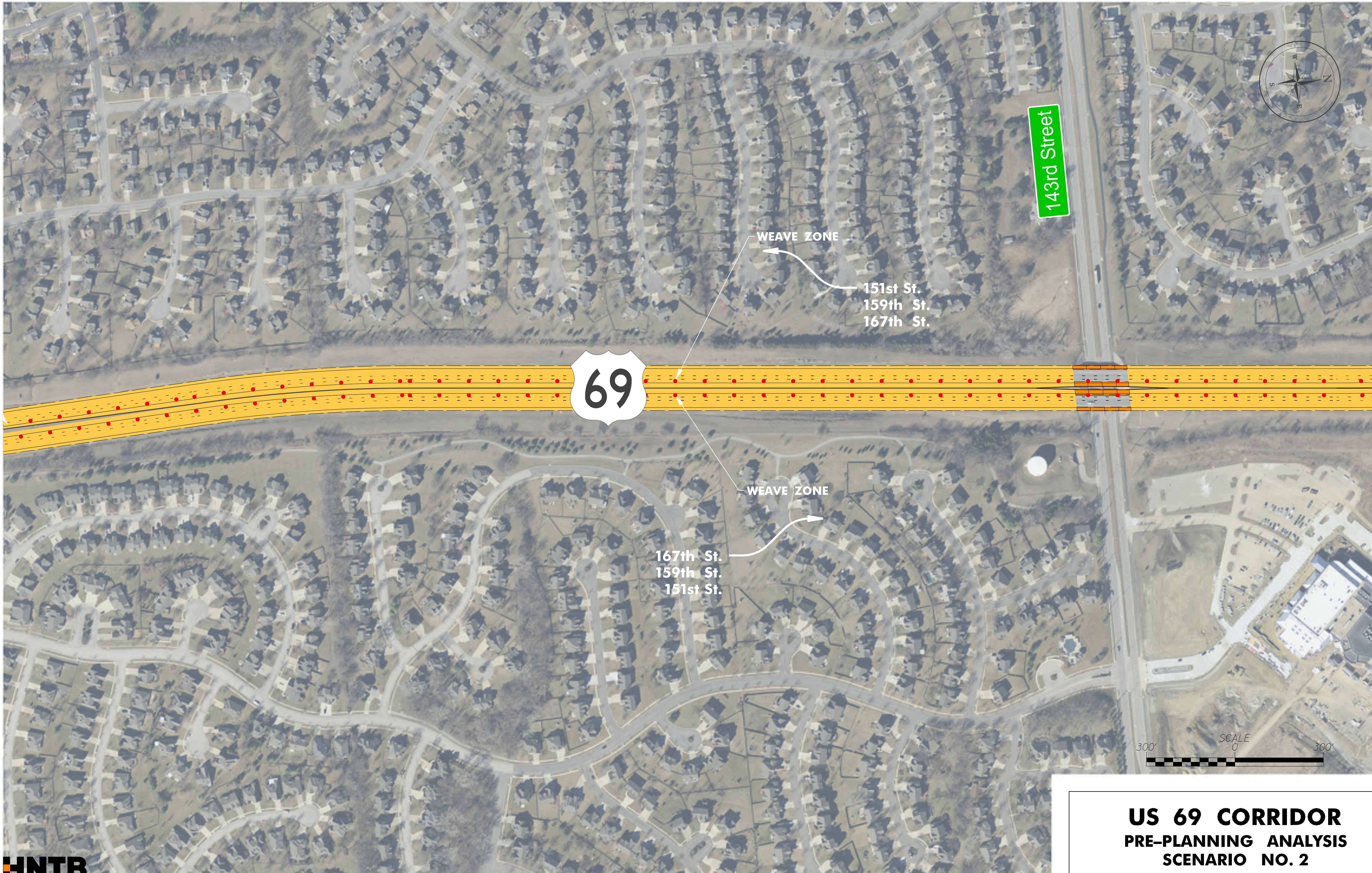
PRE–PLANNING ANALYSIS
SCENARIO NO. 1

PLATE NO. 14



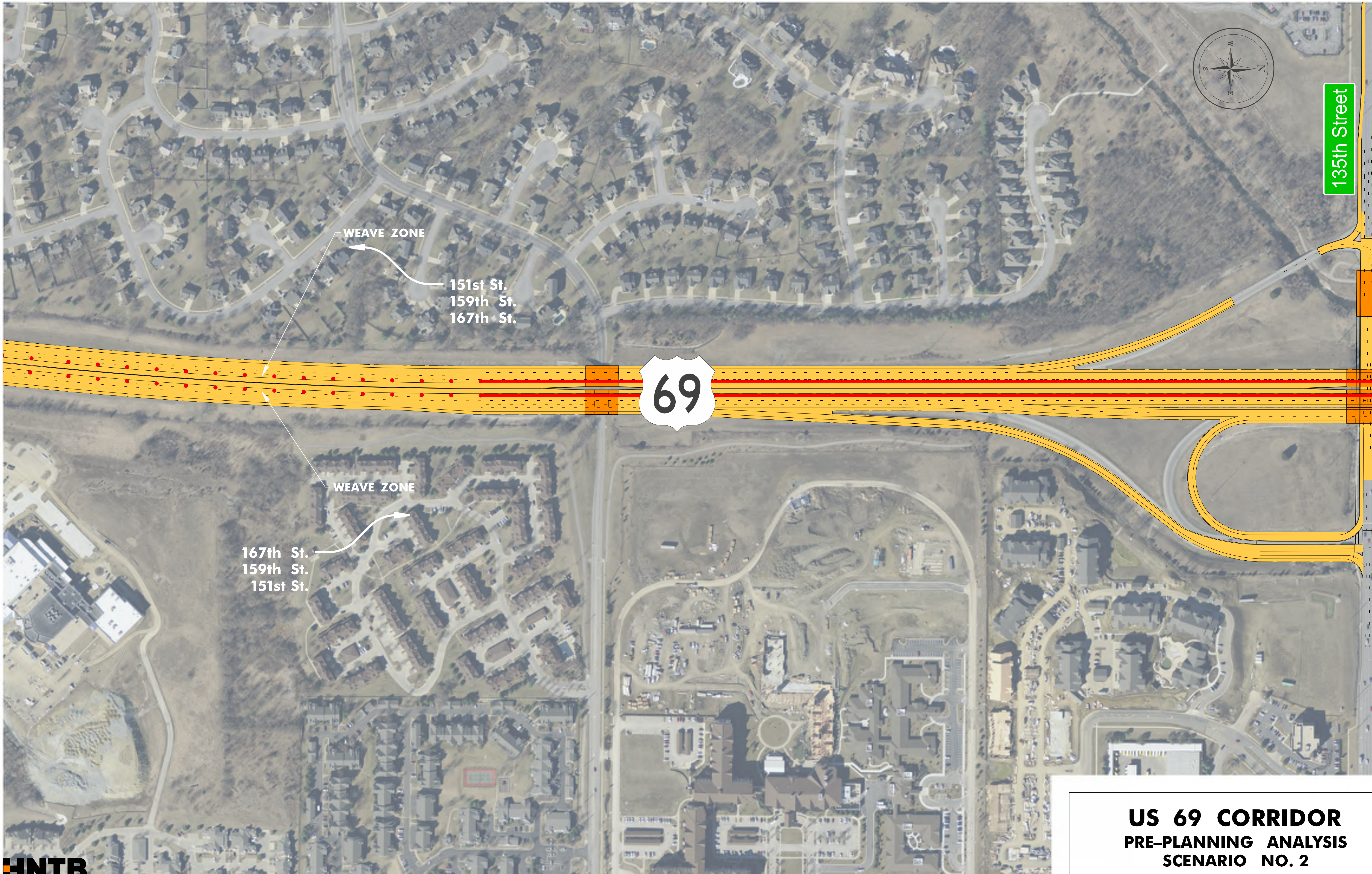
US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 1



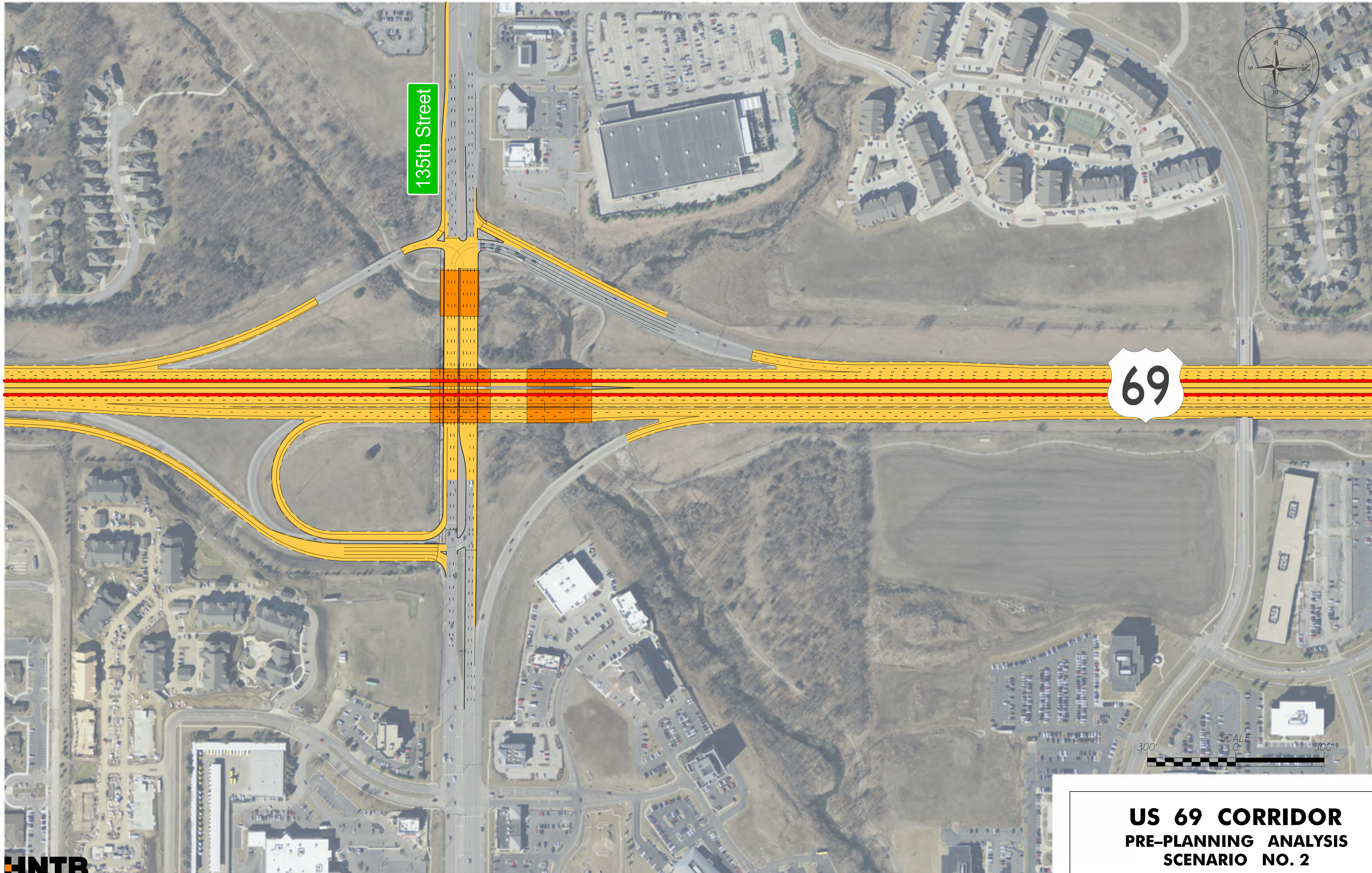
US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 2



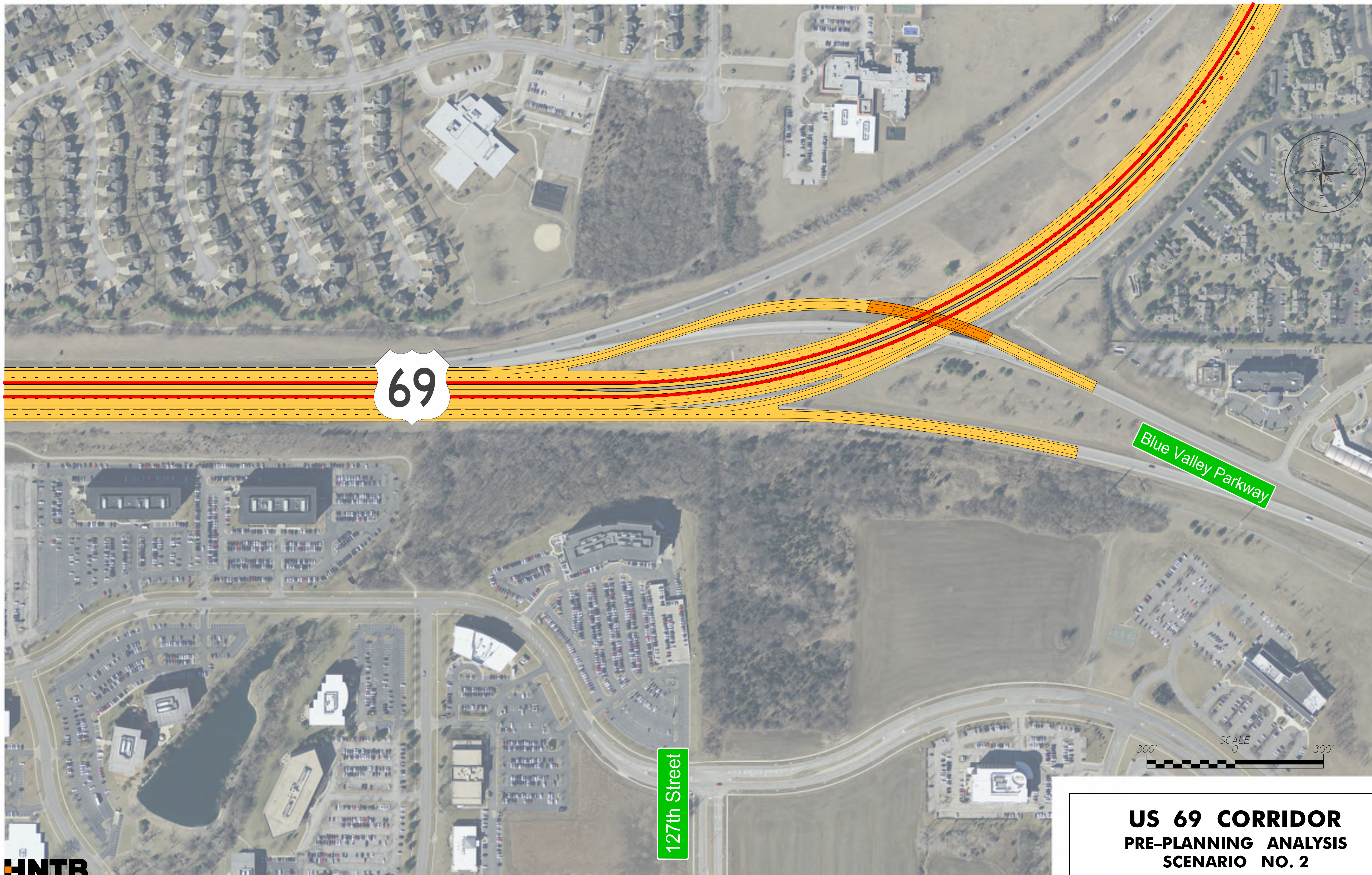
US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 3



US 69 CORRIDOR

PRE-PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 4

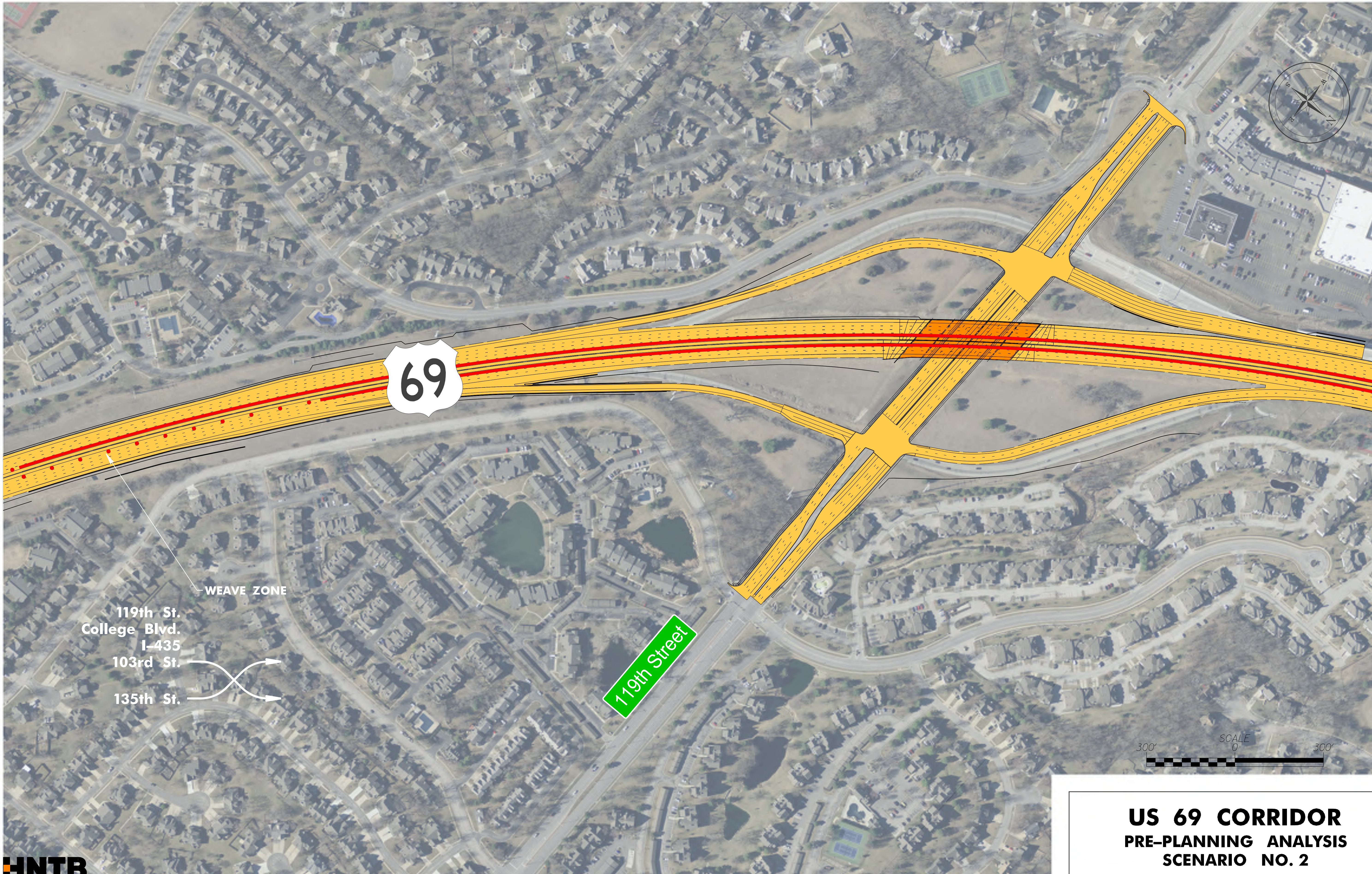


US 69 CORRIDOR
PRE–PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 5

HNTB

US 69 CORRIDOR

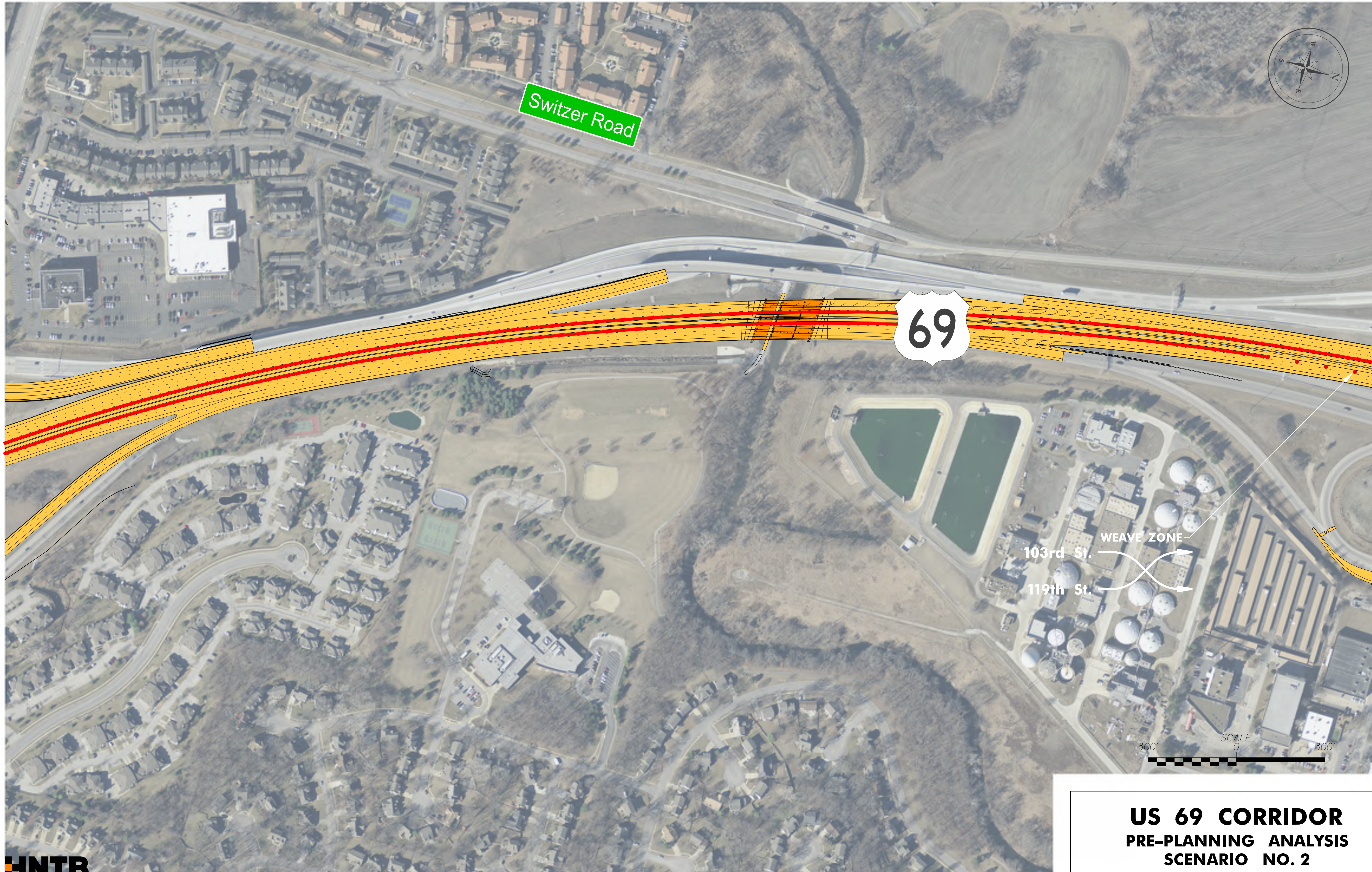
PRE–PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 6



US 69 CORRIDOR

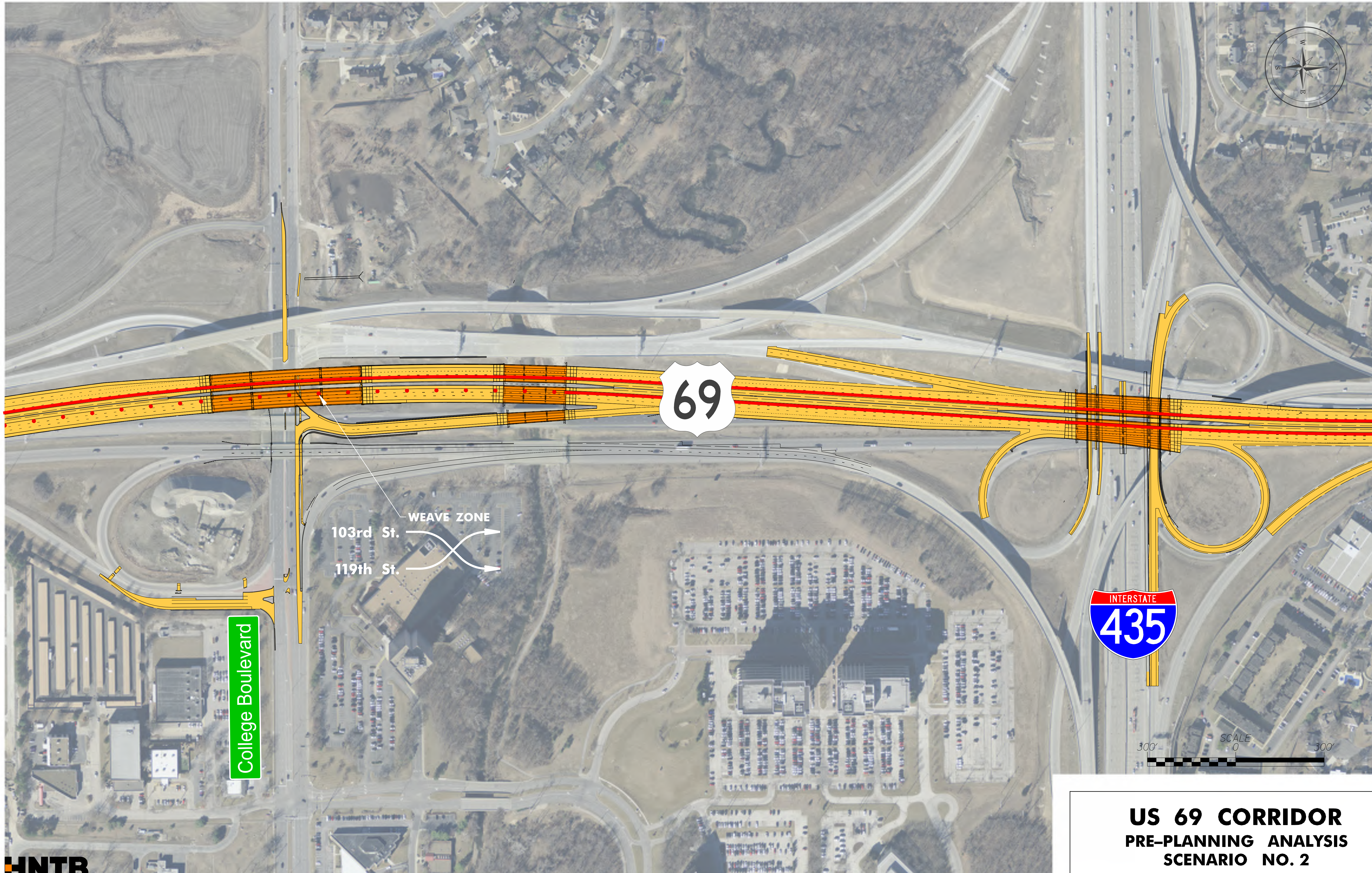
PRE-PLANNING ANALYSIS
SCENARIO NO. 2

PLATE NO. 7



HNTB

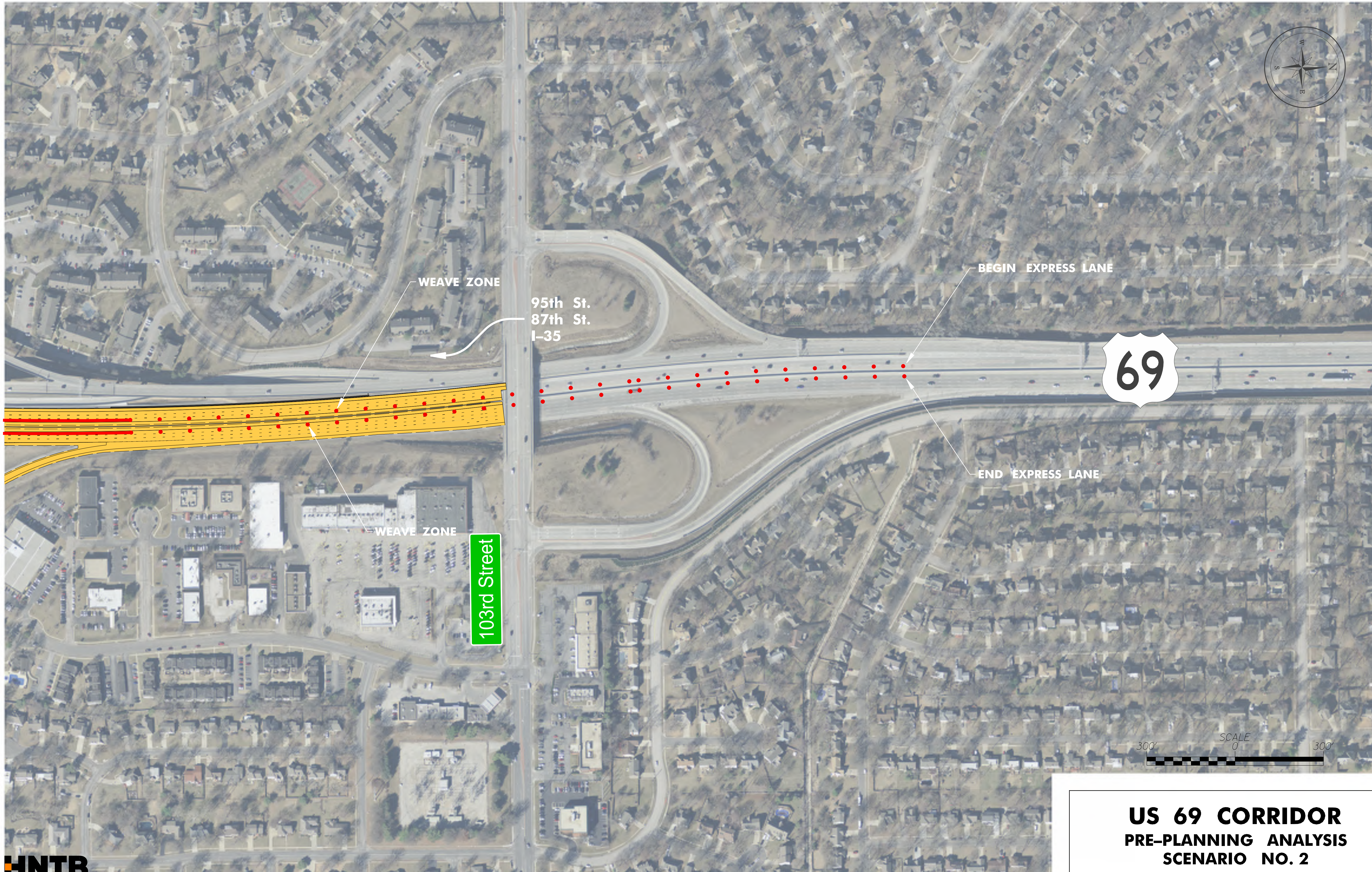
US 69 CORRIDOR
PRE–PLANNING ANALYSIS
SCENARIO NO. 2
PLATE NO. 8



US 69 CORRIDOR

PRE-PLANNING ANALYSIS
SCENARIO NO. 2

PLATE NO. 9



US 69 CORRIDOR

PRE–PLANNING ANALYSIS
SCENARIO NO. 2

PLATE NO. 10