PROJECT TRAFFIC ANALYSIS REPORT

Florida Department of Transportation

District Seven

Tampa Interstate Study

Supplemental Environmental Impact Statement

I-275 from Howard Frankland Bridge to
North of Dr. Martin Luther King, Jr. Boulevard
and
SR 60 from I-275 to North of Cypress Street
and
I-4 from I-275 to East of 50th Street

ETDM Number: N/A
Work Program Segment # 258337-2

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT.

Date: November 2019

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ON THE DATE ADJACENT TO THE SEAL

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EXECUTIVE SUMMARY

This Project Traffic Analysis Report (PTAR) was prepared in support of the Tampa Interstate Study (TIS) Supplemental Environmental Impact Statement (SEIS) performed under the National Environmental Policy Act (NEPA). The purpose of the study is to determine the preferred alternative and resulting traffic impacts for improving the interstate system within the Tampa Bay region, including Interstate - 275 (I-275) and Interstate - 4 (I-4). The study summarizes the transportation planning effort for the improvement and modernization of the region's interstate system and how it integrates with multimodal choices across the region.

I-275 is a principal interstate interconnecting the Tampa Bay region. I-275 is a major thoroughfare that extends from Manatee County into Pasco County crossing through Pinellas and Hillsborough Counties. I-275 connects interstates and other major arterials in the area, specifically, I-75, I-4 and SR 60. Additionally, two expressways indirectly connect to I-275 within the project vicinity: SR 618 Lee Roy Selmon Expressway connecting through I-4 and SR 589 Veterans Expressway connecting through SR 60. The I-275 system also provides access to Tampa International Airport, Port of Tampa, and Downtown Tampa – three major hubs of economic development in the area.

I-275 currently experiences recurring congestion during the AM and PM peak hours. Peak hour demands exceed the available capacity of the I-275 system causing longer travel times, poor travel reliability, and underperforming traffic operations. As growth in the region continues, travel times and congestion within the study area will continue to increase.

The main objective of the TIS SEIS for Sections 1A, 2A, 2B, 3A, and 3B (Sections 4/5 and 6 of the Tampa Bay Next (TBNext) program) is to compare the No Further Action (NFA) alternative with the five Build express lane design options and identify a preferred alternative. The proposed improvements aim to mitigate operational and safety deficiencies along the study corridor. Improvements are needed in the future to provide enhanced safety and mobility for all users of the I-275 system and accommodate the region's projected growth. During the TIS SEIS alternatives refinement process, FDOT determined that the 1996 TIS FEIS Long-Term Preferred Alternative (Non-Tolled) should be eliminated from further study in the TIS SEIS because it does not meet the purpose and need. The remaining alternatives are the NFA and Tolled Express Lane Alternative. For that reason, this PTAR does not evaluate the 1996 TIS FEIS Long-Term Preferred Alternative (Non-Tolled) further.

Per guidance provided in the FDOT's Project Development and Environment (PD&E) Manual and FHWA's Traffic Analysis Toolbox Volume III, the study area that was adopted for microsimulation modeling is comprised of 17 interchanges and 69 signalized intersections. The study limits were extended to incorporate the adjacent signalized intersections along the arterials on each side of the interchange ramp terminals.

The existing conditions simulation models show congestion along the mainline at the following locations:

- Travelers experience heavier congestion during the PM peak hour compared to the AM peak hour. I-275 northbound experiences higher delays compared to I-275 southbound during both AM and PM peak hours from Howard Frankland Bridge to Downtown. Whereas, I-275 southbound experiences higher delays compared to I-275 northbound during both AM and PM peak hours from Downtown to Osborne.

- I-275 northbound, south of SR 60, was observed to be a critical bottleneck segment for both AM and PM peak hours, leading to higher delays due to high exiting traffic volumes on the SR 60 off-ramp and due to vehicle slowdowns on the SR 60 westbound off-ramp curve. In addition, heavy congestion is experienced during the PM peak hour along I-275 northbound, north of SR 60, primarily due to the downstream congestion. The traffic queues from the I-275 and I-4 merge extend beyond the Westshore Boulevard interchange.

- Overall, traffic delays for the I-4 westbound segment were higher than the I-4 eastbound segment during both the AM and PM peak hours. In the I-4 westbound segment, average traffic flow speeds were slower during the AM peak hour than during the PM peak hour.

- A critical bottleneck leading to congestion was observed on the I-4 westbound segment from the Selmon Connector to the I-4 off-ramp to I-275 southbound. This bottleneck is caused by high exiting traffic volumes and vehicle slowdowns on the off-ramp curve.

The NFA Alternative is defined as the existing transportation system plus improvements approved in the1997 and 1999 RODs. This geometry will be unable to handle the future growth in traffic. This study examined the need for additional mainline improvements in each direction to improve reliability, increase the capacity, and improve the operations and safety of I-275 and I-4 within the study area. A description of each of the alternative options is provided below:

- **Options A and B - Reconstructed Interchange -** The proposed improvements under Options A and B would include:

    - Reconstruction of the I-4/I-275 interchange to enhance the design speed along the current substandard ramps.
    - Reconstruction of I-275 mainline to eliminate the horizontal/vertical curves that cause vehicles to slow down through the I-4 interchange.
    - Construction of express lanes along I-275, terminating in the vicinity of SR 574, with direct connection to I-4 and to Tampa Heights.
    - Direct express lane connection to/from the Downtown area with ramp connections at Tampa Street and Morgan Street.

- Addition of overpasses at several locations to open cross-connections of local streets through the interstate footprint, and additional ROW acquisition involving vacant or undeveloped portions of land at pinch-points.
- Reconstruction of the Orange/Jefferson interchange to improve safety by further discouraging wrong-way driving crashes.
- This section is adjacent to several historic districts and primarily residential areas. Both Options A and B improve access to/from Ybor City and Tampa Heights through reconfiguration of the N 21st /22nd Street interchange and addition of a ramp connection at N 13th /14th Street.

The differences between Options A and B are as follows:

- **Option A - Reconstructed Interchange with Express Lanes to the North:** Option A includes express lanes along the north leg of I-275 with direct connections to I-275 and I-4. Direct express lane connection from I-275 north to/from I-4 east alleviates the weave condition along I-4 between I-275 and Selmon Connector in both travel directions.

- **Option B - Reconstructed Interchange without Express Lanes to the North:** Option B does not include express lanes along the north leg of I-275 and does not include direct connections from the express lanes to the north leg of I-275. Access to and from I-275 north would be provided through slip ramps. This option does not address the weave condition along I-4 between I-275 and Selmon Connector.

- **Options C and D - Existing Interchange with Elevated Express Lanes (viaduct) -** Proposed improvements under Options C and D would include retaining the existing I-275 and I-4 interchange while adding express lanes on elevated structure from west of the Hillsborough River to I-4. Access would be provided to the downtown street grid from the elevated express lanes. However, like the 1996 Long-Term Preferred Alternative, there would be no access to Floribraska Avenue since the ramps would be eliminated. Other improvements include providing two-lane ramps for connections to I-4 and the north leg of I-275 and direct express lane connections from I-275 north to/from I-4 east which alleviates the weave condition along I-4 between I-275 and the Selmon Connector in the eastbound direction only. This would be accomplished by removing the ramp along eastbound I-4, currently serving only N 21st/22nd Street and providing separate exits from northbound I-275 and southbound I-275.

  The exit from northbound I-275 would be located between Palm Avenue and Nebraska Avenue while the exit from southbound I-275 would be located off the two-lane flyover to eastbound I-4. Those two separate ramps would then combine along the south side of the eastbound I-4 mainline east of Nebraska Avenue and would tie into N 14th/15th Street, providing a new access point that would serve both the N 14th/15th Street and N 21st/22nd Street interchanges. The ramp would align with the eastbound frontage road that currently

connects N 14th/15th Street and N 21st/22nd Street. The frontage road would be widened to two lanes to facilitate traffic to N 21st/22nd Street. The differences between Options C and D are as follows:

- **Option C - Existing Interchange with Elevated Express Lanes – South Side of I-275:** Under Option C, the elevated express lanes would fly out from the median of I-275 west of the Hillsborough River over the northbound I-275 lanes to the outside of the existing interstate and run adjacent to the existing northbound I-275 lanes from the Hillsborough River to I-4, on the south side of I-275. The elevated express lanes would turn east along I-4 by crossing over to the north side of I-4, adjacent to the westbound I-4 lanes from I-275 to east of N 15th Street. The elevated express lanes would then fly over the westbound I-4 lanes back into the median of I-4 just west of N 21st Street.

- **Option D - Existing Interchange with Elevated Express Lanes – North Side of I-275:** Under Option D, the elevated express lanes would fly out from the median of I-275 west of the Hillsborough River over the southbound I-275 lanes to the outside of the existing interstate and run adjacent to the existing southbound I-275 lanes from the Hillsborough River to I-4, on the north side of I-275. The elevated express lanes would turn east along I-4, adjacent to the westbound I-4 lanes from I-275 to east of 15th Street. The elevated express lanes would then fly over the westbound I-4 lanes back into the median of I-4 just west of 21st Street.

- **Option E – Capacity and Safety Improvements for Southbound to Eastbound, Westbound to Northbound, and Westbound to Southbound:** The proposed improvement under Option E would include:

  - I-275 northbound and southbound express lanes end prior to the Tampa Street/Ashley Drive on/off ramp. Access to and from Tampa Street/Ashley Drive ramps will be provided through direct connections from the express lanes.

  - **Southbound I-275 to Eastbound I-4** - The southbound I-275 to eastbound I-4 improvements include widening the existing flyover ramp to two lanes. New signage located near Hillsborough Avenue would inform drivers that they can remain in the outermost lane to access the dual lane flyover ramp to I-4. The existing auxiliary lane that begins at the entrance ramp from Dr. MLK, Jr. Boulevard still would also provide drivers access to the I-4 flyover ramp without changing lanes. The existing exit ramp to Floribraska Avenue would remain.

    The improvements would include relocating the exit ramp to Ybor City and East Tampa from the existing location at N 21st/22nd Street to N 14th/15th Street. The relocated exit ramp would provide enhanced access to businesses, educational institutions, and residential areas. Drivers would still access N 21st/22nd Street via

widening the existing single-lane frontage road, East 13th Avenue, to two lanes.

- **Westbound I-4 to Northbound I-275 -** The westbound I-4 to northbound I-275 improvement would include widening the existing exit to northbound I-275. Westbound I-4 would be widened beginning at the westbound on-ramp from 21st Street and continuing to northbound I-275, providing for a widened two-lane exit to north I-275.

  The additional widened lane would continue north along I-275 to provide five lanes from I-4 to the Floribraska Avenue on-ramp. Between the Floribraska Avenue on-ramp and the Dr. MLK, Jr. Boulevard exit ramp, a sixth auxiliary lane would be added connecting the existing Floribraska Avenue on-ramp to the Dr. MLK, Jr. Boulevard exit ramp. The existing single-lane exit ramp to Dr. MLK, Jr. Boulevard will be widened to two lanes. From the exit ramp to Dr. MLK, Jr. Boulevard north, the five lanes would continue and then reduce to four lanes prior to the on-ramp from Dr. MLK, Jr. Boulevard and continuing to Hillsborough Avenue. The on-ramp from Dr. MLK, Jr. Boulevard would merge prior to Osborne Avenue. Drivers in the innermost lane from the ramp to I-275 northbound would be able to continue in this lane to Hillsborough Avenue.

- **Westbound I-4 to Southbound I-275 -** The westbound I-4 to southbound I-275 improvements would include widening the southbound I-275 ramp from two lanes to three lanes. The three lanes would join the two lanes from southbound I-275 to provide five lanes. The five lanes would then merge to four lanes near Jefferson Street. The exit ramps to Downtown Tampa would be adjusted to improve spacing so drivers can safely exit to downtown. The exit ramps would still serve Orange Avenue, Jefferson Street, Ashley Drive, and Doyle Carlton Drive. The improvements would remove the existing ramp bridge structure over I-275 as part of the ramp relocations. The existing shoulders would be widened on I-275 from Palm Avenue to Jefferson Street.

The following freeway measures of effectiveness (MOEs) were compared for the Build Alternative and NFA Alternative at the end of peak hours for the 2025 Opening Year:

- Average Speed (mph)
- Total Travel Delay (in vehicle-hours)
- Delay per Vehicle Mile (min/veh/mile)

For the NFA alternative, apart from the volume to capacity constraints on a systemwide basis, several segments experience significant delay during the AM and PM peak hours. The following segments experience heavy congestion:

- I-275 northbound between Howard Frankland Bridge and Ashley Drive off-ramp (AM/PM Peak – NFA): This segment experiences moderate to heavy congestion due to closely spaced ramps and heavy on/off-ramp demand traffic. Heavy congestion is observed south of the Ashley Drive off-ramp during the AM peak hour and along the whole segment during the PM peak hour. Significant mainline and interchange improvements are necessary along this segment to address the deficiencies.
- I-275 southbound between Downtown off-ramp and Howard Avenue off-ramp (PM Peak – NFA): This segment experiences heavy congestion due to heavy on/off-ramp demand traffic.
- I-275 southbound between Hillsborough Ave on-ramp and I-4 off-ramp (AM Peak – NFA): This segment experiences heavy congestion due to heavy off-ramp demand traffic to I-4.
- I-4 westbound between I-275 interchange and 50th Street off-ramp (AM/PM Peak – NFA): This segment experiences heavy congestion due to heavy on-ramp demand traffic from Selmon Connector and off-ramp demand traffic to I-275.

The results of the CORSIM simulation analysis showed significant improvements to the overall system MOEs during AM and PM peak hours due to the Build options compared to the NFA.

Based on the analysis, Build Options addresses most of the NFA congestion locations. However, as seen below there are segments within the Build Options that experience congestion.

- I-275 northbound between Westshore Boulevard on-ramp and Himes Avenue on-ramp (AM/PM Peak – All Build Options): This congestion occurs due to closely spaced ramps within this segment. There is approximately 1,000-foot spacing between the Westshore Boulevard on-ramp and Dale Mabry Highway off-ramp. Also, Dale Mabry Highway on-ramp and Himes Avenue on-ramp are approximately 650 feet apart. In addition, the traffic demand from these ramps is also significantly higher compared to the existing traffic counts. Interchange improvements are necessary along this segment specially to address the insufficient weaving distance between Westshore Boulevard on-ramp and Dale Mabry Highway off-ramp.
- I-275 northbound between Himes Avenue on-ramp and Ashley Drive off-ramp (PM Peak – Options C & D): This congestion occurs only in Options C and D due to a significant increase in traffic demand in the future and insufficient capacity through the downtown interchange.
- I-275 southbound north of Dr. Martin Luther King, Jr. Boulevard/SR 574 (Dr. MLK, Jr. Boulevard) off-ramp (PM Peak – All Build Options: This segment experiences congestion due to the significantly higher traffic demand for Dr. MLK, Jr. Boulevard off-ramp than the capacity of a single-lane off-ramp. Interchange improvements are necessary to address the increase in traffic demand.
- I-4 eastbound between I-275 and Selmon Connector (PM Peak – Option B): This segment experiences congestion due to lack of direct express lane connection from I-275 north of I-4 to I-4 eastbound. This leads to additional traffic merging into the general purpose (GP)

lanes along this segment of I-4. In Options A, C and D, a direct connect ramp/slip ramp flyover connection is provided from I-275 southbound to I-4 eastbound GP ramp to the I-4 express lanes. This reduces the traffic along this segment.

Table E-1 provides a summary of the MOE's comparing the five Build Options (A, B, C, D and E) to the NFA option for the 2025 Opening Year and 2045 Design Year using the project traffic assumptions given in **Figure E-1.**

Option A:

1. **Speed**
    a. 2025 Opening Year: 51% increase in speed for the AM peak hour and 80% increase in speed for the PM peak hour.
    b. 2045 Design Year: 86% increase in speed for the AM peak hour and 59% increase in speed for the PM peak hour.
2. **Total Travel Delay**
    a. 2025 Opening Year: 71% reduction in total delay for the AM peak hour and 67% reduction in total delay for the PM peak hour.
    b. 2045 Design Year: 61% reduction in total delay for the AM peak hour and 38% reduction in total delay for the PM peak hour.
3. **Delay per Vehicle-Mile**
    a. 2025 Opening Year: 77% reduction in delay per vehicle-mile for the AM peak hour and 77% reduction in delay per vehicle-mile for the PM peak hour.
    b. 2045 Design Year: 74% reduction in delay per vehicle-mile for the AM peak hour and 63% reduction in delay per vehicle-mile for the PM peak hour.

Option B:

1. **Speed**
    a. 2025 Opening Year: 51% increase in speed for the AM peak hour and 84% increase in speed for the PM peak hour.
    b. 2045 Design Year: 82% increase in speed for the AM peak hour and 54% increase in speed for PM peak hour.
2. **Total Travel Delay**
    a. 2025 Opening Year: 70% reduction in total delay for the AM peak hour and 70% reduction in delay for the PM peak hour.
    b. 2045 Design Year: 58% reduction in total delay for the AM peak hour and 33% reduction in delay for the PM peak hour.
3. **Delay per Vehicle-Mile**
    a. 2025 Opening Year: 76% reduction in delay per vehicle-mile for the AM peak hour and 80% reduction in delay per vehicle-mile for the PM peak hour.
    b. 2045 Design Year: 72% reduction in delay per vehicle-mile for the AM peak hour and 59% reduction in delay per vehicle-mile for the PM peak hour.

Option C:

1. **Speed**
    a. 2025 Opening Year: 53% increase in speed for the AM peak hour and 58% increase in speed for the PM peak hour.
    b. 2045 Design Year: 72% increase in speed for the AM peak hour and 40% increase in speed for the PM peak hour.
2. **Total Travel Delay**
    a. 2025 Opening Year: 76% reduction in total delay for the AM peak hour and 49% reduction in delay for the PM peak hour.
    b. 2045 Design Year: 53% reduction in total delay for the AM peak hour and 16% reduction in delay for the PM peak hour.
3. **Delay per Vehicle-Mile**
    a. 2025 Opening Year: 80% reduction in delay per vehicle-mile for the AM peak hour and 65% reduction in delay per vehicle-mile for the PM peak hour.
    b. 2045 Design Year: 68% reduction in delay per vehicle-mile for the AM peak hour and 48% reduction in delay per vehicle-mile for the PM peak hour.

Option D:

1. **Speed**
    a. 2025 Opening Year: 54% increase in speed for the AM peak hour and 55% increase in speed for the PM peak hour.
    b. 2045 Design Year: 72% increase in speed for the AM peak hour and 40% increase in speed for the PM peak hour.
2. **Total Travel Delay**
    a. 2025 Opening Year: 77% reduction in total delay for the AM peak hour and 47% reduction in delay for the PM peak hour.
    b. 2045 Design Year: 52% reduction in total delay for the AM peak hour and 18% reduction in delay for the PM peak hour.
3. **Delay per Vehicle-Mile**
    a. 2025 Opening Year: 81% reduction in delay per vehicle-mile for the AM peak hour and 62% reduction in delay per vehicle-mile for the PM peak hour.
    b. 2045 Design Year: 67% reduction in delay per vehicle-mile for the AM peak hour and 49% reduction in delay per vehicle-mile for the PM peak hour.

Option E:

1. **Speed**
    a. 2025 Opening Year: 29% increase in the speed for the AM peak hour and 69% increase in the speed for the PM peak hour.
    b. 2045 Design Year: 48% increase in speed for the AM peak hour and 46% increase in the speed for the PM peak hour.

2. **Total Travel Delay**
    a. 2025 Opening Year: 41% reduction in total delay for the AM peak hour and 59% reduction in total delay for the PM peak hour.
    b. 2045 Design Year: 30% reduction in total delay for the AM peak hour and 25% reduction in total delay for the PM peak hour.
3. **Delay per Vehicle-Mile**
    a. 2025 Opening Year: 53% reduction in delay per vehicle-mile for the AM peak hour and 72% reduction in delay per vehicle-mile for the PM peak hour.
    b. 2045 Design Year: 53% reduction in delay per vehicle-mile for the AM peak hour and 54% reduction in delay per vehicle-mile for the PM peak hour.

Peak Period Benefits Comparison (Value of Time)

In addition to the benefits seen during the AM and PM peak hours, each of the options provide significant delay reduction during the 4-hour AM peak period and 4-hour PM peak period by the 2045 design year.

- Option A provides a delay reduction of 16,293 vehicle-hours during the 4-hour AM peak period and 7,924 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $157.4 million compared to the NFA.
- Option B provides a delay reduction of 15,397 vehicle-hours during the 4-hour AM peak period and 6,785 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $144.2 million compared to the NFA.
- Option C provides a delay reduction of 13,689 vehicle-hours during the 4-hour AM peak period and 2,547 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $105.5 million compared to the NFA.
- Option D provides a delay reduction of 13,648 vehicle-hours during the 4-hour AM peak period and 3,163 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $109.3 million compared to the NFA.
- Option E provides a delay reduction of 6,564 vehicle-hours during the 4-hour AM peak period and 5,430 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $76.8 million compared to the NFA.

Table E-1 MOE Comparison Build Options (A, B, C, D and E) vs No Further Action (NFA)

Measures of Effectiveness (MOEs)	Time Period	Build Option A vs NFA		Build Option B vs NFA		Build Option C vs NFA		Build Option D vs NFA		Build Option E vs NFA	
		2025 Opening Year	2045 Design Year	2025 Opening Year	2045 Design Year	2025 Opening Year	2045 Design Year	2025 Opening Year	2045 Design Year	2025 Opening Year	2045 Design Year
Average Speed (MPH)	AM Peak Hour	51%	86%	51%	82%	53%	72%	54%	72%	29%	48%
	PM Peak Hour	80%	59%	84%	54%	58%	40%	55%	40%	69%	46%
Total Travel Delay (Hours)	AM Peak Hour	-71%	-61%	-70%	-58%	-76%	-53%	-77%	-52%	-41%	-30%
	PM Peak Hour	-67%	-38%	-70%	-33%	-49%	-16%	-47%	-18%	-59%	-25%
Delay per Vehicle-Mile (min/veh/mi)	AM Peak Hour	-77%	-74%	-76%	-72%	-80%	-68%	-81%	-67%	-53%	-53%
	PM Peak Hour	-77%	-63%	-80%	-59%	-65%	-48%	-62%	-49%	-72%	-54%

Figure E-1 Project Traffic Assumption Summary

Traffic forecast for the project was developed using:	
☒ Travel Demand Model	☐ Growth Rates
Type of Travel Demand Model Used: ☐ Metropolitan Planning Model ☒ Other Model D7 Tampa Bay Regional Planning Model V8.1 ML	Section 3.3 provides discussion on the use of the growth rates to develop future year design hour volumes
Is the travel demand model based on the latest adopted LRTP?	
☒ YES	☐ NO
2014 Date when MPO adopted the latest LRTP	Explain why?
2010 Base Year of Travel Demand Model	
2040 Horizon Year of Travel Demand Model	
LRTP documentation is available at (provide web address): http://www.planhillsborough.org/2040-lrtp/	
Traffic Data and Factors	
Standard K = 0.09 D Factor = 0.57 for I-275 and SR 60 D Factor = 0.535 for I-4 TDaily = 4.5	Data Collection Year = 2018 Opening Year = 2025 Design Year = 2045
2040 CF model socio-economic data was extrapolated to 2045 design year to develop the 2045 NFA and Build models and was adjusted to include development that is currently under construction and not accounted for in the socio-economic data. The Build model includes all the projects proposed with the Tampa Bay Next program for all the sections.	
Traffic Analysis Assumptions	

- The proposed improvements would involve the reconstruction/widening of I-275 from east of Howard Frankland Bridge (HFB) to North of State Road (SR) 574 (Dr. Martin Luther King [MLK] Jr. Boulevard), and I-4 from I-275 to east of 50th Street. As part of the Build alternatives, five (5) alternatives are being evaluated along with the NFA alternative
- As seen in Section 2.4.3, the calibration/validation parameters include raw balanced counts, travel time and speed.
- The analysis tools used for the study include CORSIM for operational analysis, and ISATe predictive analysis tool based on the Highway Safety Analysis for safety analysis.
- The analysis period includes AM peak period from 6:30 am – 9:30 am and for the PM peak period from 3:30 pm – 6:30 pm.
- The MOE's used for the operational analysis include speed, density for individual links, and VMT, Delay, Move-Time and Travel Time as part of the systemwide MOE's. As part of the safety MOE's, the KABCO scale was used to compare the NFA and build analysis.

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Acronyms

AADT	Average Annual Daily Traffic
ADR	Automatic Data Recorder
CBD	Central Business District
CARS	Crash Analysis Reporting System
CDMS	Crash Data Management System
DDHV	Design Hour Demand Volume
DHT	Design Hour Truck
EIS	Environmental Impact Statement
ELToD	Express Lanes Time of Day model
FHWA	Federal Highway Administration
FEIS	Final Environmental Impact Statement
FDOT	Florida Department of Transportation
FTI	Florida Traffic Information
GP	General Purpose
HOV	High Occupancy Vehicle
HSM	Highway Safety Manual
HFB	Howard Frankland Bridge
IOAR	Interchange Operational Analysis Report
I	Interstate
LRTP	Long Range Transportation Plan
MLK	Martin Luther King
MLOU	Methodology Letter of Understanding
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NFA	No Further Action
ODME	Origin-Destination Matrix Estimation
PSWADT	Peak Season Weekly Average Daily Traffic
PD&E	Project Development and Environment
PTAR	Project Traffic Analysis Report
ROD	Record of Decision
ROW	Right-of-way
S4	Signals Four
SR	State Road
SEIS	Supplemental Environmental Impact Statement
TBX	Tampa Bay Express
TBN	Tampa Bay Next
TBRPM	Tampa Bay Regional Planning model
TIS	Tampa Interstate Study
TMC	Turning Movement Counts

1. INTRODUCTION

The Federal Highway Administration (FHWA) and Florida Department of Transportation (FDOT) have initiated the environmental review process for the Tampa Interstate Study (TIS) Project in Tampa, Hillsborough County, Florida. The study is a supplement to the 1996 Final Environmental Impact Statement (FEIS). FHWA issued the Records of Decision (ROD) in 1997 and 1999. FDOT and FHWA are conducting this study based on a proposed design change that includes new alternatives not previously considered, as well as modified alternatives presented in the 1996 TIS FEIS to accommodate tolled or non-tolled express lanes and other capacity and mobility improvement alternatives, some of which are being considered by FDOT in separate studies. FDOT, in coordination with FHWA, will prepare a Supplemental Environmental Impact Statement (SEIS) in accordance with the National Environmental Policy Act (NEPA) and other regulatory requirements.

1.1 Background of the TIS SEIS Project

The TIS Project has been under consideration for many years. The Tampa Interstate system is the cornerstone of the Tampa Bay Region's surface transportation system and improvements to the system have been a priority to the state since the 1980's. The proposed improvements to the interstate system are found in the Hillsborough Metropolitan Planning Organization's (MPO) *2040 Long Range Transportation Plan for Hillsborough County* (LRTP) (2018).

In 1983, FDOT began to identify potential improvements to the Tampa Interstate system, which was constructed in the early 1960's. These improvements included potential short-term safety solutions and design changes, and long-term high-occupancy vehicle (HOV) related improvements to accommodate growing traffic volumes and congestion. The 1983 study considered all transportation needs within the study area, including concurrent highway, rail, and/or transit improvements.

Using the 1983 study as a documented base, FDOT began Phase I of the TIS in 1987. The purpose of the Phase I study was to produce a Master Plan to identify alternatives and make recommendations regarding the preferred type and location of multi-lane improvements, potential HOV facilities, transit facilities, traffic management techniques, and traffic surveillance and control systems. Based on the work performed, FDOT published the *TIS Master Plan Report* in 1989. The Hillsborough County MPO adopted the Tampa Interstate Master Plan Concept into the 2010 LRTP in November 1989. Several segments identified in the original TIS have since been constructed.

Following completion of the *TIS Master Plan Report*, FHWA, in cooperation with FDOT, began the preparation of an Environmental Impact Statement (EIS) and the supporting documentation necessary for state and federal approvals and subsequent funding of the *TIS Master Plan Report* concepts. The EIS evaluated impacts associated with a Selected Alternative, a Long-Term Preferred Alternative, and a No-Action Alternative, addressed agency and citizen concerns, and identified ways to minimize impacts.

FHWA approved the EIS in November 1996, issued the ROD for the 1996 TIS FEIS in 1997, and an amended ROD in June 1999. The 1997 and 1999 RODs are the documents that have governed the development of all improvements to I-275 and I-4 providing a roadway system that includes general purpose (GP) lanes and separated express lanes in each direction, as well as a future transit corridor. The intent of the FHWA and the FDOT is to ultimately construct the Long-Term Preferred Alternative as funding becomes available through the Hillsborough County MPO. Since issuance of the 1997 and 1999 RODs, FDOT has taken several major steps to advance the Project to full implementation. The TIS Project has been re-evaluated several times to advance various elements of the project, many of which FDOT has already constructed including portions of Segment 1A, Segment 2A, Segment 2B, Segment 3A, Segment 3B, and Segment 3C. The following describes the projects that FDOT has constructed.

- **I-275 Widening Southbound and Remainder of Northbound from east of SR 60 to Downtown Tampa** – Corridor length: 4.2 miles, Construction Cost: $217.3 million, Start: July 2012 – Completion: Fall 2016. Reconstruction and roadway widening. Improvements included: providing five through lanes in each direction, flattening the profile of the roadway at bridges over the crossroads, aesthetic treatments, improved interchanges, and increased median width for future improvements.

- **I-275 Northbound from Himes Avenue to the Hillsborough River** – Corridor Length: 2 miles, Construction Cost: $109 million, Start: August 2007 – Completion: Spring 2010. Reconstruction of a 3-lane roadway into a 4-lane roadway primarily south of the existing alignment. Improvements also included: providing an increased median width reserved for future transportation needs, new bridges with improved height clearances, shoulder-mounted 8-foot noise walls near densely developed residential areas, aesthetic treatments, and improved lighting and drainage.

- **I-4/I-275 Interchange Operational Improvements (Downtown Tampa Interchange)** - Corridor Length: 2.7 miles, Construction Cost: $81 million, Start: October 2002 – Completion: December 2006. Capacity and safety improvements to the Downtown Tampa Interchange, which widened both interstates to five lanes in each direction. Improvements also included: extending the Ashley Street entrance ramp, providing a local auxiliary exit ramp system, improving weaving movements related to the I-275 southbound to I-4 eastbound flyover ramp, shoulder-mounted 8-foot noise walls near densely developed residential areas, landscaping within infield area and aesthetic treatments.

- **I-4 from West of 14th Street to East of 50th Street** – Corridor Length: 3.2 miles, Construction Cost: $185 million, Start: February 2004 – Completion: Fall 2007. Reconstruction of a 4-lane roadway into a 6-lane roadway (three lanes in each direction with auxiliary lanes) to tie into the Downtown Tampa Interchange improvement project completed in December 2006. Improvements also included: providing an increased median width reserved for future transportation needs, new bridges with improved height clearances, shoulder-mounted 8-foot noise walls near densely developed residential areas, aesthetic treatments, and improved lighting and drainage.

- **I-4/Selmon Connector** – Corridor Length: 1 mile, Construction Cost: $425 million, Start: March 2010 – Completion: Spring 2014. Construction of a new north-south toll interchange, which connects I-4 with the Lee Roy Selmon Expressway (SR 618). The elevated roadway with an all-electronic toll collection system links these two major east-west corridors and provides "truck-only" lanes for direct access to the Port Tampa Bay to reduce heavy truck traffic from local roads in Ybor City. Aesthetic treatments were also included in this project.

In 2011, FDOT released the *Florida Transportation Vision for the 21st Century*. The vision focused on innovative financing alternatives, advancing projects, and accommodating economic growth. While the 1996 TIS FEIS always included managed lanes along the region's interstates, tolling was not a consideration at the time. As a result of the 2011 Vision, FDOT initiated a master plan study in 2012 to determine the feasibility of dynamically tolling the proposed express lanes on the interstate. FDOT's 2015 *Tampa Bay Express (TBX) Master Plan*, which included the TIS project limits, established a system-wide framework for implementation of dynamically-tolled express lanes within the Tampa Bay Region. As part of the development of the *TBX Master Plan*, FDOT conducted extensive outreach, beginning with focus groups, to better understand public perceptions of the express lanes concept. The extensive outreach has been on-going since resetting as Tampa Bay Next.

1.2 Location of the TIS SEIS Project

The proposed TIS SEIS Project is located in the City of Tampa in Hillsborough County, Florida. The study area comprises approximately 11 miles of I-275 and I-4, an approximate 4.4-mile segment of the Selmon Expressway, and an approximate 0.8-mile segment of the I-4/Selmon Connector (previously known as the Crosstown Connector). The proposed improvements involve the reconstruction/widening of I-275 from north of the Howard Frankland Bridge (HFB) to north of State Road (SR) 574 (Dr. Martin Luther King [MLK], Jr. Boulevard), and I-4 from I-275 to east of 50th Street. The proposed improvements are located in the 1996 TIS FEIS Segments 1A, 2A, 2B, 3A, and 3B. TIS FEIS Segment 3C, Selmon Expressway, is not being considered in the TIS SEIS because it has been constructed. **Figure 1-1** shows the entire Tampa Bay Next Interstate Modernization projects within the Tampa Bay region. **Figure 1-2** shows the limits of the SEIS study area and **Figure 1-3** shows the SEIS study intersections.

Figure 1-1 Tampa Bay Next Interstate Modernization Projects

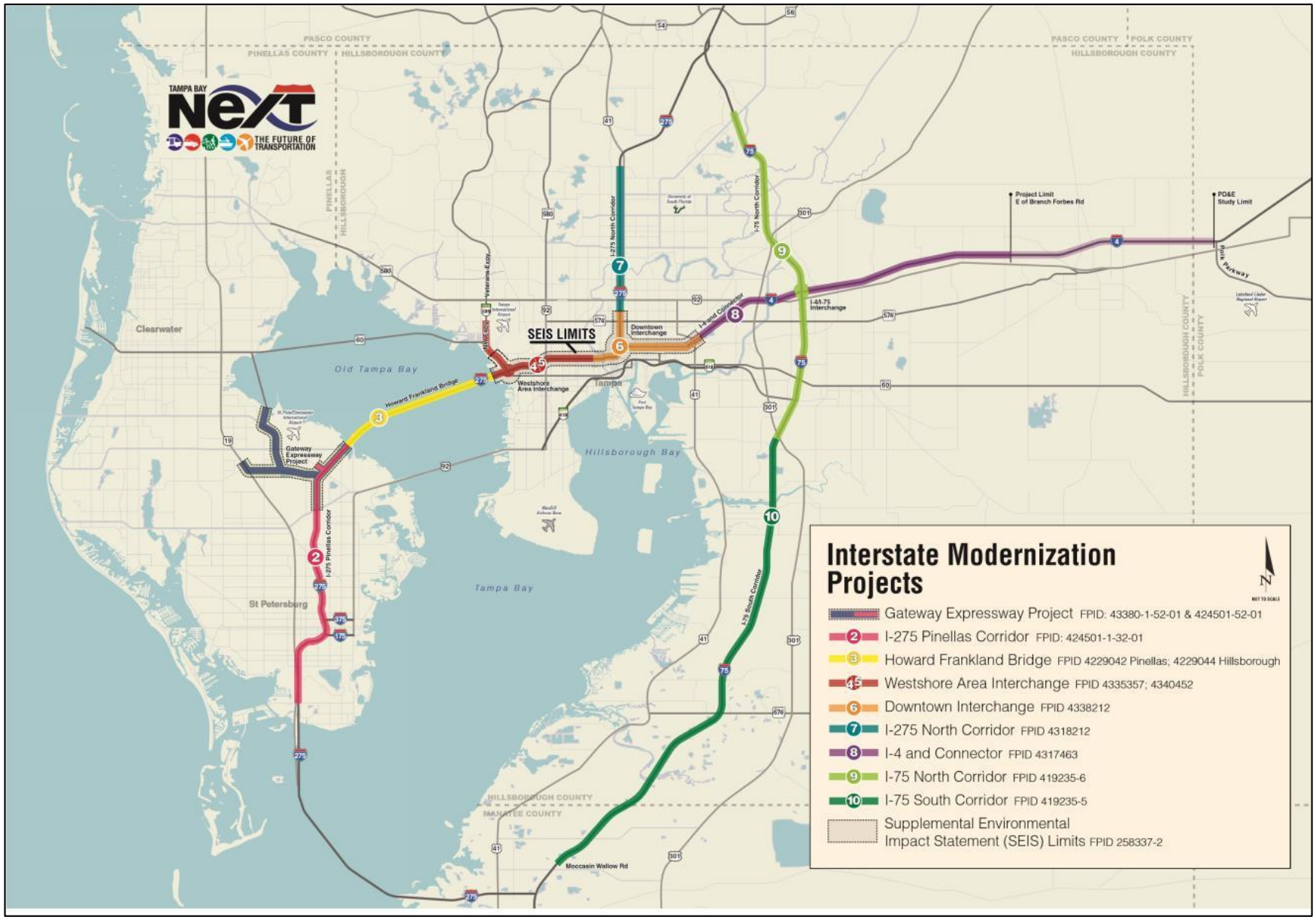


Figure 1-2 Tampa Interstate Study SEIS Project Study Area

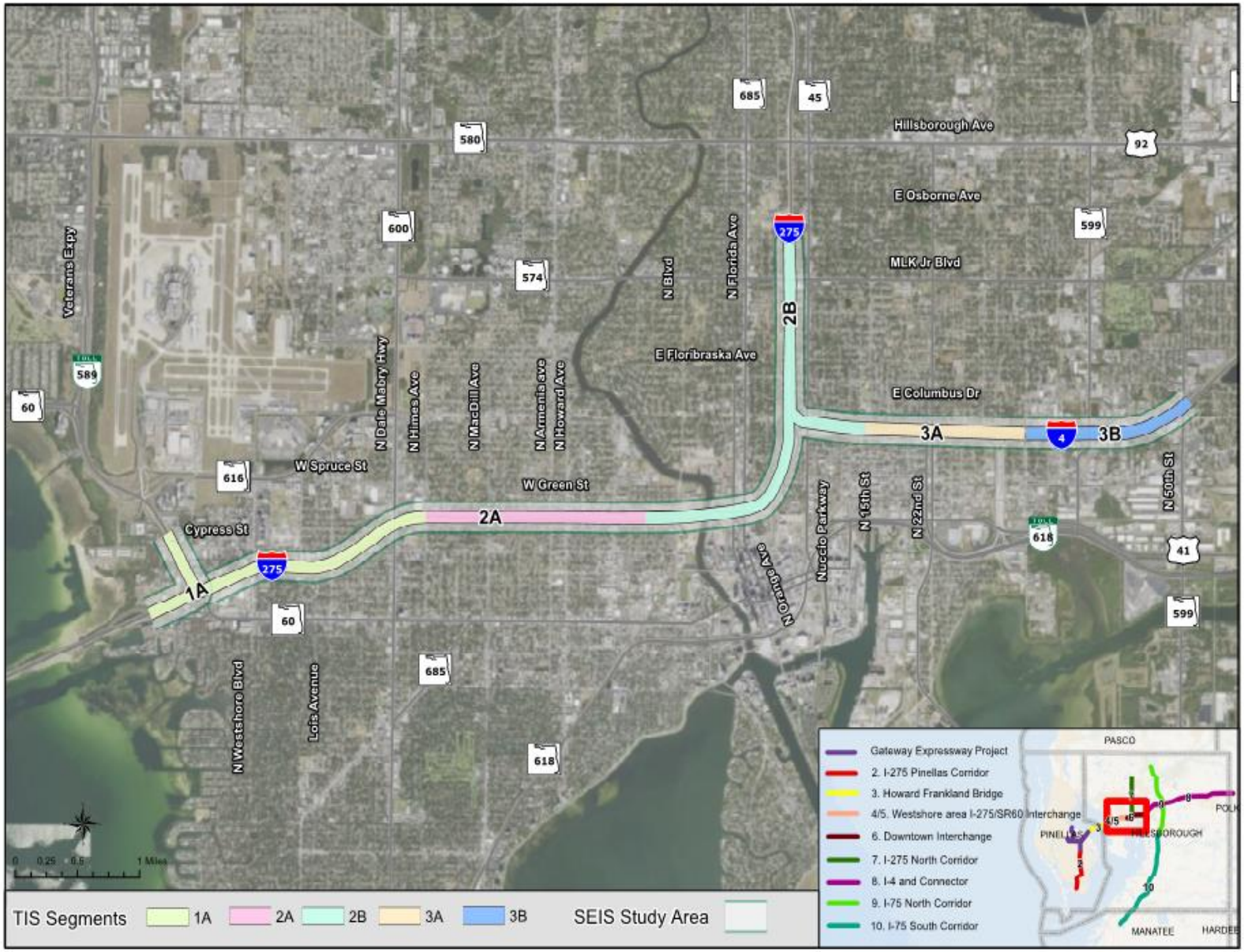
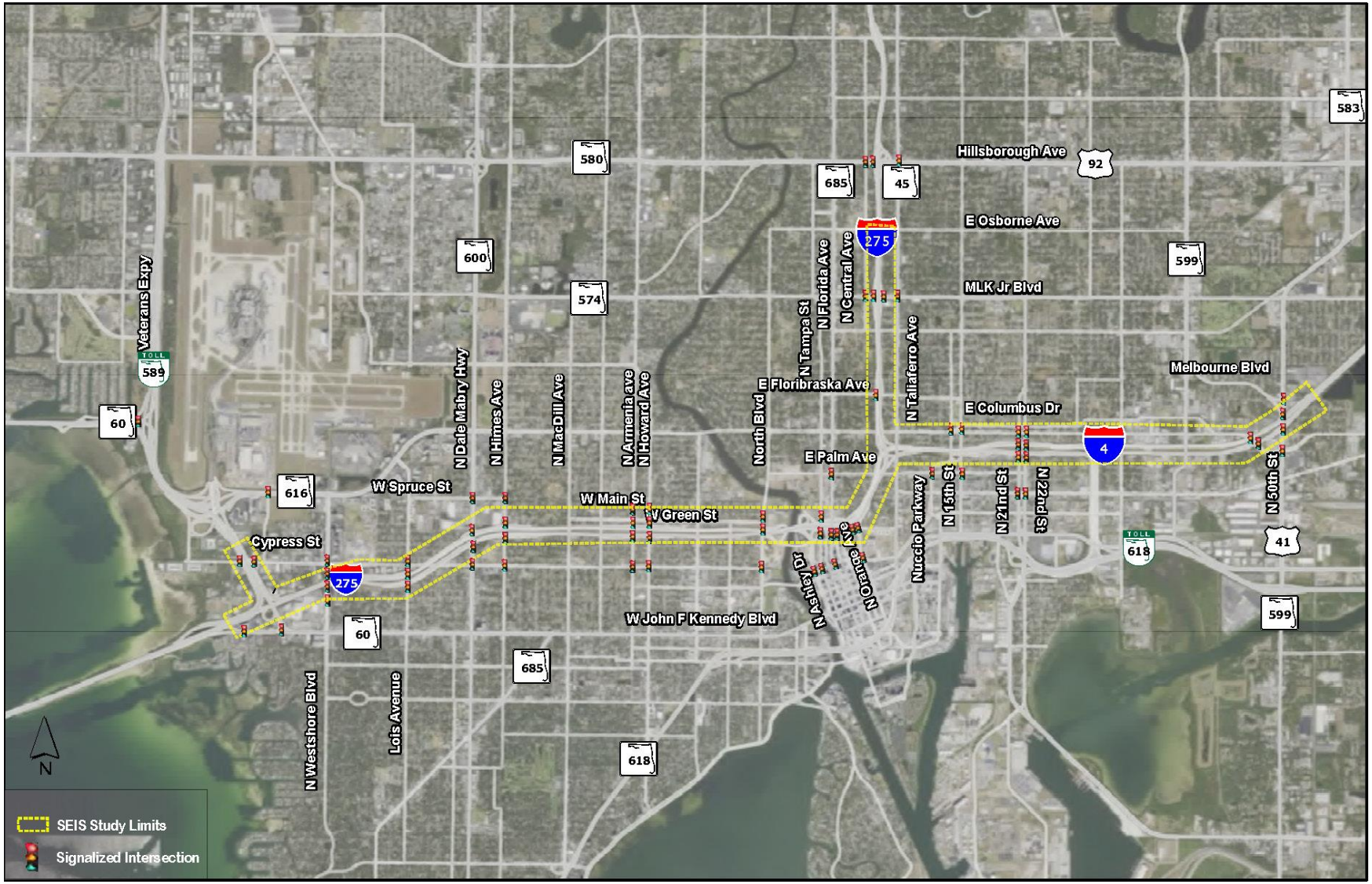


Figure 1-3 Tampa Interstate Study SEIS Project Study Intersections



1.3 Purpose of the TIS SEIS Project

In the 1996 TIS FEIS, the purpose for the proposed action was: "…to upgrade the safety and efficiency of the existing I-275 and I-4 corridors that service the Tampa urban area while maintaining access to the surrounding community."

The current SEIS Purpose is consistent with the 1996 TIS FEIS Purpose and expands upon the originally identified purpose and need to include congestion relief that improves accessibility, mobility, travel times, system linkages, and multimodal connections, while supporting regional economic development goals and enhancing quality of life for Tampa Bay residents and visitors.

2. EXISTING CONDITIONS

2.1 Study Intersections and Existing Lane Configuration

The SEIS study area encompasses TIS Segments 1A, 2A, 2B, 3A, and 3B as shown in Figure 1-2 and is located in Hillsborough County and consists of three major facilities (I-275, I-4, and SR 60). The study limits were extended to incorporate the adjacent signalized intersections along the arterial on each side of the interchange ramp terminals. **Figures 2-1** and **2-2** illustrate the lane schematics of Existing Year (2018) of I-275 and I-4 respectively. In addition, functional classification and posted speed limit for major roadways within the study limits are presented in **Table 2-1**. The section below specifies the limits of the study separately by freeway, in addition to the number of interchanges and signalized intersections captured under each facility.

- I-275 – from south of SR 60 to Hillsborough Avenue
  - 12 interchanges
    1. SR 60
    2. Westshore Boulevard
    3. Lois Avenue
    4. Dale Mabry Highway
    5. Himes Avenue
    6. Howard-Armenia Avenue
    7. Ashley Boulevard
    8. Orange Avenue
    9. I-4
    10. Floribraska Avenue
    11. Dr. Martin Luther King Jr. Boulevard
    12. Hillsborough Avenue
  - 46 signalized intersections
- I-4 – from I-275 Interchange to 50th Street
  - 3 interchanges
    1. 21st/22nd Street
    2. Selmon Expressway
    3. 50th Street
  - 18 signalized intersections
- SR 60 – from Independence Parkway to Kennedy Boulevard
  - 2 interchanges
    1. Spruce Street/Airport
    2. Veterans Expressway
  - 5 signalized intersections

Figure 2-1 Existing Year (2018) Lane Schematics for I-275 Corridor

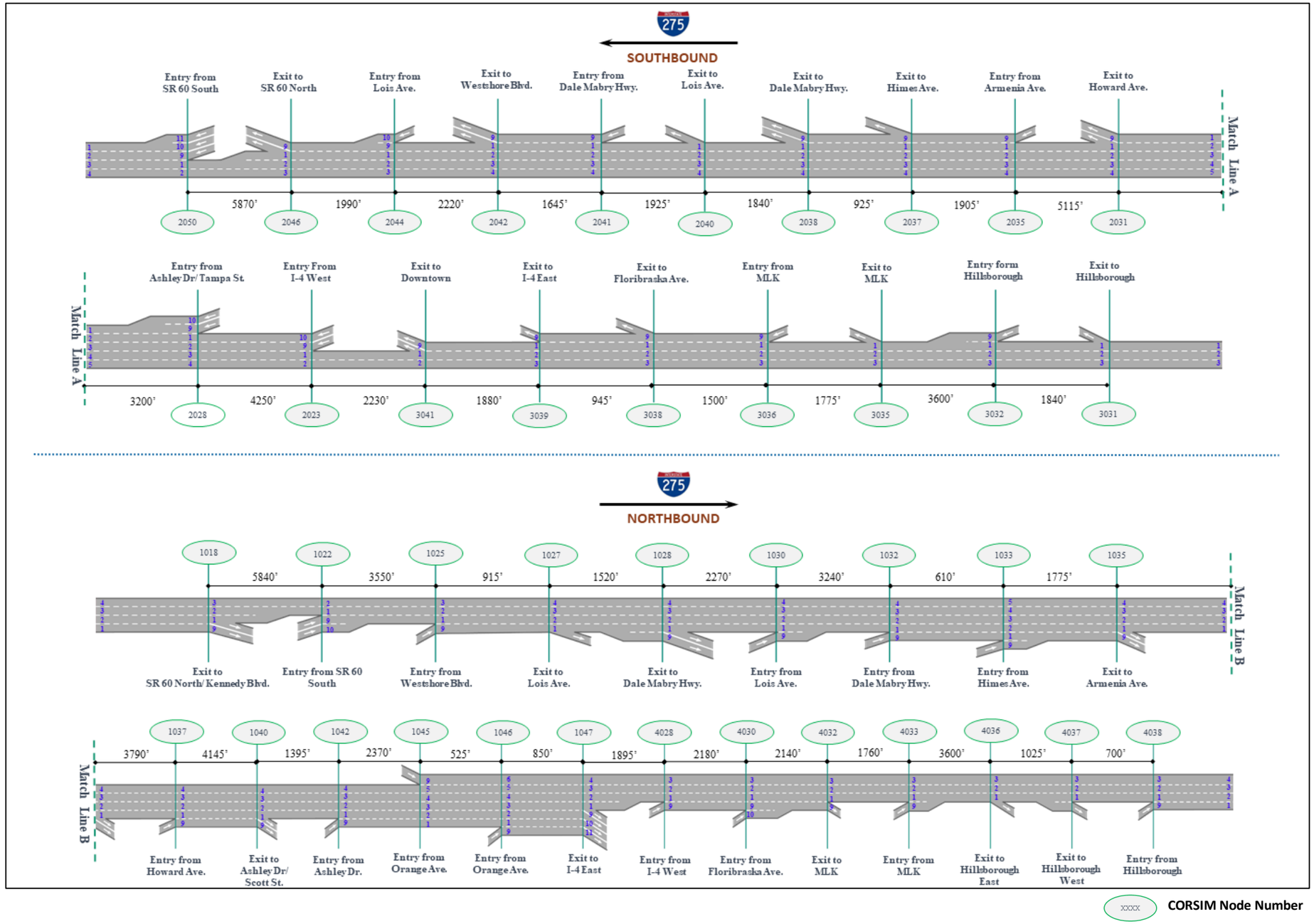


Figure 2-2 Existing Year (2018) Lane schematics for I-4 Corridor

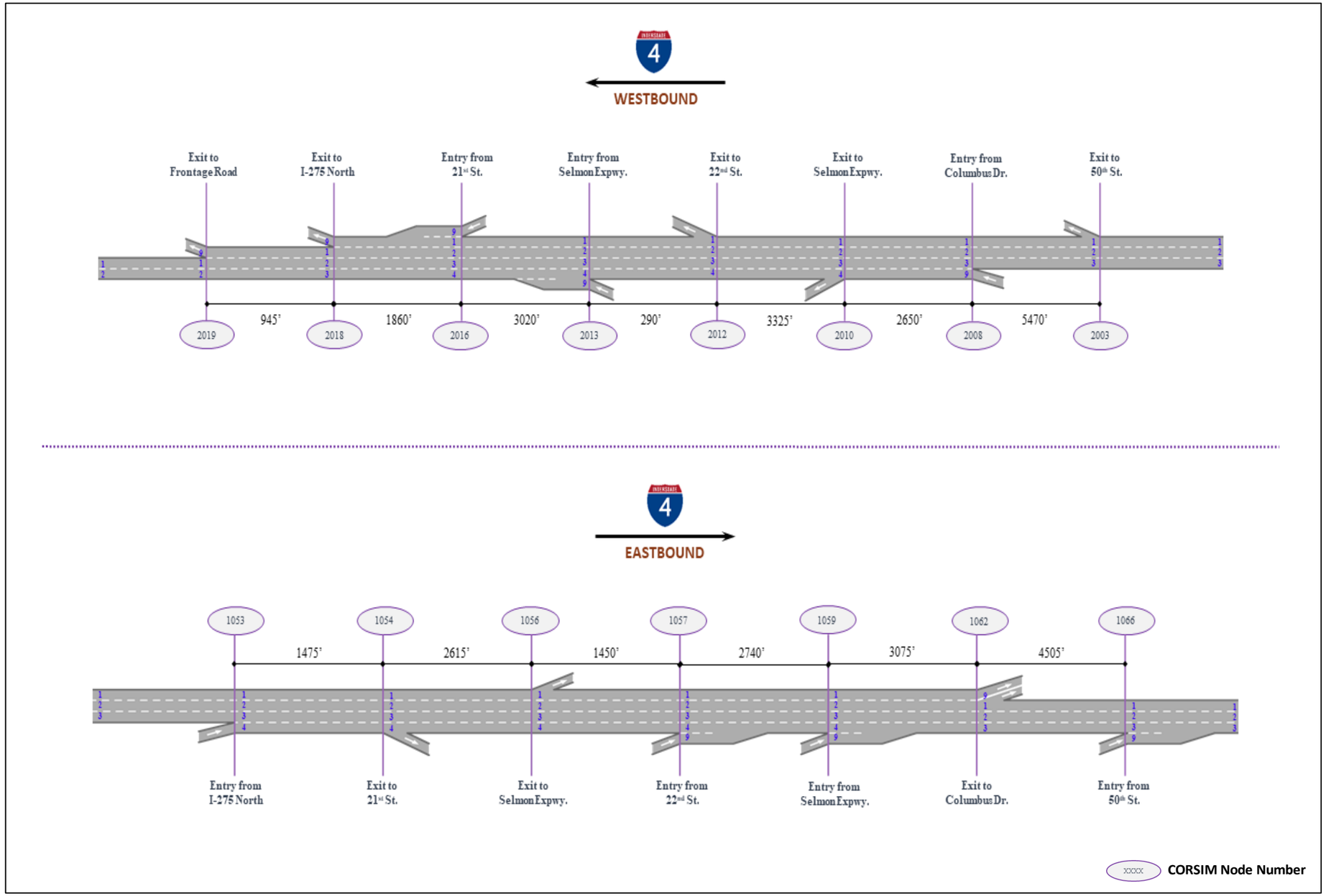


Table 2-1 Functional Classification and Posted Speed Limit of Major Roadways

No.	Roadways	Functional Classification	Posted Speed (mph)
1.	I-275	Urban Principal Arterial - Interstate	50-65[1]
2.	SR 60	Urban Principal Arterial	50
3.	I-4	Urban Principal Arterial - Interstate	55
4.	SR 589 Veterans Expressway	Urban Principal Arterial - Expressway	50
5.	Kennedy Boulevard	Urban Principal Arterial	45
6.	Westshore Boulevard	Urban Minor Arterial	45
7.	Lois Avenue	Urban Minor Arterial	35
8.	Dale Mabry Highway	Urban Principal Arterial	40
9.	Himes Avenue	Urban Major Collector	40
10.	Howard/Armenia Avenue	Urban Minor Arterial	40
11.	North Street	Urban Major Collector	35
12.	N Tampa Street/N Ashley Drive	Urban Minor Arterial	30
13.	N Florida Avenue	Urban Minor Arterial	30
14.	N Orange Avenue	Urban Major Collector	30
15.	E Floribraska Avenue	Urban Minor Collector	30
16.	Martin Luther King Jr. Boulevard	Urban Principal Arterial	35
17.	E Hillsborough Avenue	Urban Principal Arterial	40
18.	Nuccio Parkway/N 14th & 15th Street	Urban Major Collector	35
19.	N 21st Street/N 22nd Street	Urban Minor Arterial	30
20.	E Columbus Drive	Urban Major Collector	40
21.	N 50th Street	Urban Principal Arterial	45
22.	Cypress Street	Urban Major/Minor Collector[2]	40
23.	Spruce Street	Urban Minor Arterial	50
24.	Independence Parkway	Urban Minor Arterial	40

1. South of SR 60: 65 mph, SR 60 to N Orange Avenue: 55 mph, N Orange Ave to south of Dr. MLK, Jr. Boulevard: 50 mph, Dr. MLK, Jr. Boulevard to Hillsborough Ave: 55 mph
2. Between Westshore Boulevard and Lois Avenue - classified as Minor Collector, and east of Lois Avenue – classified as Major Collector

2.2 Traffic Factors

The K-Factor, D-Factor, T-Factor, Design Hour Truck (DHT) Factors, and Model Output Conversion Factors were developed using the most recent five years of historic data from the Florida Traffic Information (FTI) online tool and by coordinating with adjacent on-going studies. Supporting information to estimate these factors is presented in **Appendix A**. Below are the recommended values for used in this study:

K-factor = 9%

Justification – Statewide standard K per Project Traffic Forecasting Handbook 2.6.2.1.

D-factor = 57% for I-275 and SR 60, 53.5% for I-4

Justification – Based on count data available on FTI Online website.

T24-factor = 4.5%

Justification – The existing count and 5-year average T24-factor average resulted a value of 4.4%, rounded to 4.5% to maintain consistency with TB Next Section 7 PTAR.

Design Hour Truck (DHT) factor = 3.0%

Justification – Based on Section 2.6.4 of the Project Traffic Forecasting Handbook, DHT = T24/2, which yields a value of 2.25%. However, based on comments from the Central Office on the I-275/SR 60 Interchange Operational Analysis Report (IOAR) methodology letter of understanding (MLOU), DHT is rounded to 3.0% for operational evaluation.

Peak Hour Factor (PHF) = 0.95

Justification – The Peak Hour Factor (PHF) of 0.95 is the recommended default value for urban areas, per guidance from the FDOT Traffic Analysis Handbook, March 2014.

Model Output Conversion Factor (MOCF) = Table below shows the recommended values

Location	MOCF
I-275	0.97
SR 60	0.97
I-4	0.95

Justification – The MOCF values are developed from the peak season factor category reports available on FTI for the roadway facilities.

In addition, raw traffic counts are provided in **Appendix B**.

2.3 Existing Year (2018) Volume Development

The Existing Year 2018 volumes were developed using the following method:

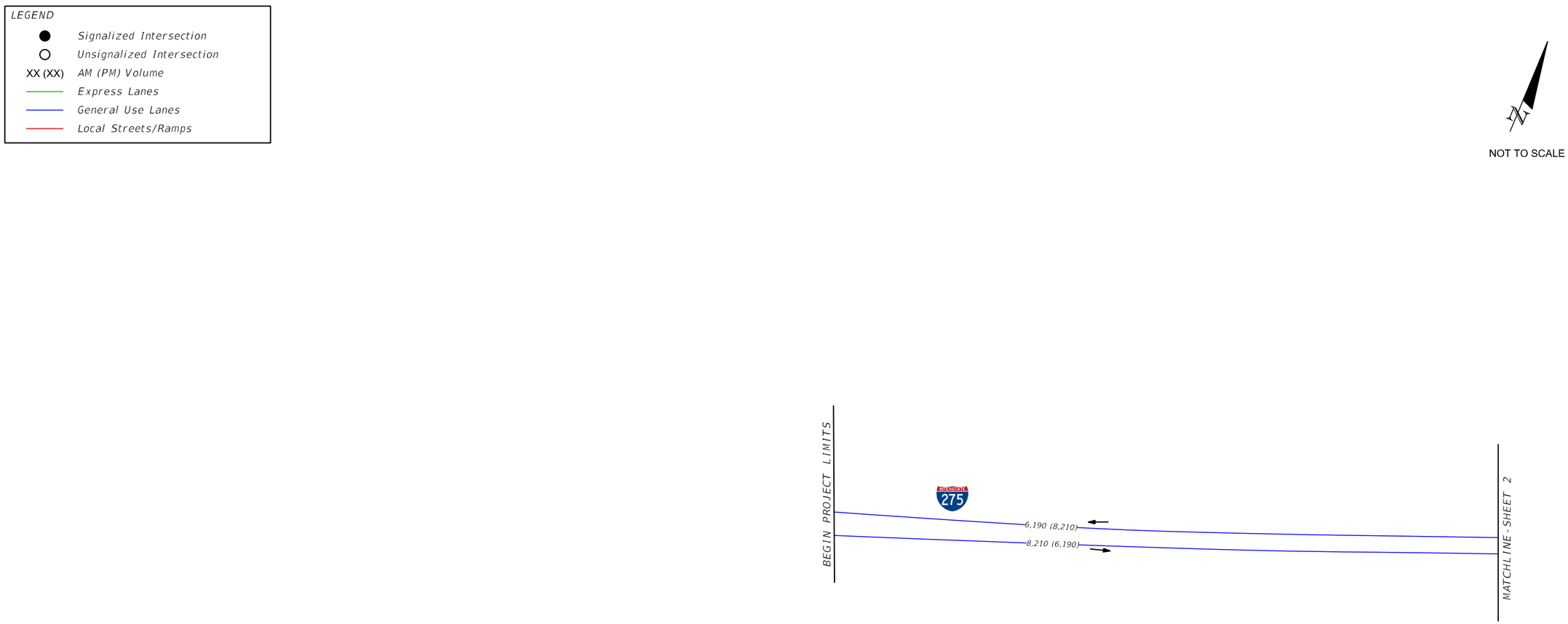
- Obtained traffic volumes that were collected as part of the I-275/SR 60 IOAR. The automated data recorder (ADR) and turning movement counts (TMCs) were collected in the months of October 2017 and November 2017.
- Expanded the project study from Himes Avenue with the above project to cover the entire SEIS study area limits as presented in **Figure 1-2** and obtained new traffic counts. The ADR and TMCs were collected in the months of June, July and September 2018.
- Applied the seasonal and axle factors to the recent counts and developed peak hour and daily volumes.
- Developed AM and PM peak hour and daily AADT volumes for Existing Year 2018 conditions and balanced across the study area.
- Developed traffic volume diagrams and utilized the volumes for existing conditions calibration.

2.4 Existing Year (2018) Design Hour (Demand) Volume Development

The Existing Year 2018 design hour volumes were developed using the following data and process:

- Based on the balanced Existing Year AADT count information, the standard K-factor of 0.09 and respective D-factors for each corridor were applied to the ramp volumes to estimate the peak hour demand traffic during 2018.
- Existing peak direction information was utilized based on the counts to estimate the AM and PM peak hour ramp volumes following the procedure outlined above.
- AM and PM peak hour volumes for Existing Year 2018 Demand conditions were balanced across the study area.

Figure 2-3 shows the 2018 Existing Demand DDHV's for the study area.

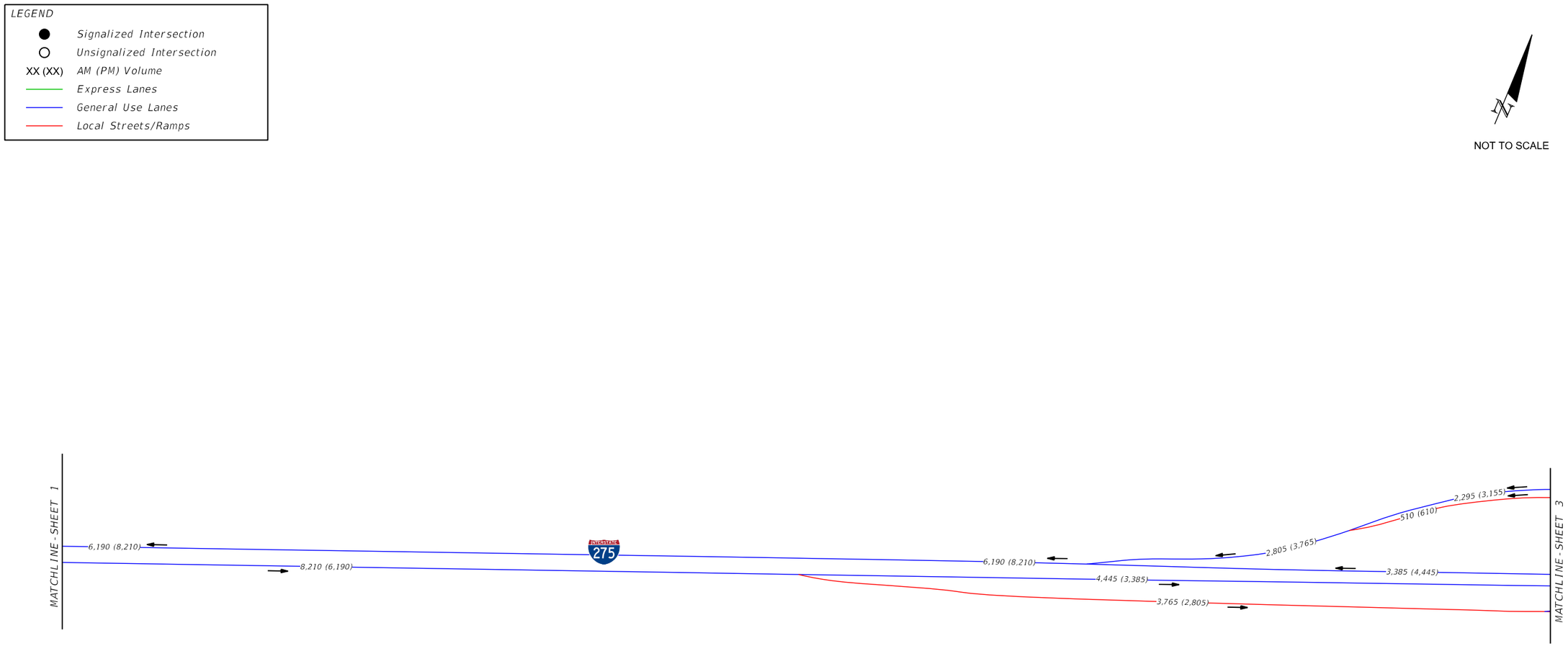


SEIS Re-evaluation

Existing Year (2018) - AM & PM DDHVs

Figure 2-3

Sheet 1 of 16



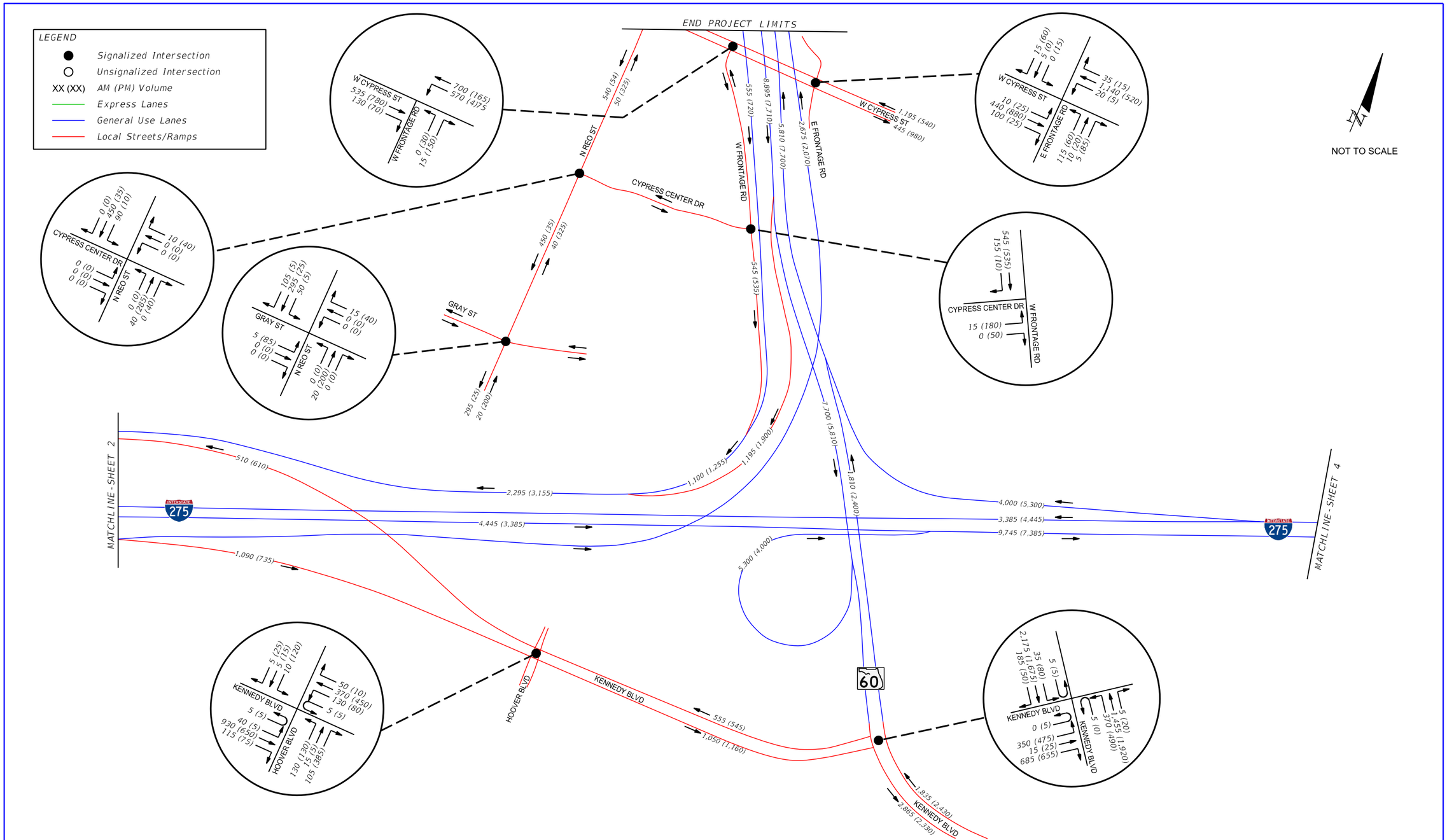
FDOT

SEIS Re-evaluation
Existing Year (2018) - AM & PM DDHVs

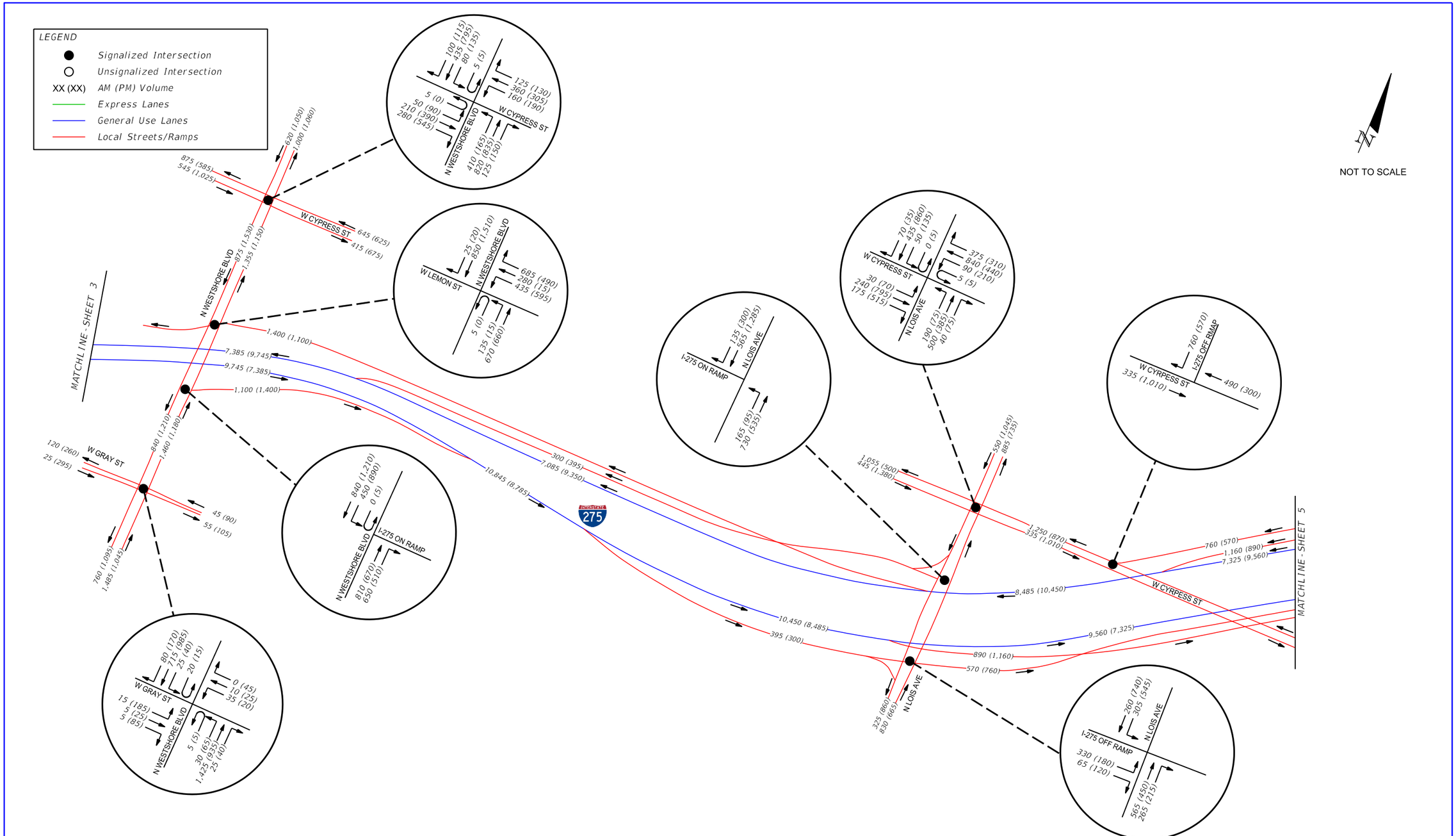
Figure 2-3

Sheet 2 of 16

WPI # 258337-2

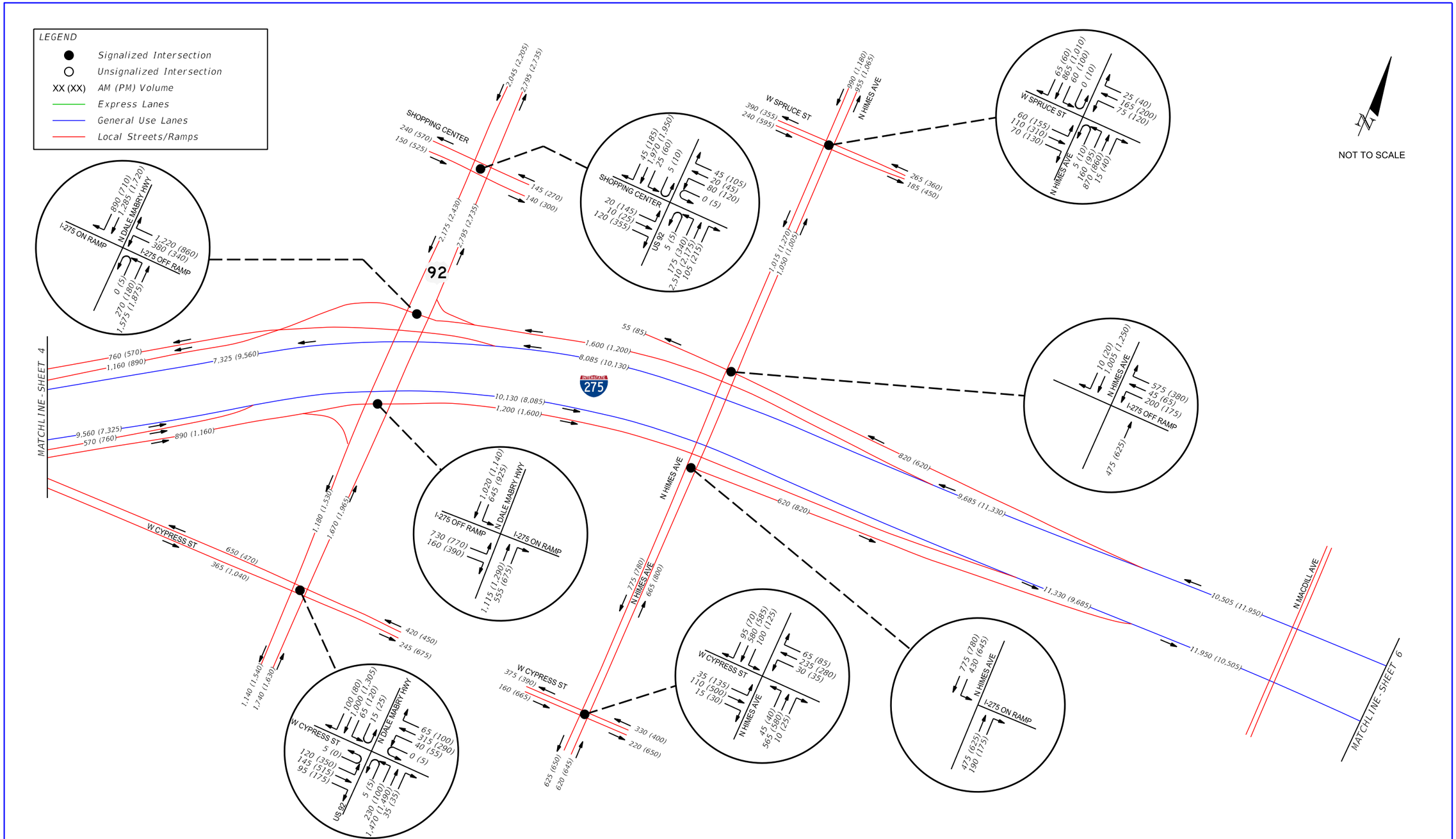


FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM DDHVs	Figure 2-3	Sheet 3 of 16



FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM DDHVs	Figure 2-3	Sheet 4 of 16

WPI # 258337-2



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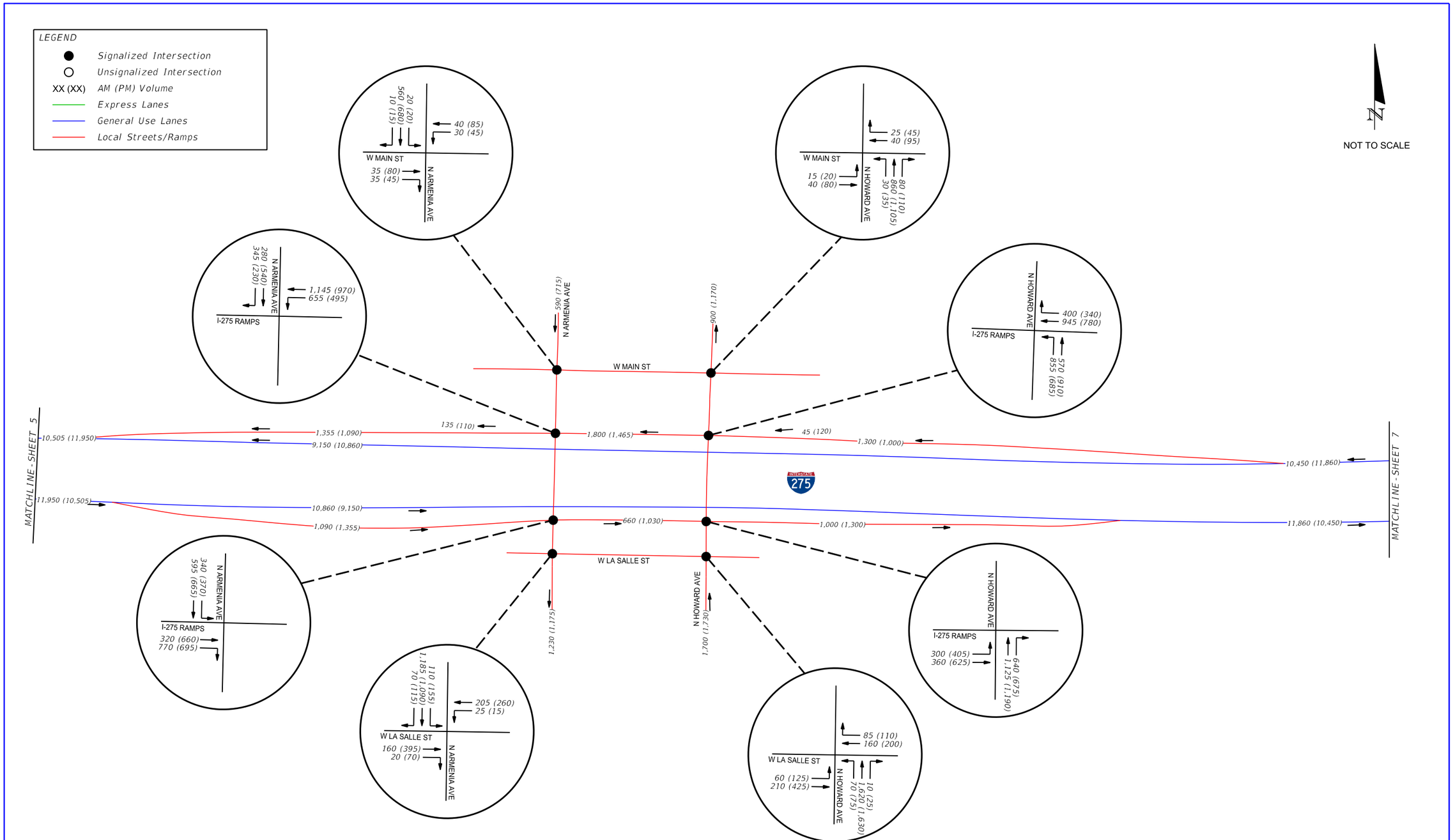
WPI # 258337-2



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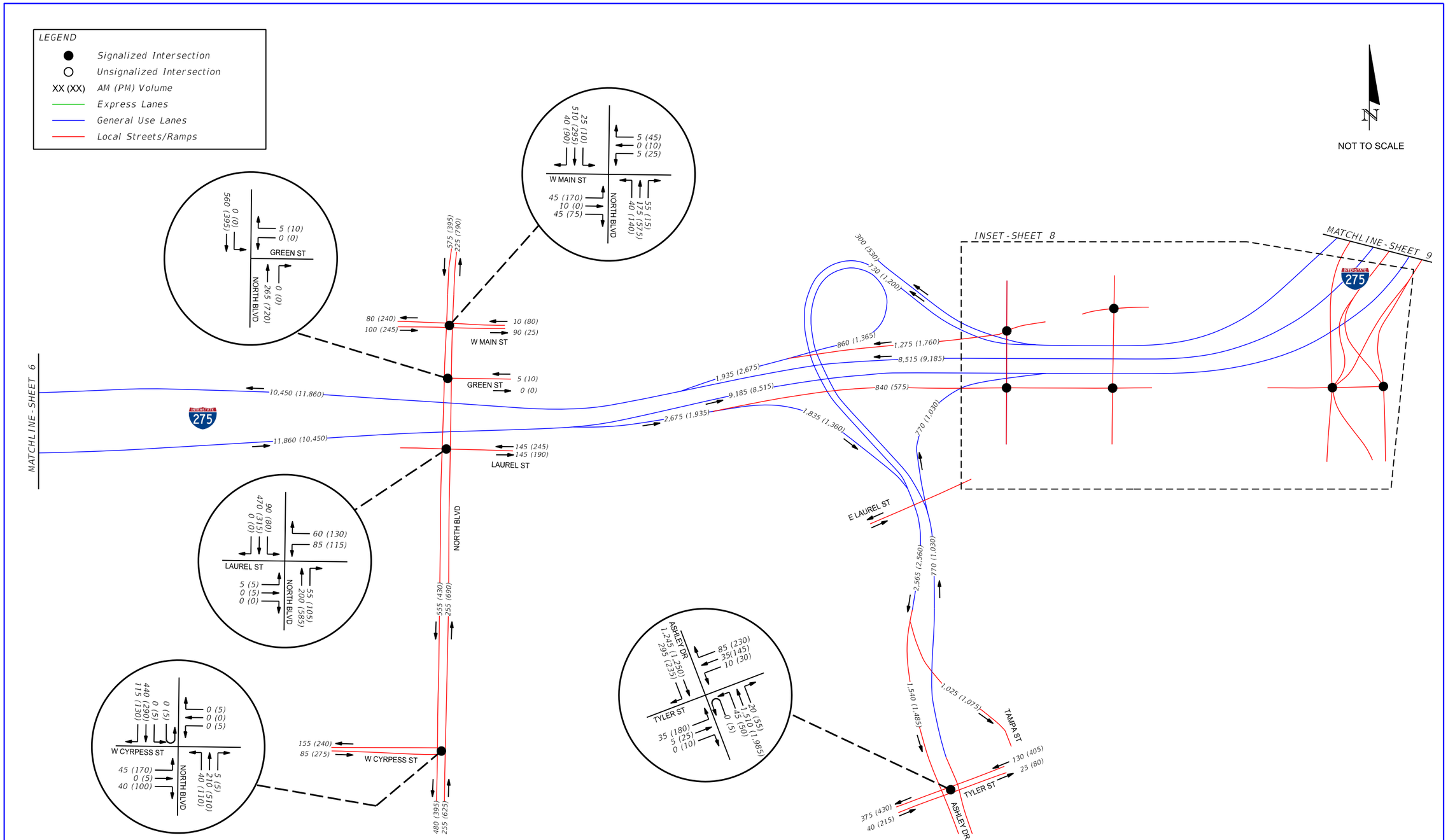
WPI # 258337-2



FDOT

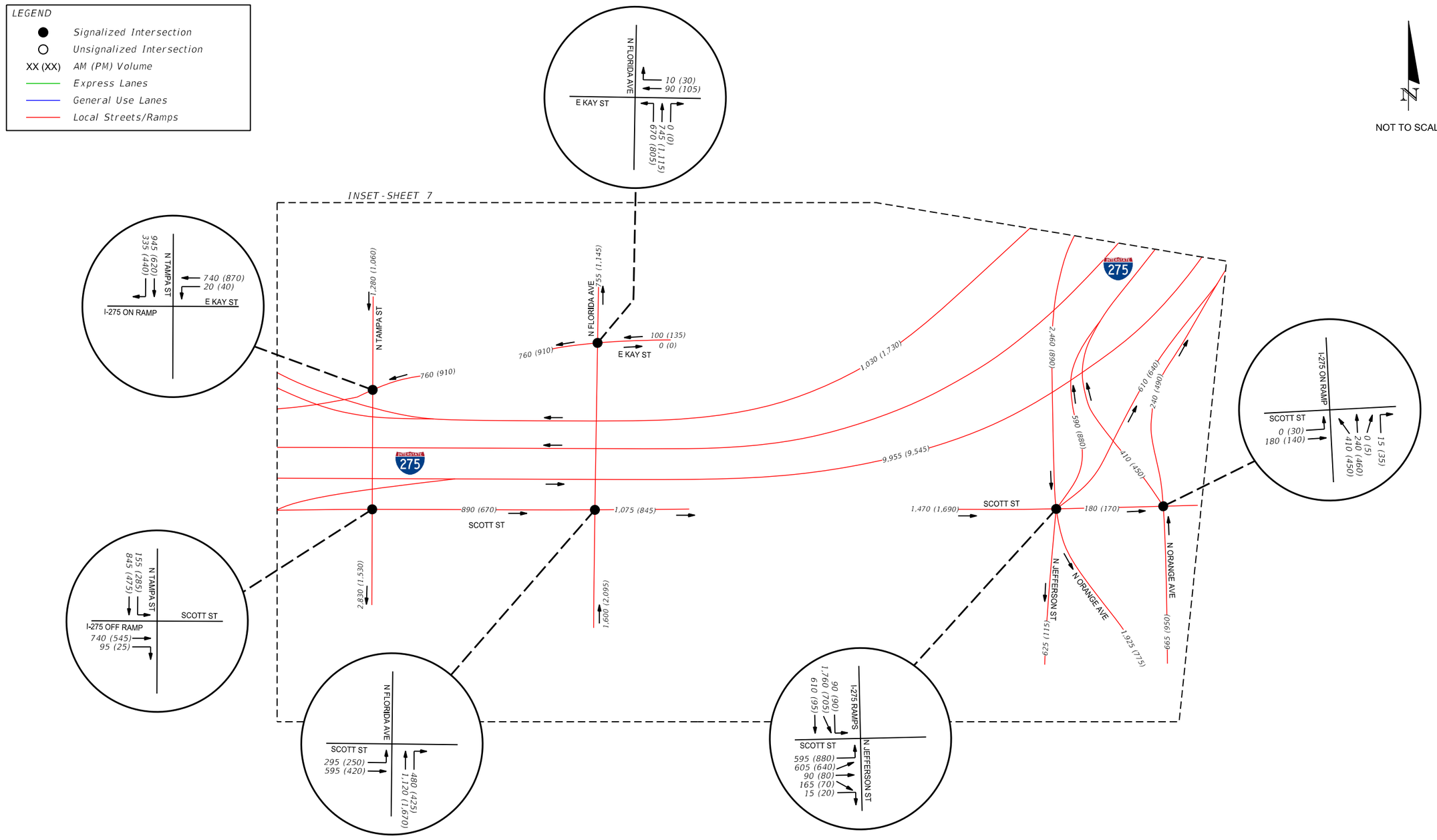
SEIS Re-evaluation

Existing Year (2018) – AM & PM DDHVs

Figure 2-3

Sheet 7 of 16

WPI # 258337-2



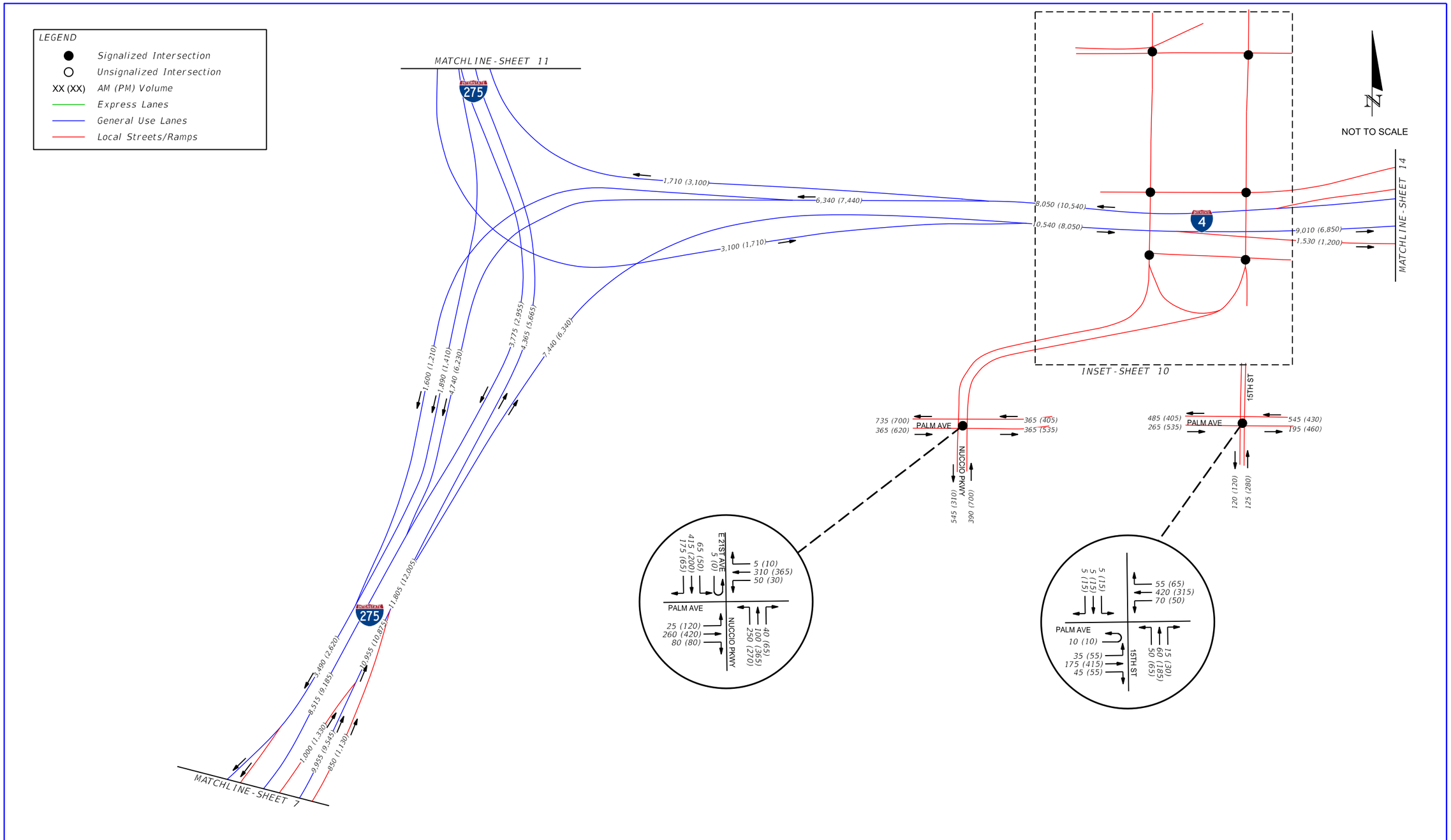
SEIS Re-evaluation

Existing Year (2018) - AM & PM DDHVs

Figure 2-3

Sheet 8 of 16

WPI # 258337-2



FDOT

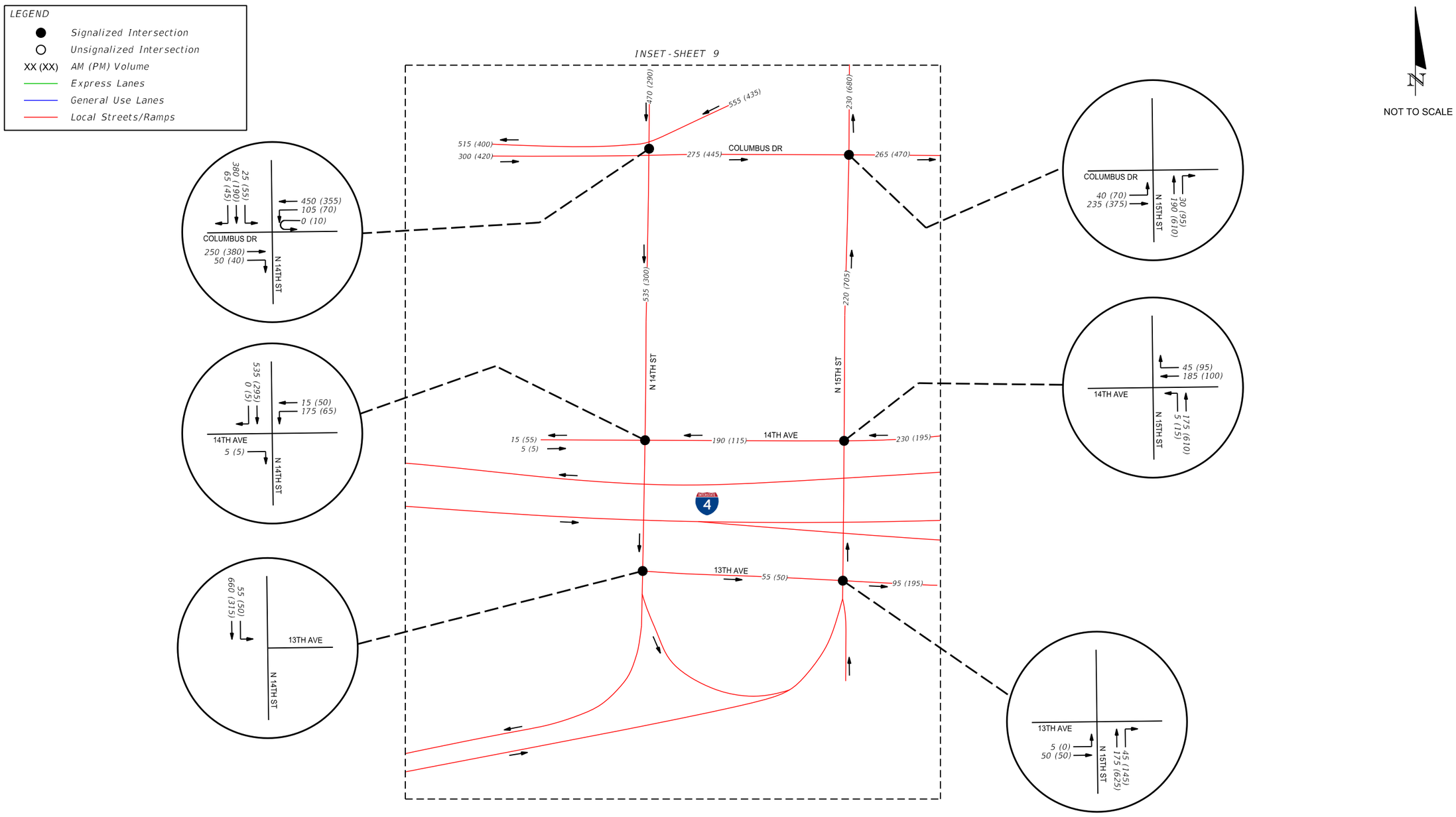
SEIS Re-evaluation

Existing Year (2018) - AM & PM DDHVs

Figure 2-3

Sheet 9 of 16

WPI # 258337-2

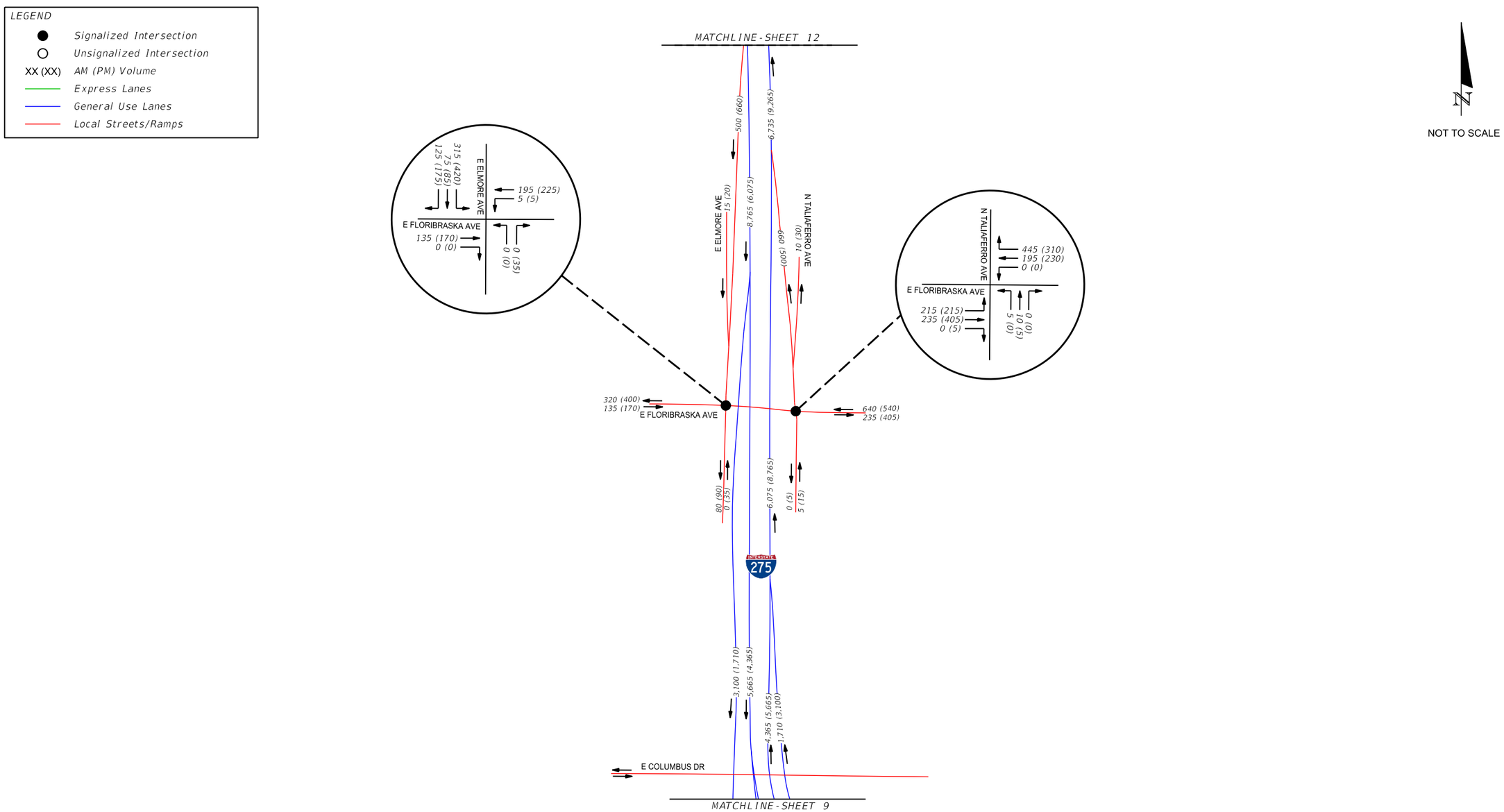


SEIS Re-evaluation
Existing Year (2018) - AM & PM DDHVs

Figure 2-3

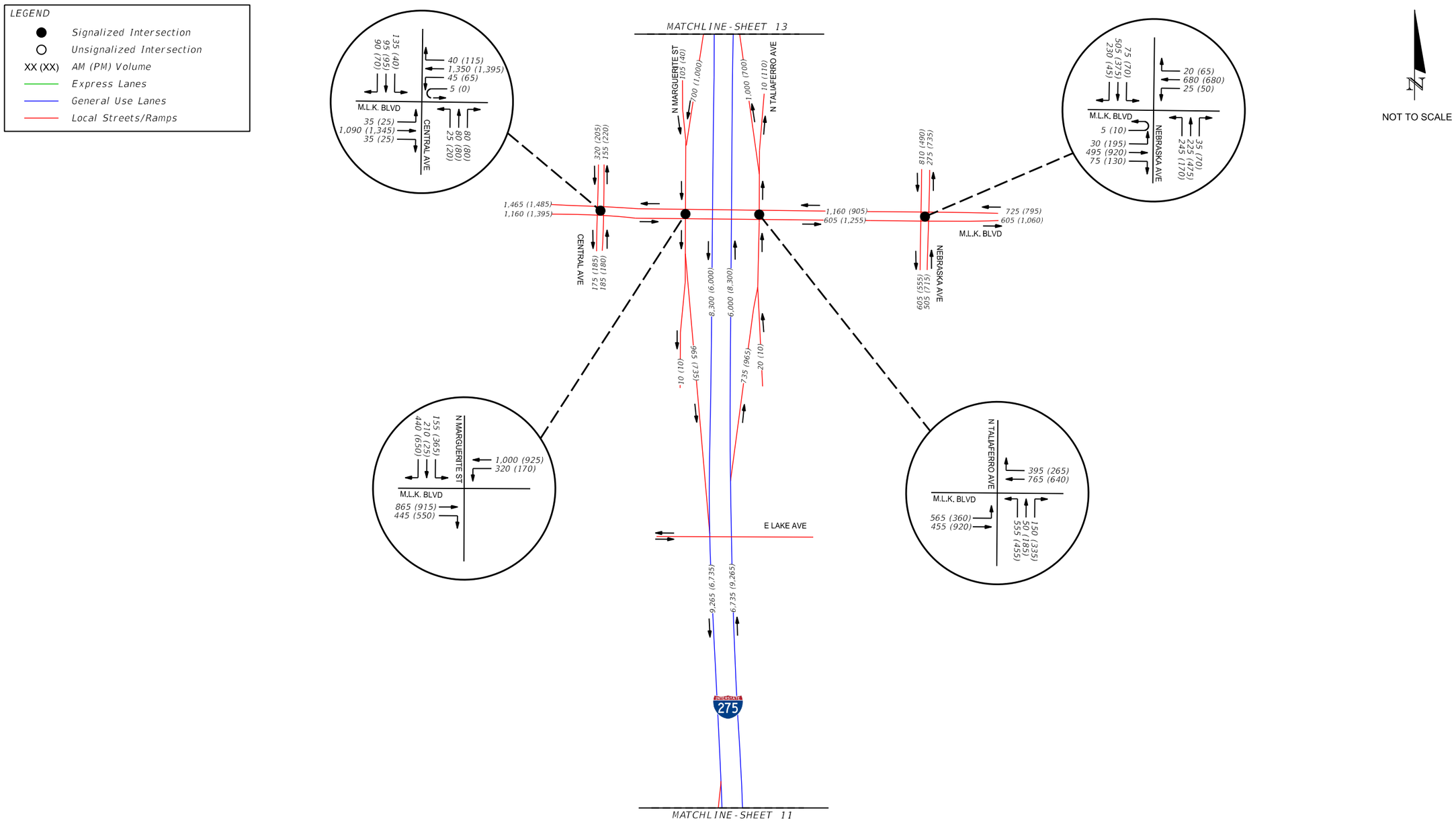
Sheet 10 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) - AM & PM DDHVs	Figure 2-3	Sheet 11 of 16

WPI # 258337-2

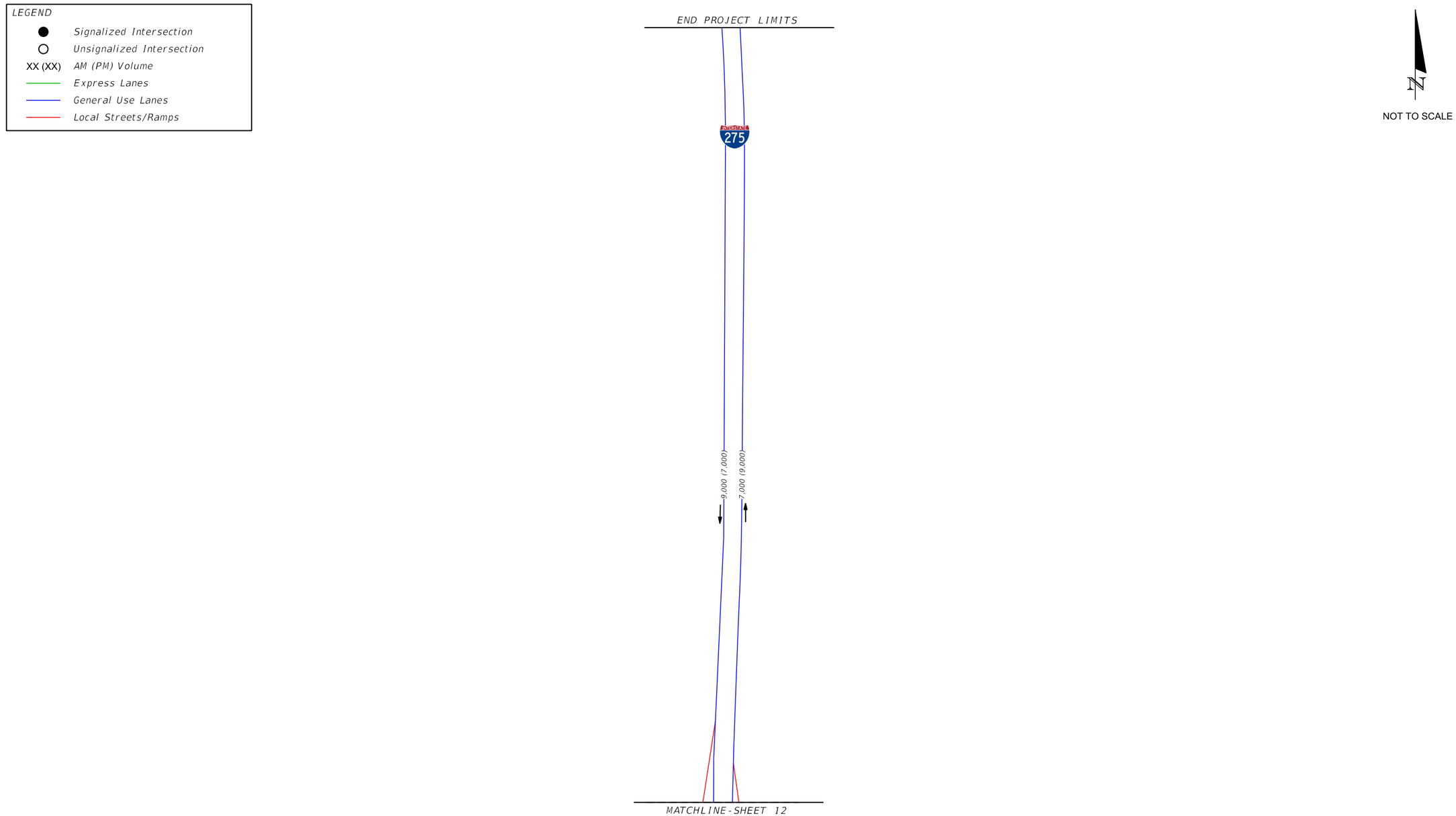


SEIS Re-evaluation

Existing Year (2018) - AM & PM DDHVs

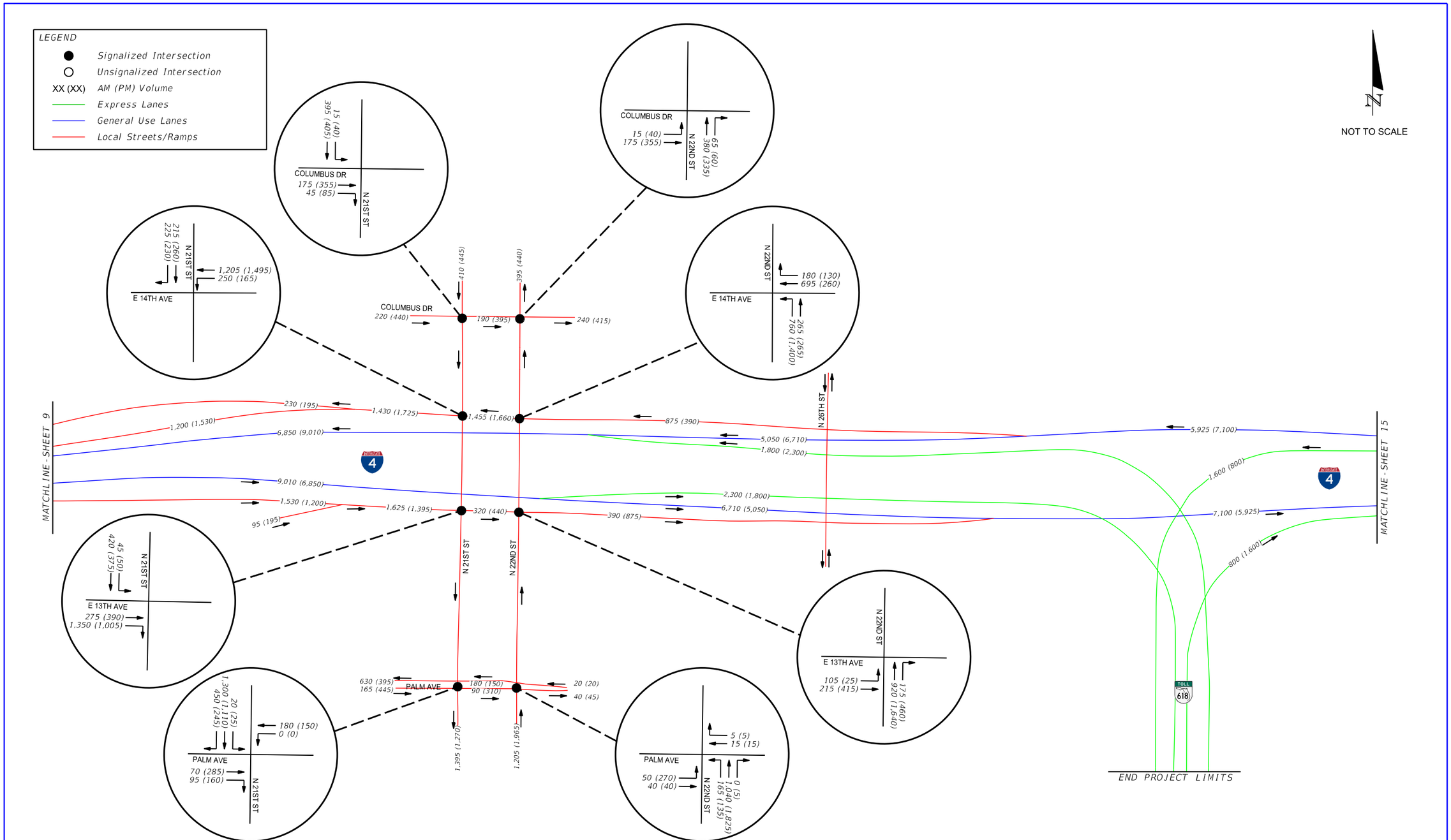
Figure 2-3

Sheet 12 of 16



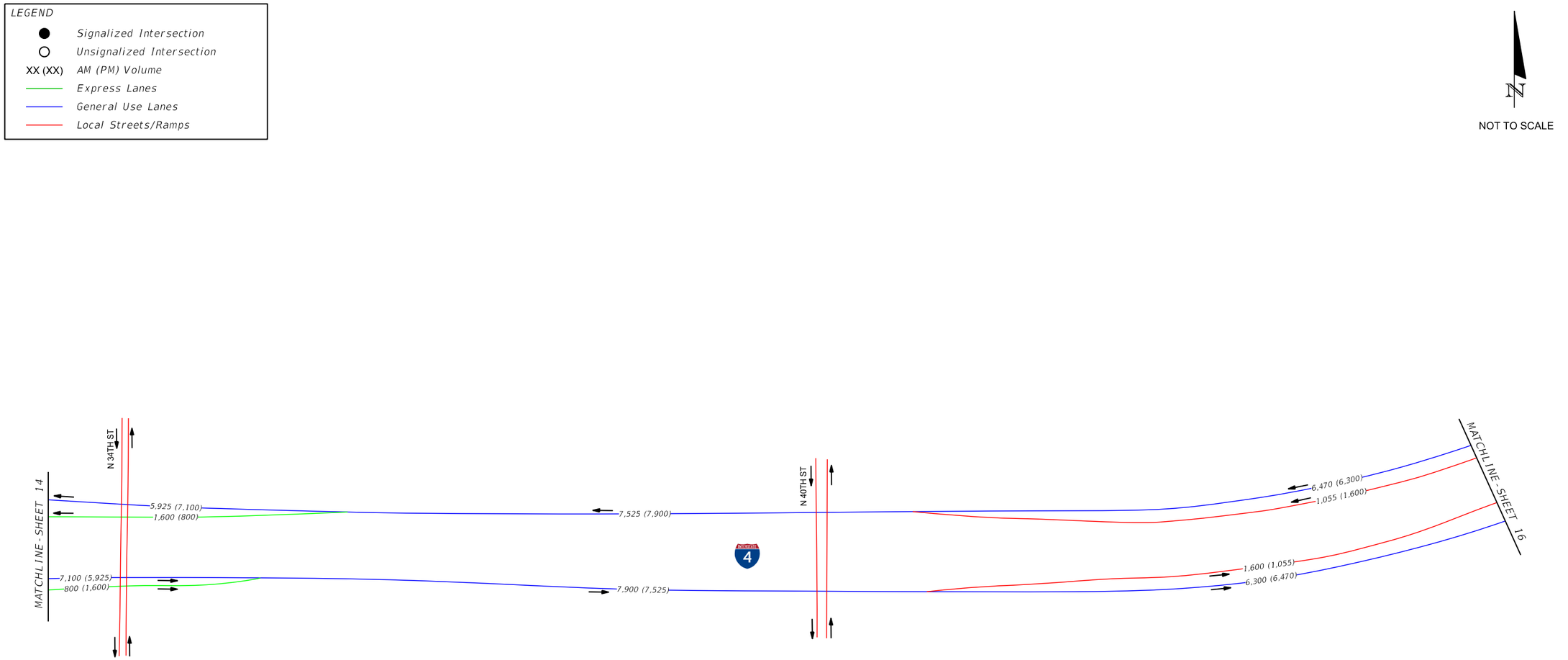
FDOT	SEIS Re-evaluation Existing Year (2018) - AM & PM DDHVs	Figure 2-3	Sheet 13 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) - AM & PM DDHVs	Figure 2-3	Sheet 14 of 16

WPI # 258337-2



FDOT

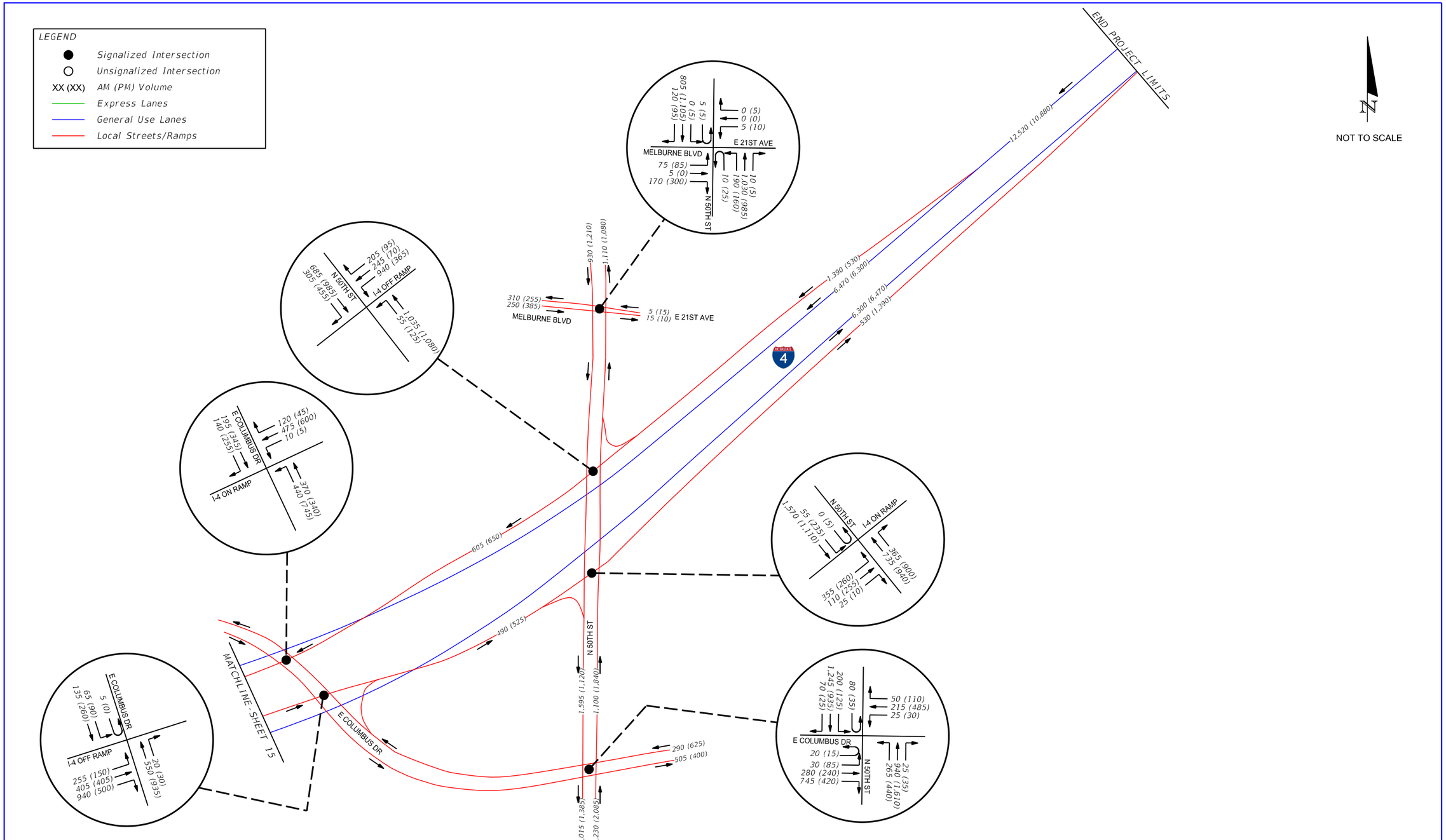
SEIS Re-evaluation

Existing Year (2018) - AM & PM DDHVs

Figure 2-3

Sheet 15 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) - AM & PM DDHVs	Figure 2-3	Sheet 16 of 16

WPI # 258337-2

2.5 Field Observations During Peak Hours

Field visits were conducted during the AM and PM peak periods on Tuesday August 21, 2018 through Thursday August 23, 2018. The purpose of field observations is to visually assess the traffic conditions of the study area, to collect traffic signal timing information at study intersections, and to conduct travel time runs within the study limits of the I-275 and I-4 corridors. The study limits for travel time extended from 4th Street to Hillsborough Avenue on I-275 and from the I-275 Interchange to 50th Street on I-4.

Existing roadway characteristics such as the number of lanes, length of turn bays, lane width, and sight distances were also observed during the field visits. **Figure 2-4 and Figure 2-5** illustrates the traffic conditions of the study area during AM and PM peak hours, respectively. The 15-minute traffic flows of AM and PM peak hour are presented in **Appendix C**. Key observations along major study corridors (I-275 and I-4) from the field visits are summarized below. The summary of field travel speeds collected is presented in **Appendix D**.

2.5.1 I- 275 Segment – From South of SR 60 to Hillsborough Avenue

- Overall, the traffic delays for PM peak hour are higher compared to AM peak hour. Congestion resulting in higher delays was observed along I-275 northbound compared to I-275 southbound during both AM and PM peak hours.

- Average speeds of 51mph and 20mph were observed along I-275 northbound segment (From south of SR 60 to Hillsborough Avenue - 10-mile segment) during AM and PM peak hours, respectively.

- I-275 northbound, south of SR 60, was observed to be a critical bottleneck segment for both AM and PM peak hours, leading to higher delays due to high existing traffic volumes to SR 60 off-ramp and due to vehicle slowdowns on the SR 60 westbound off-ramp curve. In addition, heavy congestion is experienced during the PM peak hour along I-275 northbound, north of SR 60, primarily due to the downstream congestion. The traffic queues from the I-275 and I-4 interchange extend beyond Westshore Boulevard interchange.

- Average speeds of 49mph and 34mph were observed along the I-275 southbound segment (From Hillsborough Avenue to south of SR 60 – 10 miles segment) during AM and PM peak hours, respectively.

- Minor delays were observed during the AM peak hour along I-275 southbound, whereas the segment between I-4 and SR 60 off-ramp experiences severe traffic delays (average speeds of 30mph) during PM peak hour. This is a critical segment for this facility due to high volumes of traffic from westbound I-4, southbound I-275 and the downtown Tampa area all merge together and exit to SR 60 via the off-ramp.

2.5.2 I-4 Segment – From I-275 to 50th Street

- Overall, traffic delays for the I-4 westbound segment were higher than the I-4 eastbound segment during both the AM and PM peak hours. In the I-4 westbound segment, average traffic flow speeds were slower during the AM peak hour than during the PM peak hour.

- The observed average speeds along the I-4 westbound were 21mph and 34mph (from I-275 to 50th Street – 6-mile segment) during the AM and PM peak hours, respectively.

- Critical bottleneck leading to congestion was experienced on the I-4 westbound segment from the Selmon Connector to the I-4 off-ramp to I-275 southbound caused by high exiting traffic volumes and vehicle slowdown on the off-ramp curve.

- Average speeds of 60mph and 42mph were observed along the I-4 eastbound segment (From I-275 to 50th Street – 6-mile segment) during AM and PM peak hours, respectively.

Figure 2-4 Existing Year (2018) AM Peak Hour Congestion

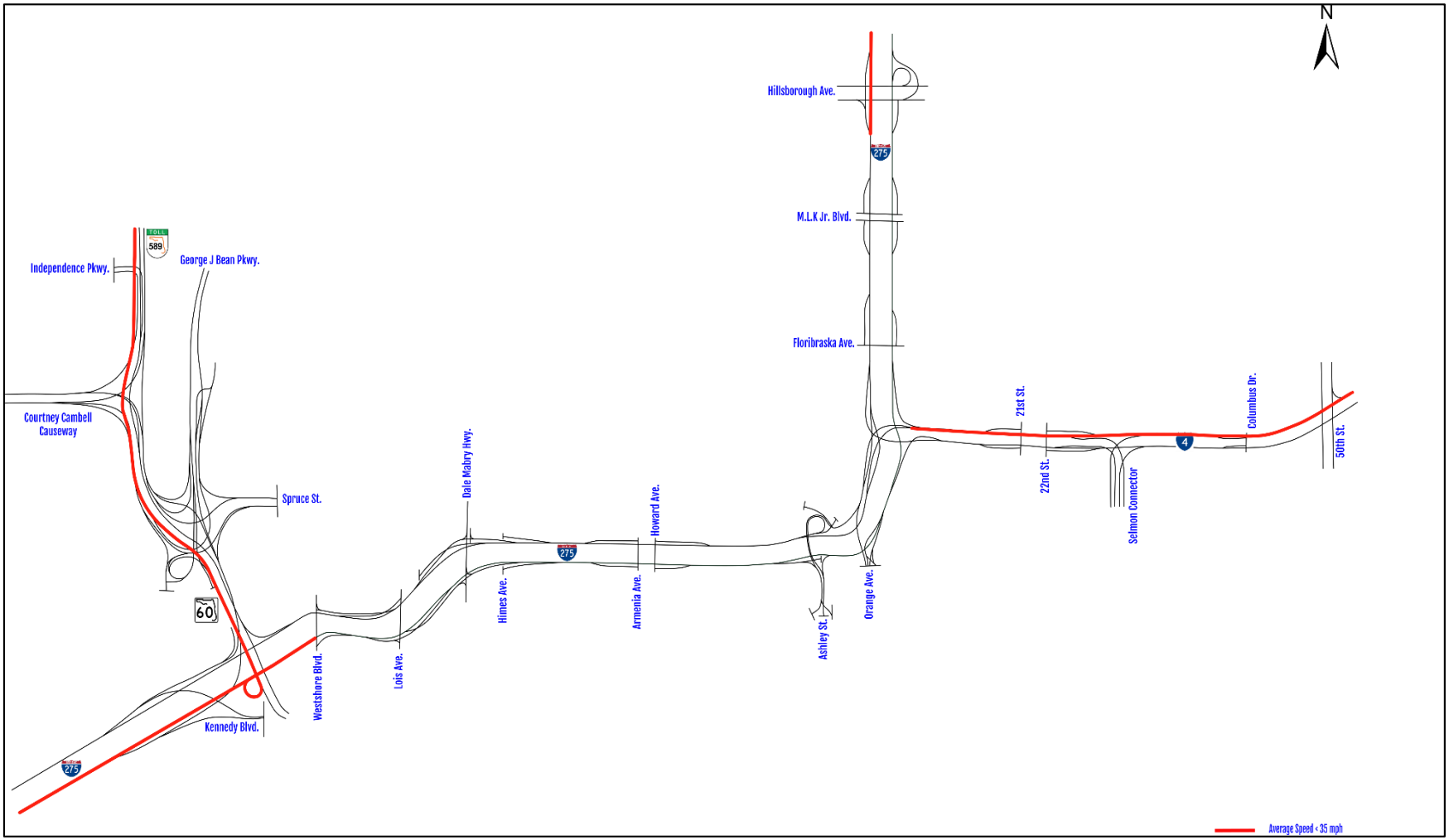
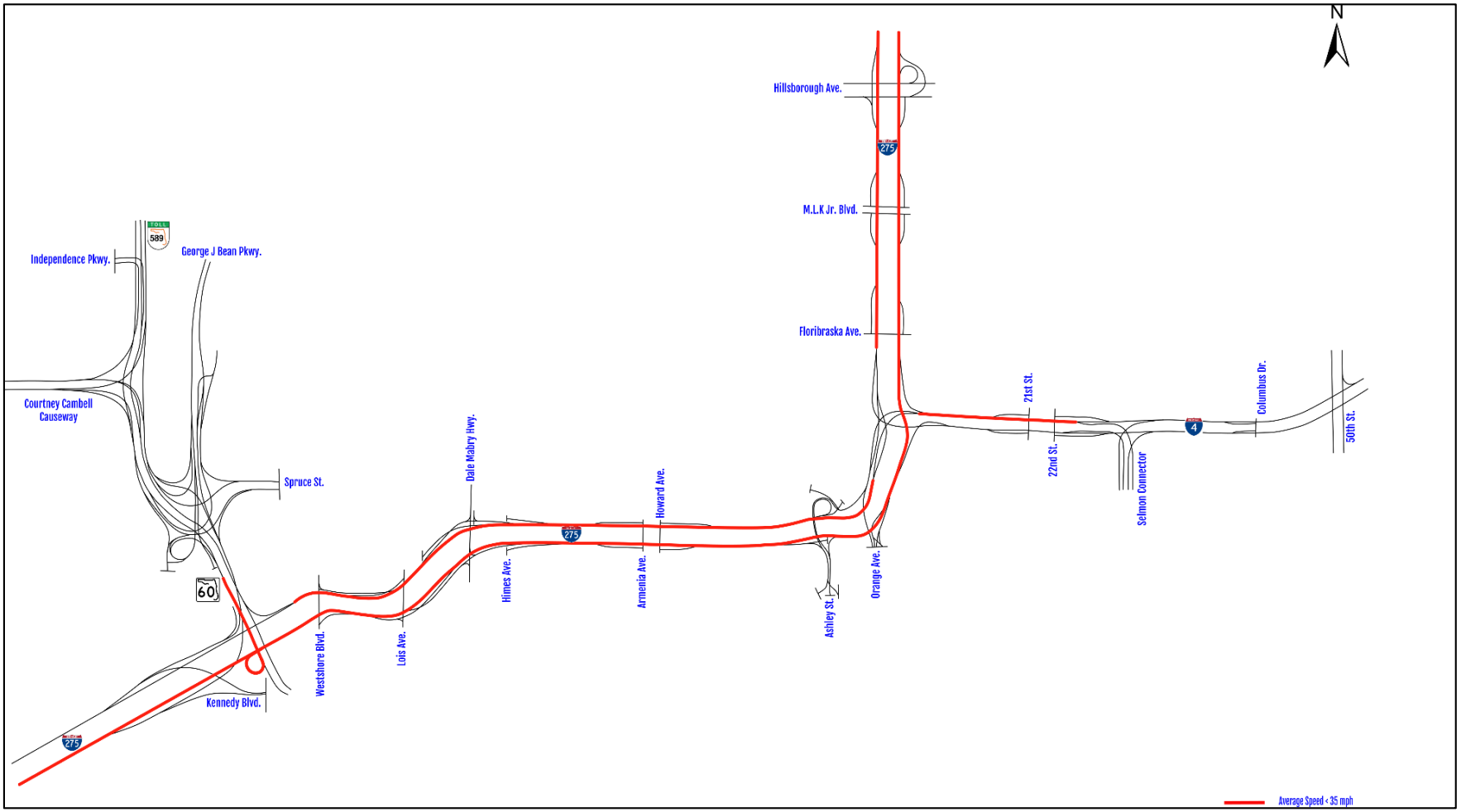


Figure 2-5 Existing Year (2018) PM Peak Hour Congestion



2.6 Balanced Peak Hour Volumes

The ADR counts and TMCs were collected in the months of September 2018 and October 2018. Additionally, the traffic counts available from FTI Online that contained synopsis reports and counts from other recent studies that were performed within the study area were also consulted for volume development purpose.

The raw tube counts and TMCs were utilized to develop balanced peak hour design hourly volumes for the study area. **Figure 2-6** illustrates the balanced peak hour volumes for freeway segments and ramps for the I-275 corridor within the study limits. **Appendix E** provides the Existing Year (2018) AADT for the study area.

2.7 CORSIM Model Development and Calibration Methodology

Microsimulation analysis was conducted using CORSIM (TSIS) 6.3 software. The existing (2018) traffic operational characteristics were assessed utilizing existing data such as traffic counts, truck percentages, speeds, geometry, capacity, and signal timings. Input data for the existing conditions analysis included Google Maps for roadway geometry that is field verified, traffic signal inventories from FDOT to recreate field signal timings in the CORSIM model, and synthesis of observed demand into 15-minute flows.

The peak hour (AM - 7:30-8:30, PM - 4:30-5:30) was determined based on raw traffic counts and the existing conditions were modeled for three hours of both AM and PM peak periods, which includes pre-peak hour, peak hour, and post-peak hour. Additionally, a 1-hour loading period was utilized for both AM and PM peak hour models to load the CORSIM network with vehicular traffic to reach equilibrium. **Appendix F** comprised of CORSIM model files and calibration results. In addition, the signal timing plans used in the CORSIM models are presented in **Appendix G. Figure 2-7** illustrates the study area limits for the microsimulation modeling. The signal timing and phasing data for these intersections for the AM and PM peak periods were obtained from the City of Tampa and Hillsborough County. For the signalized intersections, Google Maps and field visits were used to determine and verify signal phasing information, protected/permitted left-turn operations, phase overlaps, etc.

Model calibration is the process used to achieve adequate validity of the model by establishing suitable parameter values so that the model replicates local traffic conditions as closely as possible. Calibration is achieved by iteratively adjusting model parameters to replicate the traffic patterns, congestion, bottlenecks, and driver behavior observed within the study area. The CORSIM models were calibrated to replicate existing traffic operating conditions, including vehicle counts and speeds on mainline and ramp sections. Google Maps were obtained for the study area to assist in creating link-node diagram and lane schematics, which served as a blueprint for constructing CORSIM models. Developed link-node diagram is shown in **Appendix H.**

A step-by-step procedure that was defined in the FHWA Traffic Analysis Toolbox Volume IV: Guidelines for Applying CORSIM Microsimulation Modeling Software was followed to develop CORSIM models for the existing conditions. The methodology used in the CORSIM simulation is illustrated in **Figure 2-8.** It is necessary to run COSRIM models' multiple times with different random seeds to account for the stochastic nature of the analysis tool. A total of 10 runs were executed with varying random seed values for both AM and PM peak-hour models to validate the results.

2.7.1 Simulation Study Area

Per guidance provided in the FDOT's PD&E Manual, and FHWA's Traffic Analysis Toolbox Volume III, the study area that was adopted for microsimulation modeling is comprised of 17 interchanges and 69 signalized intersections. The simulation study area includes the study area in the TIS, plus Hillsborough Avenue north of the study limits on I-275 and the section of SR 60 west of I-275 to CR 576/Memorial Highway. This is to incorporate the impacts from the demand from Veterans Expressway and the Tampa International Airport. Note that SR 60 west of Cypress Street is outside of the SEIS limits; however, SR 60 was included in the CORSIM model due to impacts on traffic operations.

2.7.2 Calibration Targets

The model calibration process and calibration targets used for this study are discussed in this section. The calibration criteria listed in the FHWA Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software (Dowling et al. 2004) and FDOT Traffic Analysis Handbook (2014) for interstates and arterials was used to determine calibration targets. **Table 2-2** provides the CORSIM model calibration criteria.

Table 2-2 Model Calibration Criteria

Criteria and Measures	Calibration Acceptable Targets
Hourly Flows, Model Versus Observed	
Individual Link Flows, Model Versus Demand	
➢ Within 15%, for 700 veh/h<Flow<2,700 veh/h	85% of cases
➢ Within 100 veh/h, for Flow<700 veh/h	85% of cases
➢ Within 400 veh/h, for Flow>2,700 veh/h	85% of cases
Sum of All Link Flow	Within 5% of sum of all link counts
GEH Statistic < 5 for individual Link	85% of cases
GEH Statistic for Sum of All Link Flows	*GEH<5 for sum of all link counts
Travel Times, Speed, Model Versus Observed	
➢ Travel Time, Within 15% (or 1 min, if higher)	85% of cases
➢ *Travel Speed, Within 10 mph	85% of cases
Visual Audits	
➢ Bottlenecks, Visually Acceptable Queuing	To analyst's satisfaction

*The GEH statistic is computed as follows:

$$GEH = \sqrt{\frac{(E-V)^2}{(E+V)/2}}$$

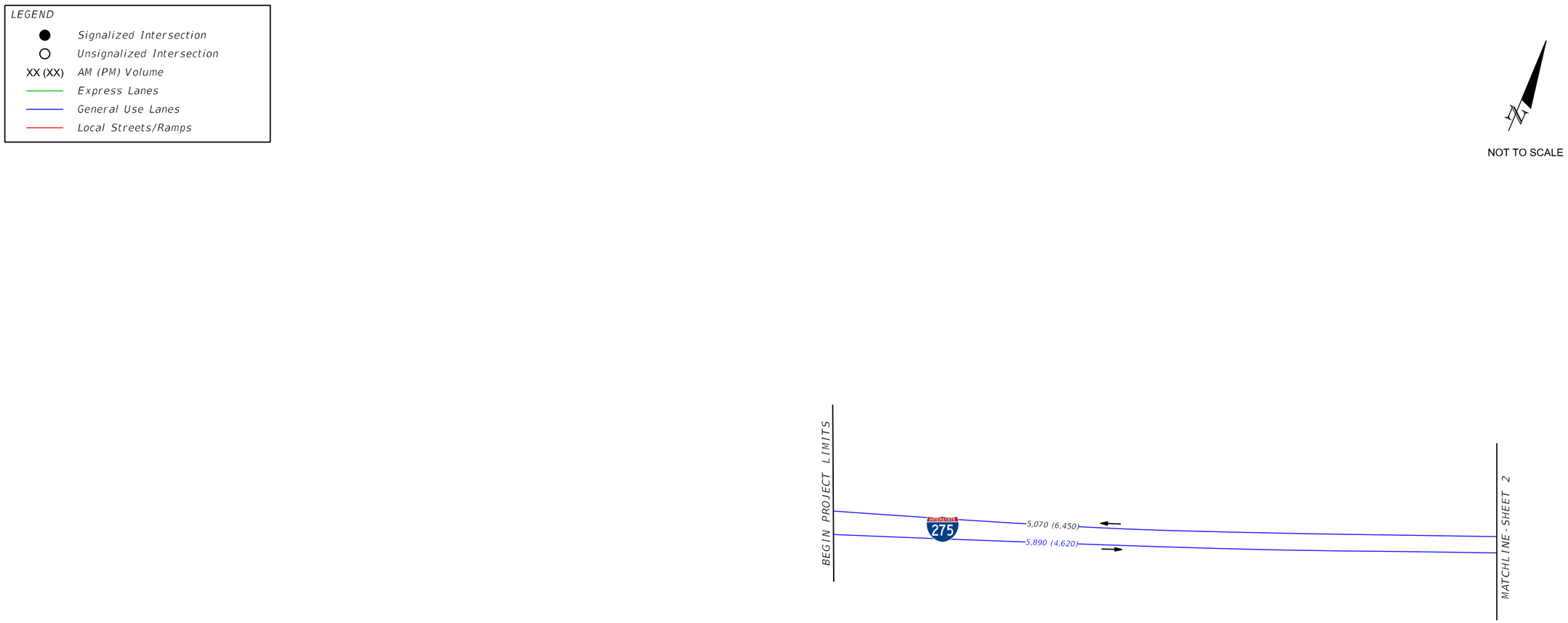
where: E = model estimated volume; V = field count.

2.7.3 Measures of Effectiveness

The measures of effectiveness used for the calibration included traffic volumes, speed, and queue lengths. The calibrated model results were summarized and compared to observed data and are provided in this document. The results are provided for both AM and PM peak periods and include a summary of and comparison between observed and model results when appropriate for the following elements:

- Demand volumes and simulated volumes on freeway segments. Existing Year (2018) Balanced DDHVs are used as the calibration target

- Travel speed on freeway segments

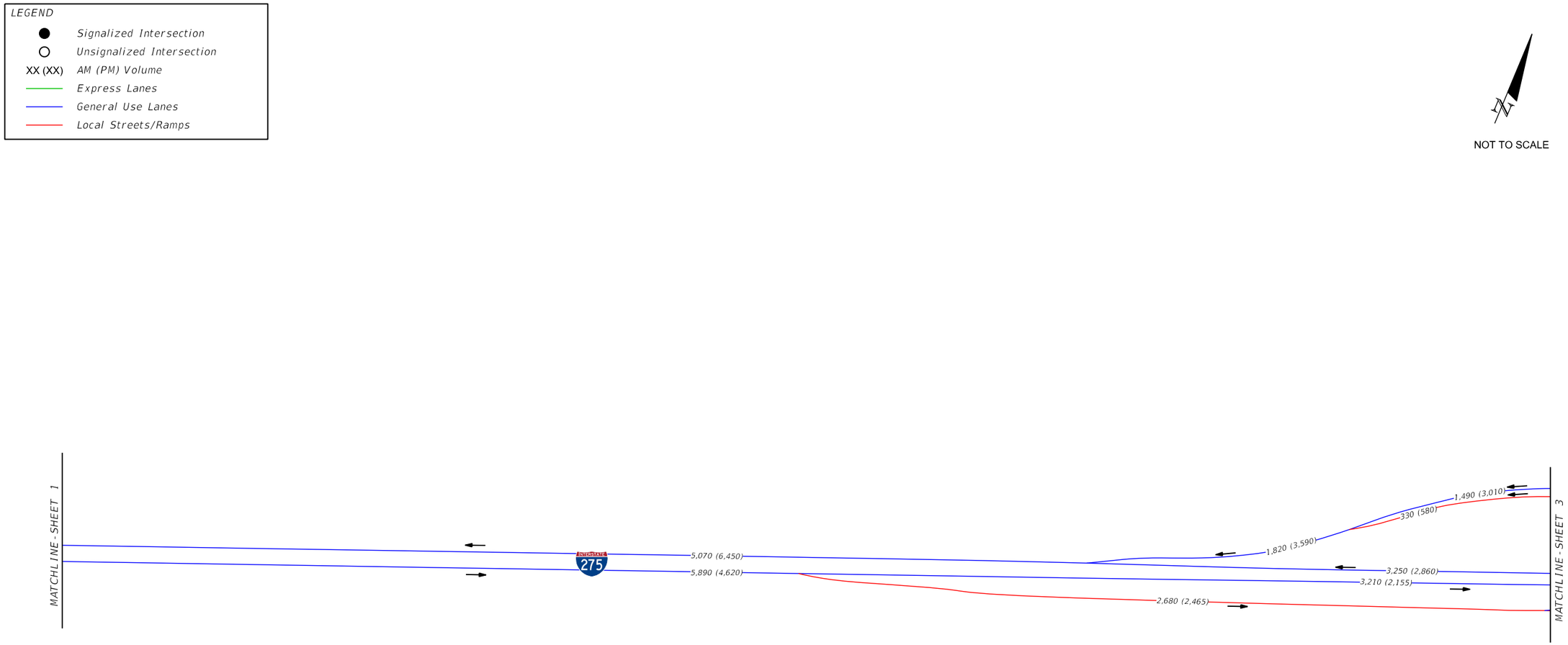


SEIS Re-evaluation

Existing Year (2018) – AM & PM Balanced DDHVs

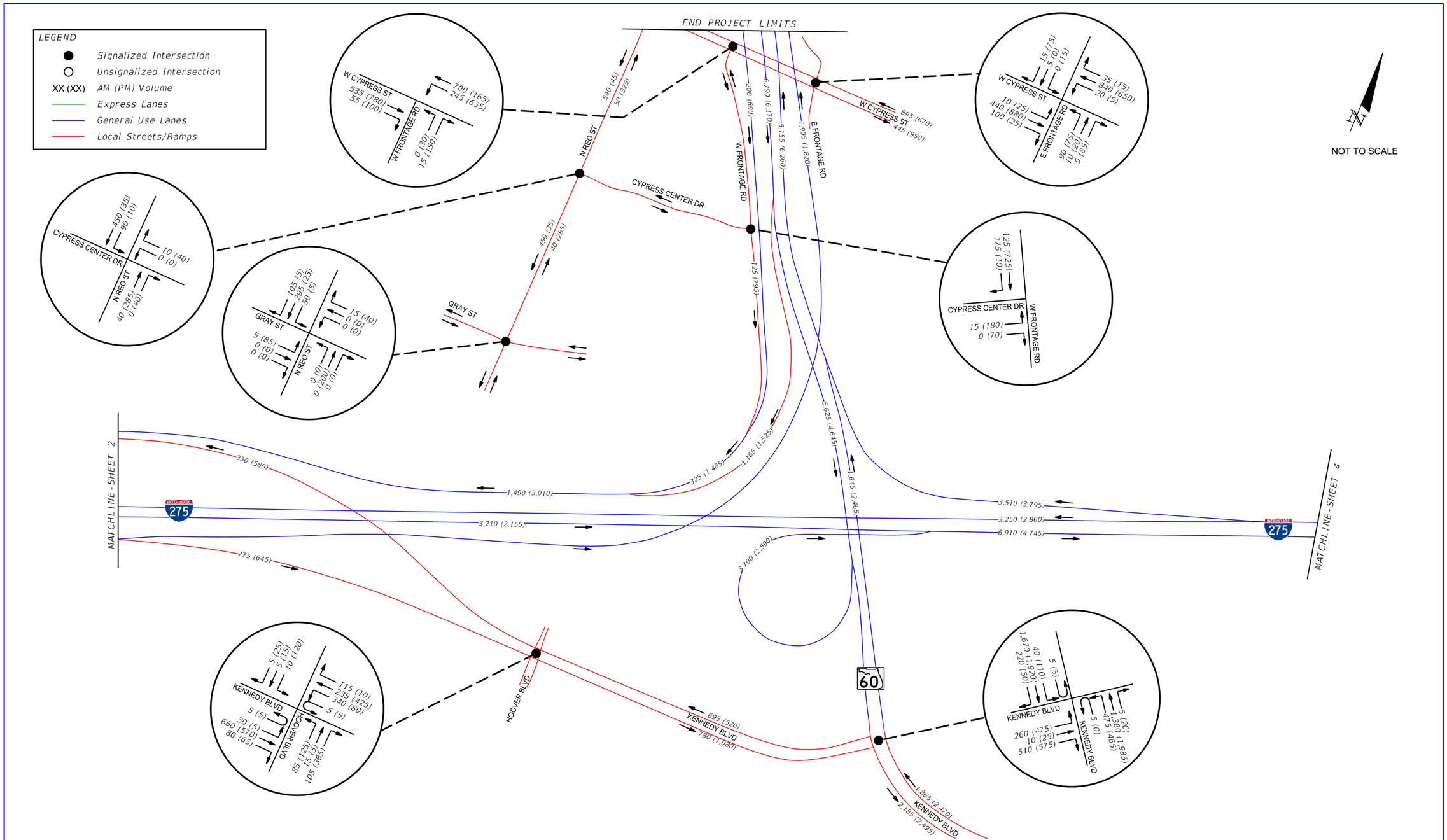
Figure 2-6

Sheet 1 of 16



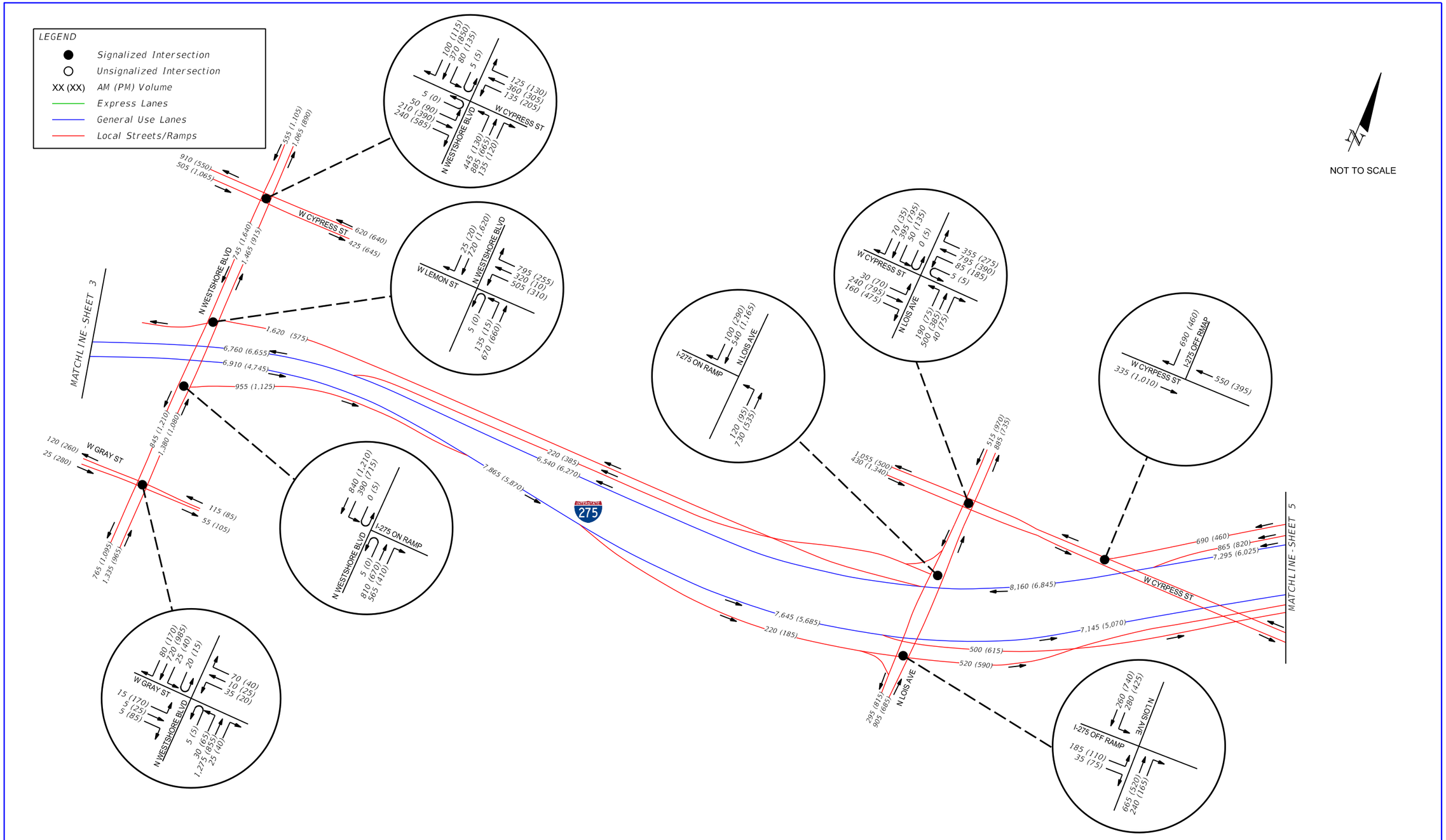
FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 2 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 3 of 16

WPI # 258337-2



FDOT

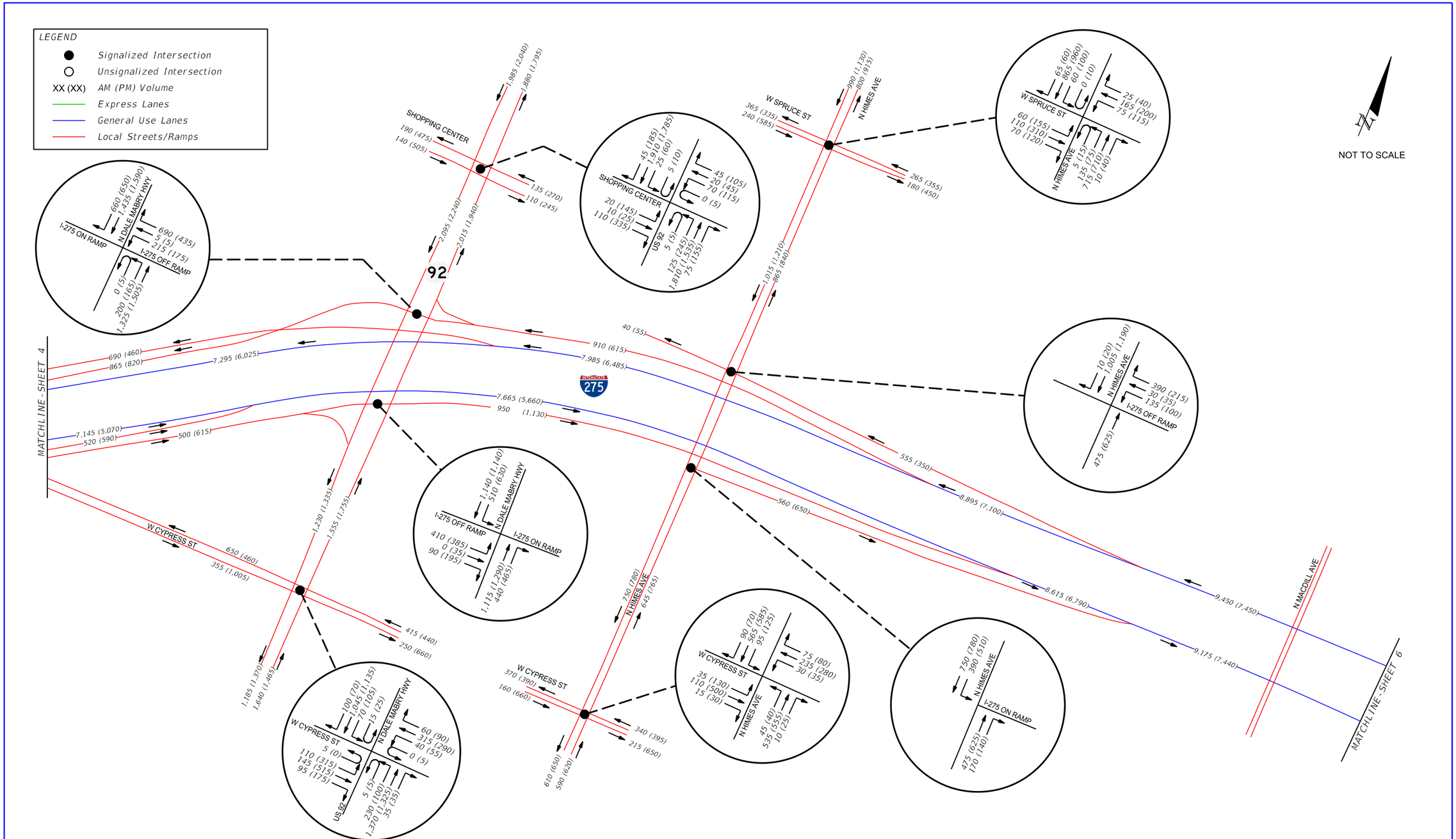
SEIS Re-evaluation

Existing Year (2018) – AM & PM Balanced DDHVs

Figure 2-6

Sheet 4 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 5 of 16

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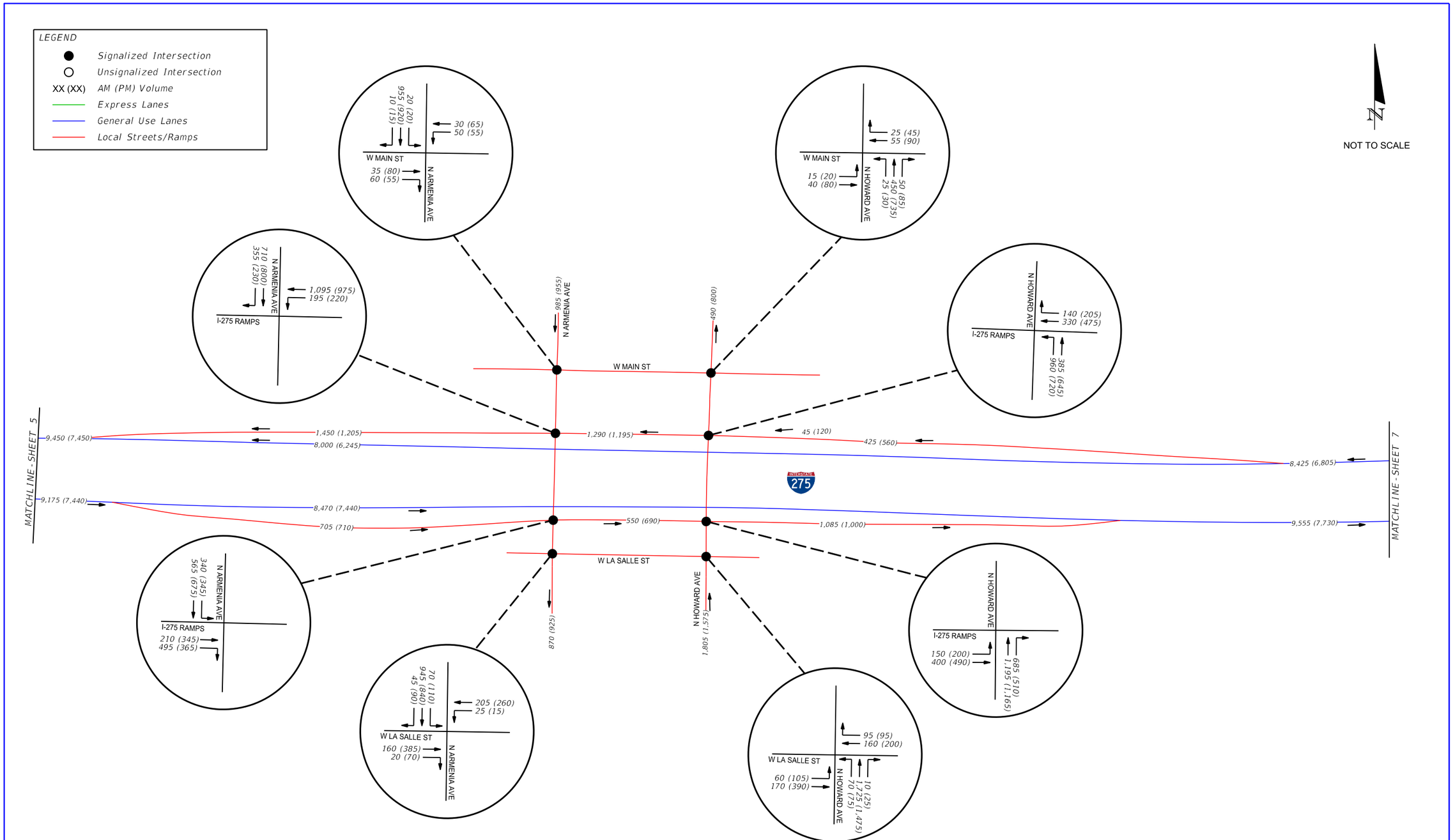


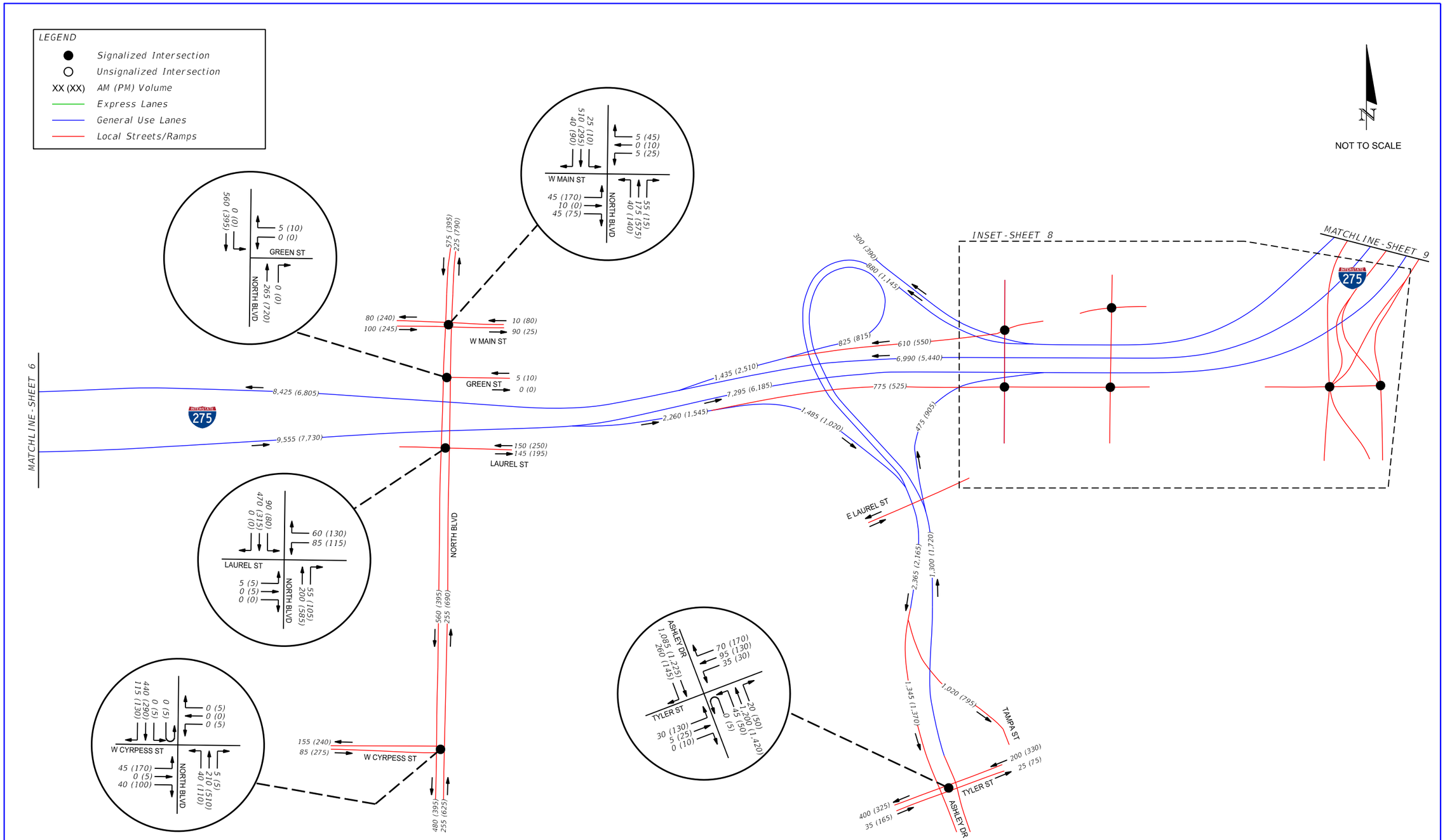
SEIS Re-evaluation

Existing Year (2018) – AM & PM Balanced DDHVs

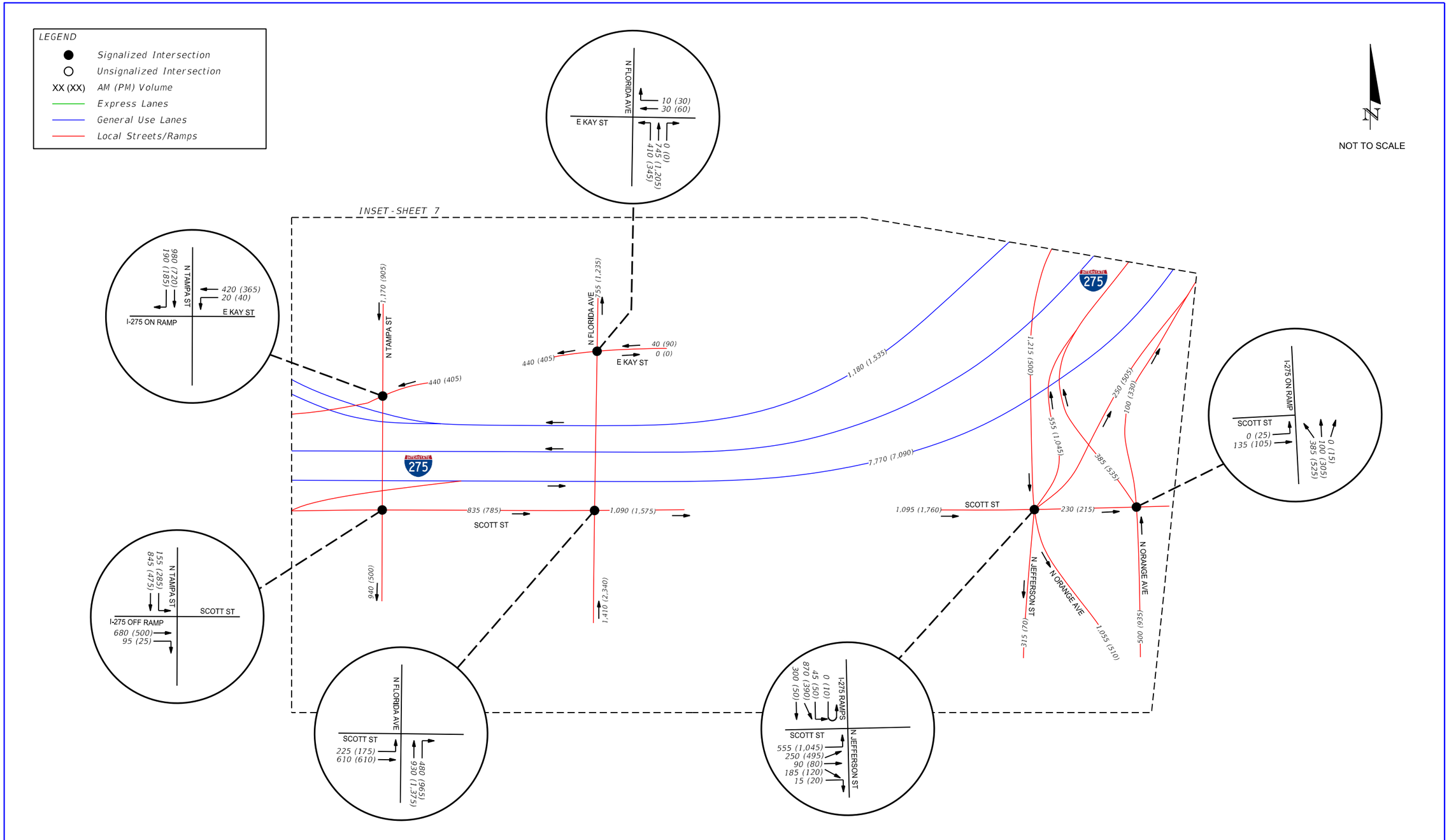
Figure 2-6

Sheet 6 of 16

WPI # 258337-2

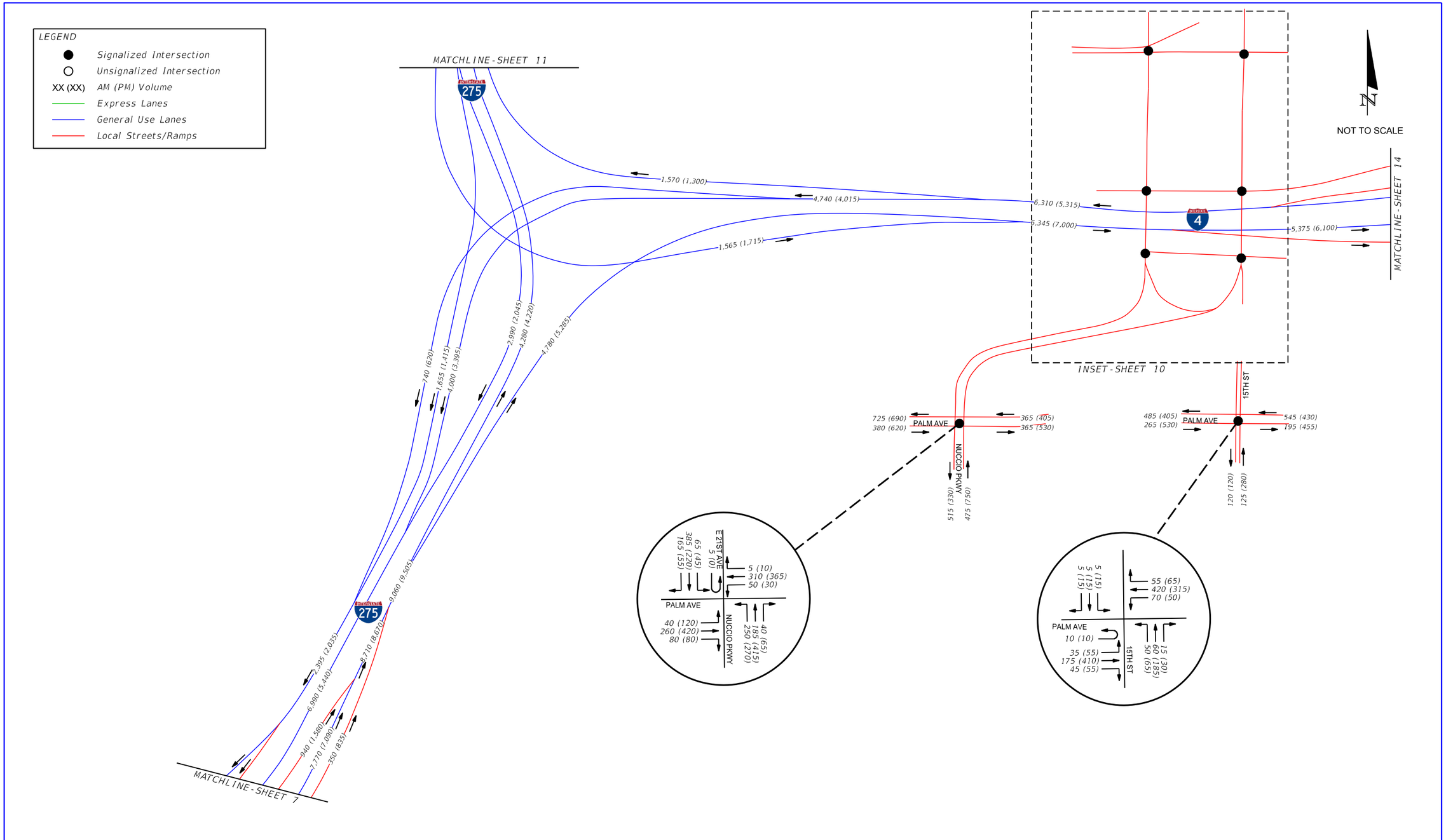


FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 7 of 16



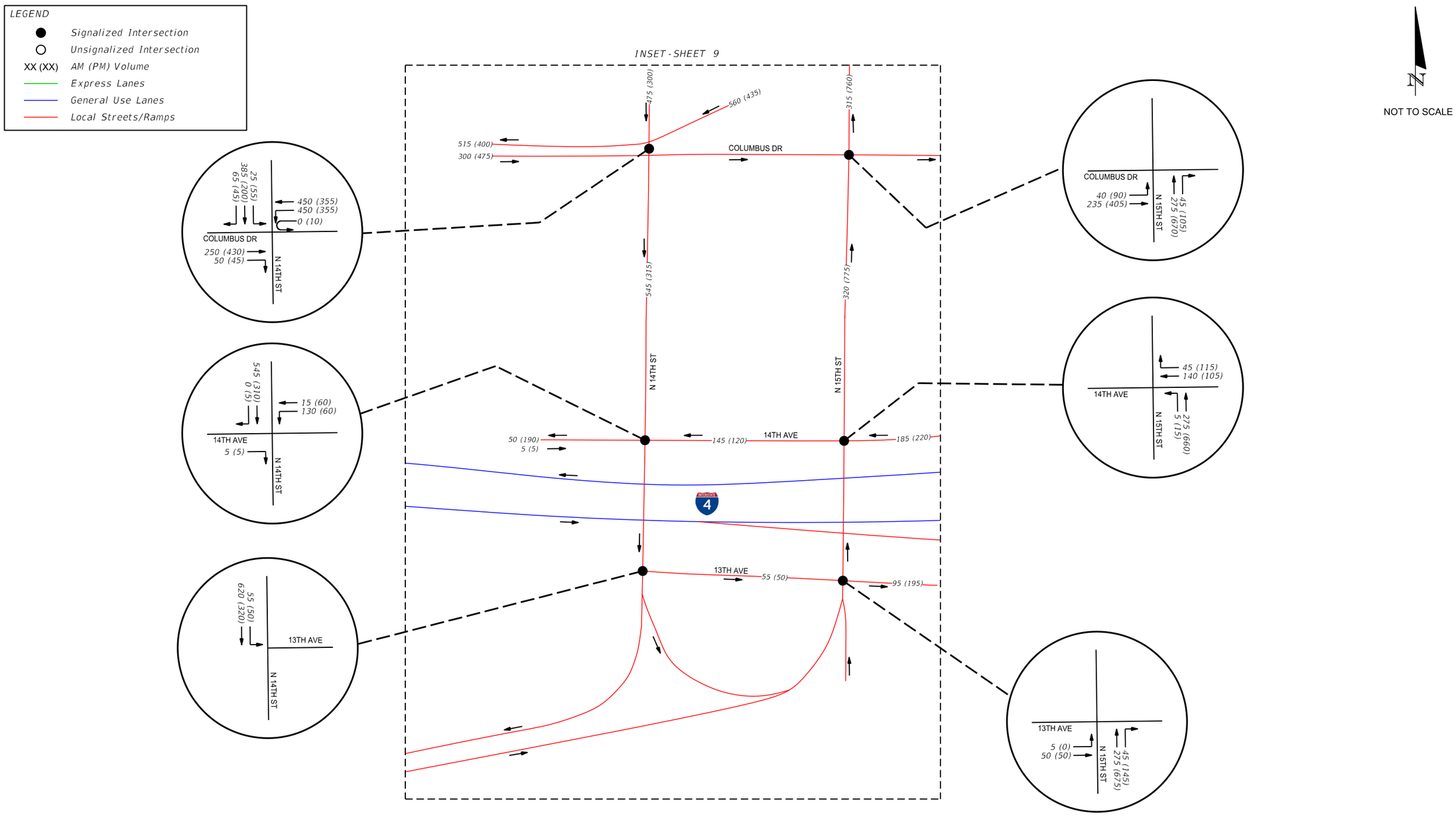
FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 8 of 16

WPI # 258337-2



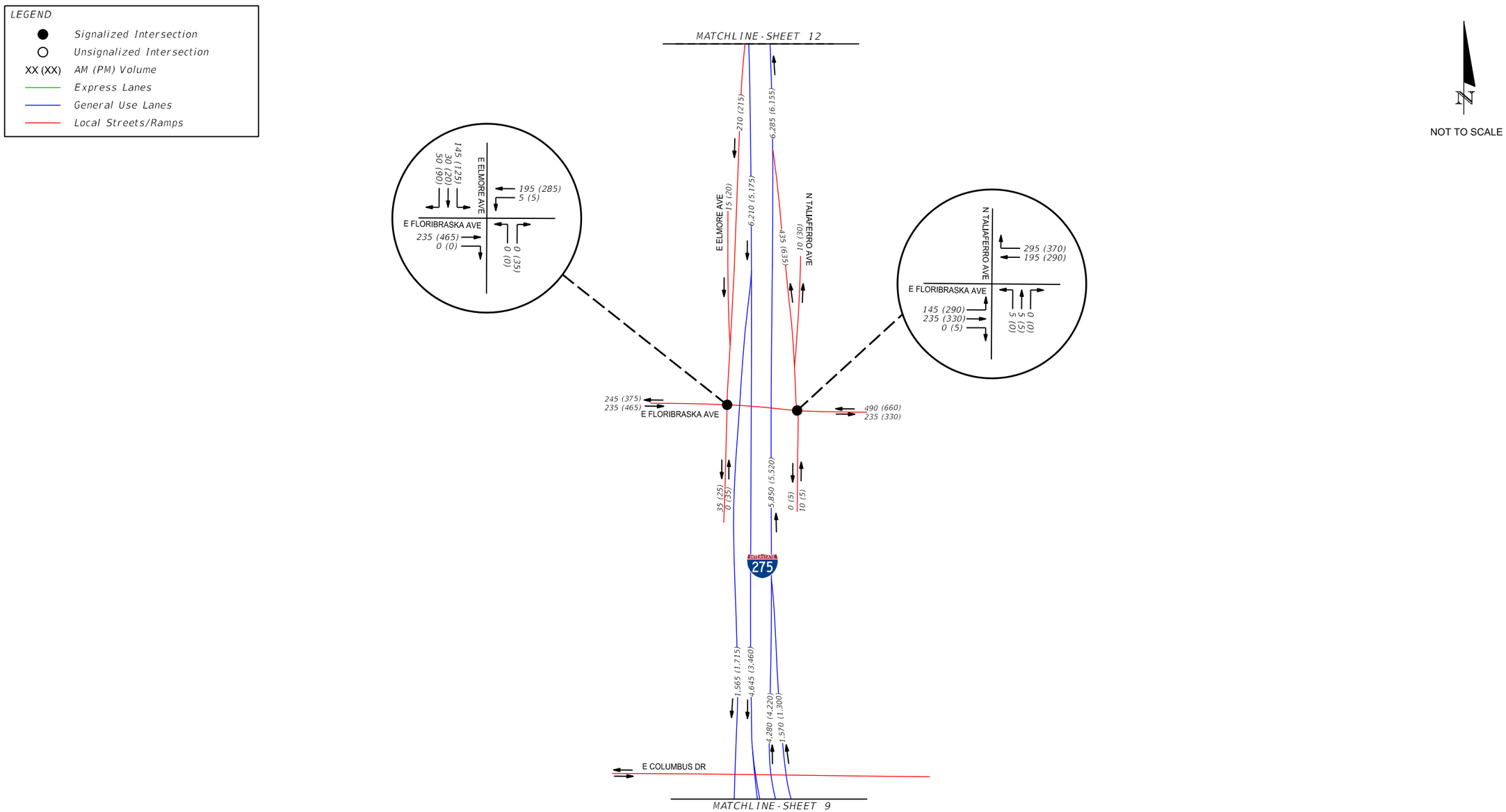
FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 9 of 16

WPI # 258337-2



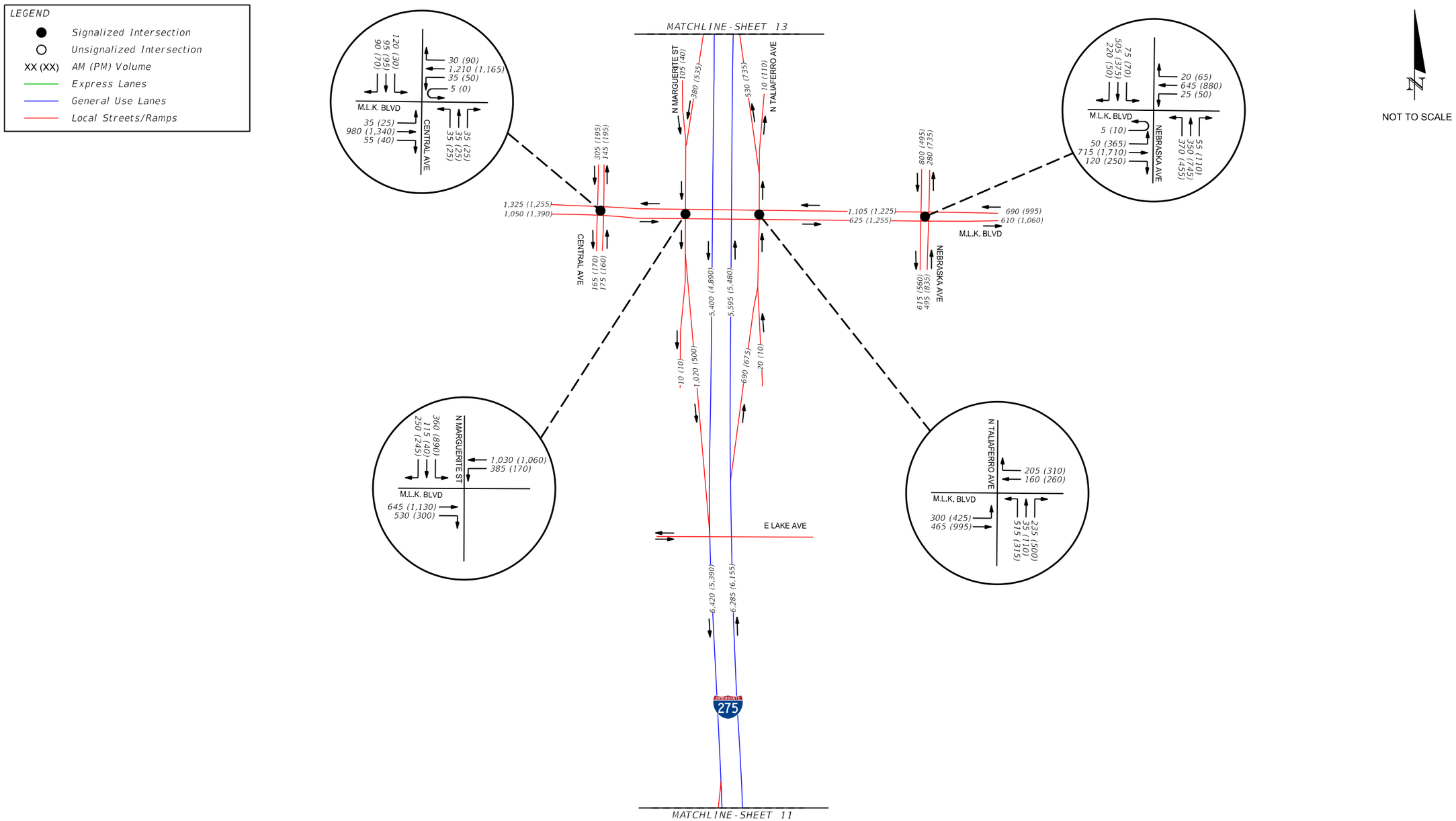
FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 10 of 16

WPI # 258337-2

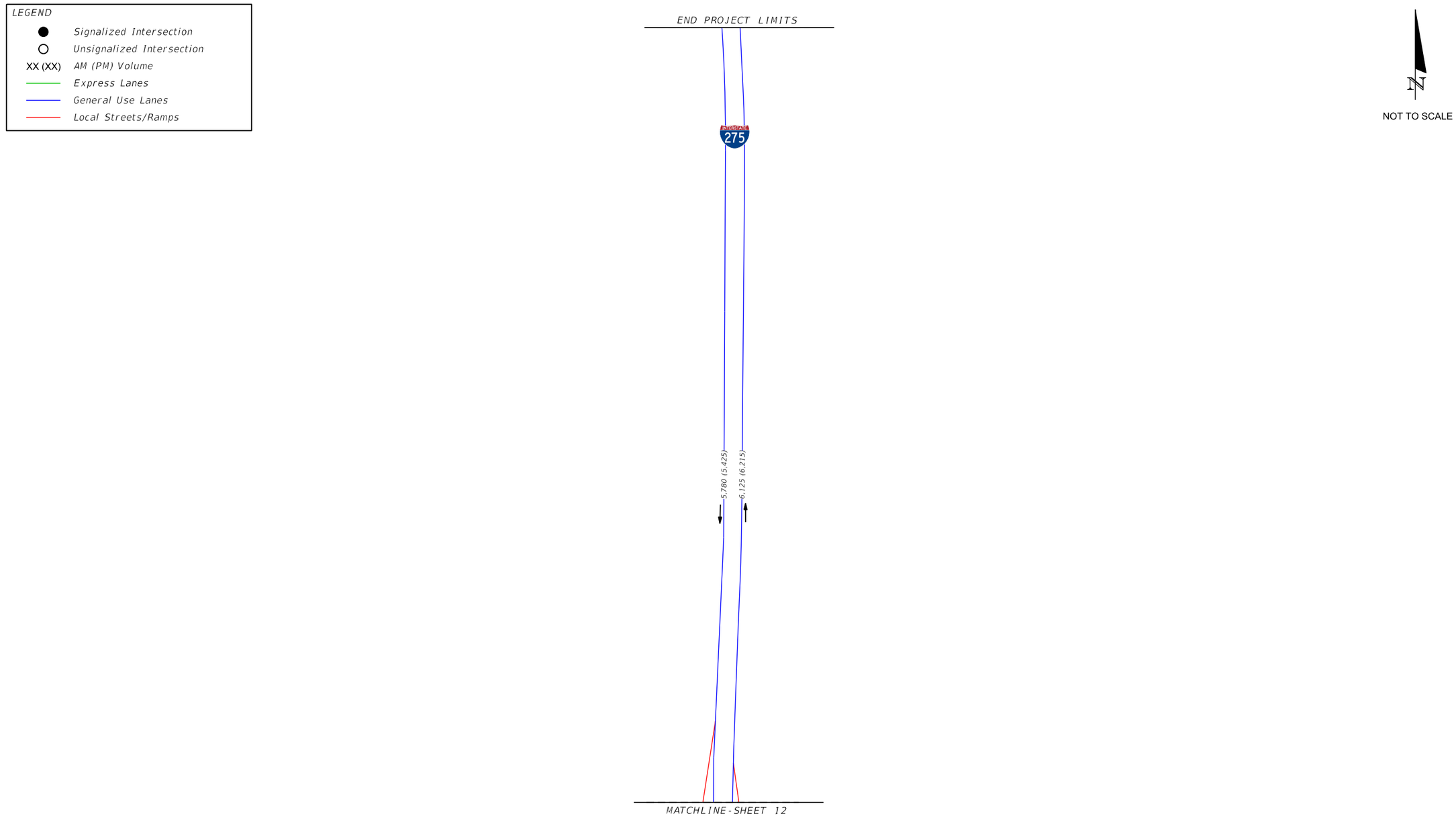


FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 11 of 16

WPI # 258337-2

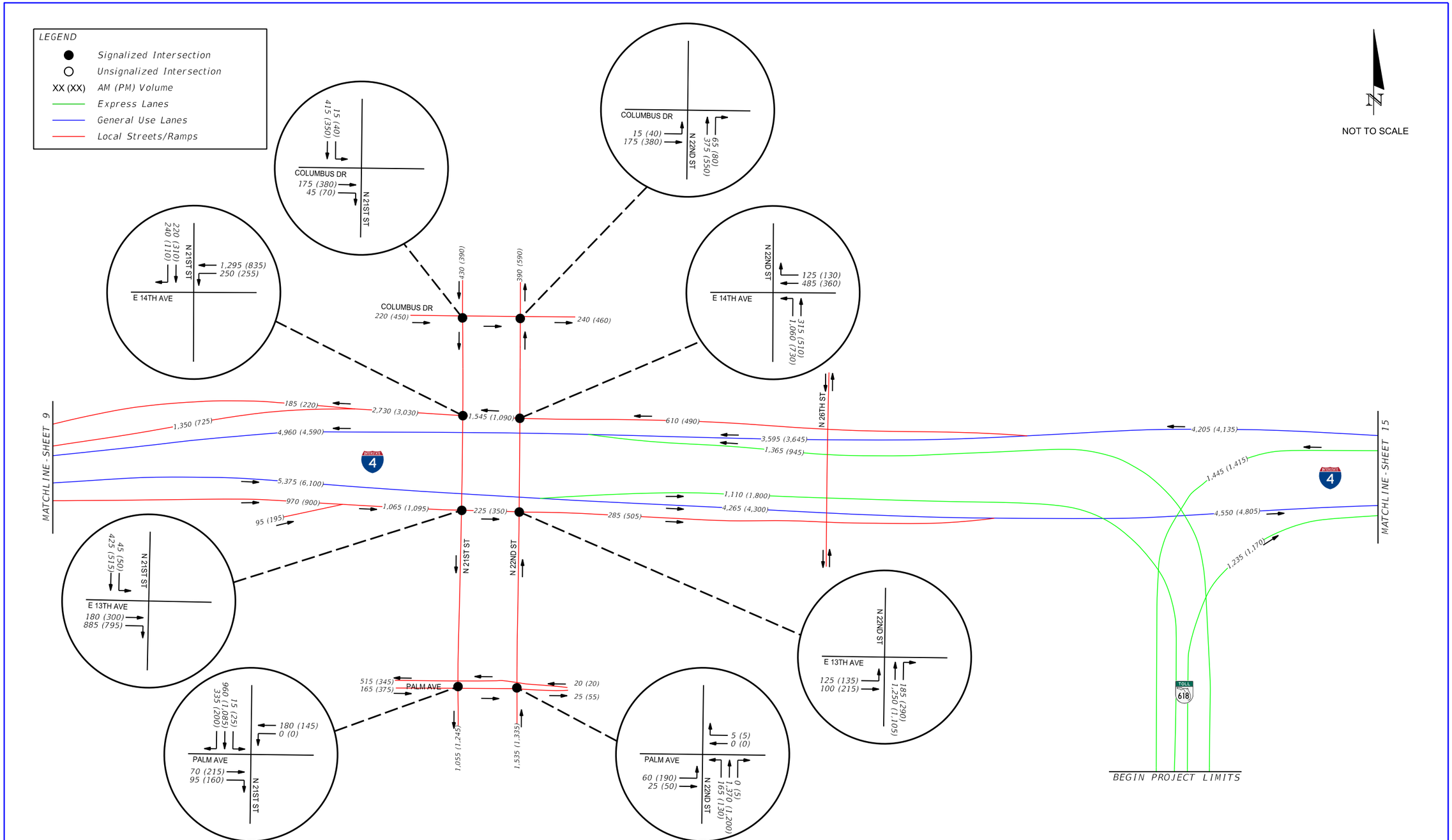


FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 12 of 16



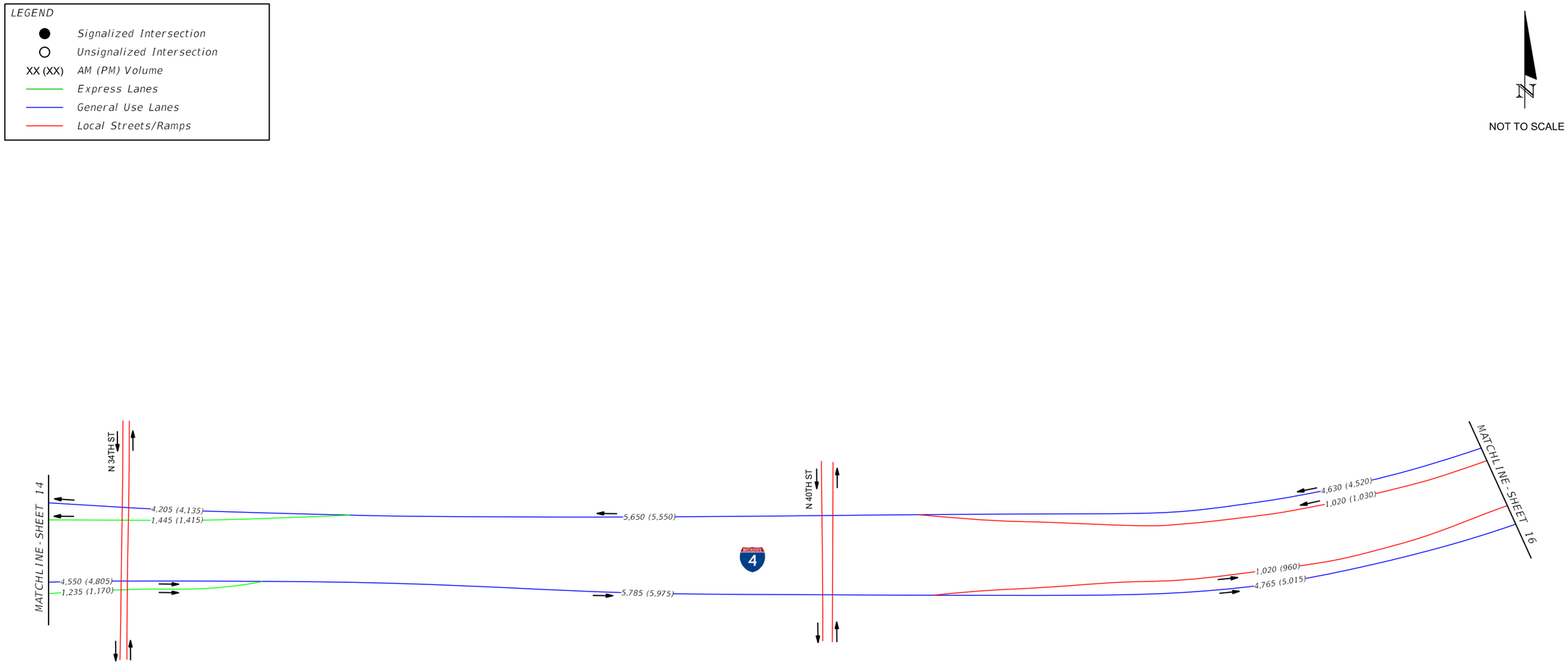
FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 13 of 16

WPI # 258337-2



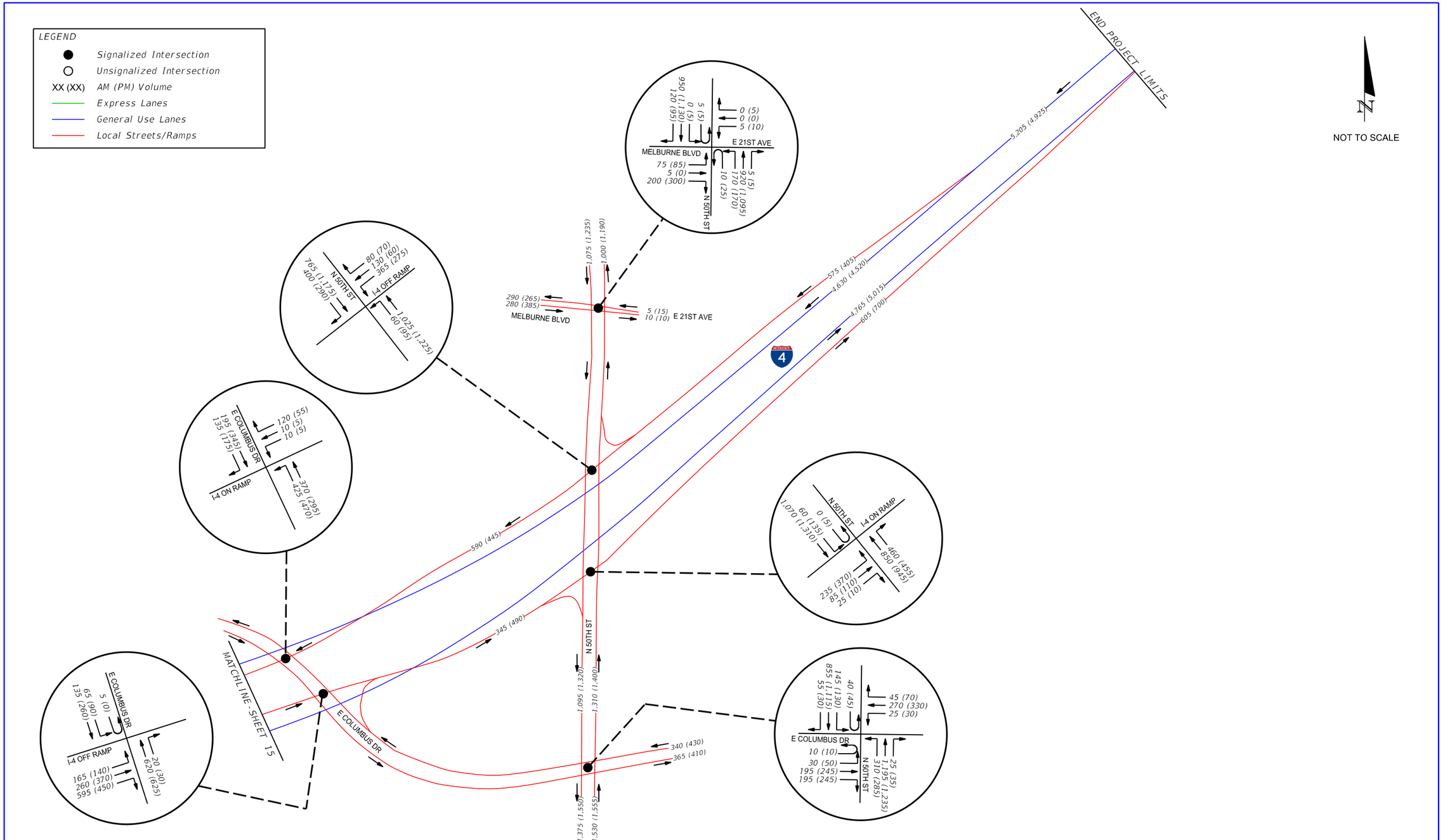
FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 14 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) - AM & PM Balanced DDHVs	Figure 2-6	Sheet 15 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Existing Year (2018) – AM & PM Balanced DDHVs	Figure 2-6	Sheet 16 of 16

WPI # 258337-2

Figure 2-7 Study Area Limits for Microsimulation Modelling

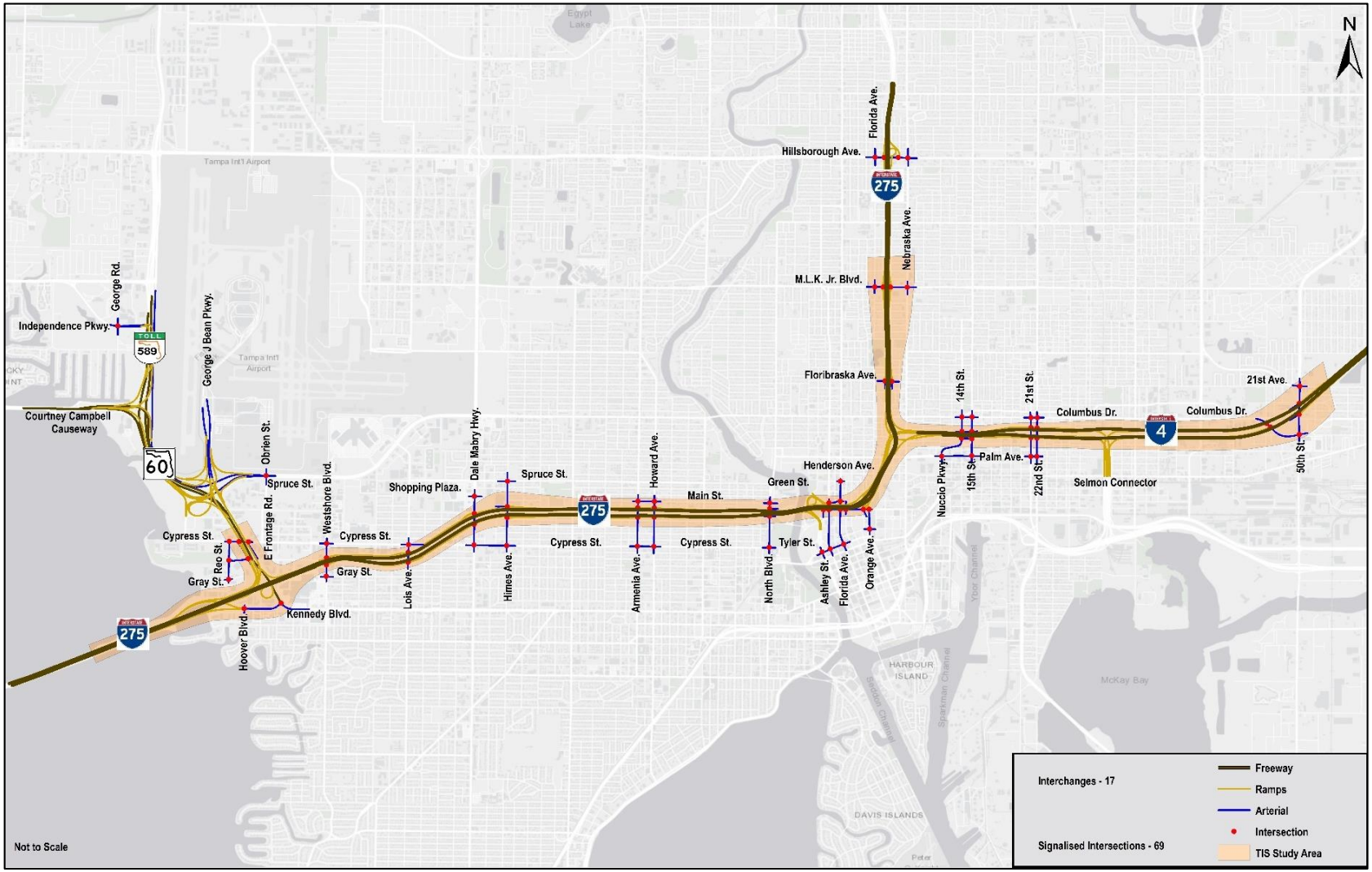
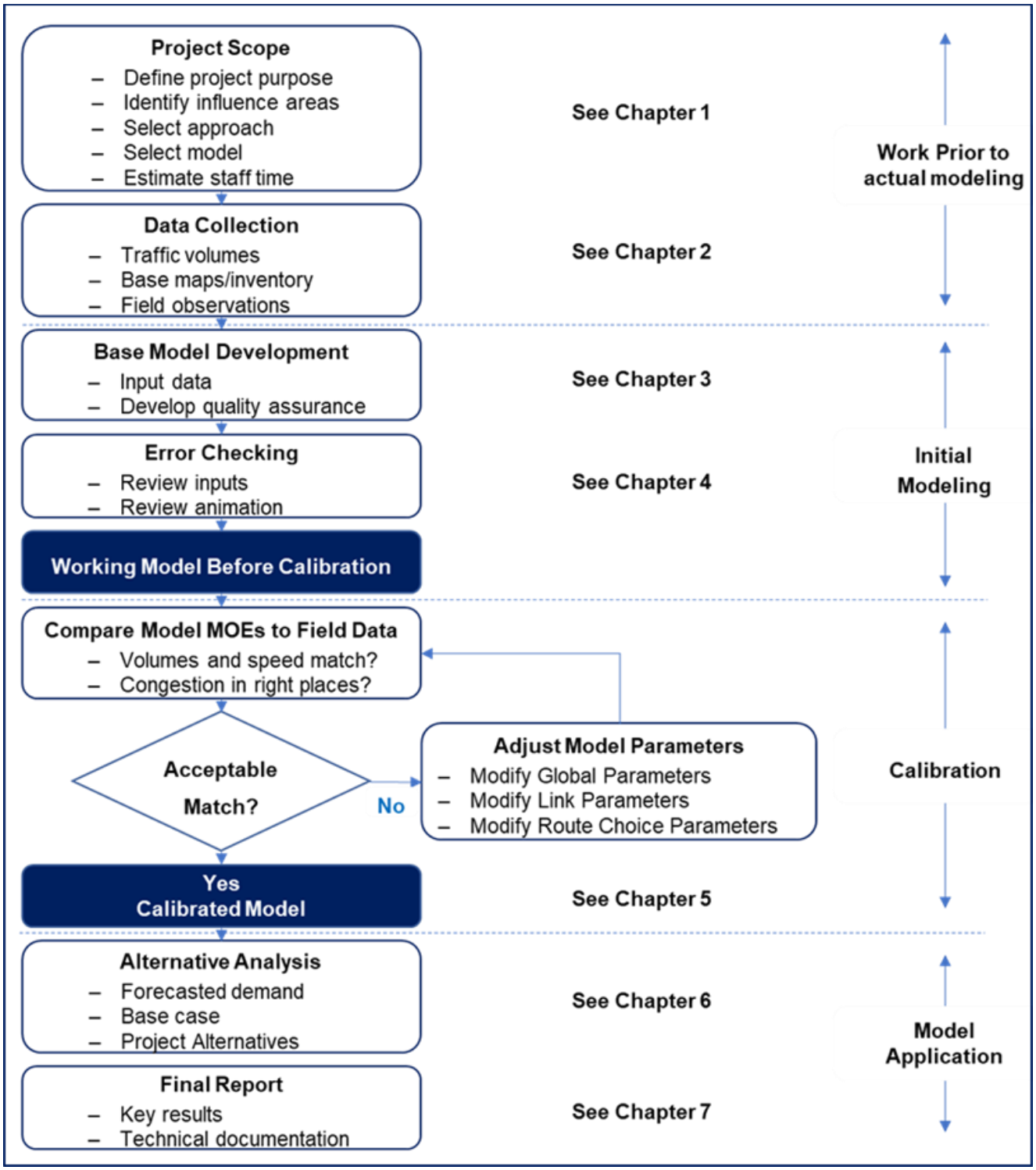


Figure 2-8 Methodology Used in the CORSIM Simulation



Source: FHWA Traffic Analysis Toolbox

2.7.4 Global and Local Parameters

Per guidance provided in the FDOT's Traffic Analysis Handbook, the CORSIM global parameters as well as local parameters for the Existing Year (2018) models (both AM and PM peak hours) were adjusted to replicate the field conditions. The following global and local adjustments were made to the existing models.

Global Parameters

The global calibration parameter "Vehicle Entry Headway" was changed to Erlang distribution with parameter a=1 as per Traffic Analysis Handbook Table 7-3 and kept consistent for both AM and PM models.

Adjustment of Local Calibration Parameters

Some of the local parameters such as Car Following Sensitivity Multiplier and Off-Ramp Reaction Distance were adjusted to create the desired bottlenecks that replicate the field conditions. The adjusted local parameters were shown in **Table 2-3**, **Table 2-4**, and **Table 2-5**.

Table 2-3 Local Parameter Changes – Car Following Multiplier (AM Peak Hour)

Link From	Node To	Roadway	Travel Direction	Car Following Sensitivity Multiplier	Comment
1013	**1014**	I-275	Northbound	180	Replicate AM congestion along I-275 NB
1014	**1015**	I-275	Northbound	170	
1015	**1016**	I-275	Northbound	140	
1016	**1017**	I-275	Northbound	180	
1017	**1018**	I-275	Northbound	180	
1018	**1019**	I-275	Northbound	170	
1020	**1021**	I-275	Northbound	130	
1021	**1022**	I-275	Northbound	218	
1024	**1025**	I-275	Northbound	125	
1025	**1026**	I-275	Northbound	125	
1026	**1027**	I-275	Northbound	122	
4028	**4029**	I-275	Northbound	120	
5003	**5004**	I-275 to SR60	Northbound	130	Replicate AM congestion along Howard Frankland Bridge NB due to capacity constraint along I-275 Off-Ramp to Airport and SR 60
5005	**5006**	I-275 to SR60	Northbound	189	
2027	**2028**	I-275	Southbound	155	Replicate AM congestion along I-275 SB
2028	**2029**	I-275	Southbound	175	
2030	**2031**	I-275	Southbound	135	
2031	**2032**	I-275	Southbound	140	
2034	**2035**	I-275	Southbound	158	
3031	**3032**	I-275	Southbound	115	
3034	**3035**	I-275	Southbound	150	
3035	**3036**	I-275	Southbound	160	
3036	**3037**	I-275	Southbound	170	
3037	**3038**	I-275	Southbound	120	
3042	**3043**	I-275	Southbound	150	
3043	**2023**	I-275	Southbound	150	
2013	**2014**	I-4	Westbound	125	
2014	**2015**	I-4	Westbound	125	
2017	**2018**	I-4	Westbound	130	
2018	**2019**	I-4	Westbound	154	

Table 2-4 Local Parameter Changes – Car Following Multiplier (PM Peak Hour)

Link From	Node To	Roadway	Travel Direction	Car Following Sensitivity Multiplier	Comment
1018	**1019**	I-275	Northbound	155	Replicate PM congestion along I-275 NB
1021	**1022**	I-275	Northbound	295	
1024	**1025**	I-275	Northbound	125	
1025	**1026**	I-275	Northbound	200	
1026	**1027**	I-275	Northbound	215	
1027	**1028**	I-275	Northbound	170	
1028	**1029**	I-275	Northbound	150	
1029	**1030**	I-275	Northbound	190	
1030	**1031**	I-275	Northbound	200	
1031	**1032**	I-275	Northbound	235	
1034	**1035**	I-275	Northbound	203	
1036	**1037**	I-275	Northbound	150	
1037	**1038**	I-275	Northbound	160	
1038	**1039**	I-275	Northbound	195	
1039	**1040**	I-275	Northbound	215	
1045	**1046**	I-275	Northbound	140	
1046	**1047**	I-275	Northbound	190	
4025	**4026**	I-275	Northbound	150	
4026	**4027**	I-275	Northbound	250	
4027	**4028**	I-275	Northbound	285	
4029	**4030**	I-275	Northbound	130	
4031	**4032**	I-275	Northbound	175	
4032	**4033**	I-275	Northbound	130	
4035	**4036**	I-275	Northbound	152	
4037	**4038**	I-275	Northbound	130	
5005	**5006**	I-275 to SR 60	Northbound	210	Replicate PM congestion along Howard Frankland Bridge due to capacity constraint along I-275 Off-Ramp to Airport and SR 60
3034	**3035**	I-275	Southbound	135	Replicate PM congestion along I-275 SB
3035	**3036**	I-275	Southbound	125	
3036	**3037**	I-275	Southbound	140	
3037	**3038**	I-275	Southbound	140	
3038	**3039**	I-275	Southbound	145	
3041	**3042**	I-275	Southbound	120	
3043	**2023**	I-275	Southbound	180	
2023	**2024**	I-275	Southbound	180	
2026	**2027**	I-275	Southbound	180	
2027	**2028**	I-275	Southbound	245	
2028	**2029**	I-275	Southbound	246	
2031	**2032**	I-275	Southbound	205	
2032	**2033**	I-275	Southbound	210	
2033	**2034**	I-275	Southbound	150	

Table 2-5 Local Parameter Changes – Off-Ramp Reaction Distance

Link From	Node To	Roadway	Travel Direction	Off Ramp Reaction Distance (ft)	Comment
1017	**1018**	I-275	Northbound	2,640	Per field guide sign
1026	**1027**	I-275	Northbound	7,920	
1027	**1028**	I-275	Northbound	11,880	
1034	**1035**	I-275	Northbound	5,280	
1046	**1047**	I-275	Northbound	6,850	
2009	**2010**	I-275	Southbound	5,280	
2011	**2012**	I-275	Southbound	2,640	
2017	**2018**	I-275	Southbound	5,280	
2018	**2019**	I-275	Southbound	5,280	
2030	**2031**	I-275	Southbound	6,600	
2036	**2037**	I-275	Southbound	6,600	
2037	**2038**	I-275	Southbound	6,600	
2039	**2040**	I-275	Southbound	6,600	
2041	**2042**	I-275	Southbound	6,600	
2045	**2046**	I-275	Southbound	5,280	
3015	**3016**	I-275	Southbound	2,000	
3016	**3017**	I-275	Southbound	3,500	
3030	**3031**	I-275	Southbound	5,280	
3034	**3045**	I-275	Southbound	5,280	
3037	**3038**	I-275	Southbound	3,960	
3038	**3039**	I-275	Southbound	7,920	
3040	**3041**	I-275	Southbound	3,200	

2.7.5 Calibration Results

The calibration process required a combination of visual examination and evaluation of statistical model outputs. The existing conditions model calibration primarily focused on replicating the traffic volume data, travel speed data, and existing bottleneck/congestion locations along I-275 and I-4 based on field observations. The AM and PM peak-hour traffic volumes and travel speeds from the model were compared to the existing conditions data collected to verify the corresponding criteria outlined by the FHWA and FDOT reference documents and detailed below. The existing demand intersection and approach LOS are provided in **Appendix I**. The existing balanced intersection and approach LOS are provided in **Appendix J**.

2.7.6 Individual Link Flows

Table 2-6 provides a summary of the total number of I-275 and I-4 mainline links that comply with the FHWA/FDOT criteria during the AM and PM peak hours. Calibration results indicate that 124 of 124 links in the AM model and 122 of 124 links in the PM model are compliant with these criteria.

Table 2-6 Individual Link Flows along I-275 Mainline

Peak Hour	Network Links		% Criteria Met
	No. of Links	Criteria Met	
Link Flow < 700 vph (within 100 vehicles)			
AM	0	0	NA
PM	0	0	NA
700 vph < Link Flow < 2,700 vph (within 15%)			
AM	0	0	NA
PM	7	7	100%
Link Flow > 2,700 vph (within 400 vehicles)			
AM	124	124	100%
PM	117	115	98%

2.7.7 Sum of All Link Flows

Table 2-7 provides a summary of the sum of link flows for the AM and PM peak hours. This table shows that the percentage of difference between the observed and simulated flows in the study area falls within FHWA/FDOT acceptable limits.

Table 2-7 Sum of All Link Flows along I-275 Mainline

Peak Hour	Sum of all Link Flows (Observed)	Sum of all Link Flows (Model)	Difference	Difference Percentage
AM	759,410	751,960	7,451	0.98%
PM	677,430	670,338	7,092	1.05%

2.7.8 GEH Statistic

Table 2-8 summarizes the GEH statistic evaluations conducted for AM and PM models. This table shows that the FHWA/FDOT criteria for the GEH statistic are met.

Table 2-8 GEH Statistic along I-275 Mainline

Peak Hour	Total Number of Links	Links with GEH < 5	Percentage	Within 85%
AM	124	124	100%	Yes
PM	124	122	98%	Yes

2.7.9 Travel Speeds Comparison – Field Vs Model

In addition to traffic volume calibration, field travel speeds along I-275 and I-4 were replicated in the AM and PM peak hour models. **Figure 2-9** through **Figure 2-16** shows the comparison of field travel speeds and model travel speeds for the AM and PM peak hour along I-275 and I-4, respectively.

Figure 2-9 Travel Speed Summary (I-275 NB – AM Peak Hour) – Model vs Field Speeds

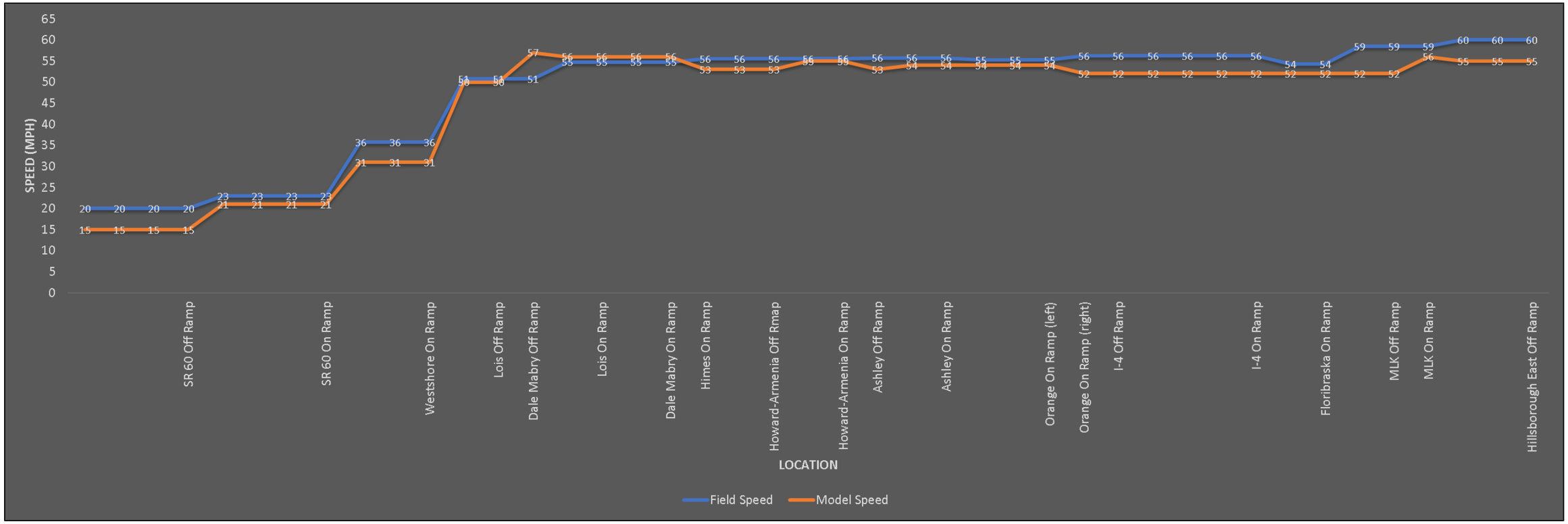


Figure 2-10 Travel Speed Summary (I-275 SB – AM Peak Hour) – Model vs Field Speeds

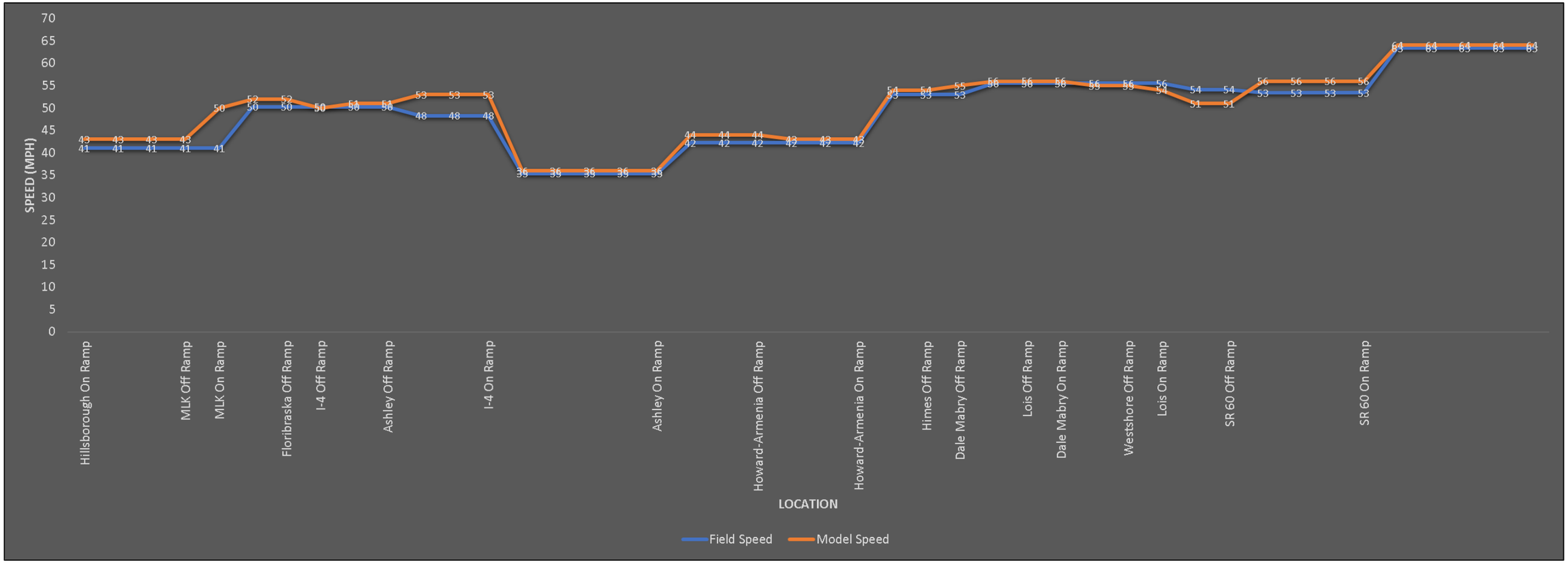


Figure 2-11 Travel Speed Summary (I-275 NB – PM Peak Hour) – Model vs Field Speeds

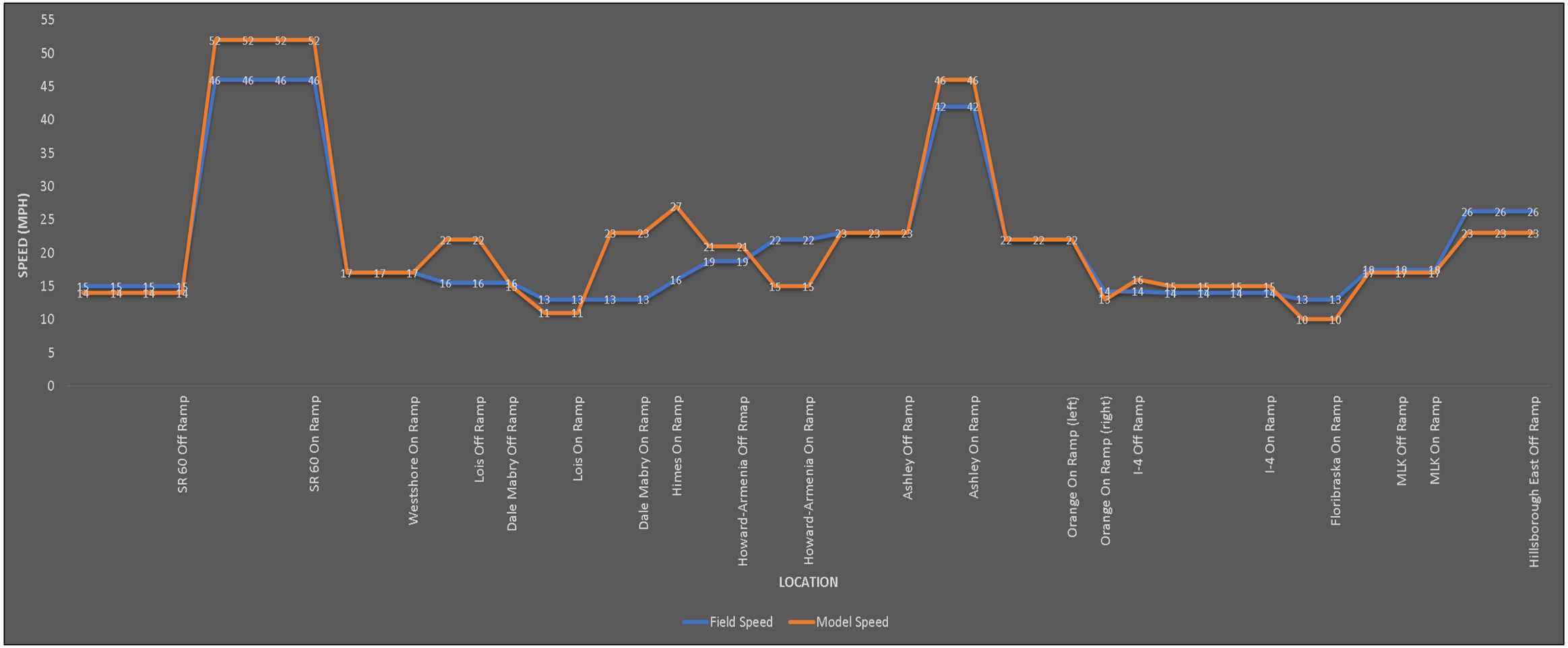


Figure 2-12 Travel Speed Summary (I-275 SB – PM Peak Hour) – Model vs Field Speeds

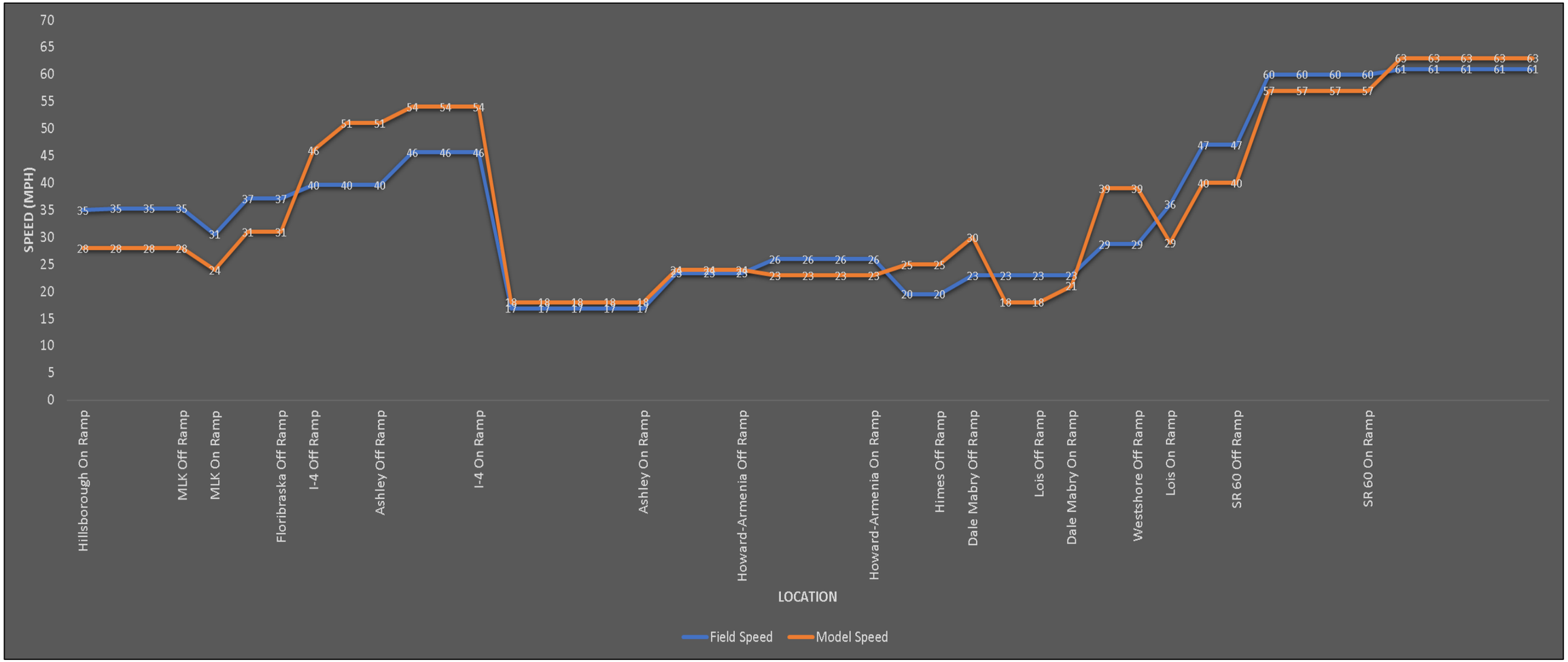


Figure 2-13 Travel Speed Summary (I-4 EB – AM Peak Hour) – Model vs Field Speeds

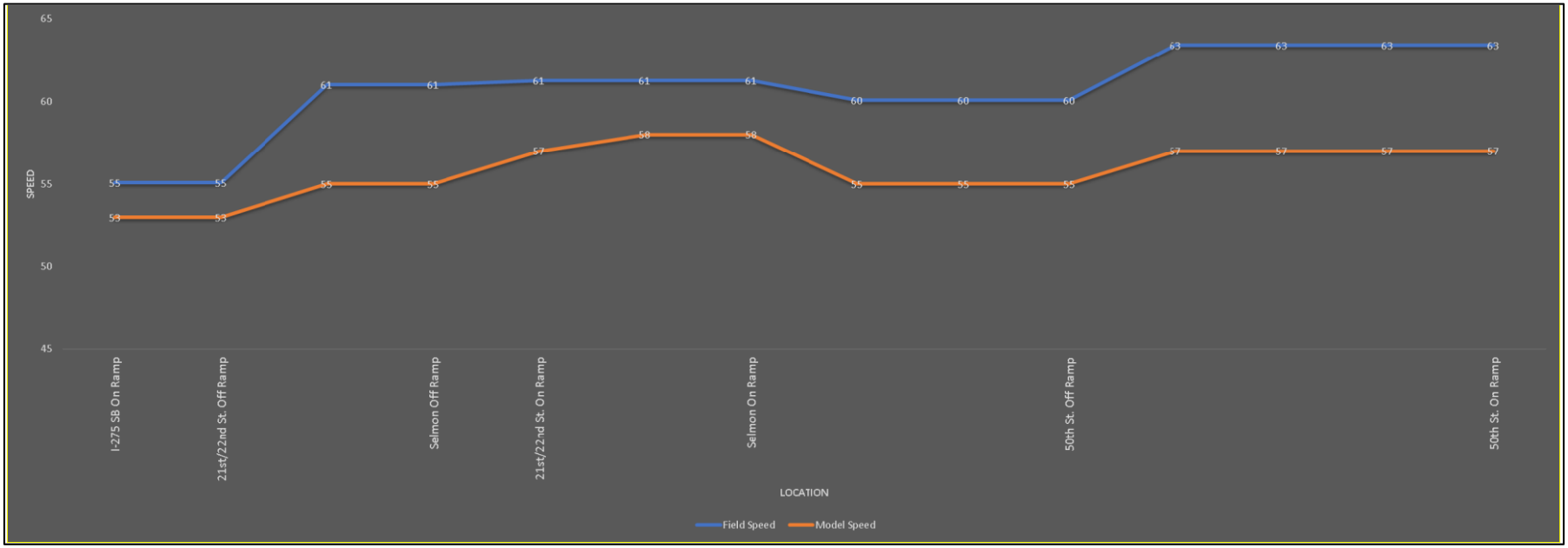


Figure 2-14 Travel Speed Summary (I-4 WB – AM Peak Hour) – Model vs Field Speeds

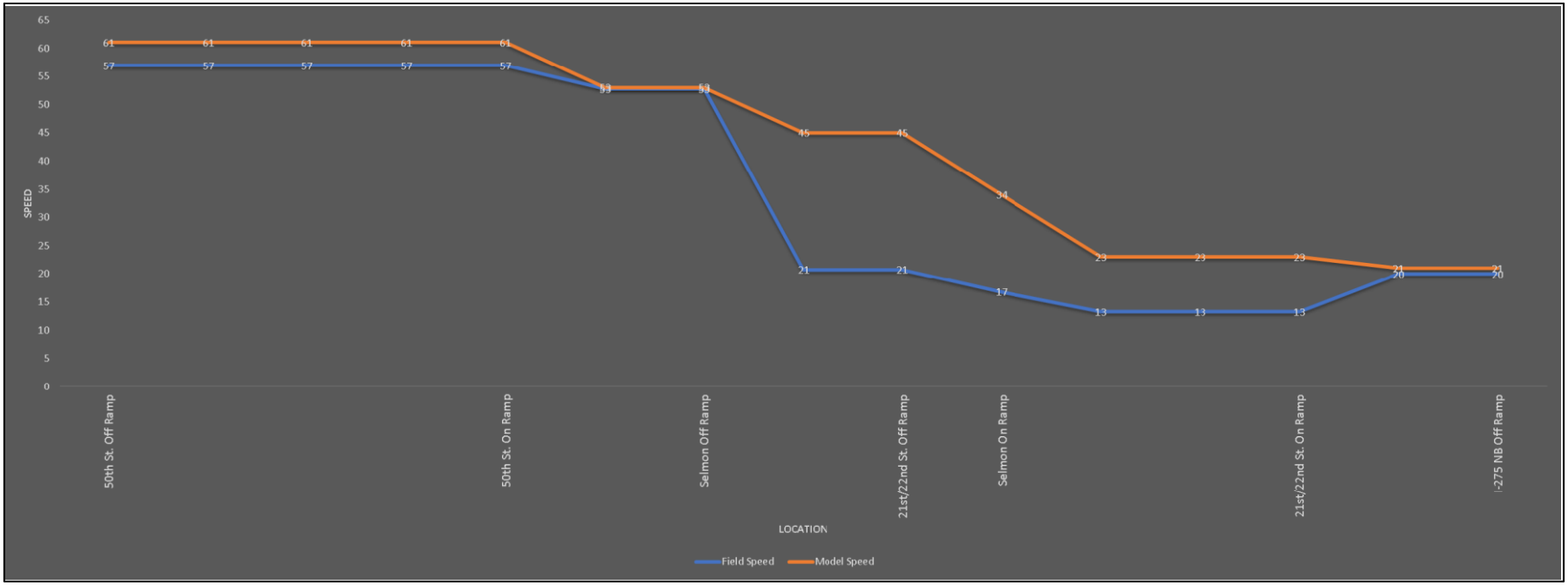


Figure 2-15 Travel Speed Summary (I-4 EB – PM Peak Hour) – Model vs Field Speeds

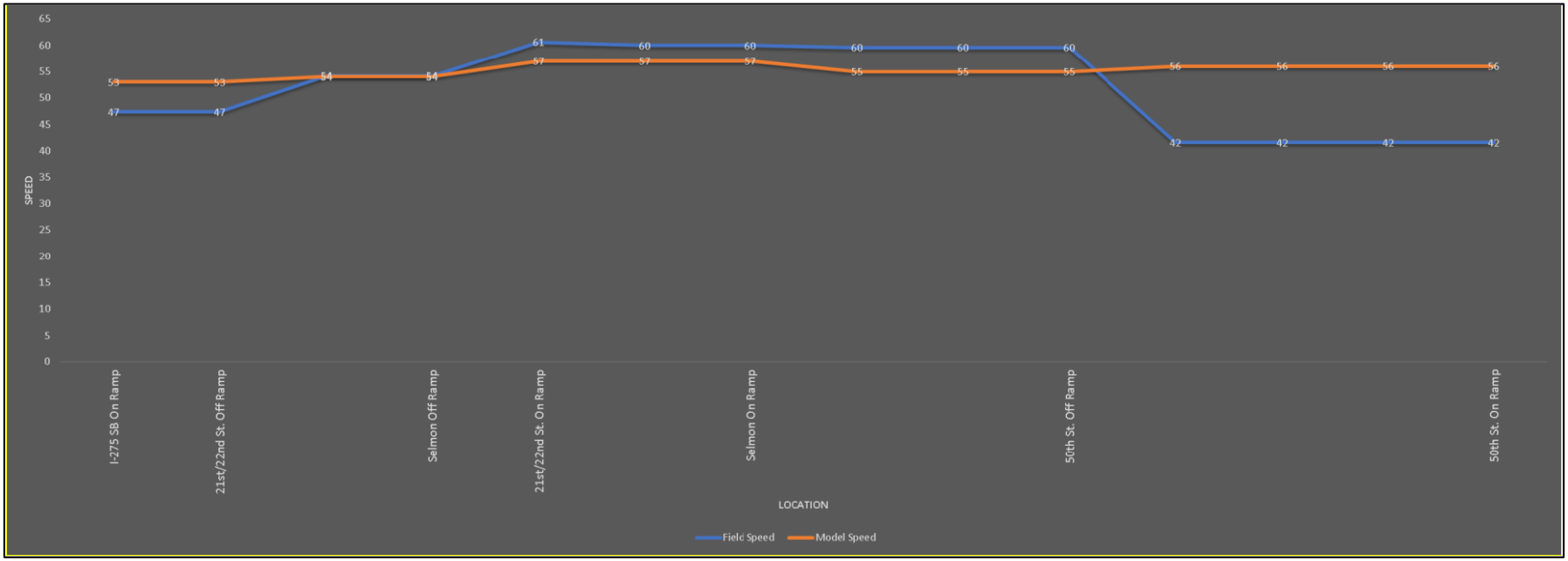
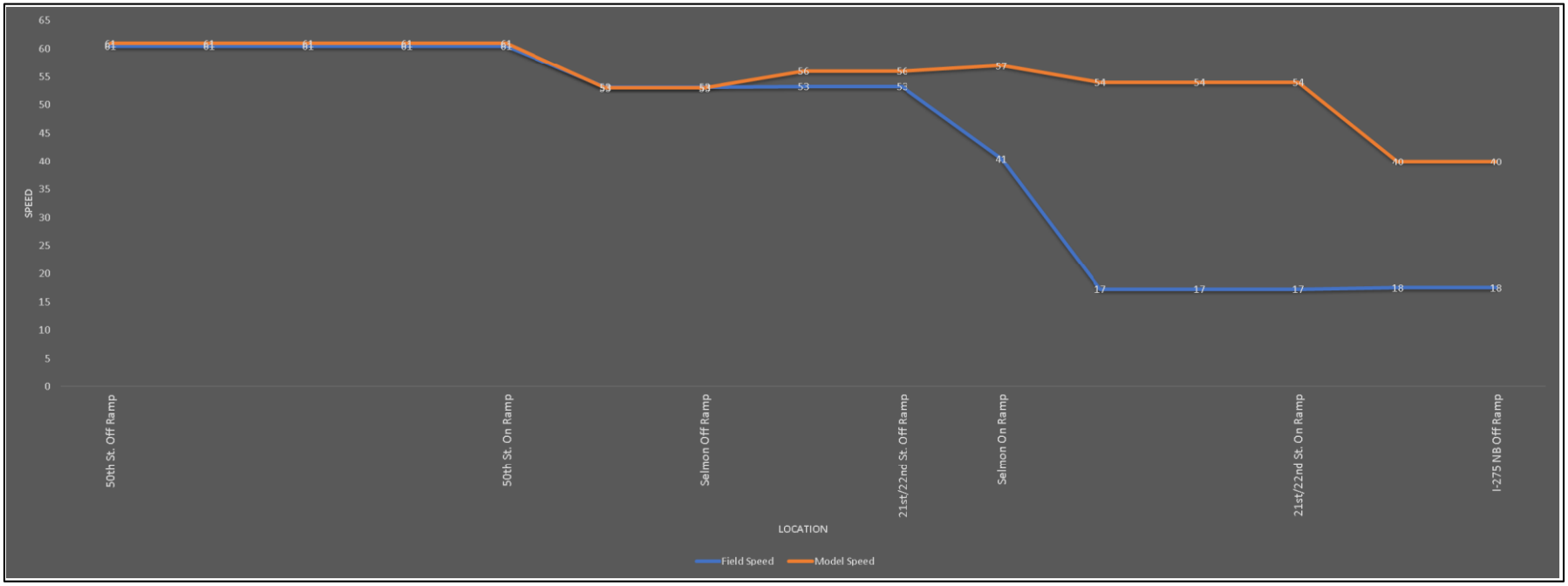


Figure 2-16 Travel Speed Summary (I-4 WB – PM Peak Hour) – Model vs Field Speeds



2.8 Summary

A summary of the existing conditions model calibration is provided below:

- Travelers experience heavier congestion during the PM peak hour compared to the AM peak hour. I-275 northbound experiences higher delays compared to I-275 southbound during both AM and PM peak hours.

- I-275 northbound, south of SR 60, was observed to be a critical bottleneck segment for both AM and PM peak hours, leading to higher delays due to high exiting traffic volumes to SR 60 off-ramp and due to vehicle slowdowns on SR 60 westbound off-ramp curve. In addition, heavy congestion is experienced during the PM peak hour along I-275 northbound, north of SR 60, primarily due to the downstream congestion. The traffic queues from I-275 and I-4 merge extend beyond Westshore Boulevard interchange.

- On average, commuters experience average travel speeds of 51 mph and 20mph to traverse I-275 northbound segment (From south of SR 60 to Hillsborough Avenue - 10-mile segment) during AM and PM peak hours, respectively.

- On average, commuters experience average travel speeds of 49 mph and 34mph to traverse I-275 southbound segment (From Hillsborough Avenue to south of SR 60 – 10 miles segment) during AM and PM peak hours, respectively.

- The summary of calibration results indicates that the individual link flows, sum of all link flows, and GEH statistic comply with the FHWA/FDOT criteria during the AM and PM peak hours.

- Additionally, the model animation replicates the AM and PM peak hour congestion and bottlenecks that were observed during field visits within the study area. The calibrated CORSIM models reflect the existing traffic operations during AM and PM peak hours within the SEIS study limits.

- As a next step, global and local model parameters that were modified to replicate field conditions will be applied to model NFA and build conditions. It is anticipated that changes to the calibration parameters that were utilized in the existing conditions CORSIM models might be required for future build conditions if geometric improvements are proposed to improve capacity near the bottleneck locations identified in the existing conditions.

2.9 Safety Analysis

A safety analysis was conducted for the I-275, SR 60, and I-4 corridors within TIS SEIS Segments 1A/2A and 2B/3A/3B located in Hillsborough County. This safety analysis includes a historic crash data analysis and a predictive crash analysis that was used to compare the predicted number of crashes under the NFA and the Preferred Build Alternatives. The historic crash data was obtained from the Crash Data Management System (CDMS), Crash Analysis Reporting System (CARS), and Signals Four (S4) databases. The historic crash data was reviewed to examine crash patterns and assess the existing safety performance of the corridors within the study area. The Enhanced Interchange Safety Analysis Tool (ISATe) was utilized to apply the predictive method included in Part C of the Highway Safety Manual (HSM).

2.9.1 Historic Crash Data

Crash data was collected and analyzed for the I-275, SR 60, and I-4 corridors within TIS SEIS Segments 1A, 2A, 2B,3A and 3B limits. The crash data was used to determine areas of potential safety concerns and identify crash patterns and possible mitigation strategies.

Crash data between January 1, 2012 and December 31, 2016 was obtained using CDMS, CARS, and S4 databases. The data obtained from these three databases were compared against each other and the duplicates were removed. The data was combined and then filtered to remove alcohol and drug related crashes, as well as distracted driver crashes and crashes involving animals. These filtered crashes can be seen in **Appendix K.**

Figure 2-17 and **Figure 2-18** show heat maps indicating concentration of crashes for the northbound/eastbound and southbound/westbound directions, respectively. In the northbound/eastbound directions, areas of high crash concentration occur around interchange areas, specifically at SR 60, Westshore Boulevard, Dale Mabry Highway, Downtown, and I-4. This high number of crashes is most likely due to the effects of on and off ramps that result in lane changes, high speed differentials between the ramp and the freeway, and potential queuing requiring sudden, unexpected breaking. In the southbound/westbound directions, high crash locations occur as vehicles enter the I-275/I-4 interchange area. This area experiences high congestion, excessive queuing, and sudden stops, which all contribute to the high number of rear end crashes in Segments 2B/3A/3B.

Over the five-year period a total of 7440 crashes were reported within the SEIS limits of TIS Segments 1A/2A and 2B/3A/3B. Of these, the majority were rear-end crashes, which comprised 64% of the total crashes, followed by sideswipes at 18%. Additional crash types include hitting a fixed object (6%) and run off the road (5%). **Table 2-9** shows the total crashes by year and type throughout the SEIS project limits. These crashes are also presented in **Table 2-10** and are divided by TIS Segments 1A, 2A, 2B, 3A and 3B and roadway within each section. Segments 2B/3A/3B, which includes the downtown

interchange area, experienced the most crashes of the two Segments, but also covers over twice the distance as Segment 1A/2A.

In total, there were 9 crashes involving a fatality and 2145 crashes resulting in an injury. **Table 2-11** shows the total crashes by year and severity throughout the SEIS project limits. These crashes are presented in **Table 2-12**, divided into TIS Segments and roadway within each section. Six of the nine fatality crashes occurred within Segments 2B/3A/3B; all six occurred on I-275.

Figure 2-17 Northbound and Eastbound Heat Map

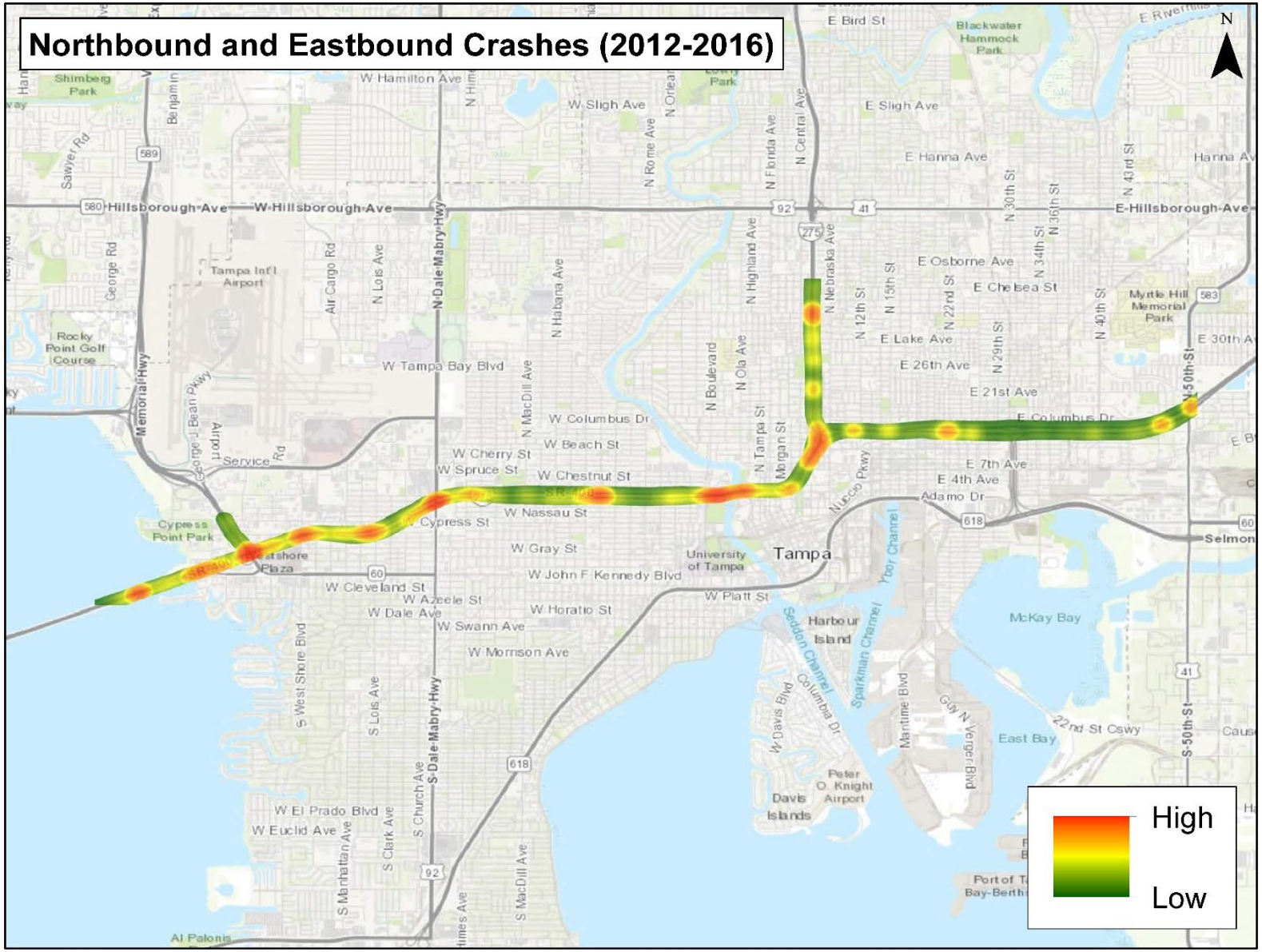


Figure 2-18 Southbound and Westbound Heat Map

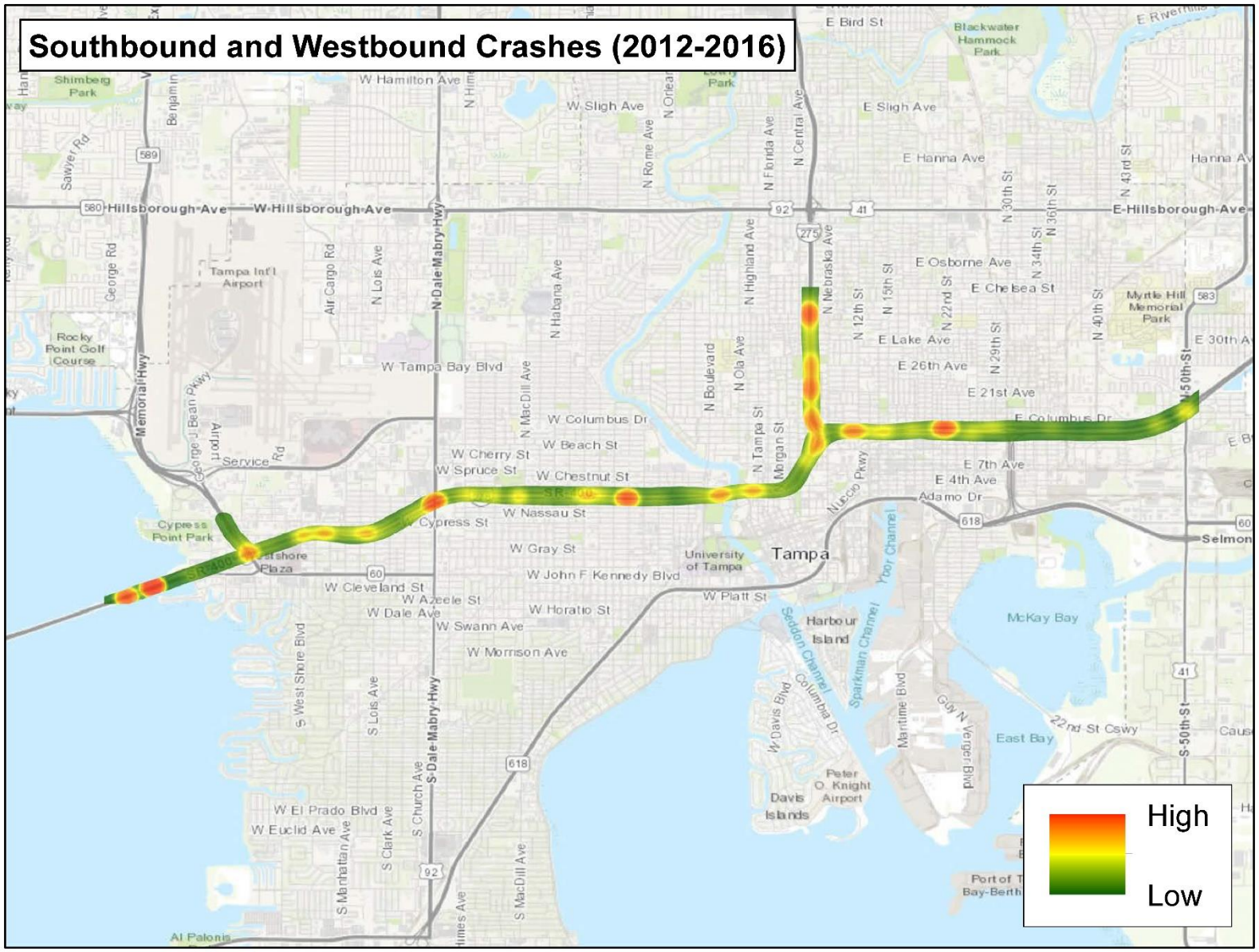


Table 2-9 Crashes by Year and Type

Crash Type	2012	2013	2014	2015	2016	Total Crashes
Angle	7	20	24	19	27	97
Bike	1	1	0	0	2	4
Head On	1	16	11	12	10	50
Hit Fixed Object	82	73	91	91	107	444
Hit Non-Fixed Object	8	4	12	2	17	43
Left Turn	4	5	8	2	7	26
Off Road	81	69	70	58	67	345
Other	36	42	55	42	30	205
Pedestrian	6	1	4	0	3	14
Rear End	671	914	948	1033	1188	4754
Right Turn	0	0	2	0	1	3
Rollover	2	6	12	5	4	29
Sideswipe	182	217	293	263	358	1313
Single Vehicle	17	13	19	13	17	79
Unknown	5	5	12	4	8	34
Total Crashes	1103	1386	1561	1544	1846	7440

Table 2-10 Crashes by TIS SEIS Segments/Roadway and Type

Crash Type	1A/2A		2B/3A/3B		Total Crashes
	I-275	SR 60	I-275	I-4	
Angle	40	5	24	28	97
Bike	0	0	1	3	4
Head On	20	3	16	11	50
Hit Fixed Object	158	24	164	98	444
Hit Non-Fixed Object	17	2	13	11	43
Left Turn	13	1	8	4	26
Off Road	159	15	89	82	345
Other	95	12	44	54	205
Pedestrian	4	0	5	5	14
Rear End	2364	147	1500	743	4754
Right Turn	3	0	0	0	3
Rollover	13	2	6	8	29
Sideswipe	565	30	400	318	1313
Single Vehicle	30	6	26	17	79
Unknown	16	3	11	4	34
Total Crashes	3497	250	2307	1386	7440

Table 2-11 Crashes by Year and Severity

Crash Severity	2012	2013	2014	2015	2016	Total Crashes
Fatal	3	1	0	1	4	9
Incapacitating Injury	39	45	39	20	29	172
Non-Incapacitating Injury	88	92	111	112	130	533
Possible Injury	220	262	273	292	393	1440
Property Damage Only	753	986	1138	1119	1290	5286
Total Crashes	**1103**	**1386**	**1561**	**1544**	**1846**	**7440**

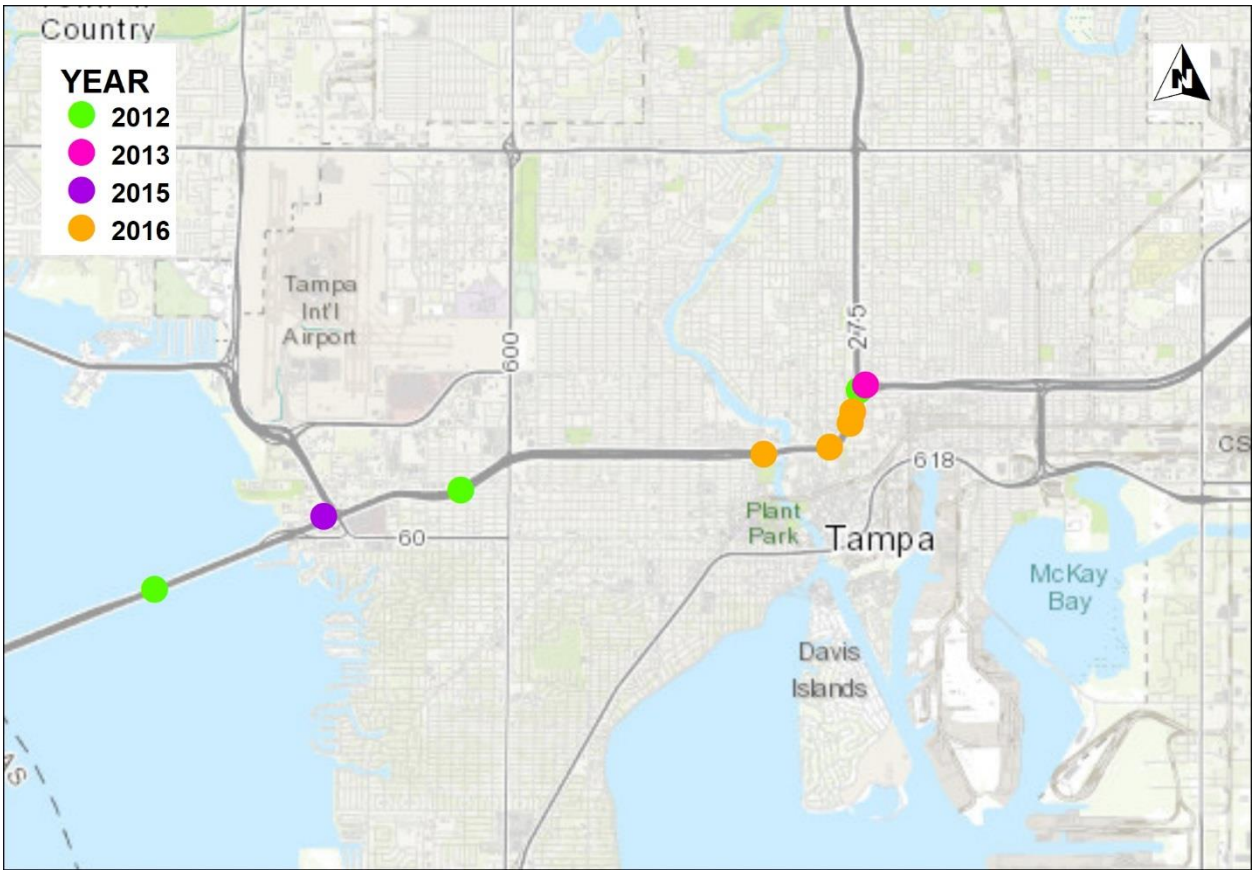
Table 2-12 Crash by Severity and TIS SEIS Segments/Roadway and Type

Section	Roadway	Fatality	Injury Type			PDO	Total Crashes
			Incapacitating Injury	Non-Incapacitating Injury	Possible Injury		
1A/2A	I-275	3	77	232	652	2533	3497
	SR 60	0	5	25	41	179	250
2B/3A/3B	I-275	6	50	161	475	1616	2308
	I-4	0	40	115	272	958	1385
Total Crashes		**9**	**172**	**533**	**1440**	**5286**	**7440**

2.9.2 Fatal Crashes

Figure 2-19 shows the locations of the nine fatal crashes within the study area between 2012 and 2016. No fatal crashes were recorded in 2014. The majority of fatal crashes are concentrated in the downtown interchange area, three of which were caused by vehicles hitting a concrete barrier. The curvature of the roadway in this area, along with speeding, may be contributing factors to the fatalities in this area. Other fatal crashes throughout the study area involved pedestrians being struck at night. Additional fatal crashes involved rear end collisions and one head on collision that resulted from a wrong way driver on an off ramp. Fatal crashes are further discussed in the following sections.

Figure 2-19 Fatal Crash Locations



2.9.3 Section Review

The study area is comprised of two sections of the TIS SEIS network.

- Segment 1A/2A covers I-275 from the Howard Frankland Bridge to Rome Avenue, as well as SR 60 from Kennedy Boulevard to Cypress Street.
- Segment 2B/3A/3B covers I-275 from Rome Avenue to Osborne Avenue, as well as I-4 from the I-275 interchange to east of the 50th Street interchange.

A historic crash analysis was conducted for the two segments within the study area where the crash type and severity were analyzed within each segment over the years.

1. Segments 1A/2A

There were a total of 3747 crashes throughout the 6.10-mile segment of Section 1A/2A. Of these crashes, 3497 occurred on I-275 and 250 occurred on SR 60. The primary crash type experienced on both roadways was rear-end crashes, followed by sideswipes. Run off the road and hitting a fixed object also account for a higher percentage of crashes. The speed limit traveling northbound on I-275 decreases from 65 mph to 55 mph as drivers encounter the SR 60/Kennedy Boulevard off ramp (Ramp

Number 10270129). This ramp experiences queuing onto northbound I-275 and may be a contributing factor to the high number of rear end crashes in this section. In the southbound direction, there is a short weaving distance between the Lois Avenue on ramp and the SR 60 off ramp that may account for the sideswipe type crashes in this section. Vehicles coming from Lois Avenue that are destined for southbound I-275 need to perform a lane change maneuver in approximately 2000 ft. That lane then merges approximately 1500 ft south of the SR 60 off ramp, causing another lane change maneuver. Portions of this section were also under construction during the years defined by the historic crash analysis, which may have caused detours and new traffic patterns to emerge. This construction may have led to an increase in crashes within this section in order for traffic to navigate new traffic patterns or comply with roadwork signage and avoid construction vehicles. The original geometry of I-275 included several short weaving segments that may contribute to the high number of rear end and sideswipe crashes. **Table 2-13** shows the crashes that occurred in Section 1A/2A by year and type.

Three fatal crashes occurred within Section 1A/2A, one of which was the result of a vehicle running off the road during the day under dry roadway conditions; there were no reported contributing causes. Another fatal crash involved a pedestrian that occurred between 4:30 and 5:00 AM under dry roadway conditions. The final fatal crash involved a motorcycle that changed lanes and was rear ended by a motor vehicle. This crash occurred during the day in clear weather with no reported contributing causes. **Table 2-14** shows the crash severity by year for the portions of I-275 and SR 60 within Section 1A/2A.

Table 2-15 shows crashes by year and condition of the roadway. Approximately 84% of the crashes within Section 1A/2A occurred while the roadway was dry, while 16% of crashes occurred under wet roadway conditions. **Table 2-16** shows crashes by year and lighting conditions. Crashes occurring at night account for 19% of all crashes in Segment 1A/2A; 18% of total crashes occurred at night under lighted conditions.

Table 2-17 is a statistical crash analysis for the portions of I-275 and SR 60 within Segment 1A/2A, which are urban interstate segments, which has an average statistical crash rate of 0.924 crashes per million vehicle miles. The historic AADT was obtained from FTI traffic counts; the count station used for I-275 is 102018, while the count station used for SR 60 is 105143. Both segments of I-275 and SR 60 experience more crashes than the statistical average for similar roadway facilities in the state of Florida. The economic loss was also calculated for these two segments based on crash costs per severity type. The total crash cost of both roadway segments over the five-year period is approximately $295,306,700.

Table 2-13 Segment 1A/2A Crashes by Year and Type

Roadway	Crash Type	2012	2013	2014	2015	2016	Total Crashes
I-275	Angle	5	9	12	7	7	40
	Head On	0	7	4	5	4	20
	Hit Fixed Object	39	21	38	30	30	158
	Hit Non-Fixed Object	1	1	4	1	10	17
	Left Turn	3	3	1	1	5	13
	Off Road	40	33	26	32	28	159
	Other	13	24	27	19	12	95
	Pedestrian	2	0	1	0	1	4
	Rear End	352	438	525	565	484	2364
	Right Turn	0	0	2	0	1	3
	Rollover	0	3	6	2	2	13
	Sideswipe	75	100	130	124	136	565
	Single Vehicle	7	5	6	5	7	30
	Unknown	3	5	4	1	3	16
	Roadway Total	540	649	786	792	730	3497
SR 60	Angle	0	0	3	1	1	5
	Head On	0	2	0	1	0	3
	Hit Fixed Object	2	6	8	4	4	24
	Hit Non-Fixed Object	0	1	1	0	0	2
	Left Turn	0	0	1	0	0	1
	Off Road	4	1	7	2	1	15
	Other	3	2	6	1	0	12
	Pedestrian	0	0	0	0	0	0
	Rear End	15	29	37	34	32	147
	Rollover	0	0	2	0	0	2
	Sideswipe	3	3	11	8	5	30
	Single Vehicle	1	1	1	3	0	6
	Unknown	0	0	3	0	0	3
	Roadway Total	28	45	80	54	43	250
Total Crashes		**568**	**694**	**866**	**846**	**773**	**3747**

Table 2-14 Segment 1A/2A Crashes by Year and Severity

Roadway	Crash Severity	2012	2013	2014	2015	2016	Total Crashes
I-275	Fatality	2	0	0	1	0	3
	Incapacitating Injury	23	17	14	9	14	77
	Non-Incapacitating Injury	42	43	58	51	38	232
	Possible Injury	108	112	134	147	151	652
	Property Damage Only	365	477	580	584	527	2533
	Total	540	649	786	792	730	3497
SR 60	Fatality	0	0	0	0	0	0
	Incapacitating Injury	1	1	2	1	0	5
	Non-Incapacitating Injury	3	2	6	7	7	25
	Possible Injury	5	7	15	7	7	41
	Property Damage Only	19	35	57	39	29	179
	Total	28	45	80	54	43	250
Total Crashes		**568**	**694**	**866**	**846**	**773**	**3747**

Table 2-15 Segment 1A/2A Crashes by Roadway Condition and Year

Years	Dry	Wet	Unknown	Total Crashes
2012	474	94	0	568
2013	593	100	1	694
2014	688	178	0	866
2015	720	126	0	846
2016	688	84	1	773
Total Crashes	**3163**	**582**	**2**	**3747**

Table 2-16 Segment 1A/2A Crashes by Lighting Condition and Year

Years	Night			Day			Unknown	Total Crashes
	Dark-Lighted	Dark-Not Lighted	Dark-Unknown Lighting	Dawn	Daylight	Dusk		
2012	127	3	0	9	411	17	1	568
2013	128	7	2	14	528	15	0	694
2014	166	10	1	16	615	58	0	866
2015	126	8	0	29	651	32	0	846
2016	123	8	2	12	583	44	1	773
Total Crashes	**670**	**36**	**5**	**80**	**2788**	**166**	**2**	**3747**

Table 2-17 Statistical Crash Analysis for Section 1A/2A

Statistic	I-275	SR 60
AADT	183200	131000
Length of Segment (Miles)	5.54	0.56
Number of Reported Crashes	3497	250
FDOT Statistical Crash Rate Per Million Vehicle Miles*	0.924	0.924
Actual Crash Rate Per Million Vehicle Miles	1.888	1.867
Total Economic Loss (in Thousand Dollars)	**$276,207.40**	**$19,099.30**

*5 Year Crash Rate Average for Interstates in Urban Segments from the Statewide Average Crash Rates Between 2012 and 2016

2. Segments 2B/3A/3B

There were a total of 3693 crashes throughout the 7.55-mile segment of Section 6. Of these crashes, 2308 occurred on I-275 and 1385 occurred on I-4. The primary crash type experienced on both roadways was rear-end crashes, followed by sideswipes. Hitting a fixed object and run off the road crash types also account for a higher percentage of crashes. The speed limit traveling on I-275 decreases from 55 mph prior to the downtown area to 50 mph within the downtown area and then increases back to 55 mph north of the I-4 interchange. The speed limit on I-4 also increases to 55 mph in the eastbound direction after the 21st Street ramps. The geometry of I-275 within the downtown area

experiences several on-/off-ramps in close succession while also navigating sharp curvature. There is a C/D road in the southbound direction that exhibits a short weaving segment. Drivers unfamiliar with the area may also experience some confusion with signage as they attempt to navigate between I-275 and I-4. All of these factors can cause an increased risk of crashes, especially rear ends and sideswipes, as drivers navigate through reduced speeds, road curvature, queuing, and lane changing throughout the downtown interchange area. **Table 2-18** shows the crashes that occurred in Section 2B/3A/3B by year and type.

Six fatal crashes occurred within Segments 2B/3A/3B; all six crashes occurred on I-275. One of these crashes involved a pedestrian, three involved running off the road and hitting a concrete barrier, another the result of a rear-end collision, and lastly a wrong way driver that resulted in a head on collision. Four of these crashes occurred at night; five of them occurred under clear weather conditions. **Table 2-19** shows the crash severity by year for the portions of I-275 and I-4 within Segment 2B/3A/3B.

Table 2-20 shows crashes by year and condition of the roadway. Approximately 82% of the crashes within Segment 2B/3A/3B occurred while the roadway was dry, while 17% of crashes occurred under wet roadway conditions. **Table 2-21** shows crashes by year and lighting conditions. Crashes occurring at night account for 18% of all crashes in Segment 2B/3A/3B; 18% of all crashes occurred at night under lighted conditions.

Table 2-22 is a statistical crash analysis for the portions of I-275 and I-4 within Segments 2B/3A/3B, which are urban interstate segments, which has an average statistical crash rate of 0.924 crashes per million vehicle miles. The historic AADT was obtained from FTI traffic counts; the count station used for I-275 is 102016, while the count station used for I-4 is 102028. Both segments of I-275 and I-4 experience more crashes than the statistical average for similar roadway facilities in the state of Florida. The economic loss was also calculated for these two segments based on crash costs per severity type. The total crash cost of both roadway segments over the five-year period is approximately $349,909,400.

Table 2-18 Segments 2B/3A/3B Crashes by Year and Type

Roadway	Crash Type	2012	2013	2014	2015	2016	Total Crashes
I-275	Angle	1	5	3	8	7	24
	Bike	0	0	0	0	1	1
	Head On	1	3	3	5	4	16
	Hit Fixed Object	21	32	23	37	51	164
	Hit Non-Fixed Object	3	1	5	0	4	13
	Left Turn	1	1	5	0	1	8
	Off Road	19	16	25	10	20	90
	Other	8	4	8	12	12	44
	Pedestrian	1	0	3	0	1	5
	Rear End	200	264	269	321	446	1500
	Rollover	1	2	1	2	0	6
	Sideswipe	49	59	95	78	119	400
	Single Vehicle	6	6	6	2	6	26
	Unknown	1	0	5	1	4	11
	Roadway Total	312	393	451	476	676	2308
I-4	Angle	1	6	6	3	12	28
	Bike	1	1	0	0	1	3
	Head On	0	4	4	1	2	11
	Hit Fixed Object	20	14	22	20	22	98
	Hit Non-Fixed Object	4	1	2	1	3	11
	Left Turn	0	1	1	1	1	4
	Off Road	18	19	12	14	18	81
	Other	12	12	14	10	6	54
	Pedestrian	3	1	0	0	1	5
	Rear End	104	183	117	113	226	743
	Rollover	1	1	3	1	2	8
	Sideswipe	55	55	57	53	98	318
	Single Vehicle	3	1	6	3	4	17
	Unknown	1	0	0	2	1	4
	Roadway Total	223	299	244	222	397	1385
Total Crashes		**535**	**692**	**695**	**698**	**1073**	**3693**

Table 2-19 Segments 2B/3A/3B Crashes by Year and Severity

Roadway	Crash Severity	2012	2013	2014	2015	2016	Total Crashes
I-275	Fatality	1	1	0	0	4	6
	Incapacitating Injury	8	15	11	6	10	50
	Non-Incapacitating Injury	26	23	26	35	51	161
	Possible Injury	65	80	79	102	149	475
	Property Damage Only	212	274	335	333	462	1616
I-4	Fatality	0	0	0	0	0	0
	Incapacitating Injury	7	12	12	4	5	40
	Non-Incapacitating Injury	17	24	21	19	34	115
	Possible Injury	42	63	45	36	86	272
	Property Damage Only	157	200	166	163	272	958
Total Crashes		**535**	**692**	**695**	**698**	**1073**	**3693**

Table 2-20 Segments 2B/3A/3B Crashes by Roadway Conditions and Year

Years	Dry	Wet	Unknown	Total Crashes
2012	448	87	0	535
2013	581	111	0	692
2014	549	146	0	695
2015	572	125	1	698
2016	894	177	2	1073
Total Crashes	**3044**	**646**	**3**	**3693**

Table 2-21 Segments 2B/3A/3B Crashes by Lighting Condition and Year

Years	Night			Day			Unknown	Total Crashes
	Dark-Lighted	Dark-Not Lighted	Dark-Unknown Lighting	Dawn	Daylight	Dusk		
2012	126	2	0	11	370	26	0	535
2013	118	2	1	10	537	24	0	692
2014	120	5	0	13	515	42	0	695
2015	102	1	0	10	534	51	0	698
2016	183	5	1	16	809	58	1	1073
Total Crashes	**649**	**15**	**2**	**60**	**2765**	**201**	**1**	**3693**

Table 2-22 Statistical Crash Analysis for Section 2B/3A/3B

Statistic	I-275	I-4
AADT	158800	172800
Length of Segment (Miles)	3.968	3.554
Number of Reported Crashes	2308	1385
FDOT Statistical Crash Rate Per Million Vehicle Miles	0.924	0.924
Actual Crash Rate Per Million Vehicle Miles	2.007	1.236
Total Economic Loss (Thousand Dollars)	**$244,508.00**	**$105,401.40**

*5 Year Crash Rate Average for Interstates in Urban Segments from the Statewide Average Crash Rates Between 2012 and 2016

3. ALTERNATIVE ANALYSIS

I-275, I-4 and SR 60 provide important connections to the regional and statewide transportation network linking the Tampa Bay region to the remainder of the state and nation. From the NFA Alternative analysis it is seen that the current geometry will be unable to handle the future growth in traffic. This study examined the need for additional mainline improvements in each direction to increase the capacity and improve the reliability, operations and safety of I-275, I-4 and SR 60 within the study area.

The alternatives that will be evaluated in the TIS SEIS are described in the following sections.

3.1 No Further Action (NFA) Alternative

The NFA Alternative provides a baseline against which the Build alternatives can be compared. Portions of the selected alternative in the 1996 TIS FEIS have been constructed, so the NFA Alternative that was evaluated in previous studies is no longer applicable. Therefore, a new NFA Alternative is evaluated for comparison to the 1996 TIS FEIS Long-Term Preferred Alternative and a 2018 Express Lane Alternative. The NFA Alternative is defined as the existing transportation system plus improvements approved in the1997 and 1999 RODs.

In Segment 1A, the NFA Alternative includes construction of the general use lanes (outer roadways) and associated ramps within the I-275/SR 60 Interchange, which was approved under the 1997 ROD. Within the TIS SEIS study area, the remainder of the improvements identified in the RODs has already been built. The NFA Alternative also includes operational improvements to address existing operational and safety needs. They include the following:

I-275 from South SR 60/Kennedy Boulevard to South of Lois Avenue in TIS SEIS Segment 1A:

- Add an additional northbound deceleration lane to the SR 60/Kennedy Boulevard off-ramp creating a third exit lane to SR 60/Kennedy Boulevard.
- Add a second exit lane to eastbound SR 60/Tampa International Airport (TIA) that merges to a single lane just west of the flyover bridge over I-275 mainline.
- Add a third northbound I-275 lane from eastbound SR 60/Kennedy Boulevard off-ramp to SR 60 on-ramp creating a 3-lane section.
- Extend the two-lane eastbound SR 60/Kennedy Boulevard on-ramp to I-275 northbound creating a 5-lane section to the Westshore Boulevard on-ramp.
- Maintain the existing northbound auxiliary lane between the Westshore Boulevard on-ramp and Lois Avenue off-ramp creating a 6-lane section. Terminate the additional lane at the Lois Avenue off-ramp.

- Add a third southbound I-275 lane from SR 60/Airport off-ramp to westbound SR 60/Kennedy Boulevard on-ramp creating a 3-lane section.
- Merge the outside two lanes from westbound SR 60/Kennedy Boulevard on-ramp southbound I-275 prior to the HFB Bridge matching the existing 4-lane section prior to the bridge.

I-275/SR 93 from North of the Downtown Interchange to North of Dr. MLK, Jr. Boulevard in TIS SEIS Segment 2B:

- Provide an auxiliary lane in the northbound direction from Floribraska Avenue on-ramp to SR 600 eastbound off-ramp creating a 4-lane section.
- Create an auxiliary lane by extending the northbound deceleration lane from the eastbound SR 600 off-ramp to the westbound off-ramp.
- Add an auxiliary lane in the southbound I-275 lane of travel from north of the SR 600 on-ramp to south of the I-4 exit ramp creating a 4-lane section.
- Add a second exit lane to the I-4 eastbound off-ramp that merges to a single lane approximately 700 feet prior to the flyover bridge.
- Merge the fourth southbound I-275 choice lane prior to the Downtown Tampa exit.

3.2 1996 TIS FEIS Long-Term Preferred Alternative (Non-Tolled)

Proposed improvements of the 1996 TIS FEIS Long-Term Preferred Alternative consist of a four-roadway system (general use lanes that provide local access and non-tolled express lanes in each direction of travel) on I-275 throughout the study limits and the preservation of a HOV/Transitway corridor within the interstate alignment. The non-tolled alternative is described in the Technical Memorandum included in the **Appendix L.**

Proposed interchange improvements include:

- a fully directional interchange for the I-275 connection to the SR 60/Veterans Expressway;
- modifications to the existing Westshore Boulevard, Lois Avenue, and Dale Mabry Highway interchanges;
- split interchange ramps remaining at Howard and Armenia Avenues;
- a new west bank Central Business District (CBD) interchange with ramps to and from the west on I-275 at North Boulevard;
- a fully directional interchange for the I-4/I-275 connection;
- removal of the existing ramps to and from the north at Floribraska Avenue;
- a full interchange at Dr. MLK, Jr. Boulevard;
- reconfiguration of the split interchange at Columbus Drive and 50th Street;
- removal of the interchange ramps at 40th Street;
- a new directional freeway-to-freeway interchange with the proposed I-4/Selmon Connector on I-4 near 31st Street; and

- a new Ybor City/east side CBD split interchange on I-4 at N 14th Street and N 15th Street (with extension of the ramps at N 14th Streets and N 15th Streets as parallel frontage roads to 21st and 22nd Streets to replace the existing access from I-4 to these streets).

Other new non-interstate improvements include the following:

- the removal of the 19th Street overpass and the maintenance of the 26th Street overpass;
- the extension of Sherrill Street from Memorial Highway (SR 60) and Kennedy Boulevard under I-275 to Cypress Street;
- the extension of Trask Street under I-275;
- a Lemon Street Connector to Westshore Boulevard from Occident Street;
- park-n-ride lots to provide access to HOV lanes located at the Florida State Fairgrounds, Yukon Street, Sinclair Hills Road, and SR 56;
- overpass width to accommodate pedestrian and bicycle facilities on cross street; and
- a multi-modal terminal/parking garage at the northern end of the Marion Street.

The TIS FEIS Long-Term Preferred Alternative has been reevaluated numerous times throughout the past 20 years as the various segments of interstate have been constructed. Therefore, this alternative consists of the original impacts, as updated by the approved re-evaluations.

3.3 2018 Express Lane Alternative

Improvements identified for the segments that will be evaluated in the TIS SEIS include major components of the 1996 TIS FEIS Long-Term Preferred Alternative. There are areas where the design has changed in alignment and configuration. The TIS segments that will be evaluated in the SEIS and the design differences from the 1996 TIS FEIS Long-Term Preferred Alternative are described in the following sections.

1A – I-275 from Howard Frankland Bridge/Kennedy Boulevard ramps and just north of Cypress Street on Memorial Highway (SR 60) to East of Himes Avenue: The general use lanes (outer roadways) in this section were included in the 1996 TIS FEIS and approved by the 1999 ROD. The design changes would involve the use of express lanes and access changes between general use and express lanes, expansion of I-275 from HFB to south of SR 60 to accommodate express lanes along I-275, and local street changes, including relocation of Lemon Street, the extension of Occident Street, modified Trask Street ramp connections, replacement of Executive Drive to the southbound I-275 ramp connection, and extension of Sherrill Street with a new I-275 Reo Street interchange that would provide a connection between Kennedy Boulevard, Reo Street, and I-275. Additional ROW would be needed to accommodate express lanes near the SR 60 interchange to and from I-275, a new toll ramp into TIA, the addition of general use lanes west of Westshore Boulevard, and expansion of the corridor for future transit use west of SR 60.

2A – I-275 from East of Himes Avenue to East of Rome Avenue: The general use and express lanes in this section were included in the 1996 TIS FEIS and approved in the 1997 and 1999 ROD. The outer

roadway (general use lanes) has already been constructed with I-275 improvements. The work in this section includes adding express lanes in the median. Himes Avenue would include direct connect express lane ramps constructed within the I-275 median area, tying into Himes Avenue between the northbound and southbound I-275 bridges. Left turns from northbound and southbound Himes Avenue to the express lane ramps would be prohibited. Construction would include the widening of the I-275 bridges over Himes Avenue, toward the median, with pavement widening, median modifications and sidewalk construction along Himes Avenue. These interchange modifications would not require additional ROW and the existing northbound I-275 general use on-ramp and the existing southbound I-275 general use off-ramp would remain in place.

2B – I-275 from East of Rome Avenue to North of Dr. MLK, Jr. Boulevard and I-4 from I-275 to East of 15th Street: Operational improvements at the I-275/I-4 interchange were included in the 1996 TIS FEIS. The design changes include express lanes, changes in access to express lanes, which include adding a direct connection to the downtown local street network and slip ramp access north and east of downtown, adding overpasses at several locations to open cross-connections of local streets through the interstate footprint, and additional ROW acquisition involving vacant or undeveloped portions of land at a few pinch-points. This section is adjacent to several historic districts and primarily residential areas.

3A – I-4 from East of 15th Street to East of 34th Street: The general use and express lanes in this section were included in the 1996 TIS FEIS. The outer roadway (general use lanes) has already been constructed from 21st Street to 34th Street. The design changes involve express lanes, changes in access to express lanes, which include slip ramp access east of downtown, and ramp access change with I-4 interchanges at N 14th Street/ N 15th Street and N 21st Street/ N 22nd Street. Land uses adjacent to this section include historic districts and a mix of residential and commercial areas such as Ybor City and East Tampa.

3B – I-4 from East of 34th Street to East of 50th Street: The general use lanes in this section were included in the 1996 TIS FEIS. The outer roadway (general use lanes) has already been constructed from 34th Street to 50th Street. Work in this section would include adding express lanes in the median and adjustments in access between express and general lanes. This would require the mainline and eastbound entrance ramp to shift south of the existing ROW within the limits of the ramp.

3C – I-4/Lee Roy Selmon Expressway Interchange: These improvements were fully constructed in 2014 and are not a part of the SEIS.

3.4 Design Options for the 2018 Express Lane Alternative

Four express lane interchange design options are being considered for the Downtown Interchange in Segment 2B.

- **Options A and B - Reconstructed Interchange -** The proposed improvements under Options A and B would include:
    - Reconstruction of the I-4/I-275 interchange to enhance the design speed along the current substandard ramps.
    - Reconstruction of I-275 mainline to eliminate the horizontal/vertical curves that cause vehicles to slow down through the I-4 interchange.
    - Construction of express lanes along I-275, terminating in the vicinity of SR 574, with direct connection to I-4 and to Tampa Heights.
    - Addition of direct express lane connection to/from the Downtown area with ramp connections at Tampa Street and Morgan Street.
    - Addition of overpasses at several locations to open cross-connections of local streets through the interstate footprint, and additional ROW acquisition involving vacant or undeveloped portions of land at pinch-points.
    - Reconstruction of the Orange/Jefferson interchange to improve safety by further discouraging wrong-way driving crashes.
    - This section is adjacent to several historic districts and primarily residential areas. Both Options A and B improve access to/from Ybor City and Tampa Heights through reconfiguration of the N 21st /22nd Street interchange and addition of a ramp connection at N 13th /14th Street.

The differences between Options A and B are as follows:

- **Option A - Reconstructed Interchange with Express Lanes to the North:** Option A includes express lanes along the north leg of I-275 with direct connections to I-275 and I-4. Direct express lane connection from I-275 north to/from I-4 east alleviates the weave condition along I-4 between I-275 and Selmon Connector in both travel directions.

- **Option B - Reconstructed Interchange without Express Lanes to the North:** Option B does not include express lanes along the north leg of I-275 and does not include direct connections from the express lanes to the north leg of I-275. Access to and from I-275 north would be provided through slip ramps. This option does not address the weave condition along I-4 between I-275 and Selmon Connector.

- **Options C and D - Existing Interchange with Elevated Express Lanes (viaduct) -** Proposed improvements under Options C and D would include retaining the existing I-275 and I-4

interchange while adding express lanes on elevated structure from west of the Hillsborough River to I-4. Access would be provided to the downtown street grid from the elevated express lanes. However, like the 1996 Long-Term Preferred Alternative, there would be no access to Floribraska Avenue since the ramps would be eliminated. Other improvements include providing two-lane ramps for connections to I-4 and the north leg of I-275 and direct express lane connections from I-275 north to/from I-4 east which alleviates the weave condition along I-4 between I-275 and the Selmon Connector in the eastbound direction only. This would be accomplished by removing the ramp along eastbound I-4, currently serving only N 21st/22nd Street and providing separate exits from northbound I-275 and southbound I-275.

The exit from northbound I-275 would be located between Palm Avenue and Nebraska Avenue while the exit from southbound I-275 would be located off the two-lane flyover to eastbound I-4. Those two separate ramps would then combine along the south side of the eastbound I-4 mainline east of Nebraska Avenue and would tie into N 14th/15th Street, providing a new access point that would serve both the N 14th/15th Street and N21st/22nd Street interchanges. The ramp would align with the eastbound frontage road that currently connects N 14th/15th Street and N 21st/22nd Street. The frontage road would be widened to two lanes to facilitate traffic to N 21st/22nd Street. The differences between Options C and D are as follows:

- **Option C - Existing Interchange with Elevated Express Lanes – South Side of I-275:** Under Option C, the elevated express lanes would fly out from the median of I-275 west of the Hillsborough River over the northbound I-275 lanes to the outside of the existing interstate and run adjacent to the existing northbound I-275 lanes from the Hillsborough River to I-4, on the south side of I-275. The elevated express lanes would turn east along I-4 by crossing over to the north side of I-4, adjacent to the westbound I-4 lanes from I-275 to east of N 15th Street. The elevated express lanes would then fly over the westbound I-4 lanes back into the median of I-4 just west of N 21st Street.

- **Option D - Existing Interchange with Elevated Express Lanes – North Side of I-275:** Under Option D, the elevated express lanes would fly out from the median of I-275 west of the Hillsborough River over the southbound I-275 lanes to the outside of the existing interstate and run adjacent to the existing southbound I-275 lanes from the Hillsborough River to I-4, on the north side of I-275. The elevated express lanes would turn east along I-4, adjacent to the westbound I-4 lanes from I-275 to east of 15th Street. The elevated express lanes would then fly over the westbound I-4 lanes back into the median of I-4 just west of 21st Street.

- **Option E – Capacity and Safety Improvements for Southbound to Eastbound, Westbound to Northbound, and Westbound to Southbound:** The proposed improvement under Option E would include:

  - I-275 northbound and southbound express lanes end prior to the Tampa Street/Ashley Drive on/off ramp. Access to and from I-275 north would be provided through slip ramps.

- **Southbound I-275 to Eastbound I-4** - The southbound I-275 to eastbound I-4 improvements include widening the existing flyover ramp to two lanes. New signage located near Hillsborough Avenue would inform drivers that they can remain in the outermost lane to access the dual lane flyover ramp to I-4. The existing auxiliary lane that begins at the entrance ramp from Dr. MLK, Jr. Boulevard still would also provide drivers access to the I-4 flyover ramp without changing lanes. The existing exit ramp to Floribraska Avenue would remain.

  The improvements would include relocating the exit ramp to Ybor City and East Tampa from the existing location at N 21st/22nd Street to N 14th/15th Street. The relocated exit ramp would provide enhanced access to businesses, educational institutions, and residential areas. Drivers would still access N 21st/22nd Street via widening the existing single-lane frontage road, East 13th Avenue, to two lanes.

- **Westbound I-4 to Northbound I-275 -** The westbound I-4 to northbound I-275 operational improvement would include widening the existing exit to northbound I-275. Westbound I-4 would be widened beginning at the westbound on-ramp from 21st Street and continuing to northbound I-275, providing for a widened two-lane exit to north I-275.

  The additional widened lane would continue north along I-275 to provide five lanes from I-4 to the Floribraska Avenue on-ramp. Between the Floribraska Avenue on-ramp and the Dr. MLK, Jr. Boulevard exit ramp, a sixth auxiliary lane would be added connecting the existing Floribraska Avenue on-ramp to the Dr. MLK, Jr. Boulevard exit ramp. The existing single-lane exit ramp to Dr. MLK, Jr. Boulevard will be widened to two lanes. From the exit ramp to Dr. MLK, Jr. Boulevard north, the five lanes would continue and then reduce to four lanes prior to the on-ramp from Dr. MLK, Jr. Boulevard and continuing to Hillsborough Avenue. The on-ramp from Dr. MLK, Jr. Boulevard would merge prior to Osborne Avenue. Drivers in the innermost lane from the ramp to I-275 northbound would be able to continue in this lane to Hillsborough Avenue.

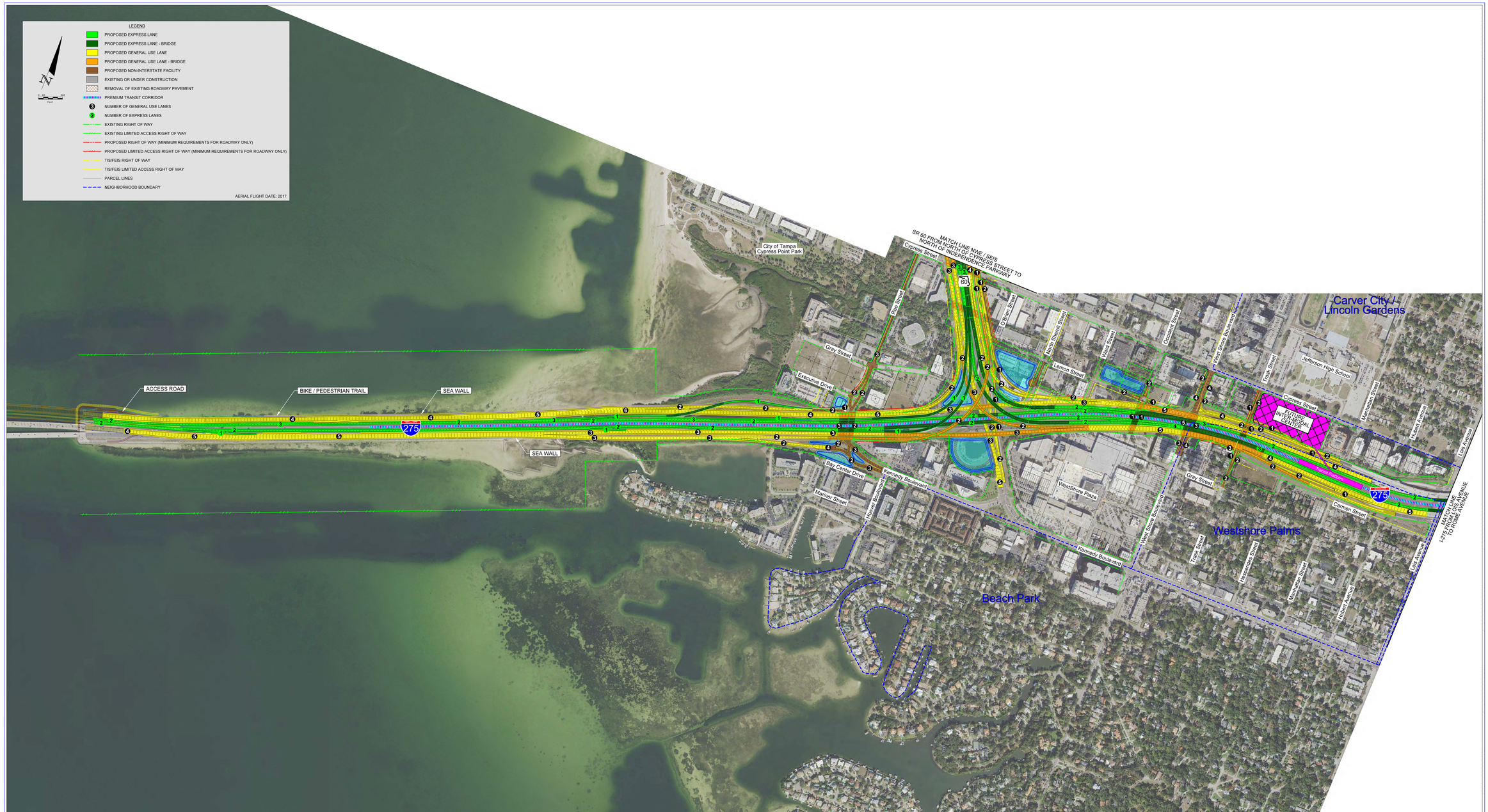
- **Westbound I-4 to Southbound I-275 -** The westbound I-4 to southbound I-275 operational improvements would include widening the southbound I-275 ramp from two lanes to three lanes. The three lanes would join the two lanes from southbound I-275 to provide five lanes. The five lanes would then merge to four lanes near Jefferson Street. The exit ramps to Downtown Tampa would be adjusted to improve spacing so drivers can safely exit to downtown. The exit ramps would still serve Orange Avenue, Jefferson Street, Ashley Drive, and Doyle Carlton Drive. The improvements would remove the existing ramp bridge structure over I-275 as part of the ramp relocations. The existing shoulders would be widened on I-275 from Palm Avenue to Jefferson Street.

Figure 3-1 through Figure 3-9 shows the No Further Action (NFA) and Build geometry within the study area.

FDOT

No Further Action (NFA) Alternative

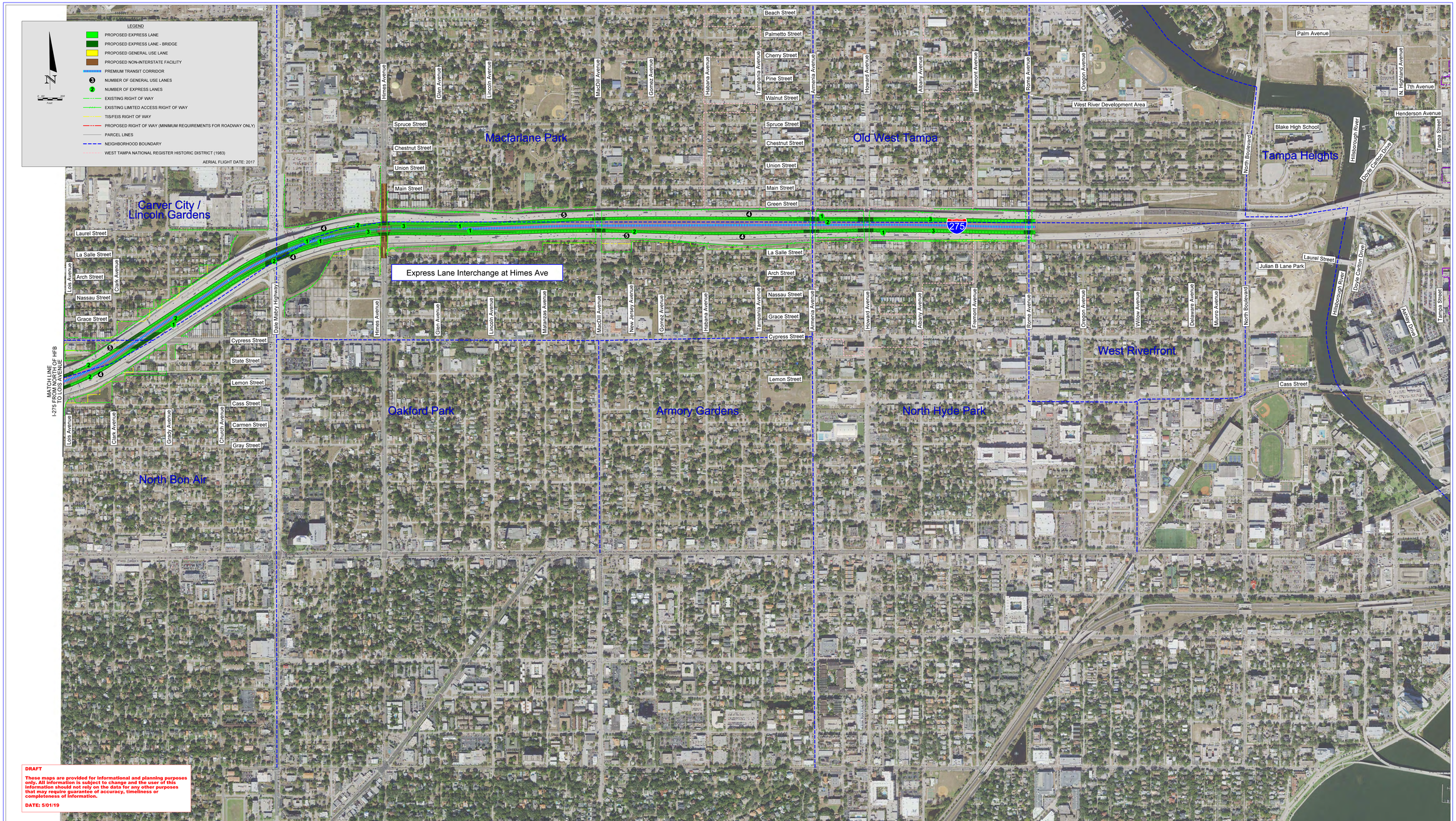
Figure 3-1



FDOT

BUILD GEOMETRY: SECTION 4- I-275 FROM NORTH OF HFB TO LOIS AVENUE

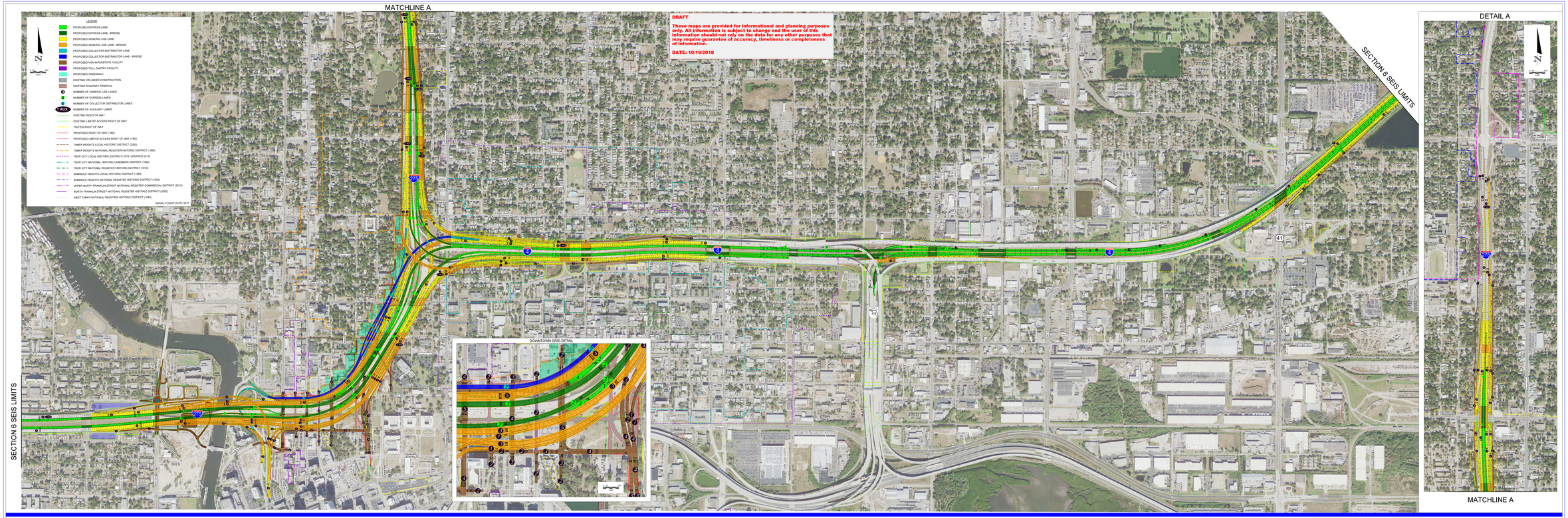
Figure 3-2



BUILD GEOMETRY: SECTION 5- I-275 FROM FROM LOIS AVENUE TO ROME AVENUE

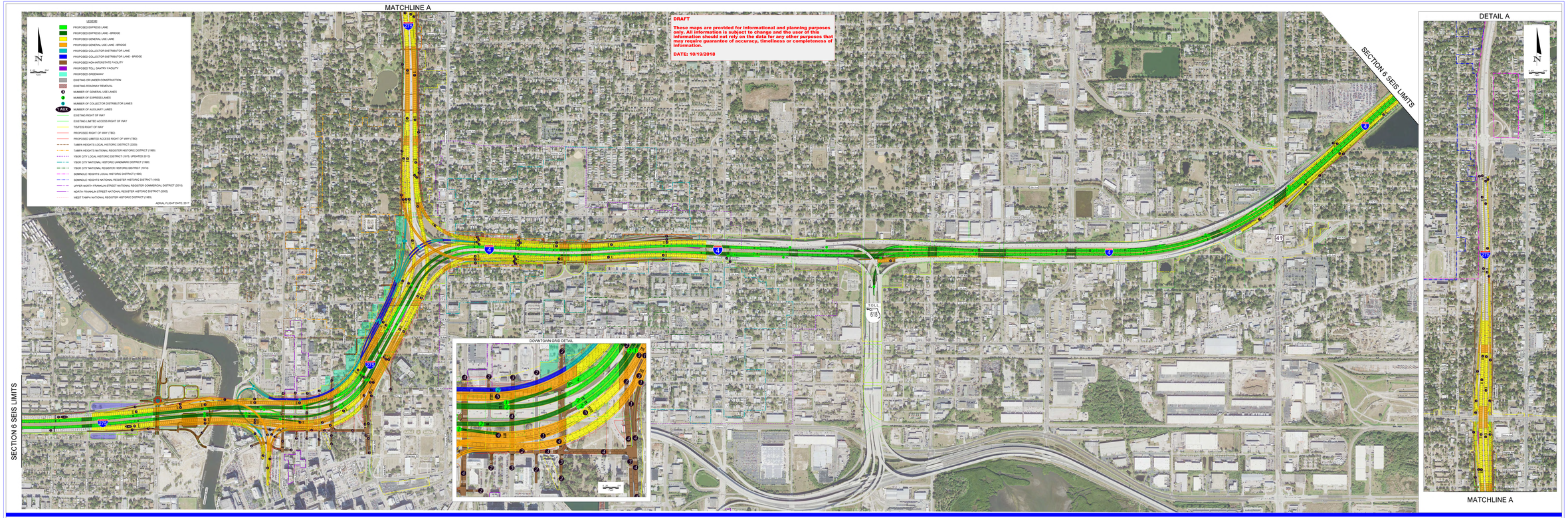
Figure: 3-3

WPI # 258337-2



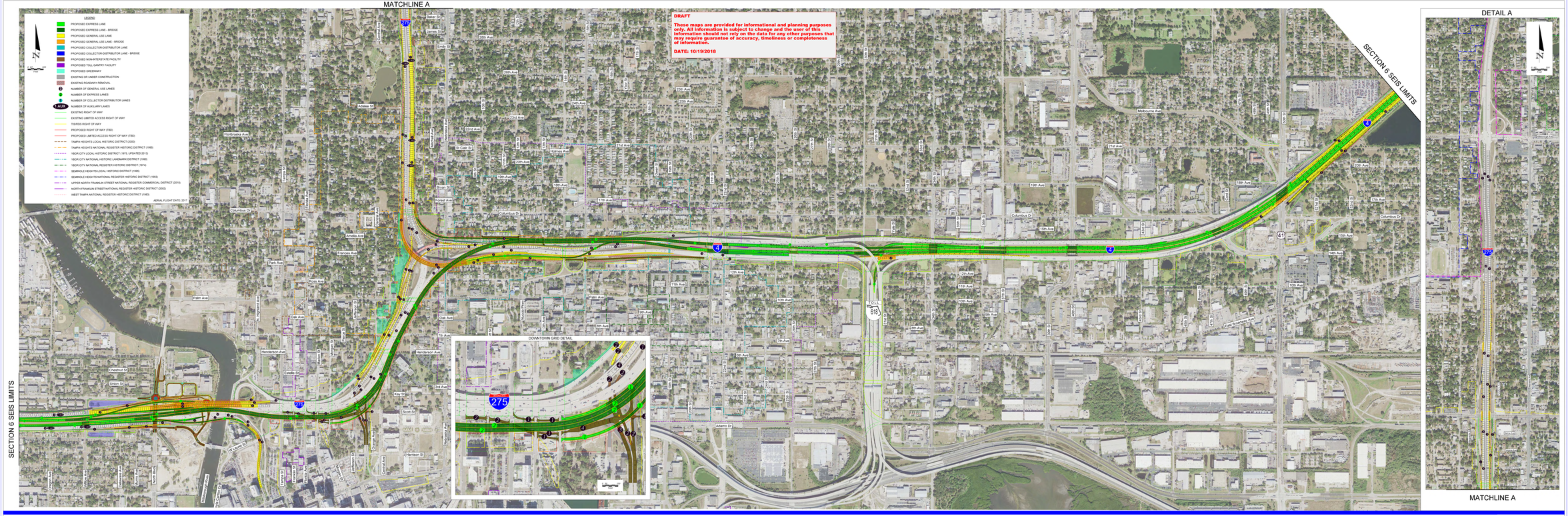
OPTION A: RECONSTRUCTED INTERCHANGE WITH EXPRESS LANE RAMPS TO THE NORTH

Figure 3-4



OPTION B: RECONSTRUCTED INTERCHANGE WITHOUT EXPRESS LANE RAMPS TO THE NORTH

Figure 3-5

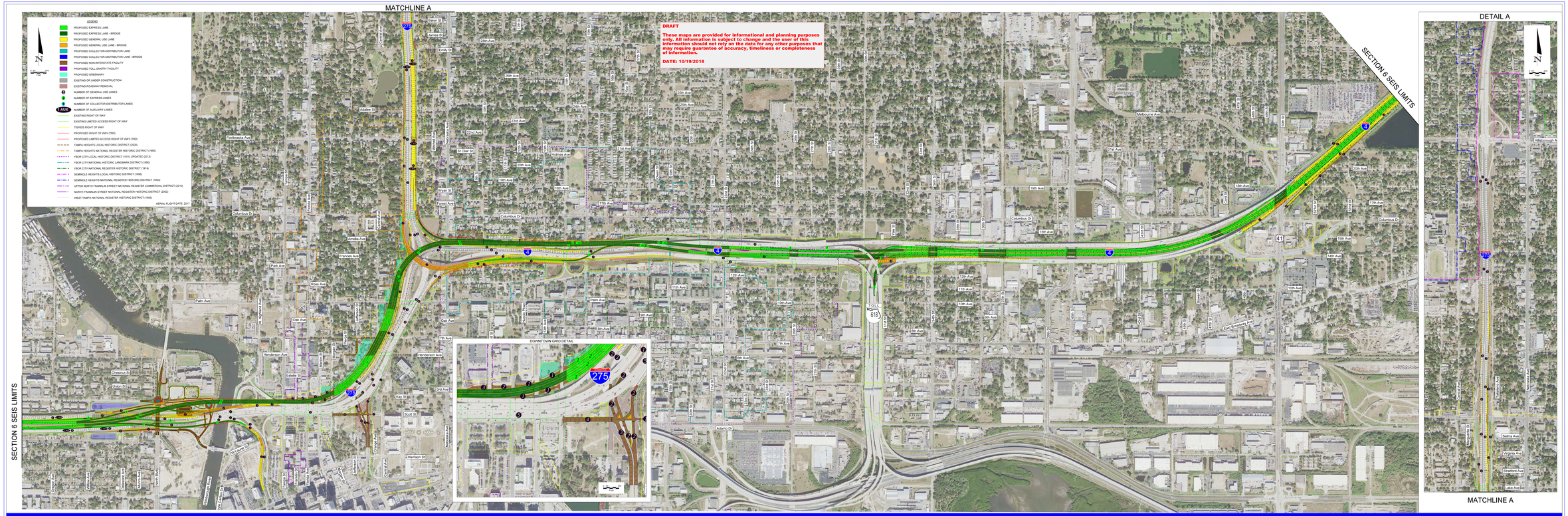


FDOT

OPTION C: EXISTING INTERCHANGE WITH ELEVATED EXPRESS LANES SOUTH OPTION

Figure 3-6

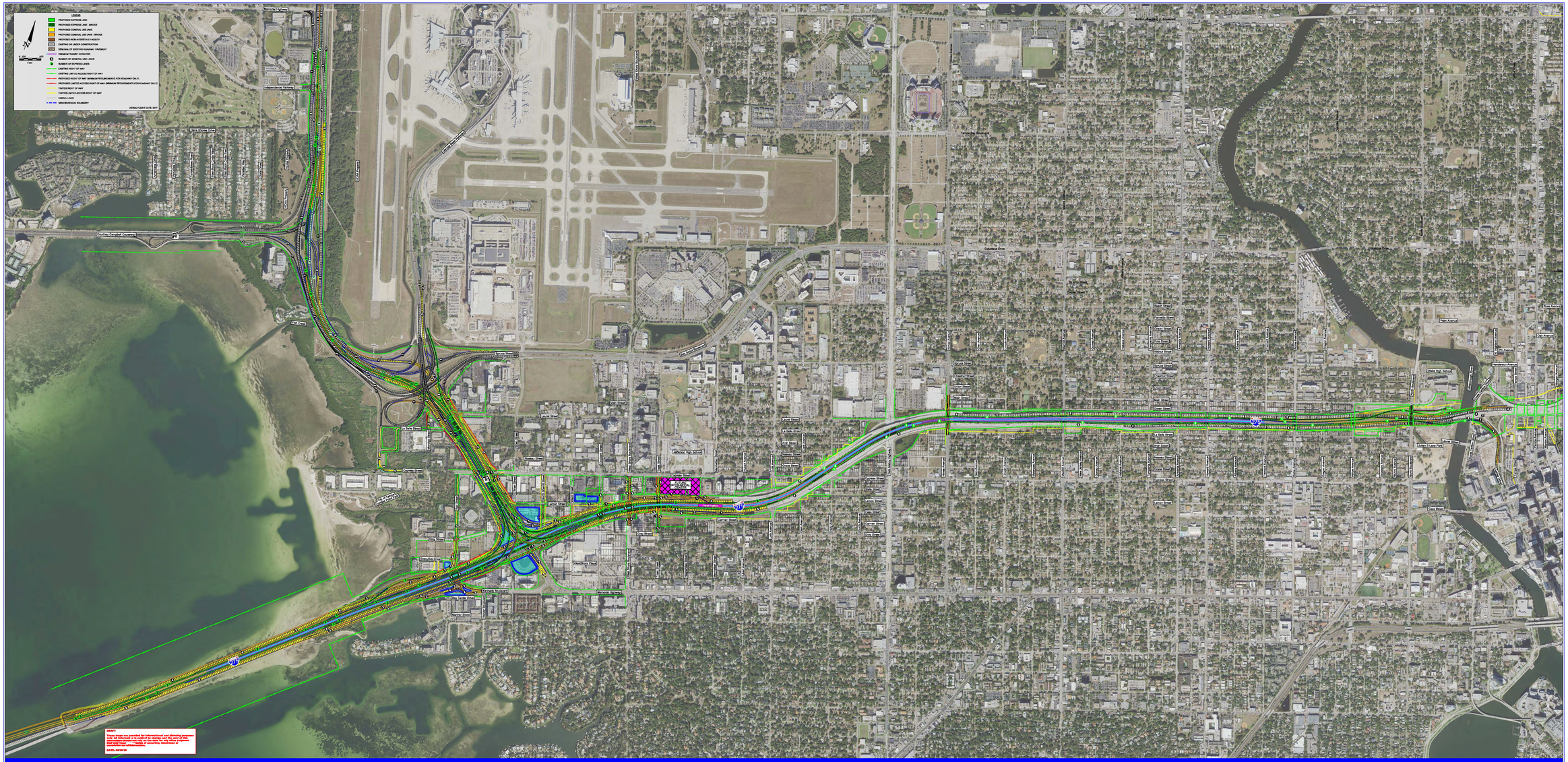
WPI # 258337-2



FDOT

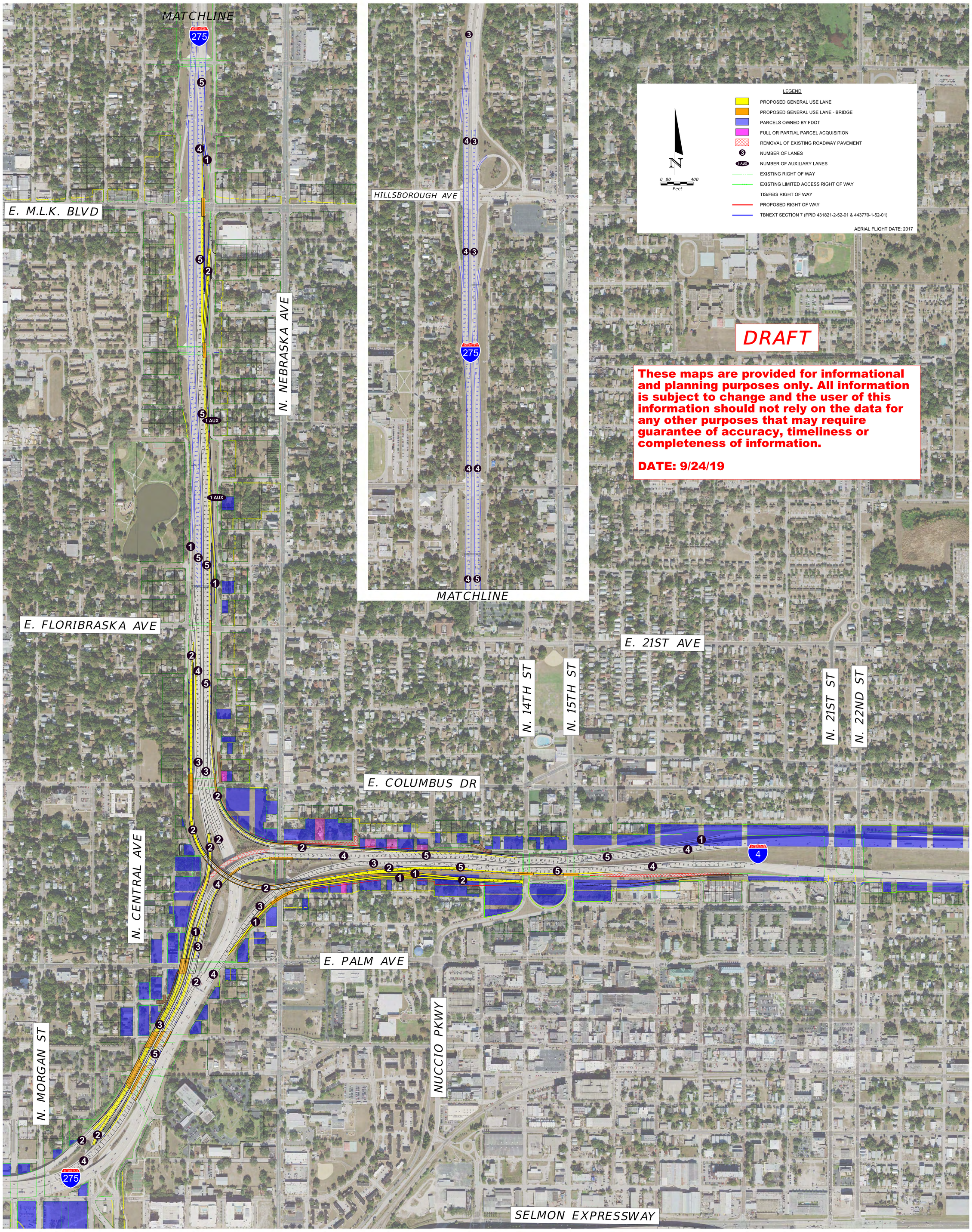
OPTION D: EXISTING INTERCHANGE WITH ELEVATED EXPRESS LANES NORTH OPTION

Figure 3-7



BUILD GEOMETRY: SECTION 5 - NORTH OF HOWARD FRANKLAND BRIDGE TO ASHLEY DRIVE/TAMPA STREET

Figure 3-8



TAMPA BAY NEXT THE FUTURE OF TRANSPORTATION

DTI OPERATIONAL IMPROVEMENT PROJECTS

FDOT

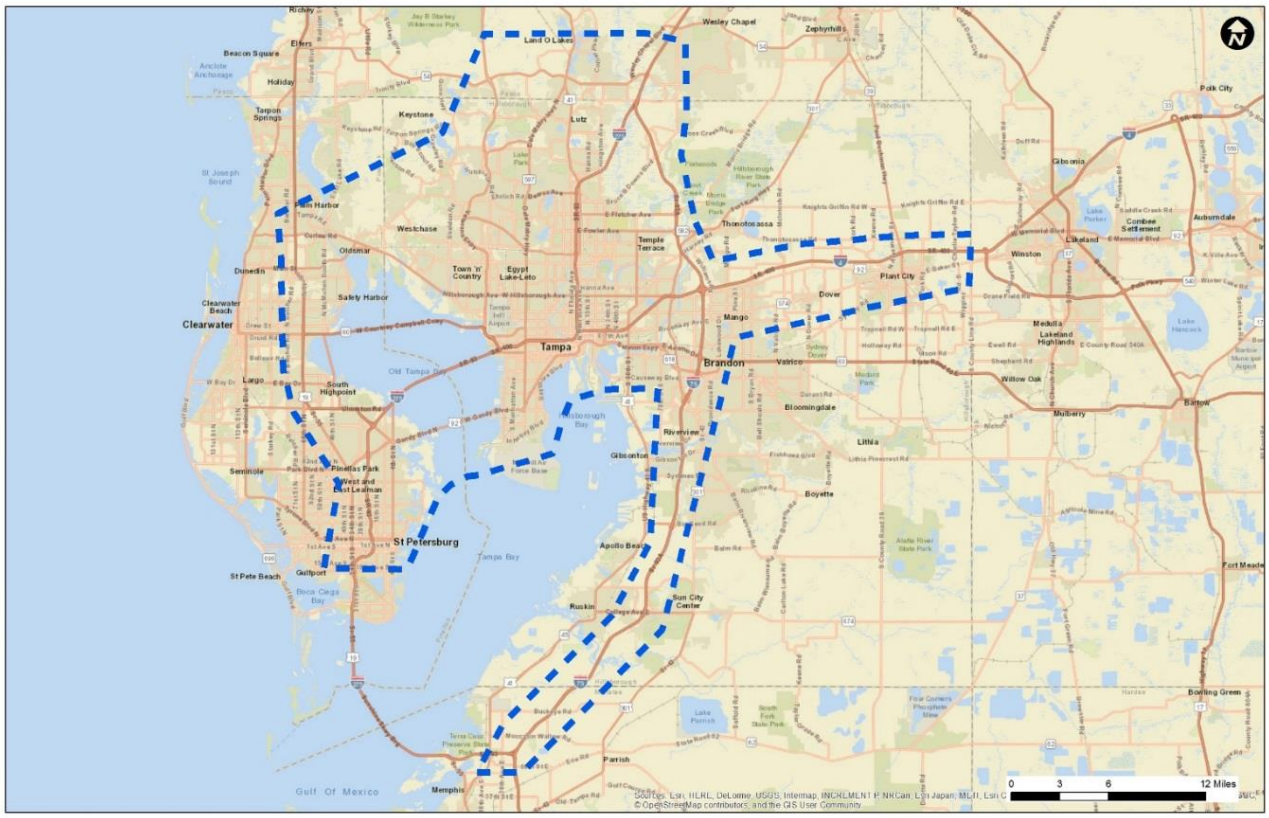
BUILD GEOMETRY (SECTION 6) - OPTION E

Figure 3-9

3.5 Future Year Volume Forecasting – NFA Demand Volumes

The Base Year (2010) model was validated at a regional level to ensure that the model is replicating the counts within the study area. A subarea model network was extracted from the validated regional model to further calibrate the traffic volumes and subarea trip tables. **Figure 3-10** provides the extracted network from the 2010 Base Year regional network. The subarea network and trip tables, along with the traffic counts provided input for the Origin-Destination Matrix Estimation (ODME) process. Necessary adjustments have been made to the model input including hourly capacity and free flow speed adjustments. **Table 3-1** represents a summary of the adjustments made to the sub-area input network. The details of the adjustment process are documented in 2.2.1.2 *and Section 3.3 of the TBRPM v8.1 2010 Base Year Sub-Area Model Calibration for TBNEXT Projects, May 2018*. The documentation is provided in **Appendix M.**

Figure 3-10 Subarea Model Coverage Area



The ODME process helped to refine the subarea and corridor level travel demand. The 2010 Base Year volumes correspond well to observed data and the majority of the mainline volumes are within the targeted ranges. It provided a good base year model for future year travel demand forecasts.

Table 3-1 Sub-Area Model Adjustments

Corridor	Segment	Model Inputs	Original Model	Adjusted in Sub-Area Model
I-275	From US 92 to I-4	Hourly Capacity (vehicle per hour per lane)	2,300-2,400	2,000-2,100
I-4	From I-275 to N 54th St	Hourly Capacity (vehicle per hour per lane)	2,300-2,400	2,000-2,100
I-275	From US 92 to I-4	Free Flow Speed (miles per hour)	50	55
I-4	From I-275 to N 54th St	Hourly Capacity (vehicle per hour per lane)	2,300-2,400	2,000-2,100
		Free Flow Speed (miles per hour)	50	55
I-75	From E Fletcher Ave to I-4	Free Flow Speed (miles per hour)	50	55

Table 3-2 provides a summary of the Percent Root Mean Square Error (RMSE) for all the 2010 traffic count locations within the sub area, from the model outputs before and after the ODME process. The percent RMSE is a measure of the average deviation between the actual counts and model assigned volumes. It is one of the indicators to illustrate how closely the model volumes match the observed traffic counts. Details on the subarea ODME process has been documented in Section 3.4 of the *TBRPM v8.1 2010 Base Year Sub-Area Model Calibration for TBNEXT Projects, May 2018*, including the following additional measures:

- 2010 Base Year Sub Area Model Volume to Count Comparison by Volume Groups
- 2010 Base Year Sub Area Model Volume to Count Comparison for Freeway Segments
- 2010 Base Year Sub Area Model Volume to Count Comparison for Ramps
- 2010 Base Year Sub Area Model Volume to Count Comparison for All Traffic Count Locations

Table 3-2 2010 Base Year Sub-Area Model Volume Group Percent RMSE

Volume Group	Number of Count Locations	% RMSE (Pre ODME)	% RMSE (Post ODME)
<5,000	193	115%	105%
5,000-10,000	260	64%	56%
10,000-20,000	275	40%	39%
20,000-30,000	118	28%	28%
30,000-40,000	105	23%	23%
40,000-50,000	68	21%	20%
>50,000	147	12%	10%
Total	**1,166**	**27%**	**24%**

The base year calibration efforts were carried over to 2025 and 2045 NFA TBPRM and subarea ODME models. The models provide Peak Season Weekly Average Daily Traffic (PSWADT) volumes for the next steps. MOCFs are applied to convert PSWADT to AADTs for Base Year 2010, Future Year 2025 and 2045. The NCHRP report 765 recommended "Factoring Procedure-Difference Method" approach was utilized to correct the error associated with regional model projected volumes. Following this procedure, the existing year 2018 AADTs were interpolated from base year and future year TBRPM models. These values were compared to existing traffic count (year 2018 count data) and the difference (delta) was calculated. This delta was applied to the future year 2025 and 2045 TBRPM model AADT values to correct the error in the model and to make sure growth rates are reasonable. The delta adjusted year 2025 and 2045 AADTs were balanced along the mainline by matching the AADT near Section 7 overlap and using the TBRPM model ramps AADTs within SEIS limits.

After the AADTs were established, the K- and D-factors recommended for the project were applied to the ramps to calculate the demand on each ramp in the AM and PM peak according to the existing peak direction. Using the Section 7 match line as a refence point, AM and PM mainline demands were matched to Section 7 mainline demands for year 2025 and 2045 and were balanced with the ramp demands developed above.

At boundary locations along I-4 and I-275 south of SR 60, DDHV targets were estimated based on the AADT, K and D factors for each PM. The ramp volumes were revised to achieve the DDHV targets at the above boundary locations. The ramp terminal intersections were balanced using the on-/off-ramp demand values and existing turn percentages.

3.6 Future Year Volume Forecasting – Build Demand Volumes

The build volumes were developed using the Express Lanes Time of Day (ELToD) v2.3 model for this project. The 2045 ODME subarea models, including input network, refined trip tables, and associated parameters developed in the previous steps, were used as a base to develop the ELToD models. A corridor level input network was extracted from the ODME subarea model as shown in **Figure 3-11**.

ELToD model analysis was performed under the guidance and review of Florida's Turnpike and its consultant. The model was enhanced during the calibration to include 1) additional directional parameters to support the hourly distributions for each corridor/section, and 2) directional parameters for toll segments were identified using the maximum distance.

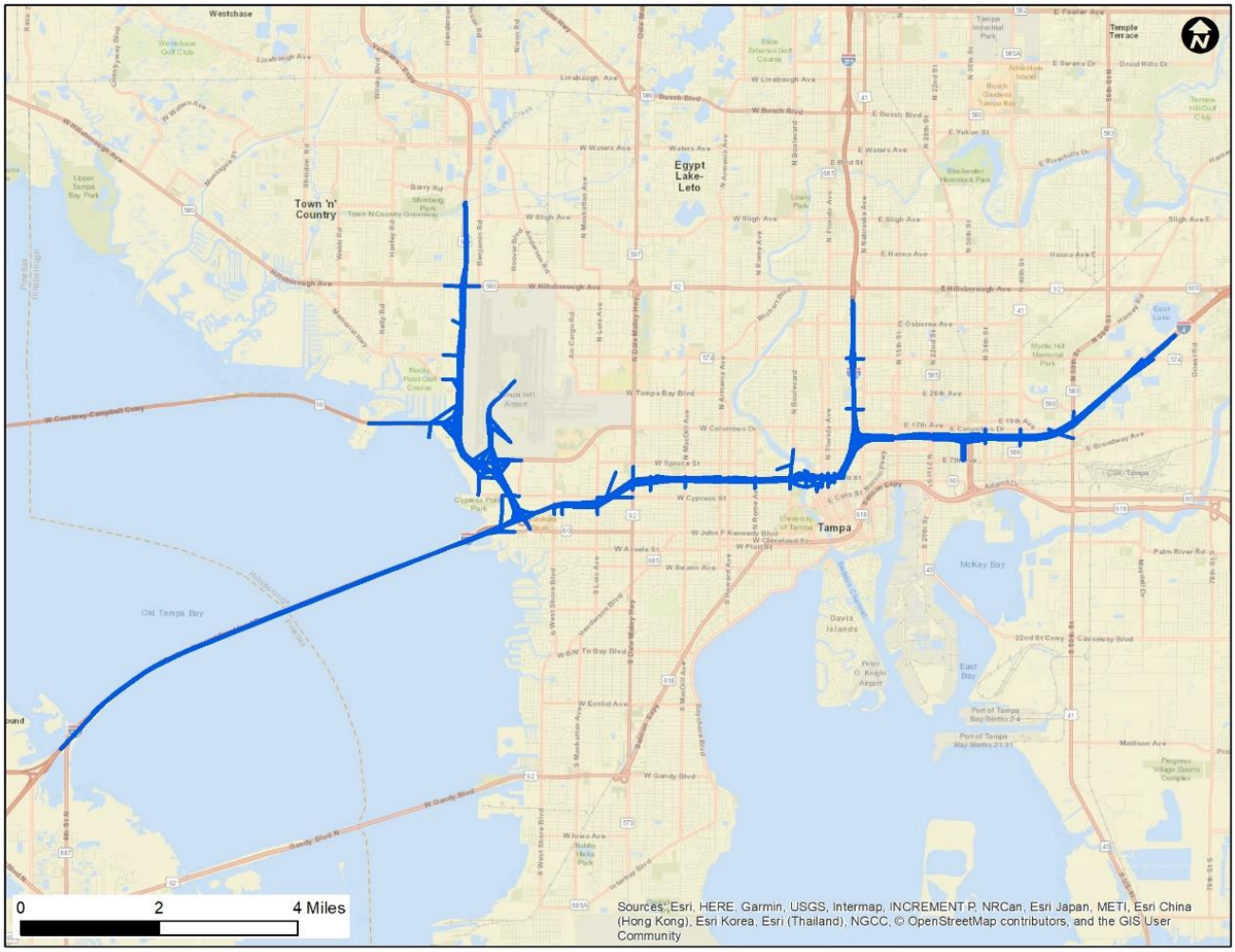
The original ELToDv2.3 model includes a directional link file for the model to assign the hourly percent traffic distribution. The directional link file includes link identifications (link A and B nodes) and four link directions (i.e. north, south, east, or west). This file is used as indicators for the model to assign hourly distribution percentages to each express lane link. For example, if a bi-directional corridor runs from east to west, all the links along the westbound are assigned to a link direction value (i.e. 1) and all eastbound links are assigned to a different link direction value (i.e. 2). Links then will use the corresponding hourly distribution percentages for each direction. The methodology functions well when the study corridors are relatively simple with similar hourly distribution. During development of the ELToD model for this project, it was determined that additional directional indicators should be added due to the complexity of the study network. As indicated in **Figure 3-11**, the ELToD network included two east-west corridors (I-4 from I-275 Interchange to 50th Street and I-275 from south of SR 60 to I-4) and two north-south corridors (SR 60 from Independence Parkway to I-275 and I-275 from I-4 to Hillsborough Ave) with different hourly distribution and travel pattern. Therefore, two additional direction indicators were added to the directional link file as shown in **Appendix A**.

The original ELToD model assigns the hourly distribution for each origin or destination zone by the direction of the first link that directly connects to the zone. This methodology works reasonably for one or two corridors with similar directionality. It was noticed during the model development that this methodology needed to be improved for the project. Especially for the origin and destination zones located within the downtown area where all different corridor segments join. The hourly distribution assignment should be robust enough to consider beyond the first link that connects each zone and include a function that scans the entire corridor links and determines the directions that reflect the distribution of the trips for each zone well. As a result, the ELToD model scripts for hourly distribution assignment were updated using the maximum link distance of each direction.

With the updating on additional directional indicators and assignment of hourly distribution by maximum link distance, the ELToD model was enhanced to model the reasonable directionality of the study network.

ELToD models provide express lanes and general-purpose lanes volume on an hourly basis (Hours 1 through 24) based on the regional models and ODME. Where necessary, express versus general use splits were utilized from the ELToD output from peak hour volumes for Hour 8 and Hour 17 for AM and PM peak hour traffic operational analysis, respectively.

Figure 3-11 ELToD Model Input Network



Figures 3-12 through 3-17 shows the 2025 Opening year DDHV's for the No Further Action, Build Option A, Build Option B, Build Option C, Build Option D and Build Option E.

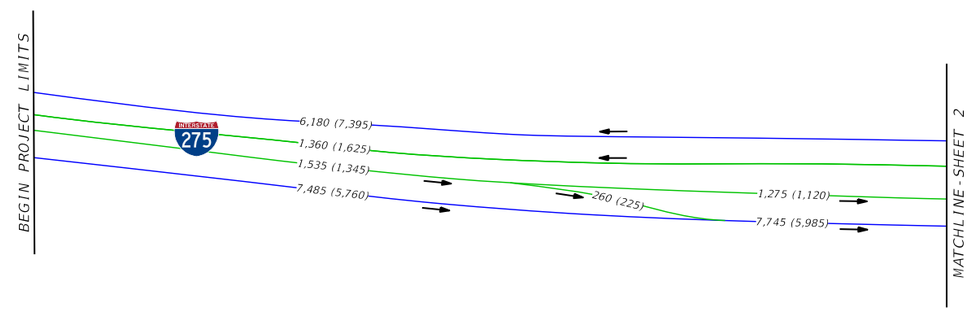
Figures 3-18 through 3-23 shows the 2045 Design year DDHV's for the No Further Action, Build Option A, Build Option B, Build Option C, Build Option D and Build Option E.

Appendix E provides the Existing, 2025 Opening and 2045 Design year No Further Action AADT within the study limits. **Appendix N through R** provides the Option A, Option B, Option C, Option D and Option E AADT for the 2025 Opening and 2045 Design year.

LEGEND

- Signalized Intersection
- Unsignalized Intersection
- XX (XX) AM (PM) Volume
- Express Lanes
- General Use Lanes
- Local Streets/Ramps
- mm (mm) Minimal Volume Movement

NOT TO SCALE

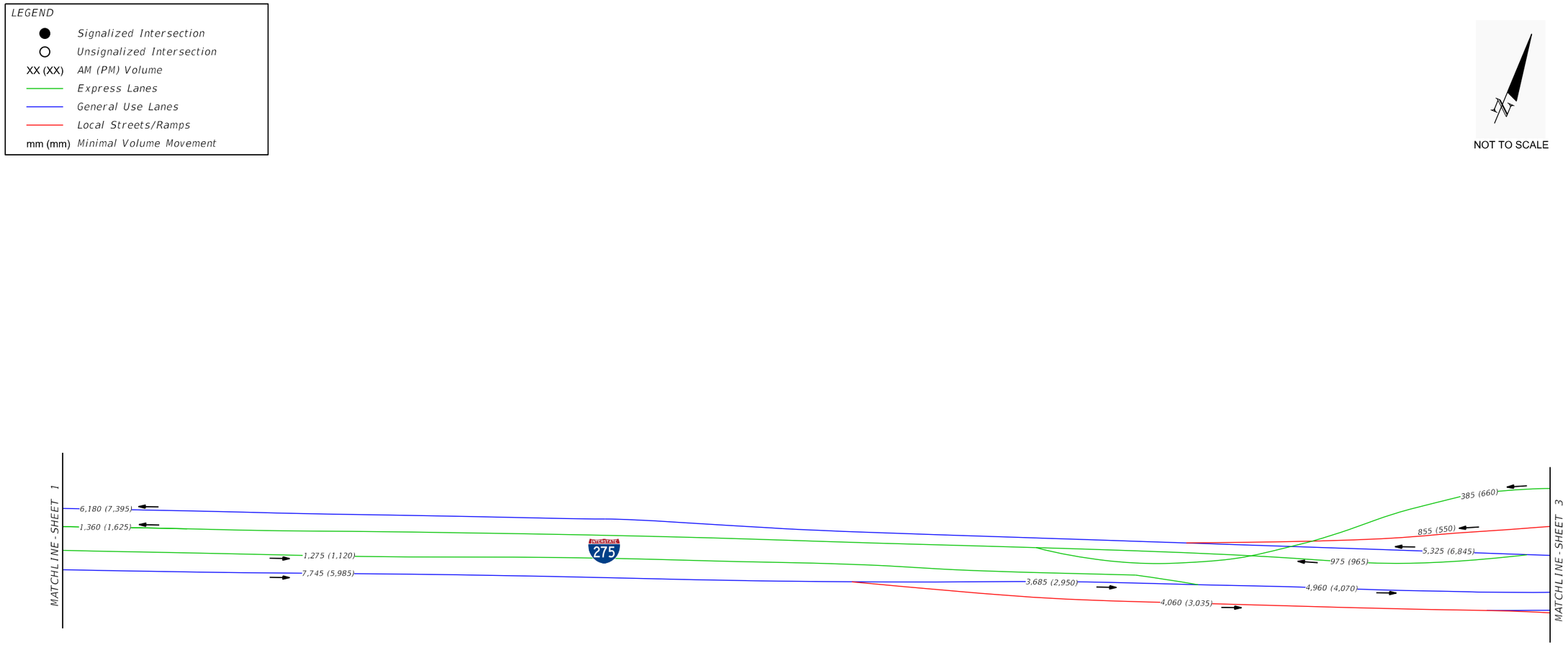


SEIS Re-evaluation
No Further Action (NFA) - Opening Year (2025) - AM & PM DDHVs

Figure 3-12

Sheet 1 of 16

WPI # 258337-2



FDOT

SEIS Re-evaluation
No Further Action (NFA) - Opening Year (2025) - AM & PM DDHVs

Figure 3-12

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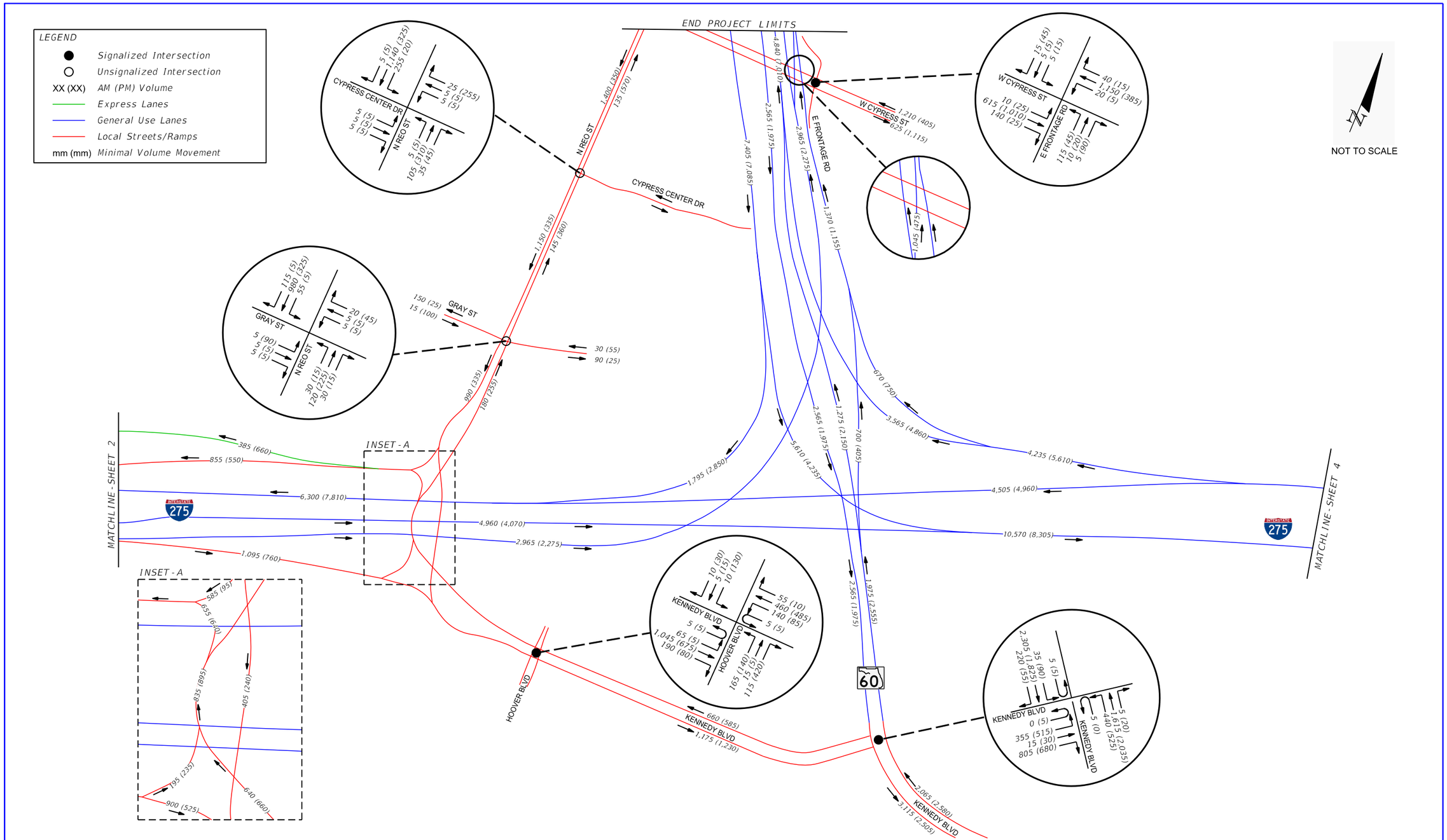
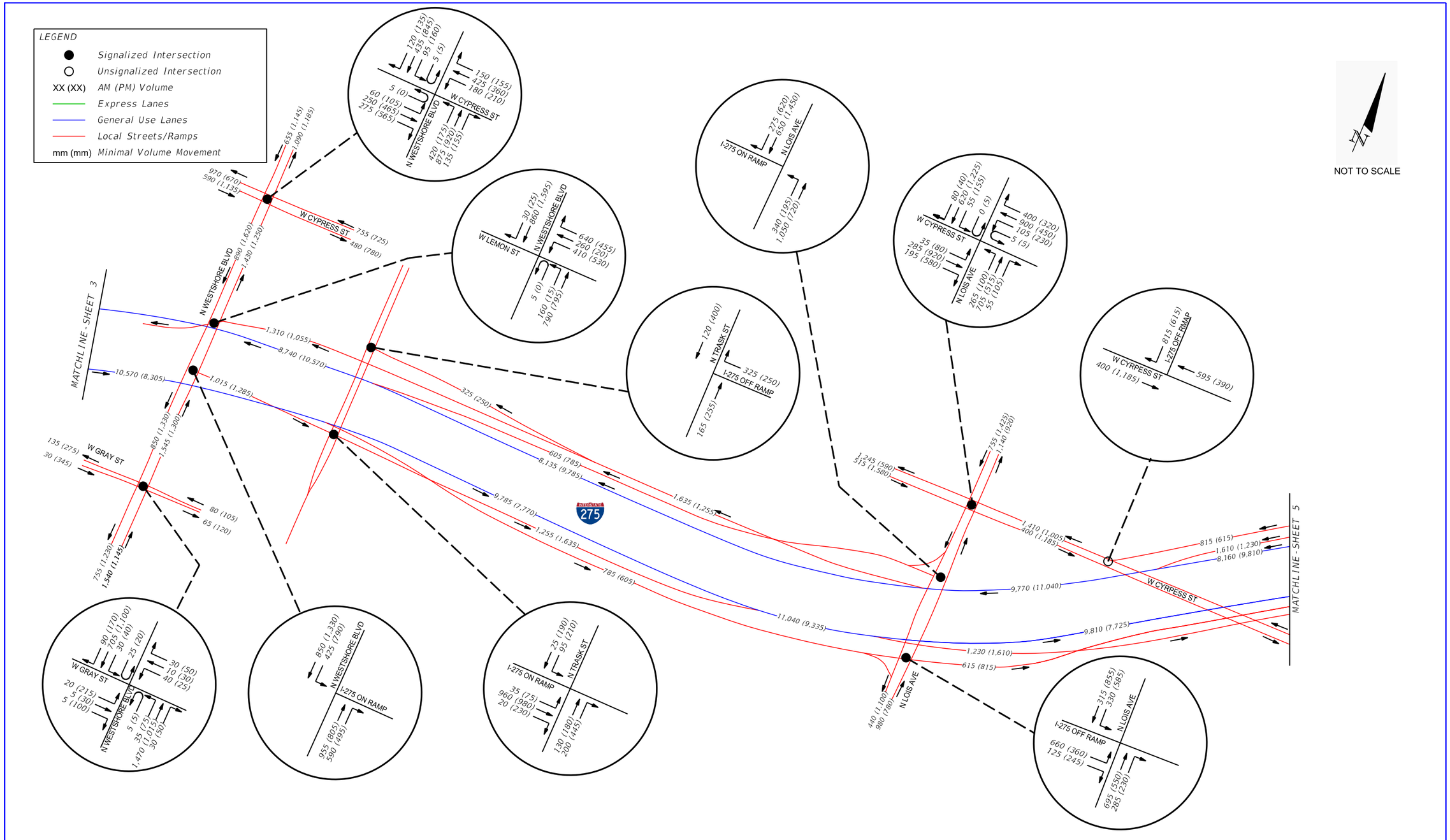
WPI # 258337-2



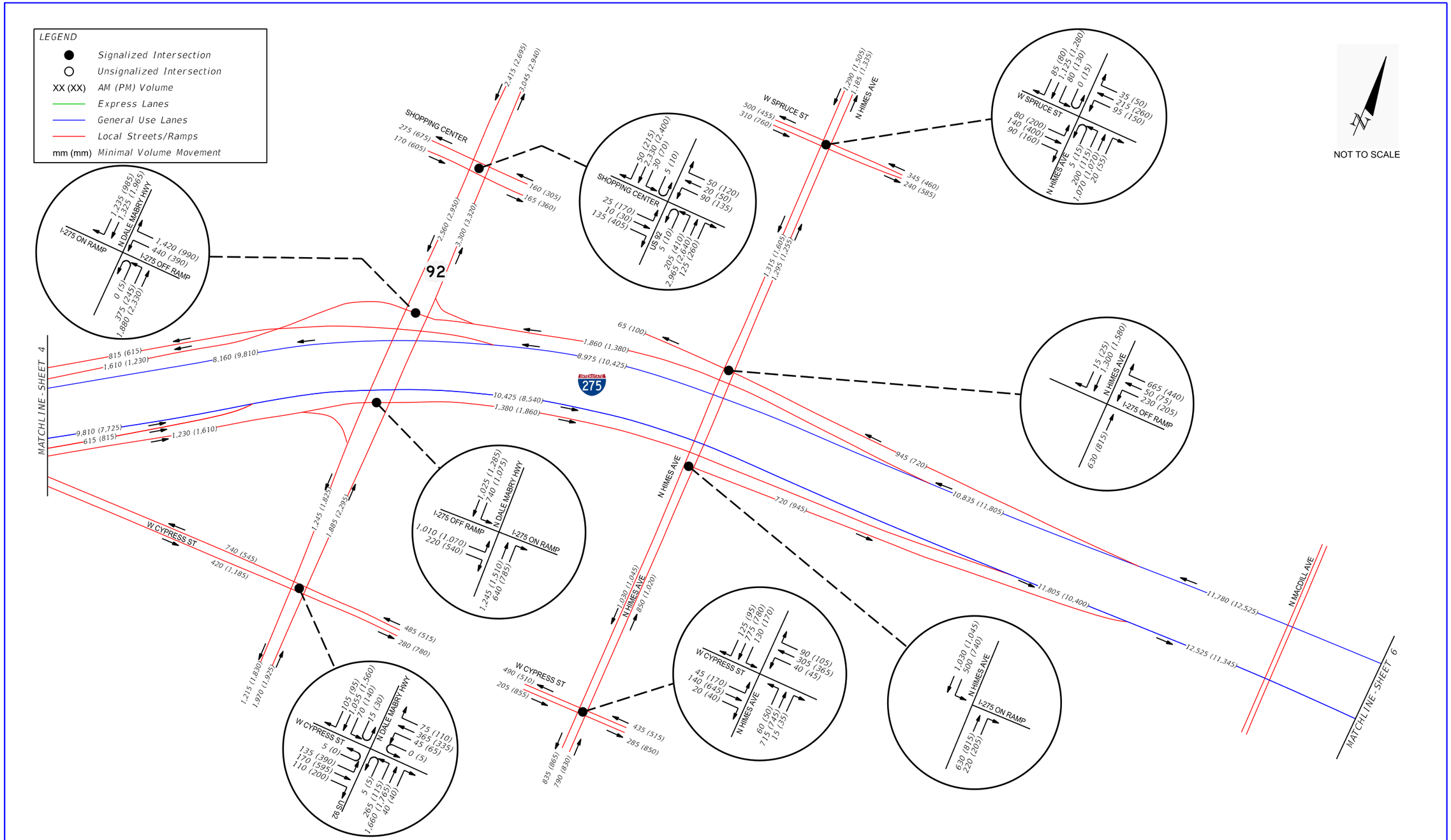
FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 3 of 16

WPI # 258337-2



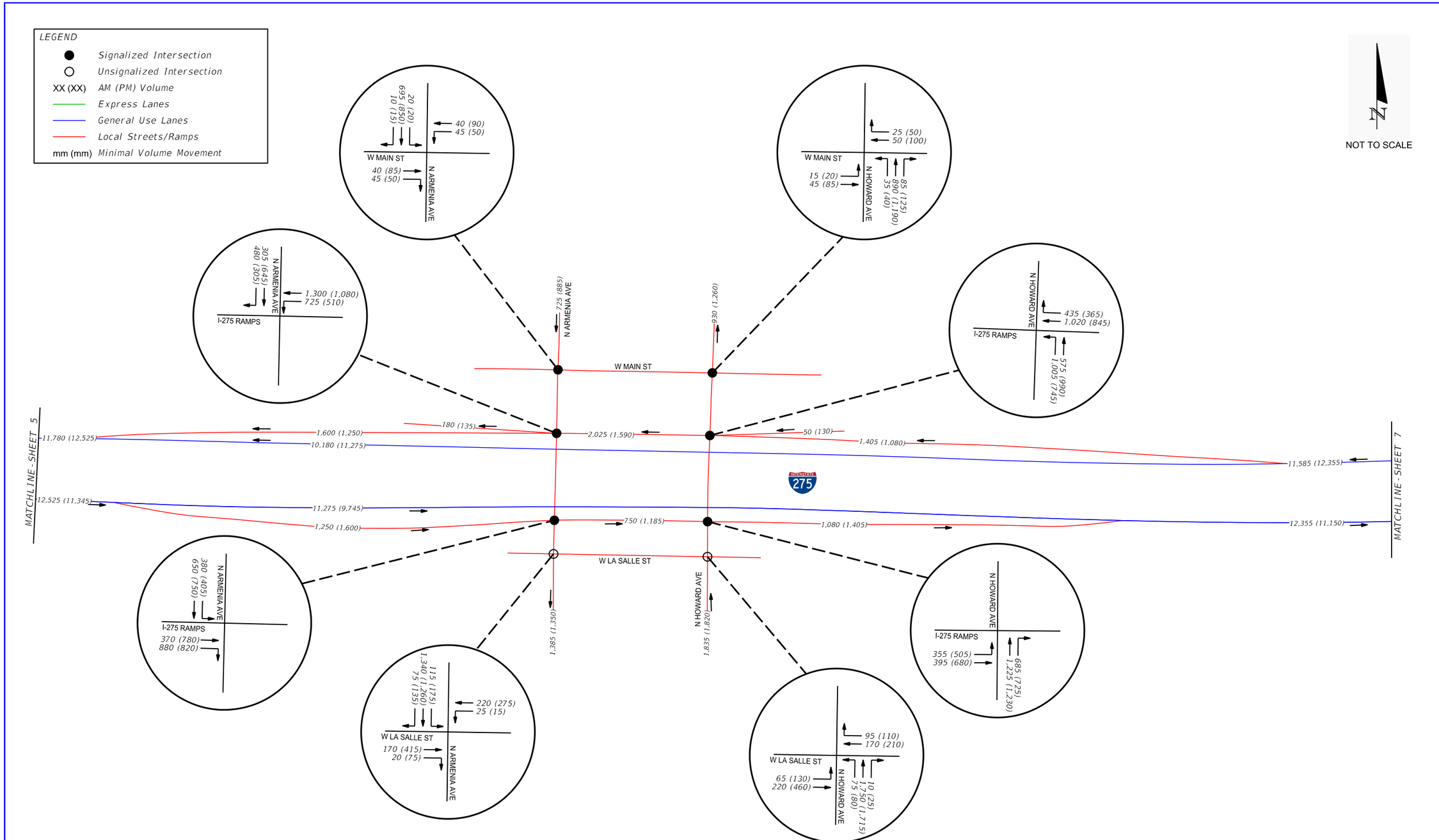
FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 4 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 5 of 16

WPI # 258337-2



SEIS Re-evaluation
No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs

Figure 3-12

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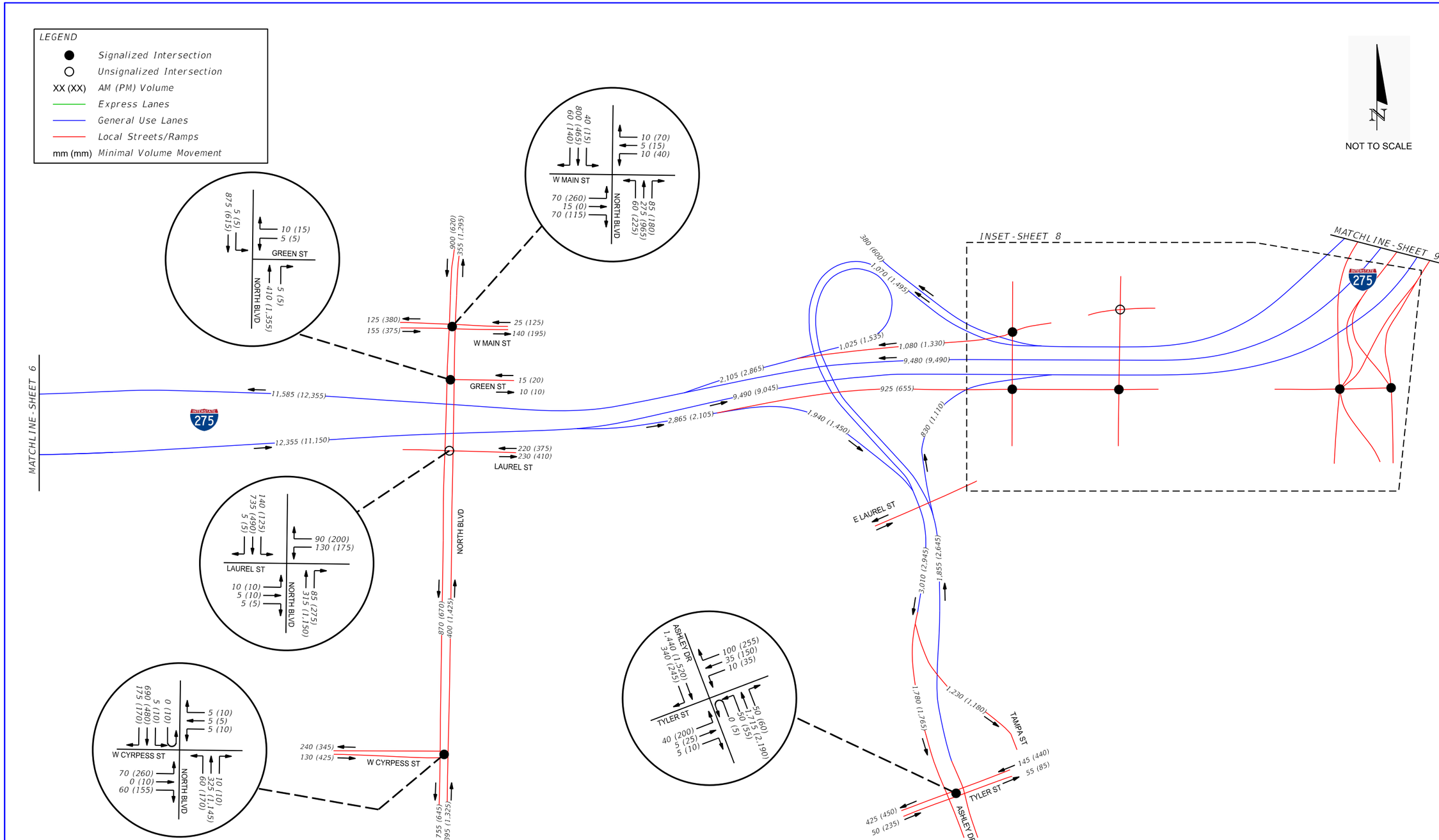
WPI # 258337-2



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SEIS Re-evaluation
No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs

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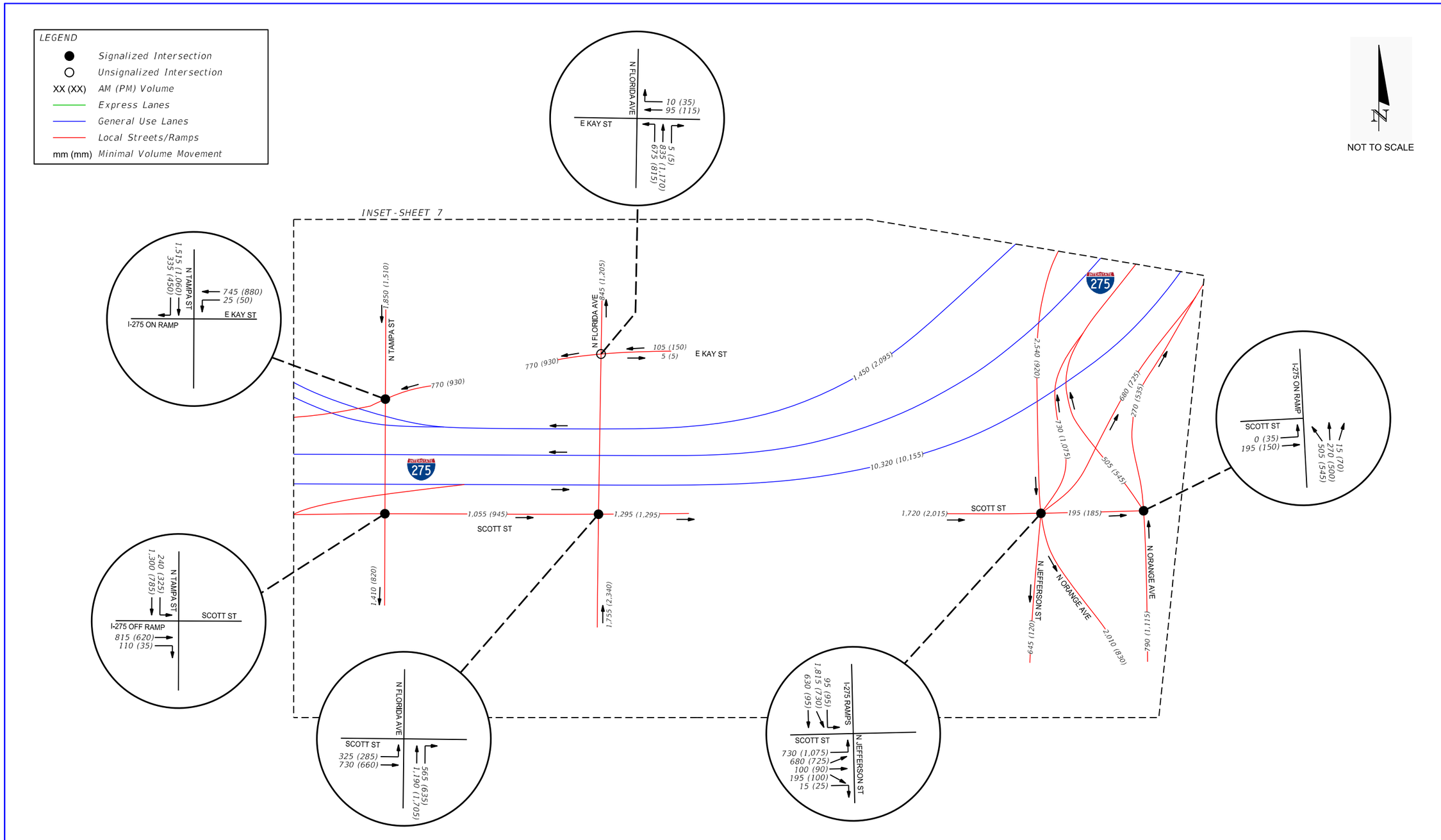
WPI # 258337-2



SEIS Re-evaluation
No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs

Figure 3-12

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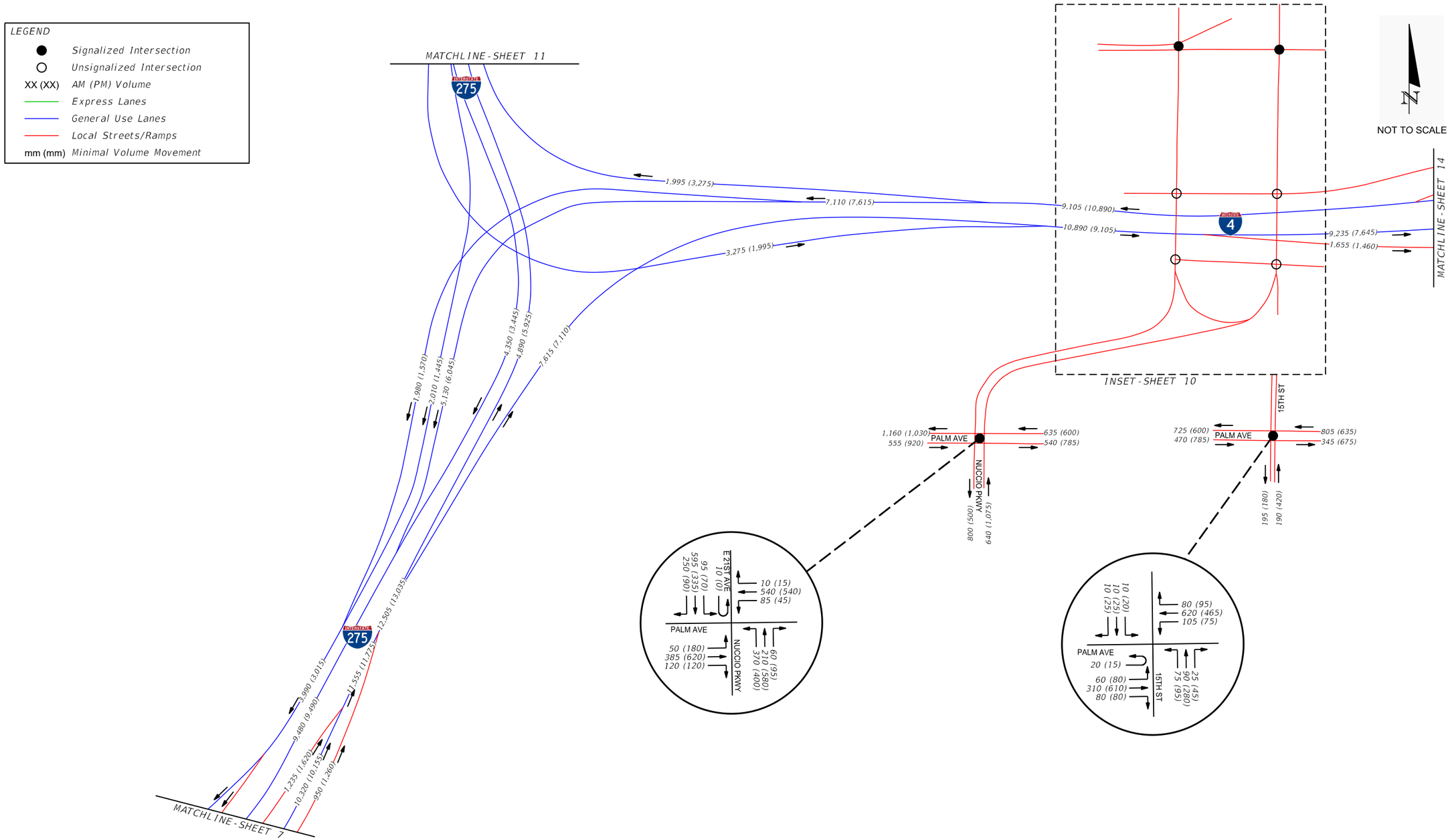
WPI # 258337-2



FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 9 of 16

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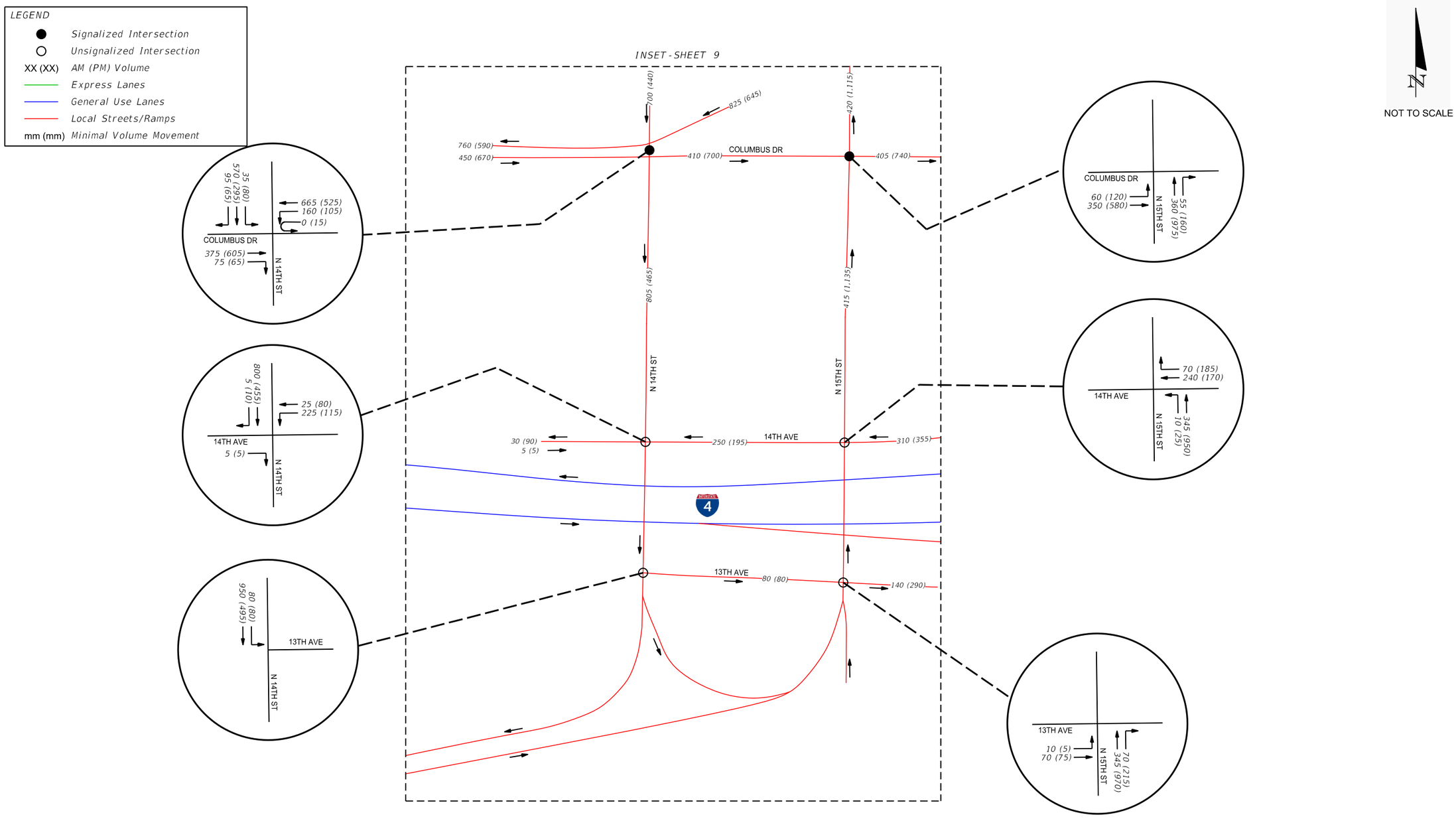

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SEIS Re-evaluation
No Further Action (NFA) - Opening Year (2025) - AM & PM DDHVs

Figure 3-12

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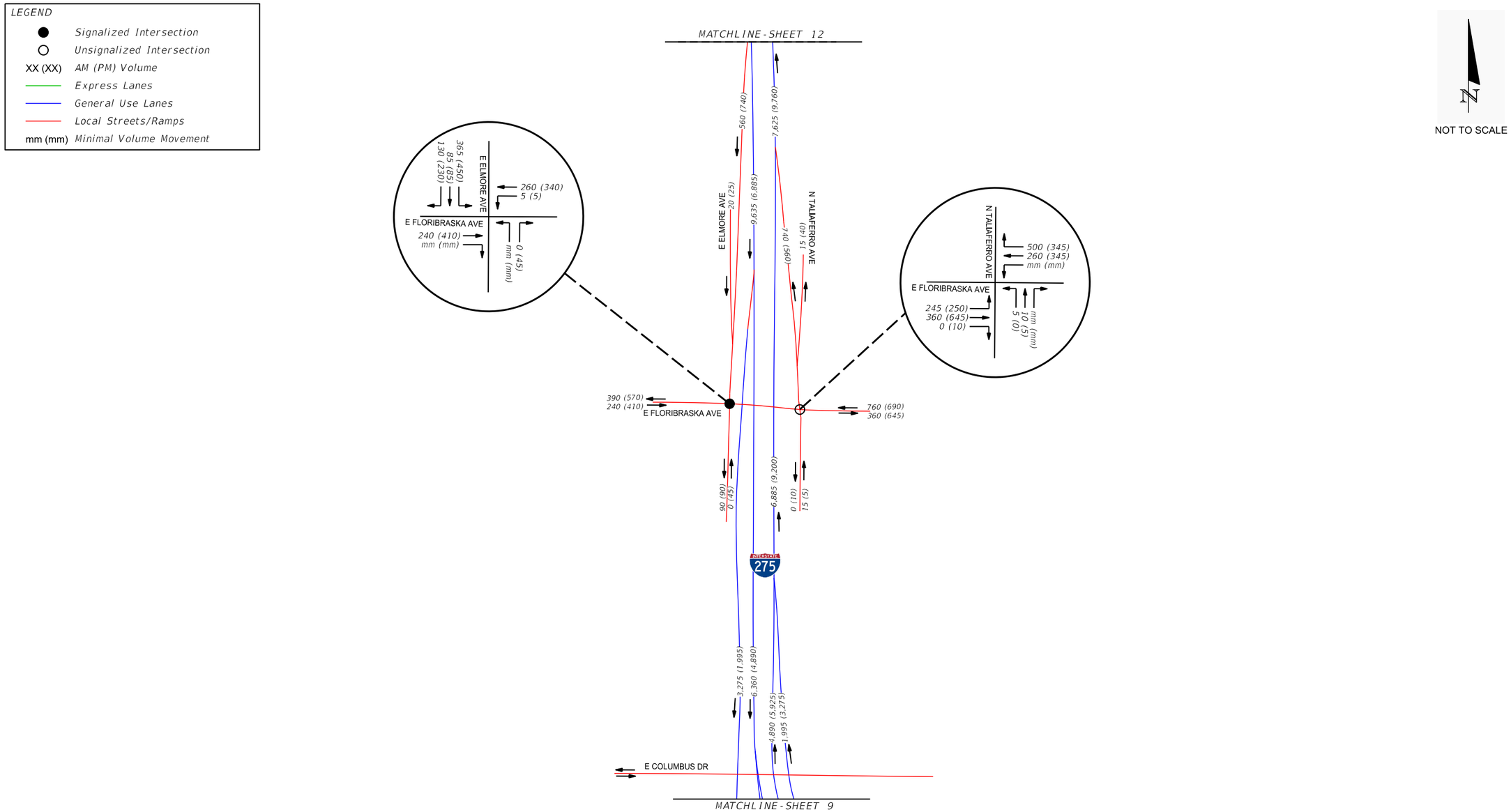
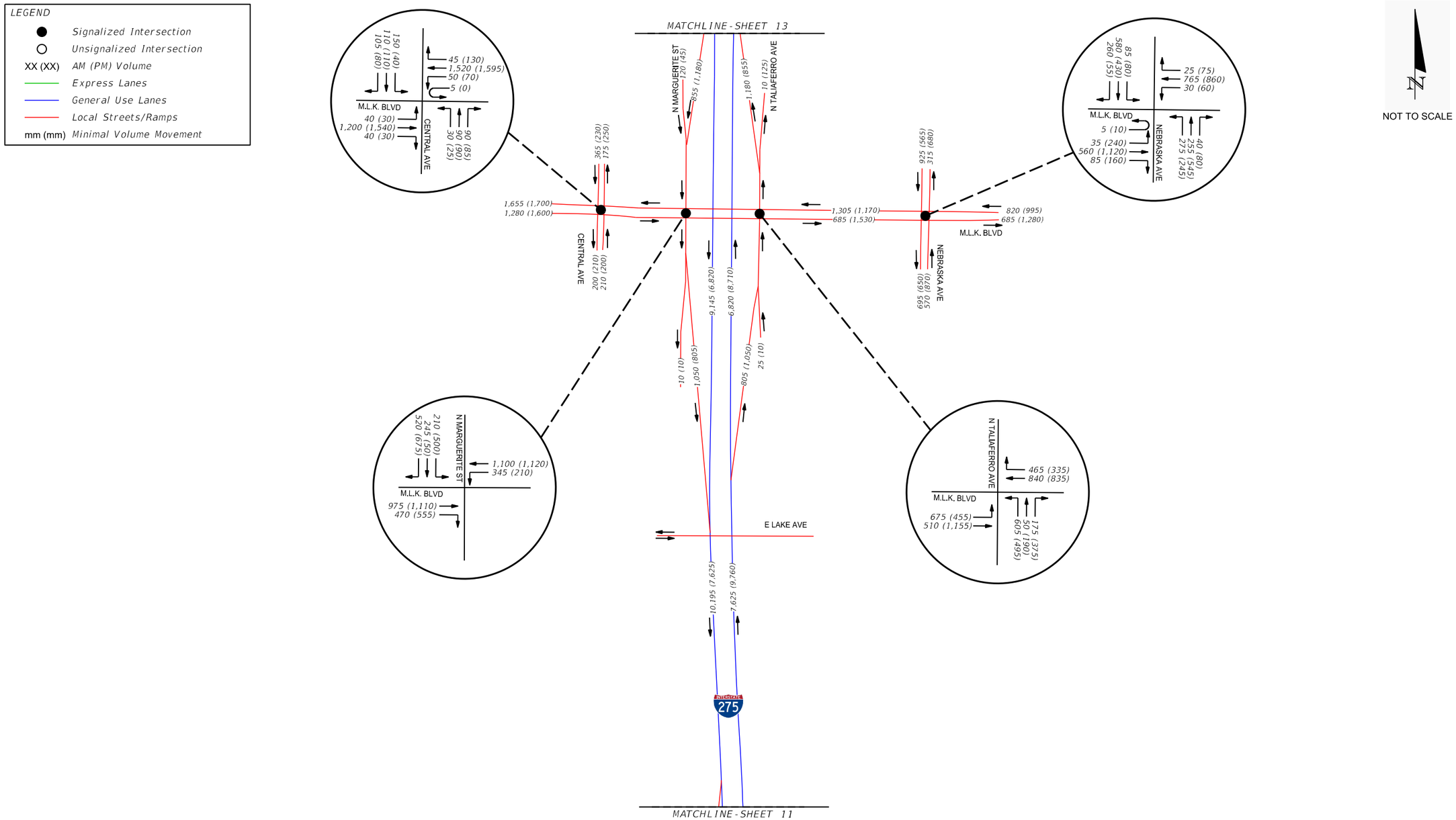
WPI # 258337-2



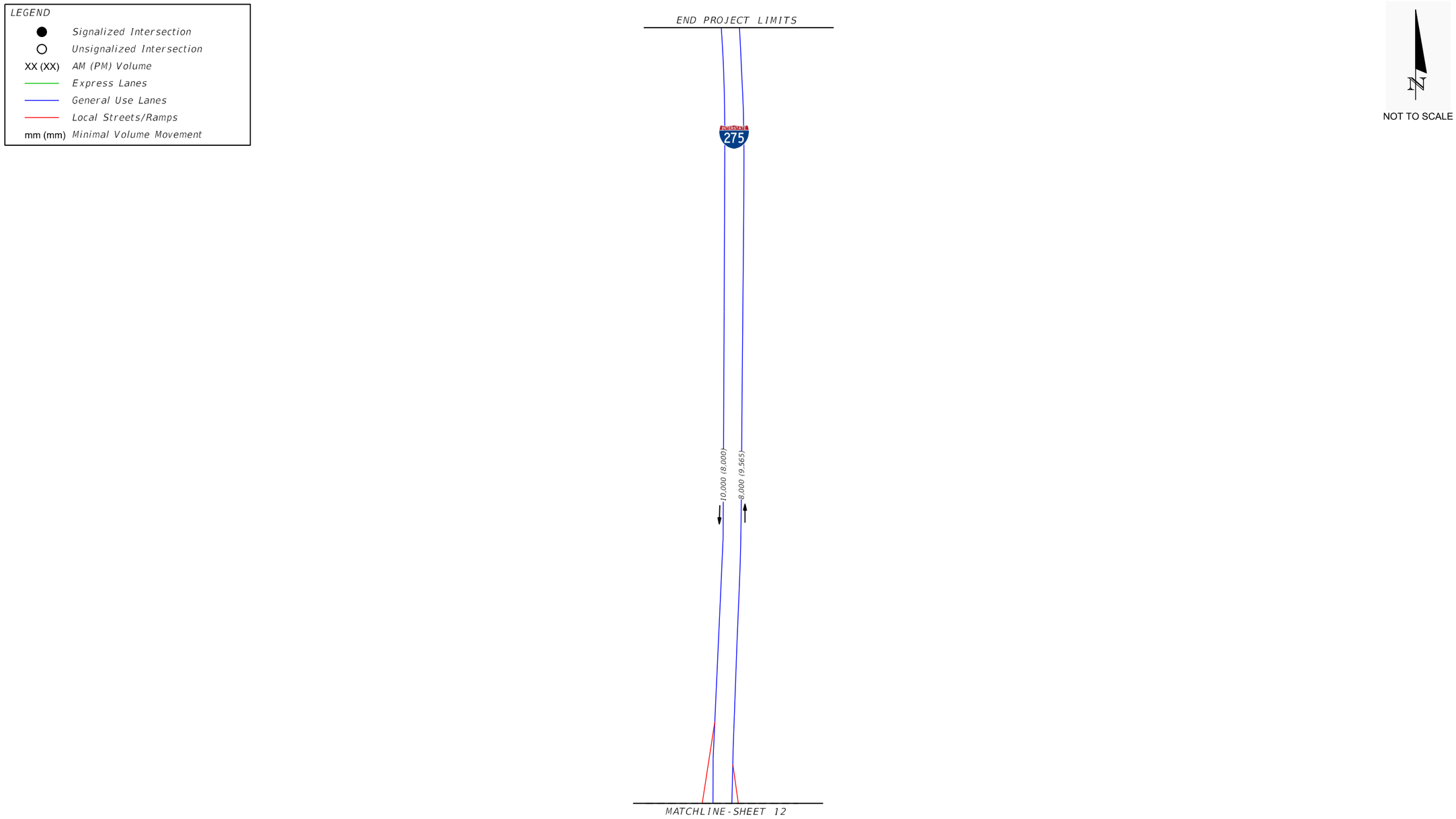
FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 11 of 16

WPI # 258337-2



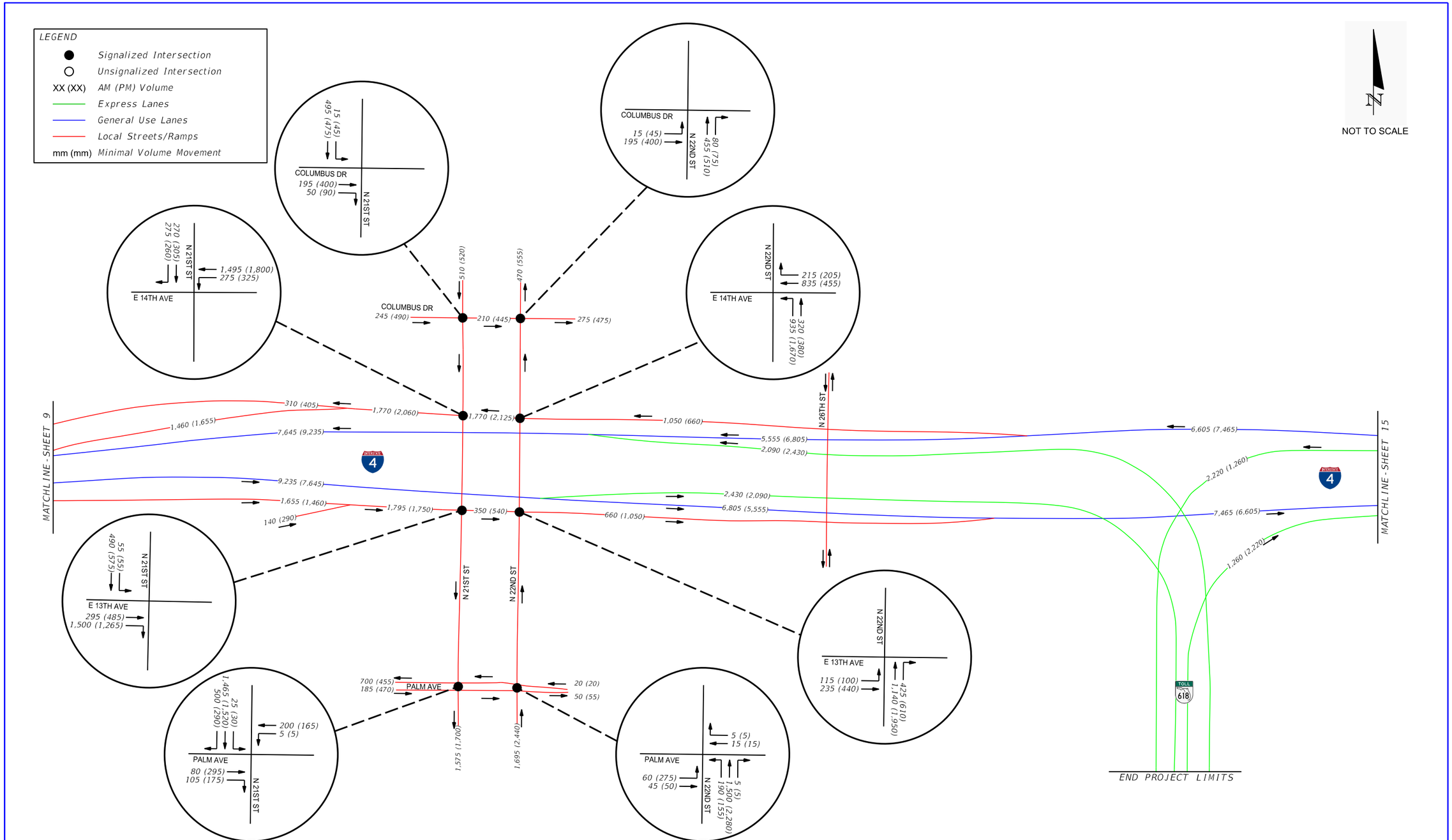
FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 12 of 16

WPI # 258337-2



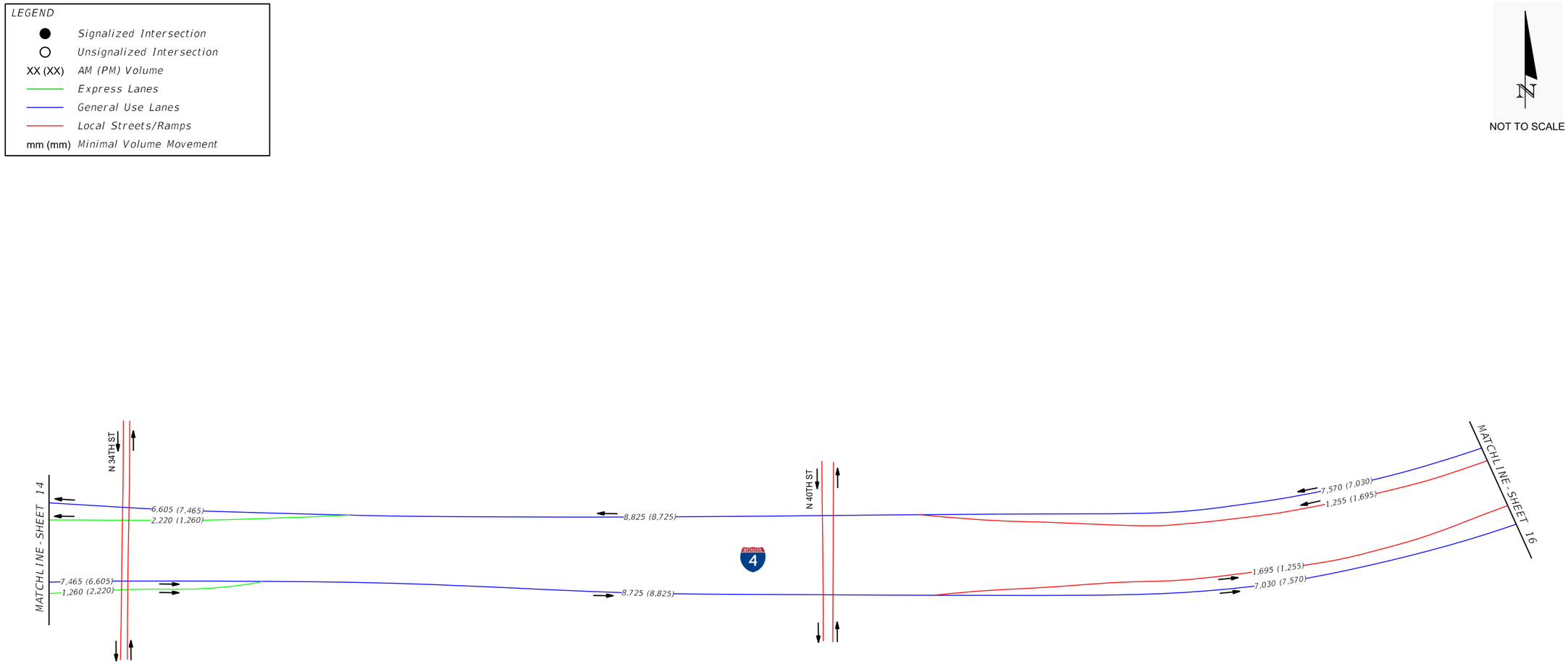
FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 13 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs	Figure 3-12	Sheet 14 of 16

WPI # 258337-2



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SEIS Re-evaluation
No Further Action (NFA) – Opening Year (2025) – AM & PM DDHVs

Figure 3-12

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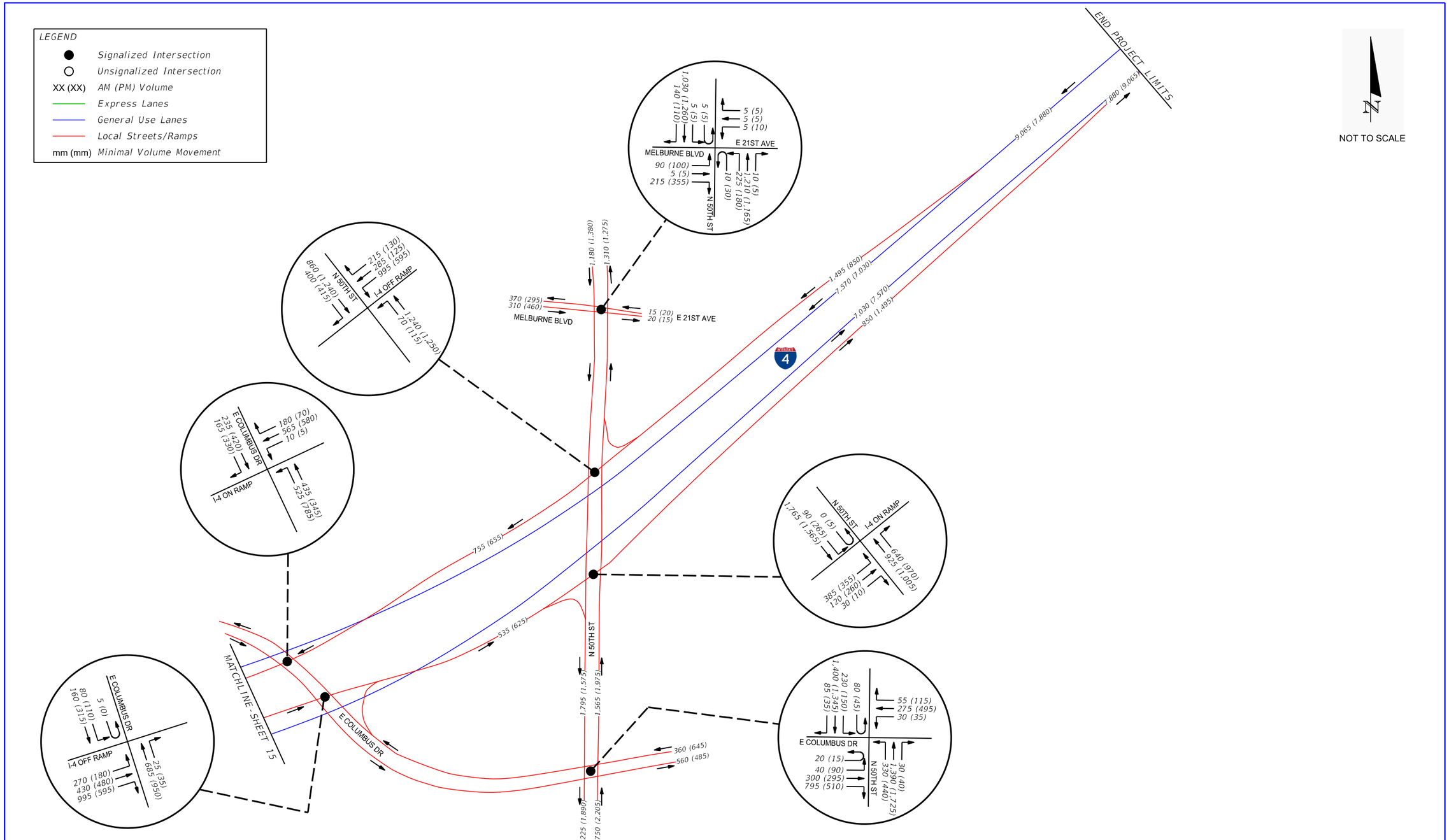
WPI # 258337-2



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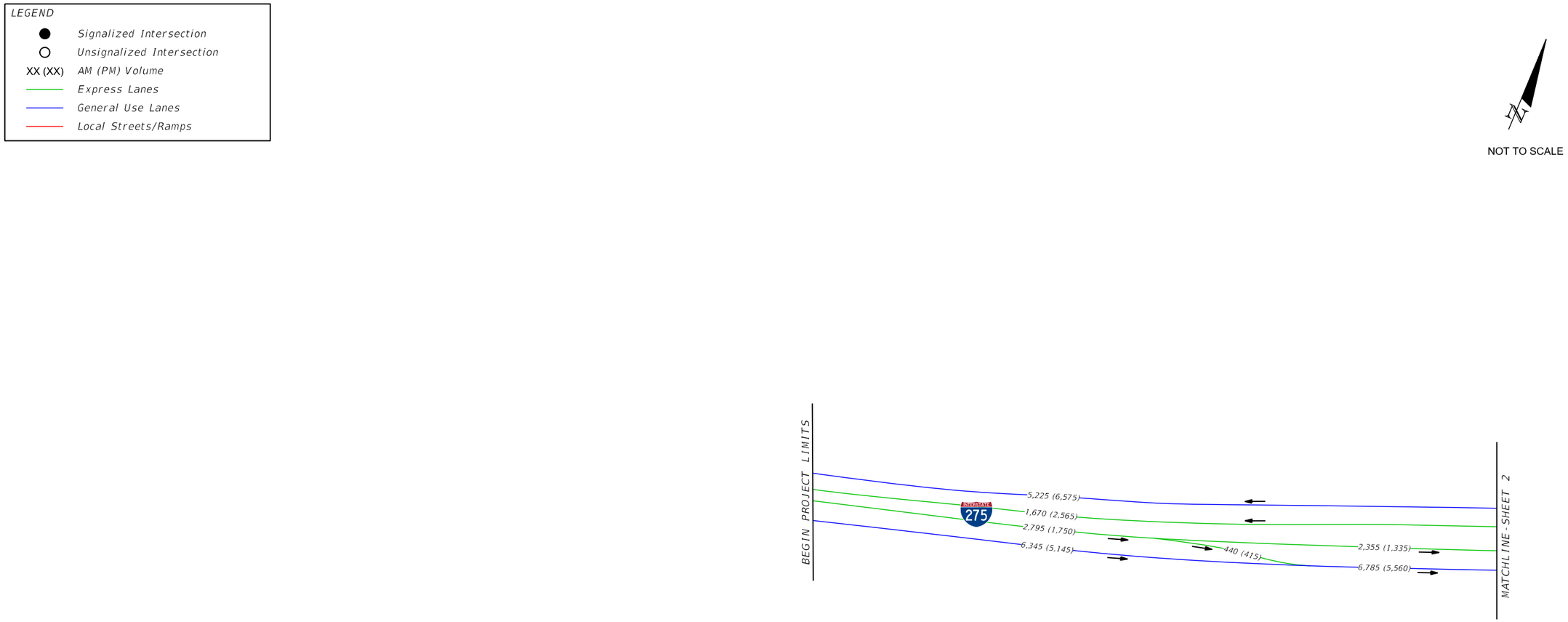
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

Figure 3-13

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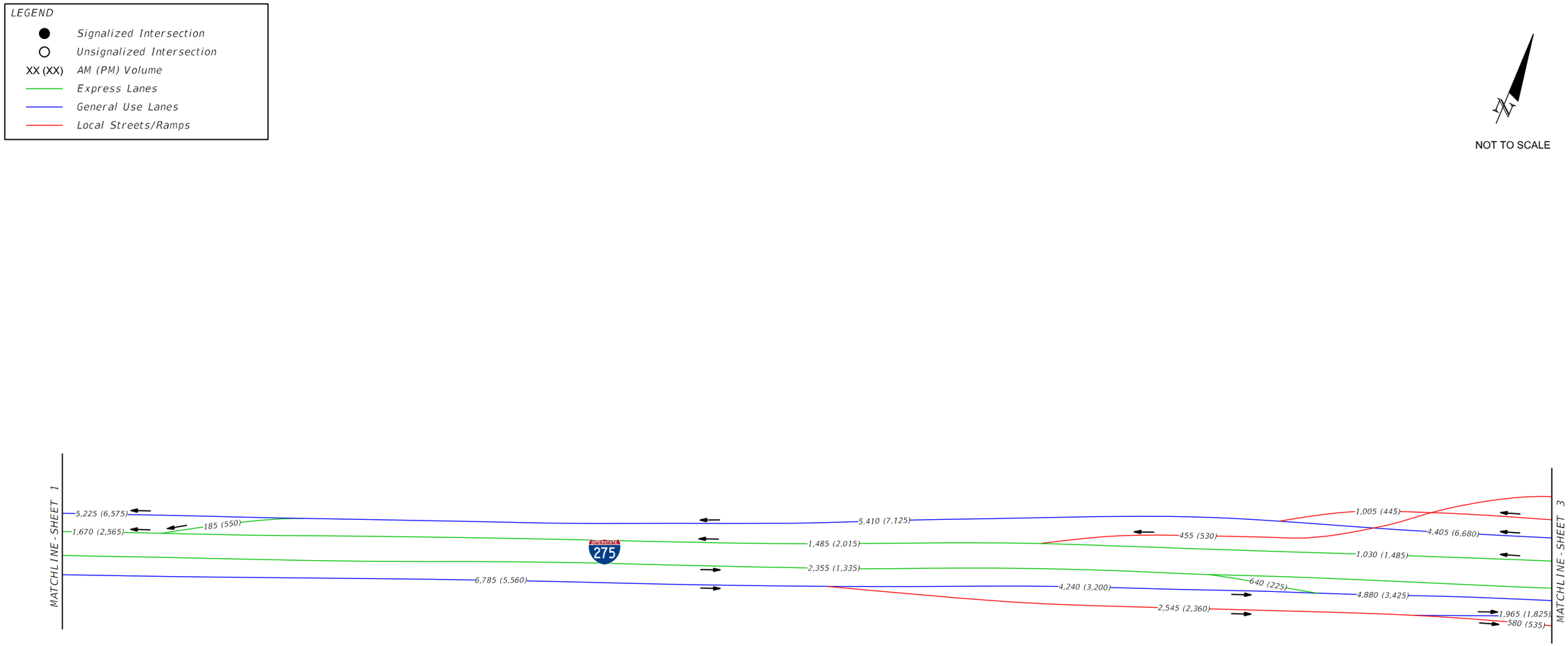
WPI # 258337-2



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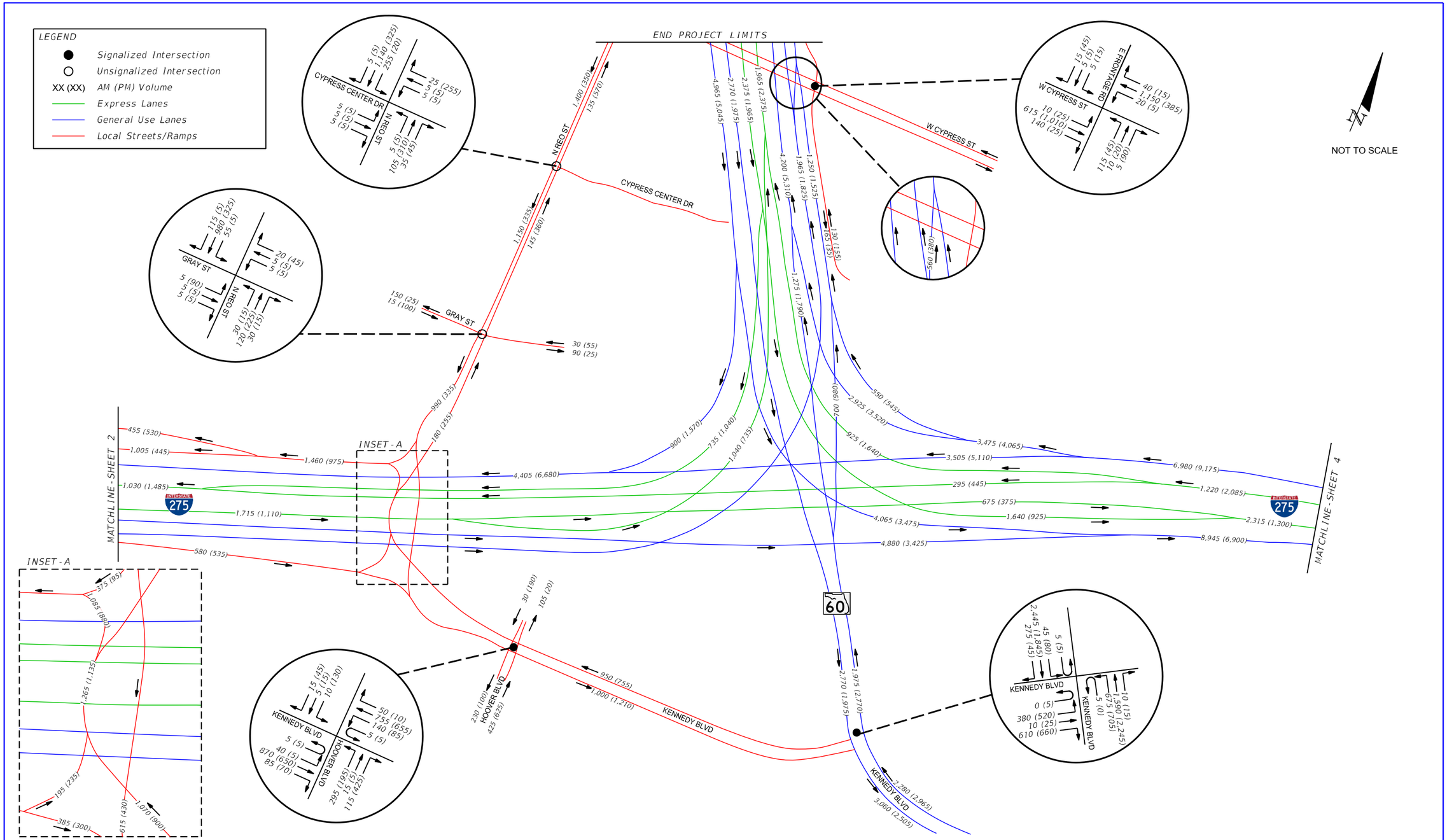

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SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

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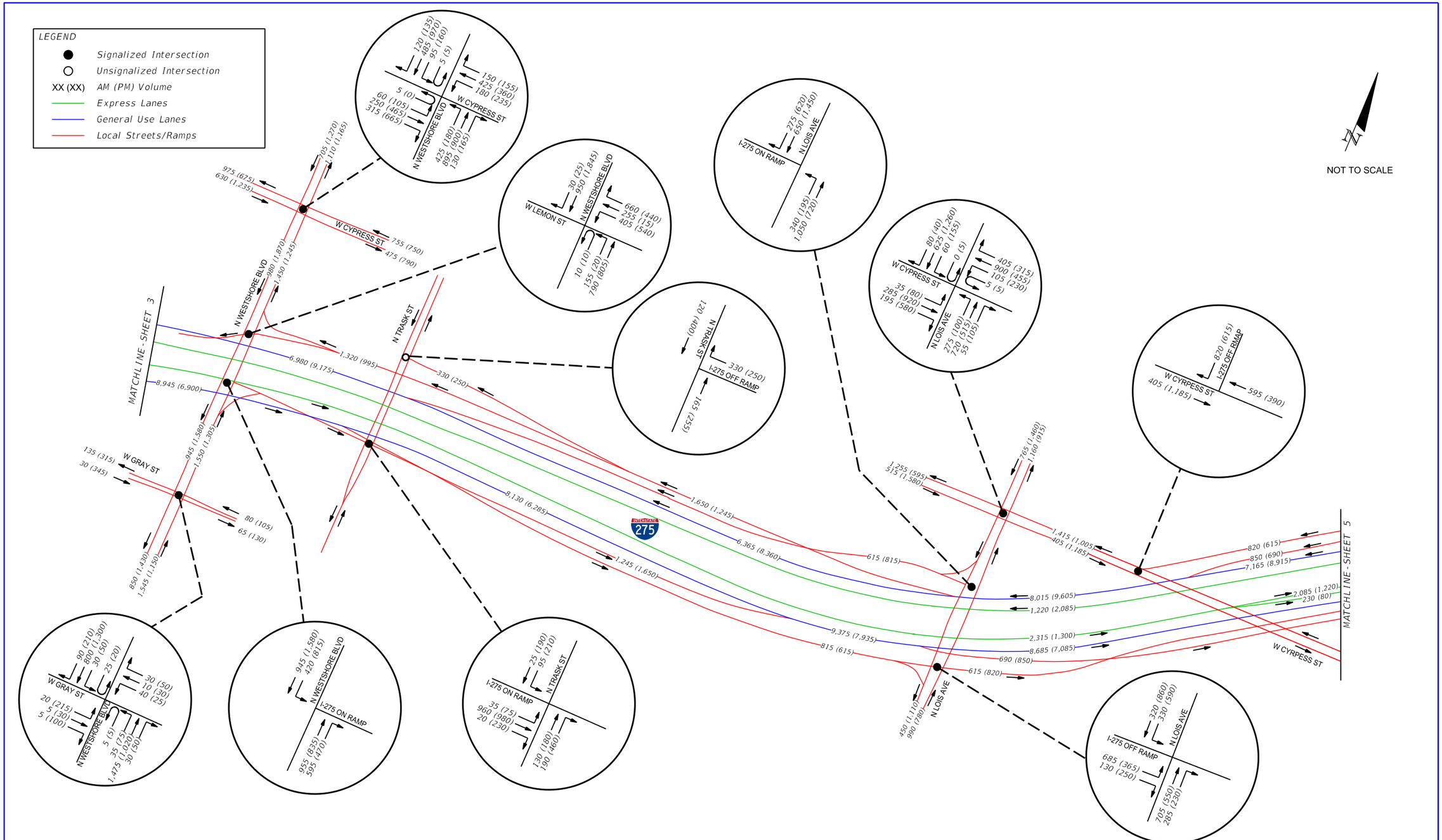
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

Figure 3-13

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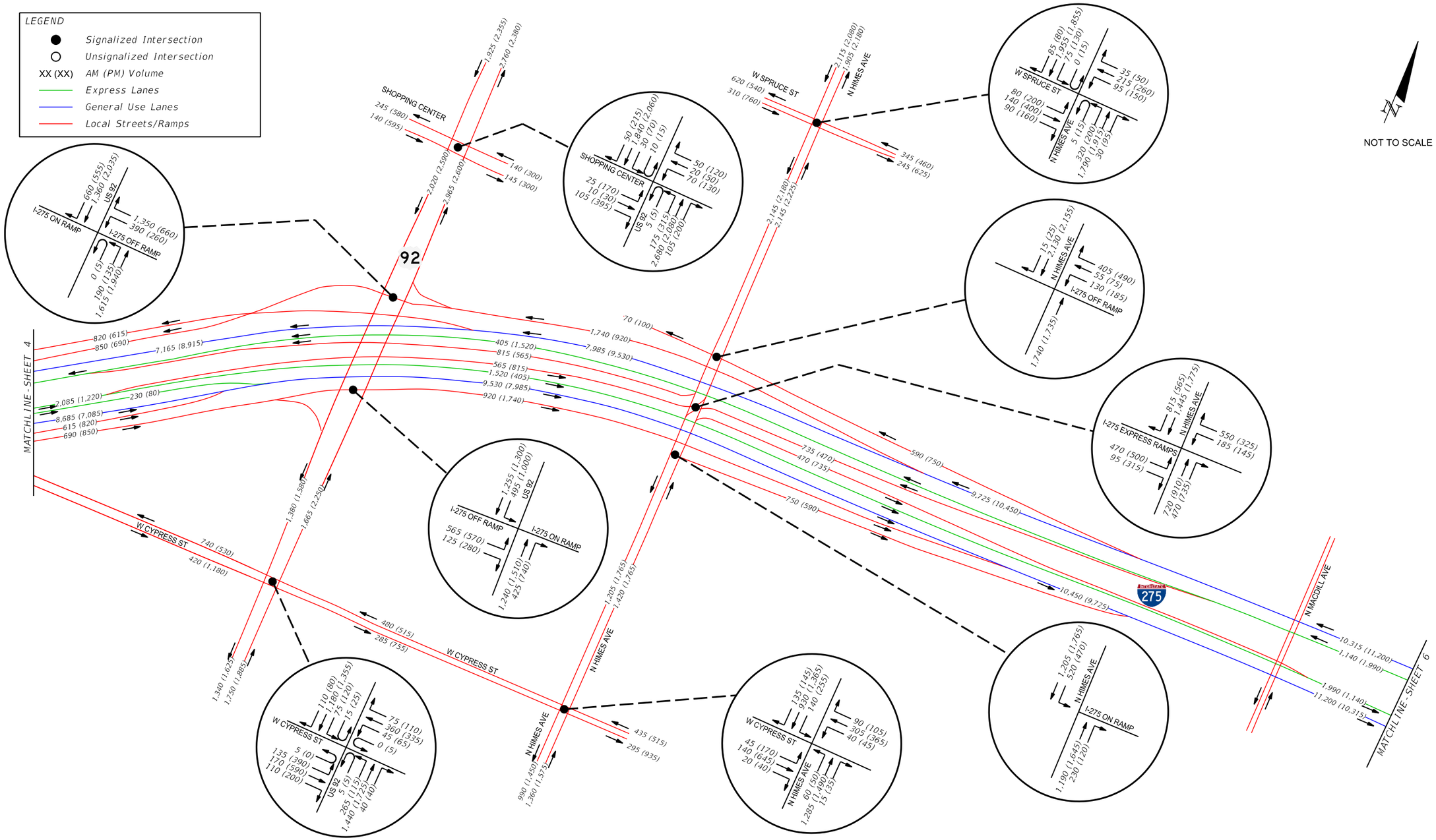
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

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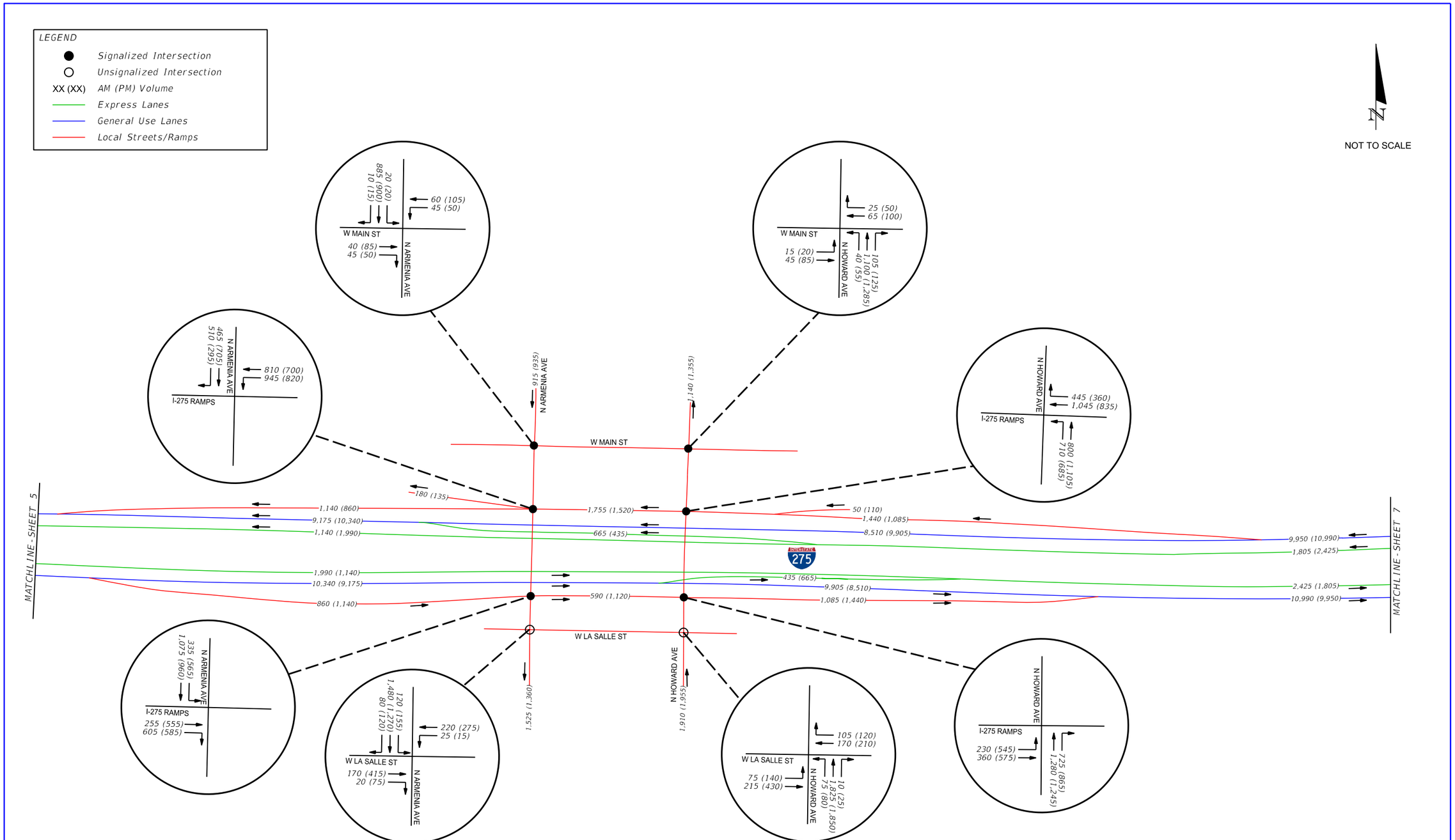
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs	Figure 3-13	Sheet 6 of 16

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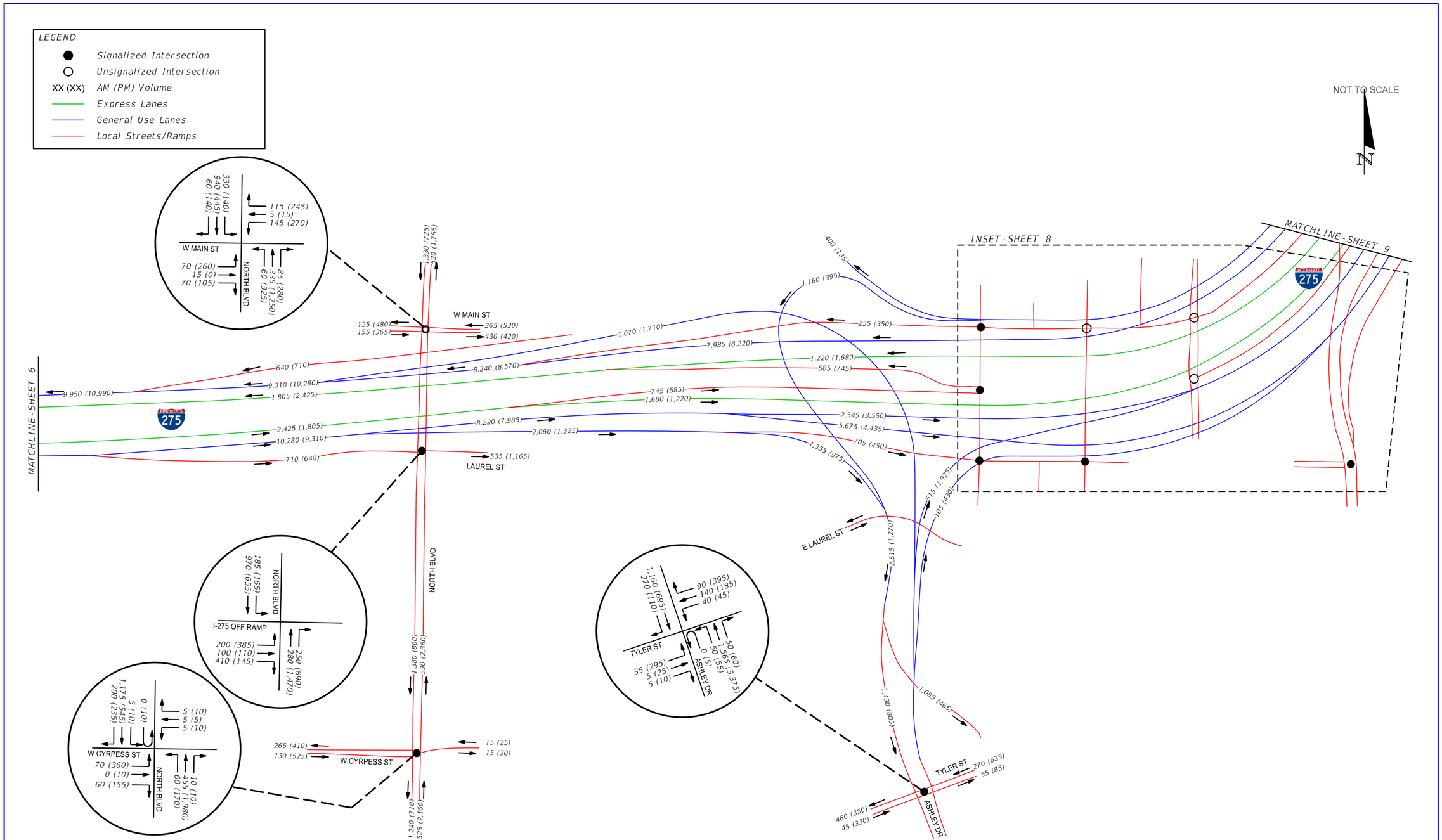
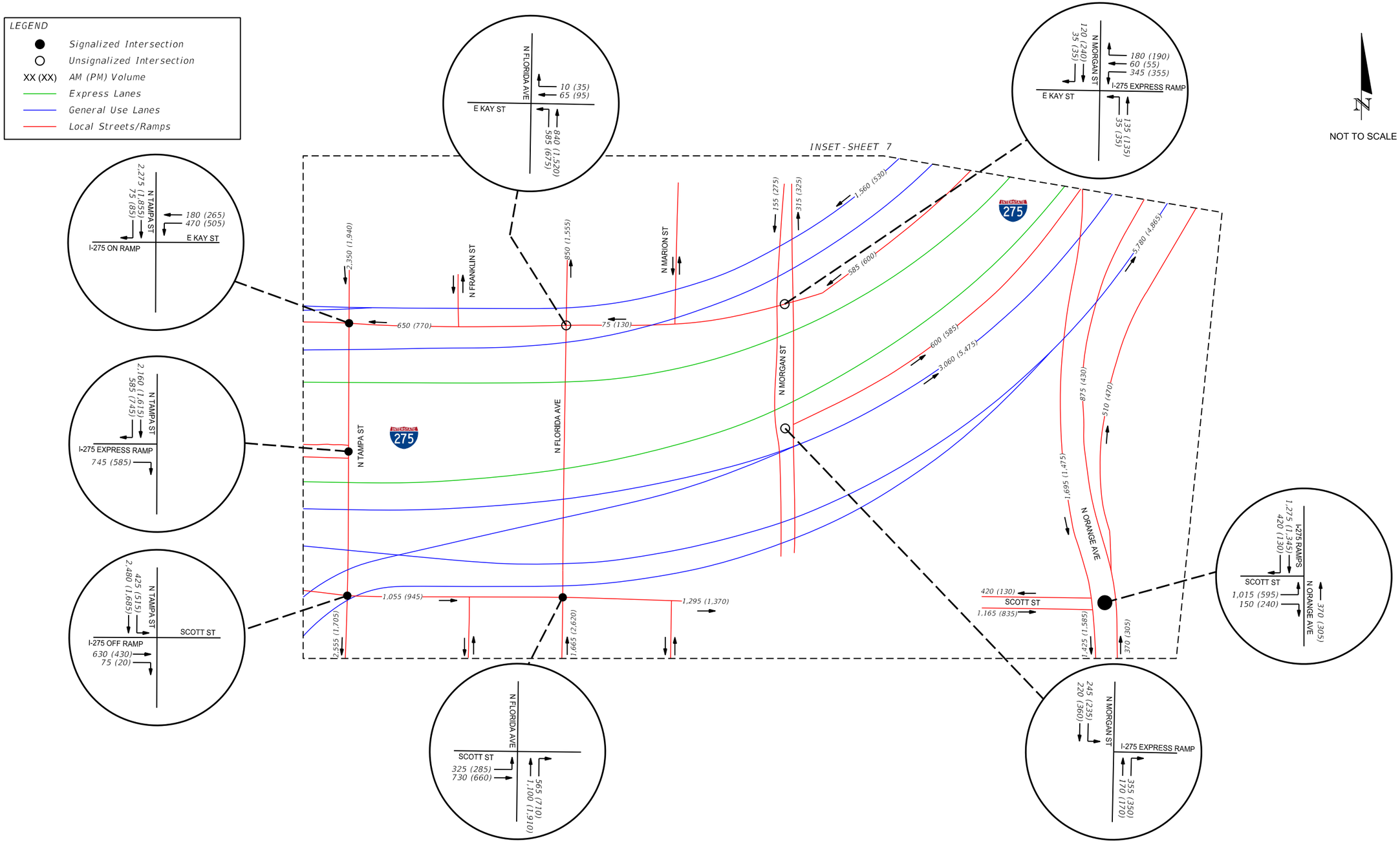


FDOT	SEIS Re-evaluation Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs	Figure 3-13	Sheet 7 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

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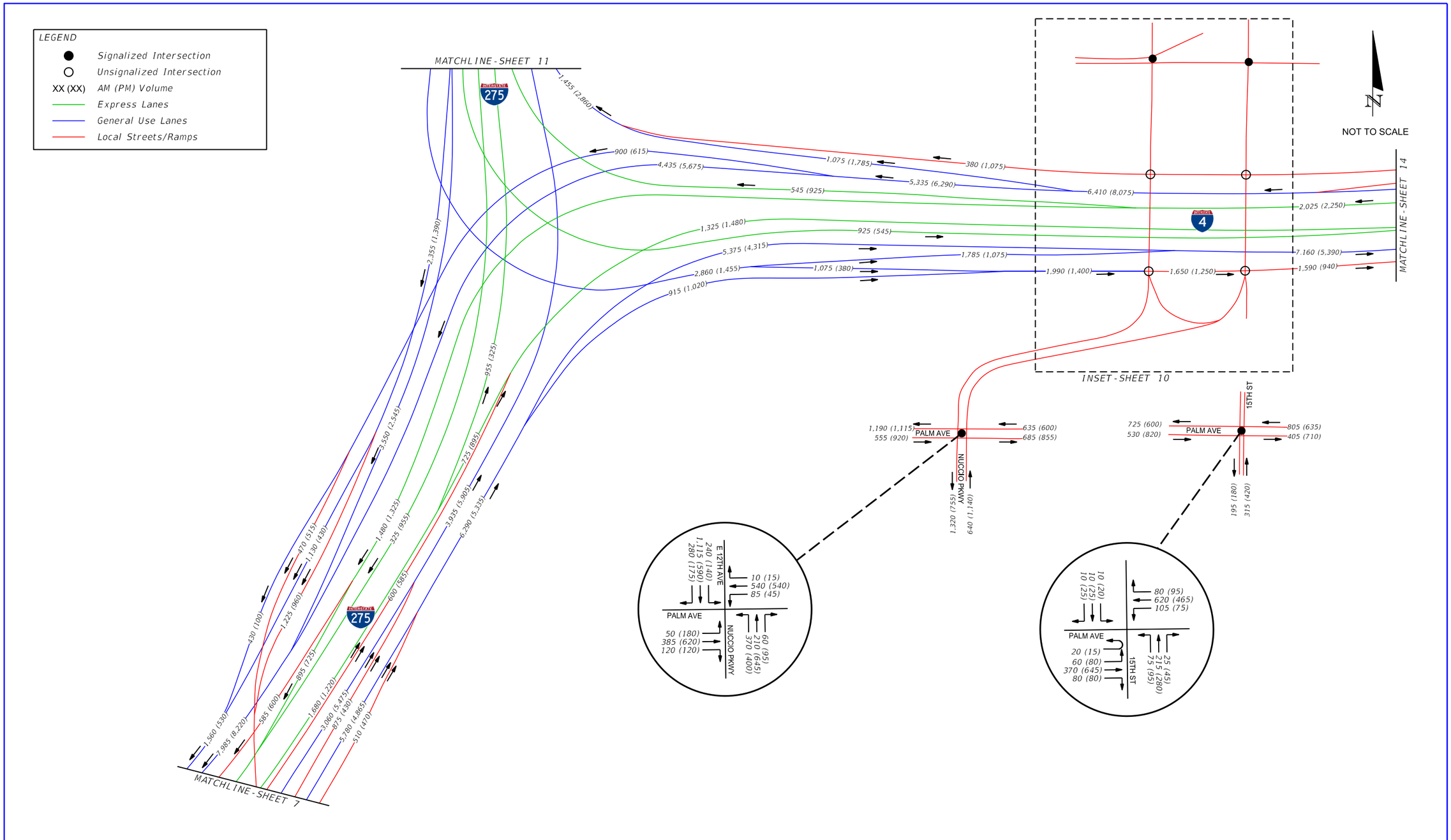
WPI # 258337-2



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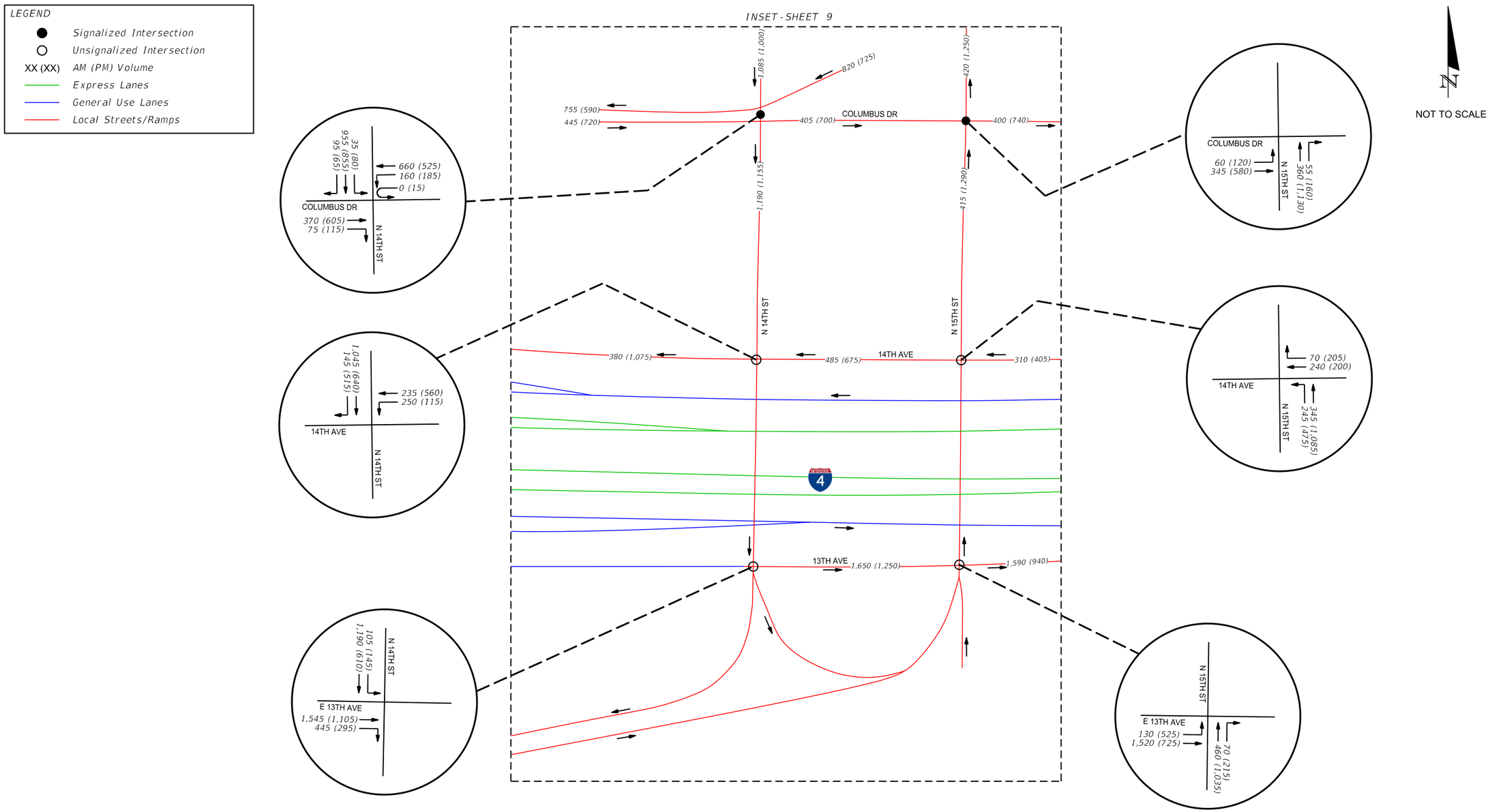

SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

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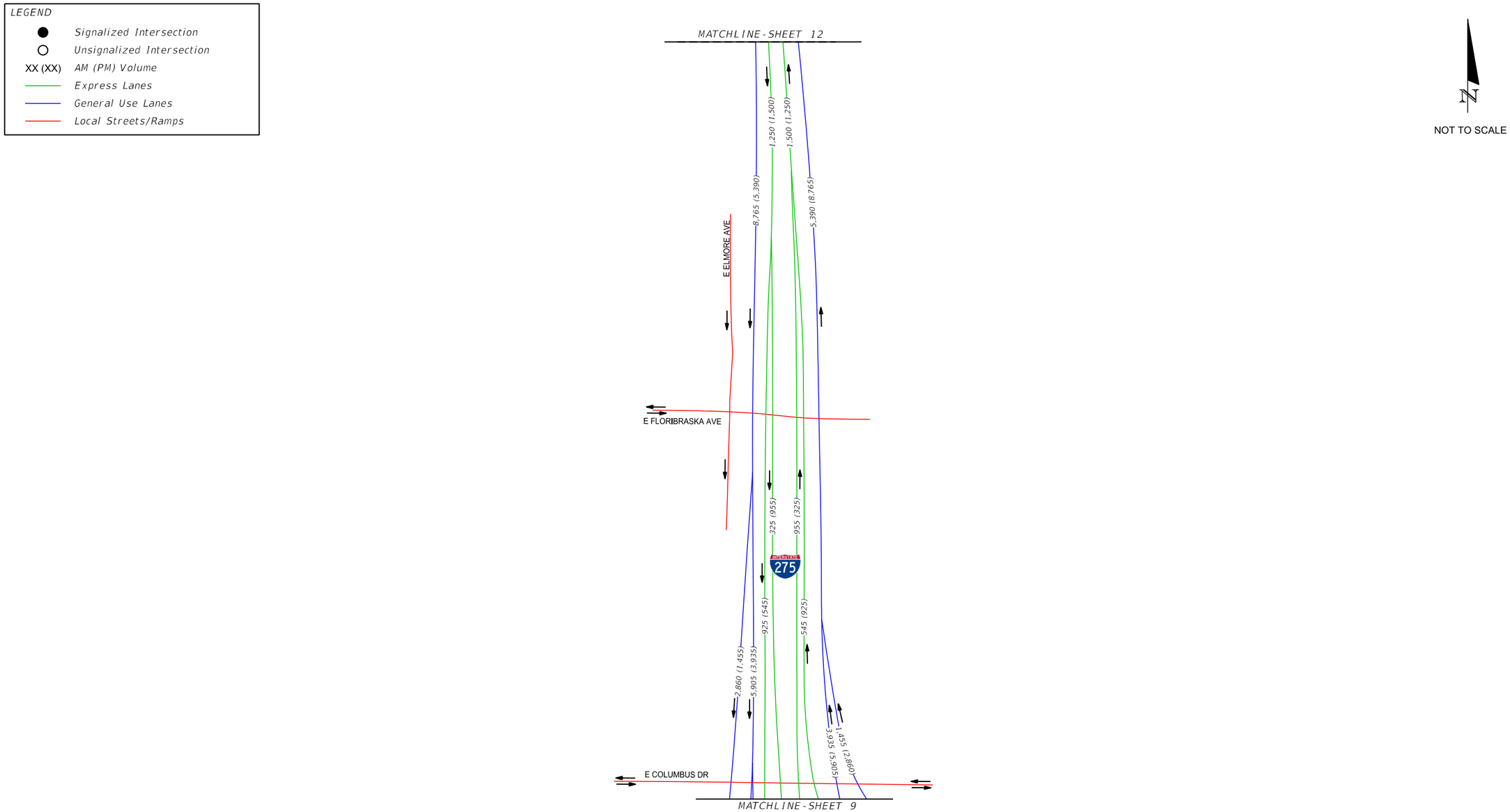

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SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

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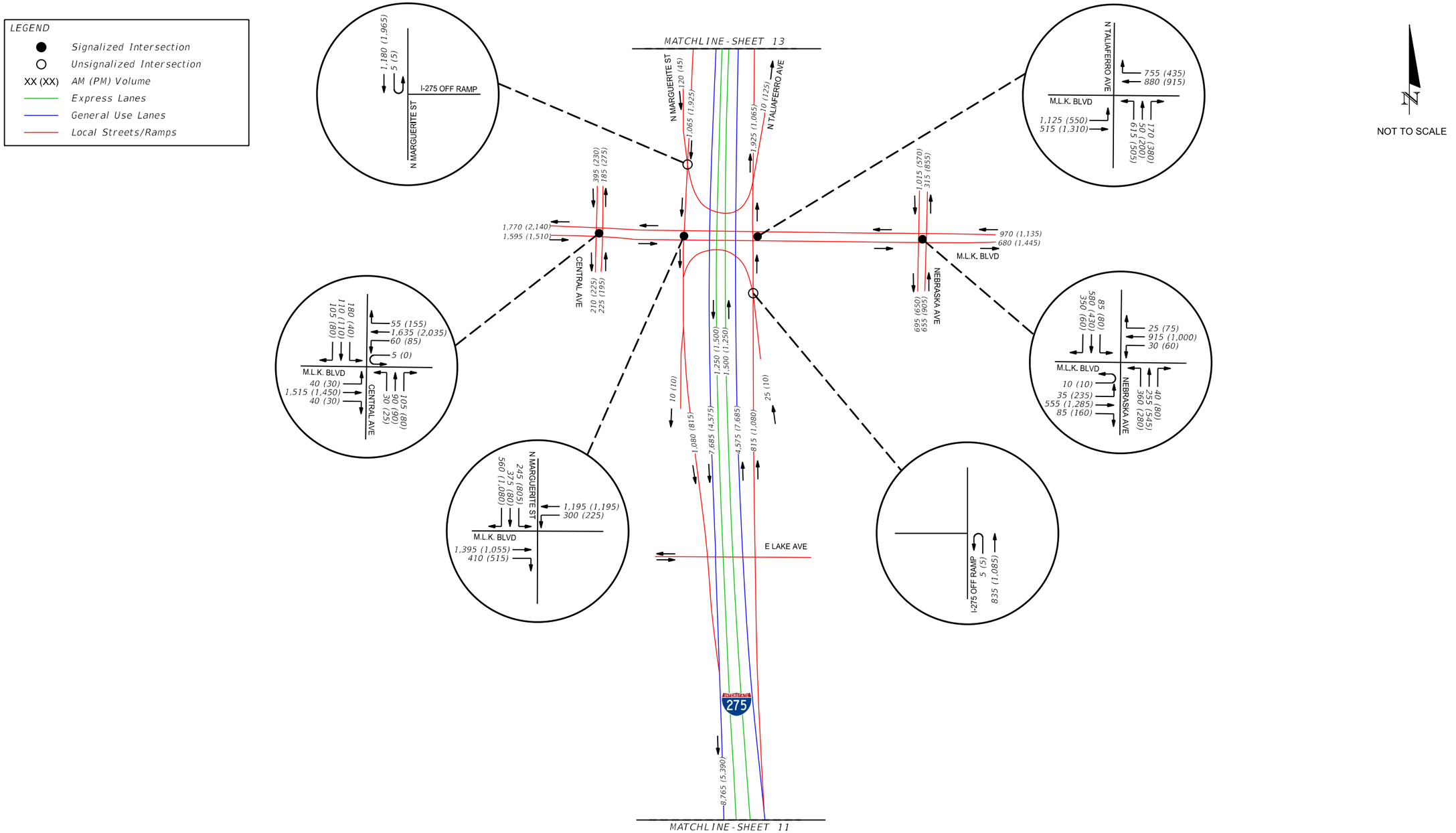

FDOT	SEIS Re-evaluation Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs	Figure 3-13	Sheet 12 of 16

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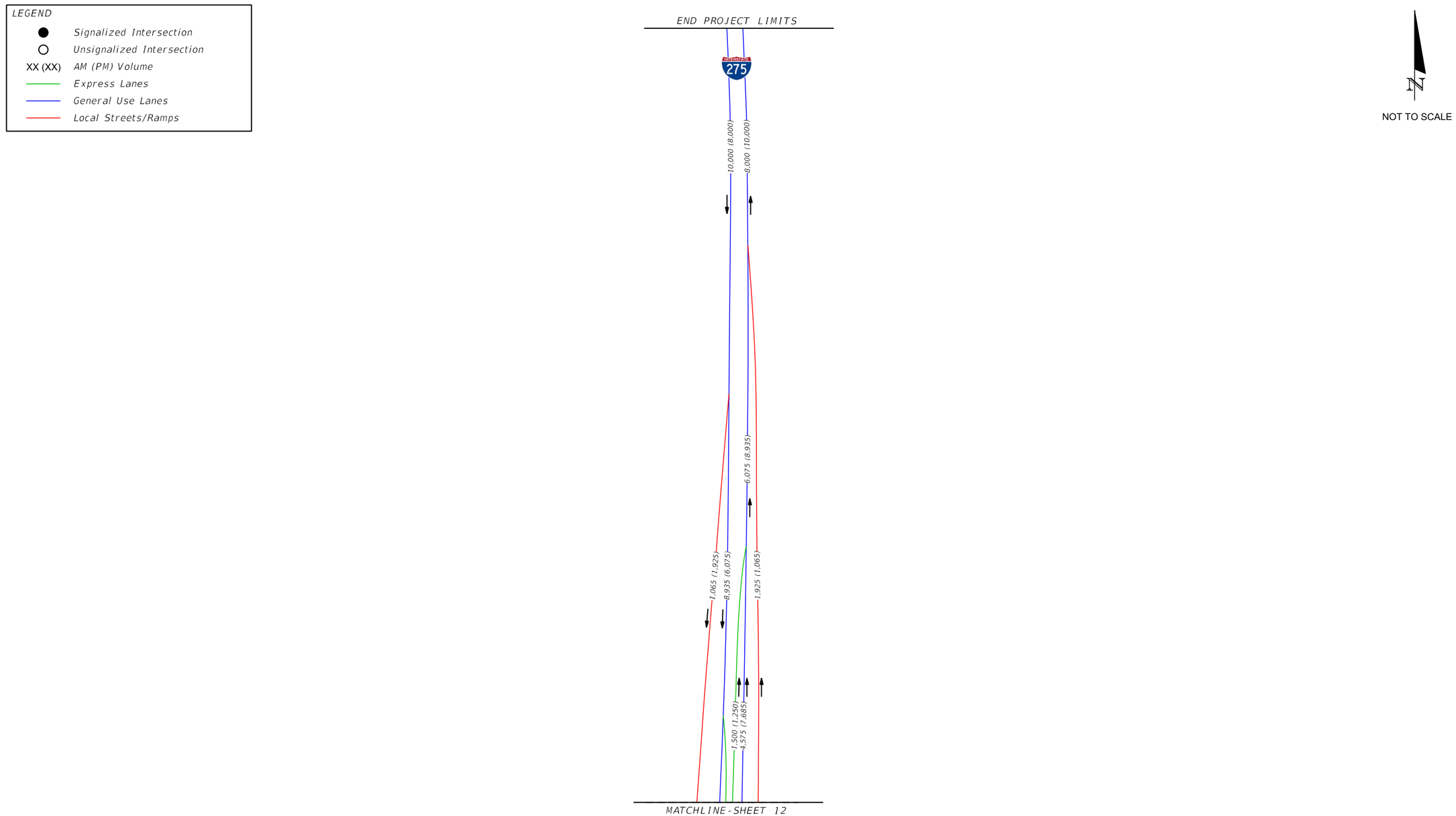
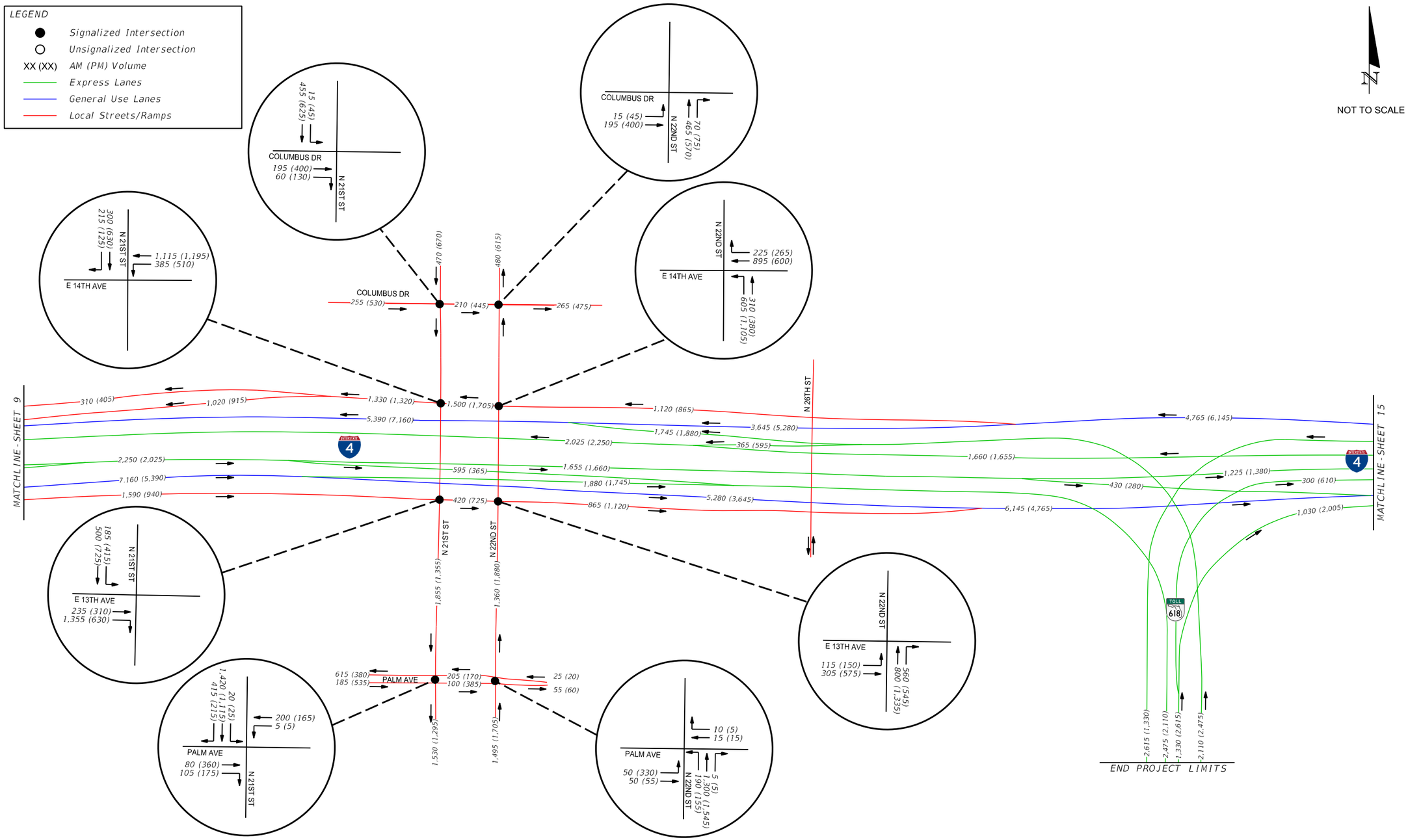


FDOT	SEIS Re-evaluation Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs	Figure 3-13	Sheet 13 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs

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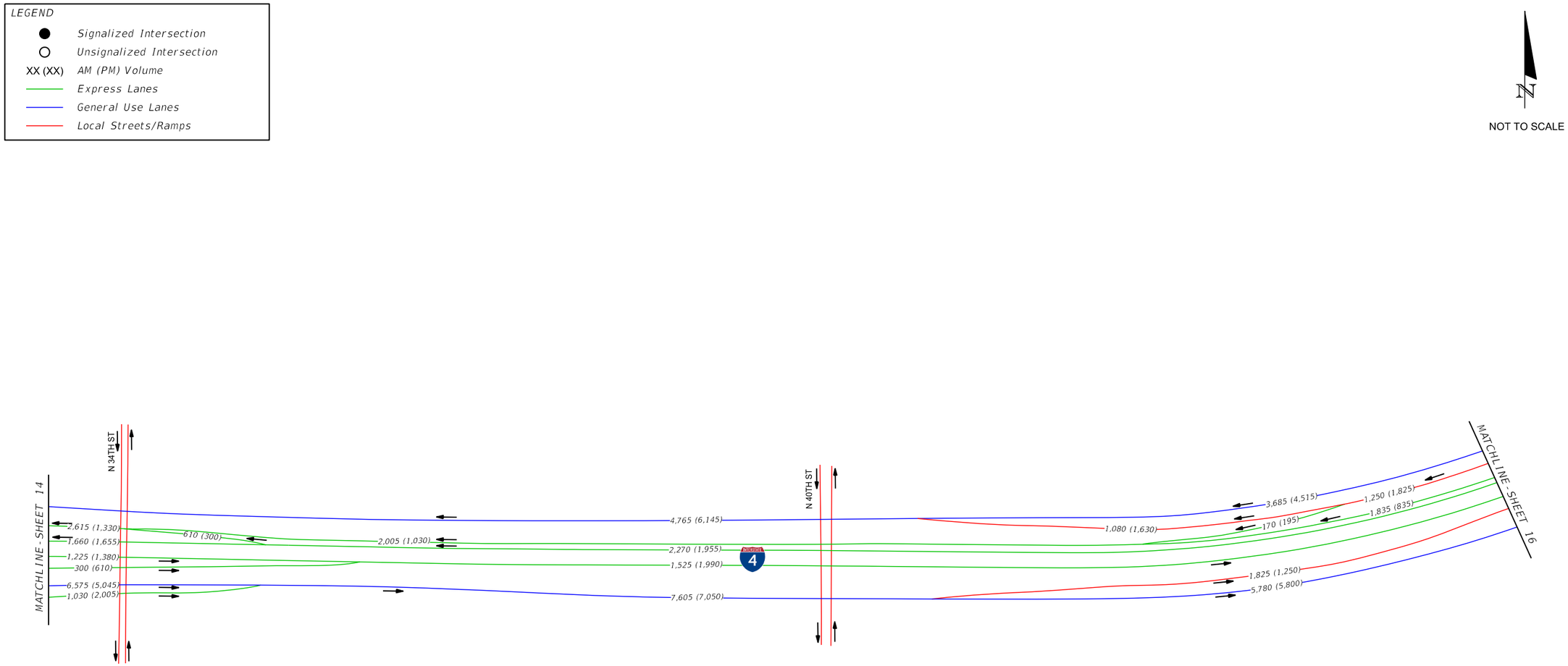

FDOT	SEIS Re-evaluation Build Alternative – Option A – Opening Year (2025) – AM & PM DDHVs	Figure 3-13	Sheet 15 of 16

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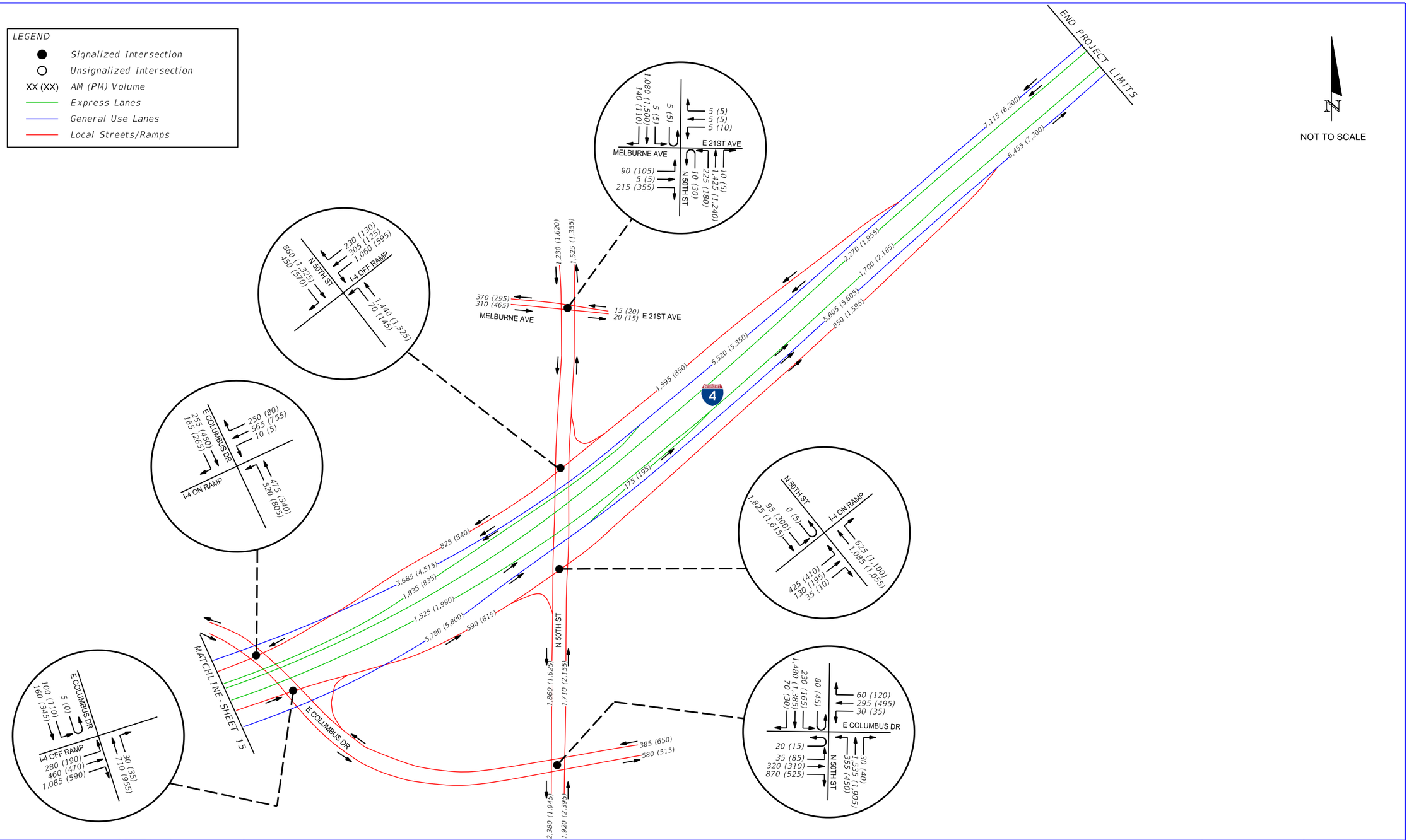

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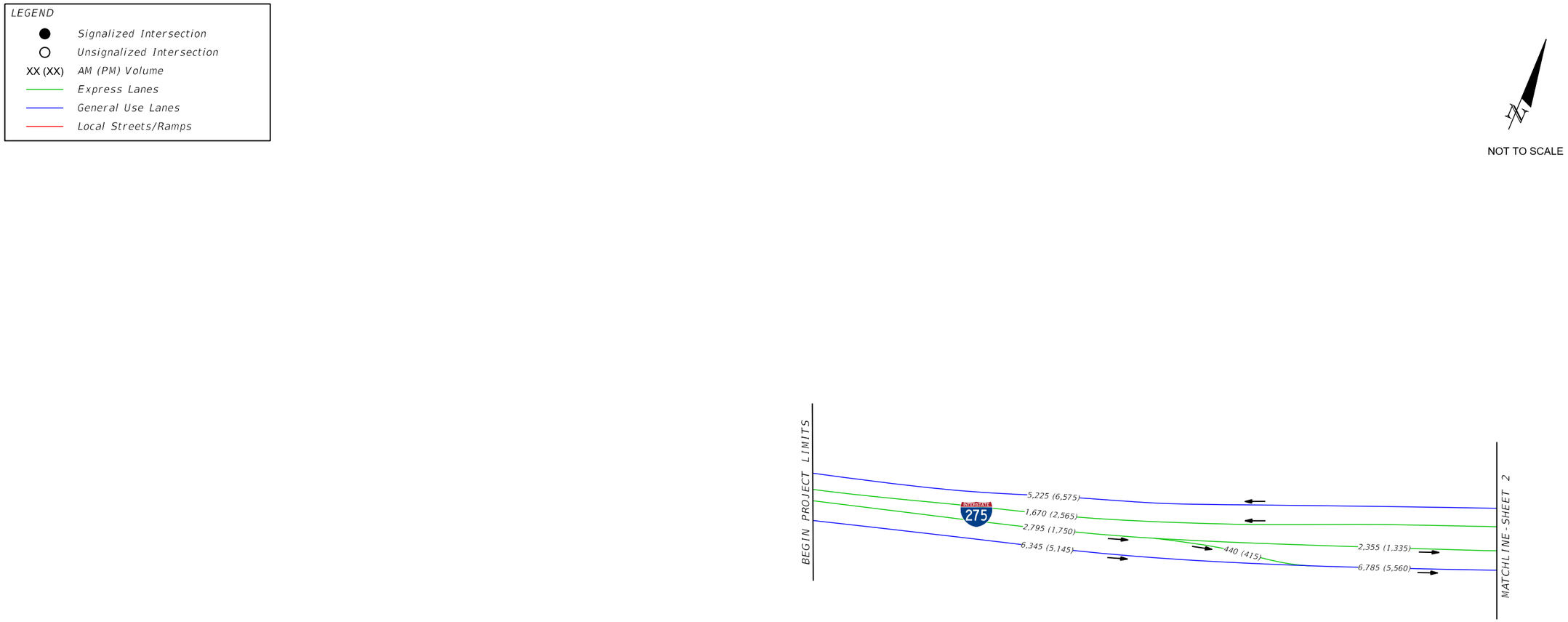

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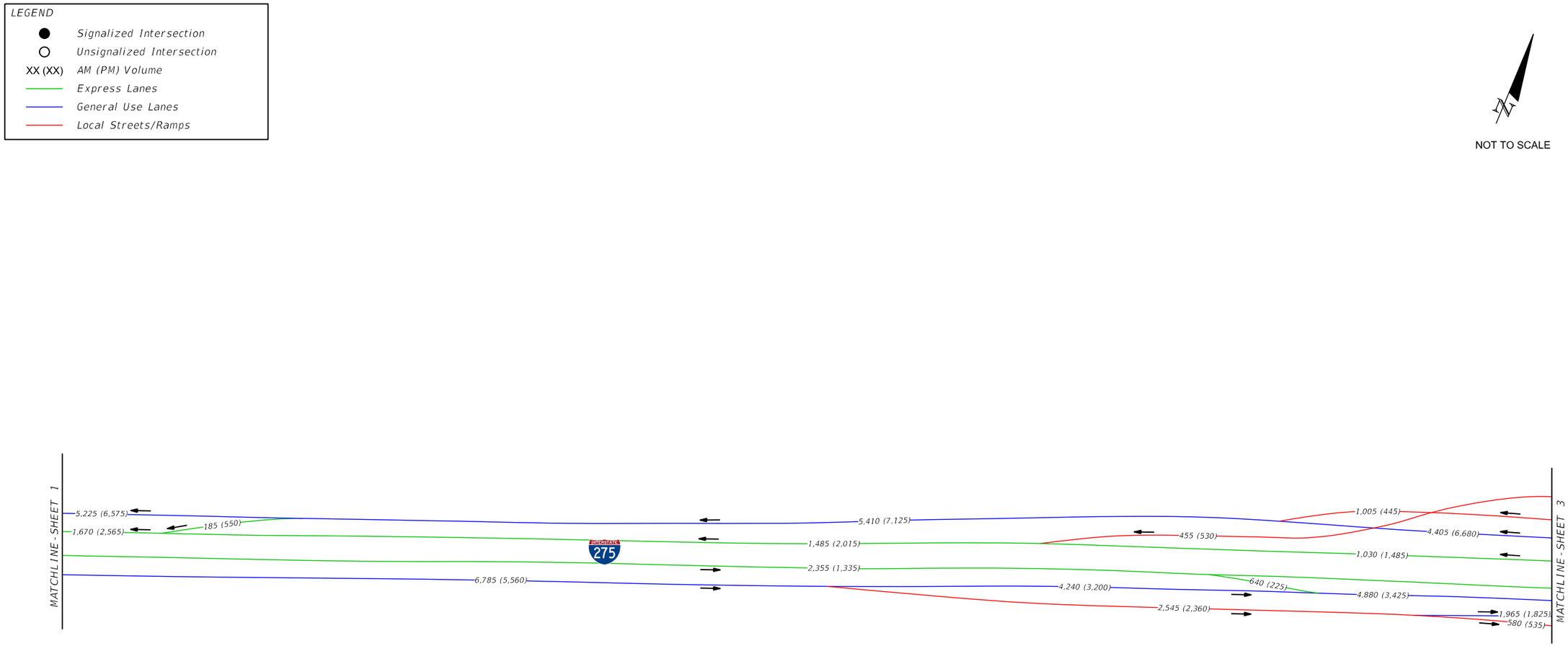

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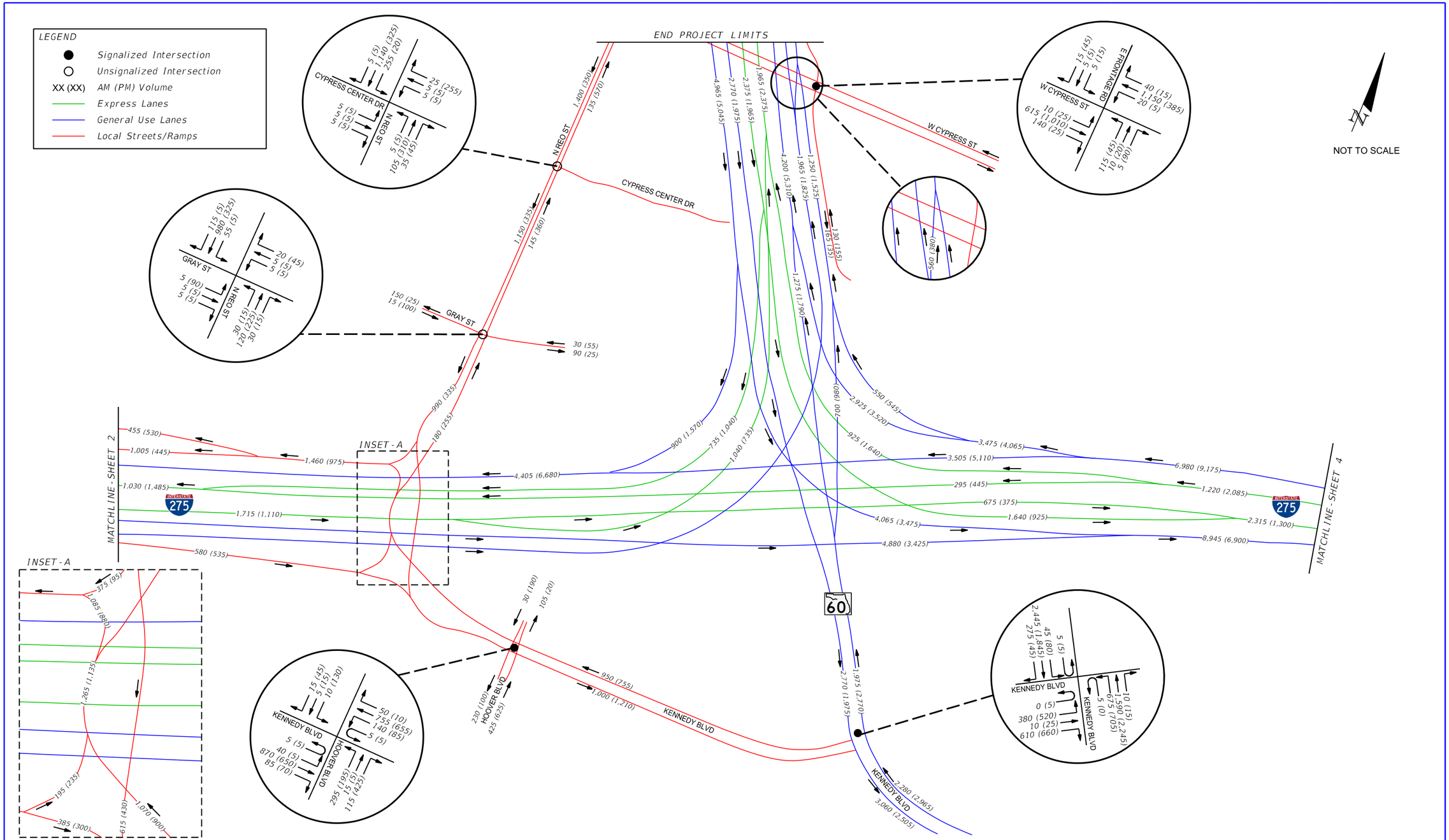
WPI # 258337-2



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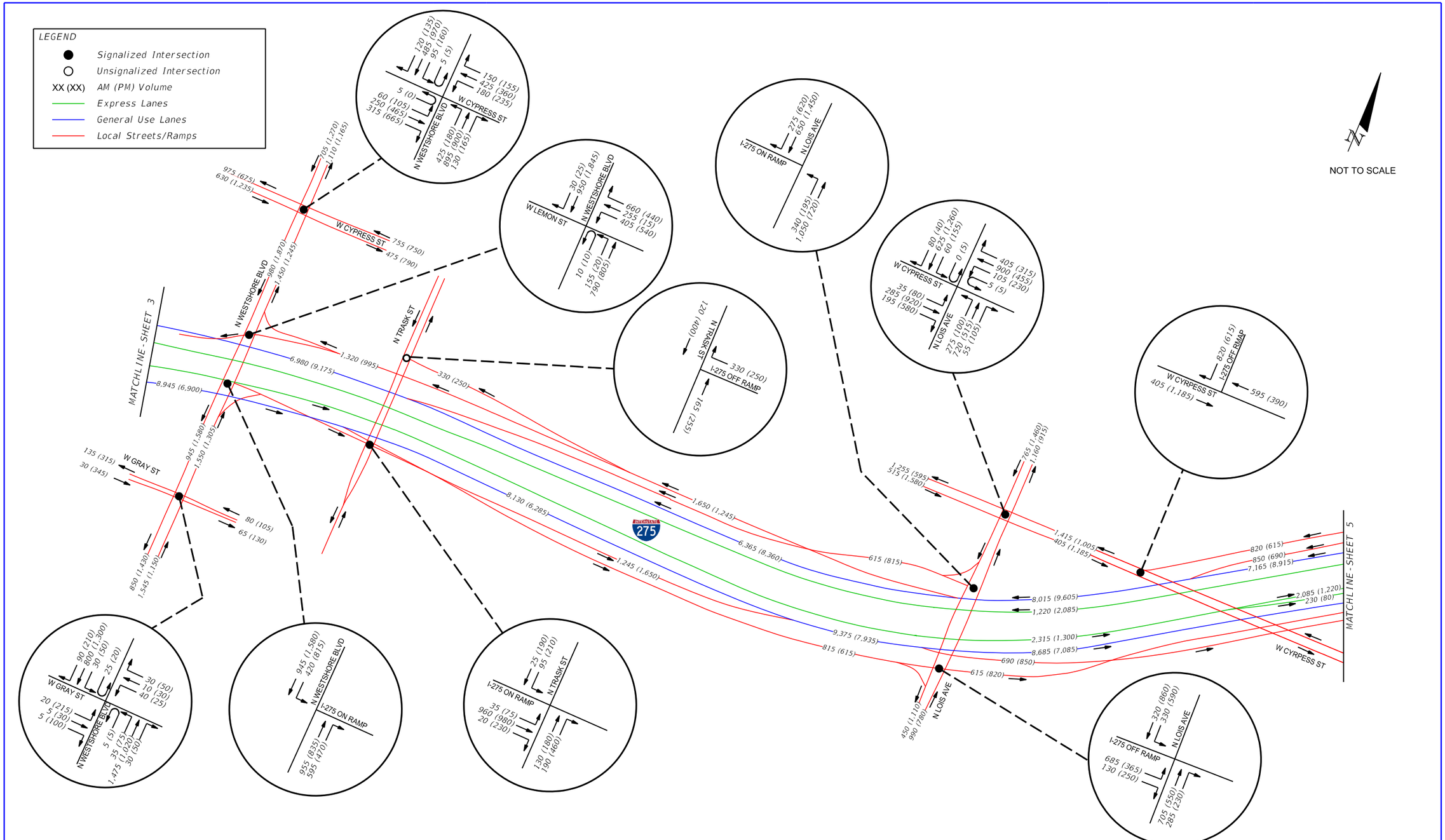
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs

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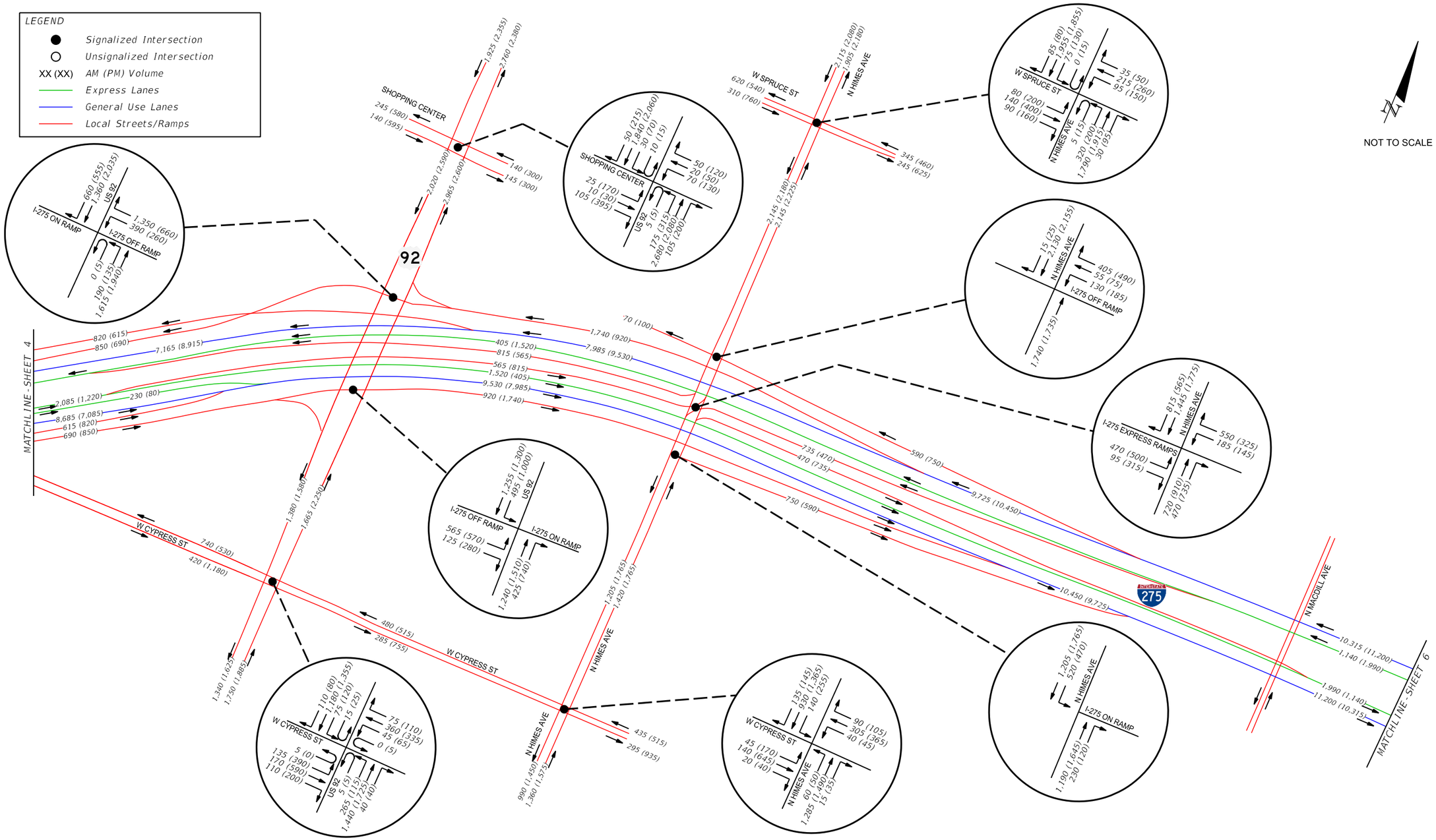

SEIS Re-evaluation

Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs

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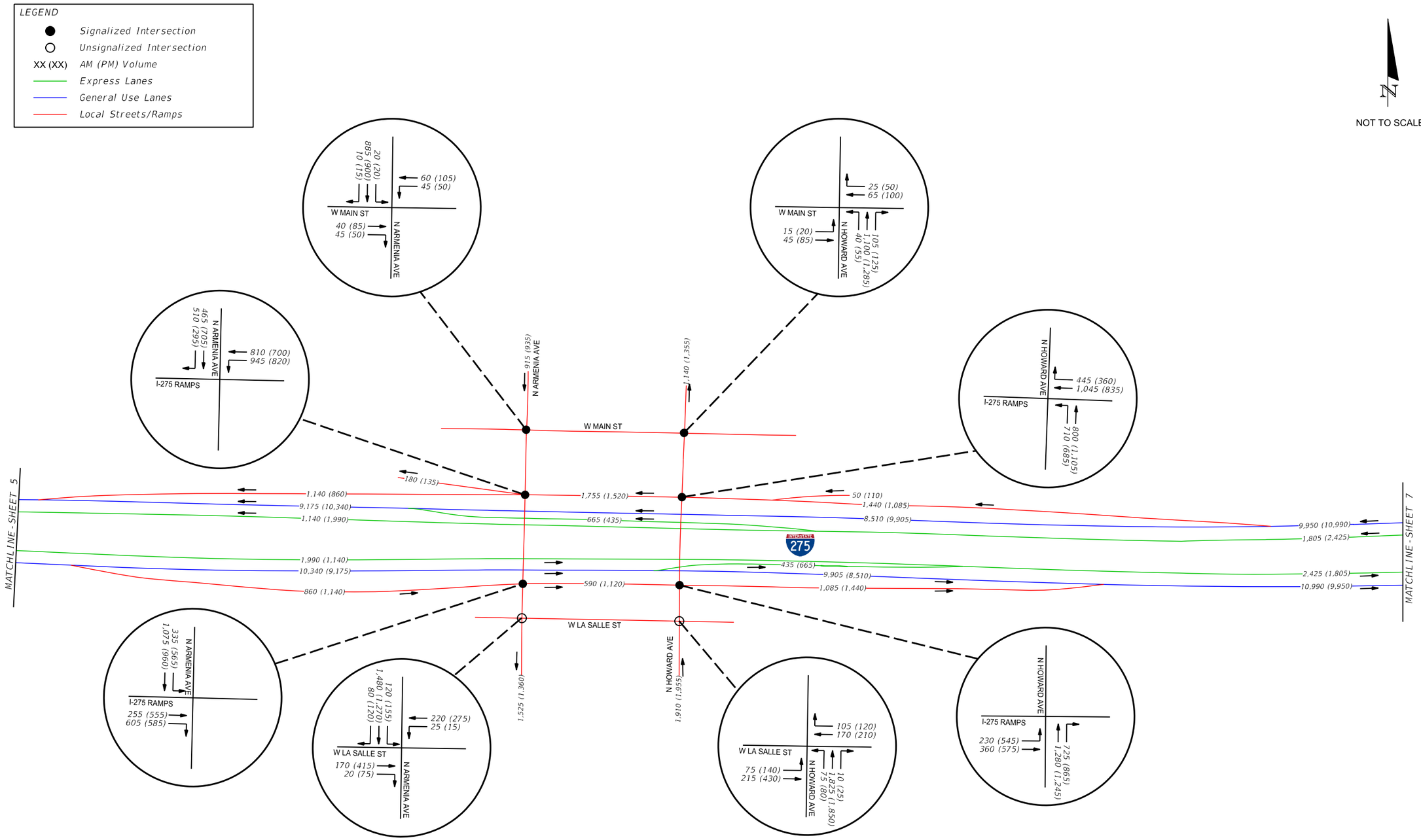

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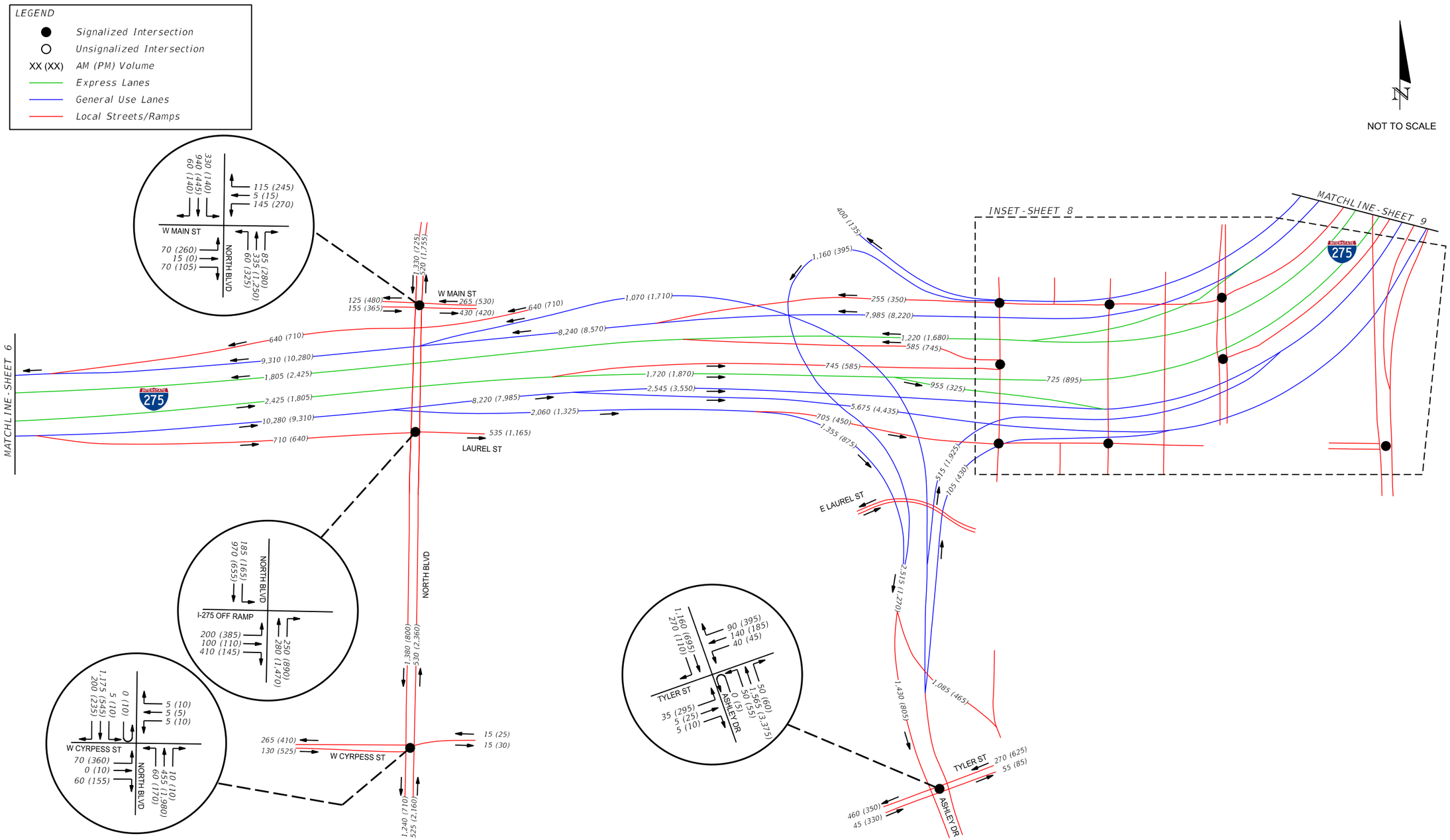

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Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs

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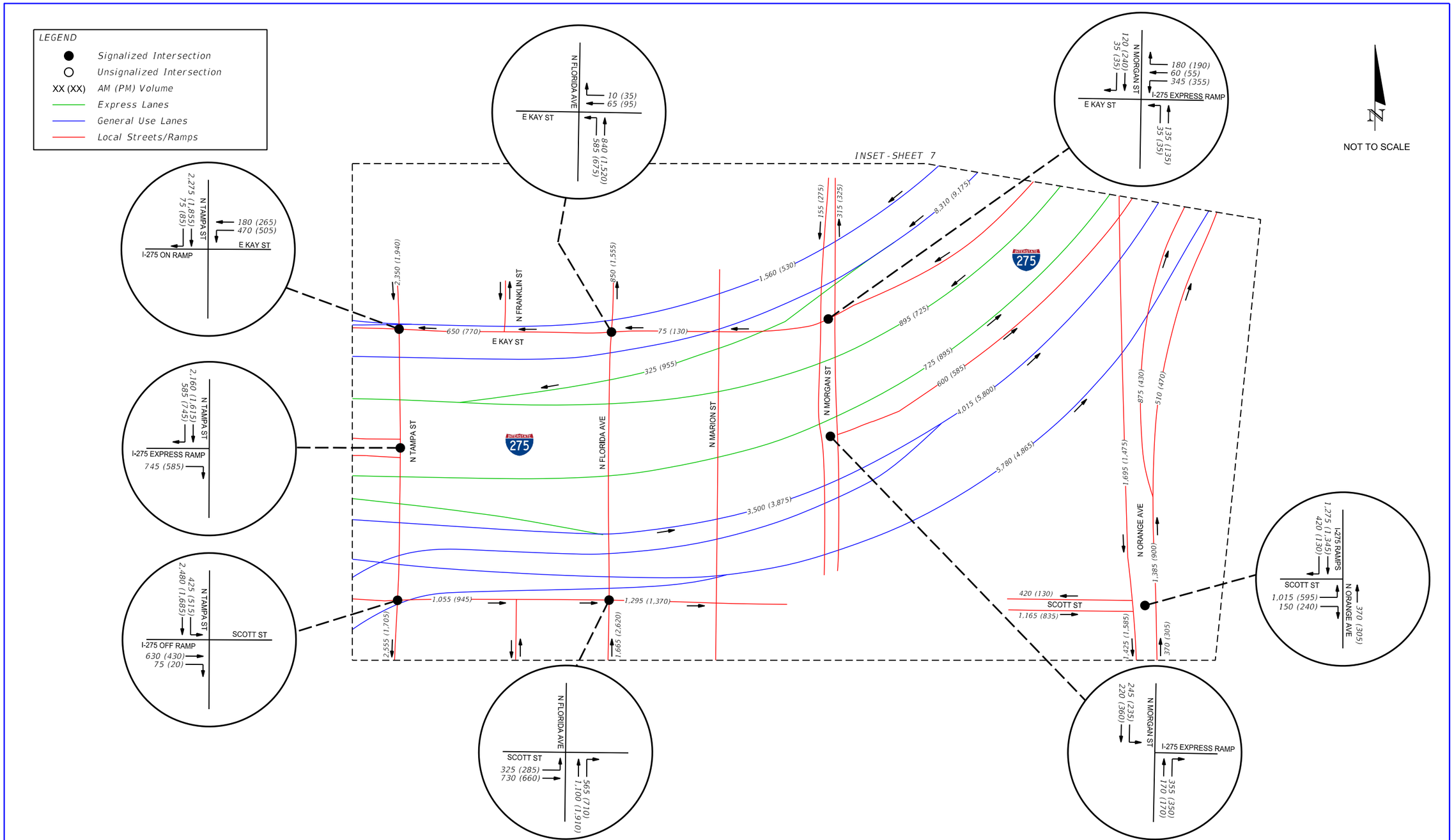

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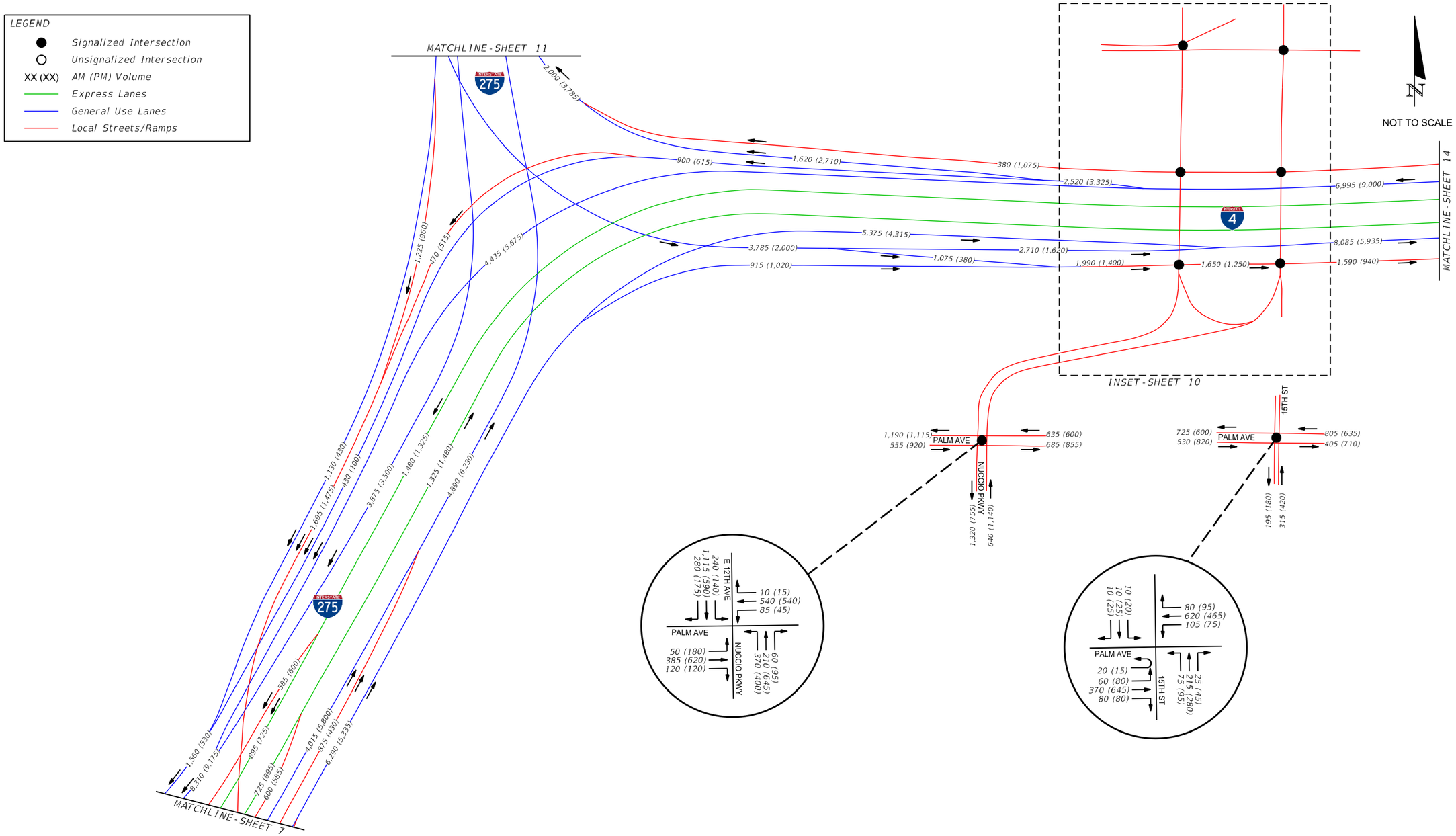

SEIS Re-evaluation

Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs

Figure 3-14

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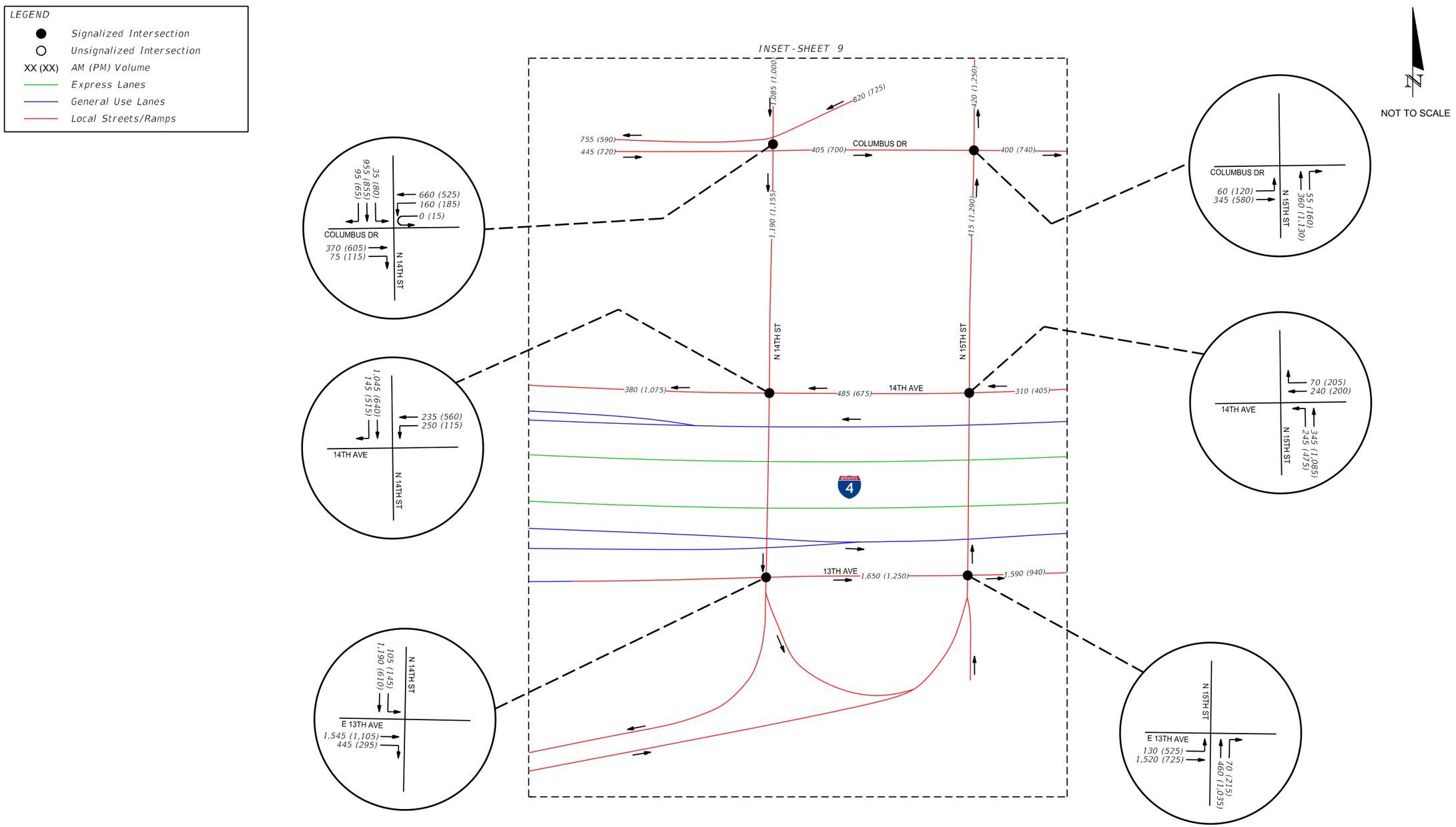

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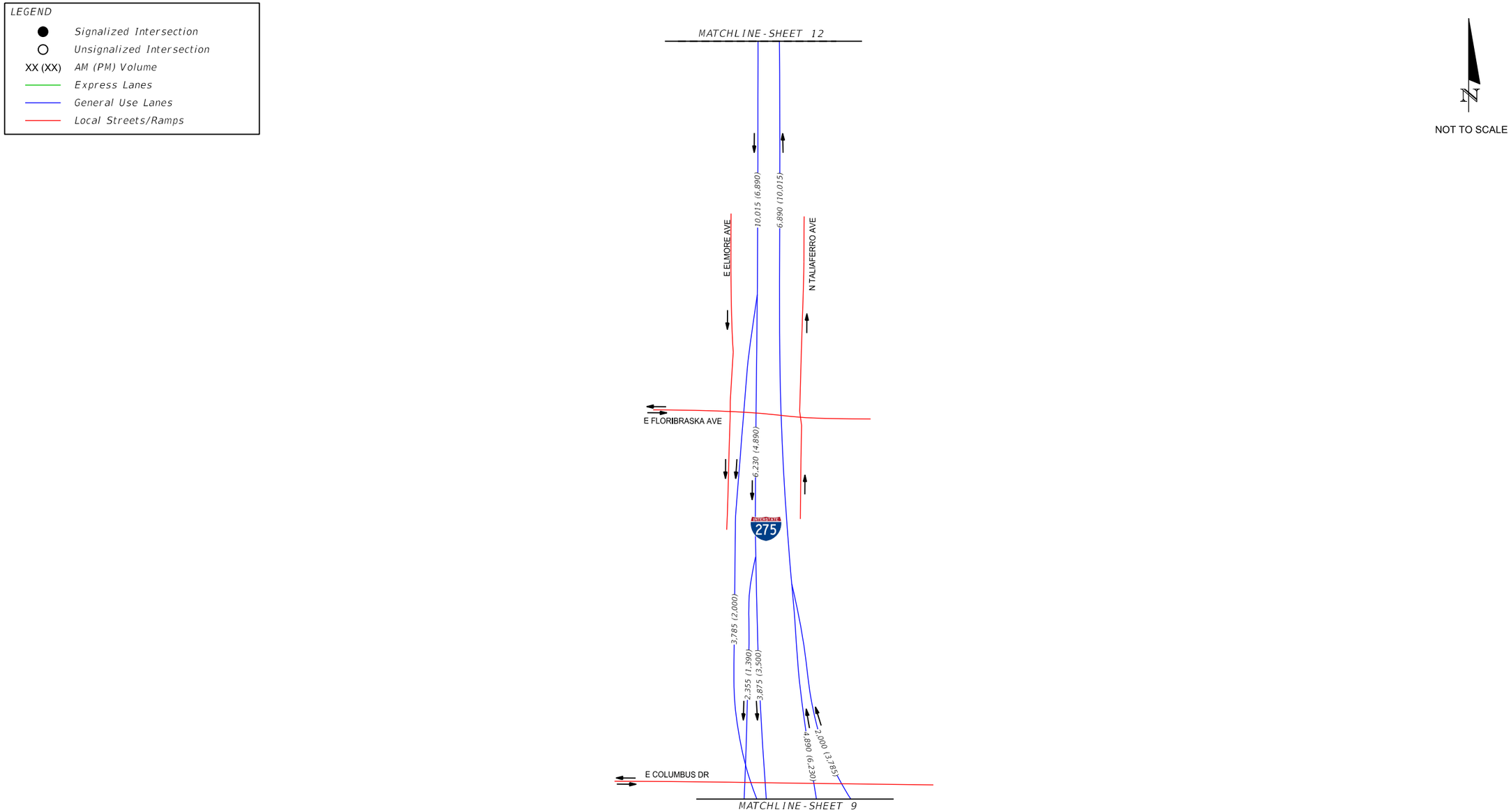

SEIS Re-evaluation

Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs

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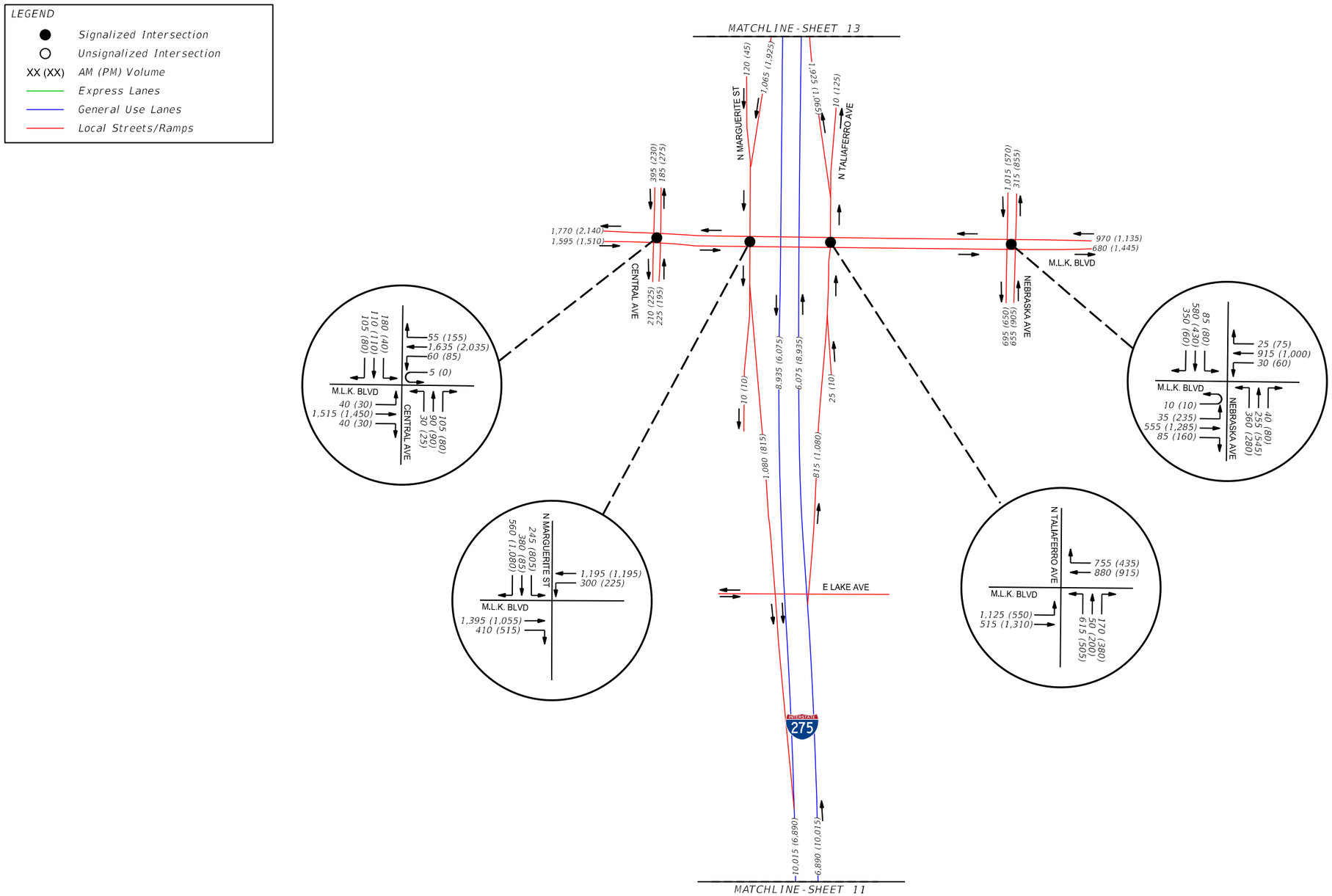

FDOT	SEIS Re-evaluation Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs	Figure 3-14	Sheet 12 of 16

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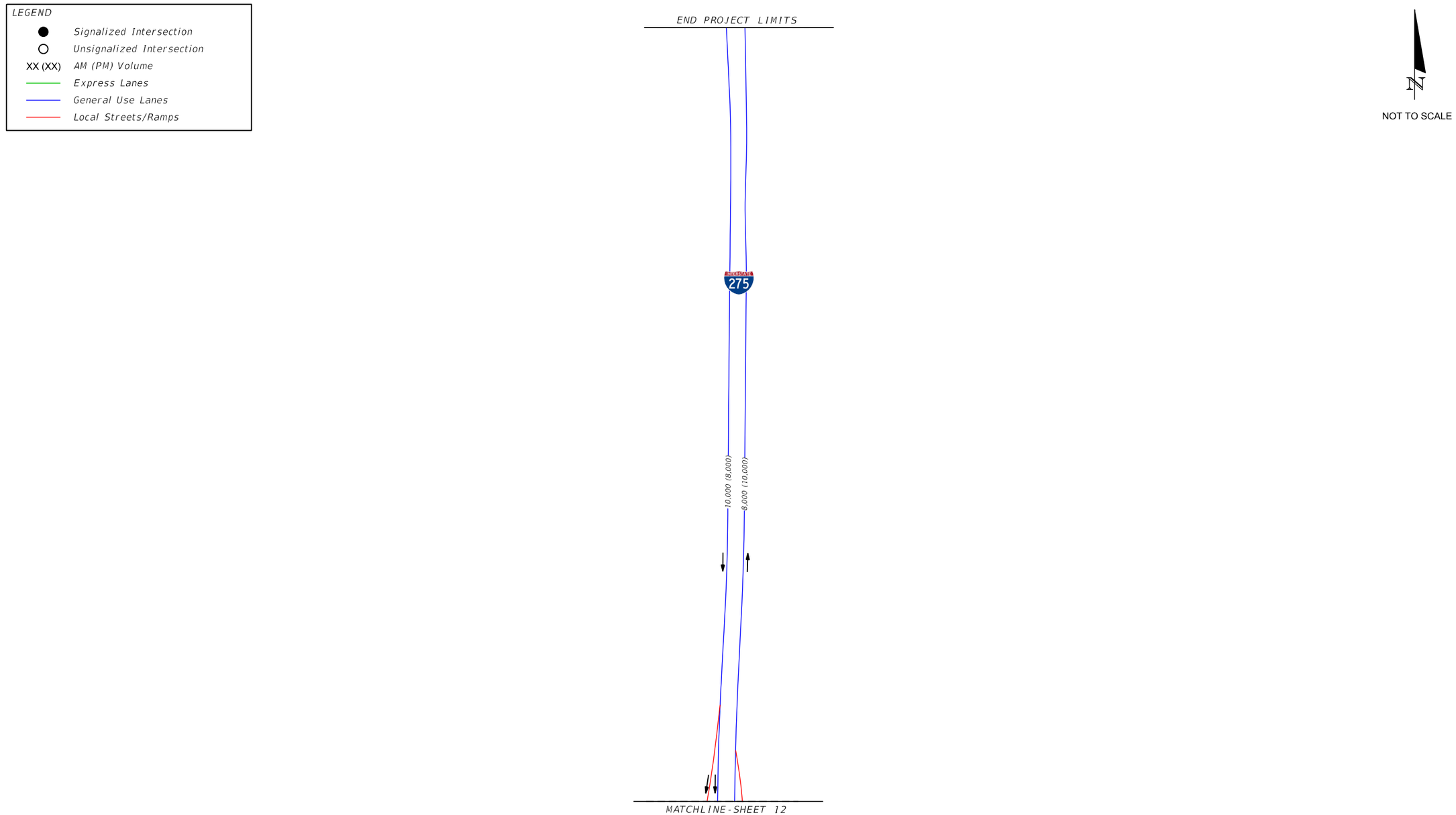

FDOT	SEIS Re-evaluation Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs	Figure 3-14	Sheet 13 of 16

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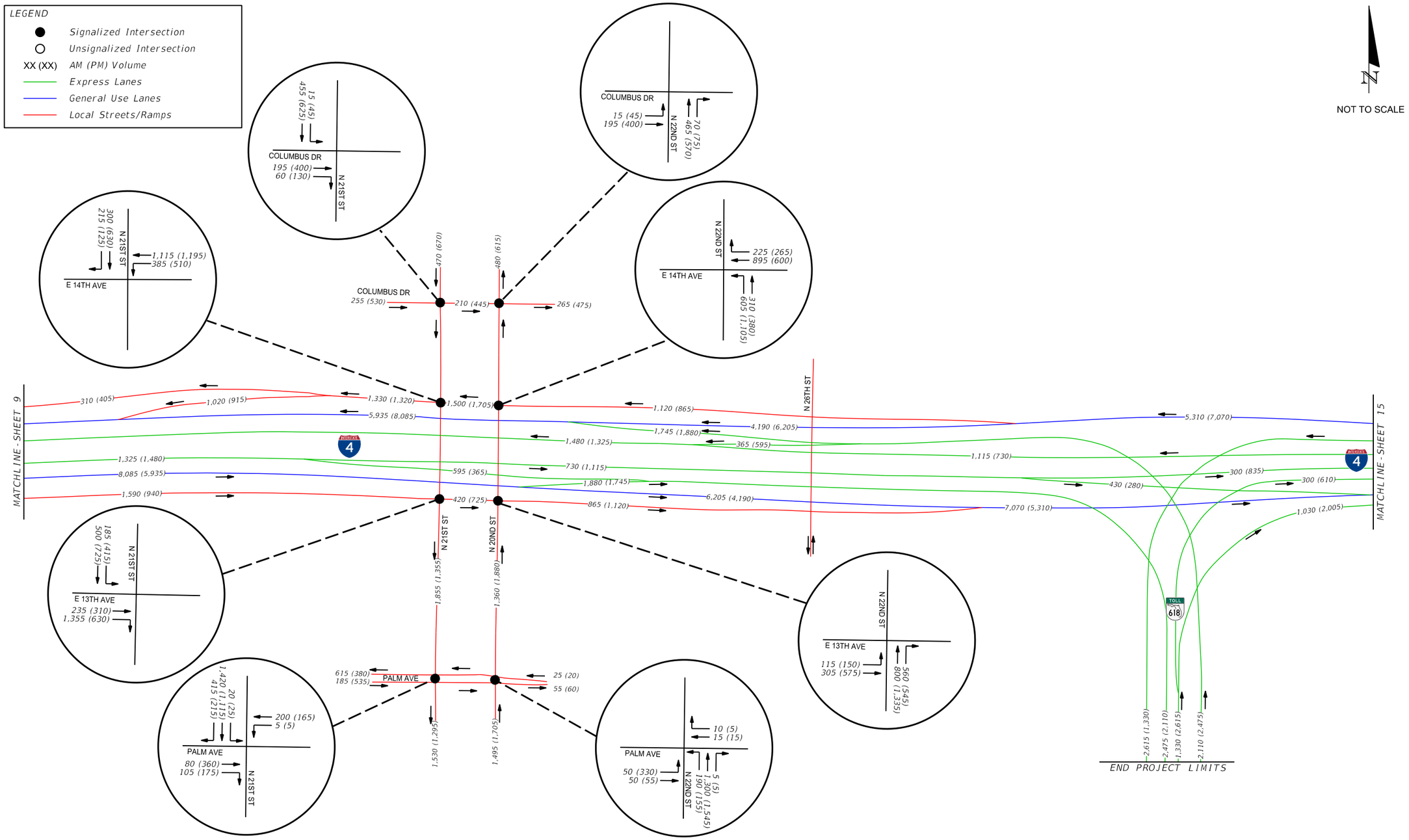

SEIS Re-evaluation

Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs

Figure 3-14

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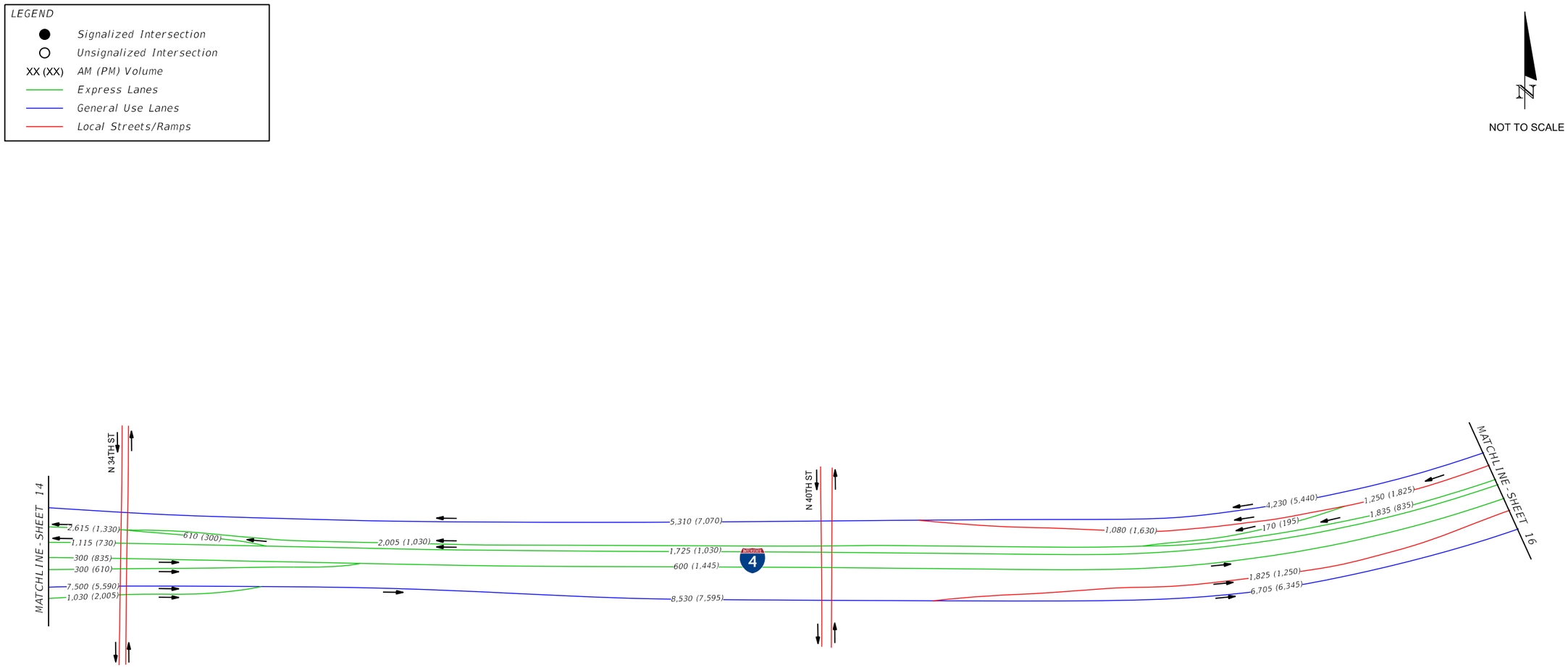

FDOT	SEIS Re-evaluation Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs	Figure 3-14	Sheet 15 of 16

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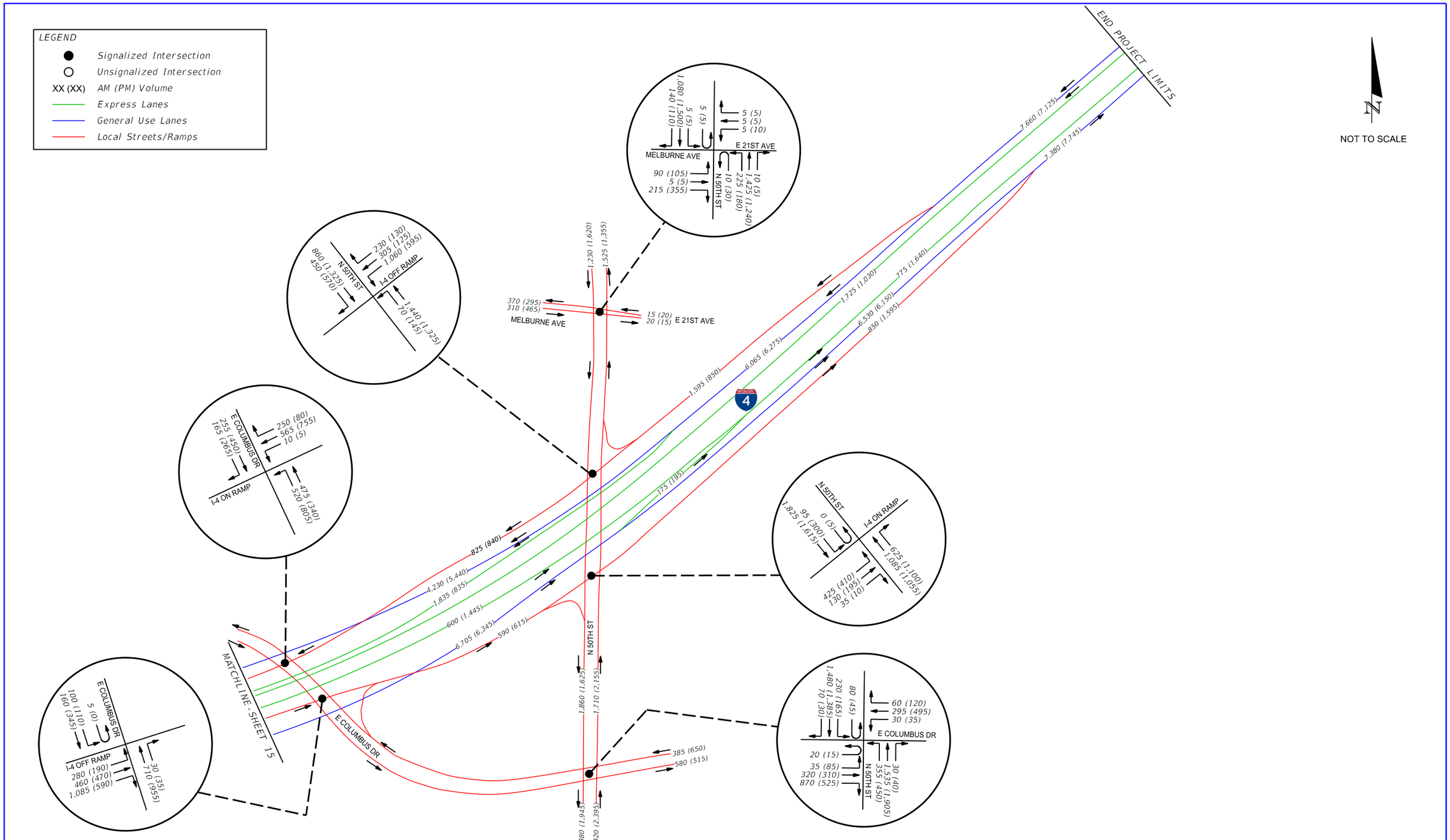
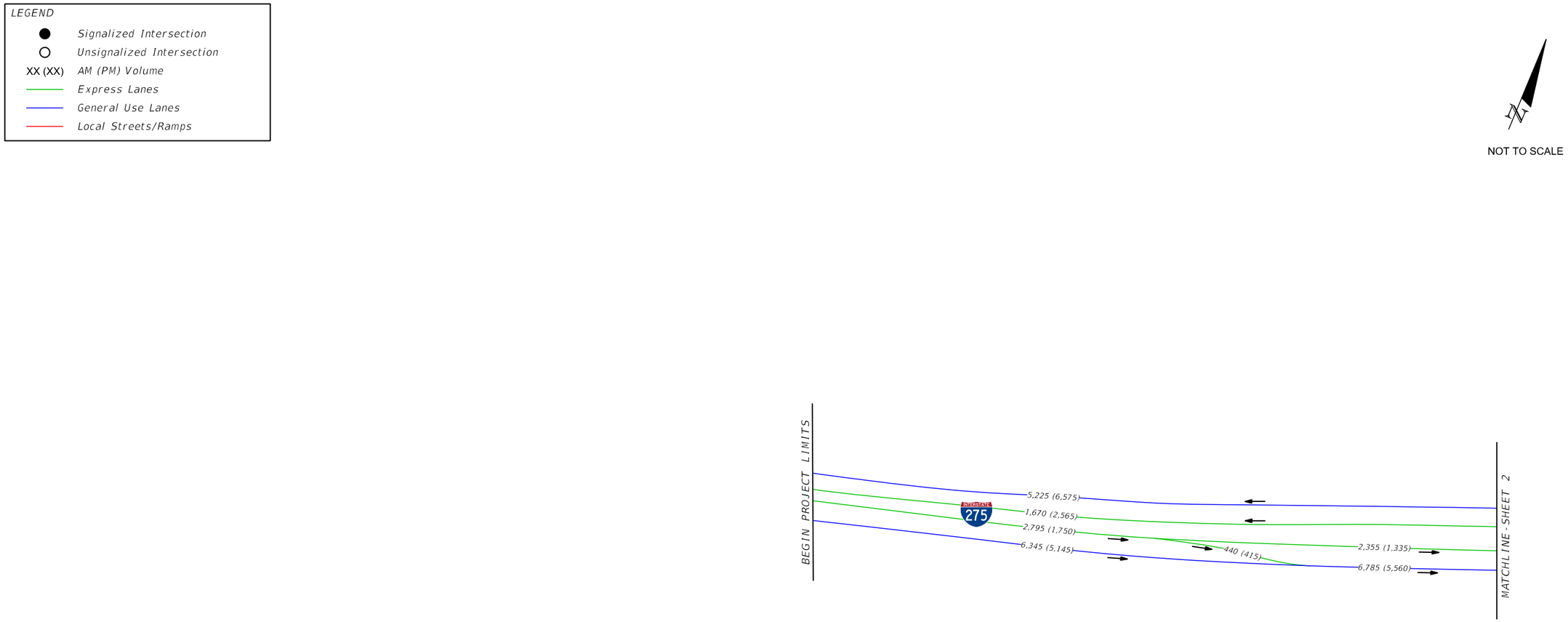


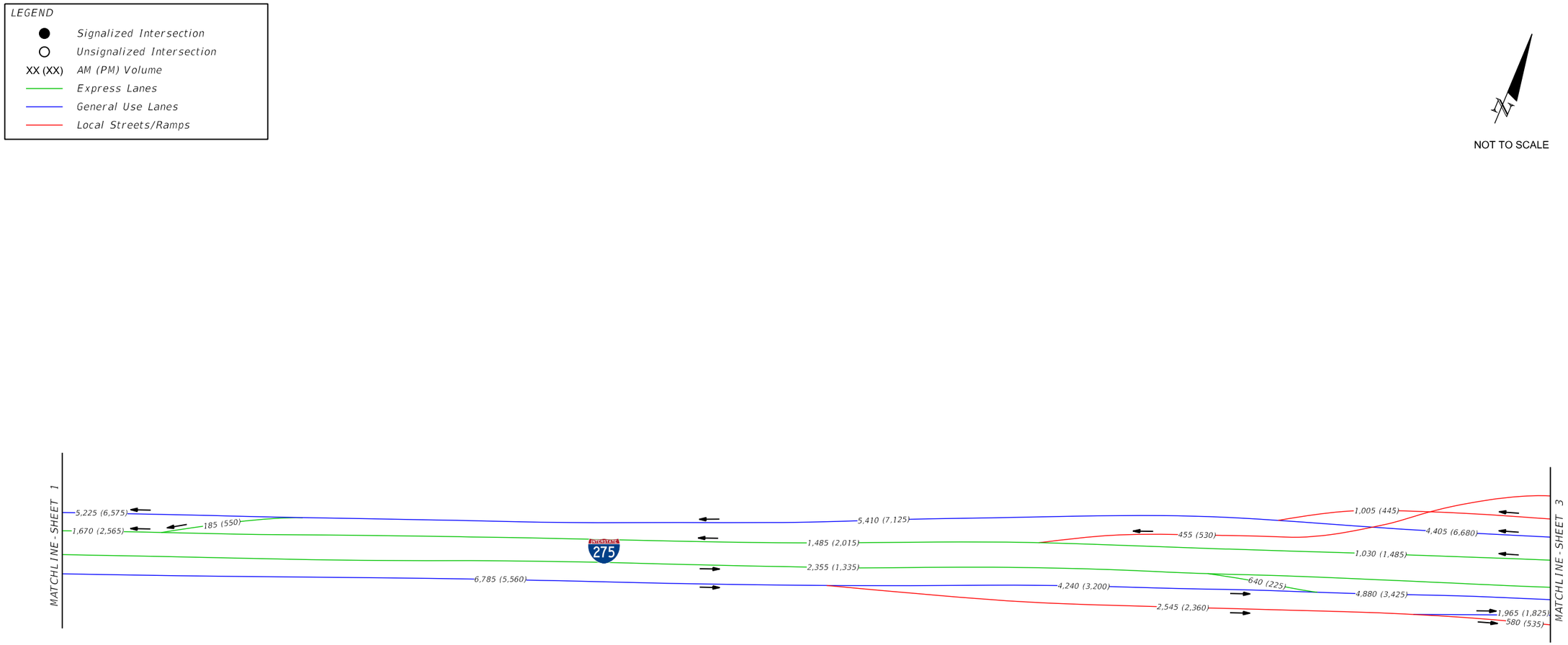
FDOT	SEIS Re-evaluation Build Alternative – Option B – Opening Year (2025) – AM & PM DDHVs	Figure 3-14	Sheet 16 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs	Figure 3-15	Sheet 1 of 16

WPI # 258337-2



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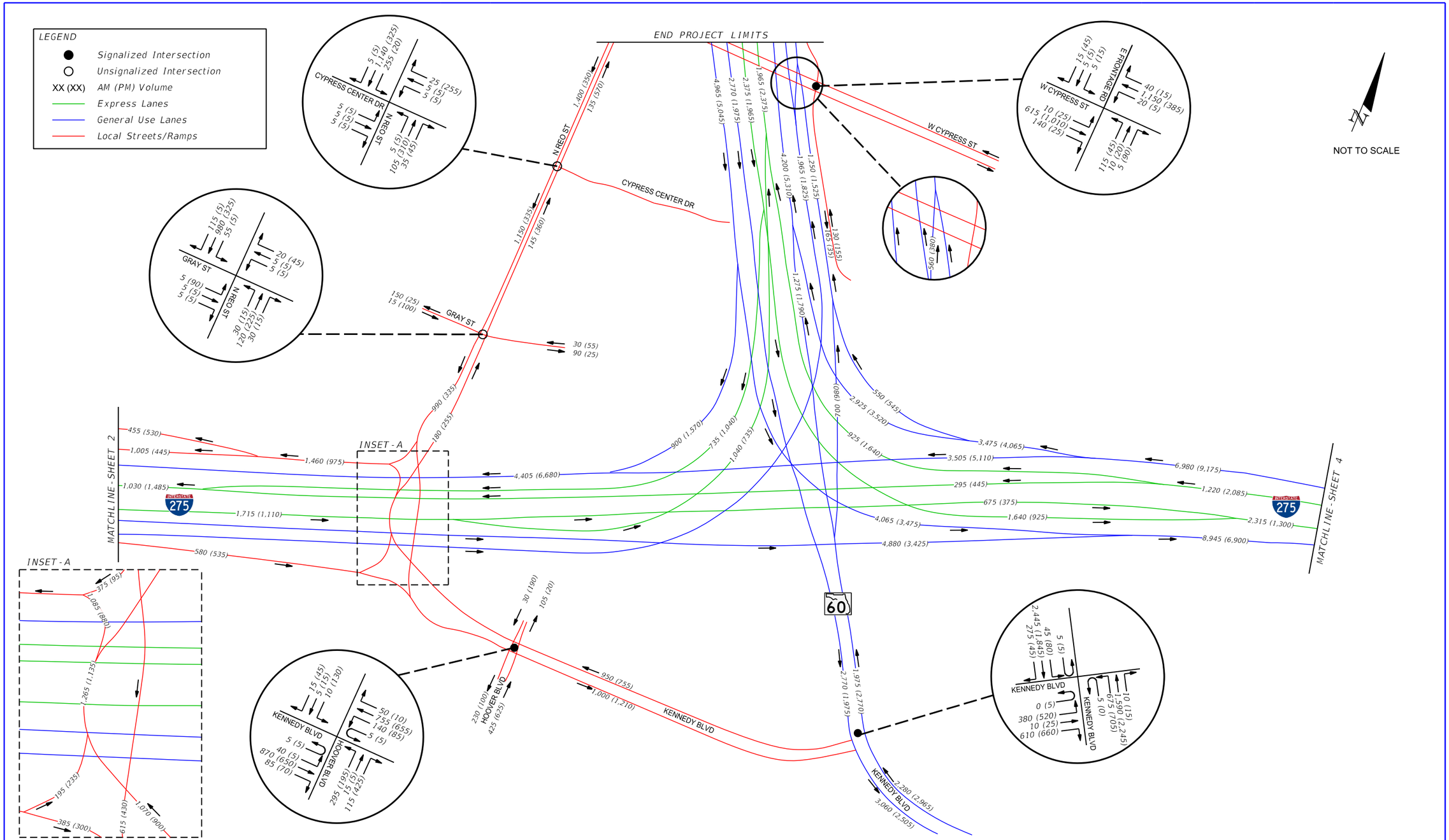

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SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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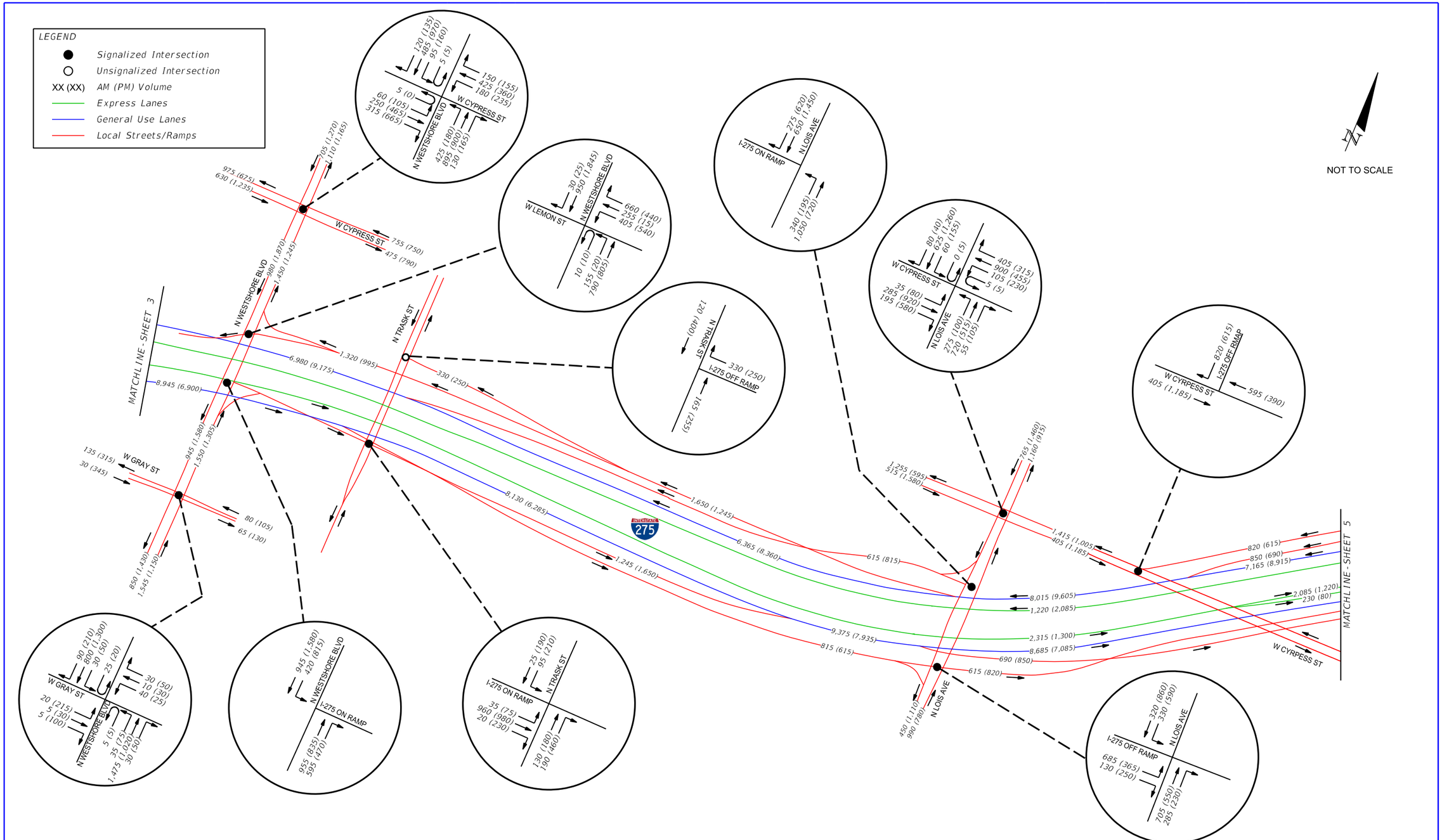

SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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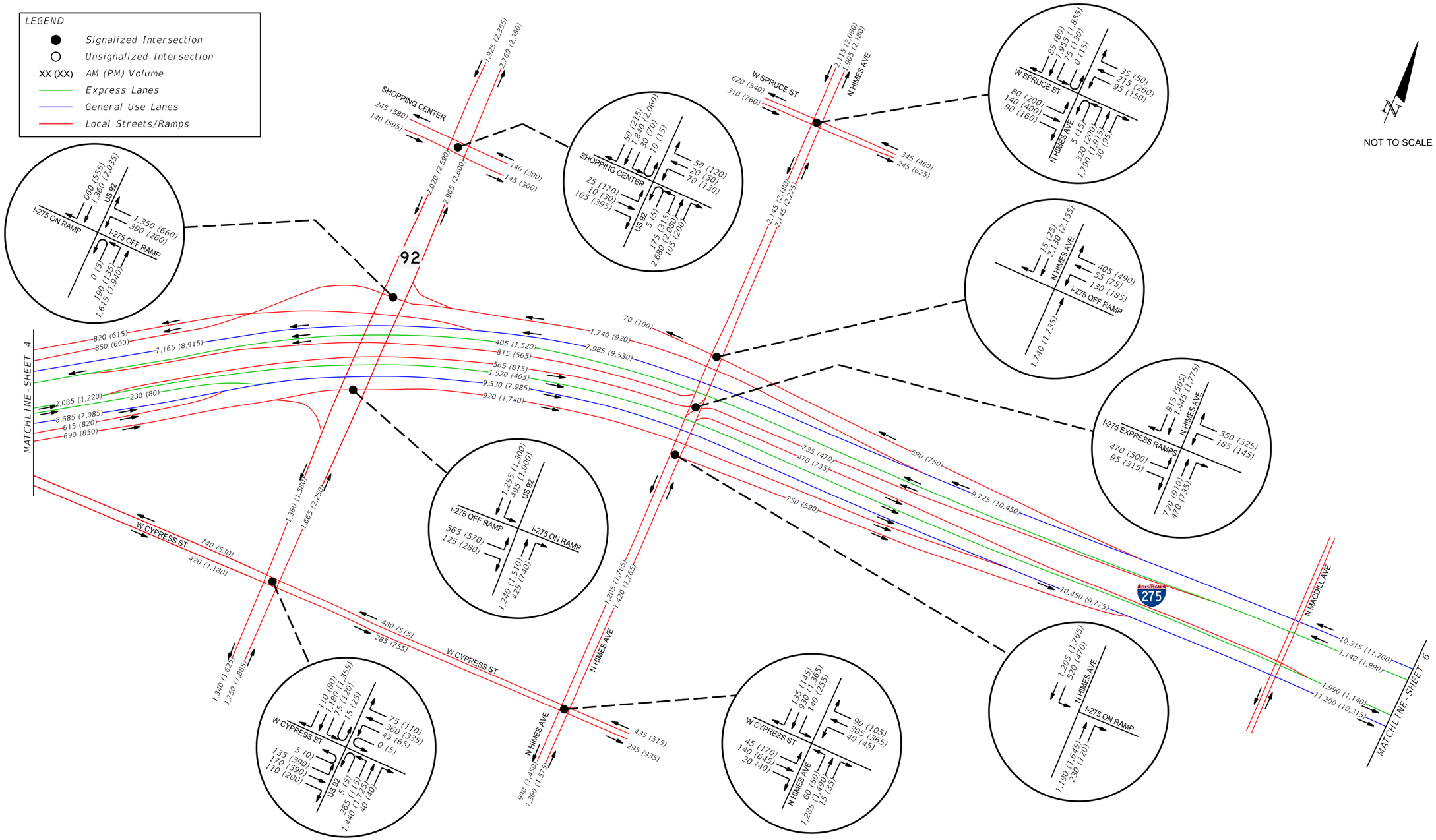

SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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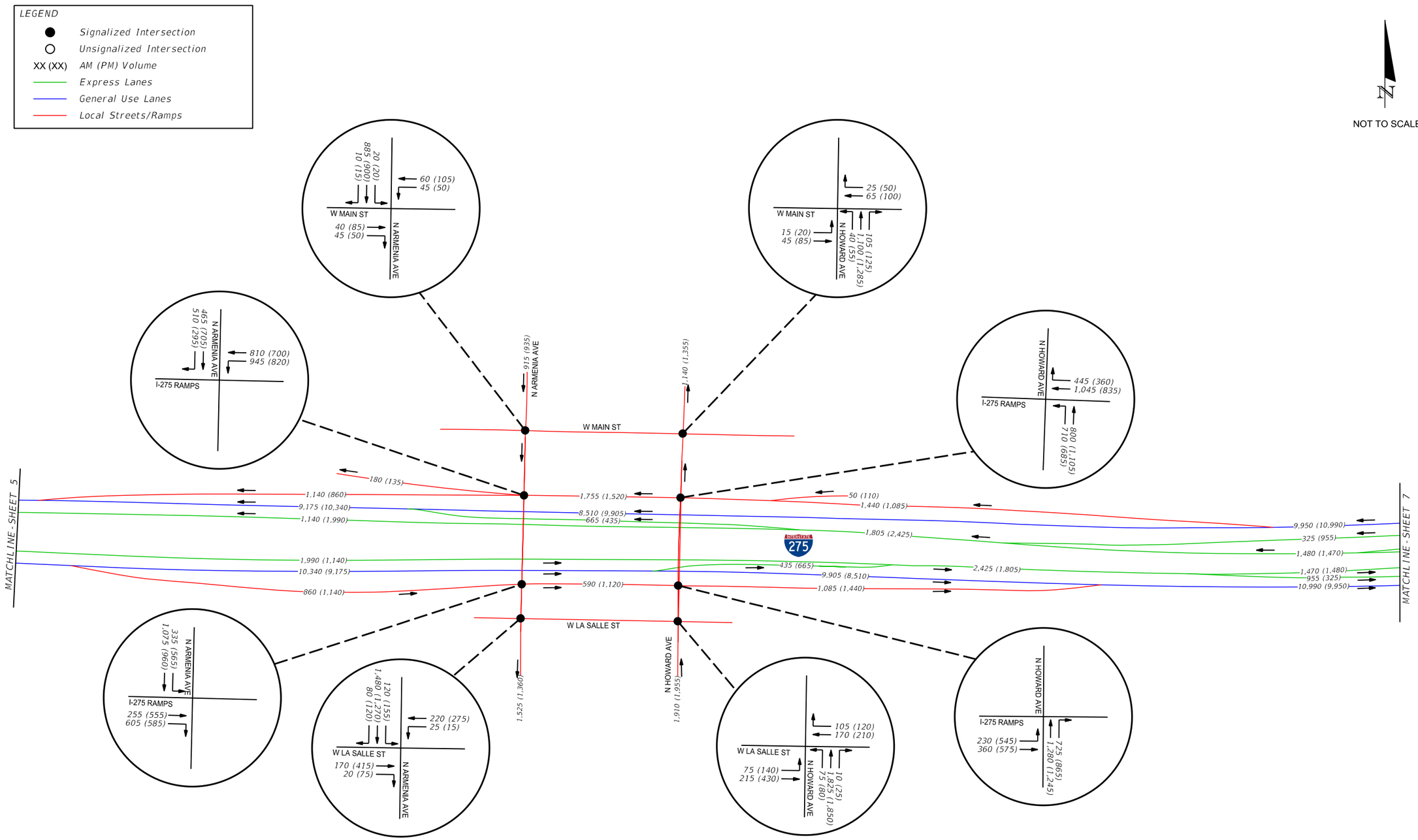
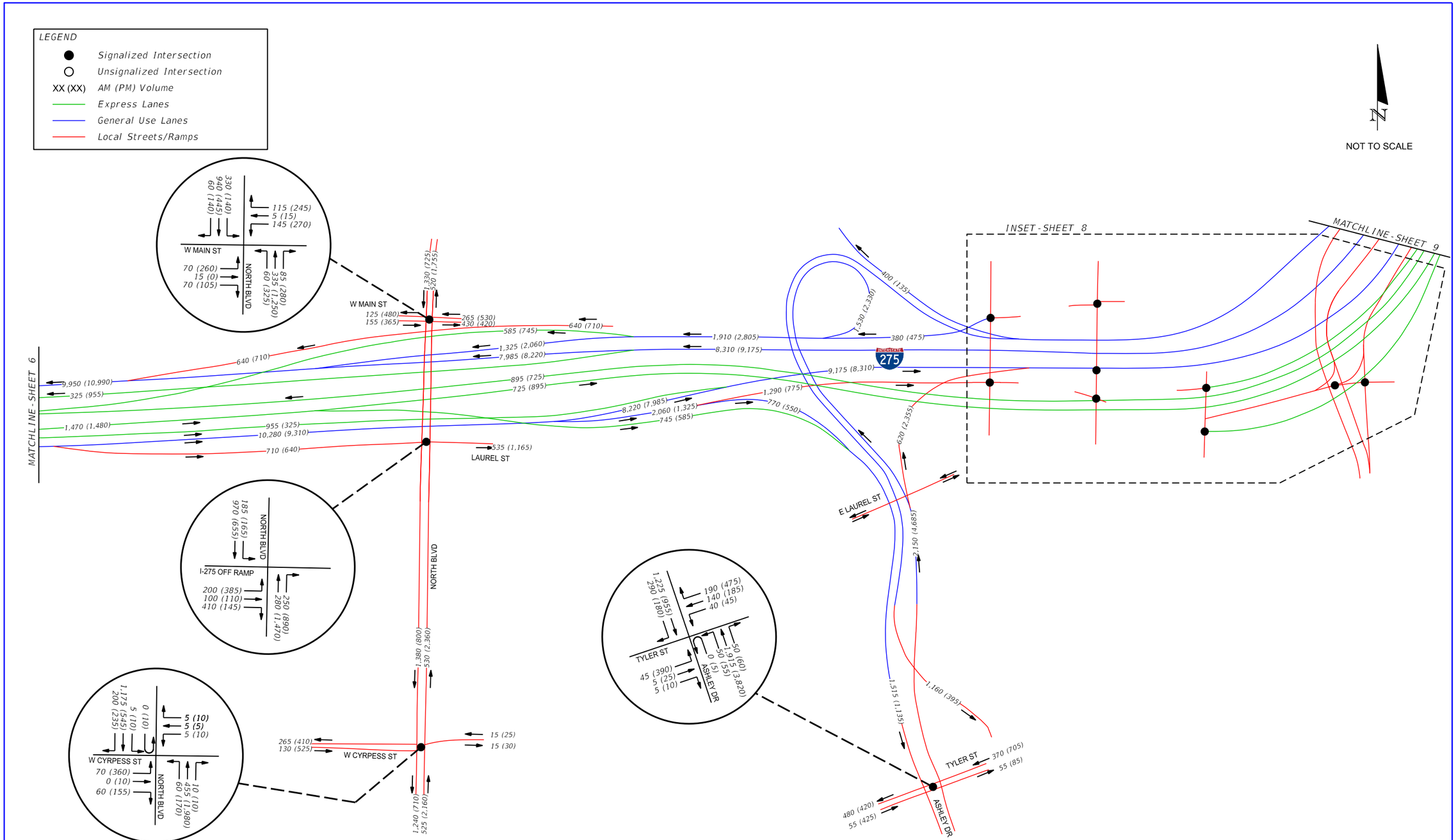


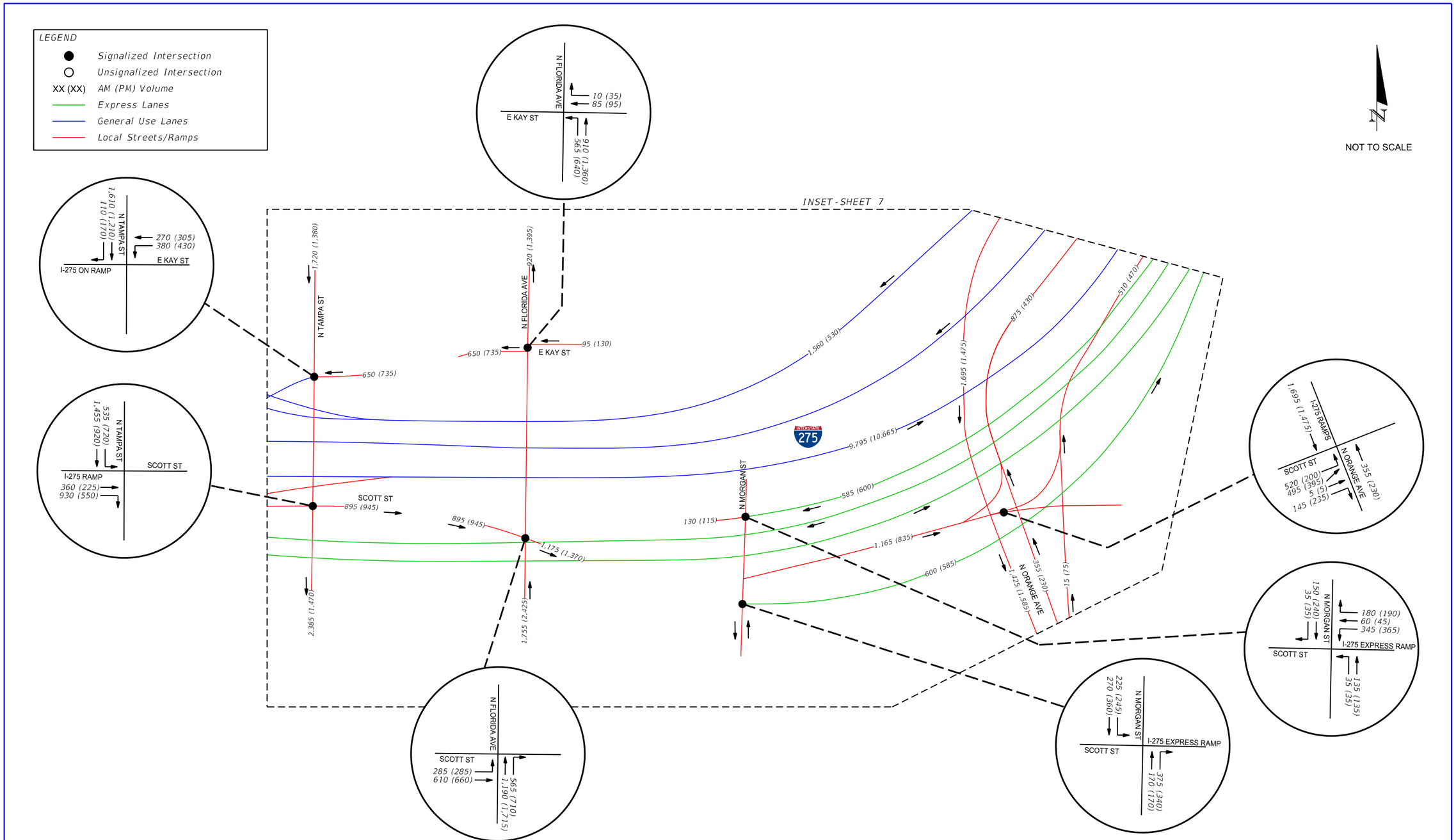
FDOT	SEIS Re-evaluation Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs	Figure 3-15	Sheet 6 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs	Figure 3-15	Sheet 7 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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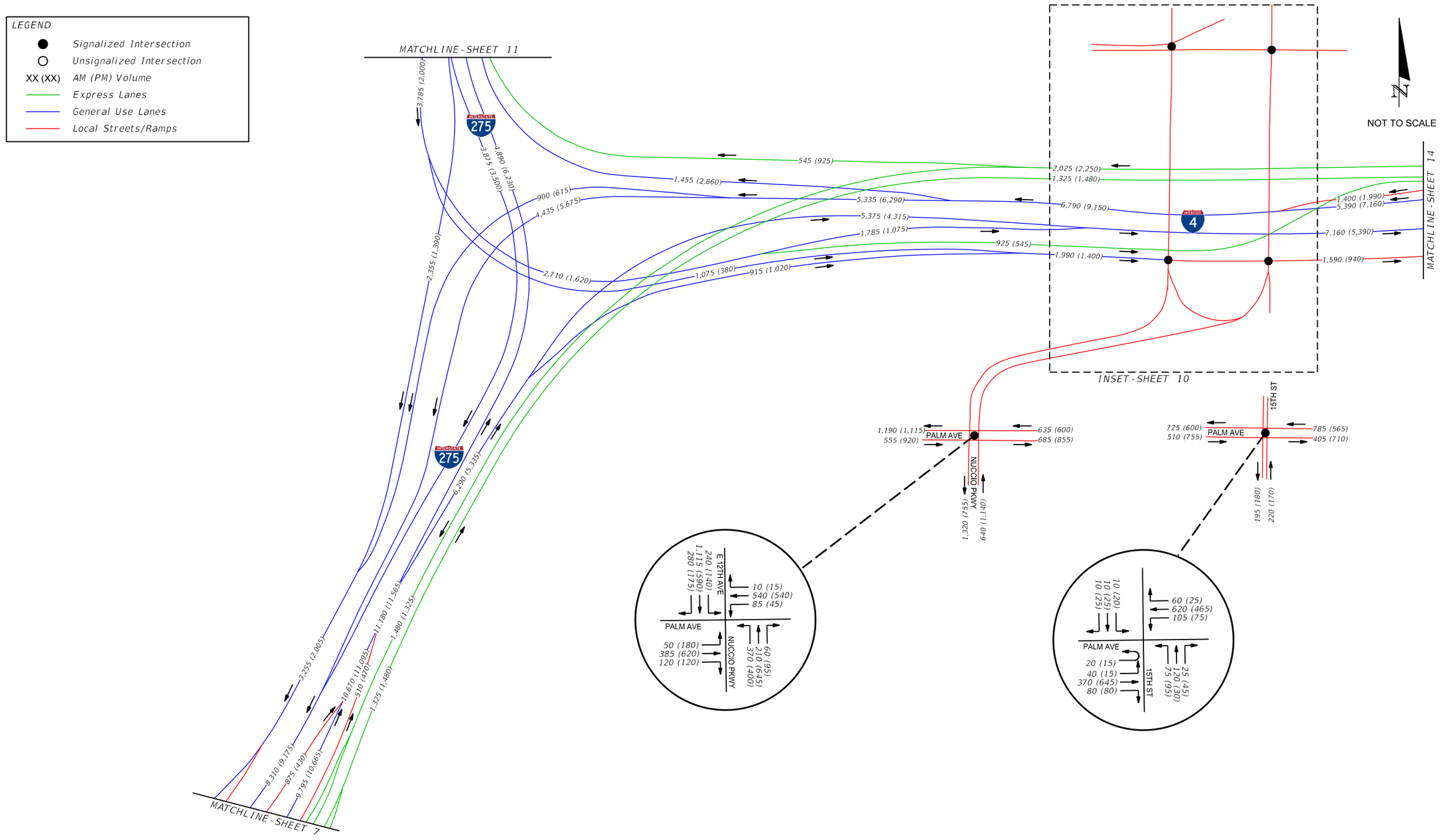
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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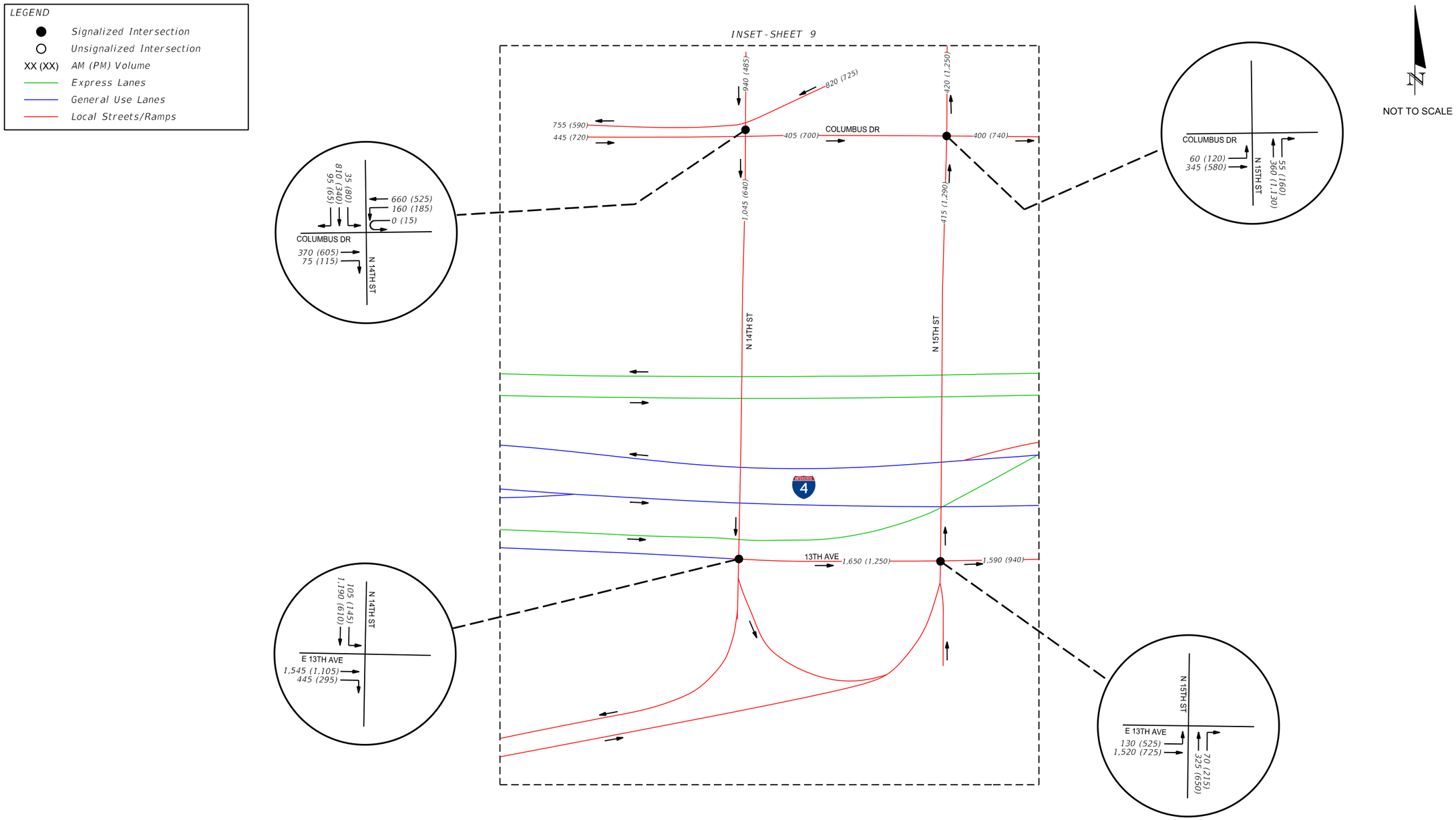
WPI # 258337-2



SEIS Re-evaluation

Build Alternative - Option C - Opening Year (2025) - AM & PM DDHVs

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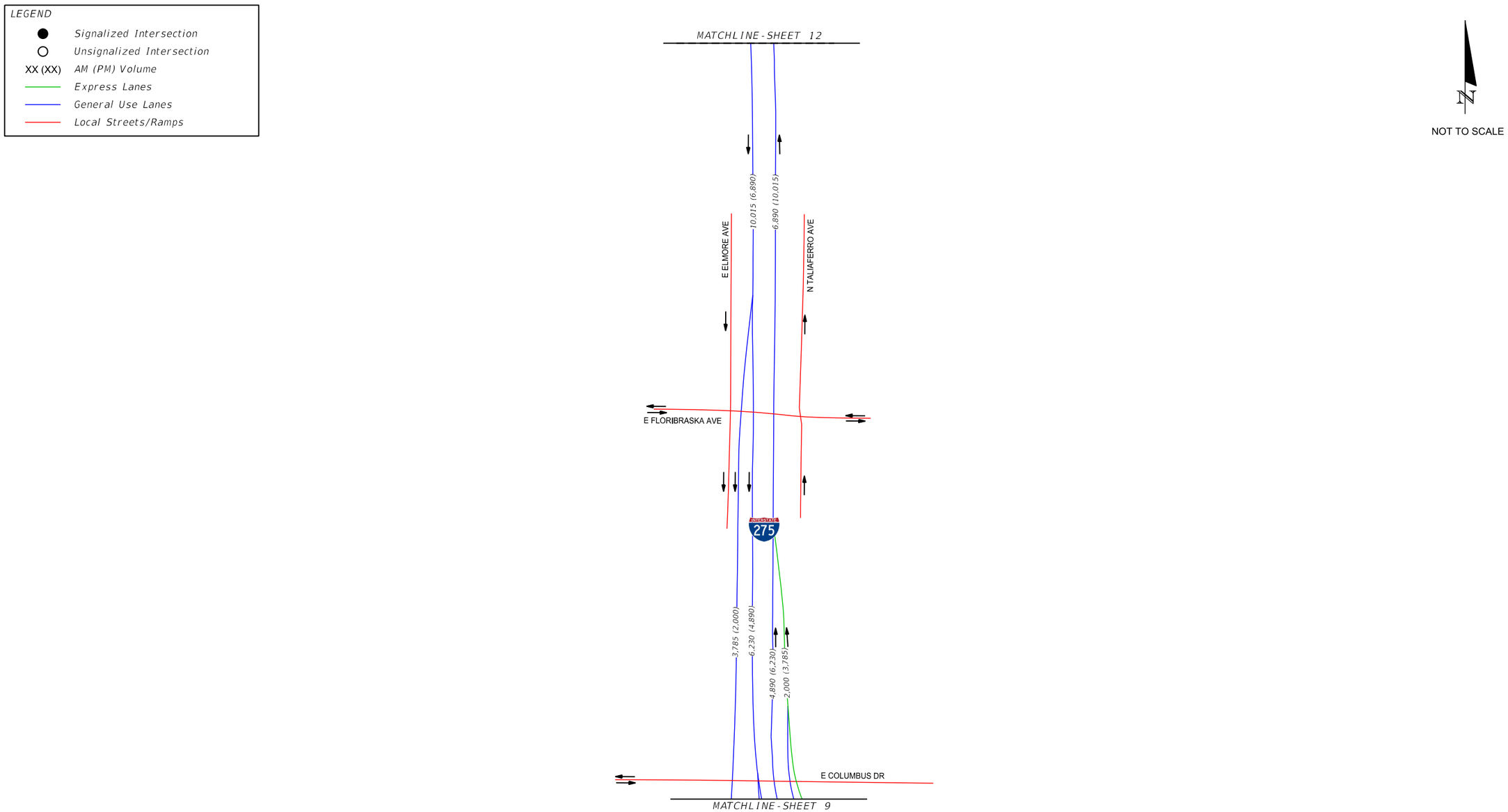
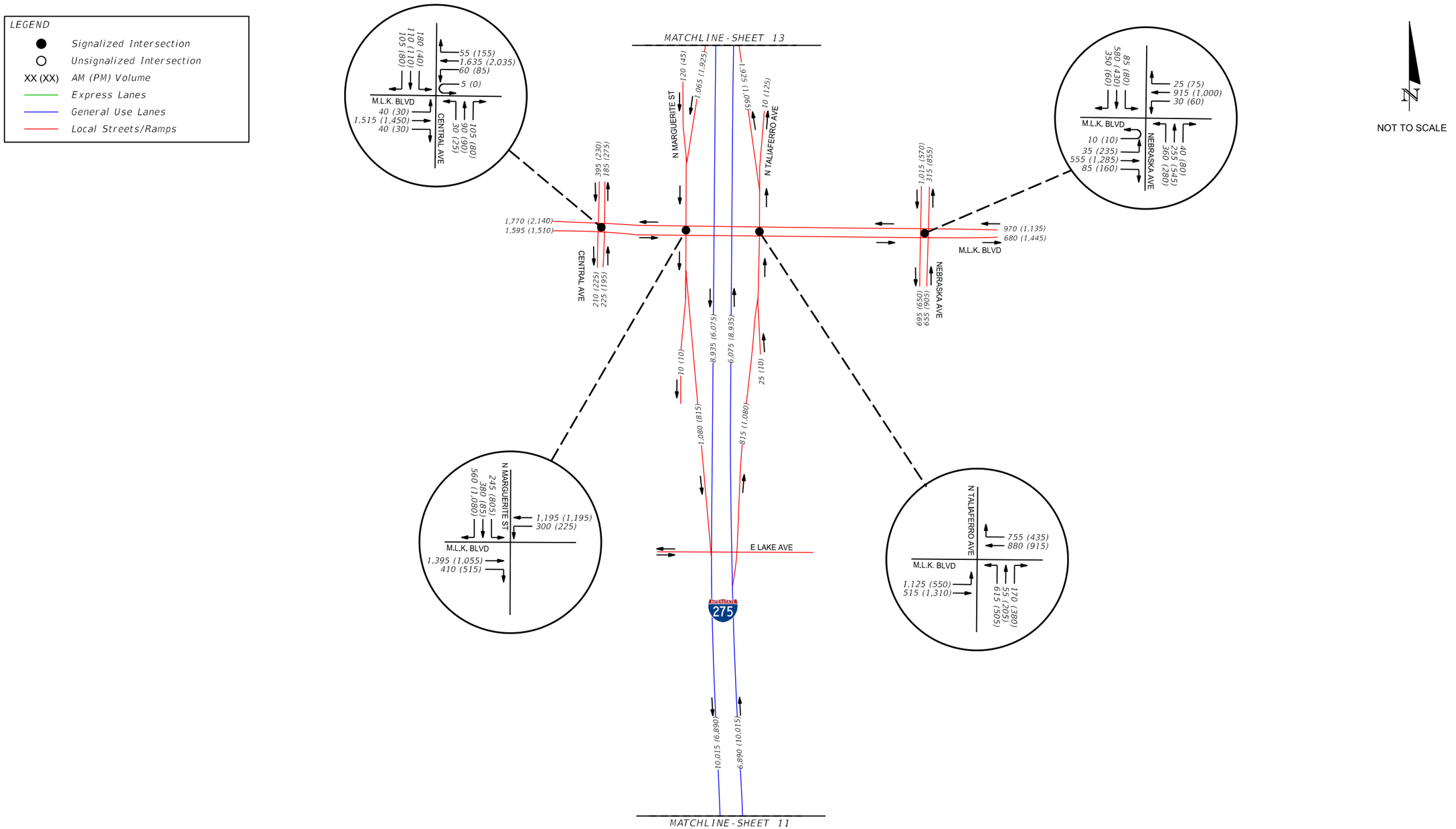
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs	Figure 3-15	Sheet 11 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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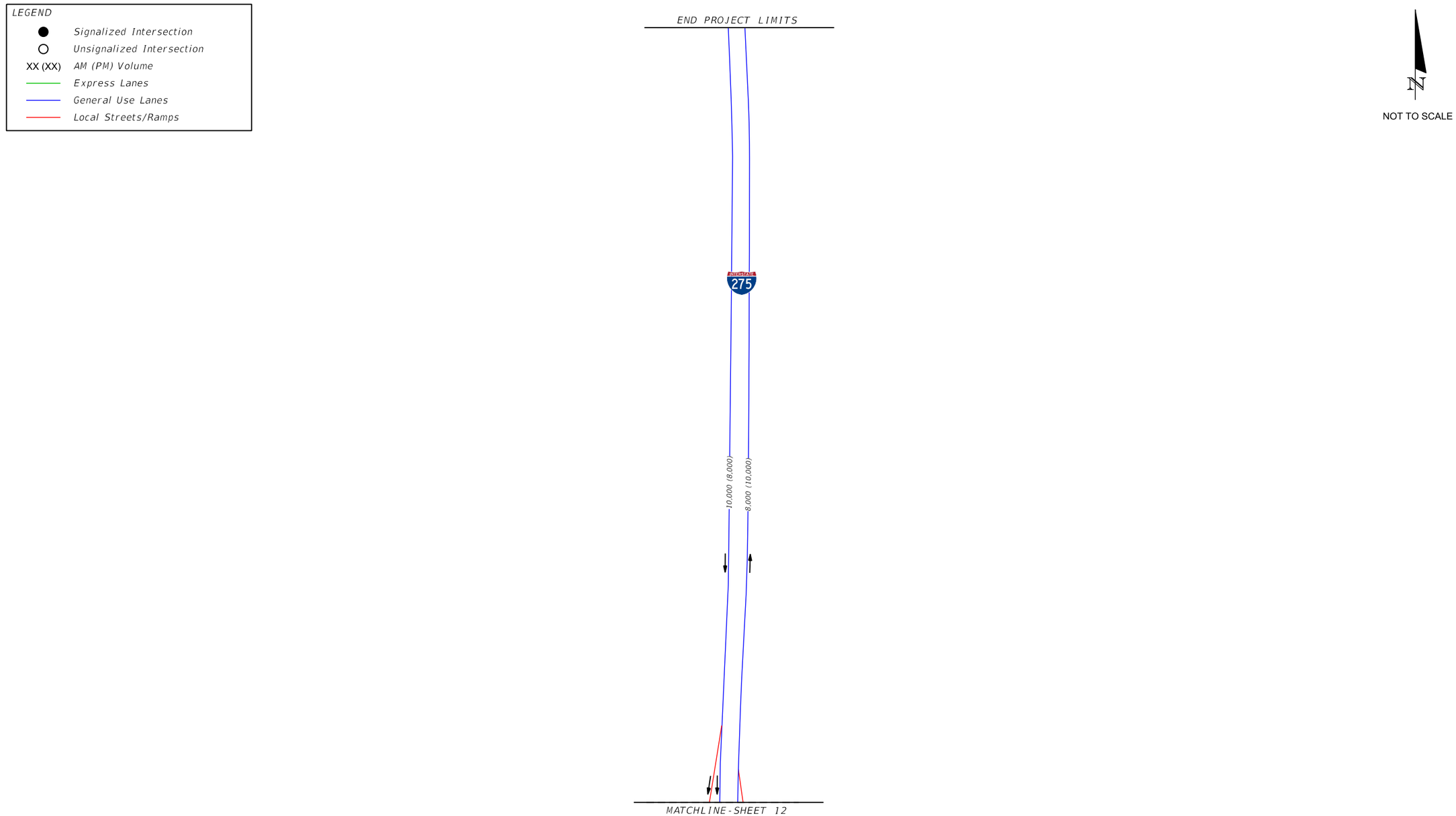
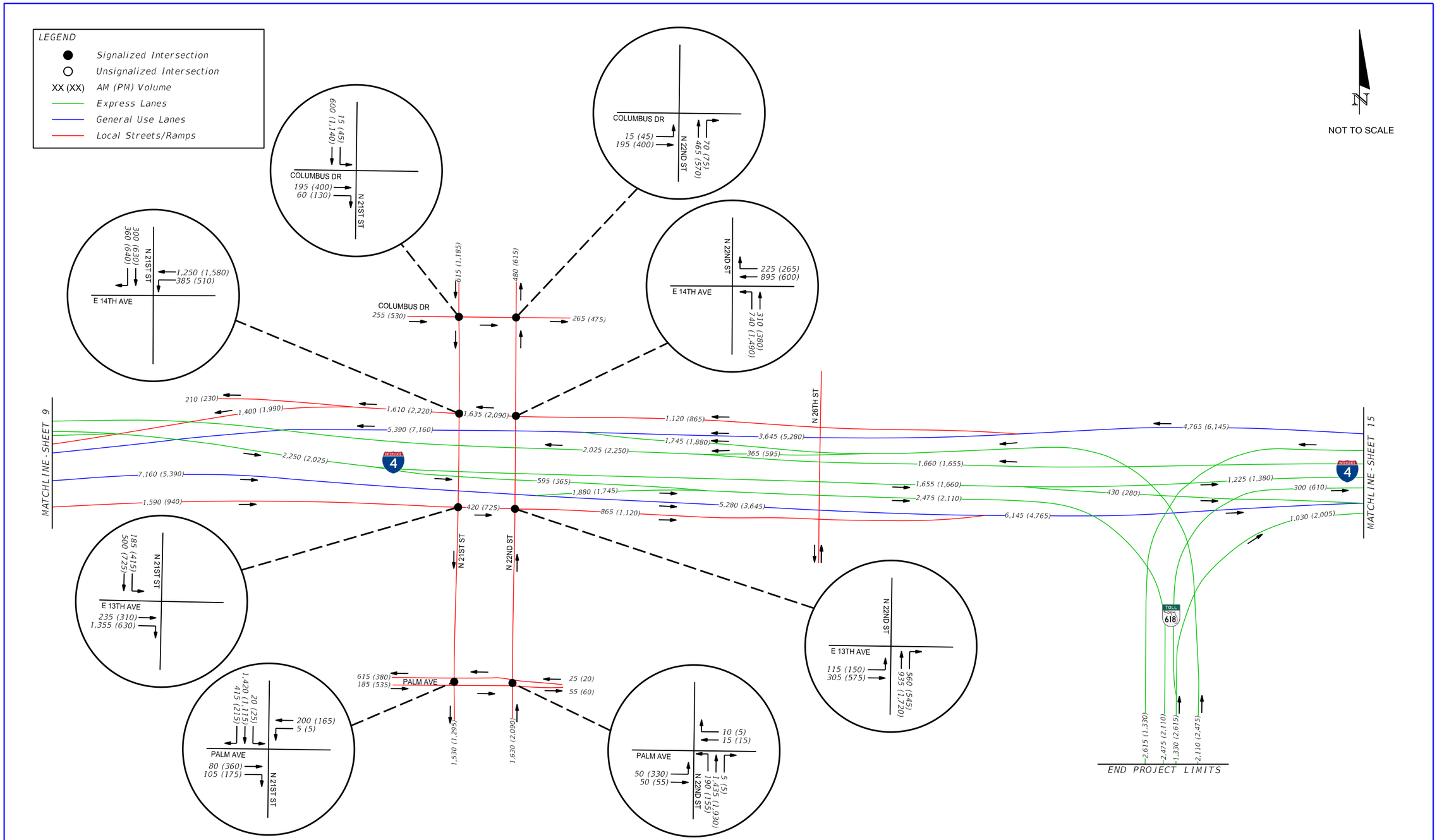
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs	Figure 3-15	Sheet 13 of 16

WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option C – Opening Year (2025) – AM & PM DDHVs

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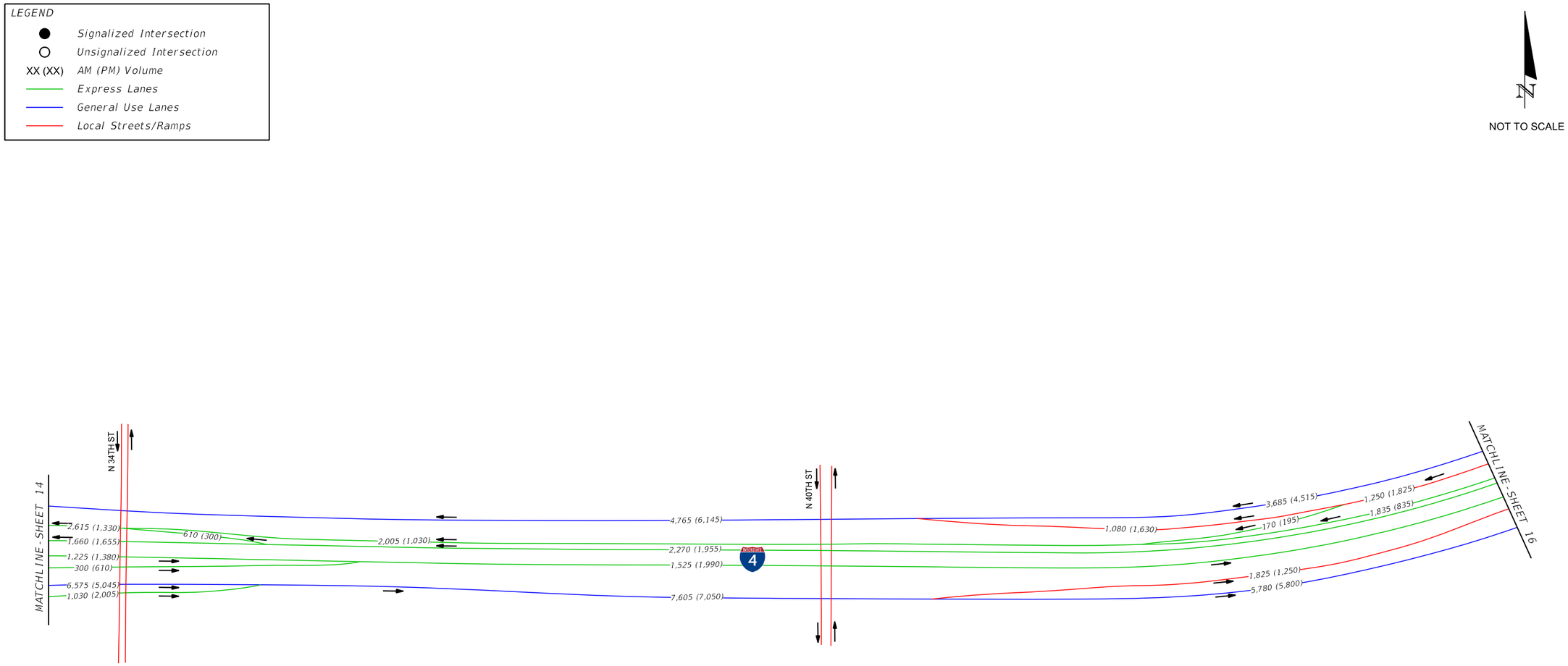
WPI # 258337-2



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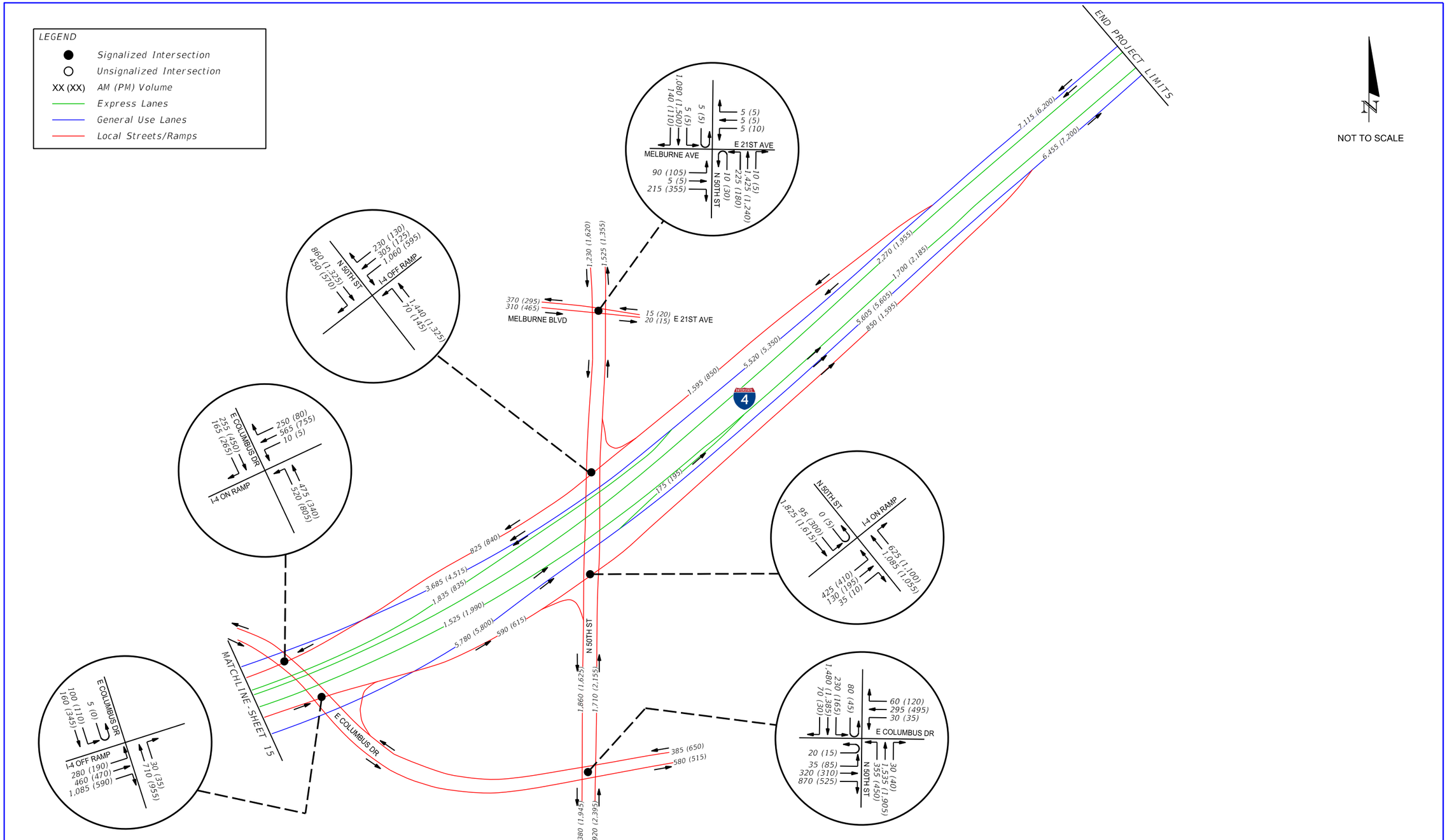

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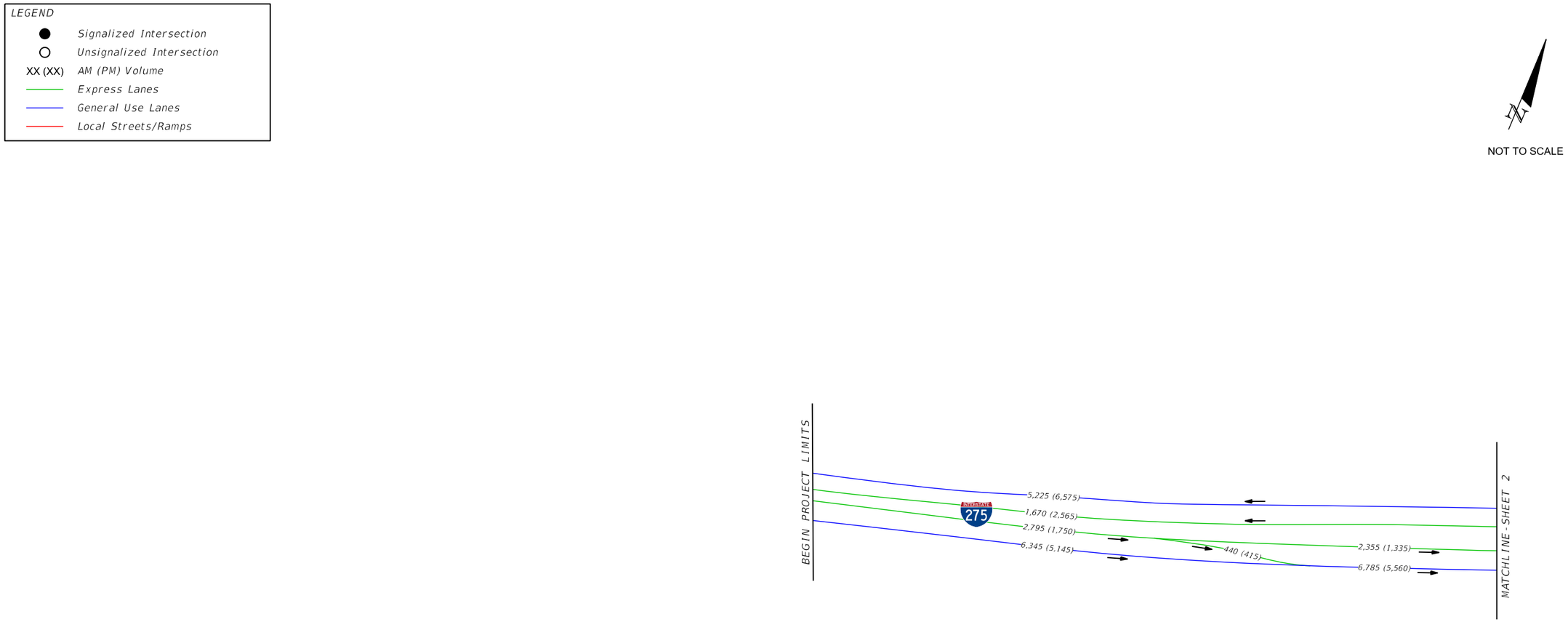

SEIS Re-evaluation

Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs

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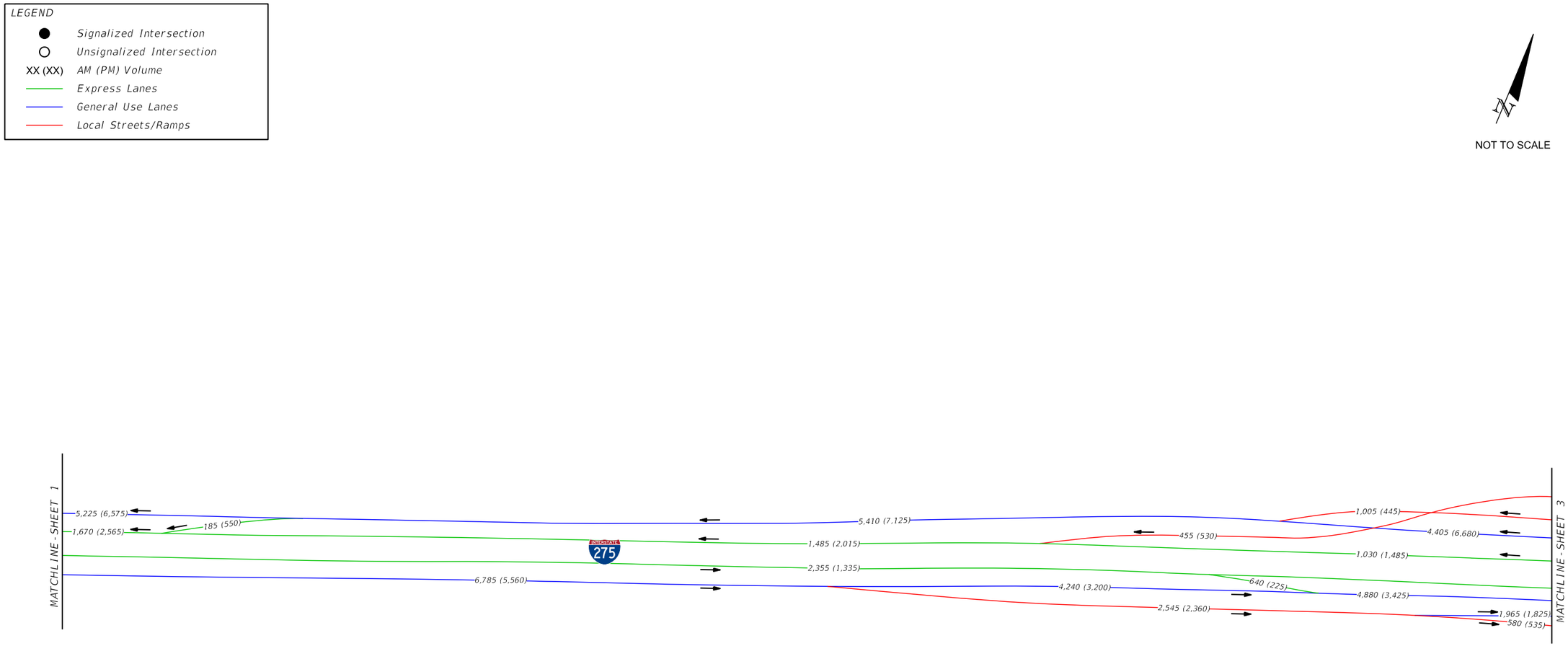
WPI # 258337-2



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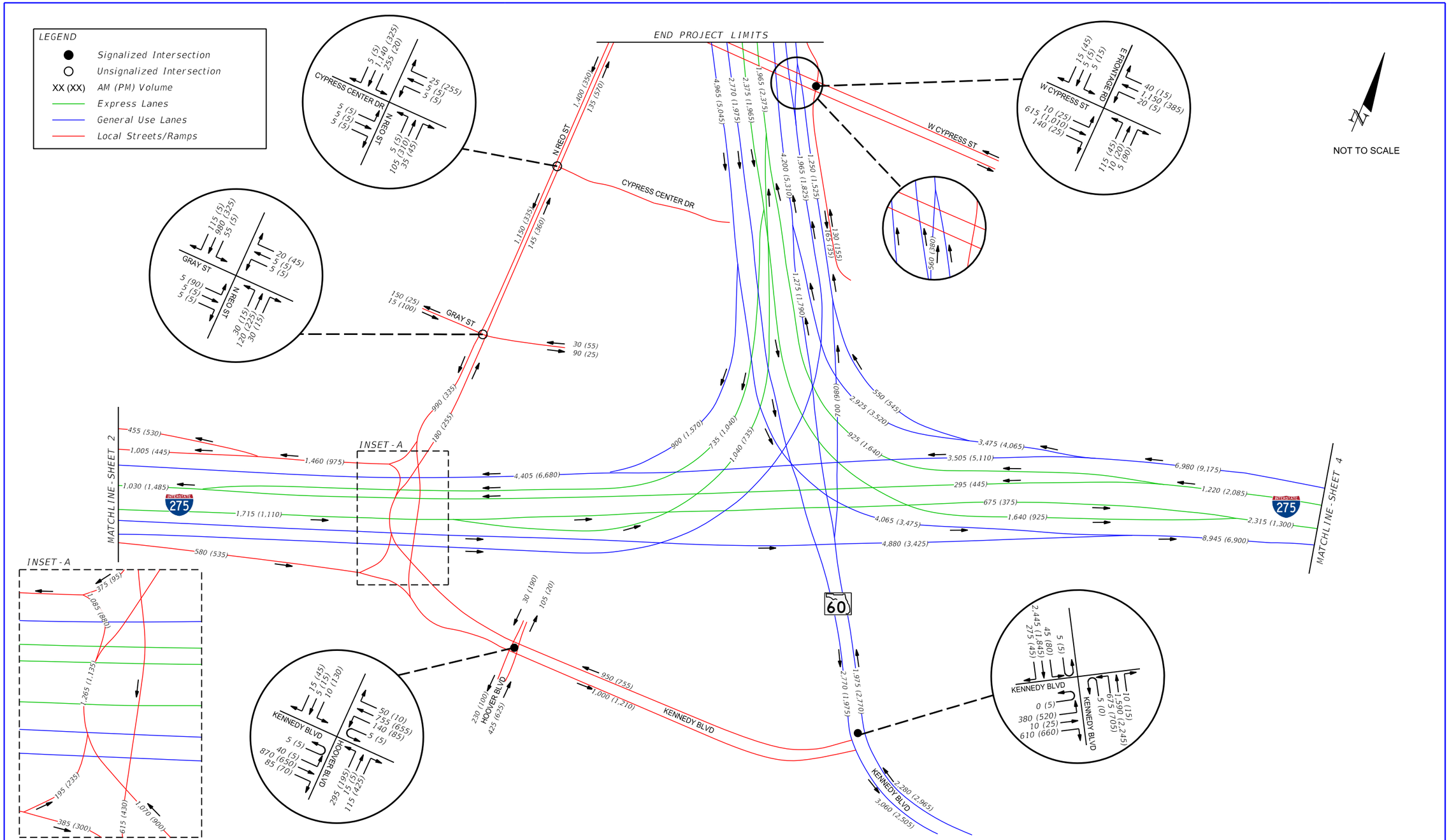

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SEIS Re-evaluation

Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs

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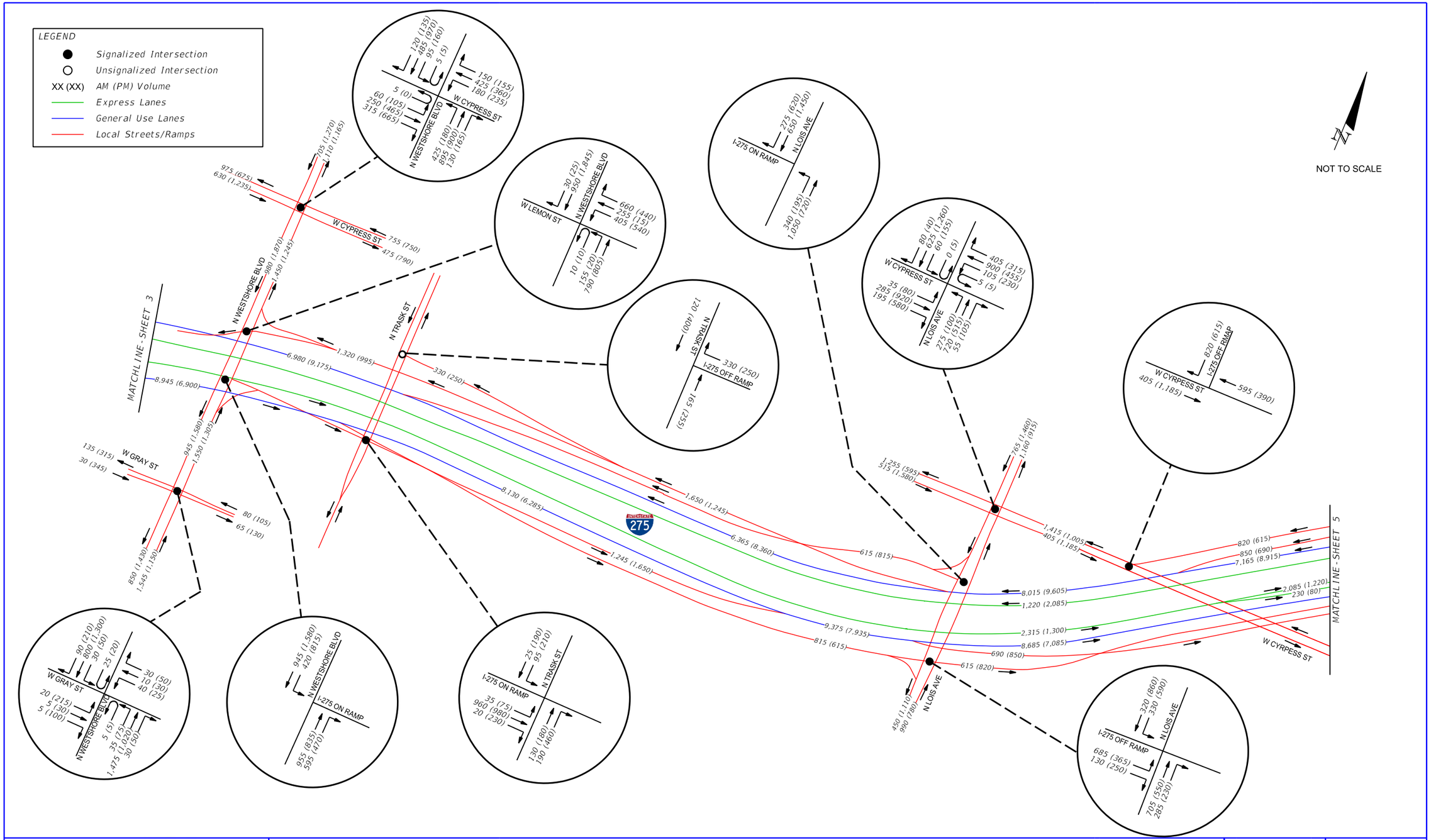

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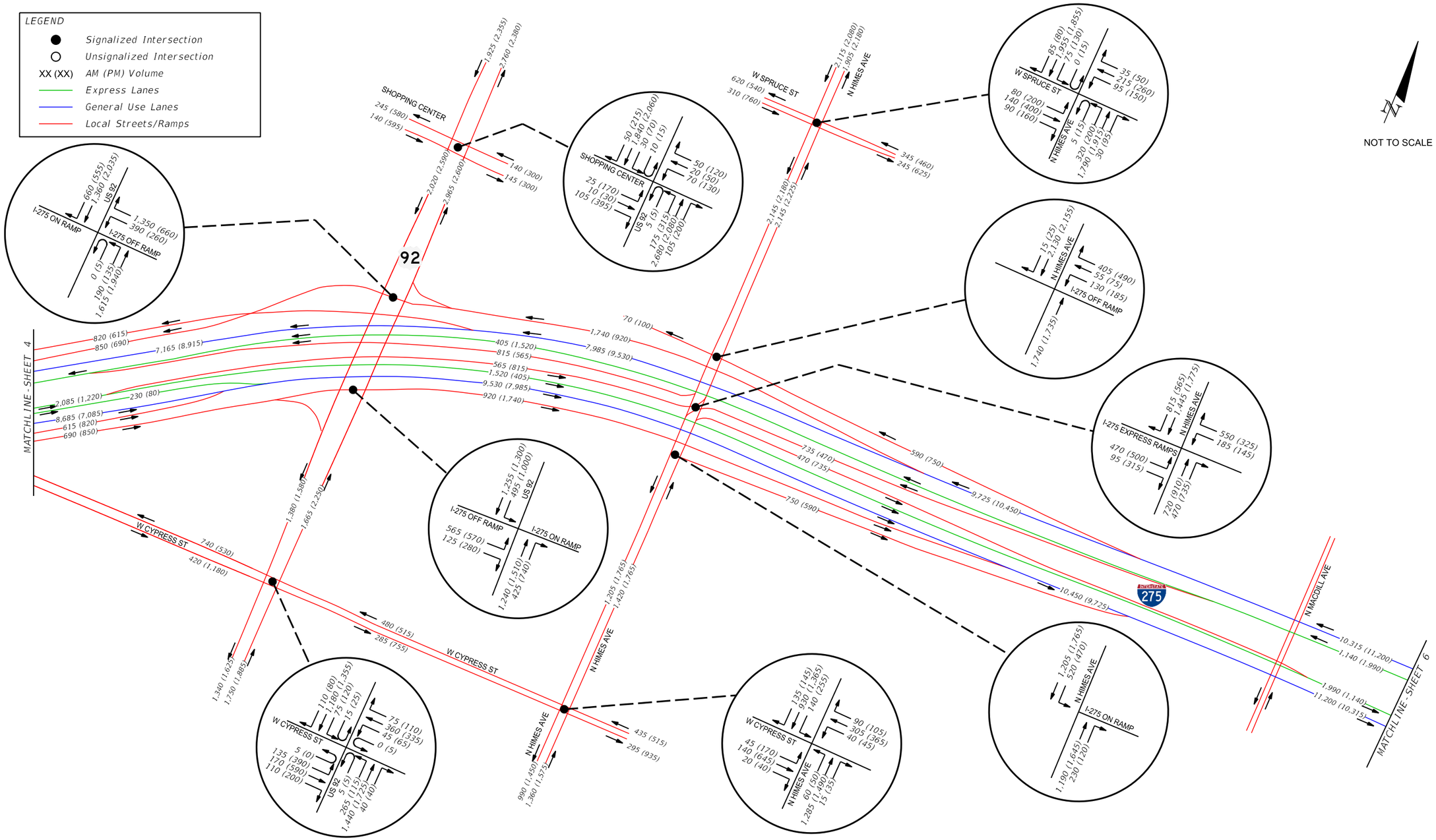

SEIS Re-evaluation

Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs

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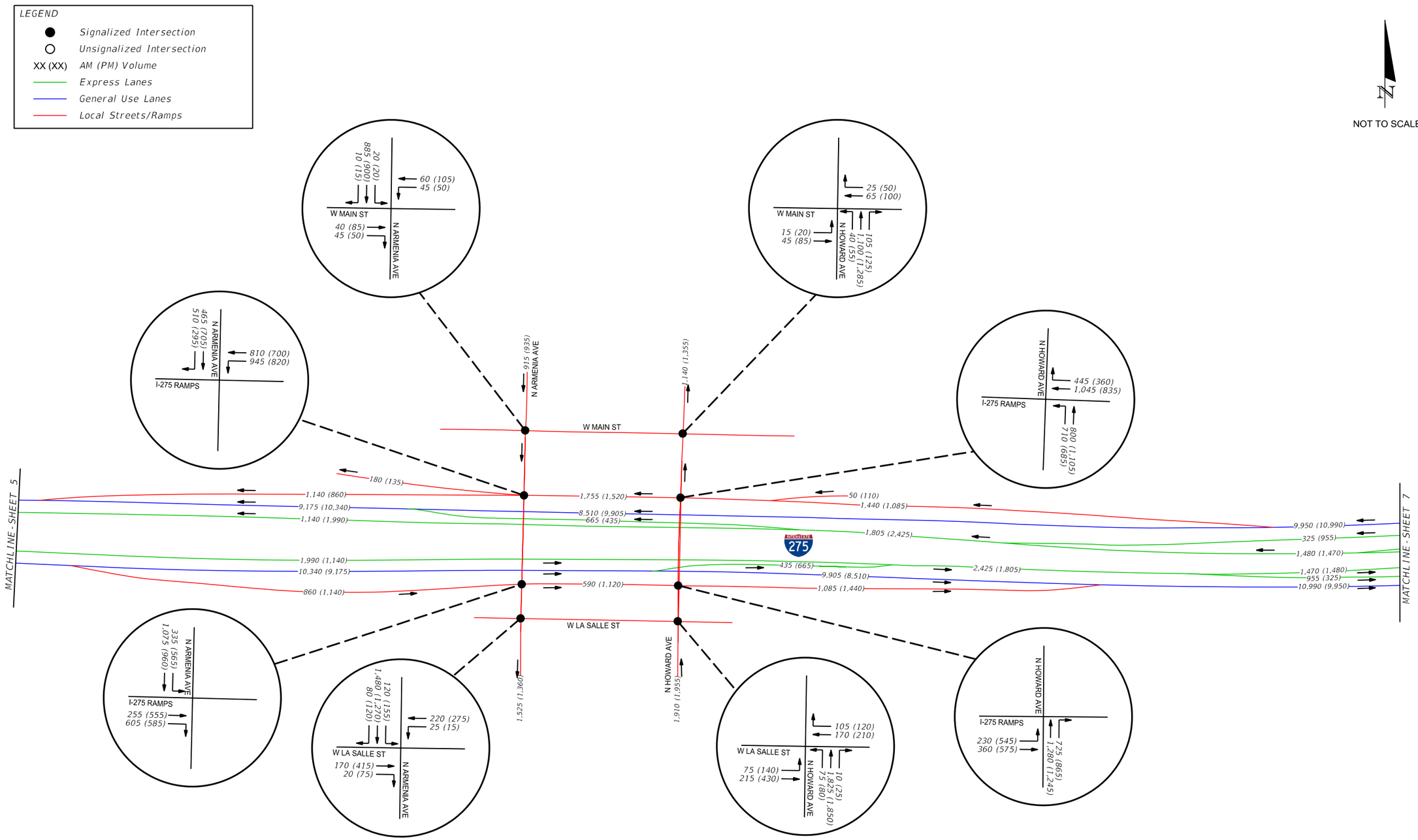

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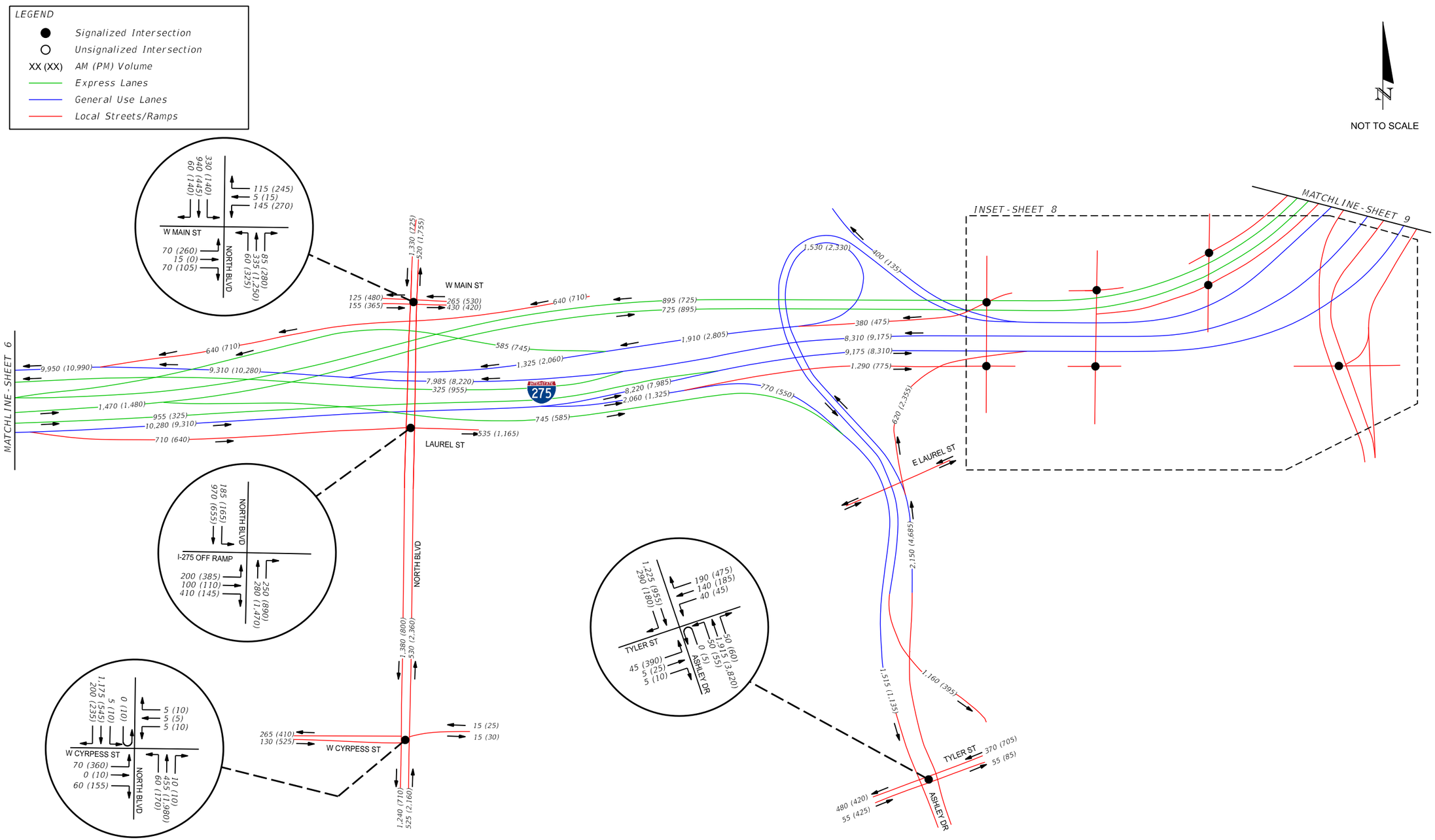

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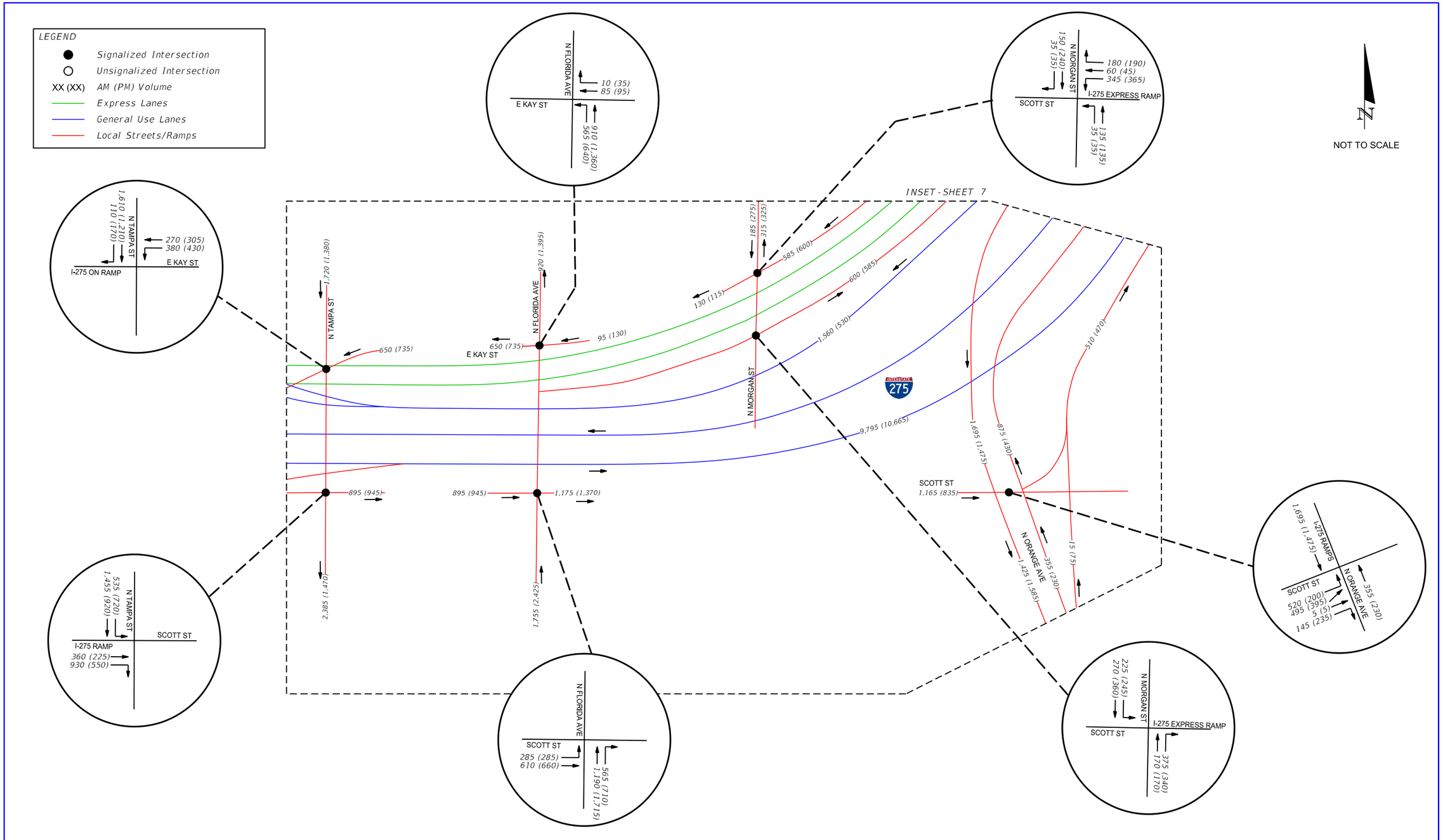

SEIS Re-evaluation

Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs

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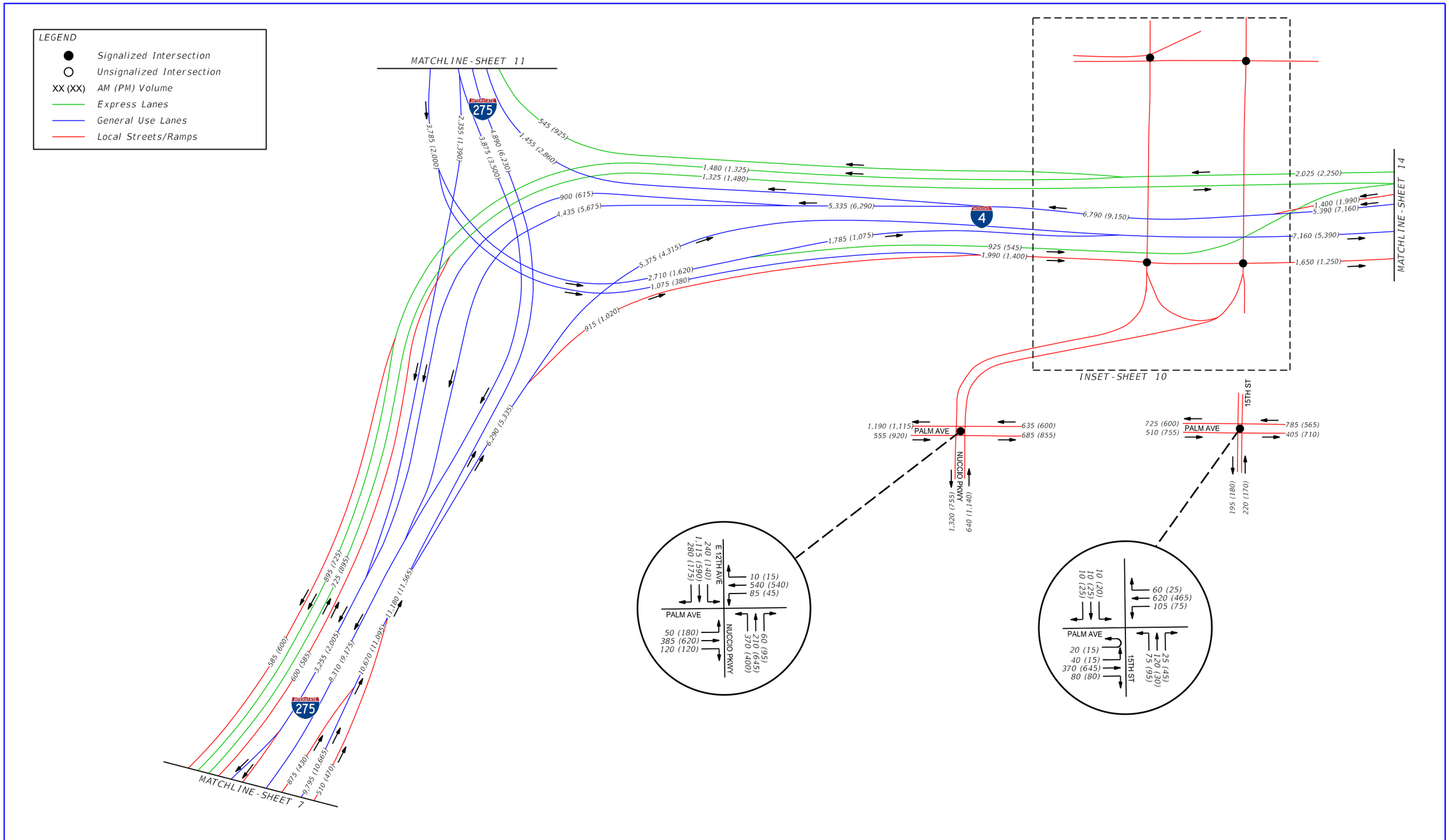

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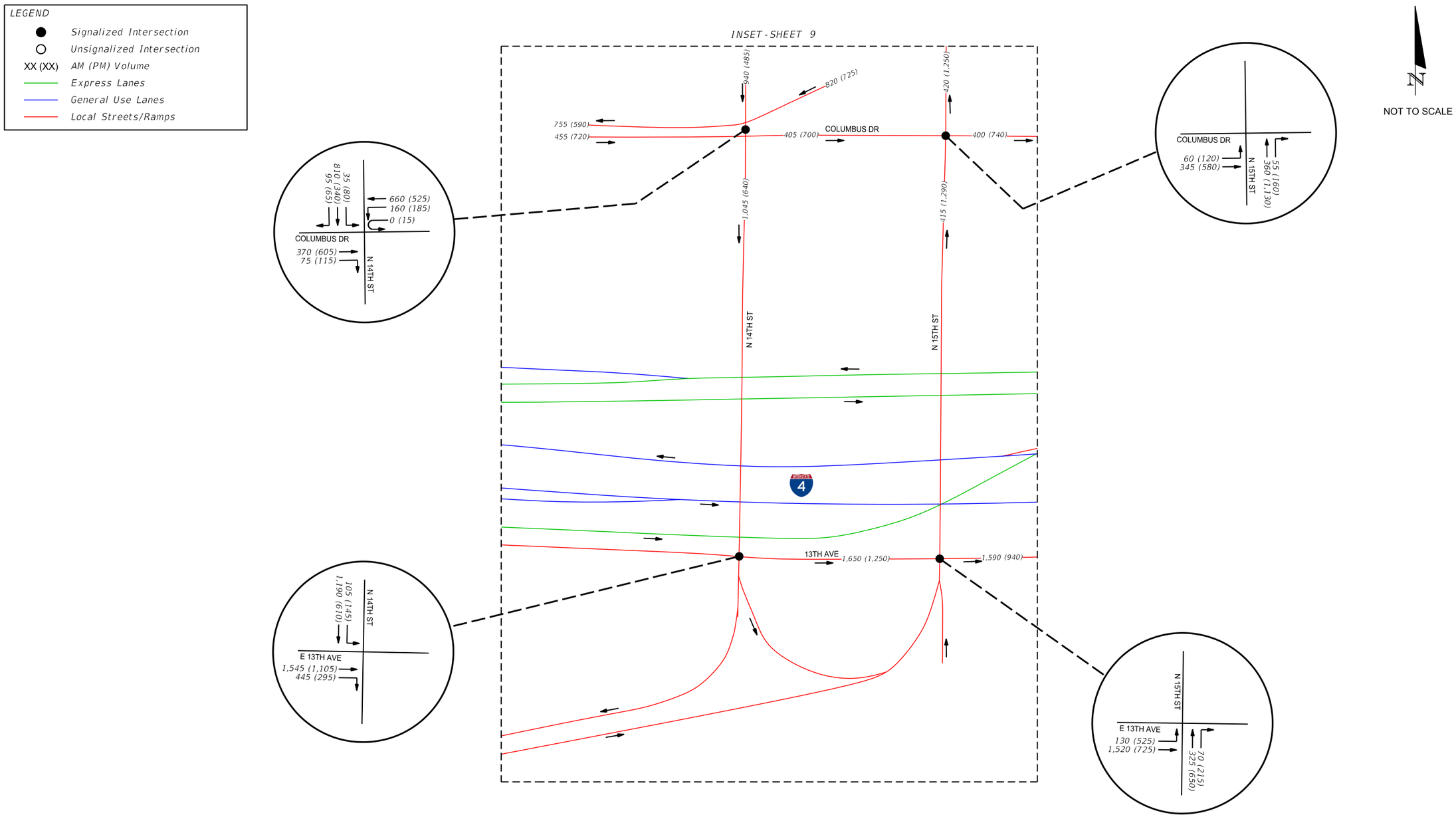

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SEIS Re-evaluation

Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs

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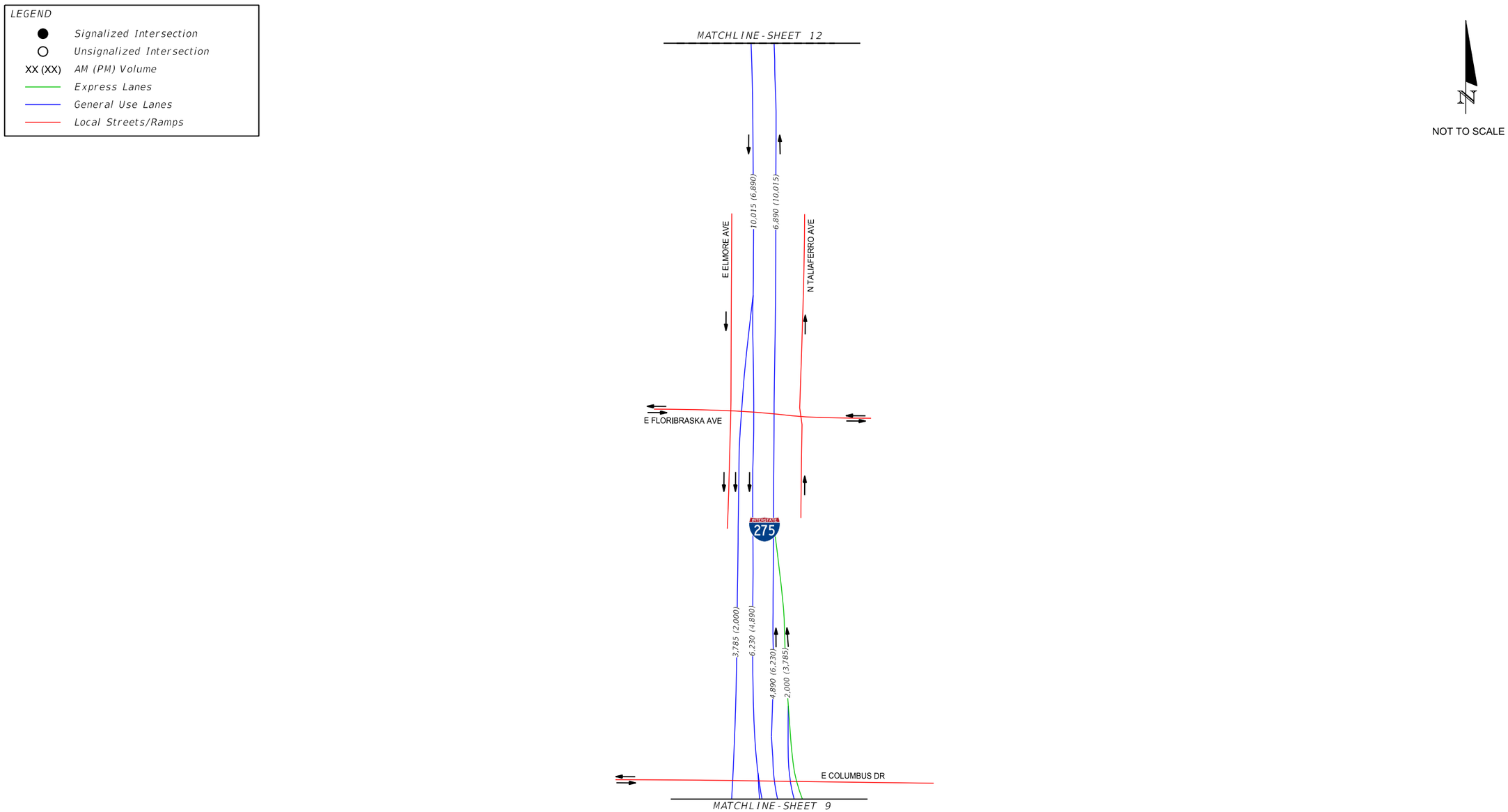

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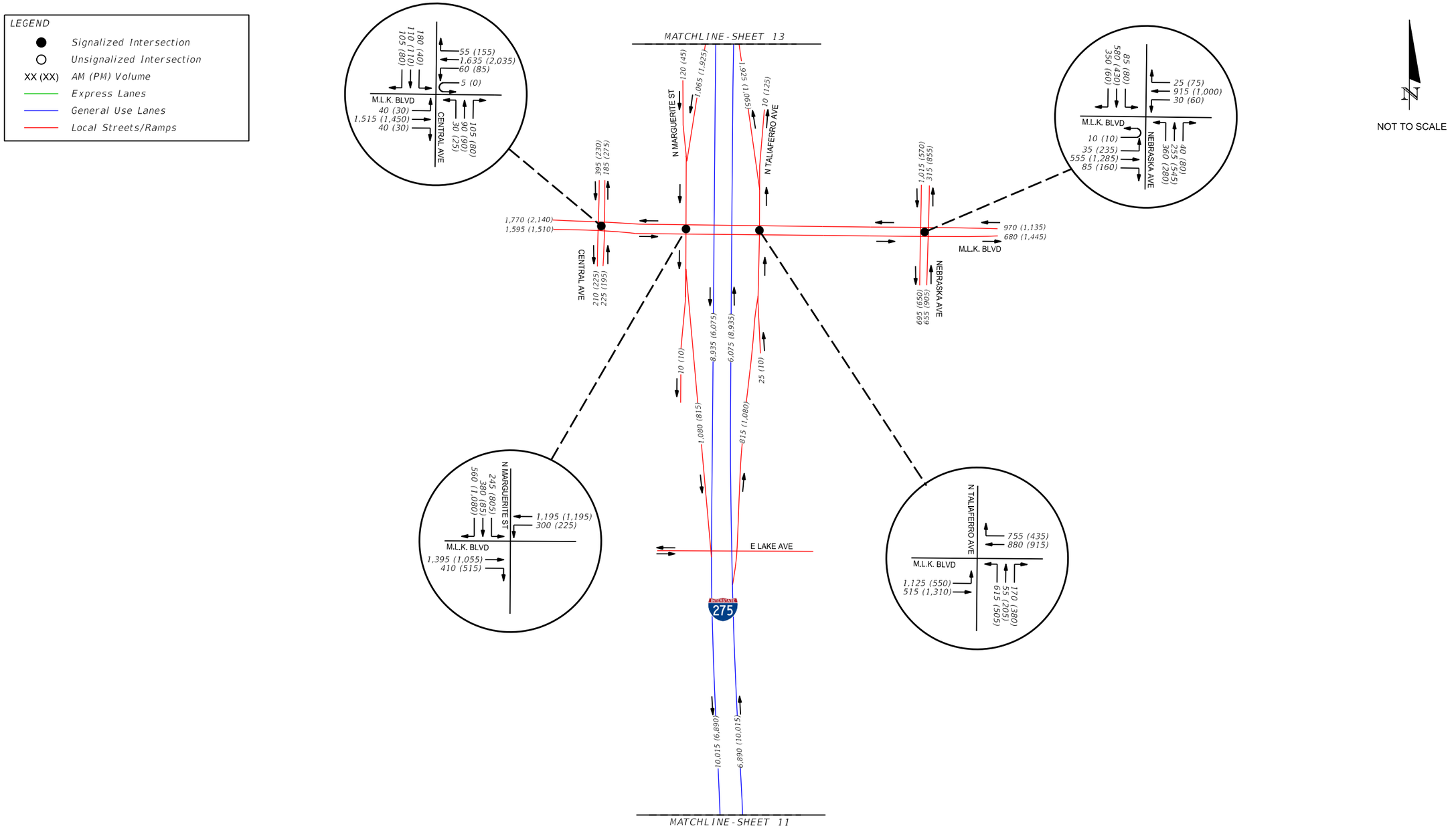

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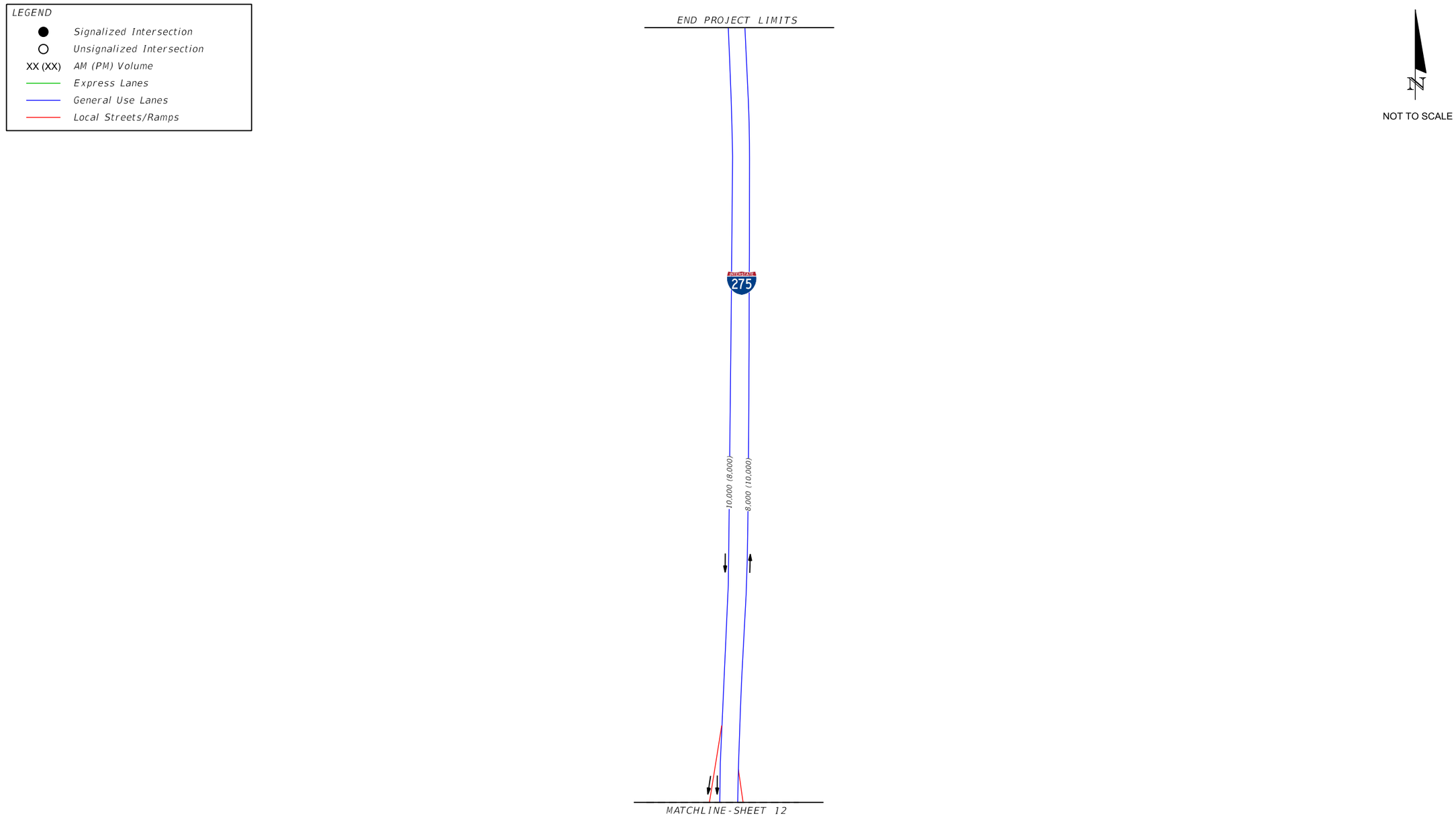

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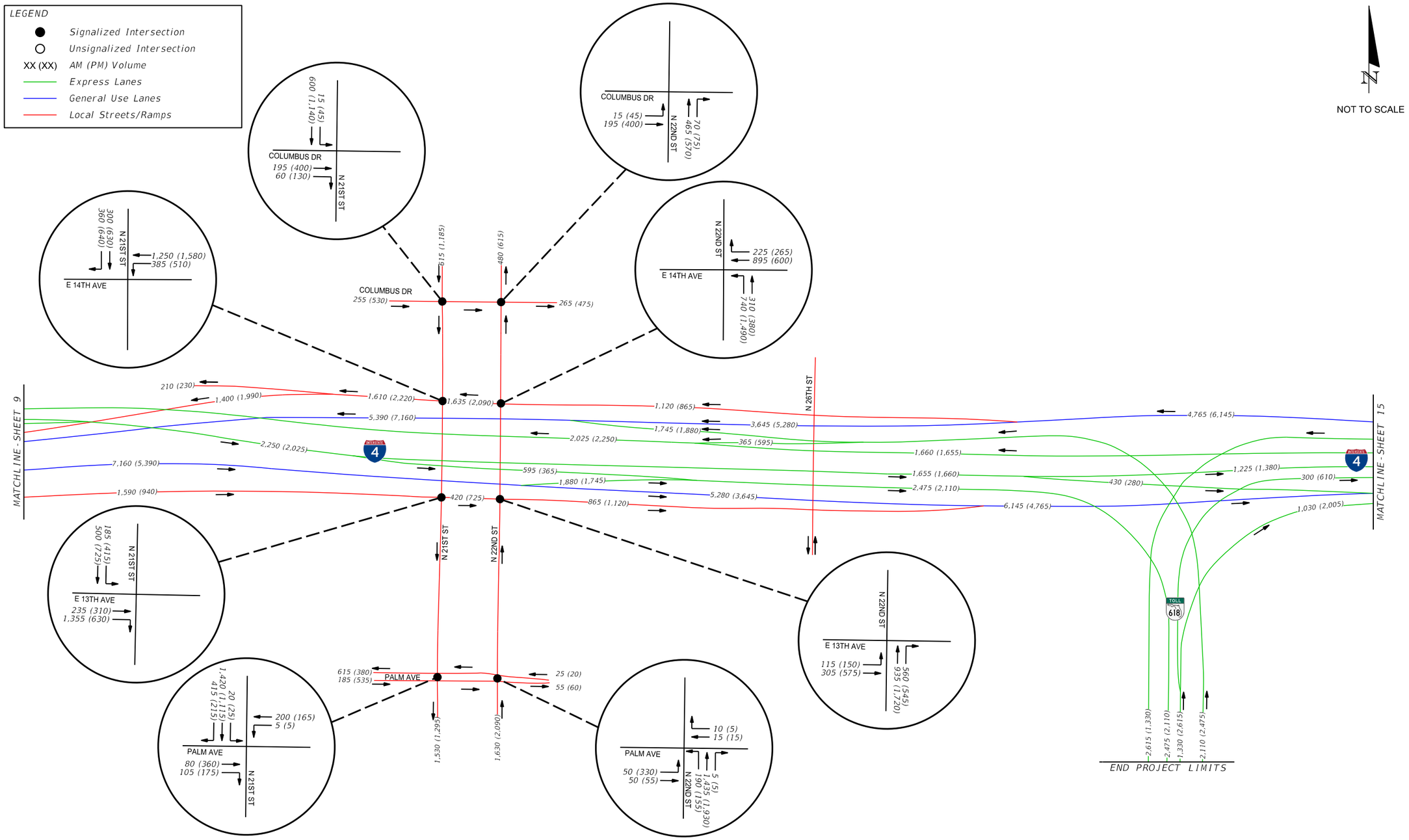

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SEIS Re-evaluation

Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs

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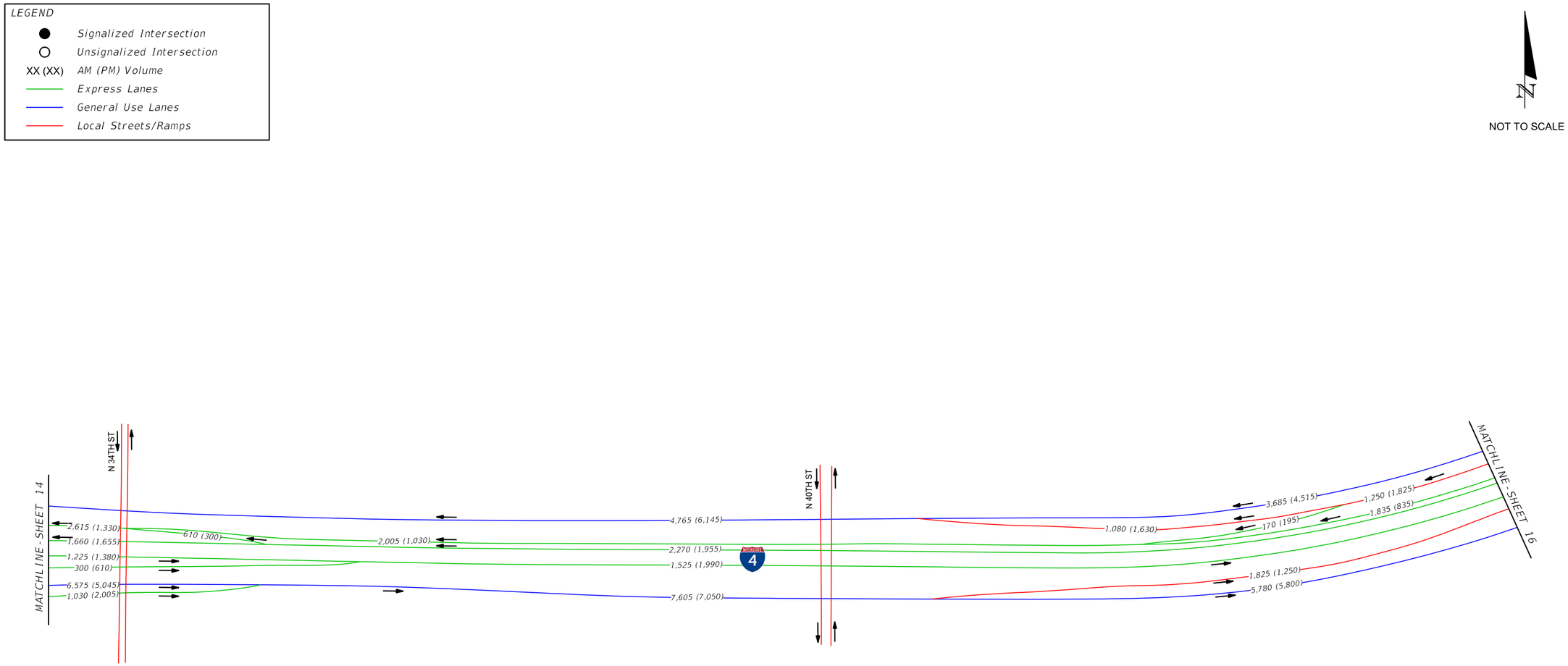
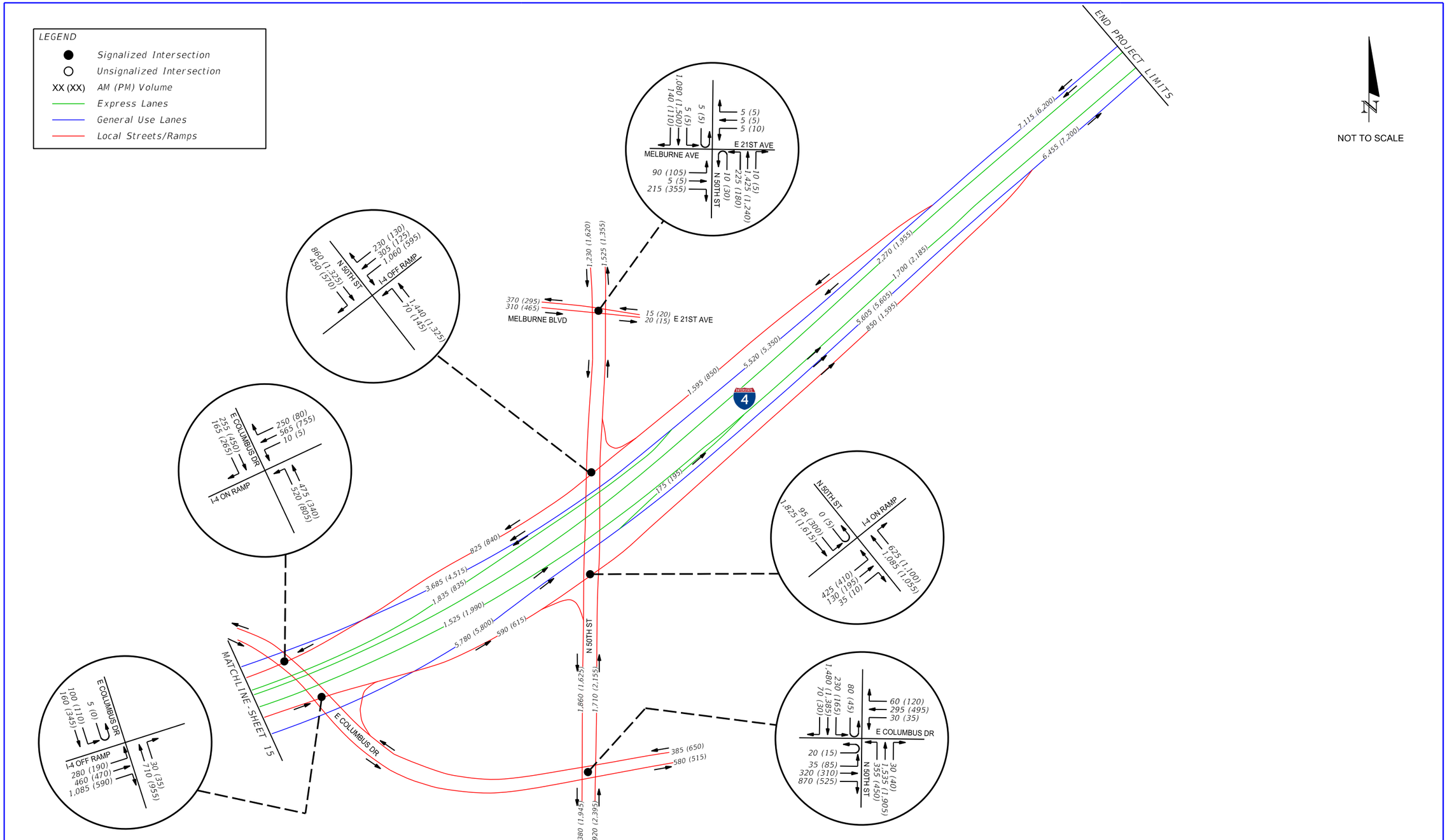
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option D – Opening Year (2025) – AM & PM DDHVs	Figure 3-16	Sheet 15 of 16



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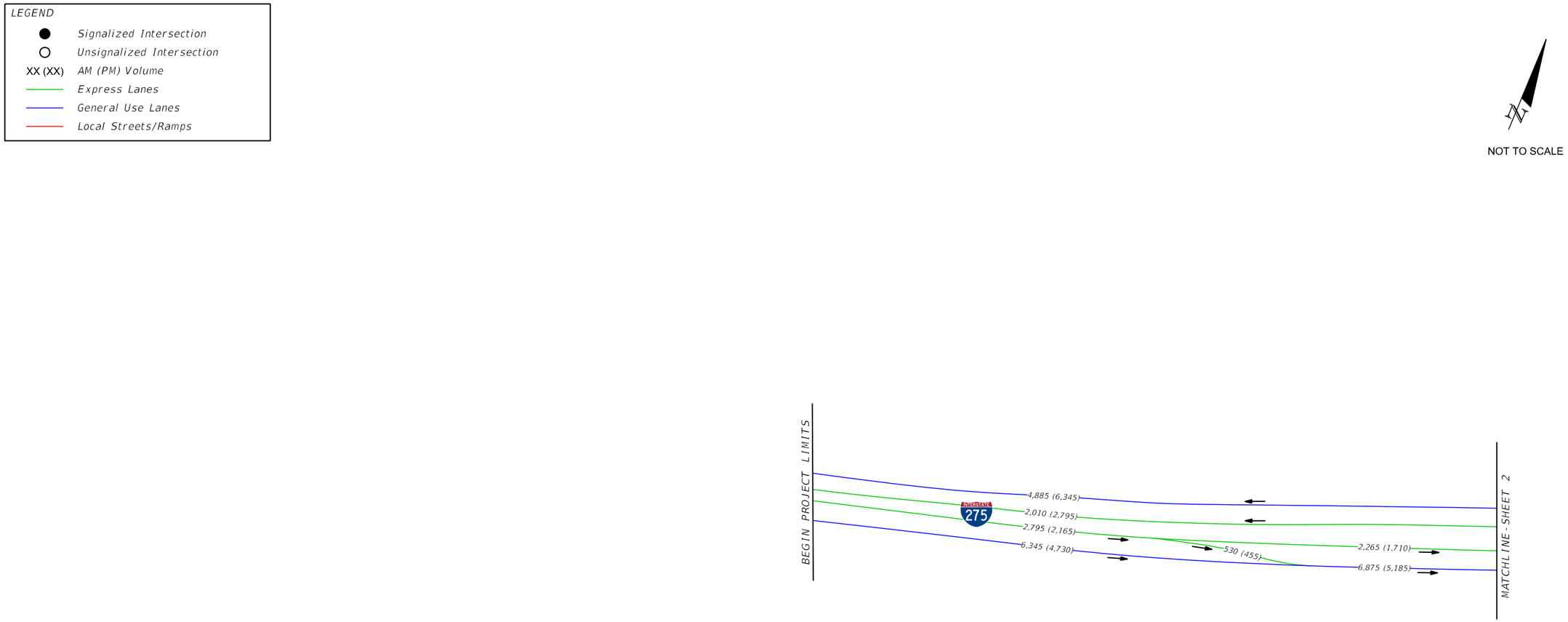

SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

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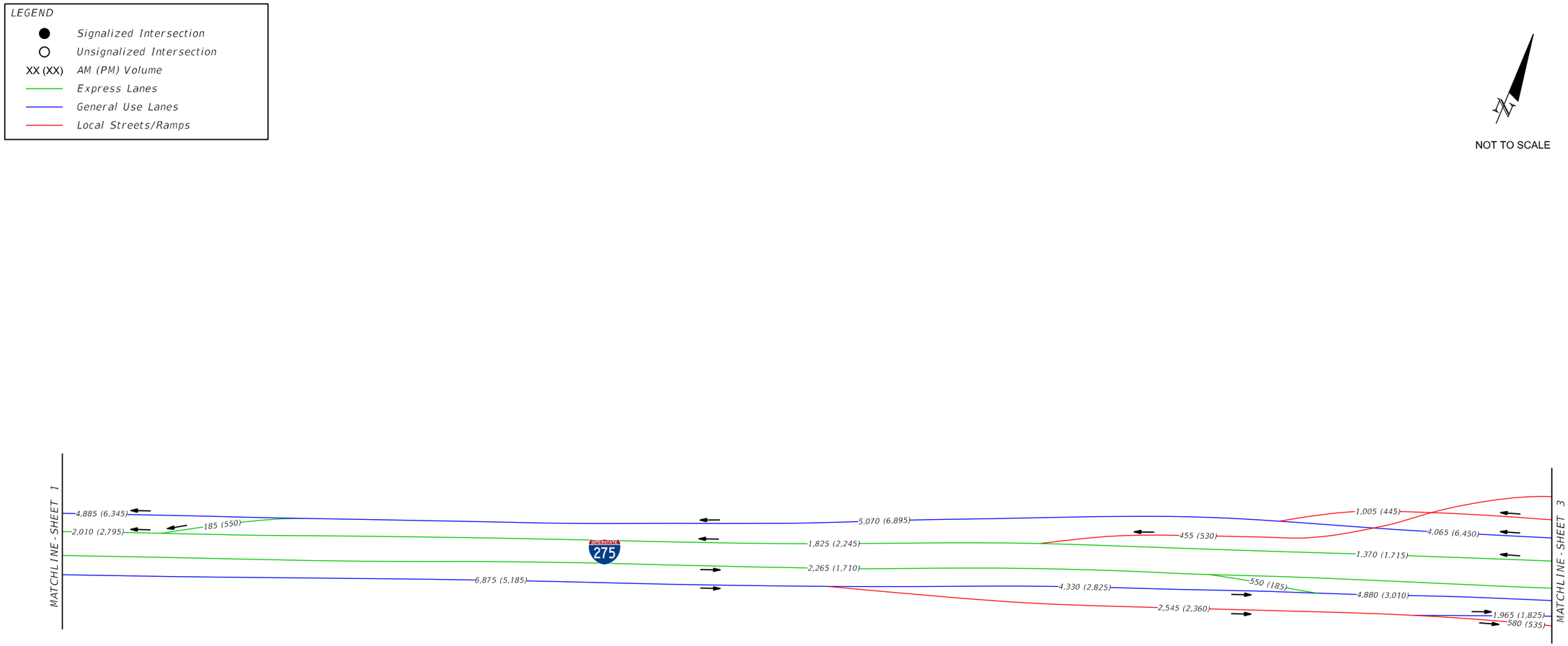

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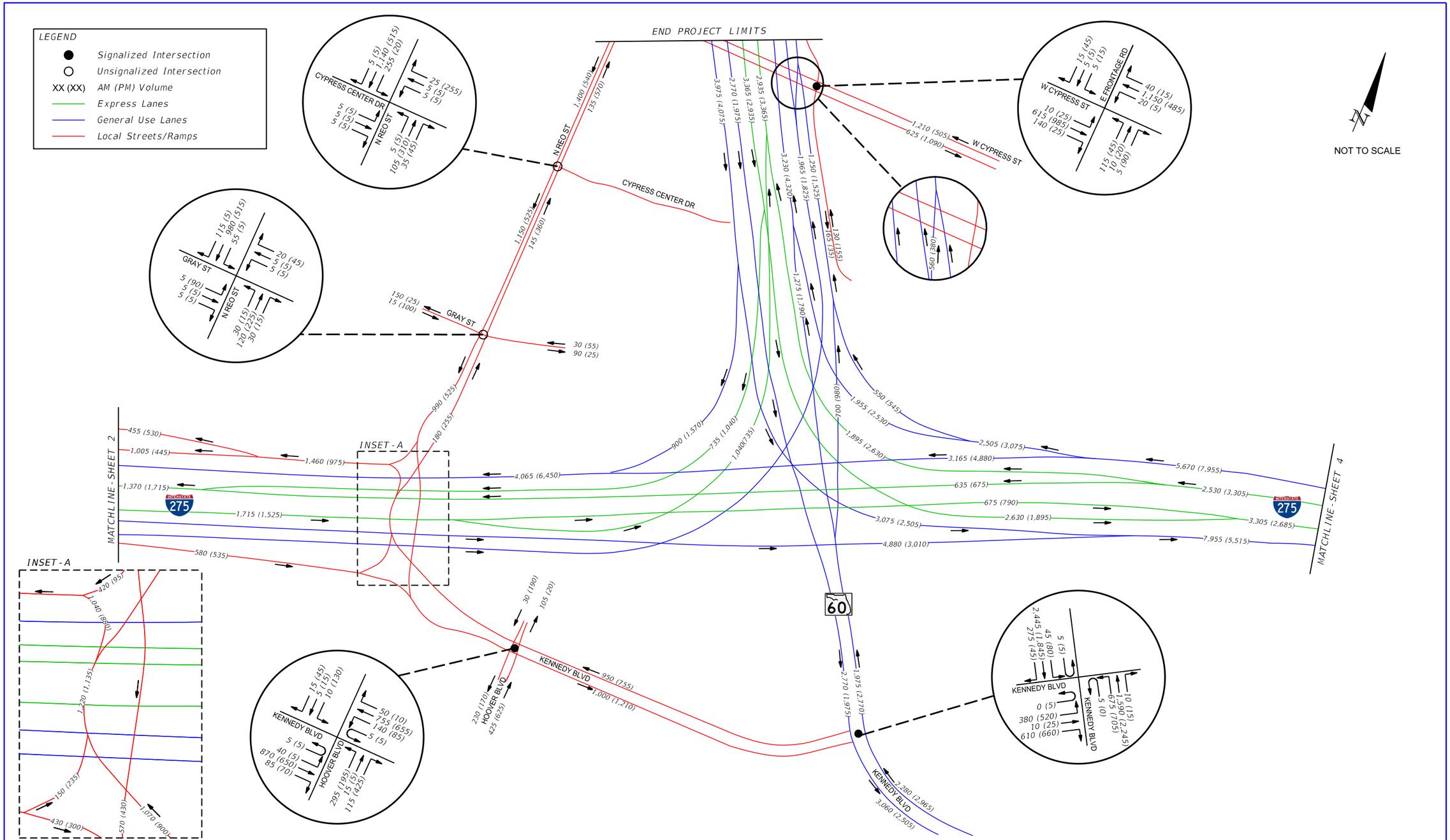

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SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

Figure 3-17

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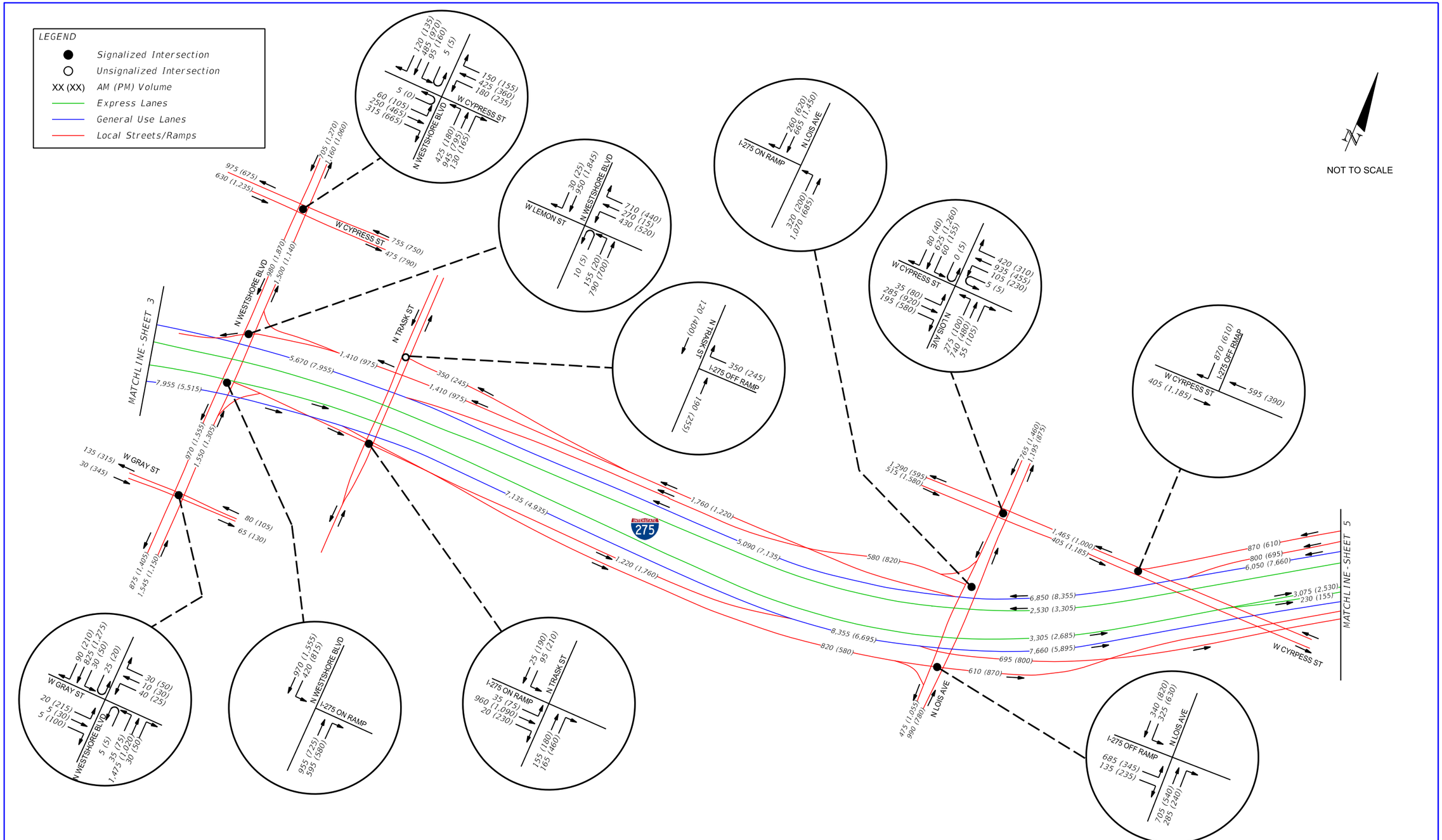
WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

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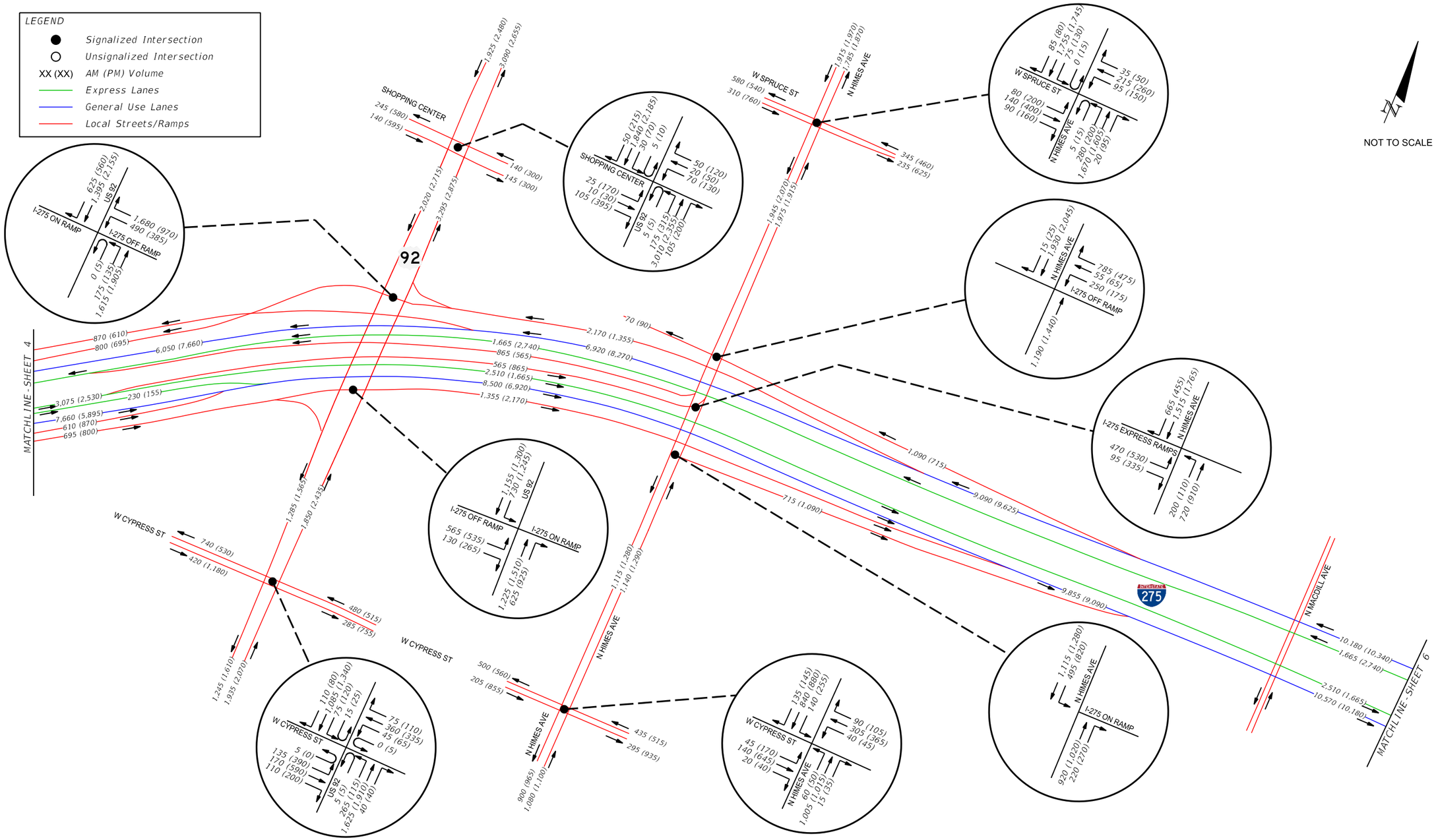

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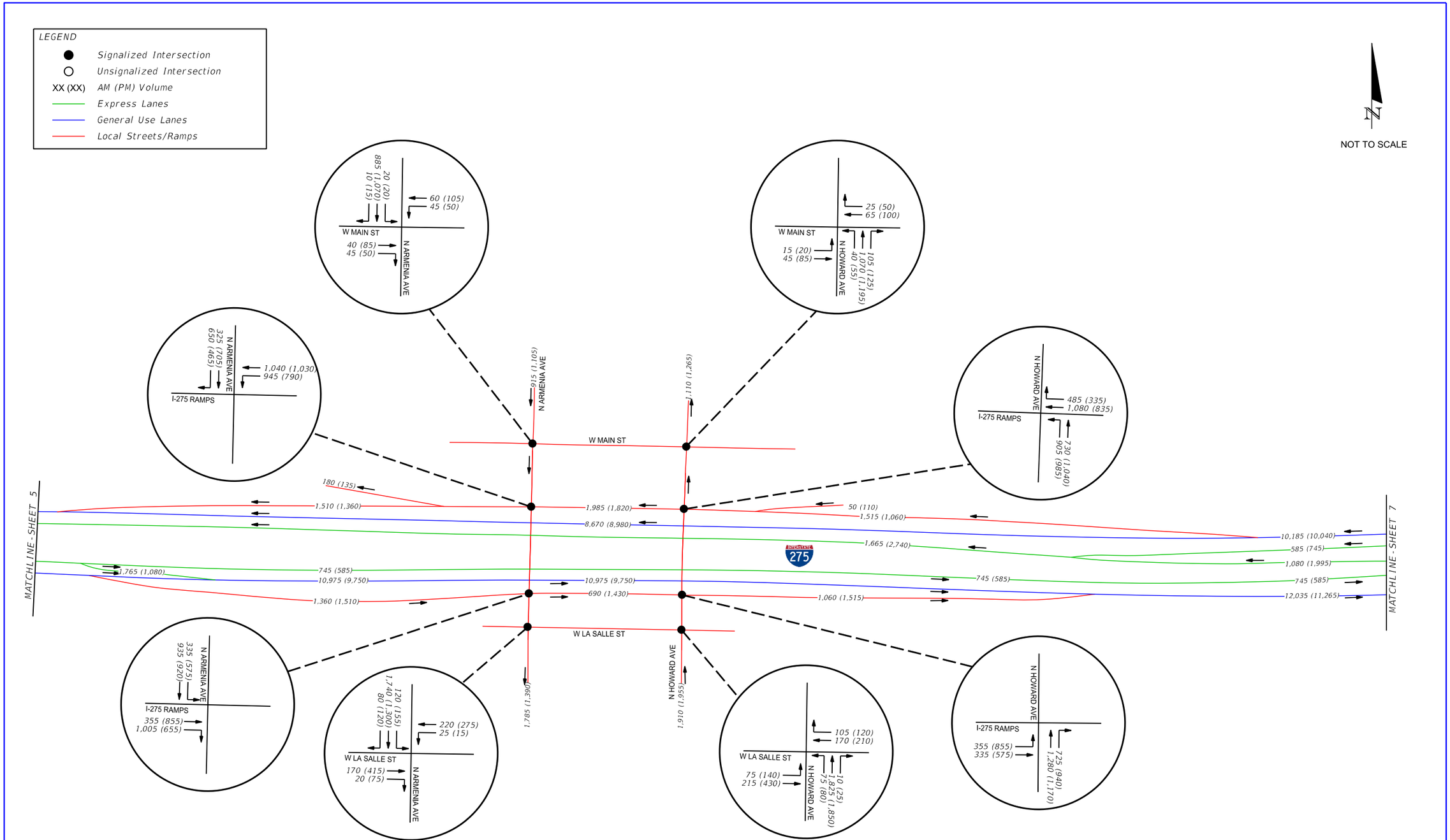

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SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

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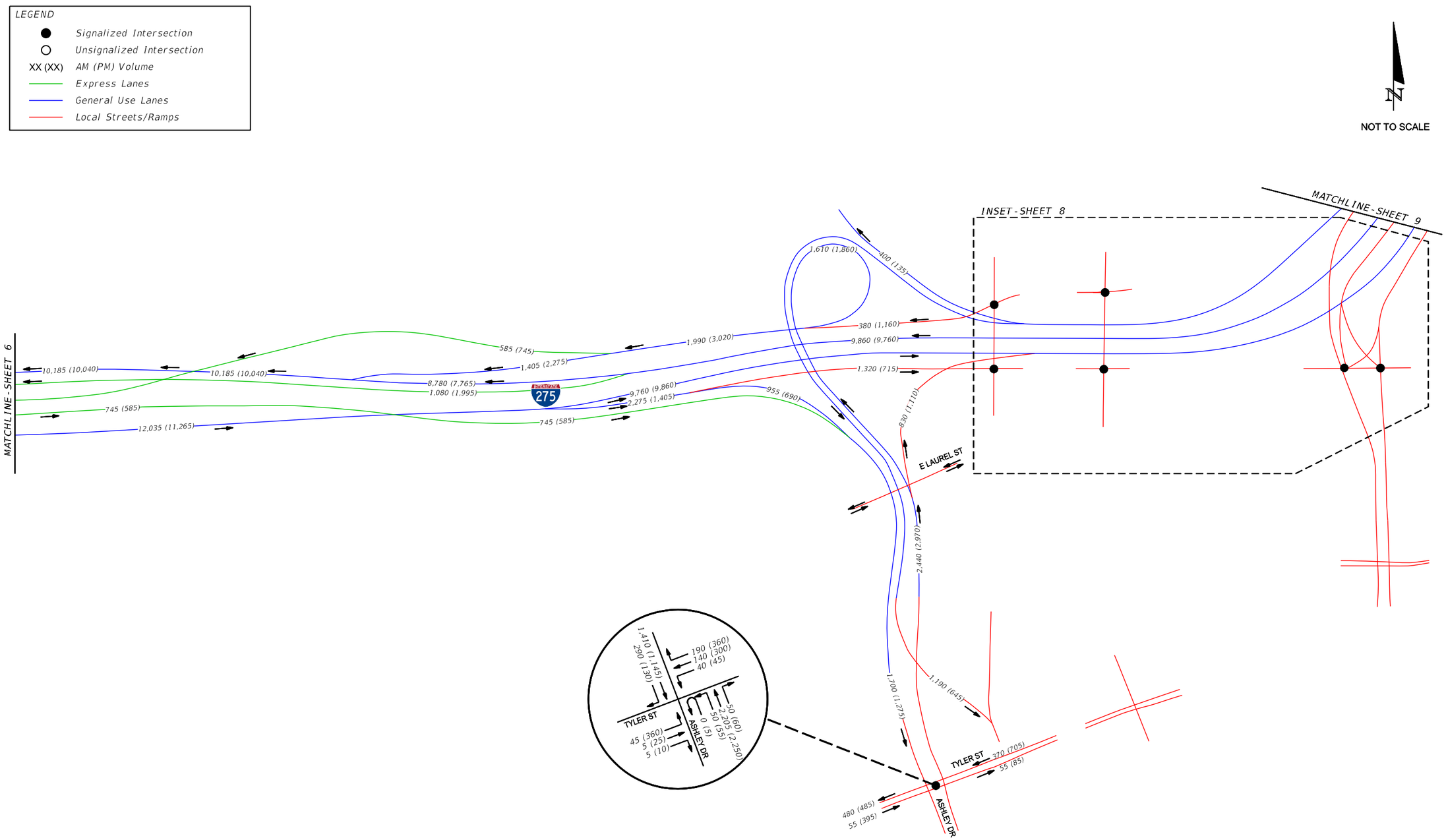

FDOT	SEIS Re-evaluation Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs	Figure 3-17	Sheet 7 of 16

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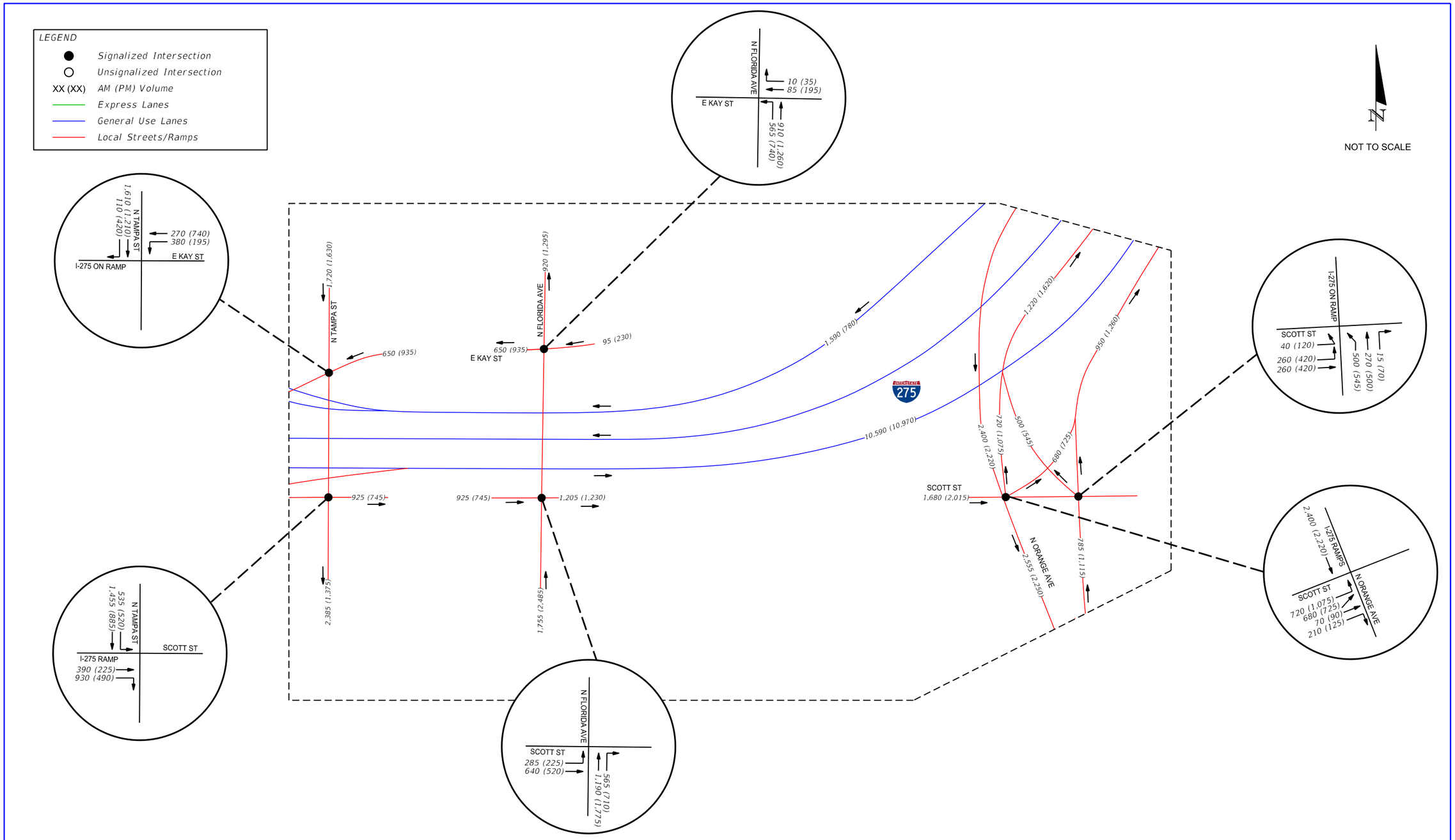

FDOT	SEIS Re-evaluation Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs	Figure 3-17	Sheet 8 of 16

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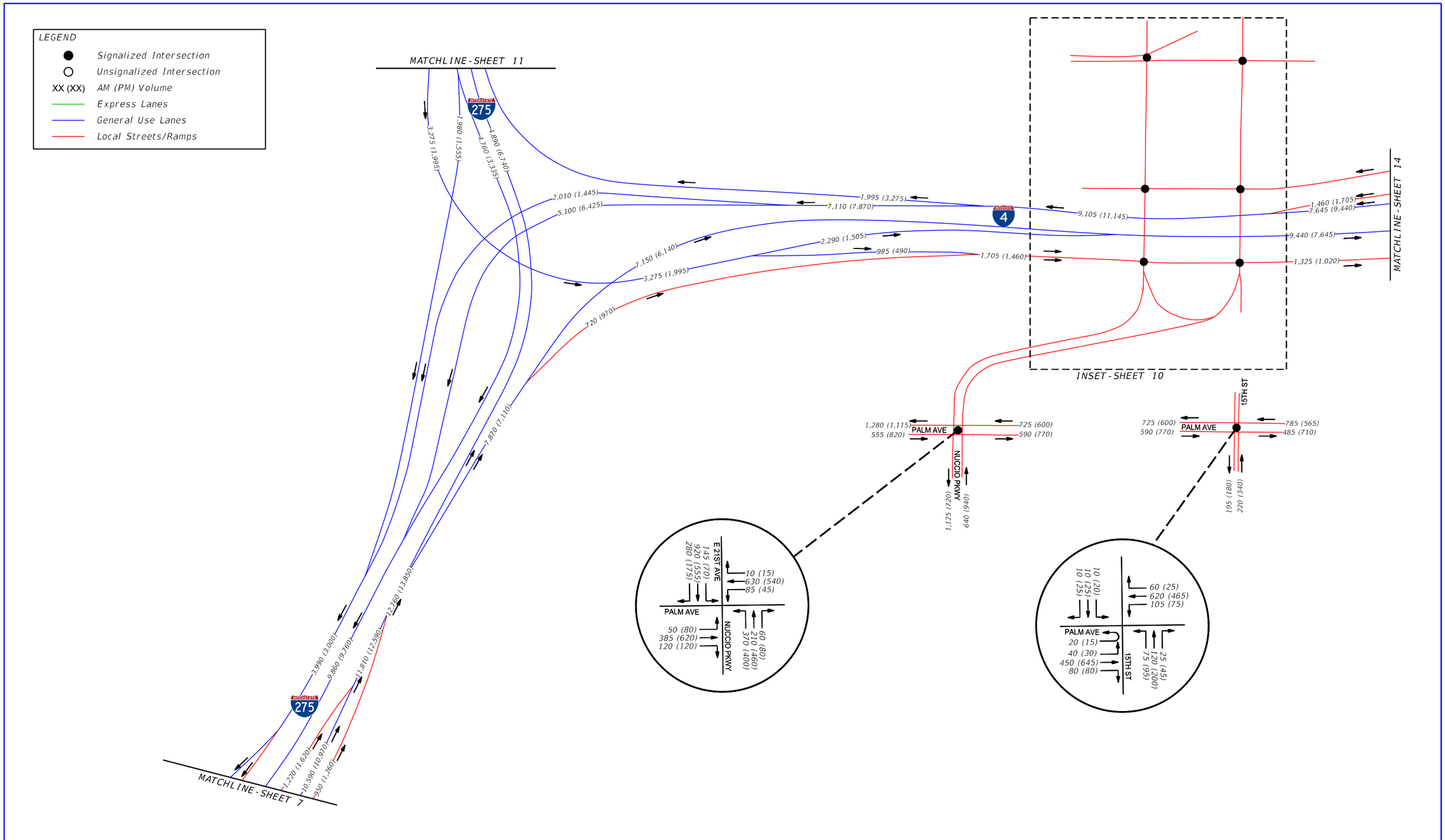

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Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

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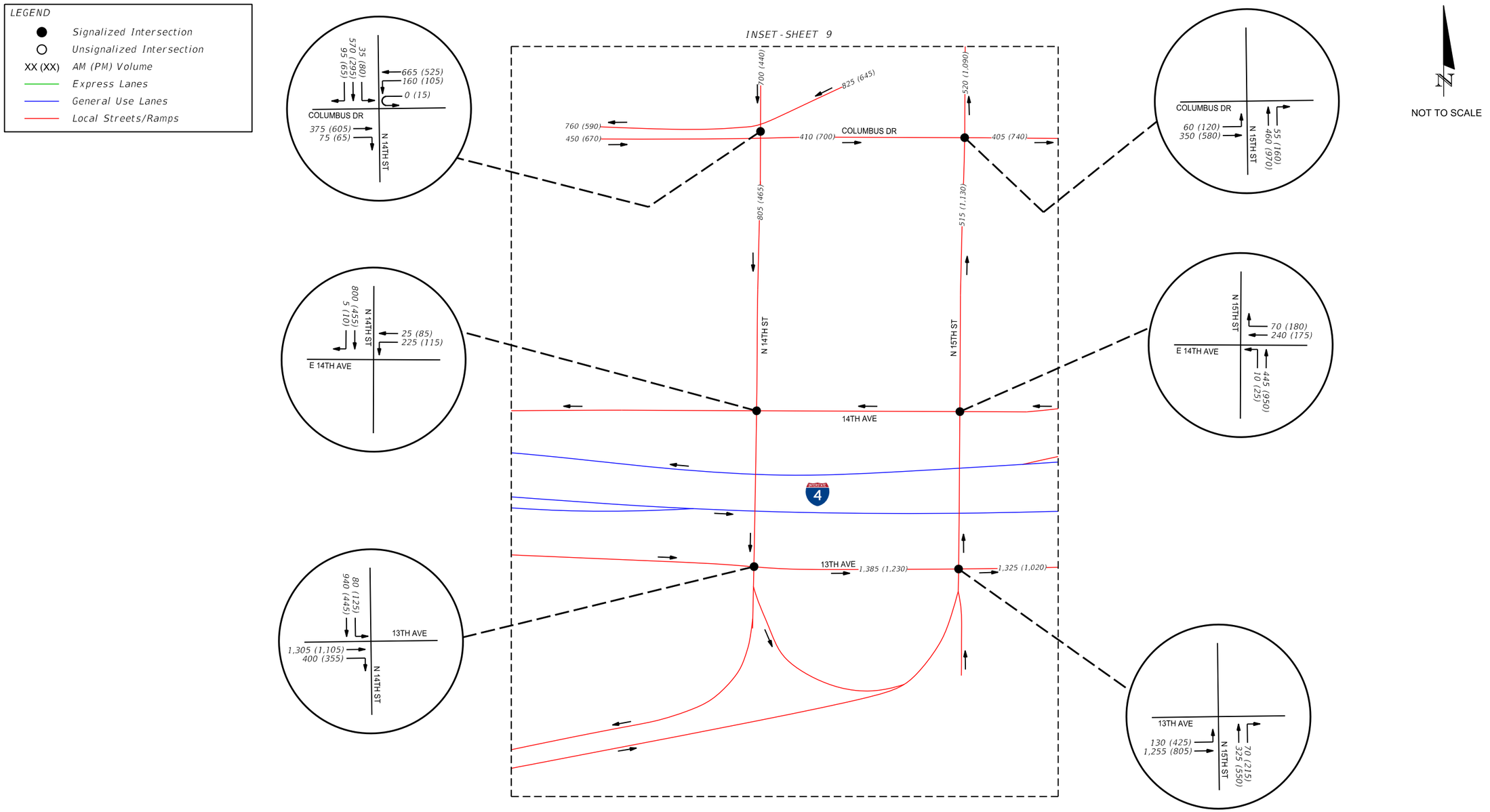
WPI # 258337-2



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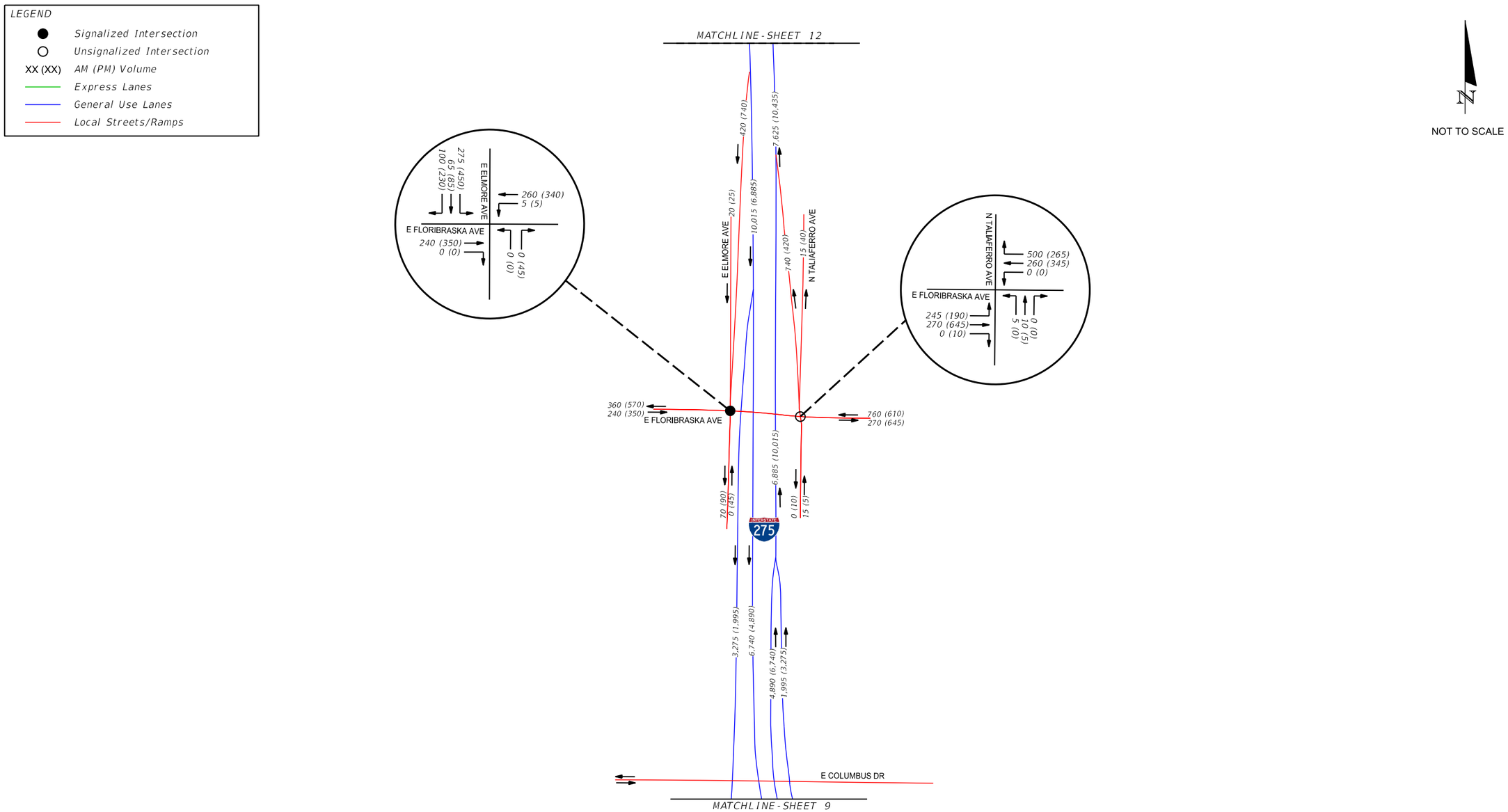

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Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

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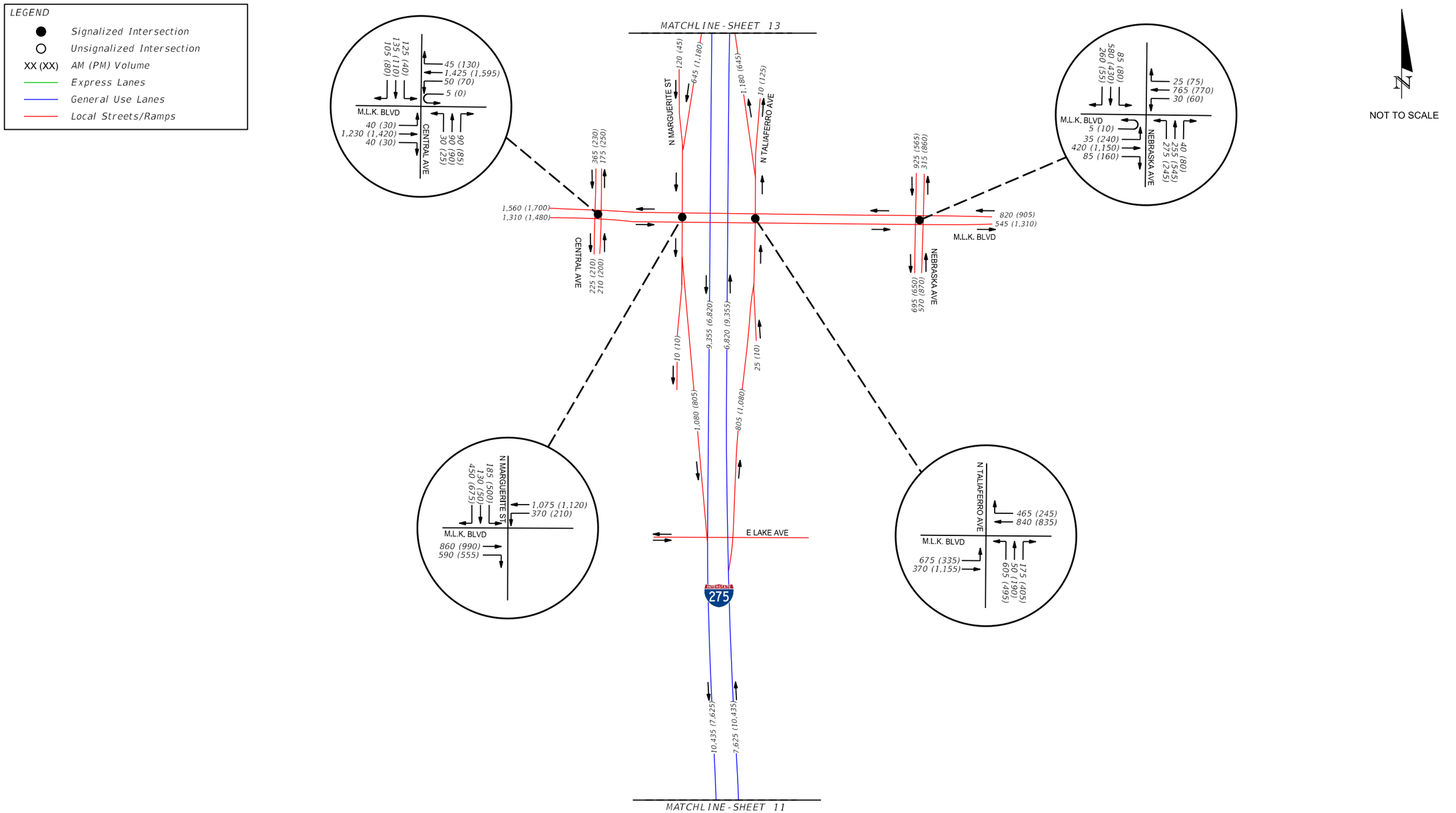
WPI # 258337-2



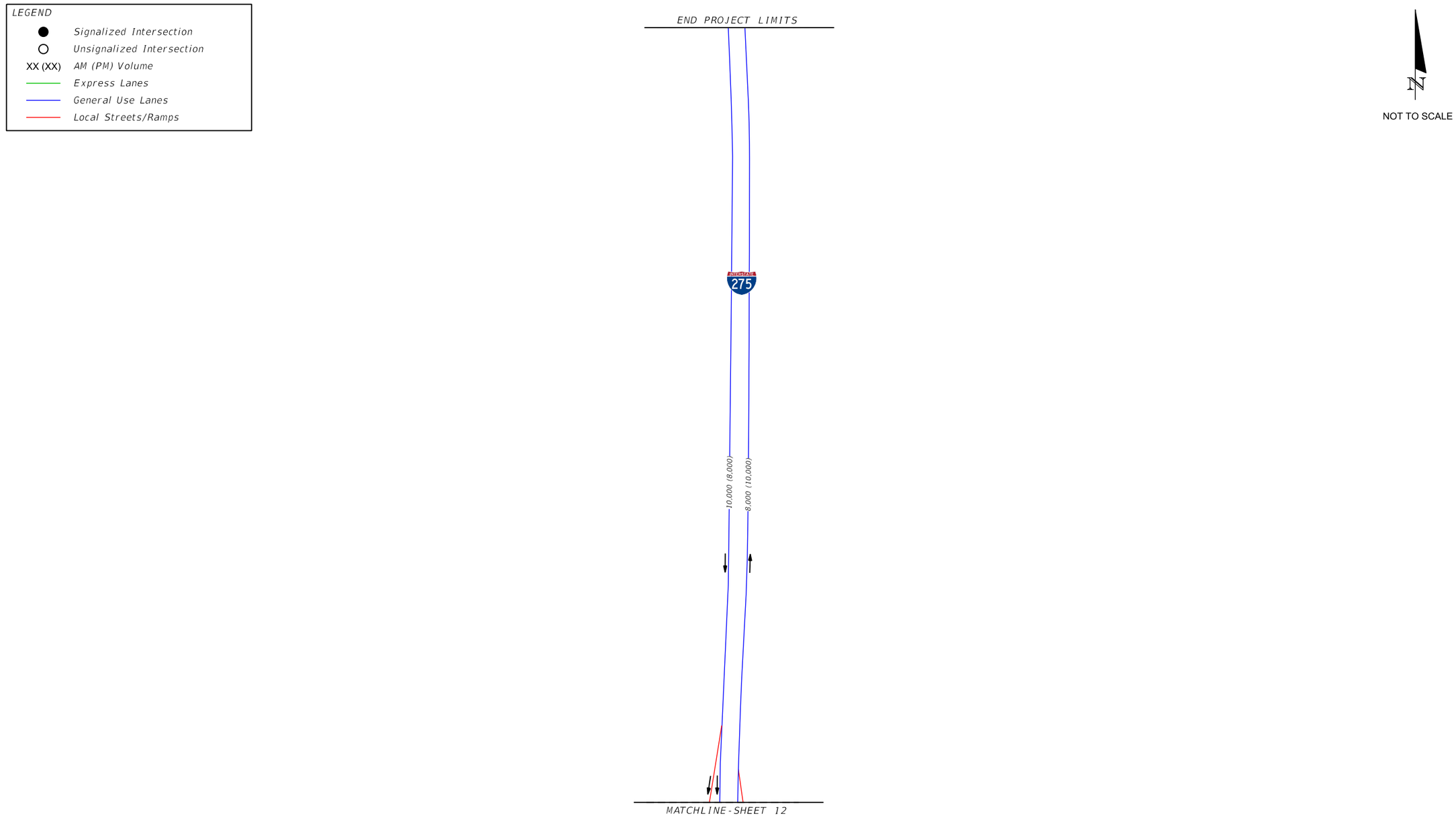
SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

Figure 3-17

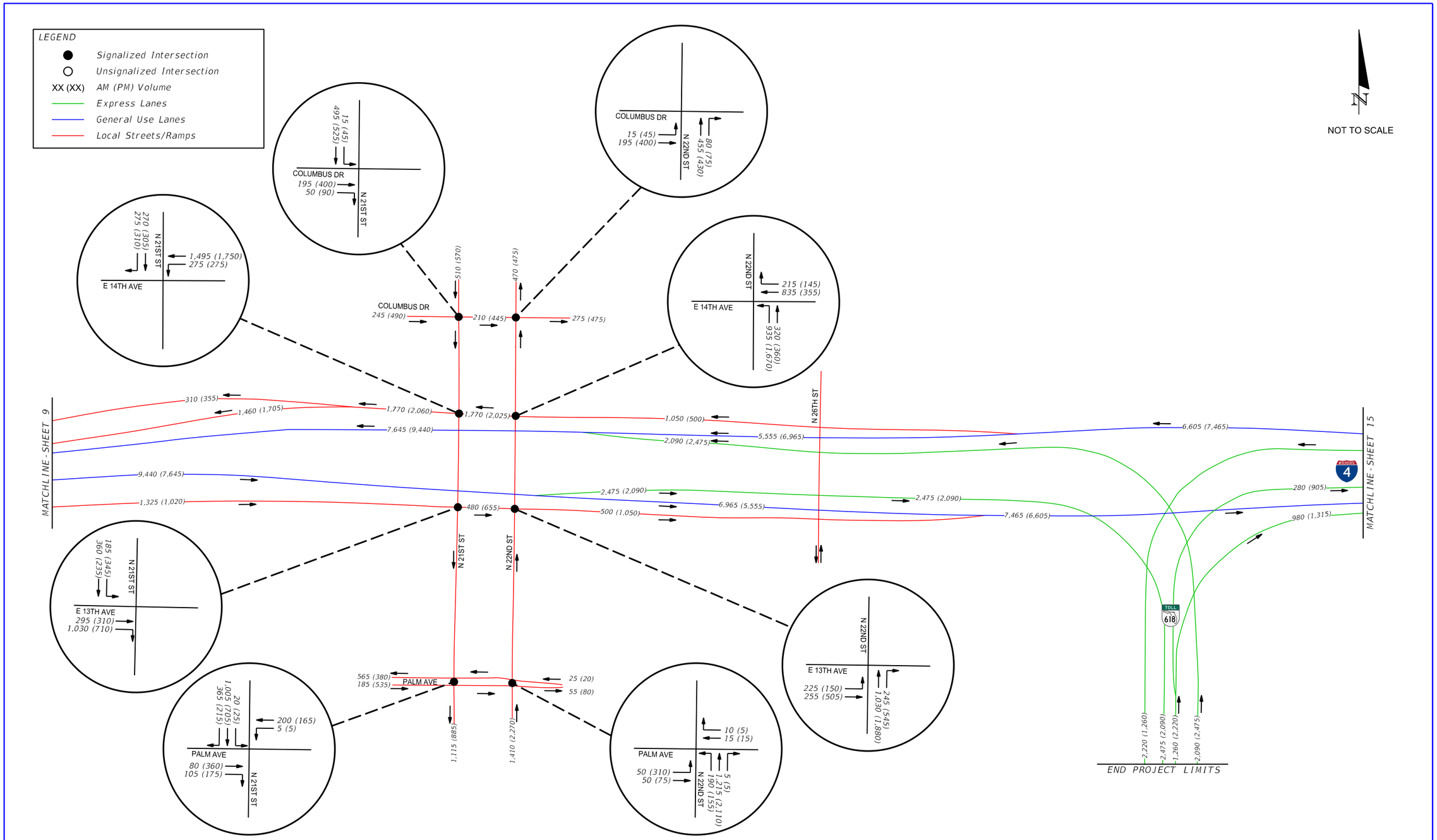
Sheet 12 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs	Figure 3-17	Sheet 13 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

Figure 3-17

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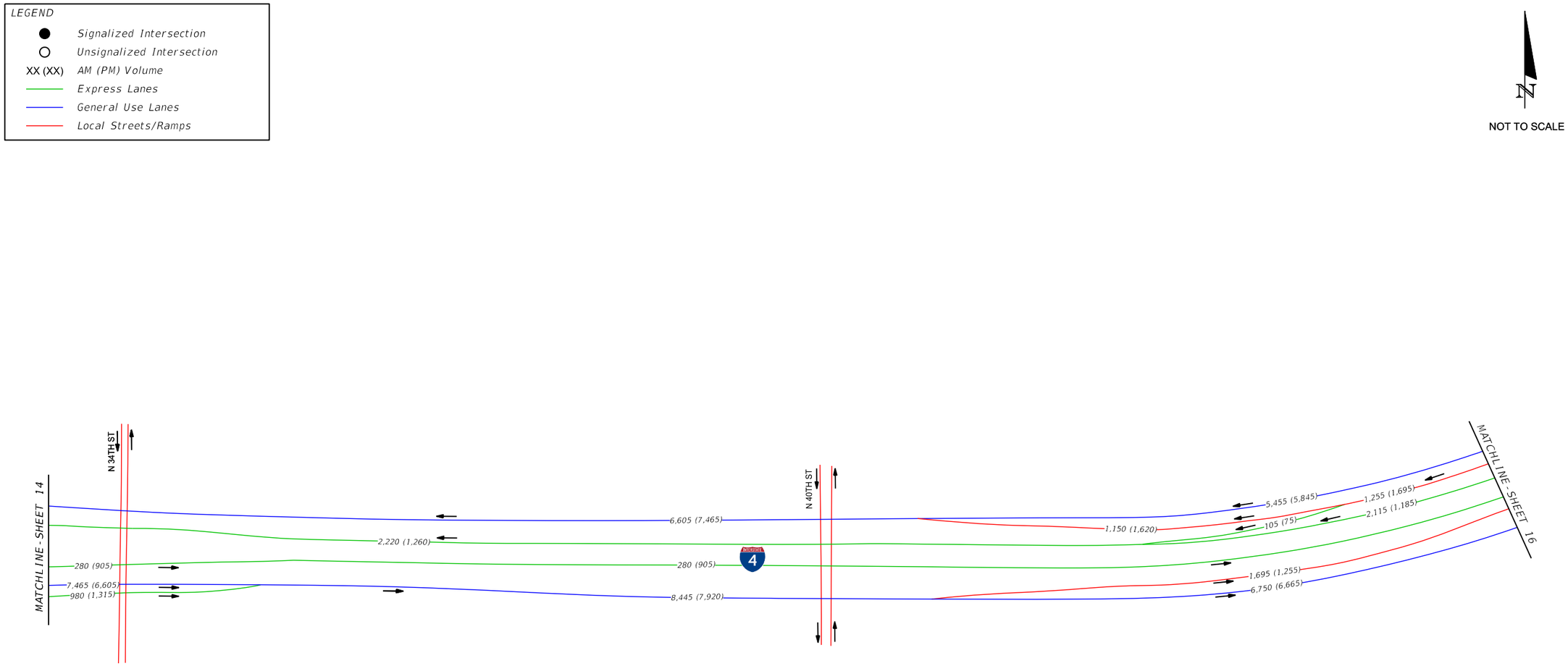
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs

Figure 3-17

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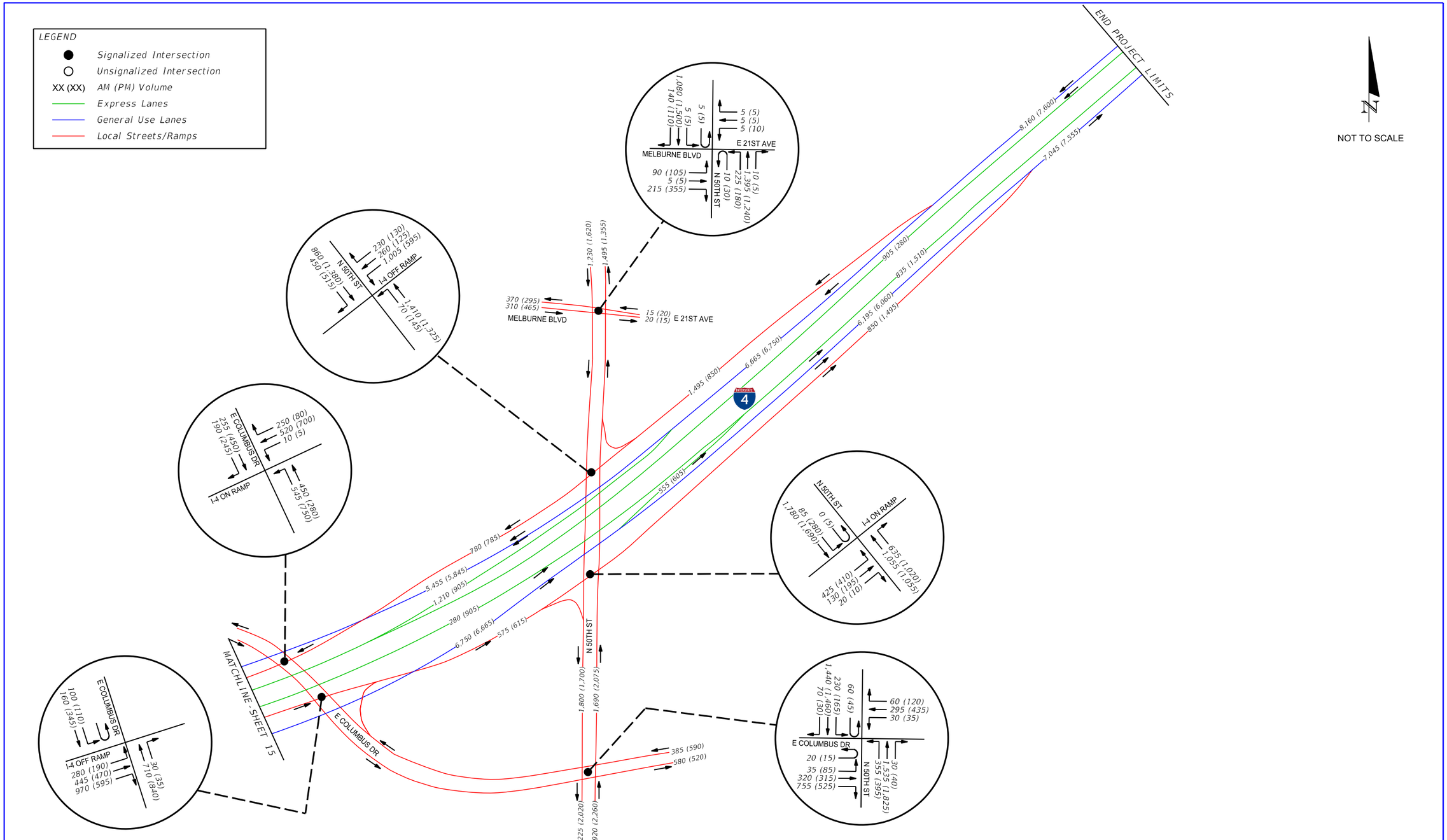
WPI # 258337-2



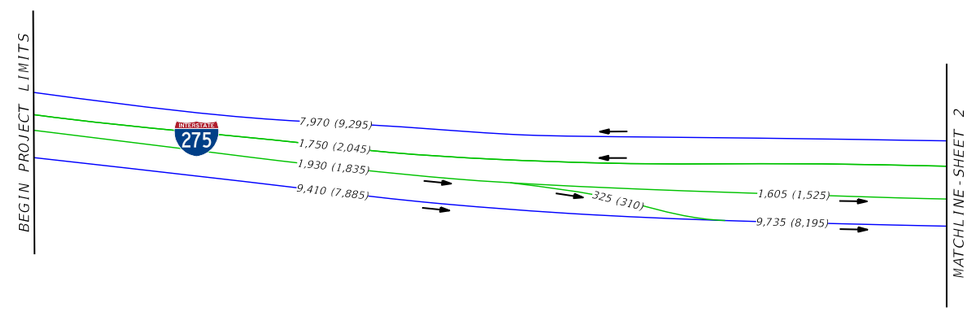
FDOT	SEIS Re-evaluation Build Alternative – Option E – Opening Year (2025) – AM & PM DDHVs	Figure 3-17	Sheet 16 of 16

WPI # 258337-2

LEGEND

- Signalized Intersection
- Unsignalized Intersection
- XX (XX) AM (PM) Volume
- Express Lanes
- General Use Lanes
- Local Streets/Ramps
- mm (mm) Minimal Volume Movement

NOT TO SCALE



SEIS Re-evaluation
No Further Action (NFA) - Design Year (2045) - AM & PM DDHVs

Figure 3-18

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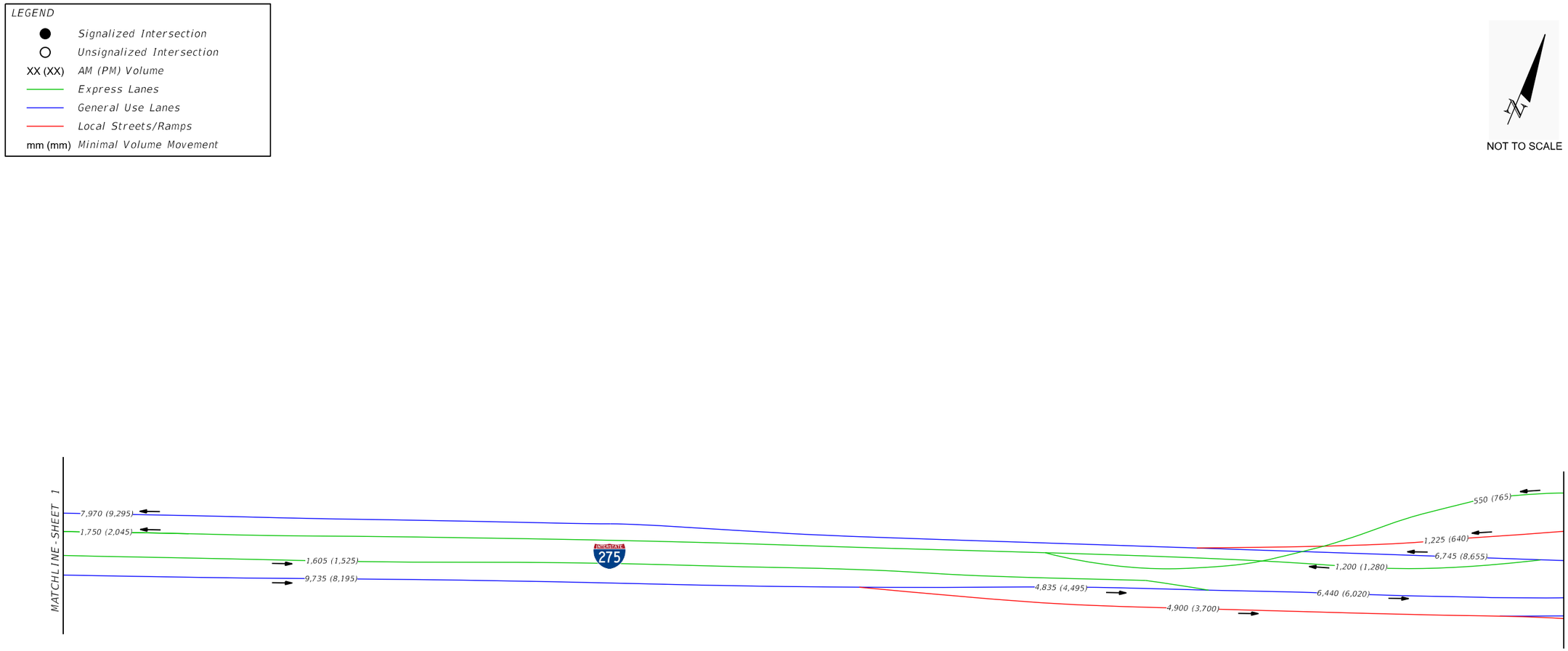
WPI # 258337-2



FDOT

SEIS Re-evaluation
No Further Action (NFA) - Design Year (2045) - AM & PM DDHVs

Figure 3-18

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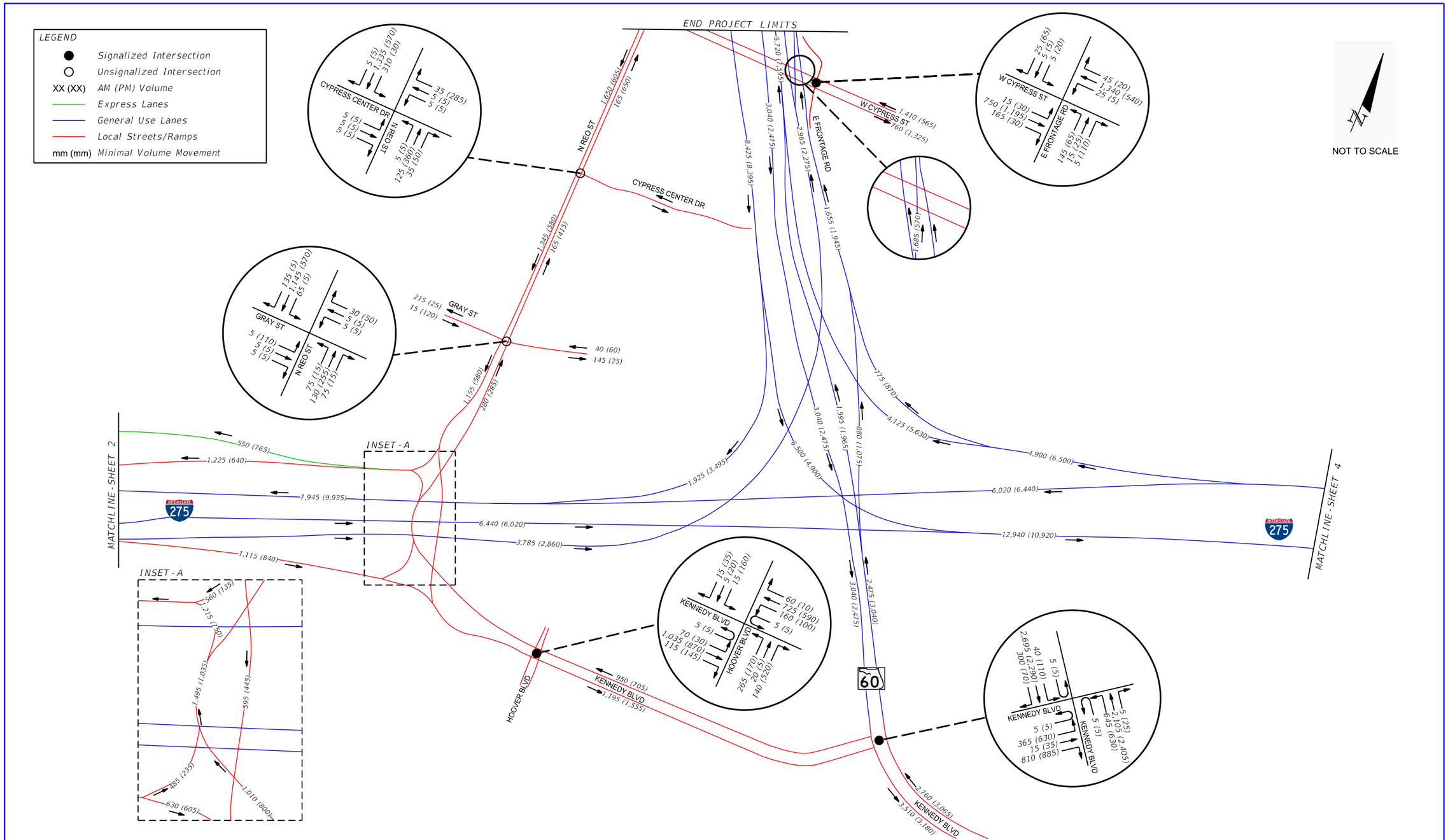
WPI # 258337-2



FDOT

SEIS Re-evaluation
No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs

Figure 3-18

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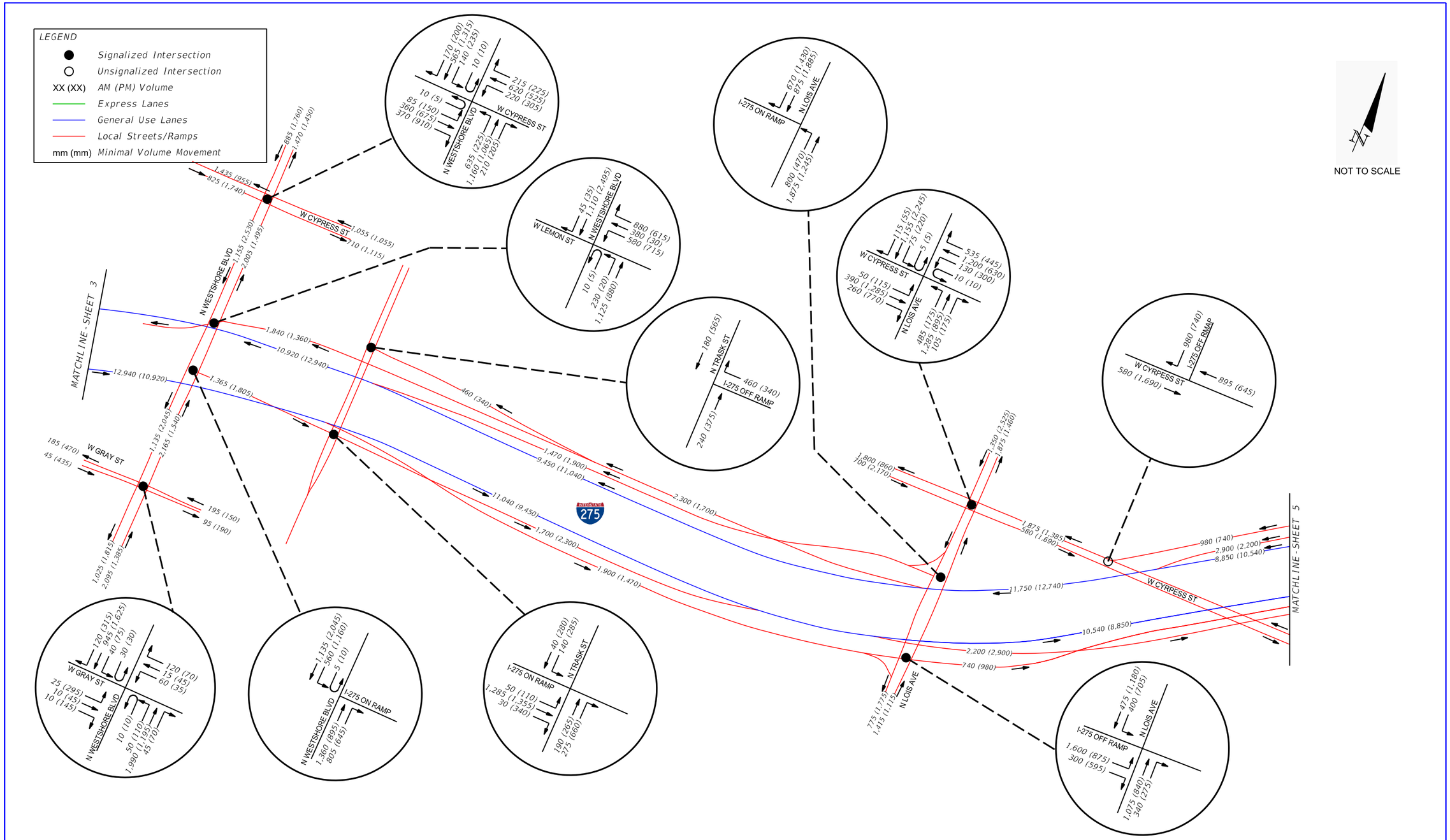
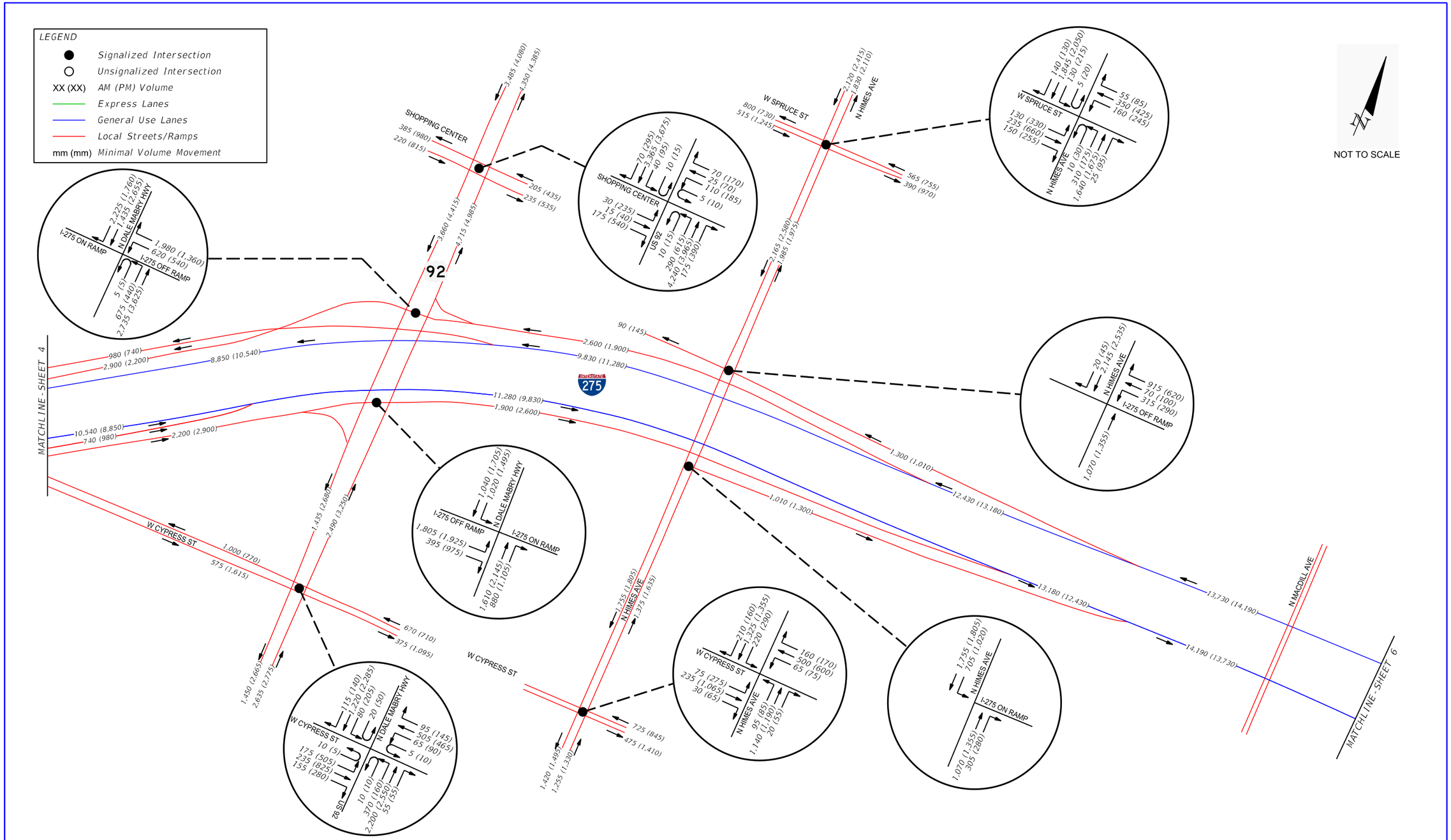
WPI # 258337-2



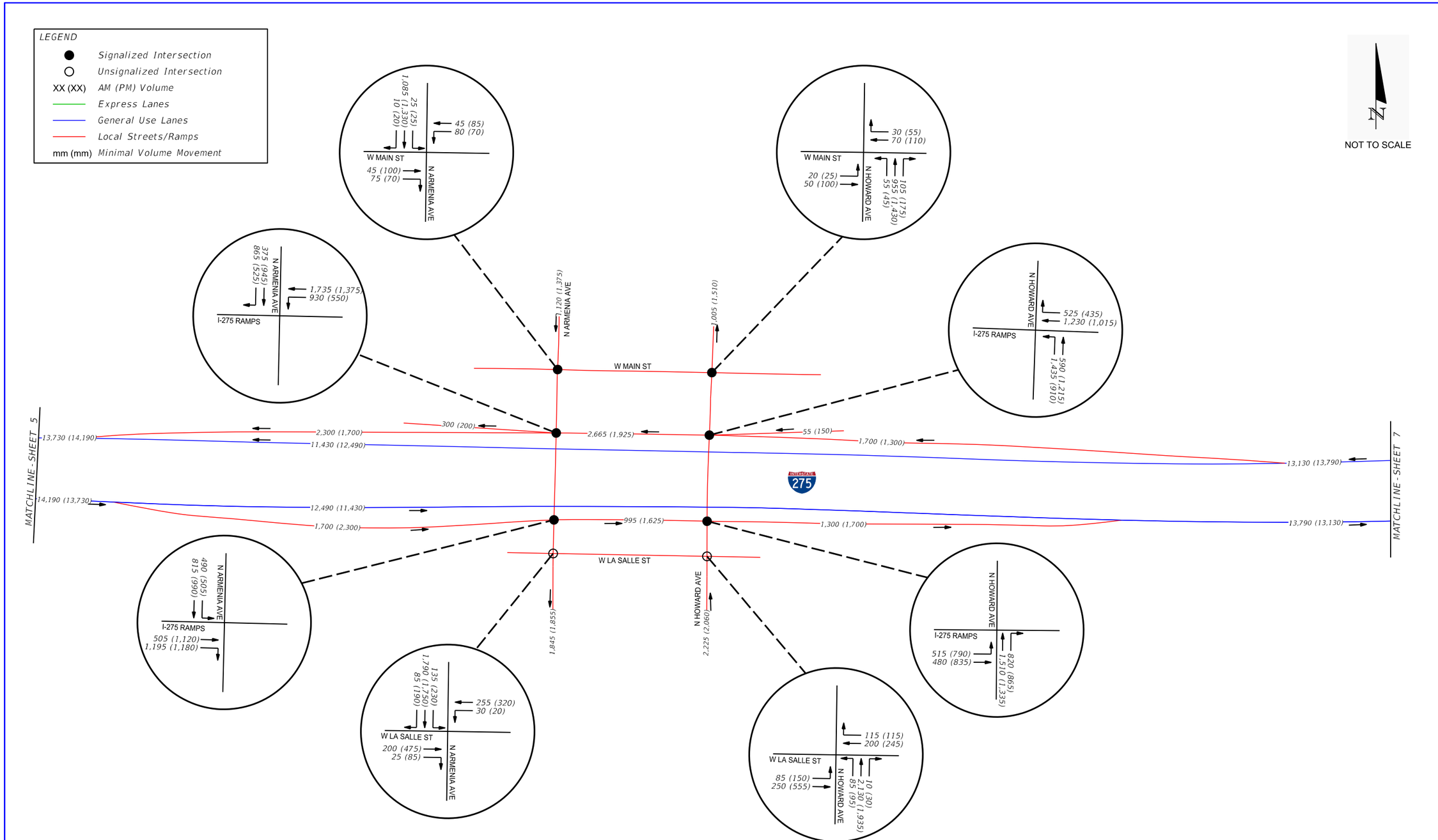
FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 4 of 16

WPI # 258337-2



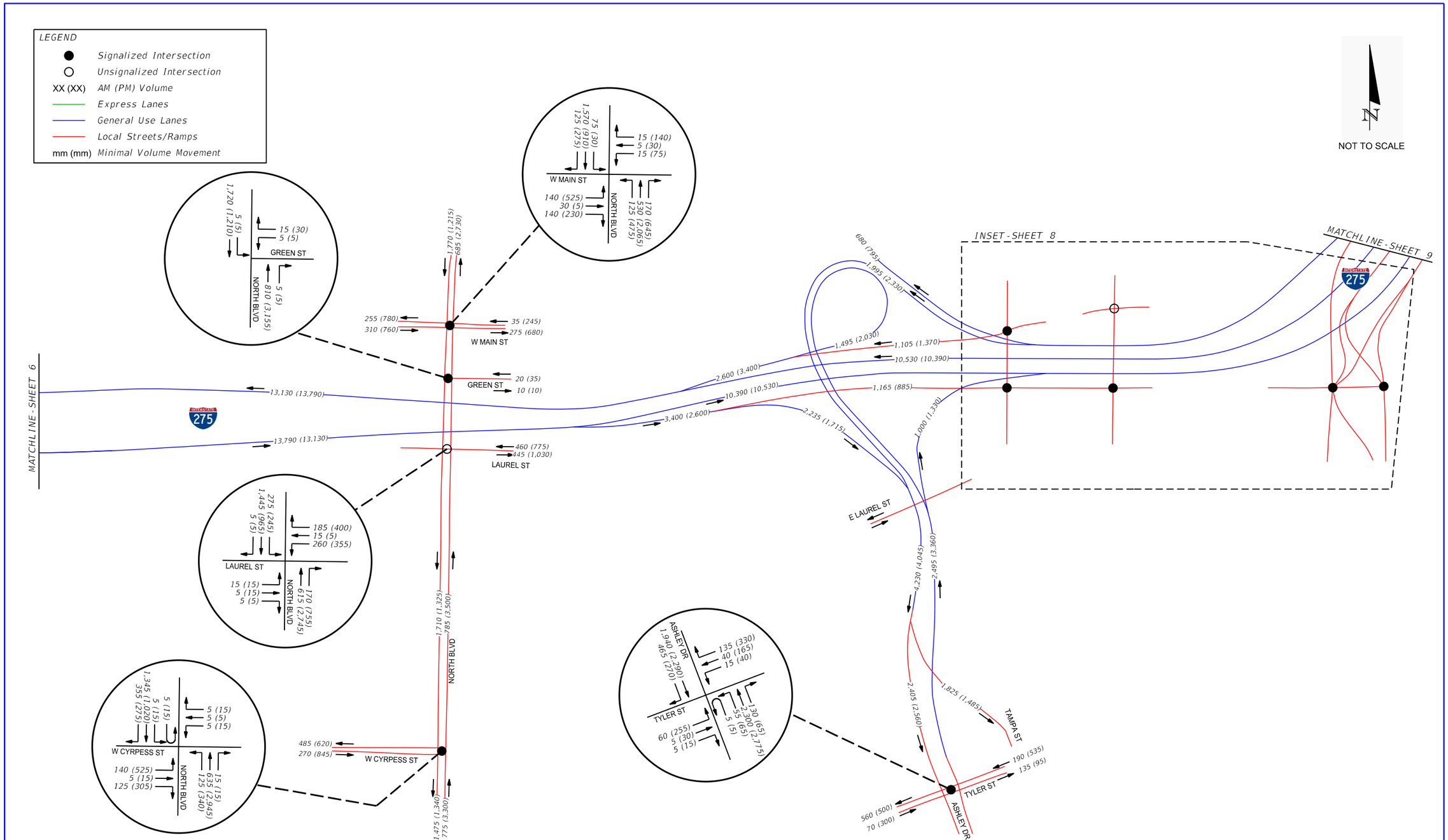
FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 5 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 6 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 7 of 16

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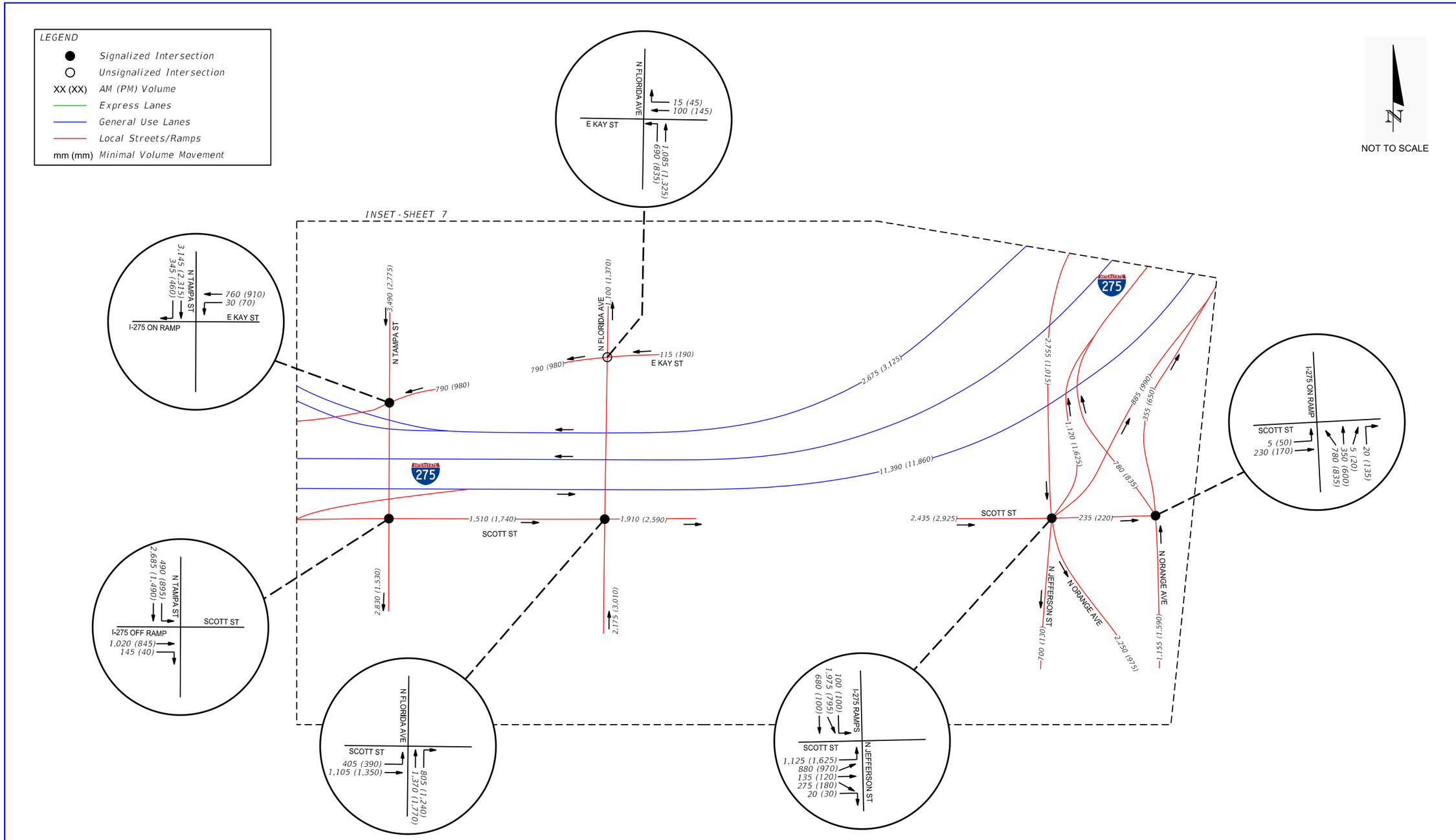
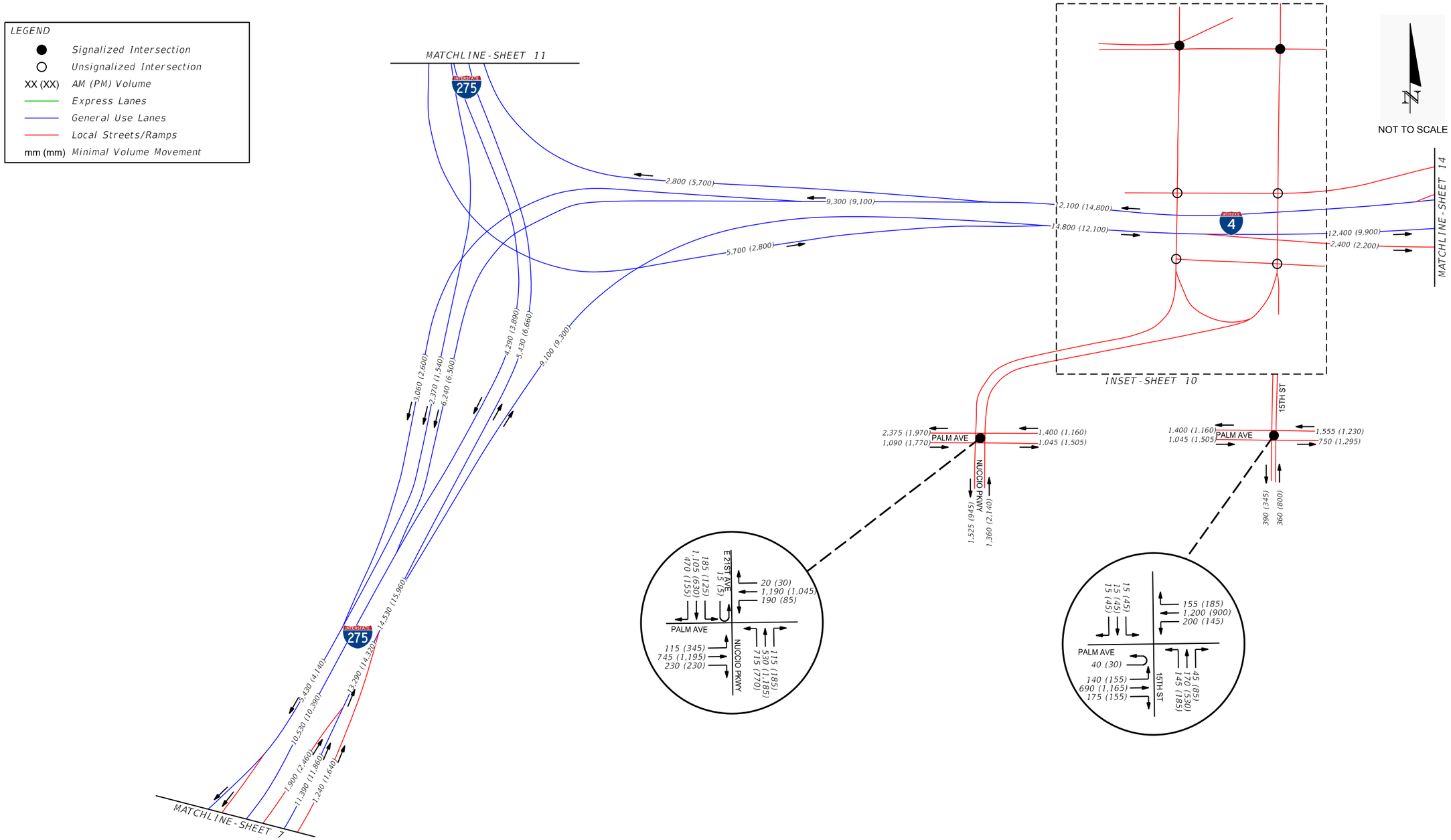


FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 8 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 9 of 16

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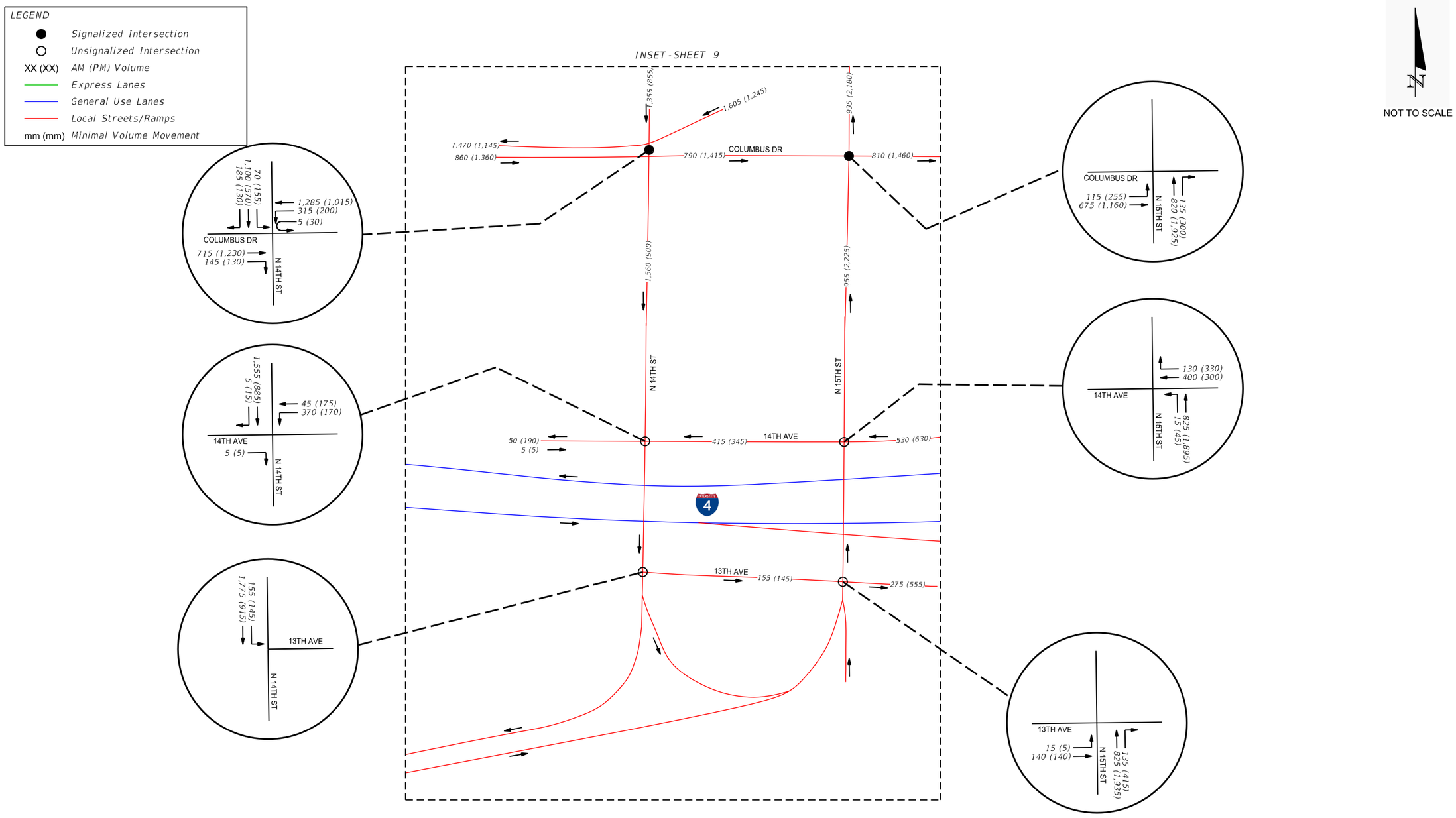

FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 10 of 16

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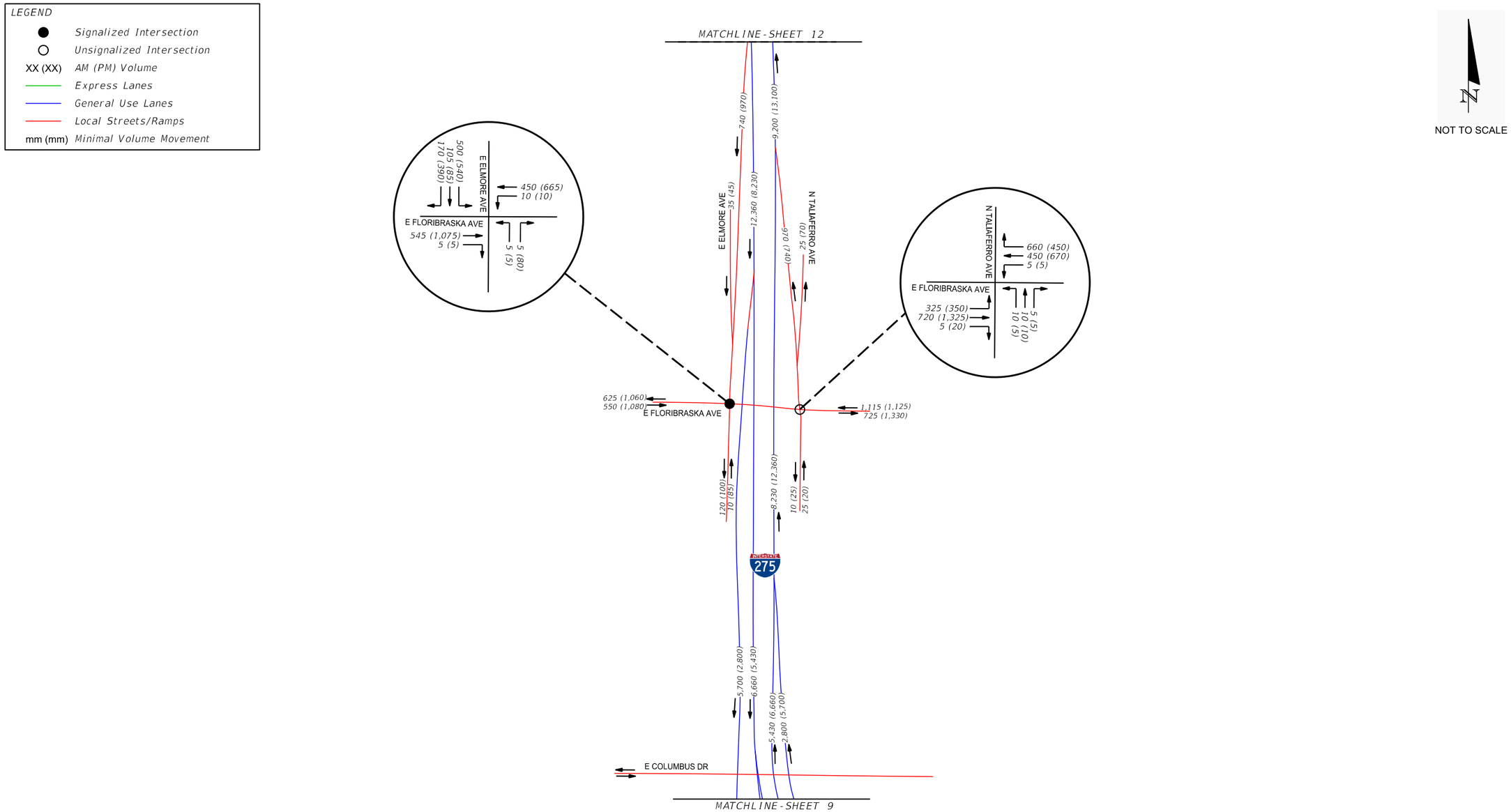

FDOT	SEIS Re-evaluation No Further Action (NFA) – Design Year (2045) – AM & PM DDHVs	Figure 3-18	Sheet 11 of 16

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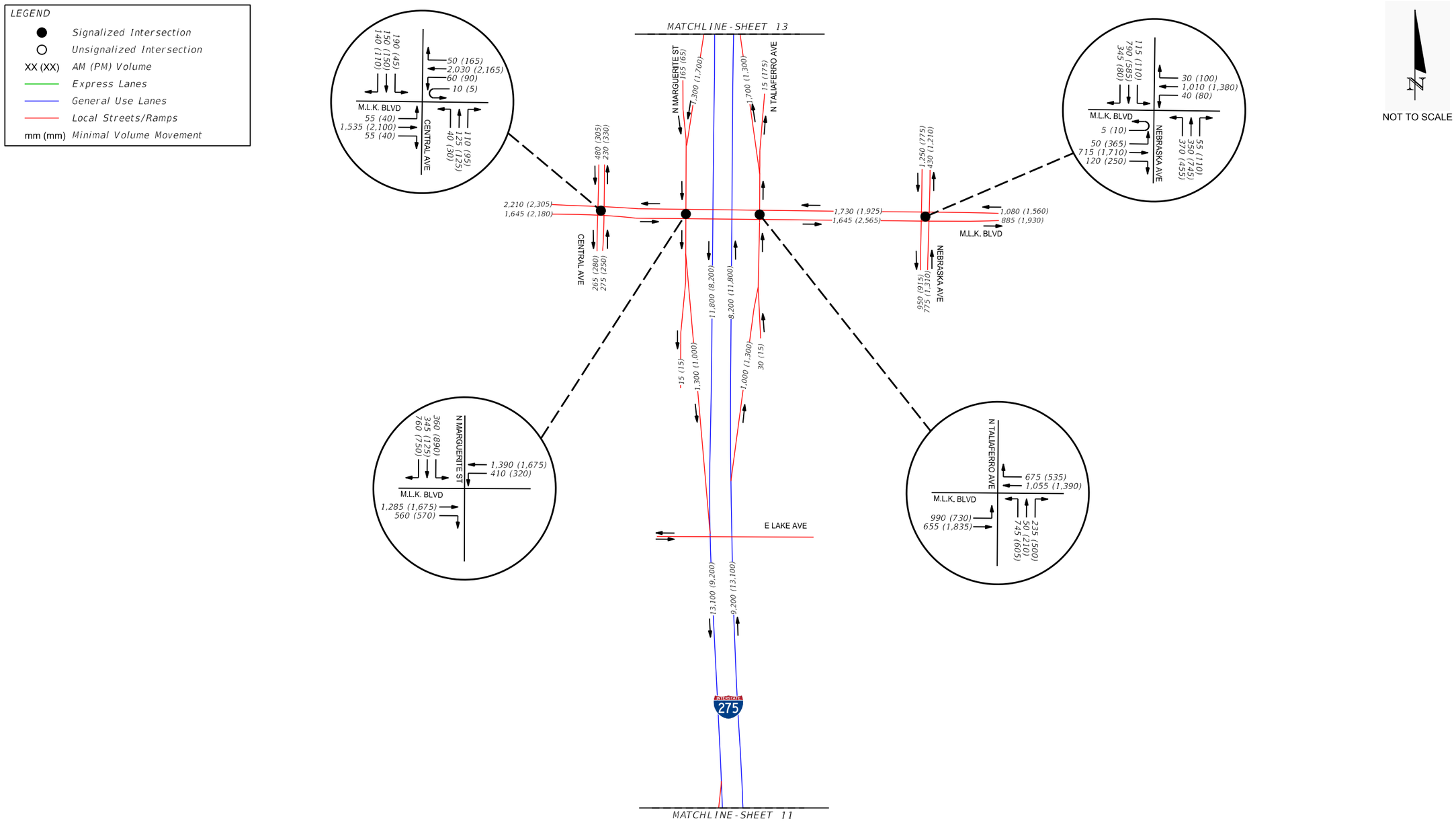

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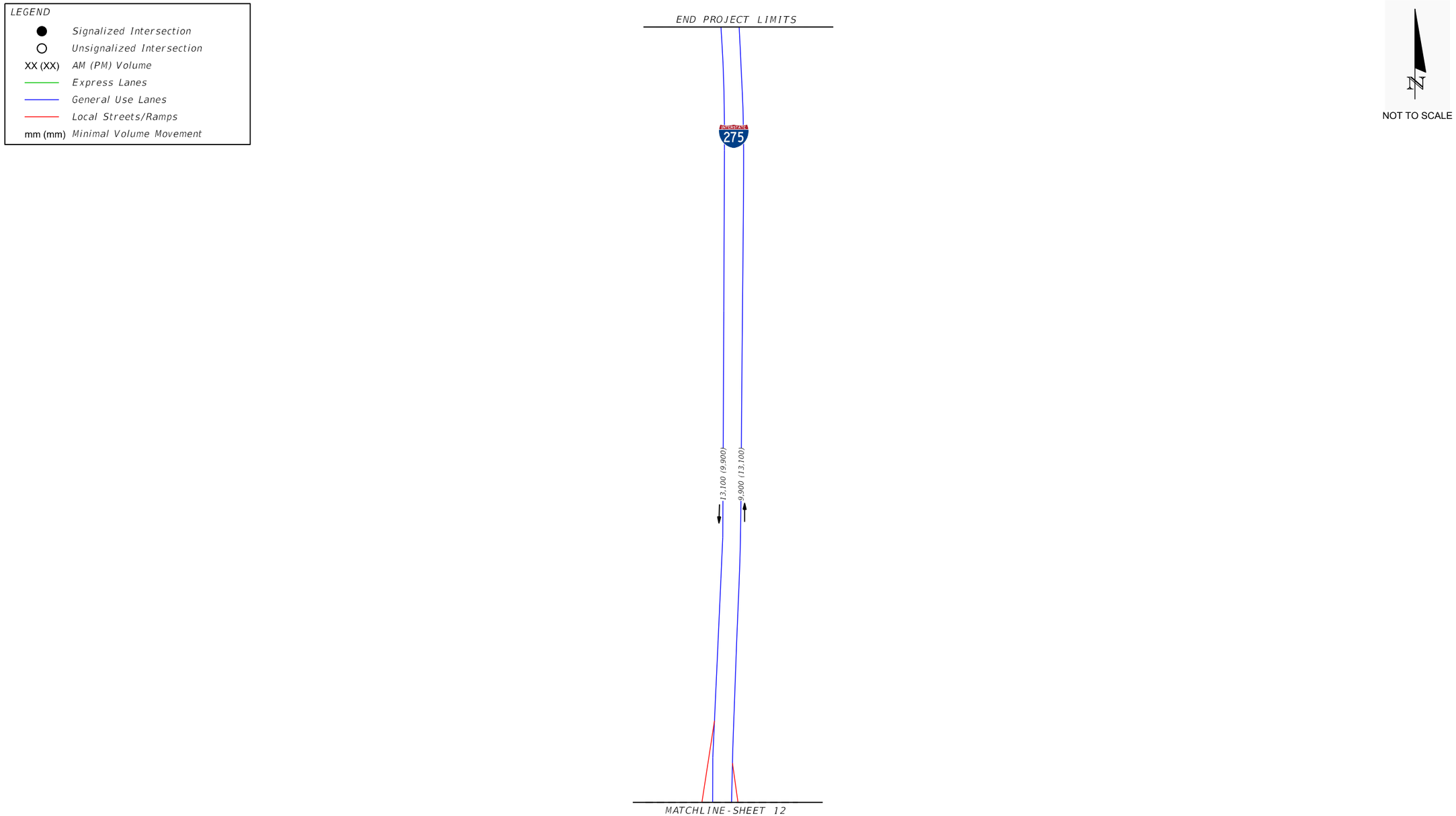

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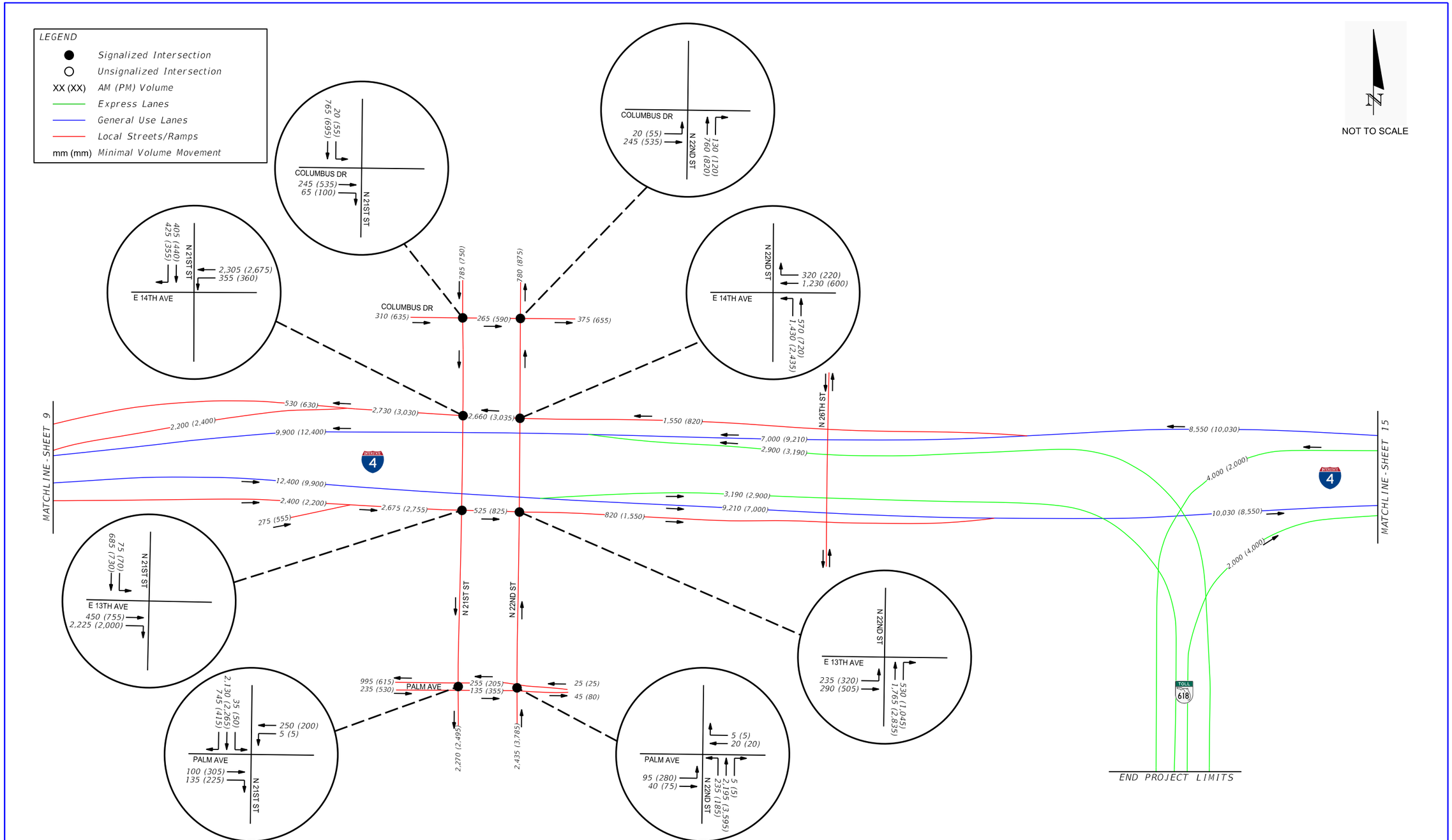

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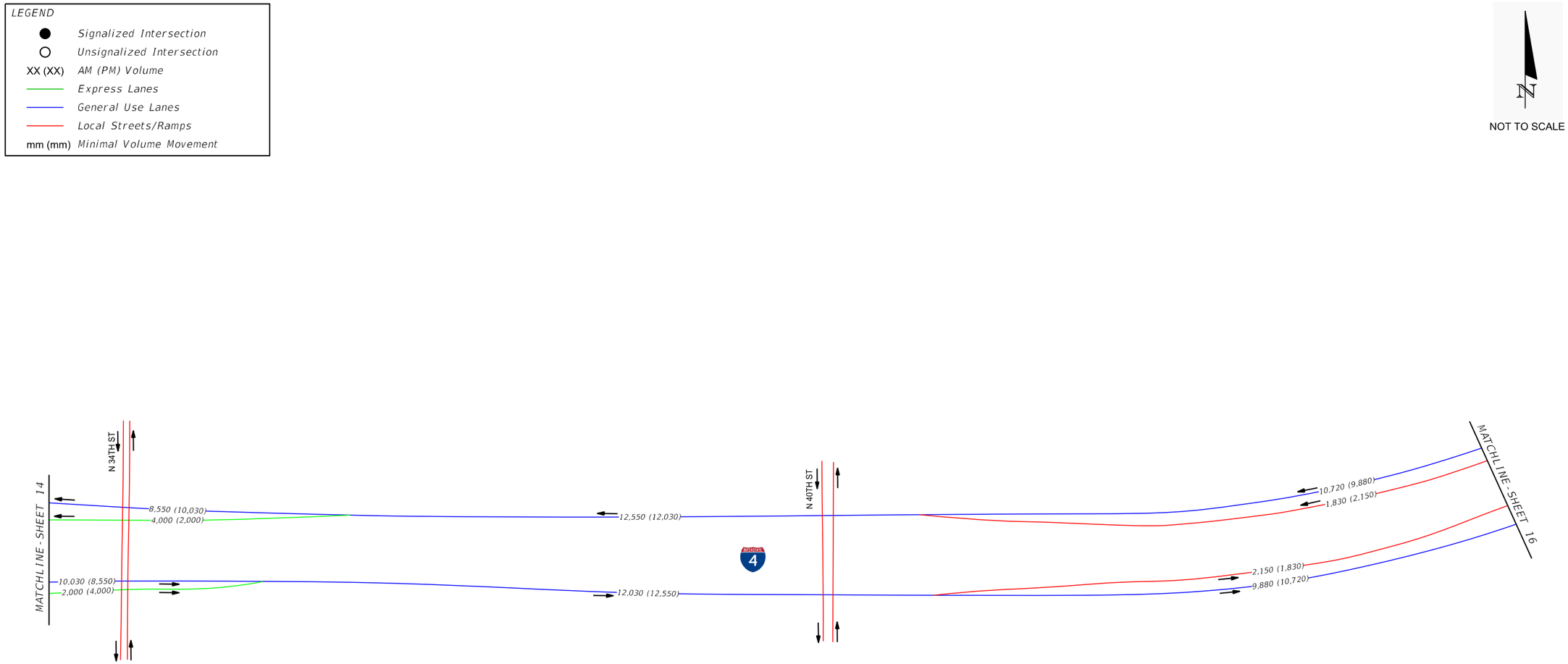

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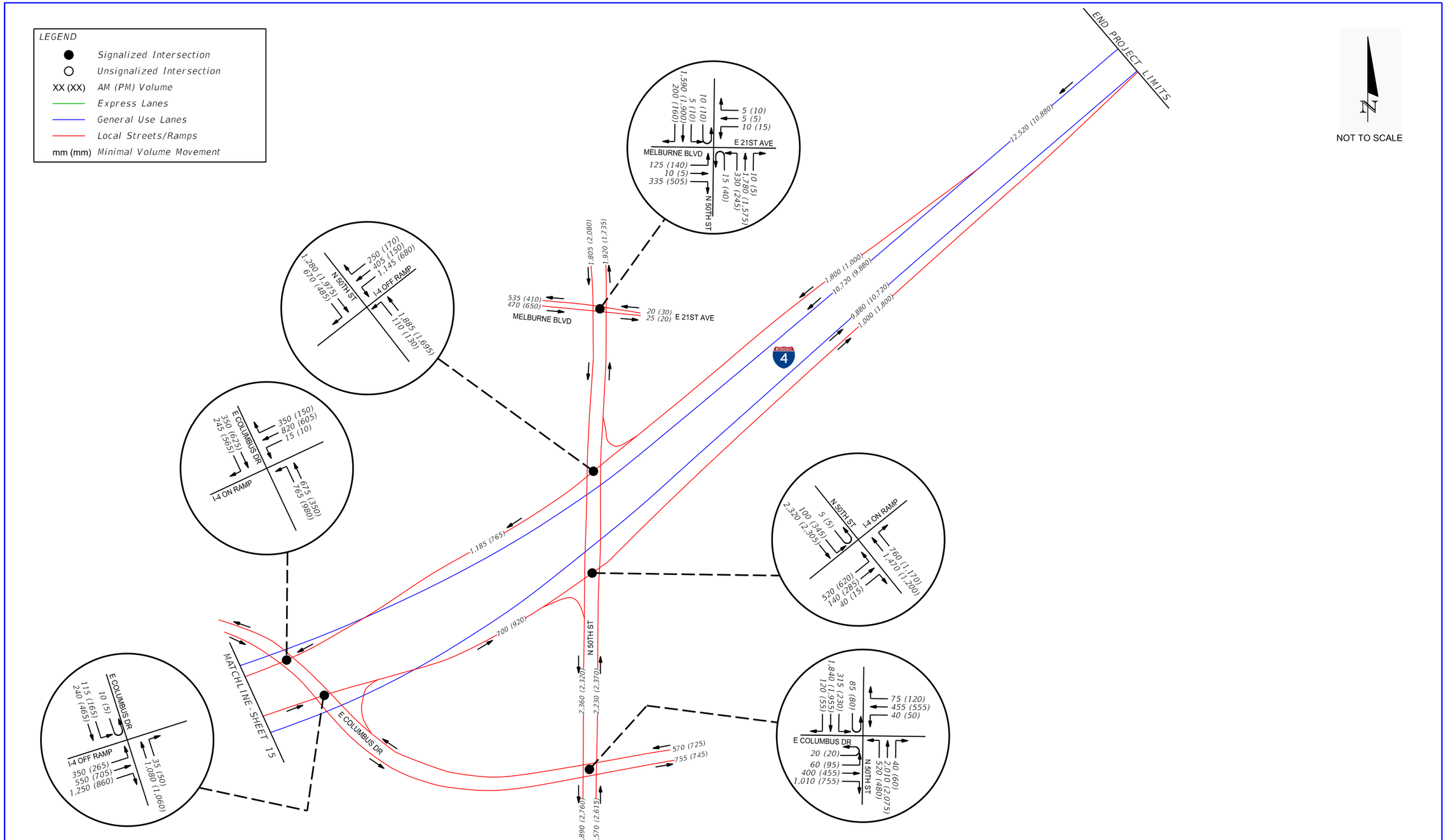

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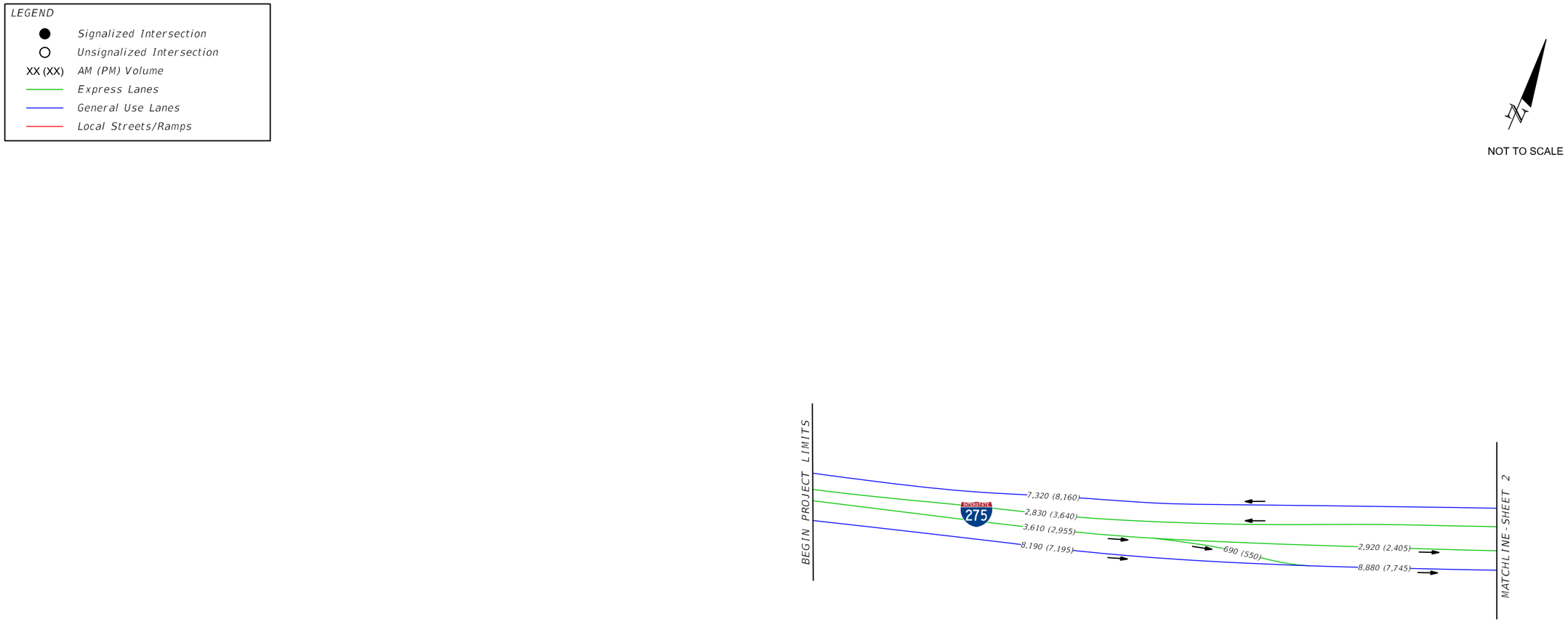


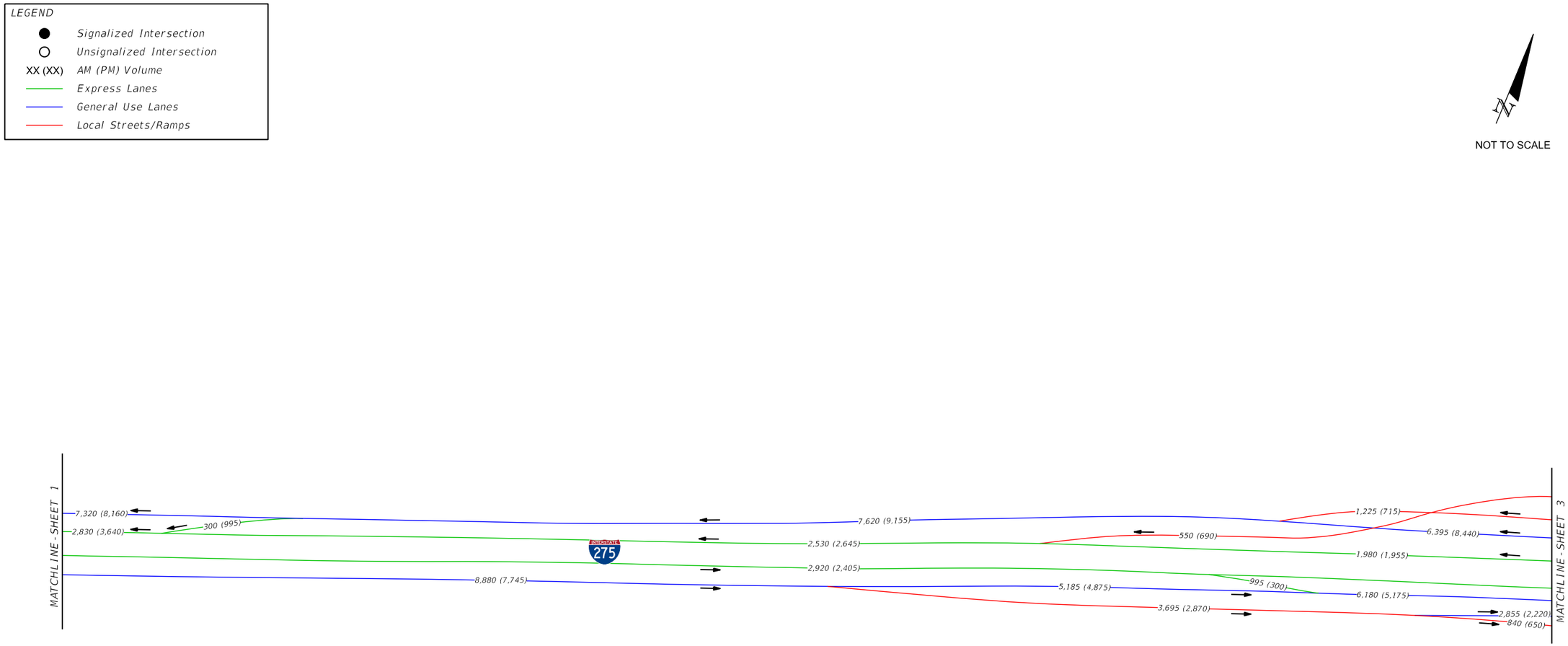
SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

Sheet 1 of 16

WPI # 258337-2



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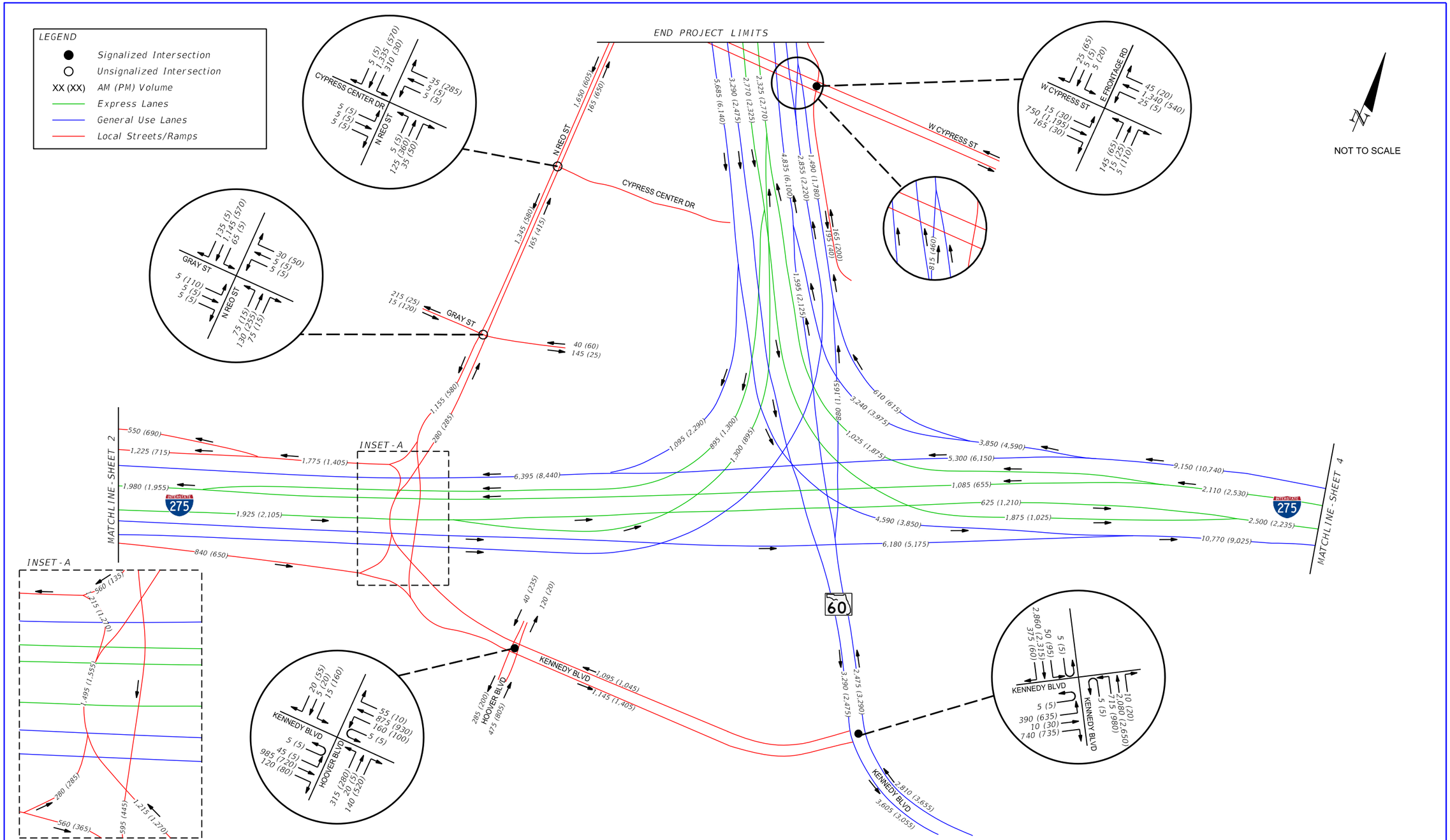


FDOT

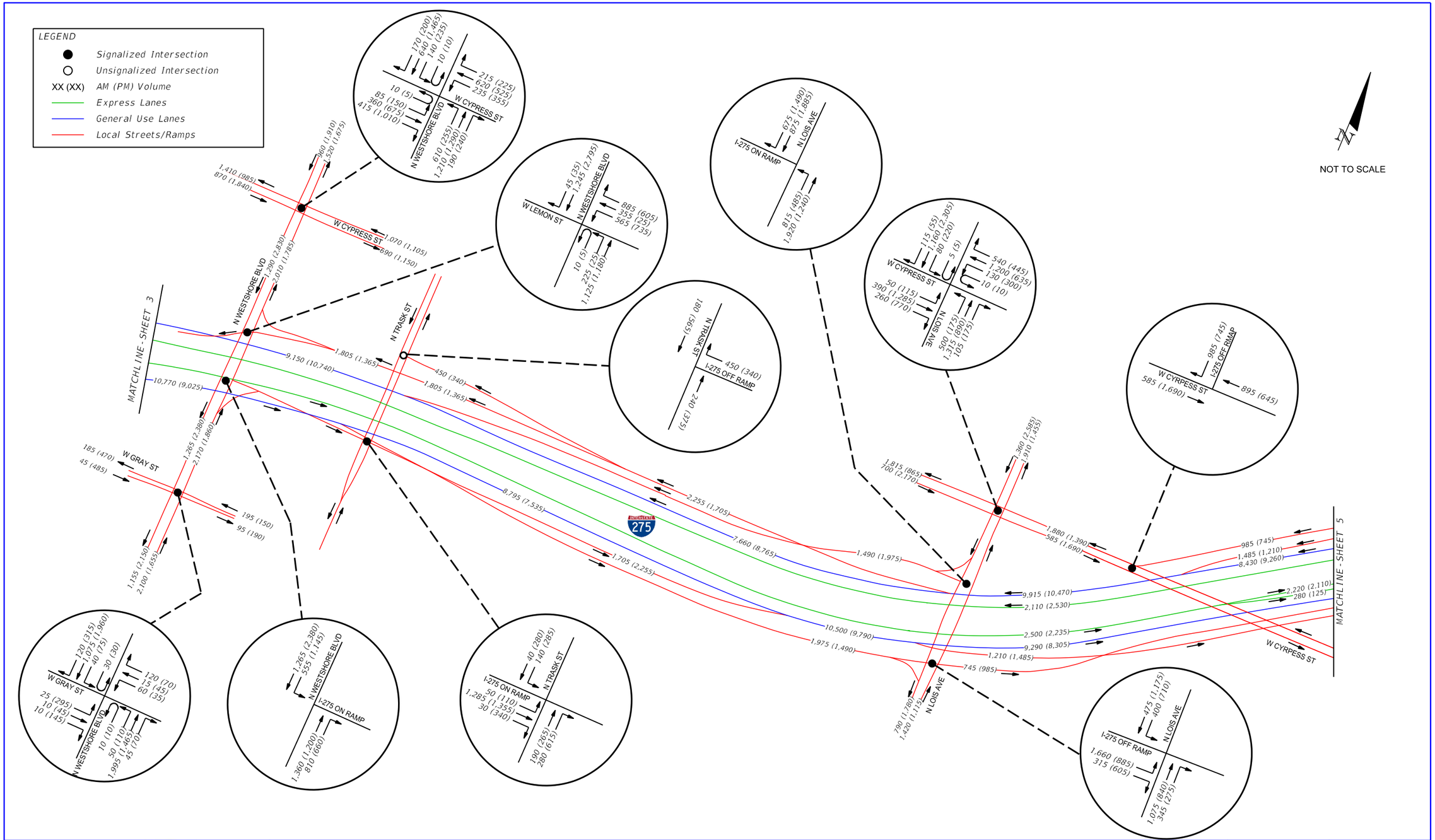
SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

Sheet 3 of 16

WPI # 258337-2



FDOT

SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

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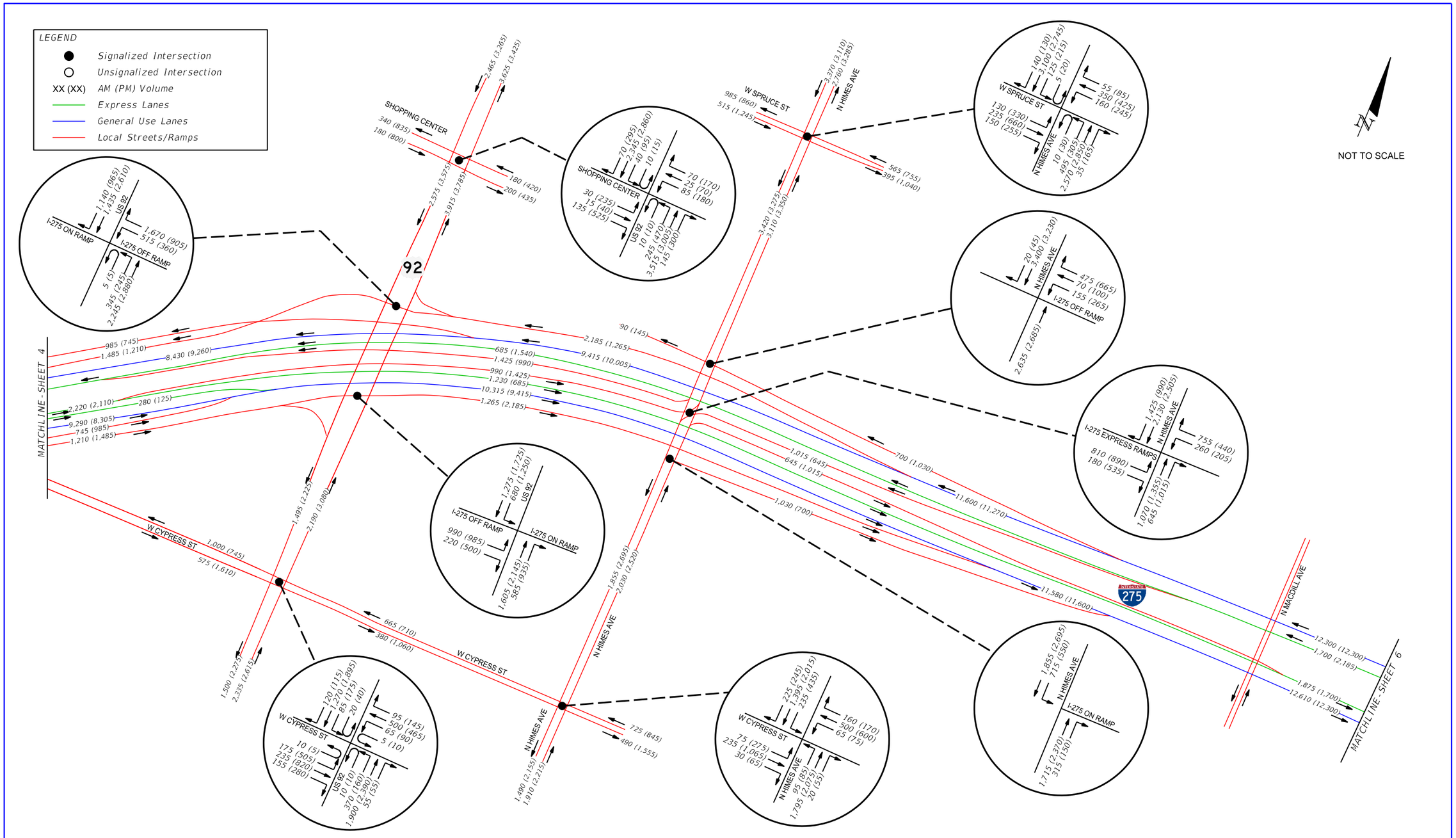
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

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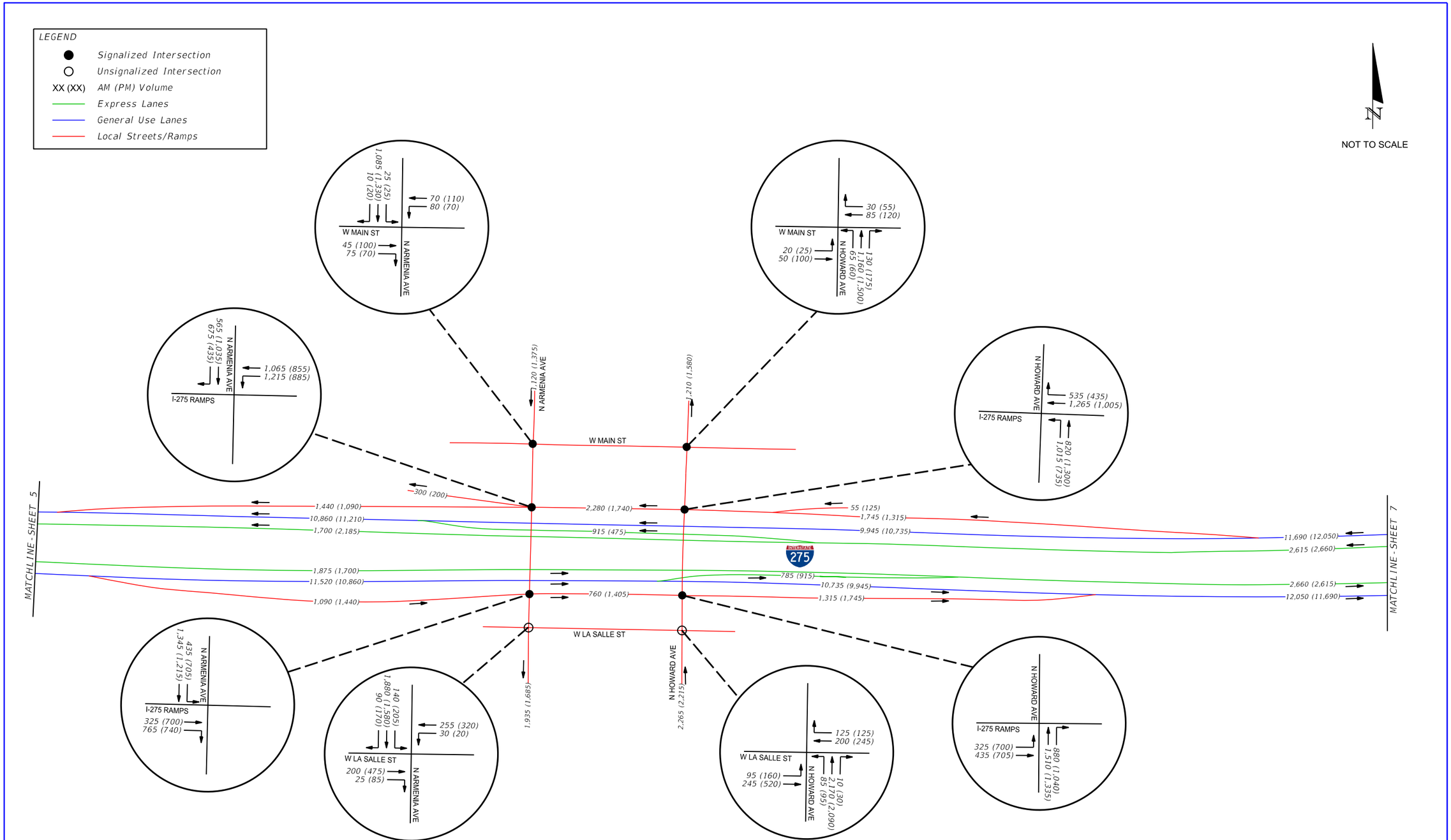
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 6 of 16

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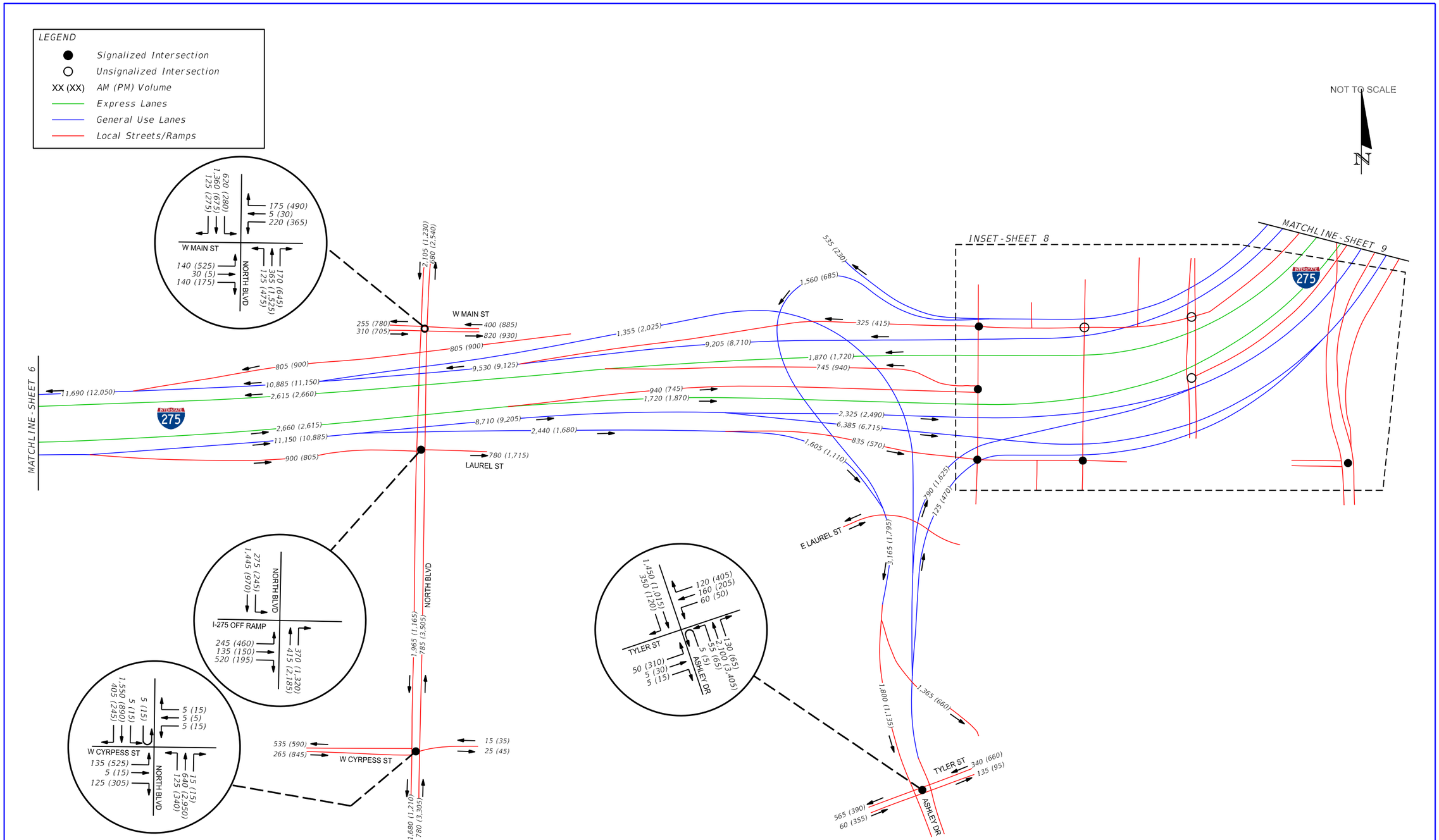

FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 7 of 16

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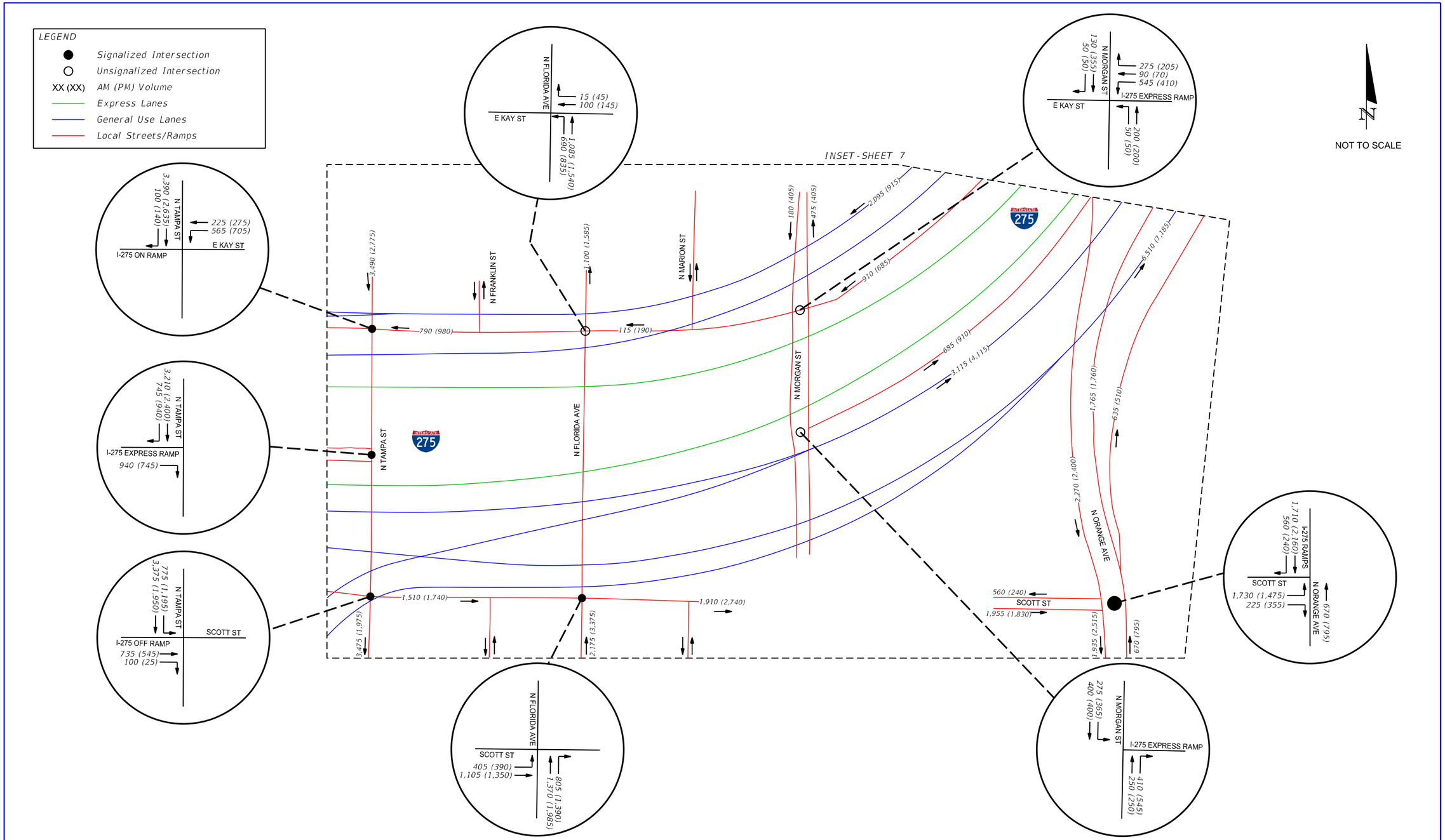

SEIS Re-evaluation

Build Alternative - Option A - Design Year (2045) - AM & PM DDHVs

Figure 3-19

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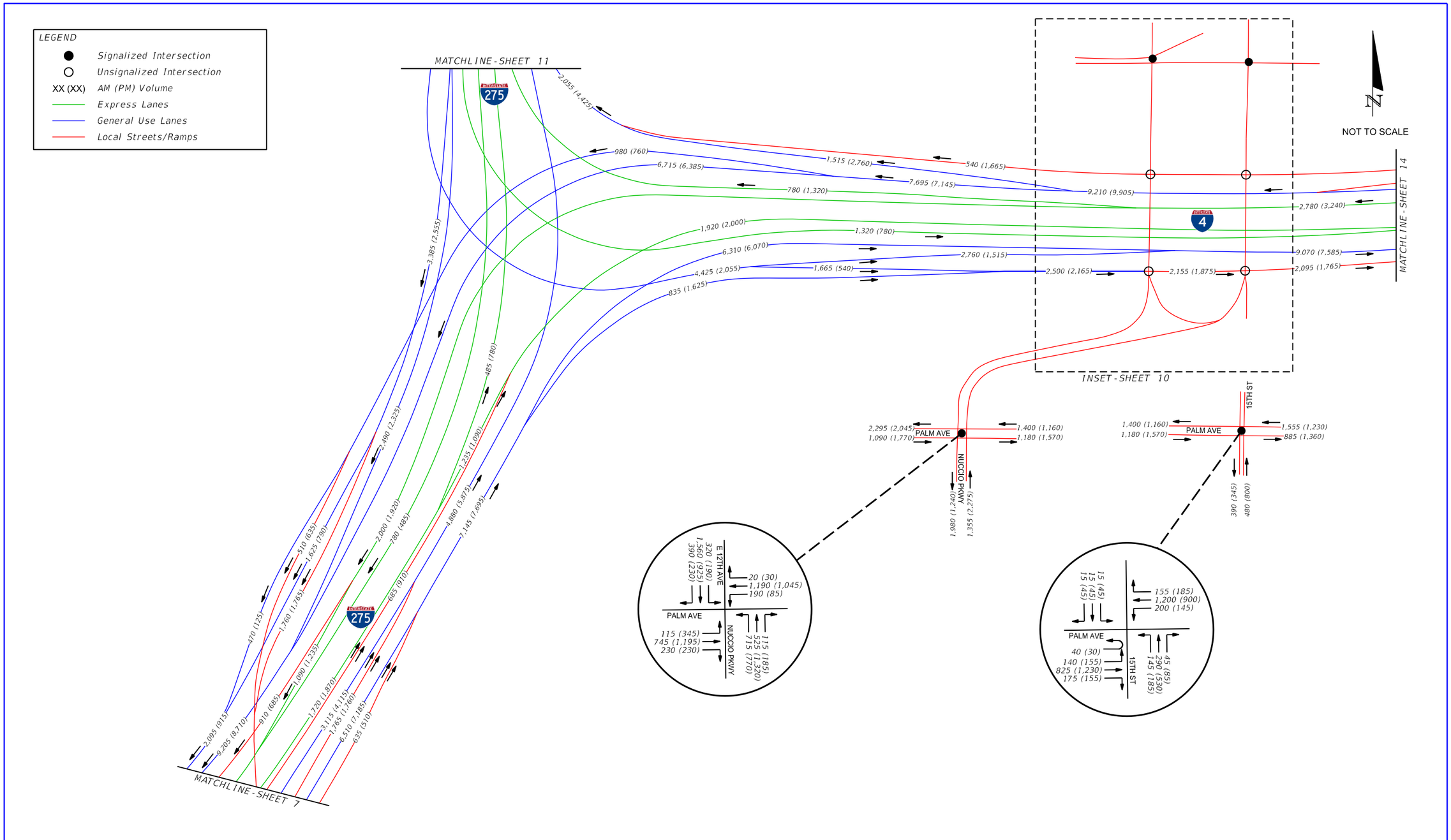
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 9 of 16

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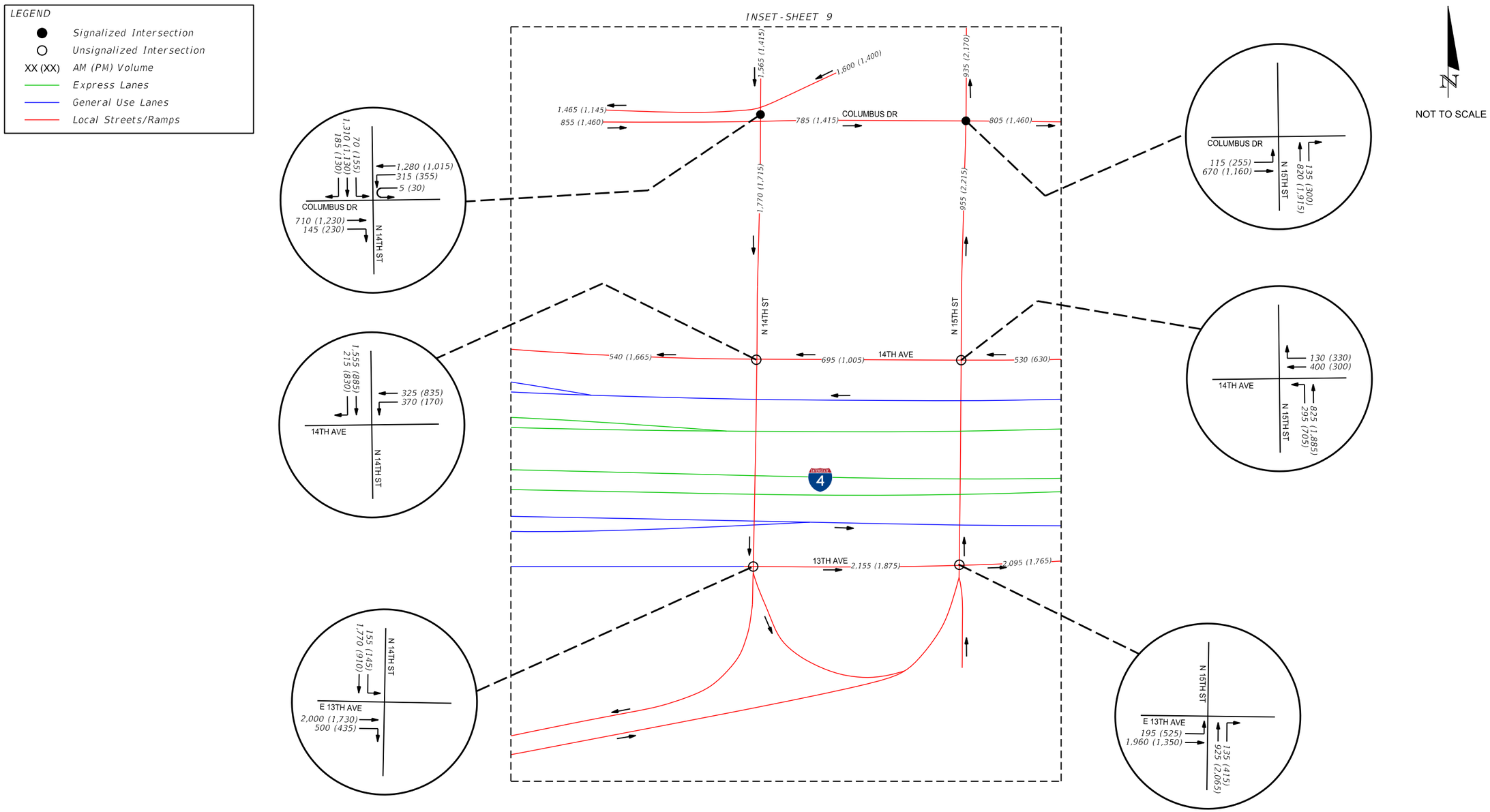
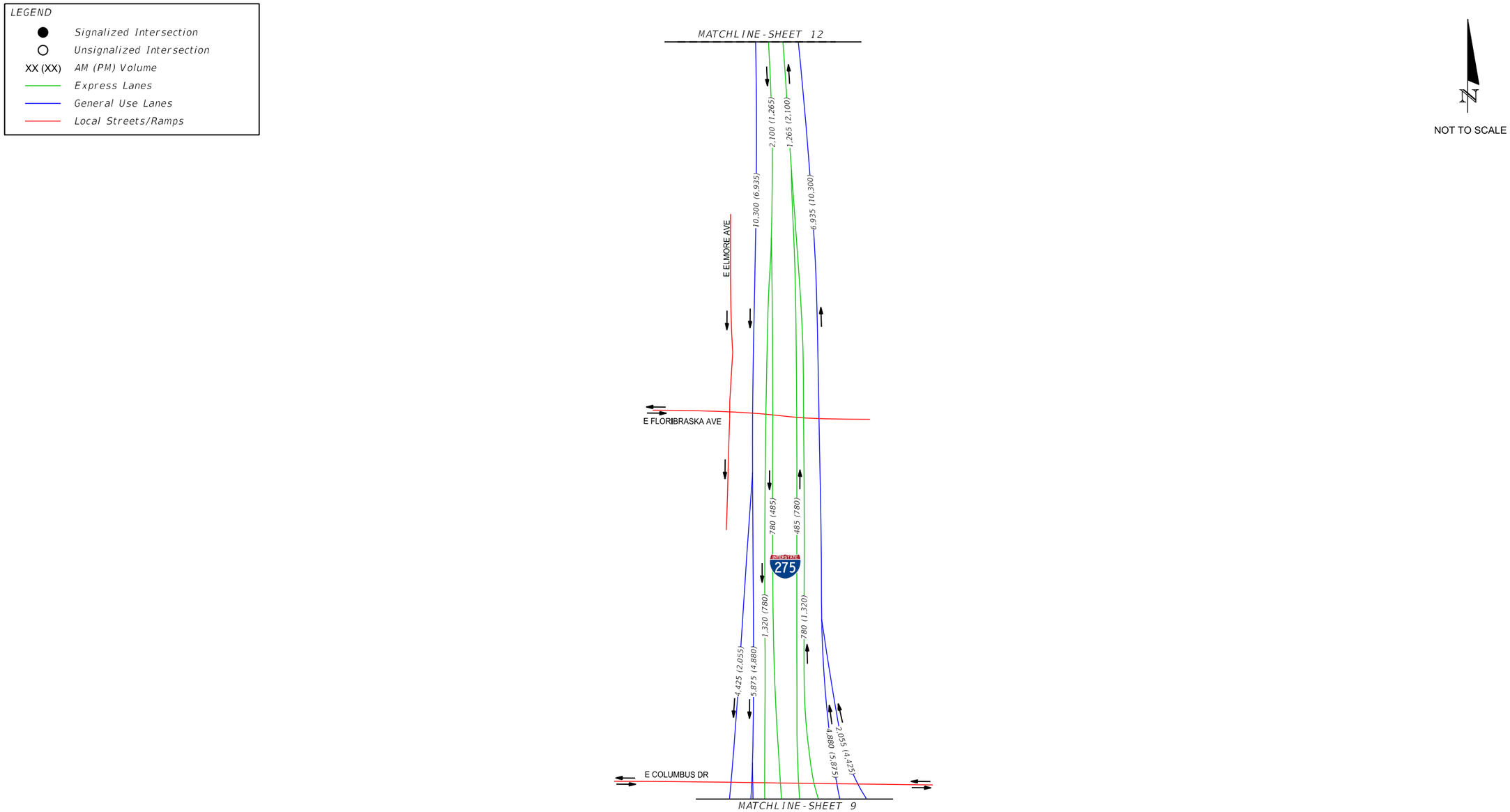


FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 10 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

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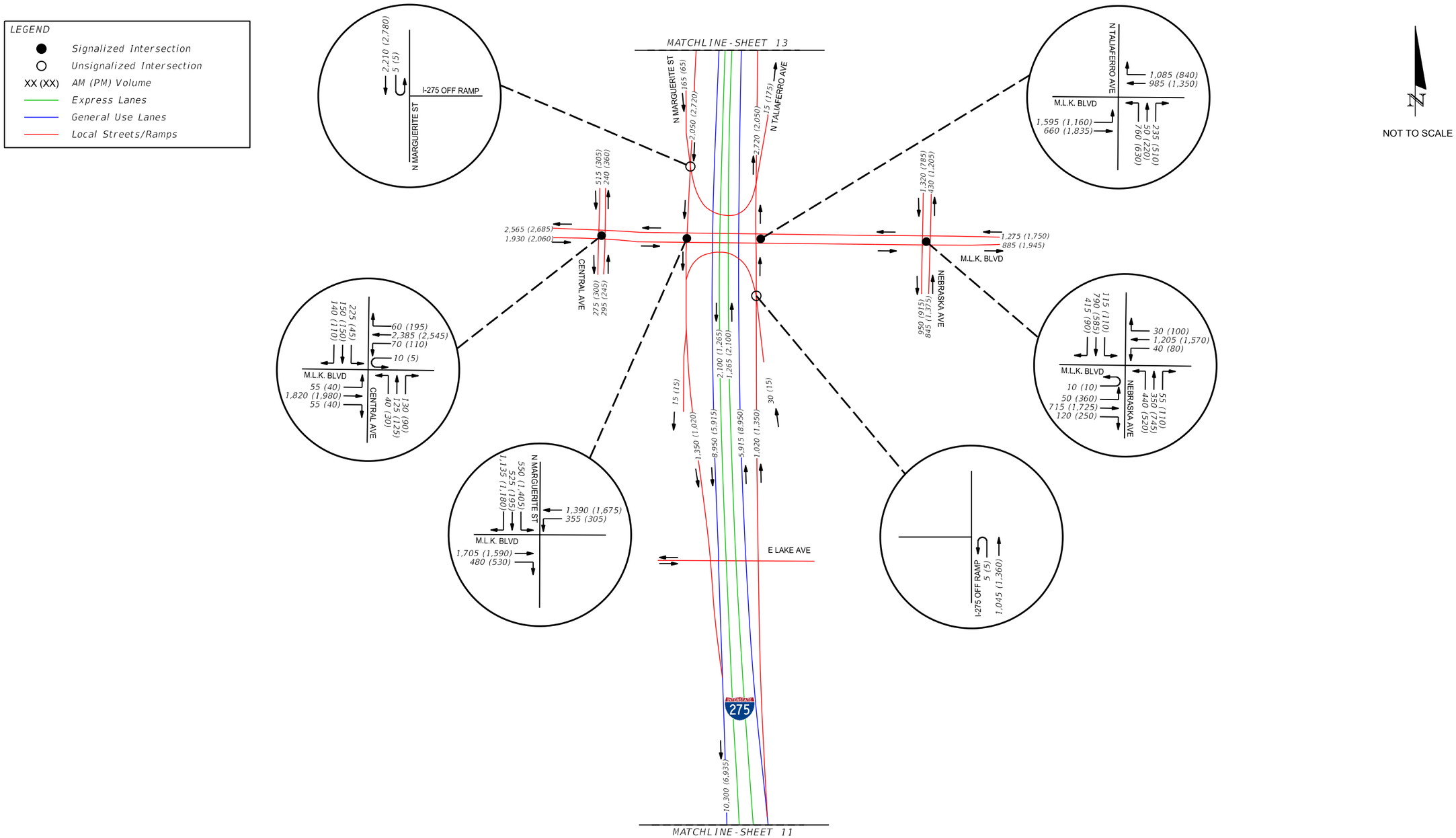
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

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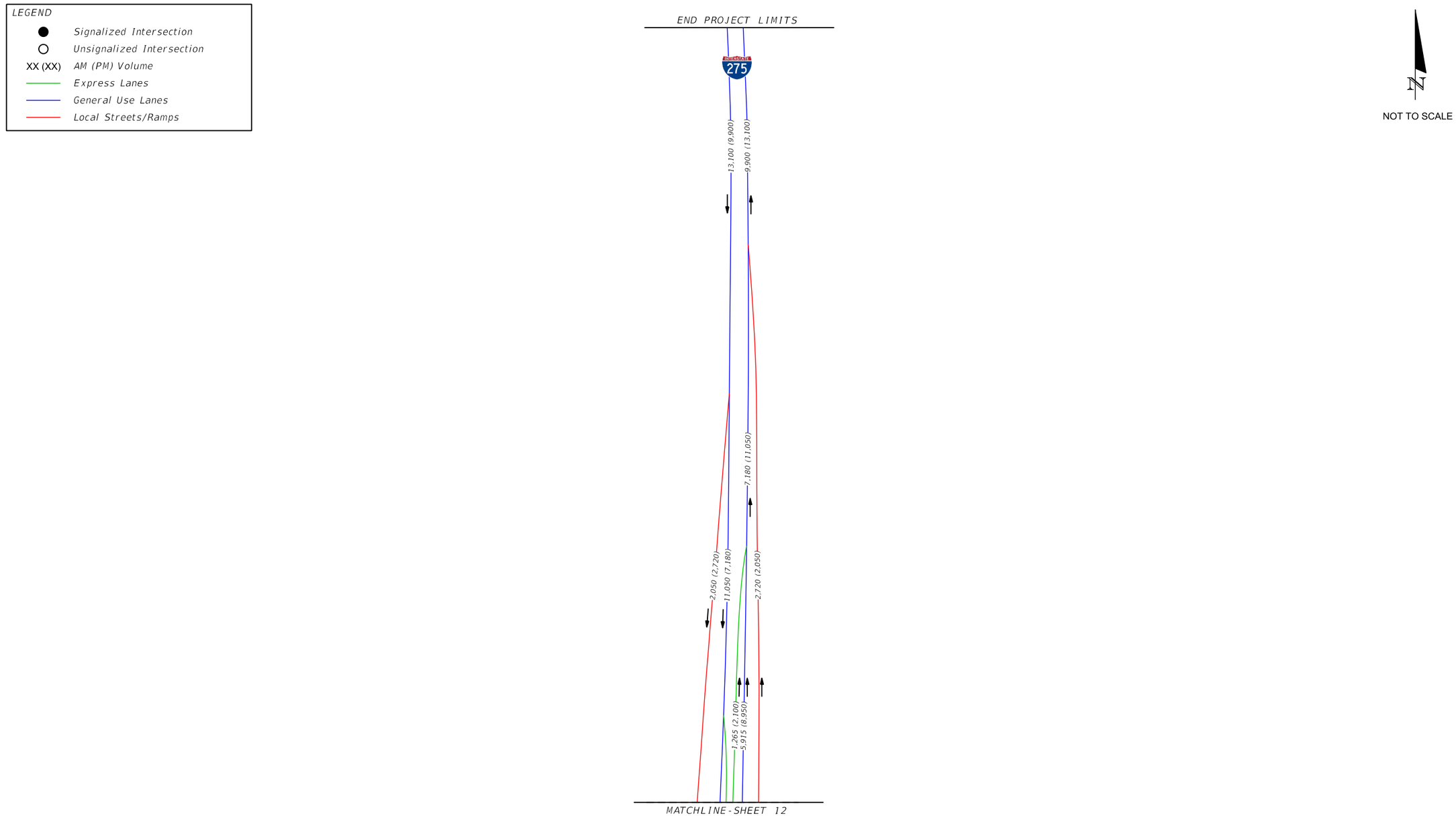
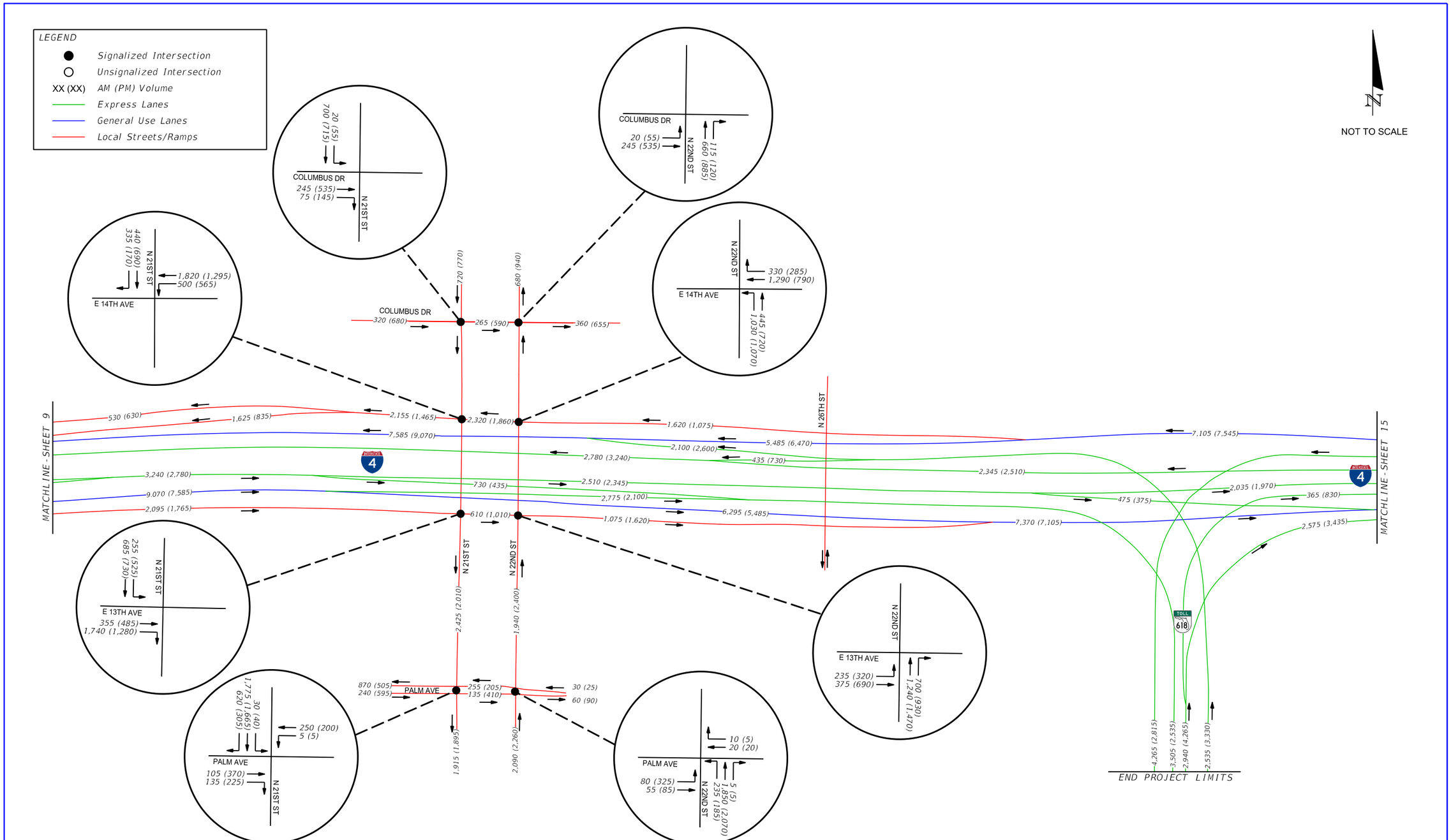
WPI # 258337-2



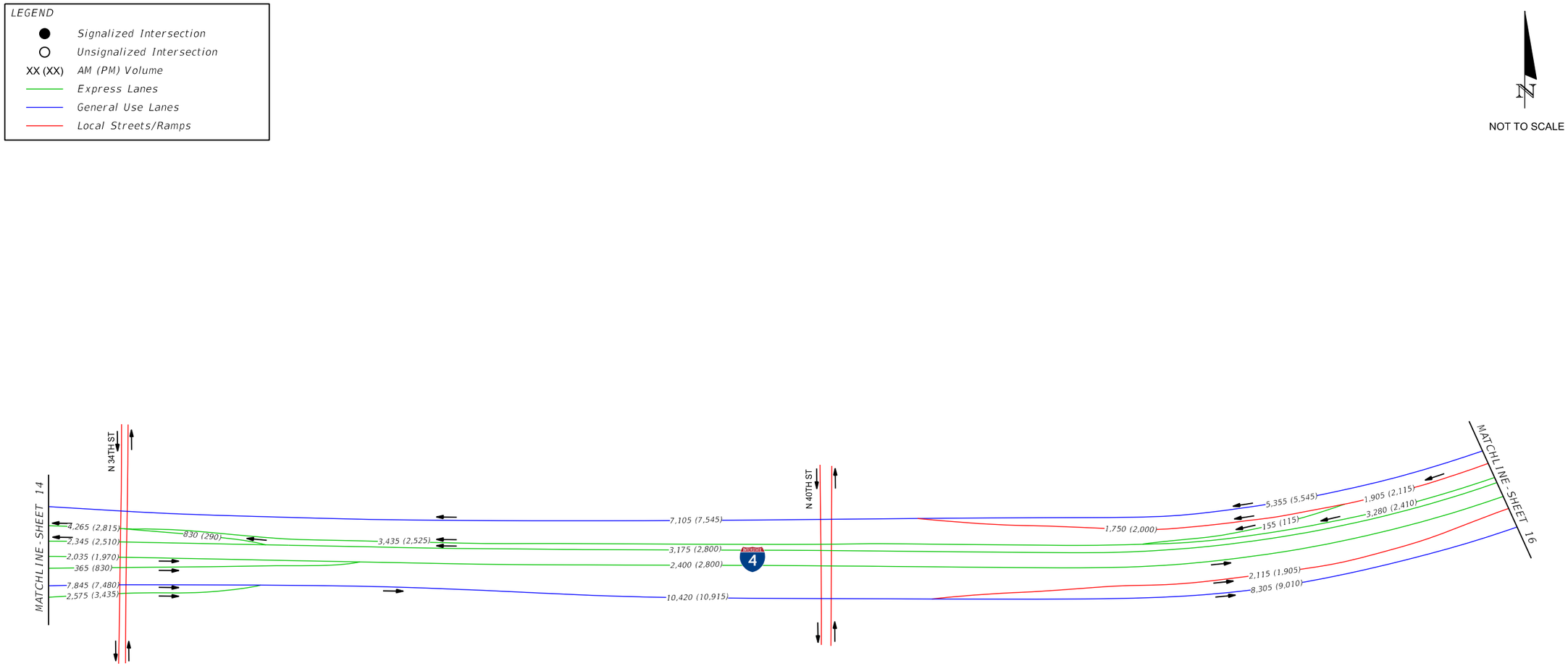
FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 13 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 14 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs

Figure 3-19

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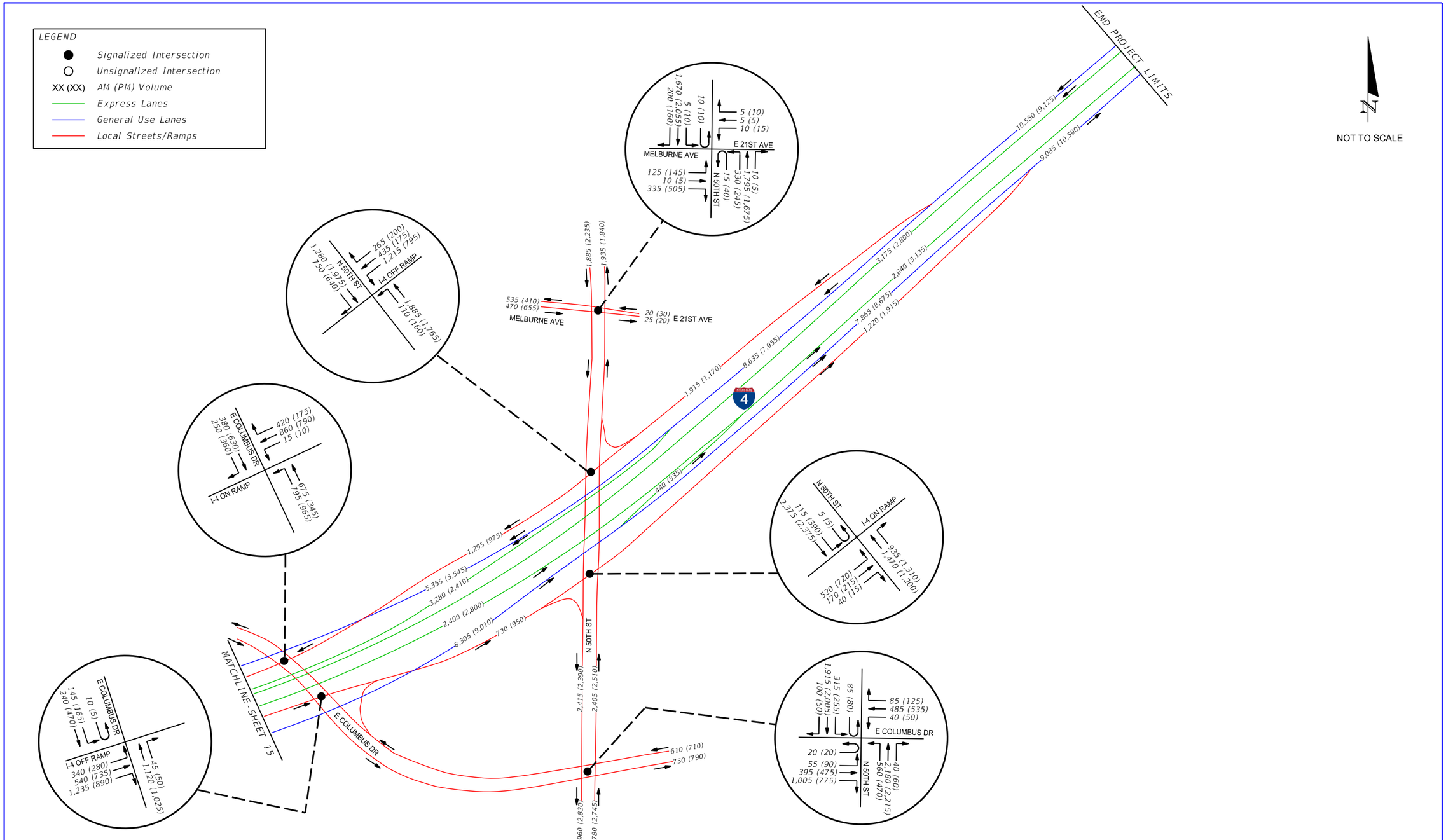
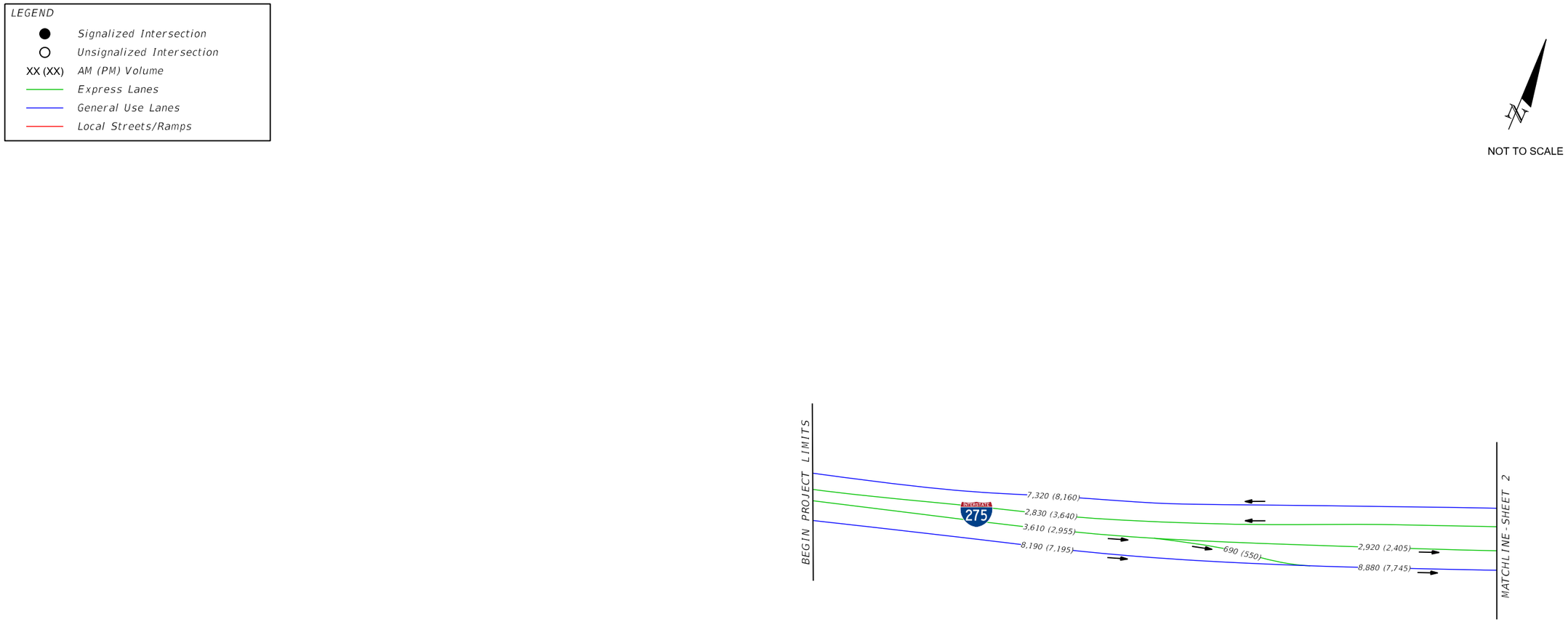
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option A – Design Year (2045) – AM & PM DDHVs	Figure 3-19	Sheet 16 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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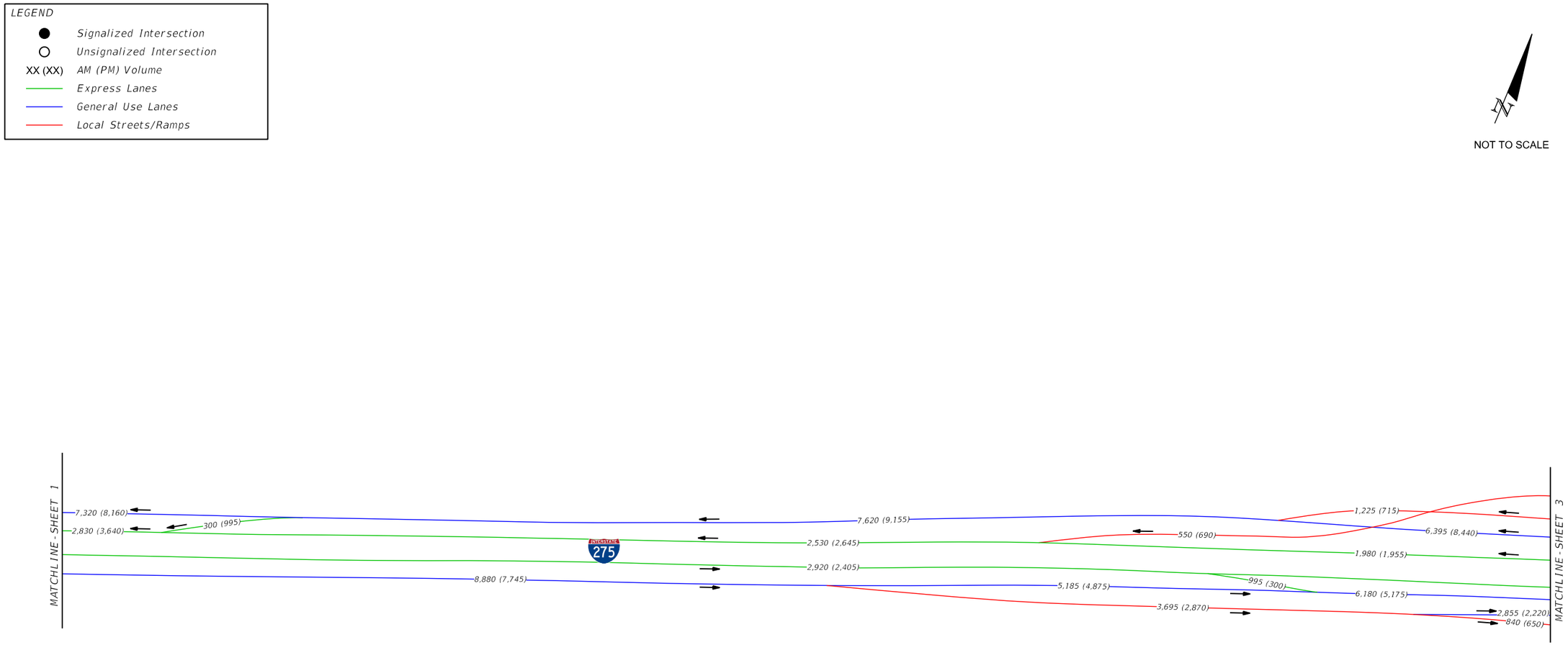
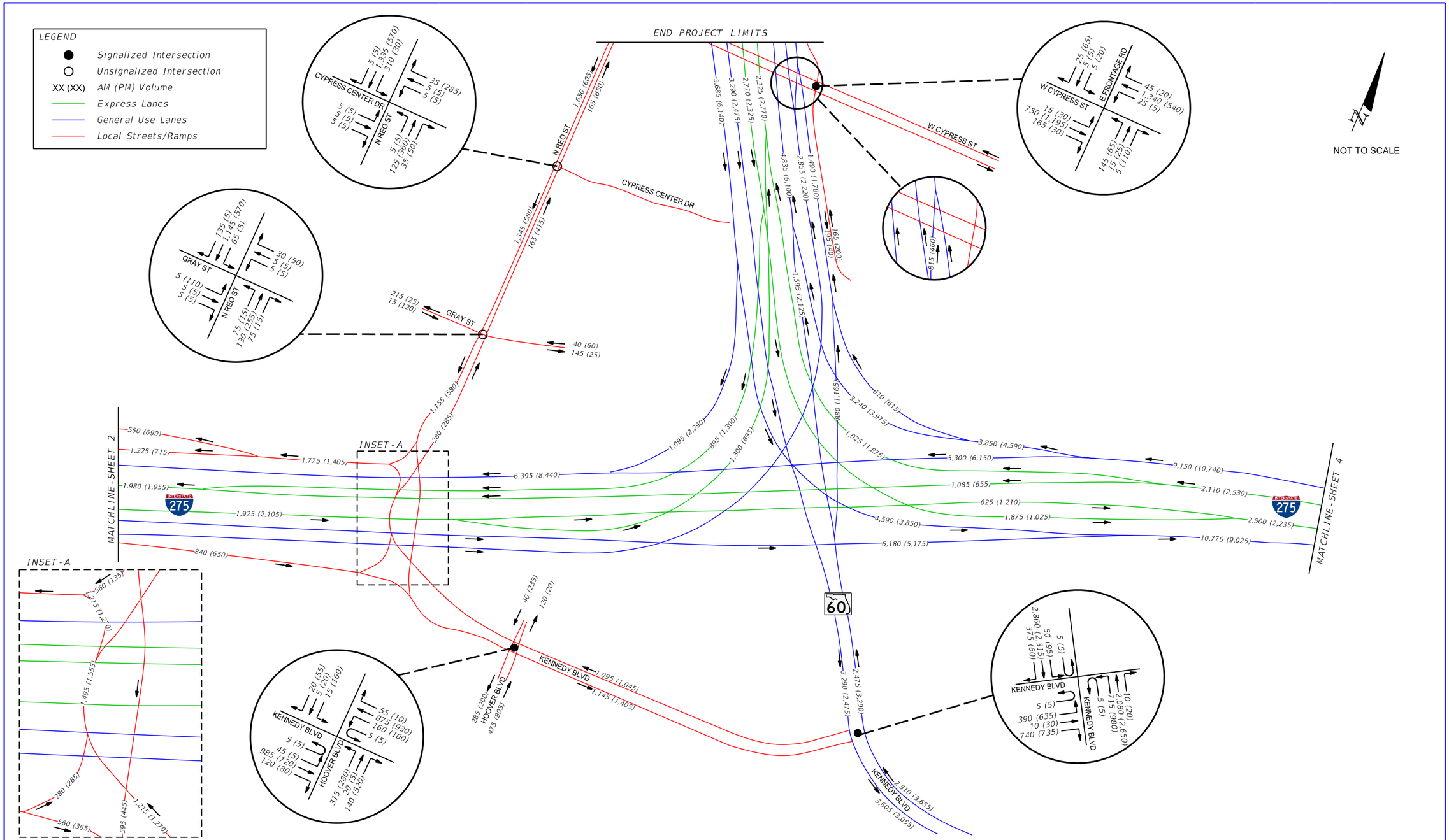
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs	Figure 3-20	Sheet 2 of 16

WPI # 258337-2



FDOT

SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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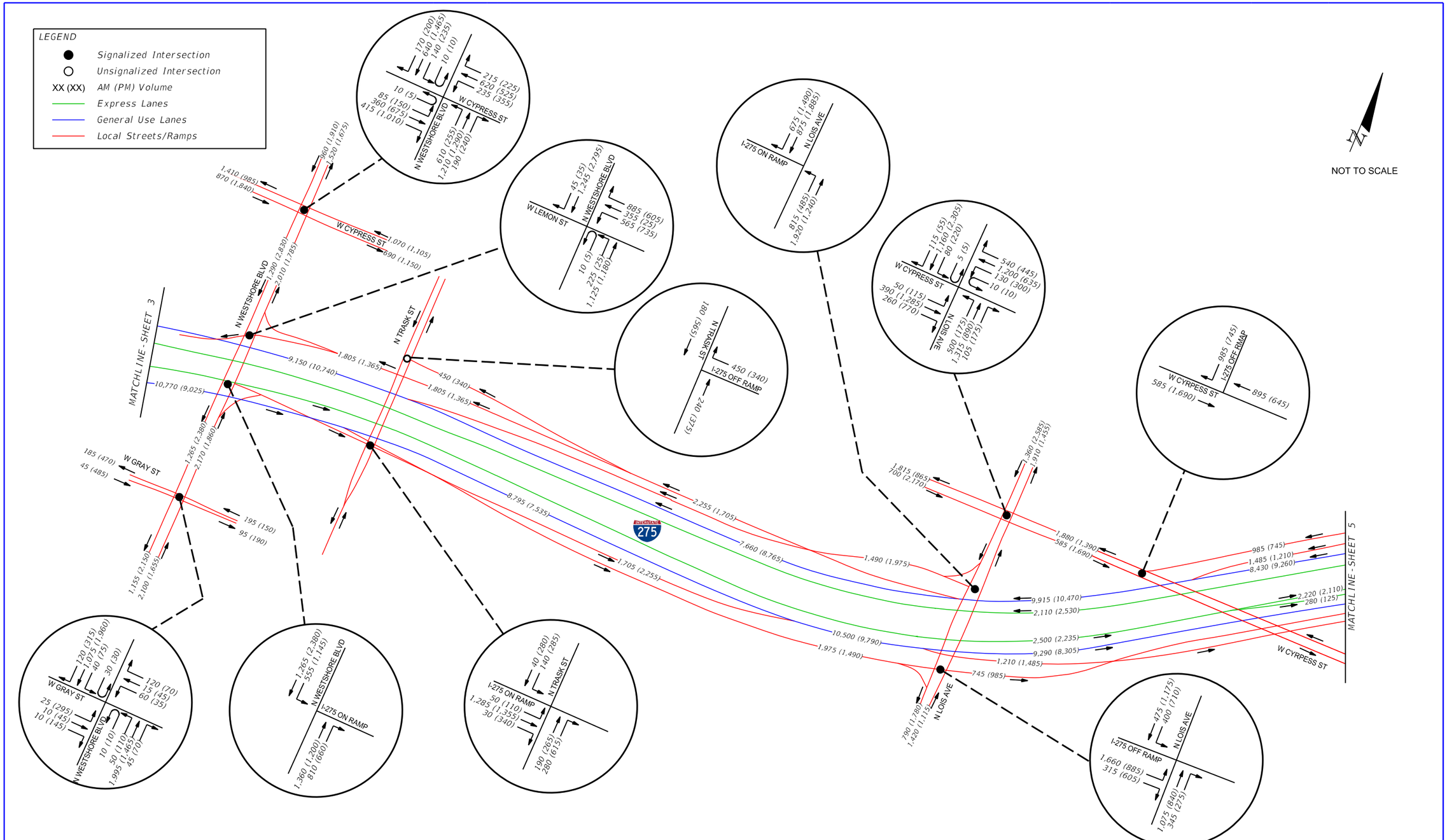
WPI # 258337-2



FDOT

SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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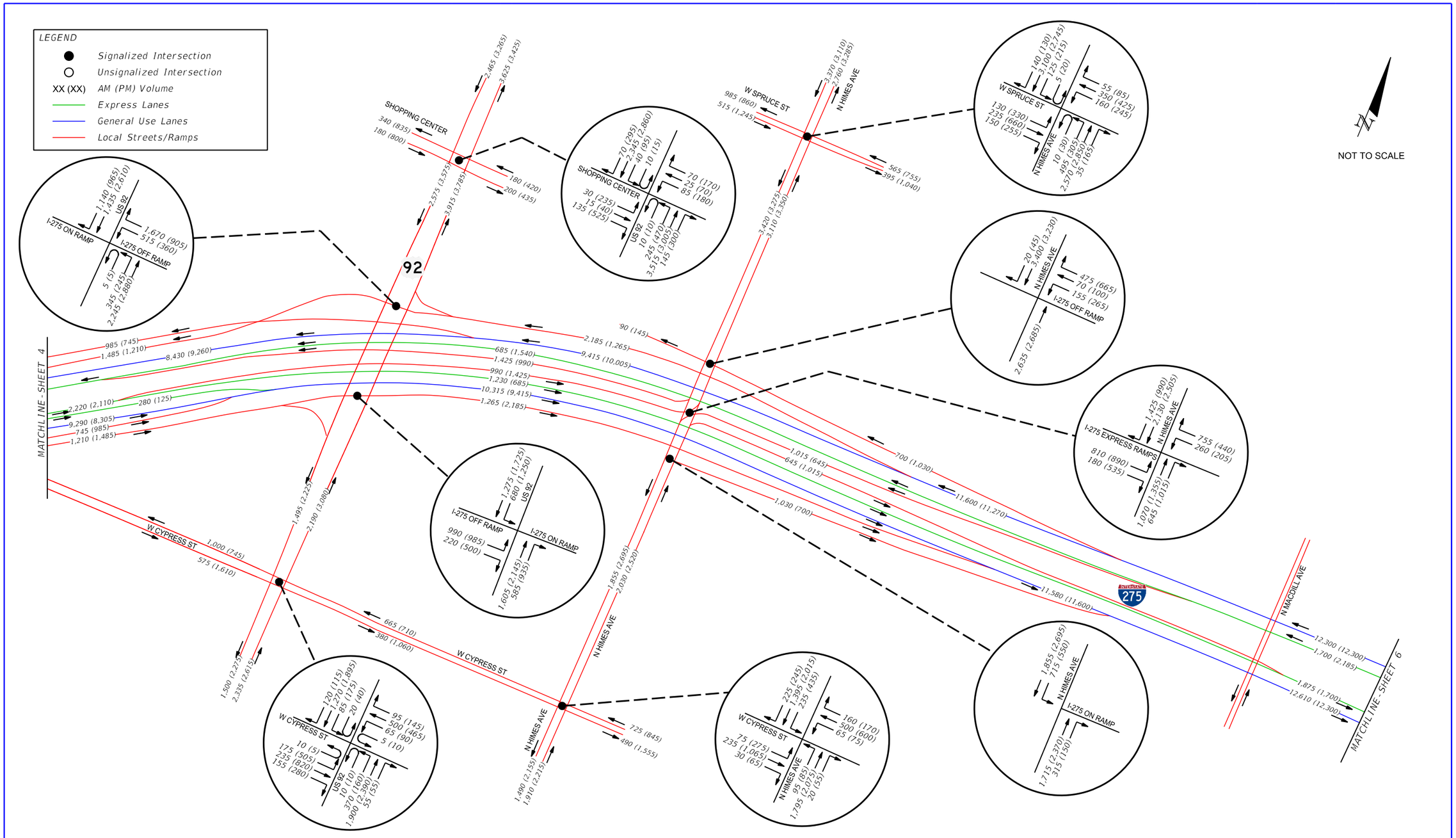
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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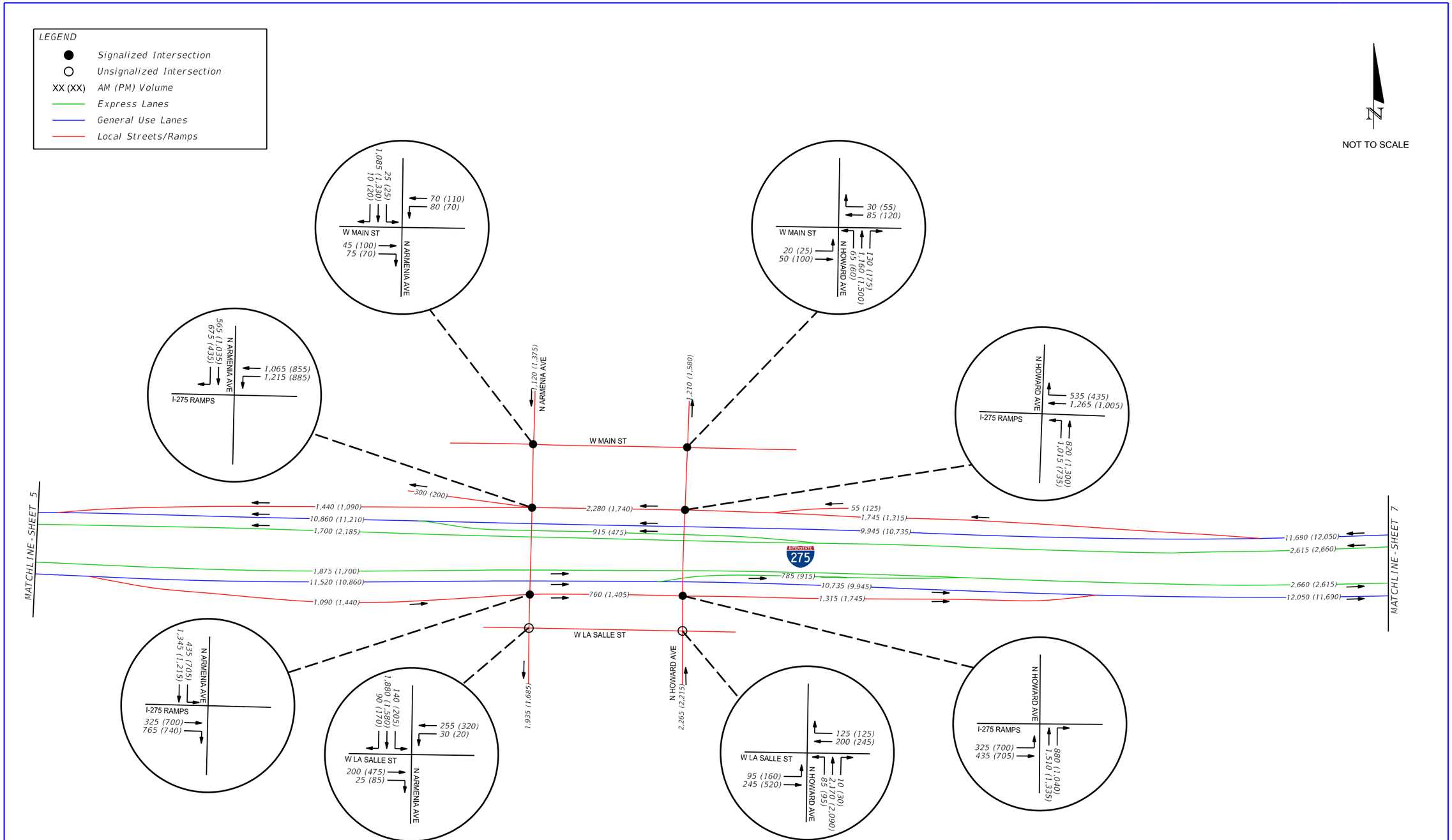
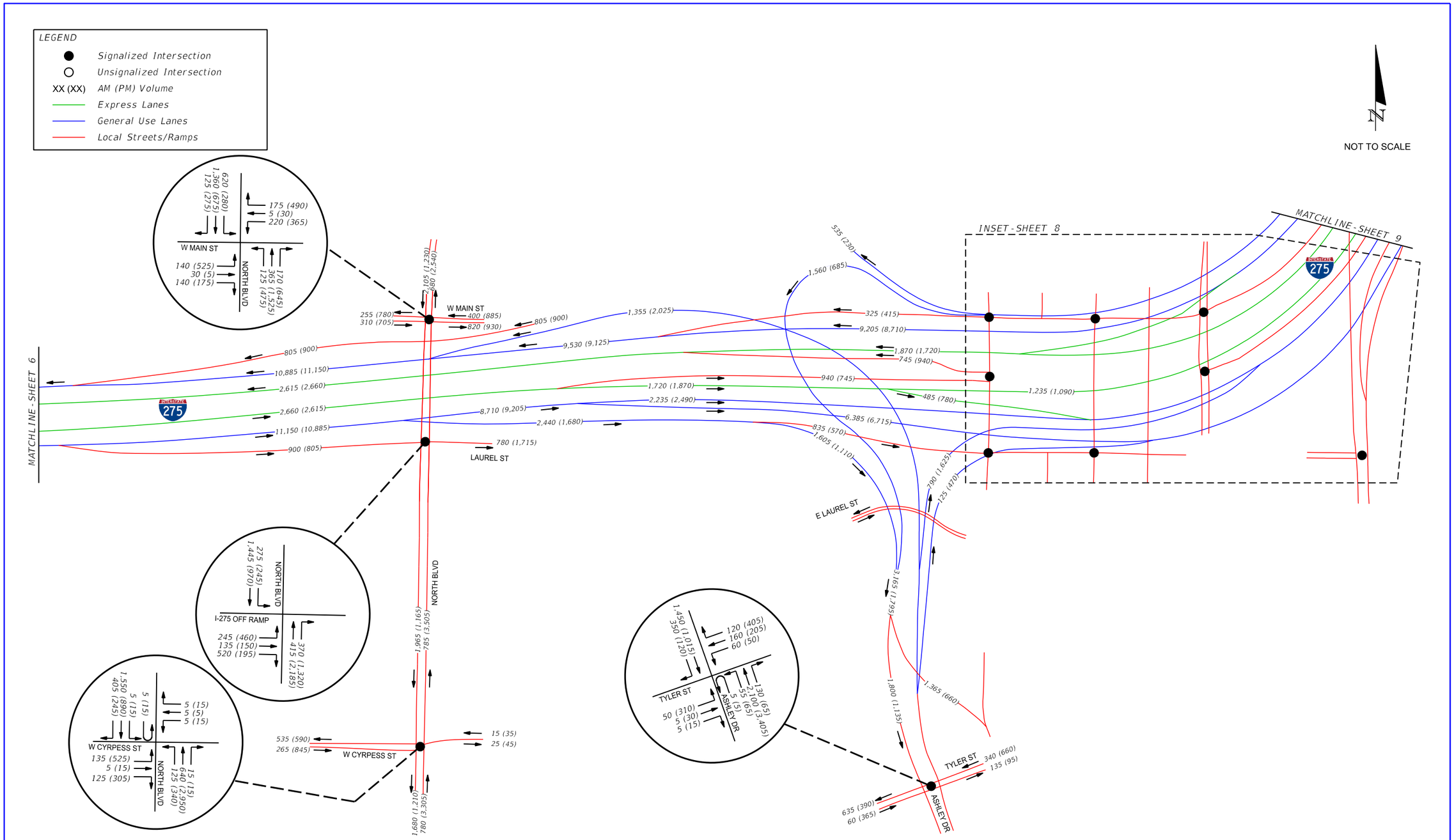
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs	Figure 3-20	Sheet 6 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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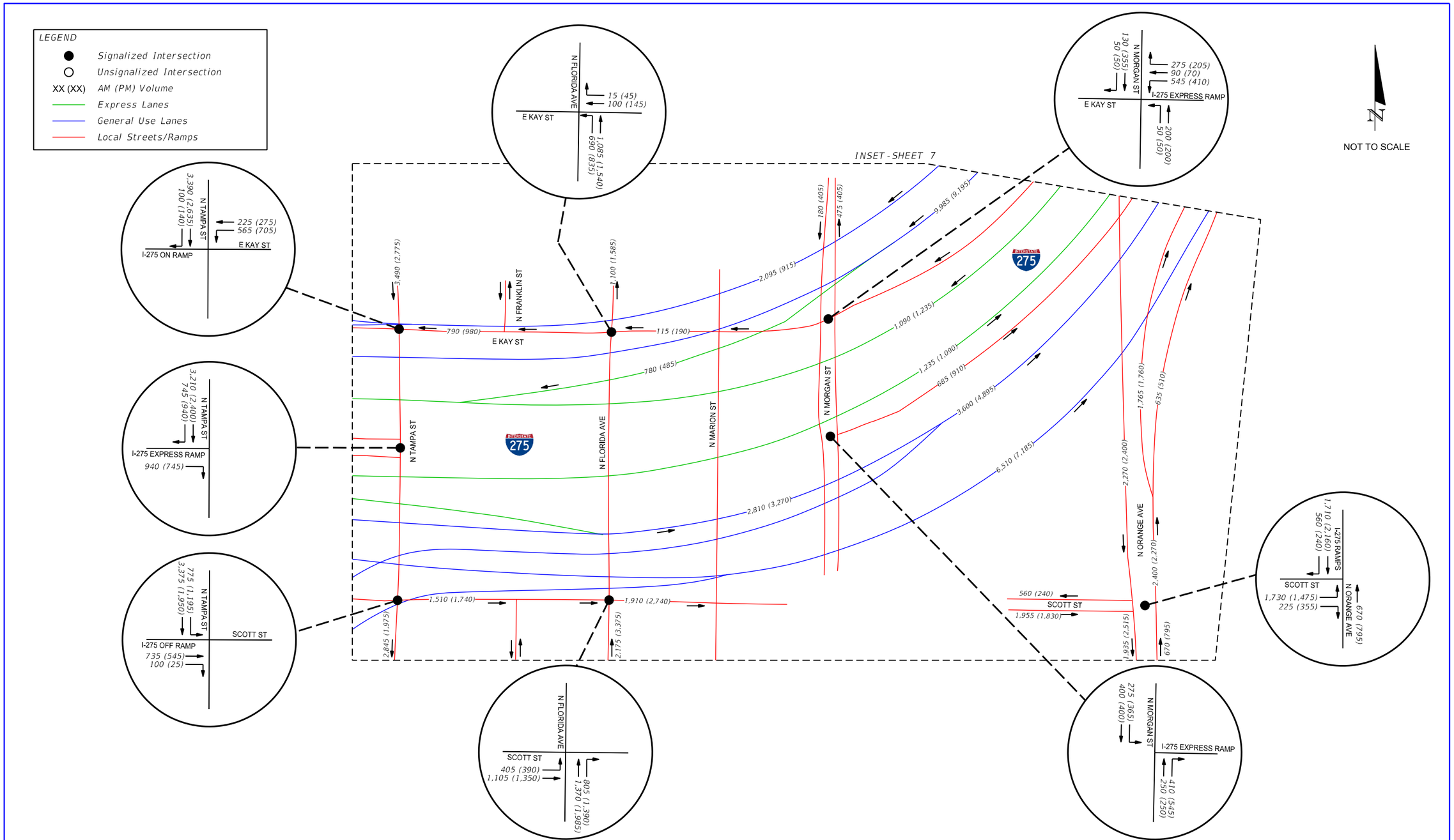
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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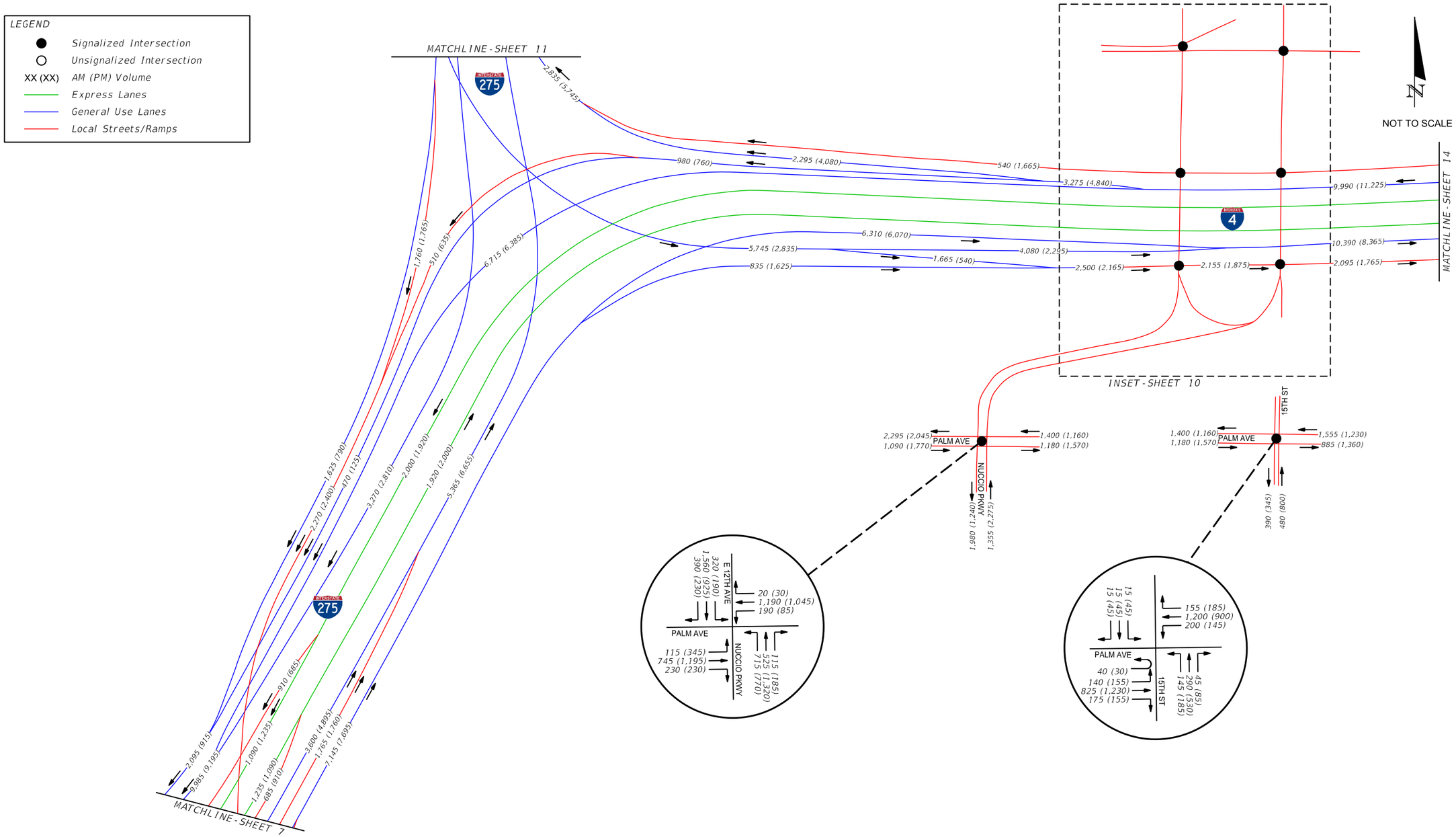
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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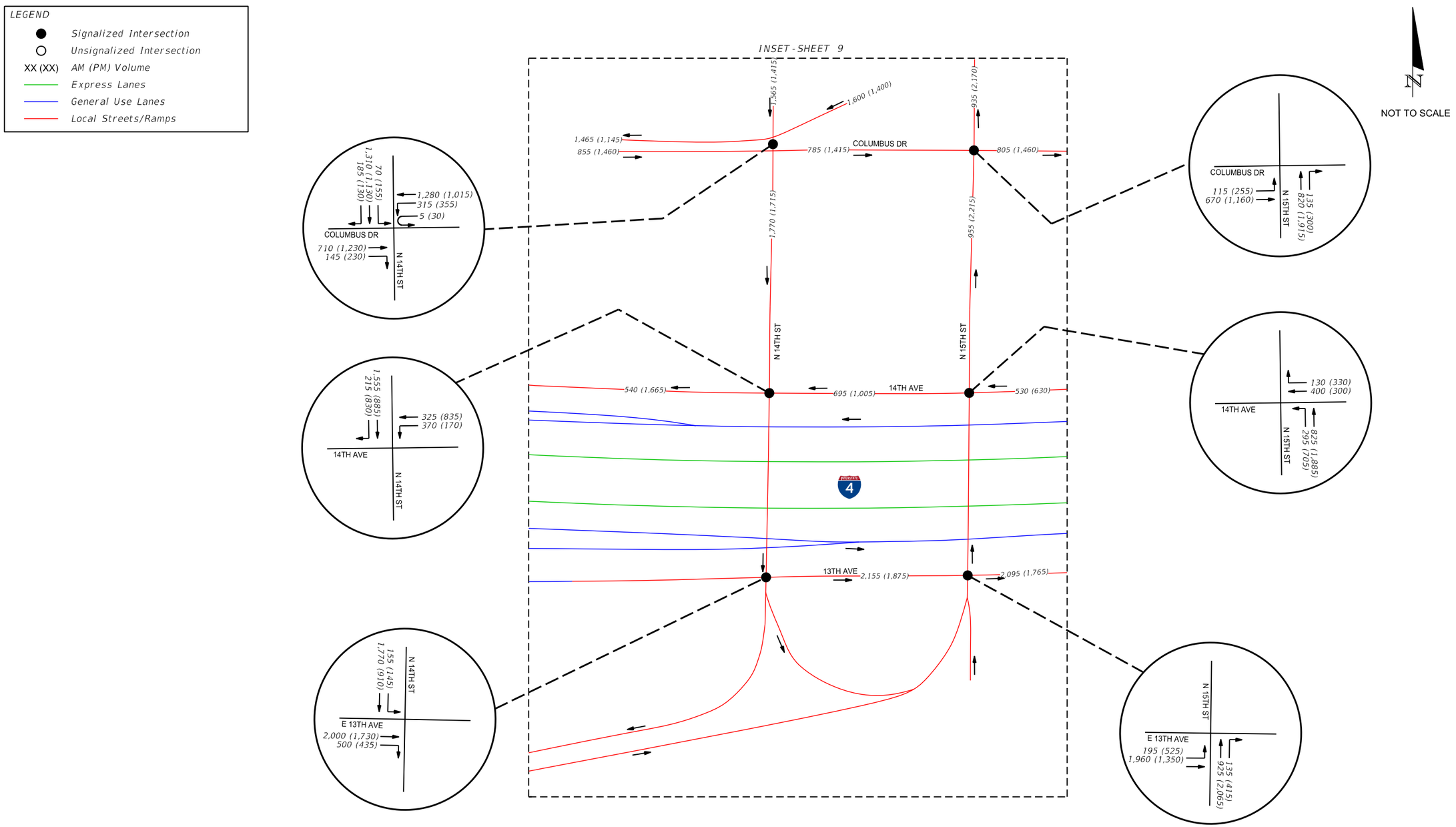
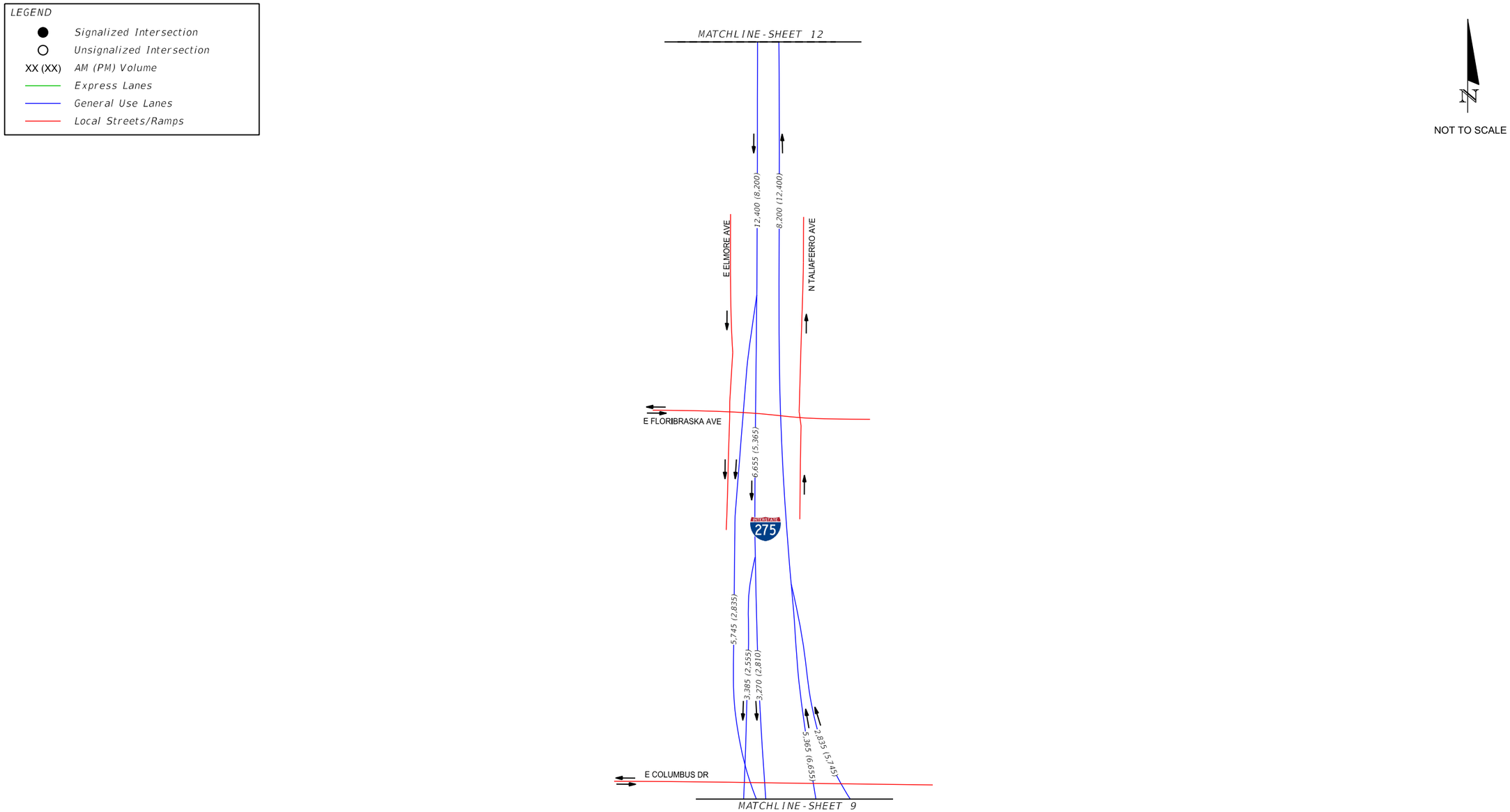
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs	Figure 3-20	Sheet 10 of 16

WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs

Figure 3-20

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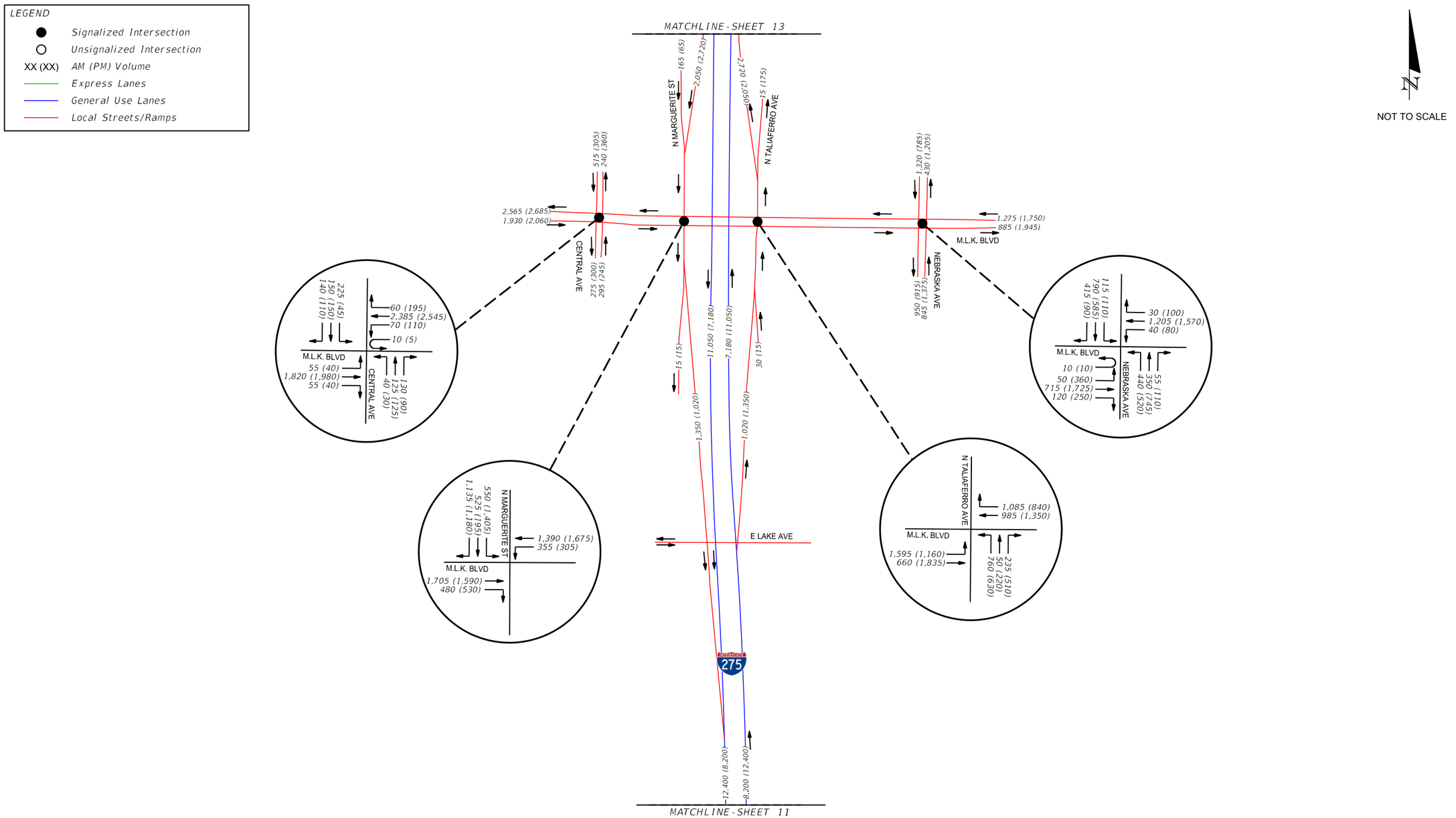
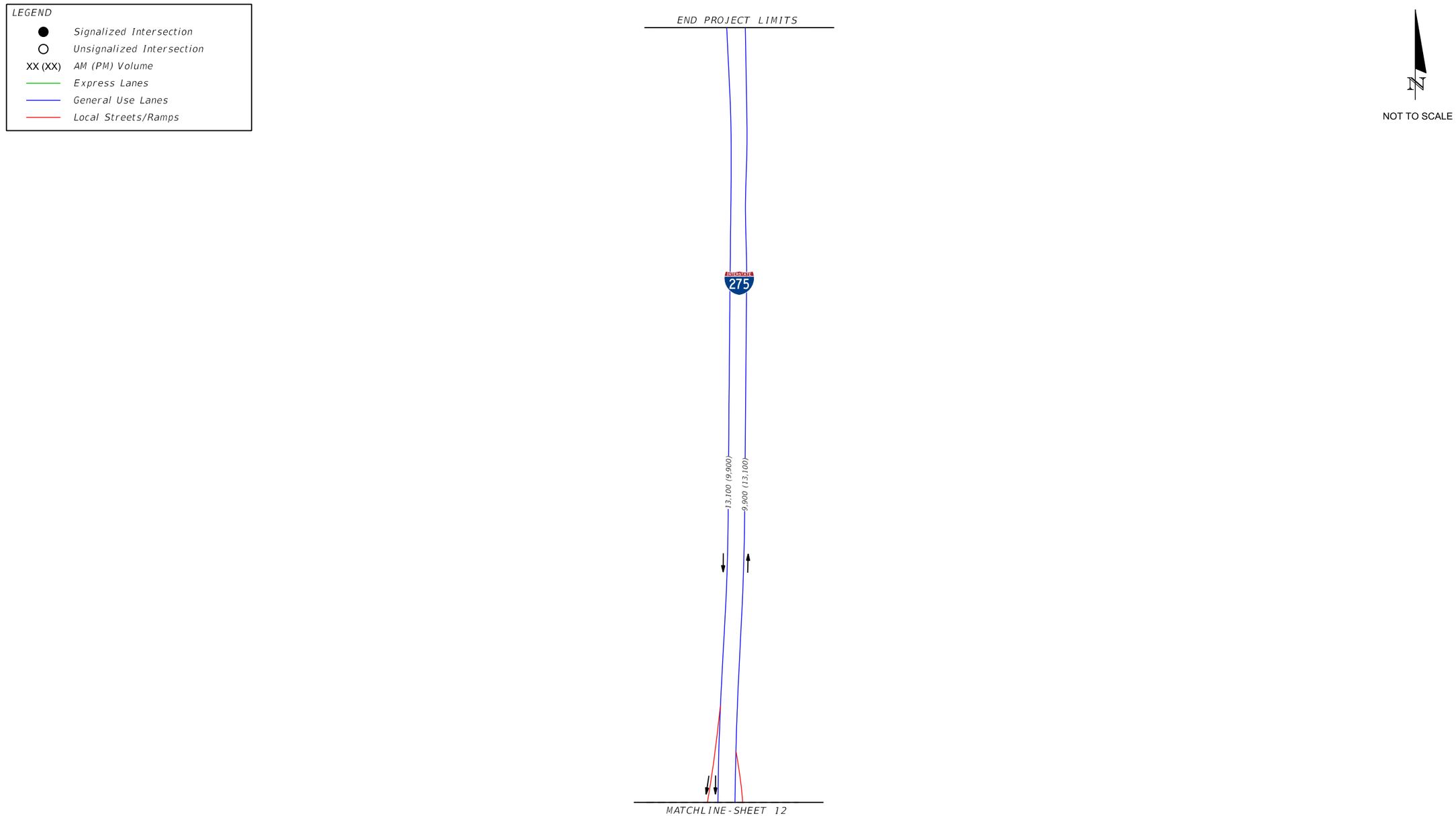
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs	Figure 3-20	Sheet 12 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs	Figure 3-20	Sheet 13 of 16

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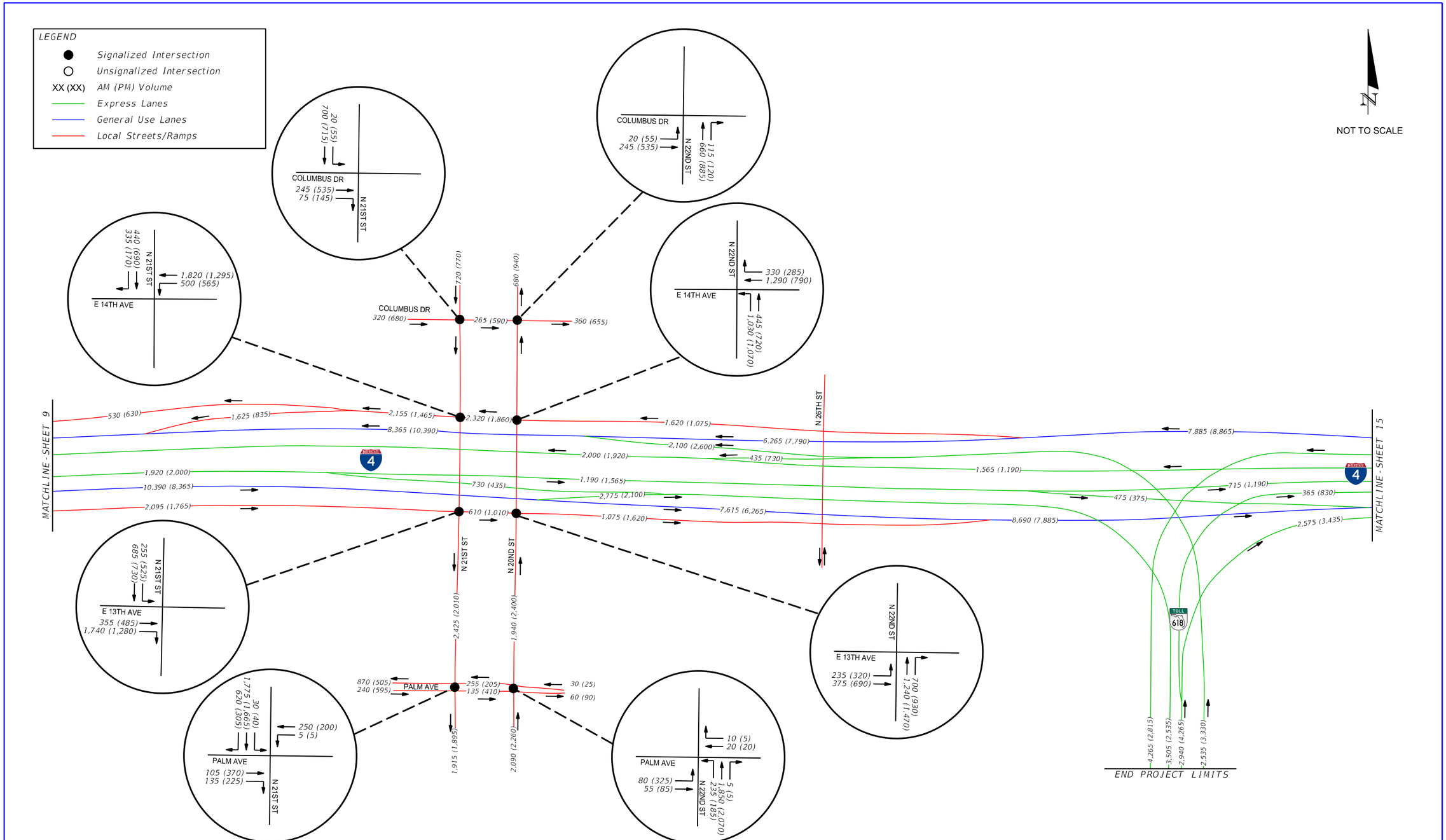

FDOT	SEIS Re-evaluation Build Alternative – Option B – Design Year (2045) – AM & PM DDHVs	Figure 3-20	Sheet 14 of 16

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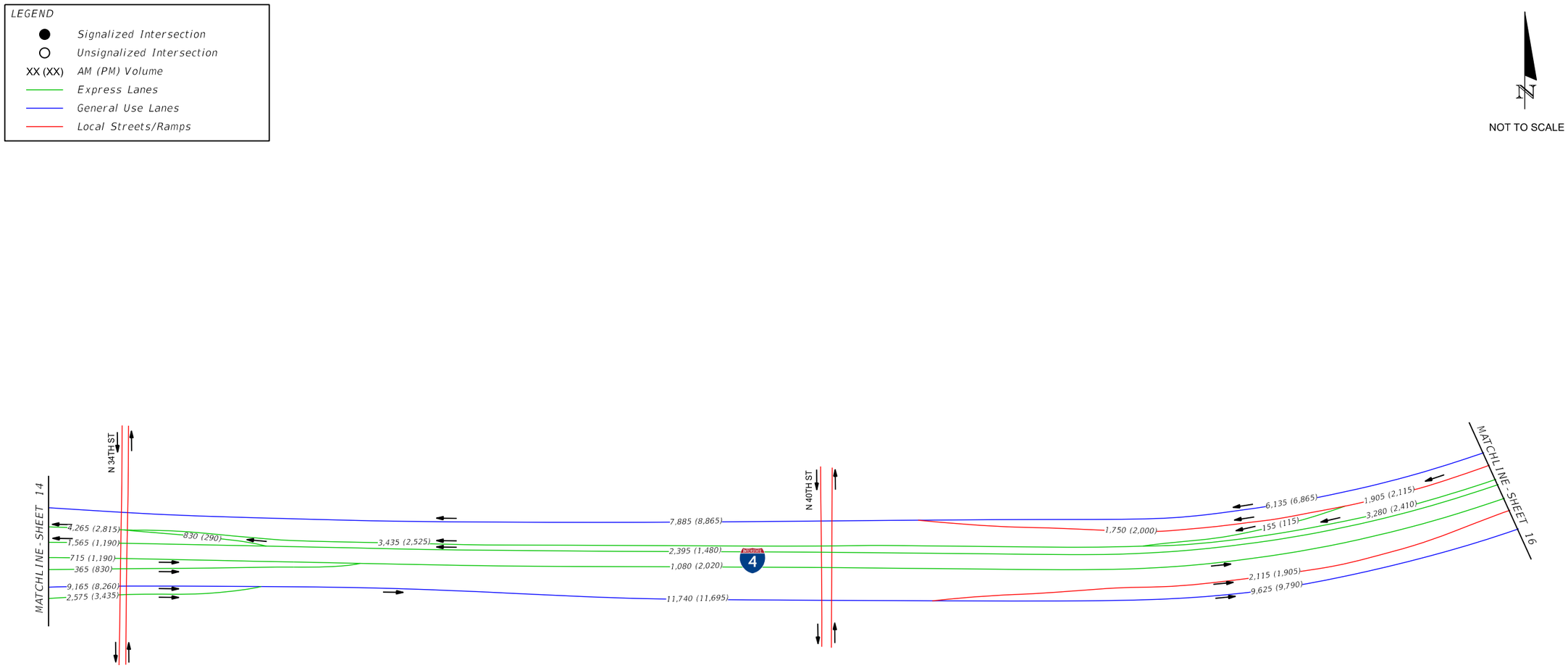

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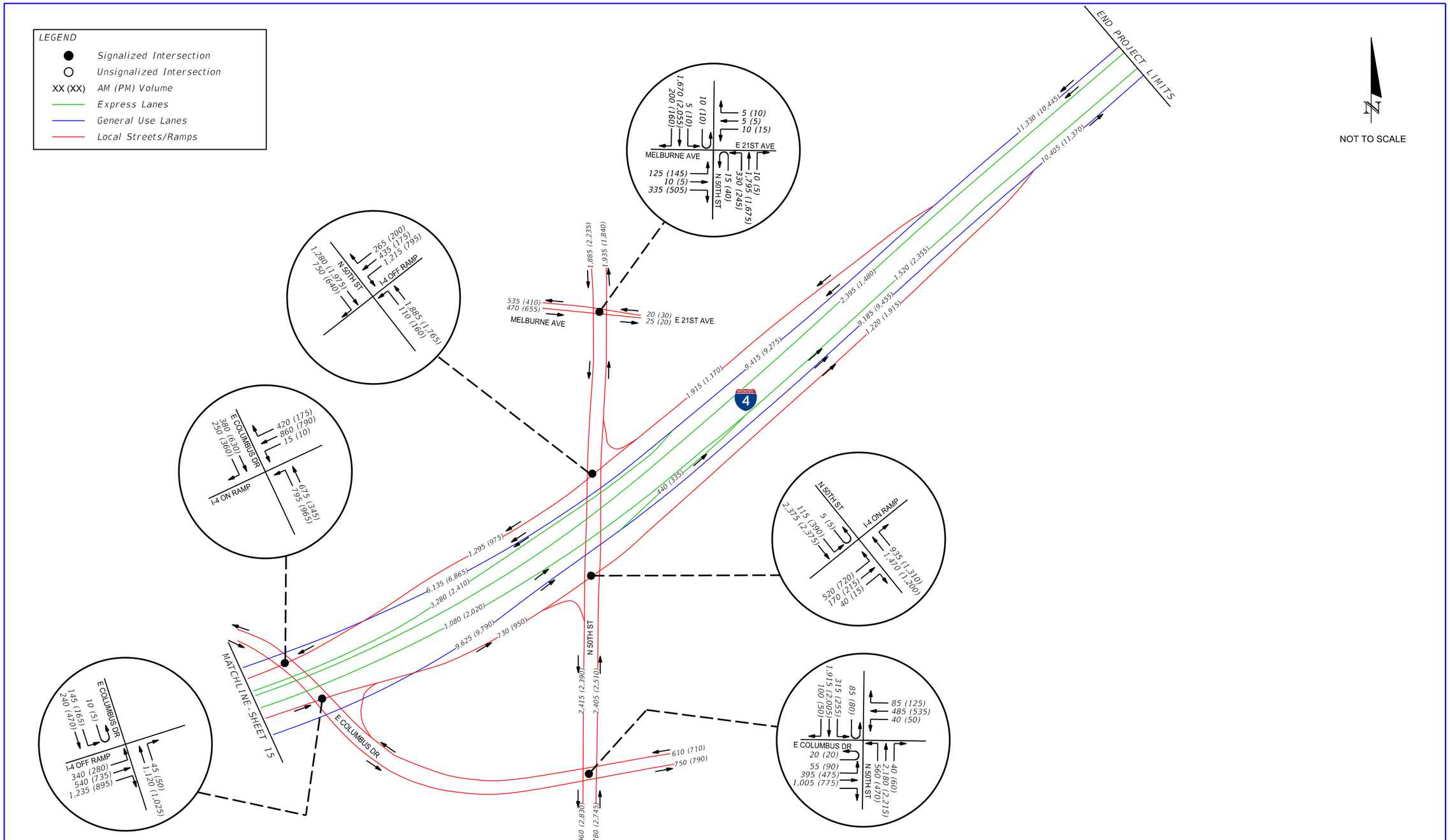

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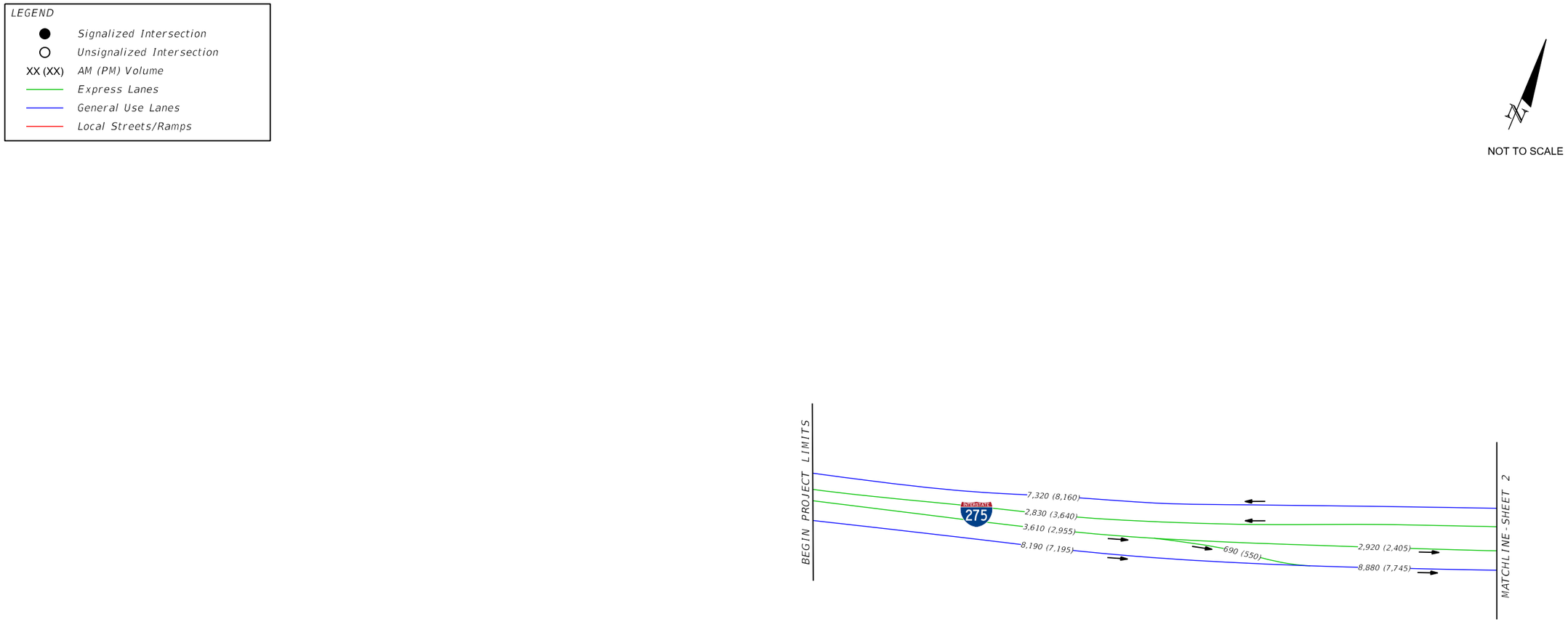

SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

Figure 3-21

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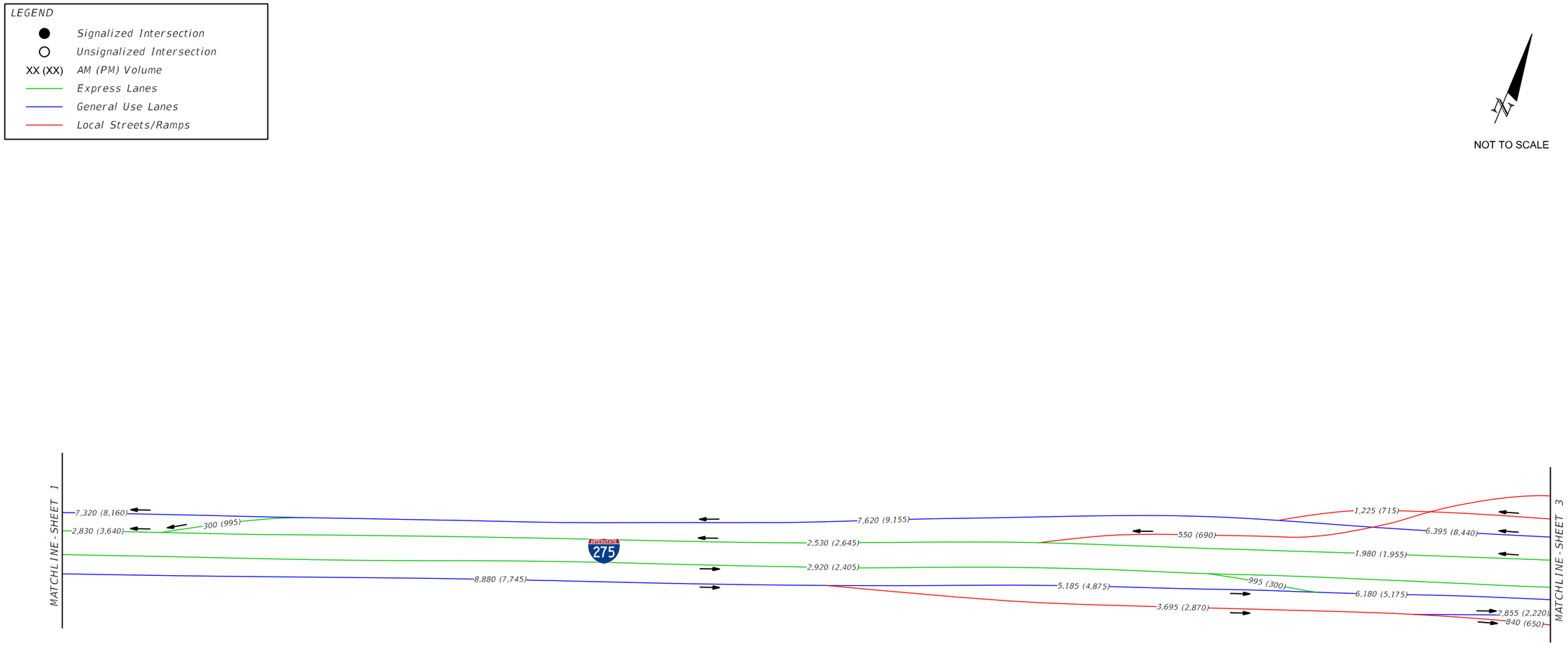
WPI # 258337-2



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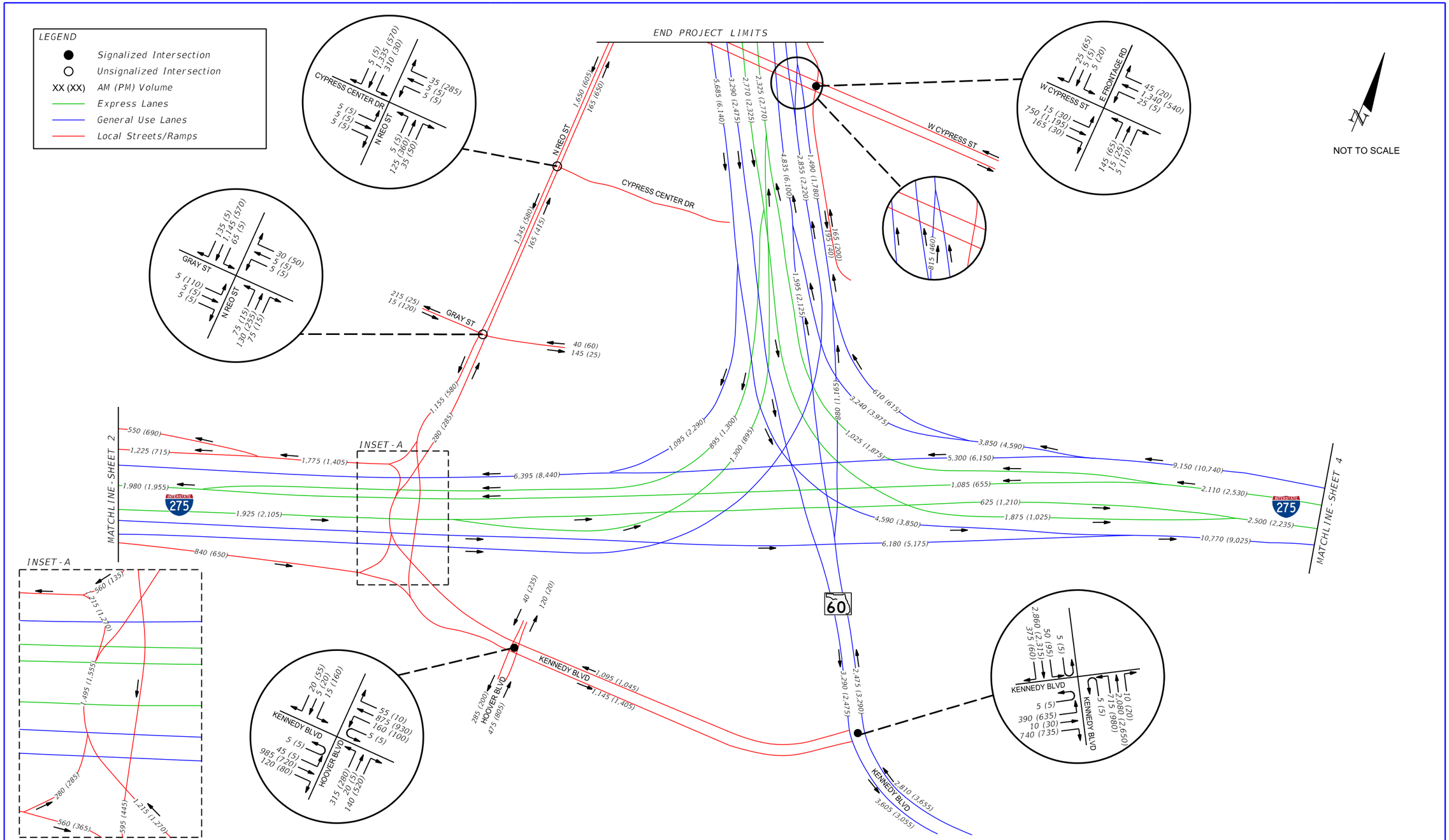
WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

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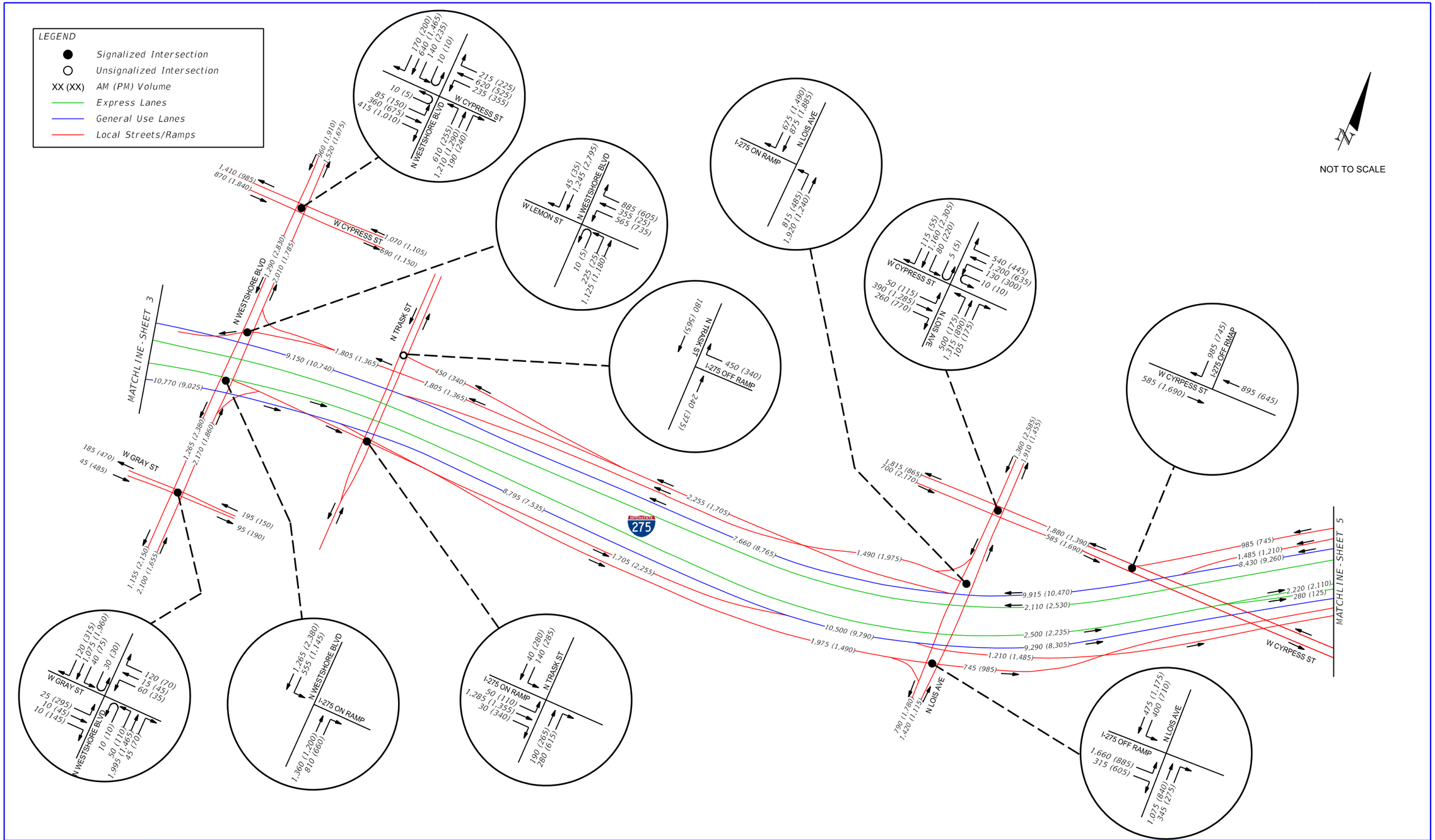
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

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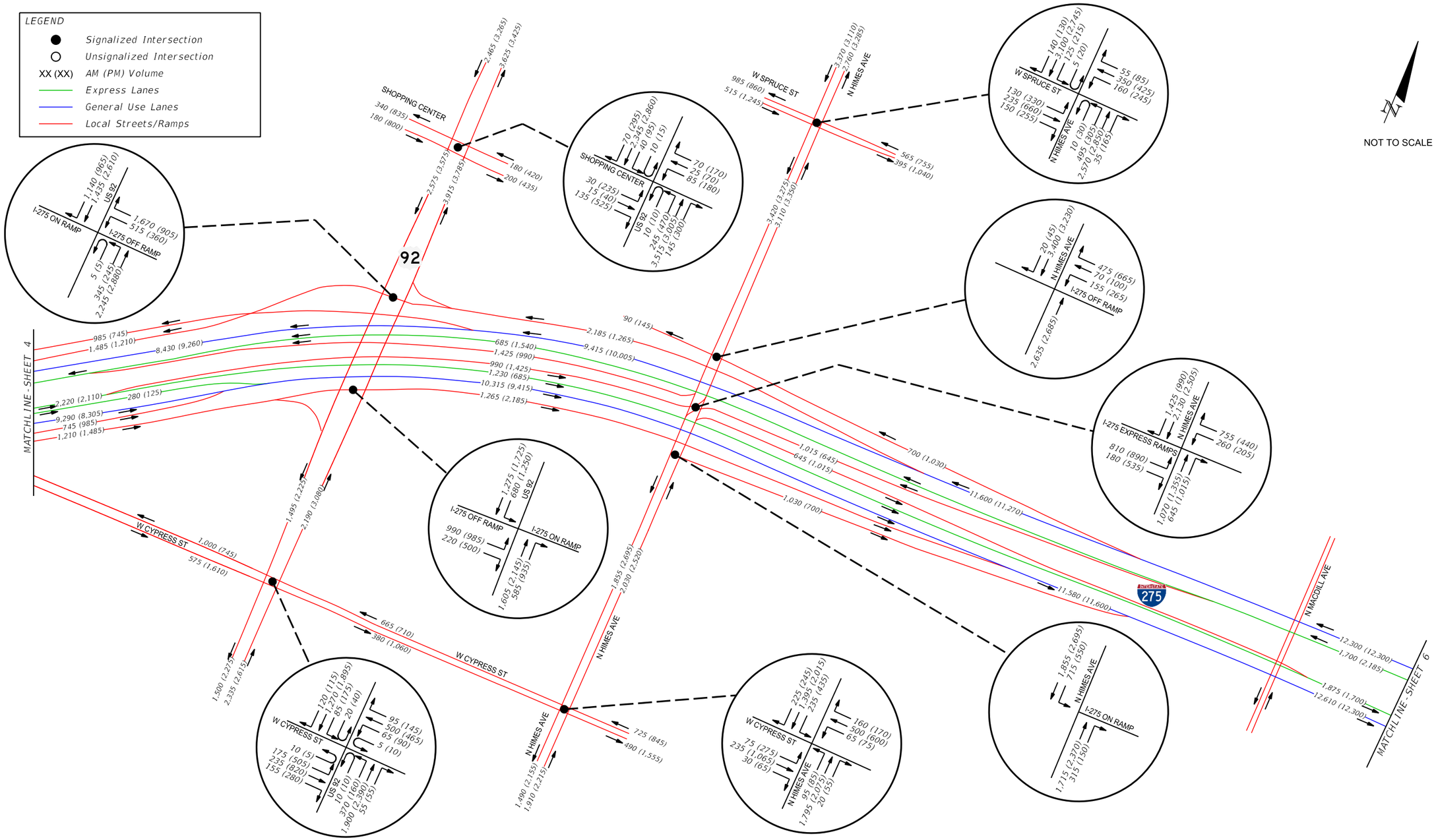
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

Figure 3-21

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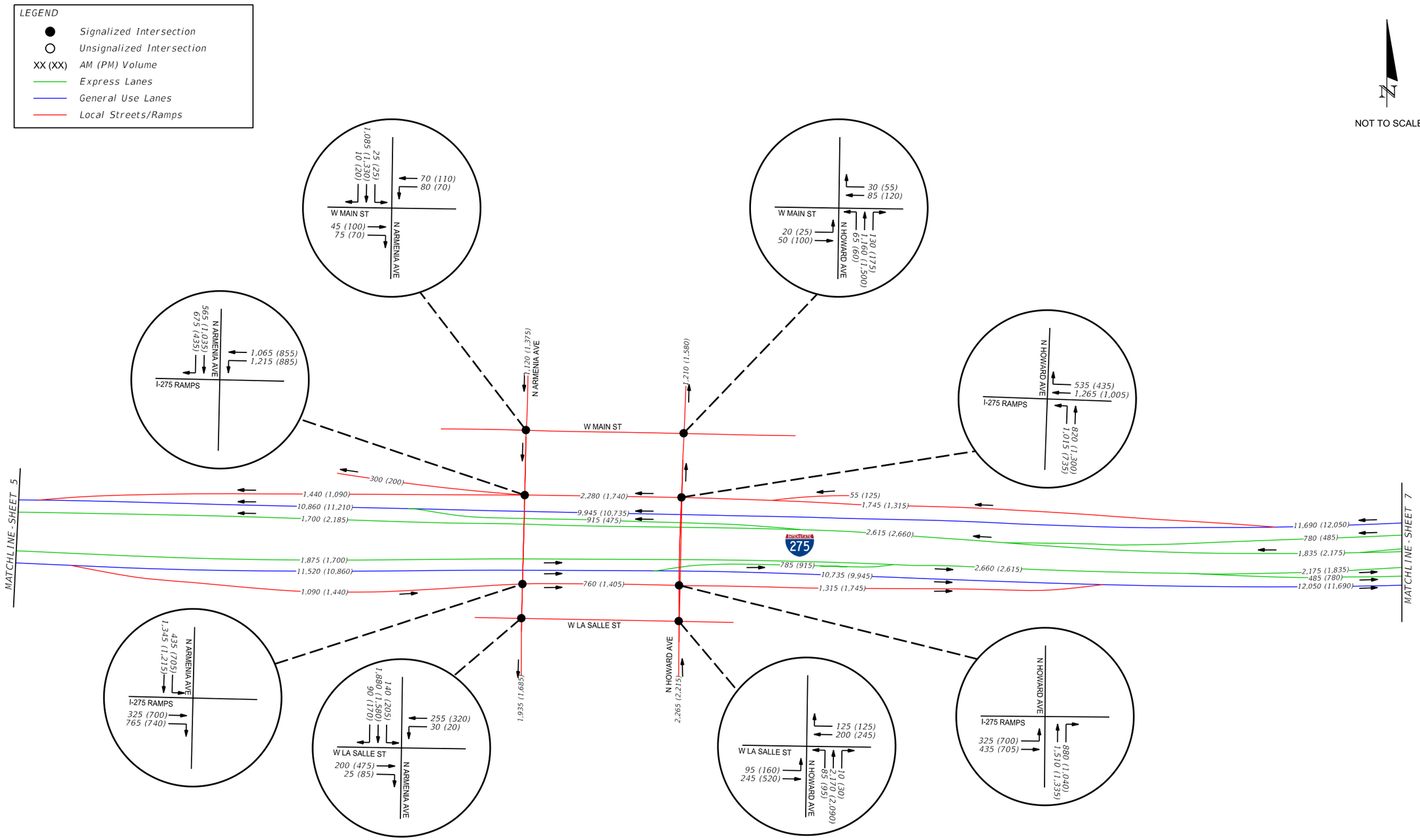
WPI # 258337-2



SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

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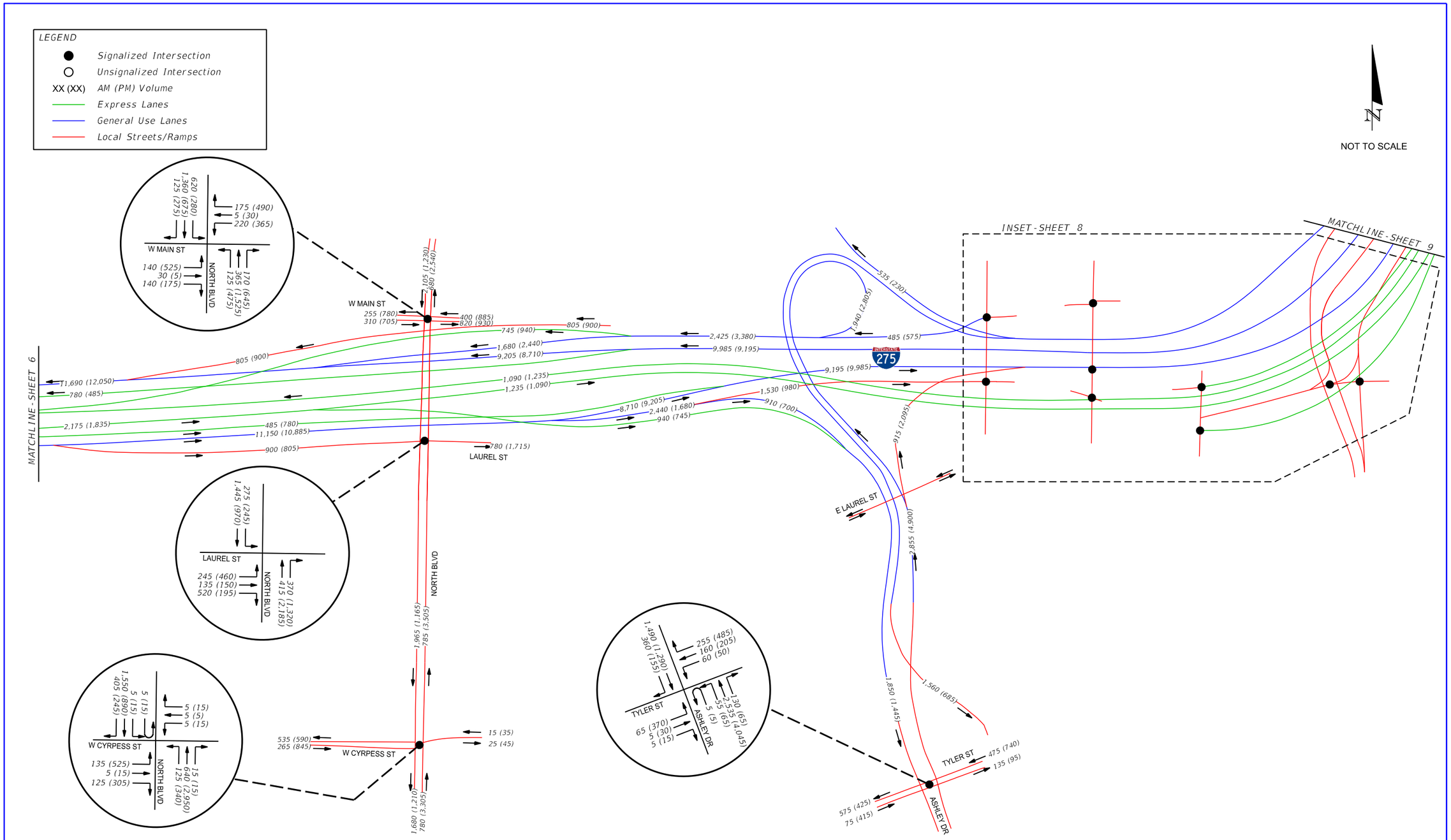
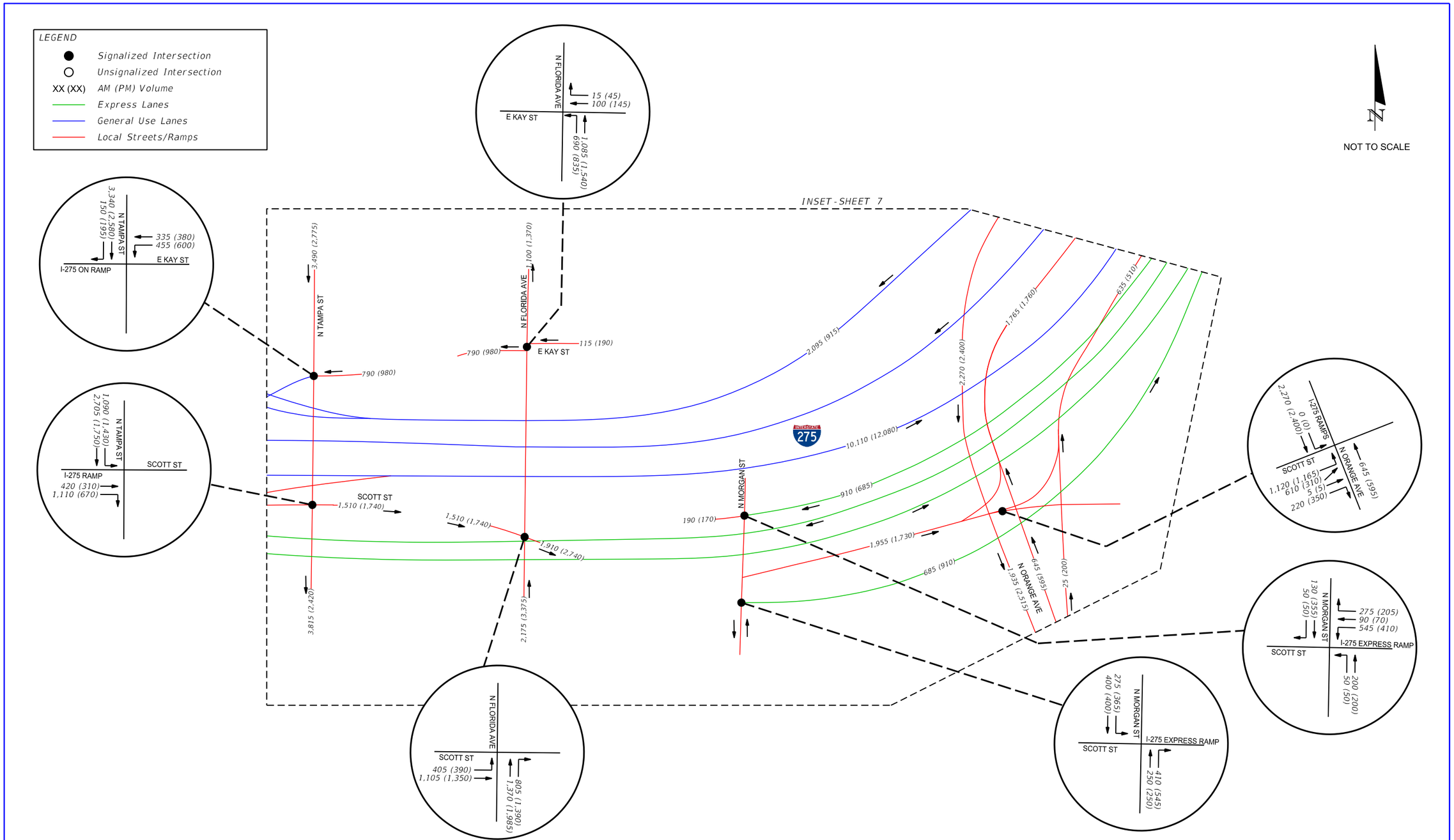
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs	Figure 3-21	Sheet 7 of 16

WPI # 258337-2



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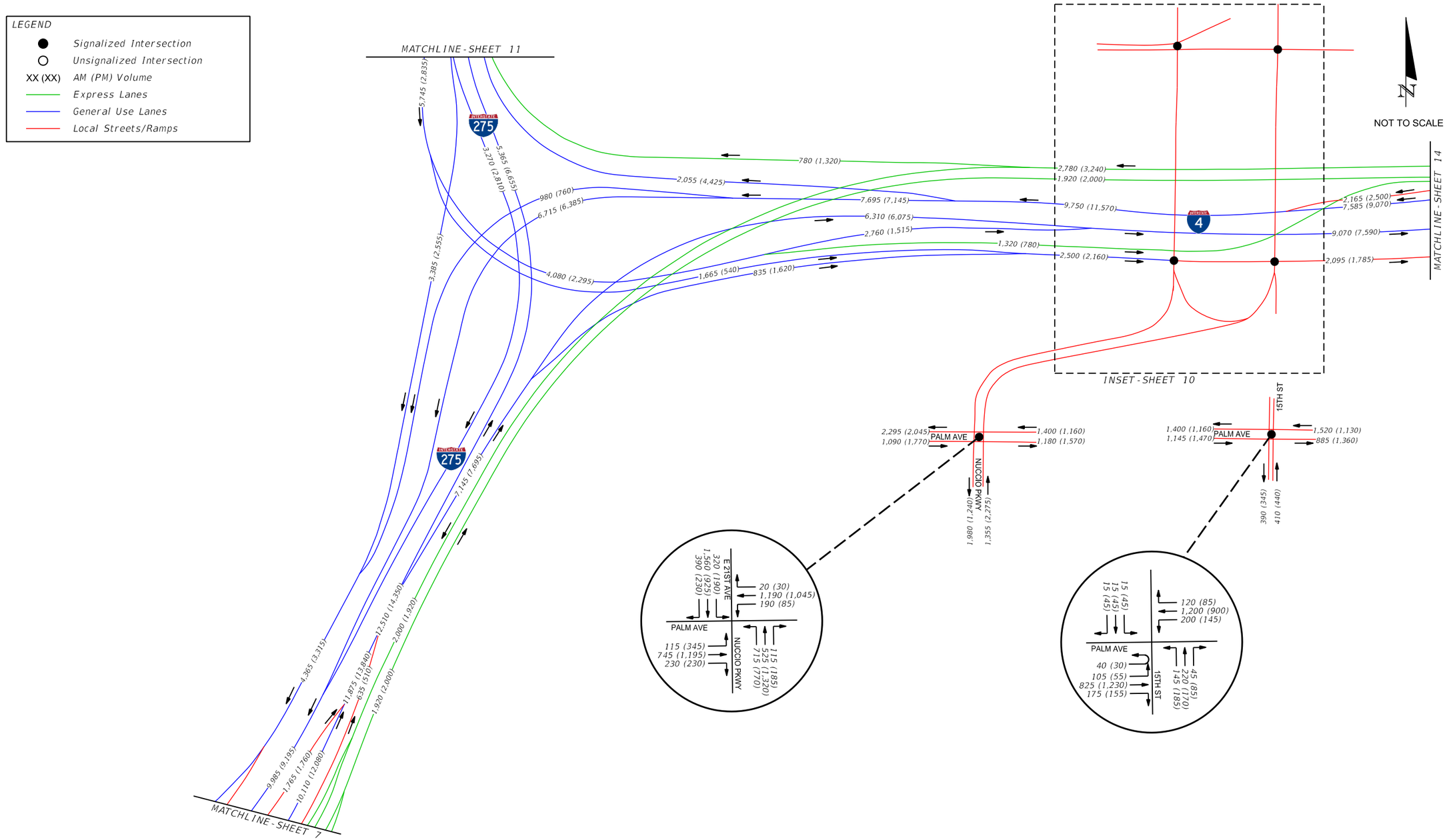
WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

Figure 3-21

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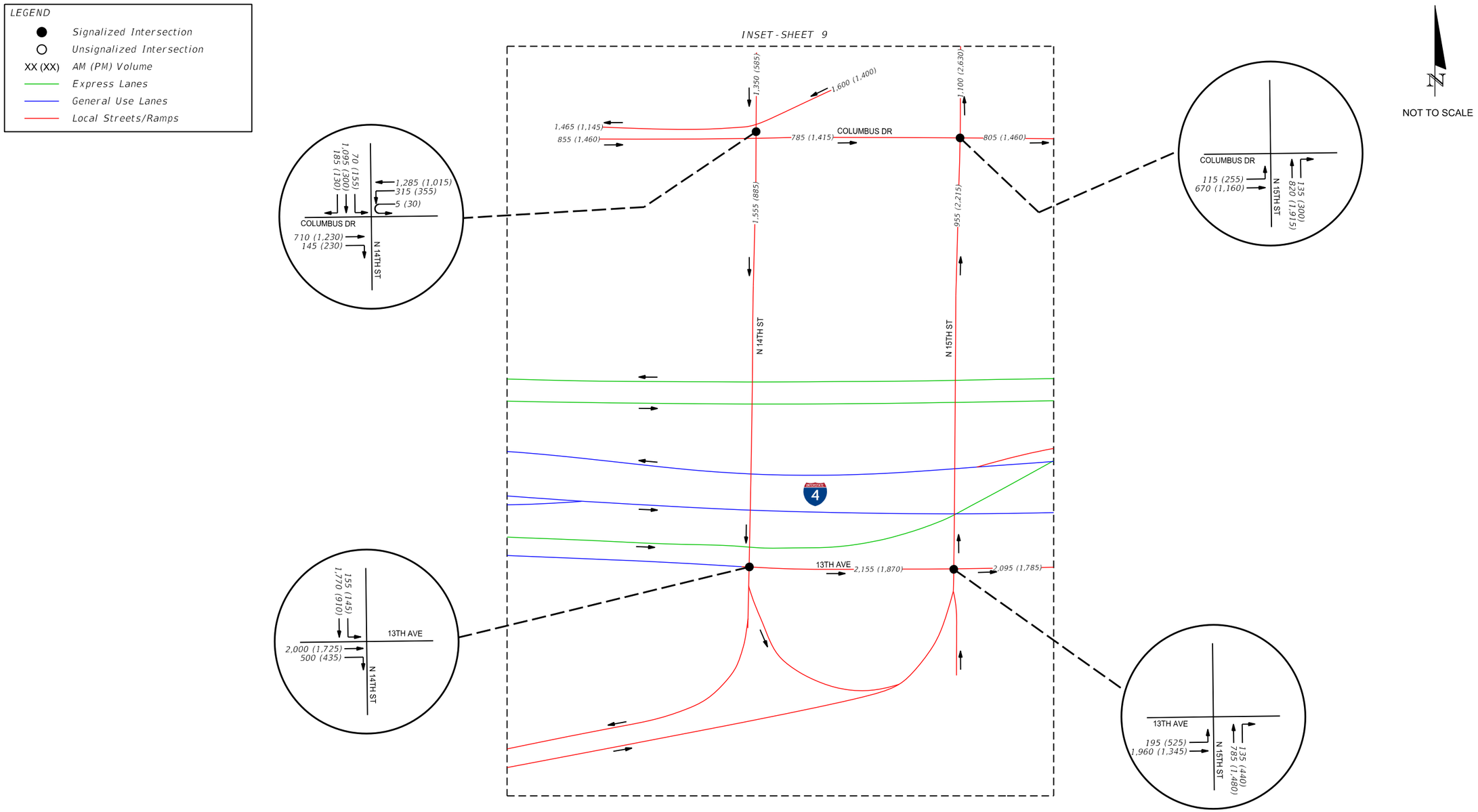
WPI # 258337-2



SEIS Re-evaluation

Build Alternative - Option C - Design Year (2045) - AM & PM DDHVs

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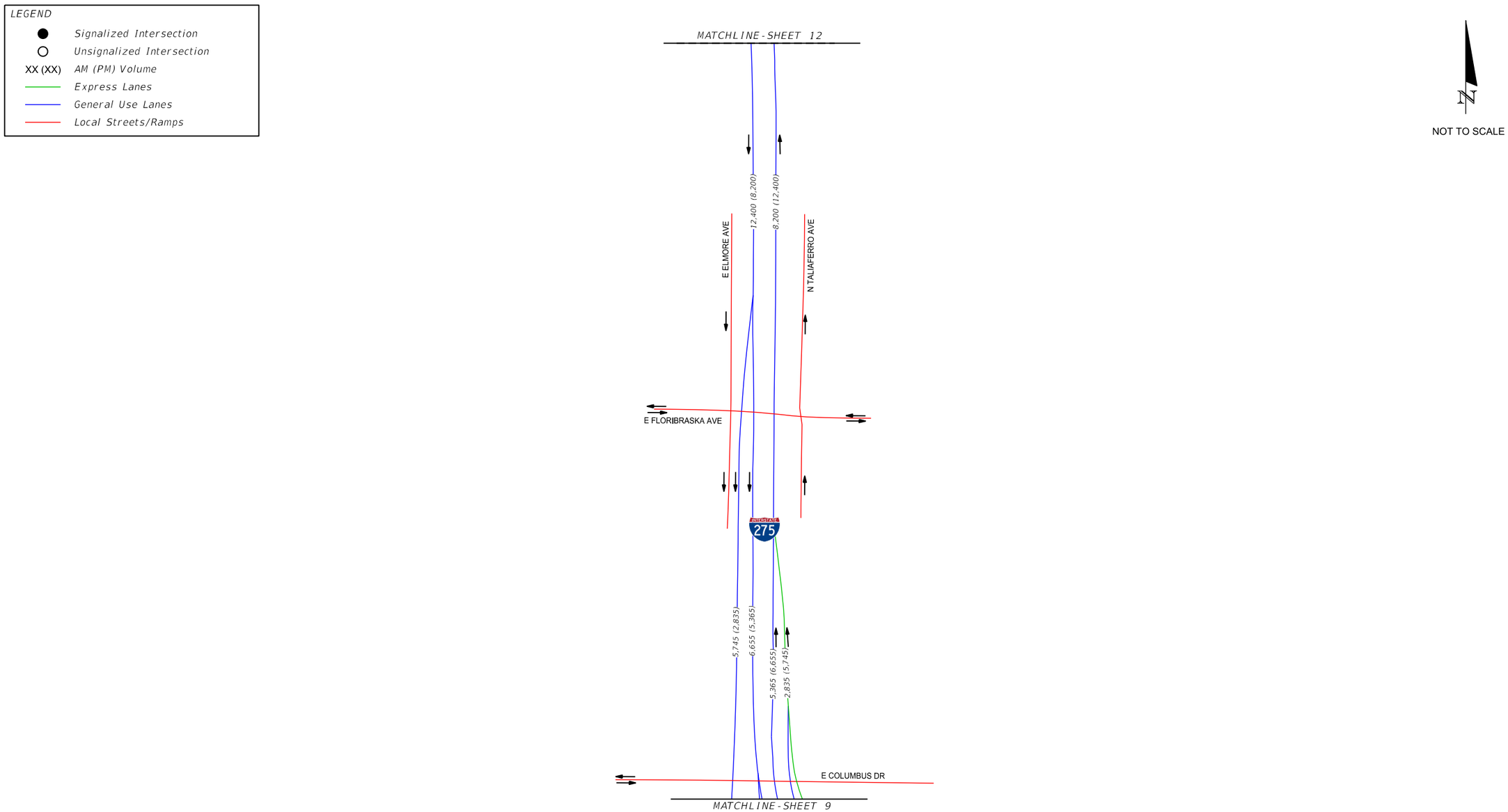

SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

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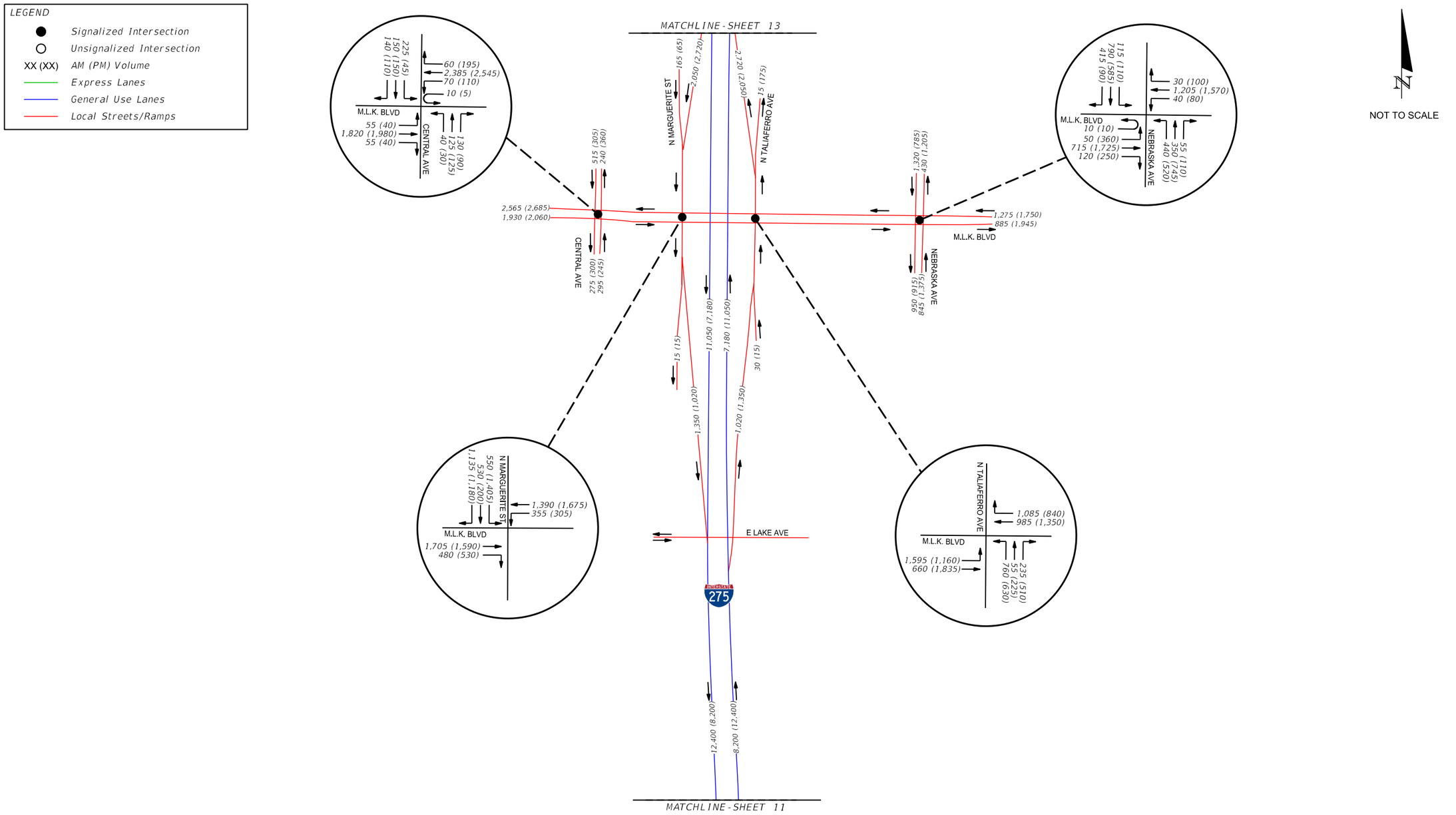
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs	Figure 3-21	Sheet 12 of 16

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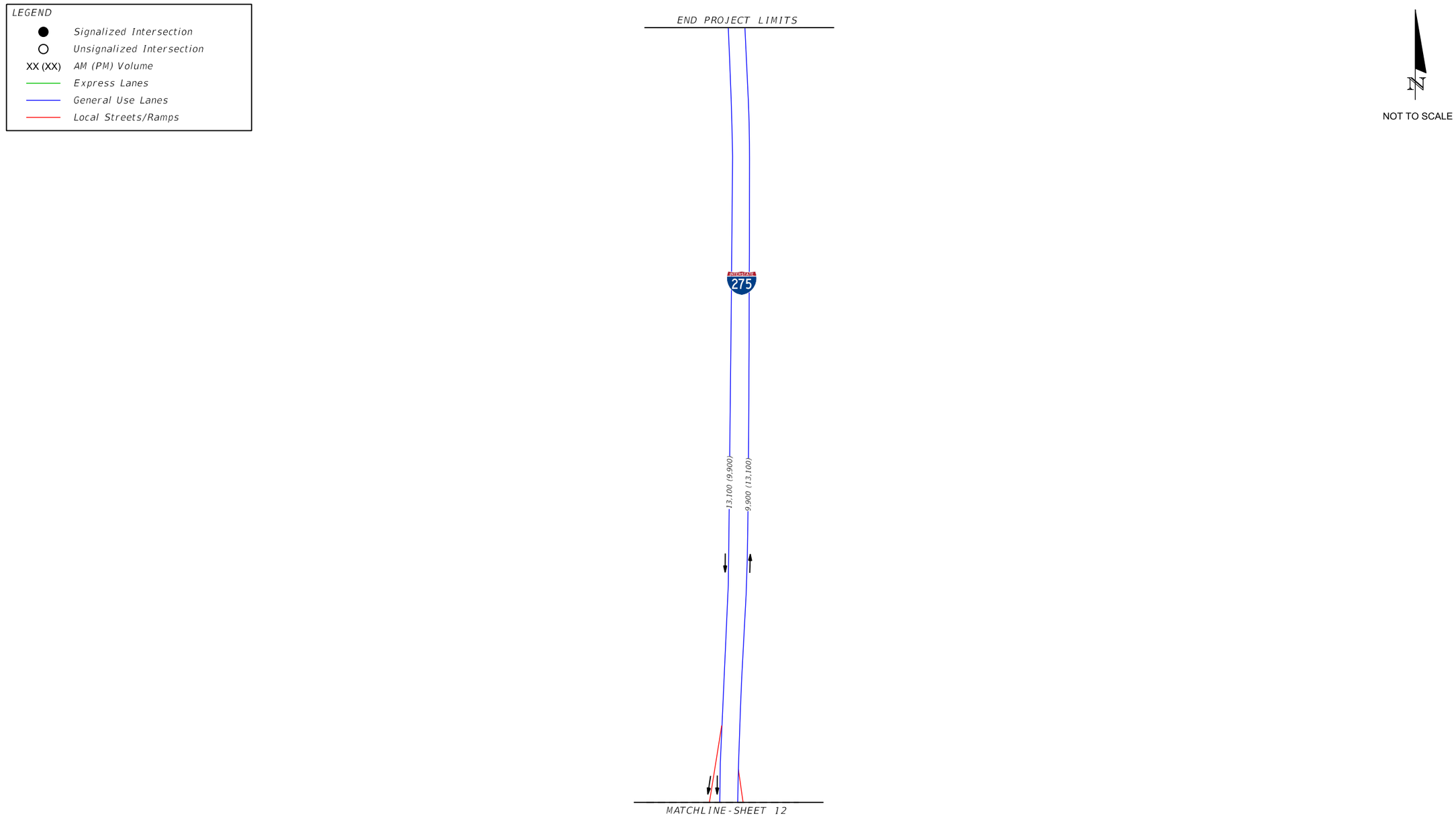

FDOT	SEIS Re-evaluation Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs	Figure 3-21	Sheet 13 of 16

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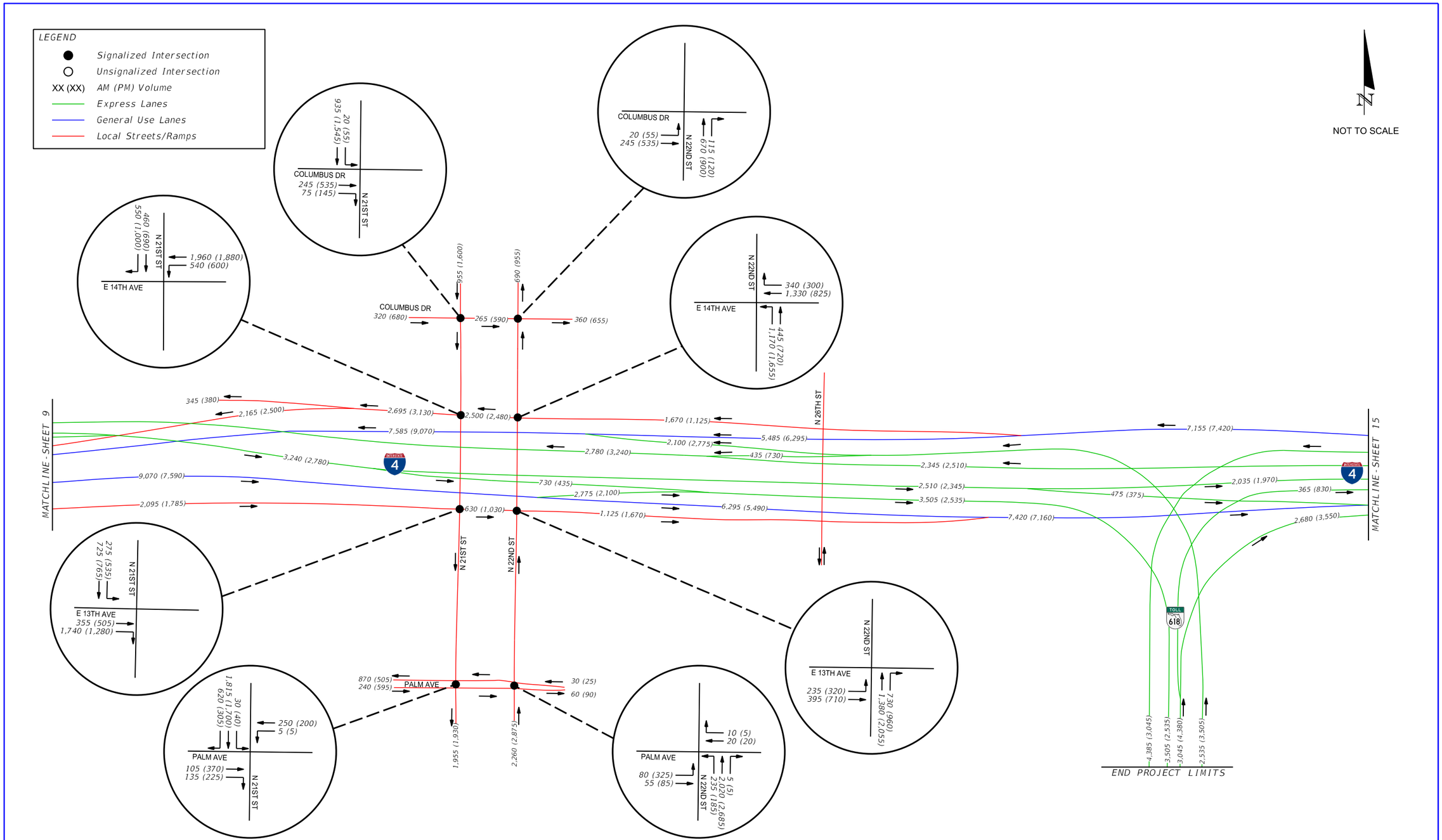

FDOT	SEIS Re-evaluation Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs	Figure 3-21	Sheet 14 of 16

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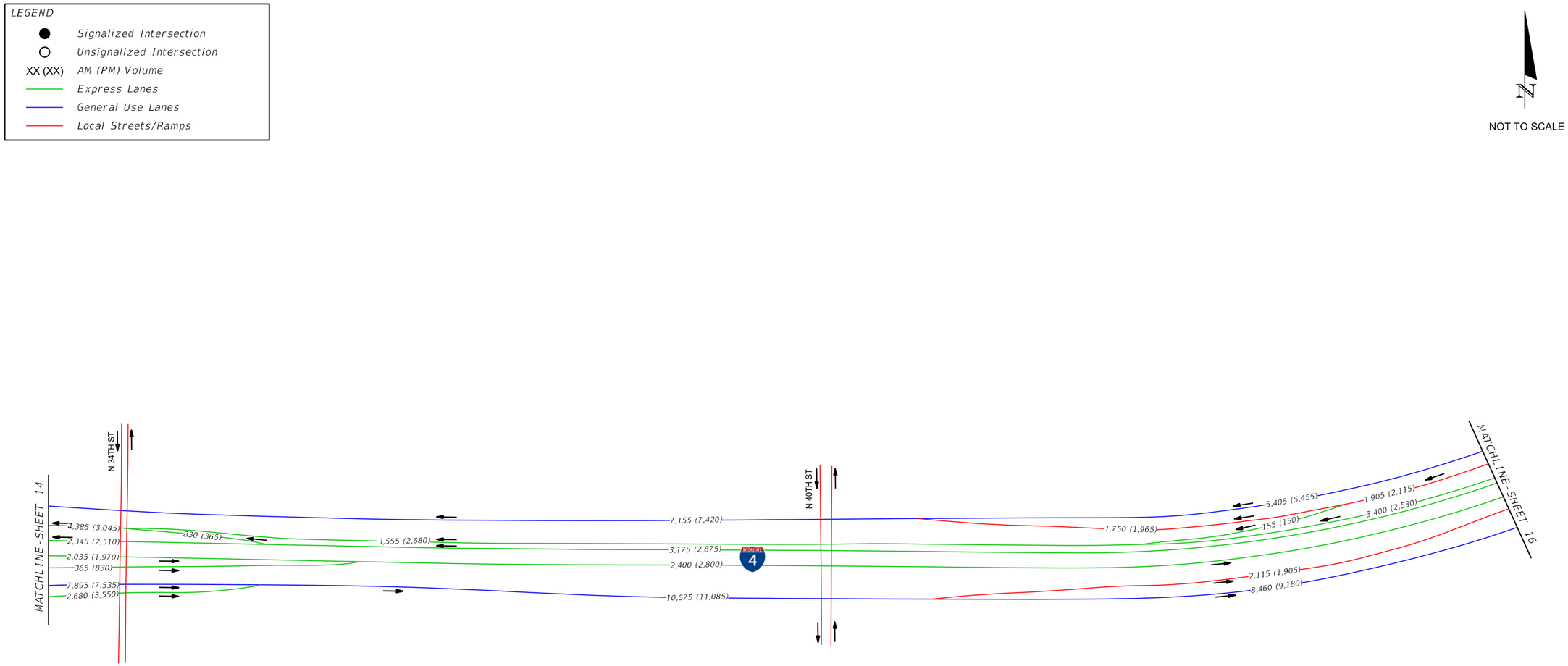

SEIS Re-evaluation

Build Alternative – Option C – Design Year (2045) – AM & PM DDHVs

Figure 3-21

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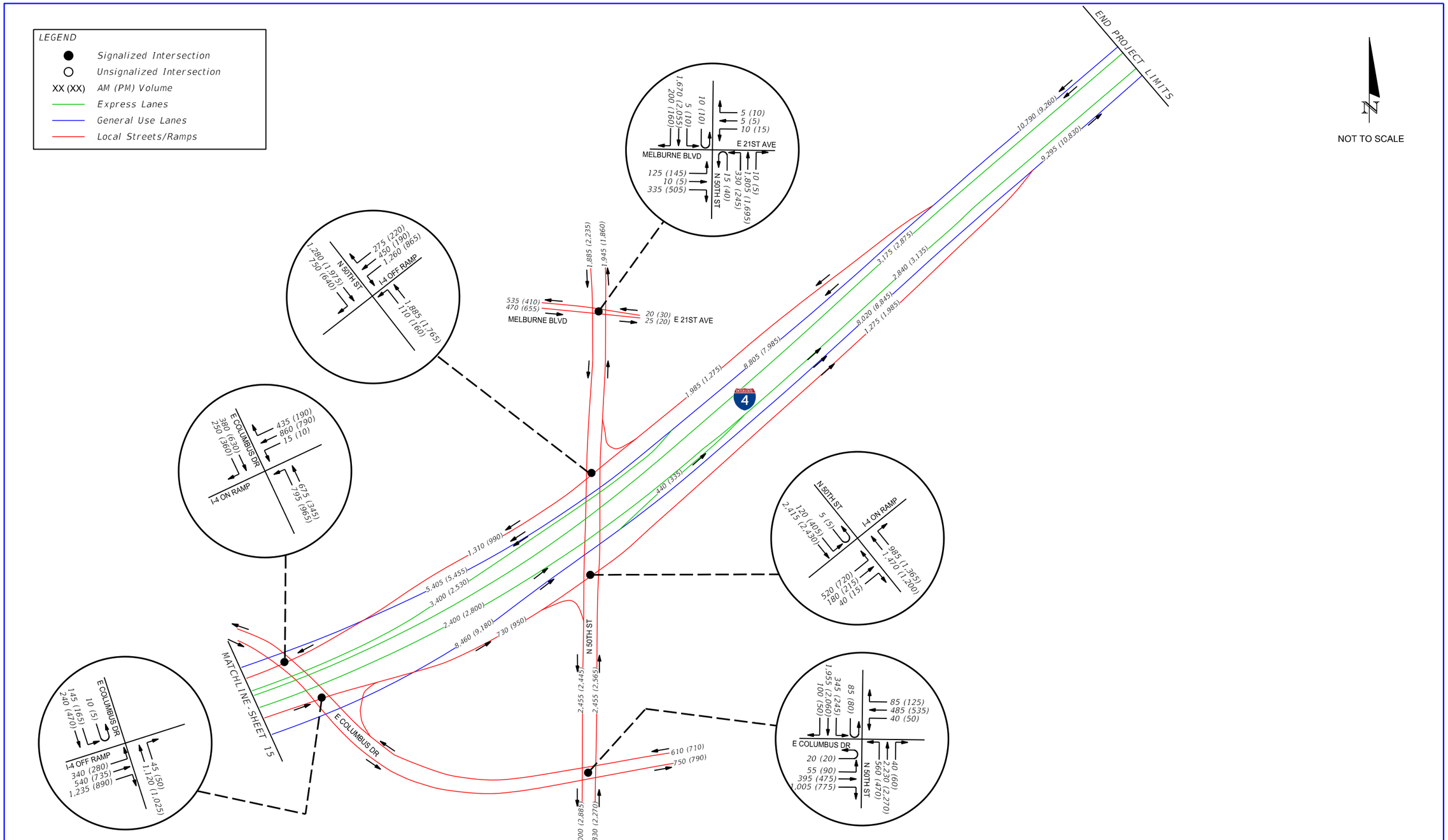

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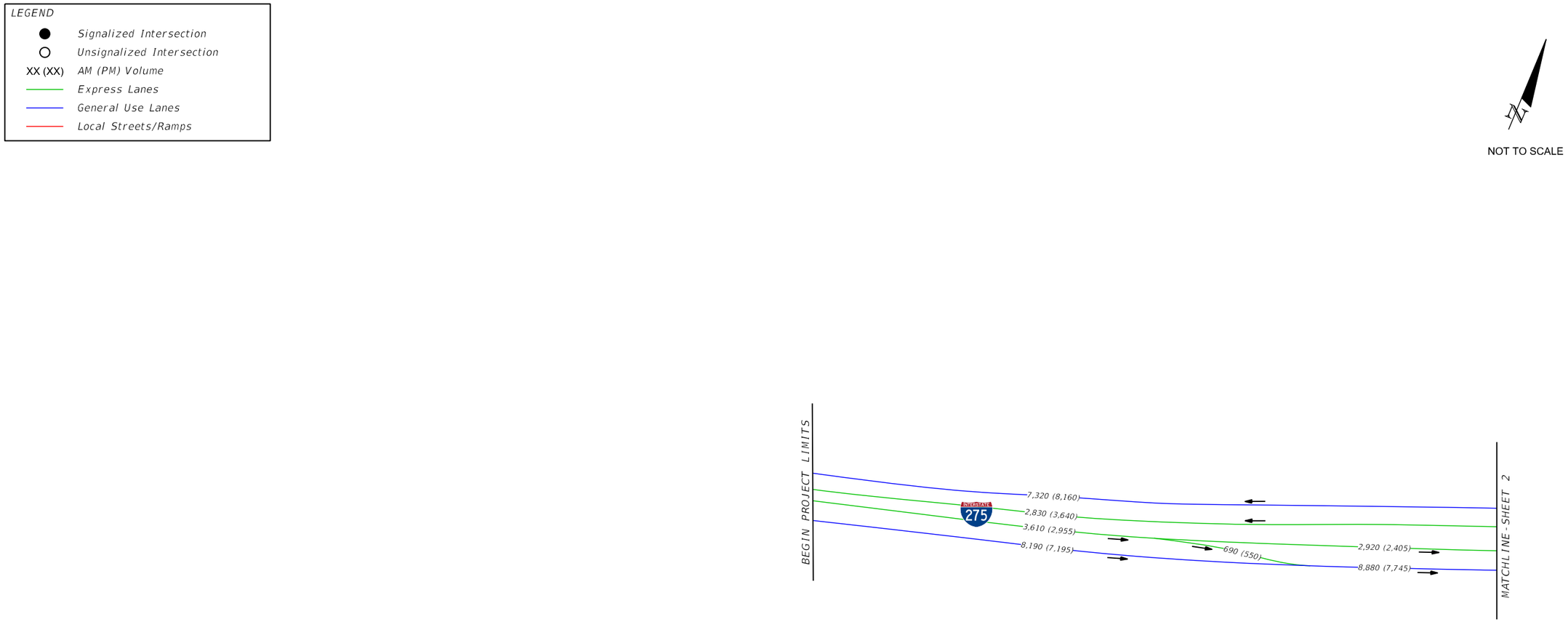

SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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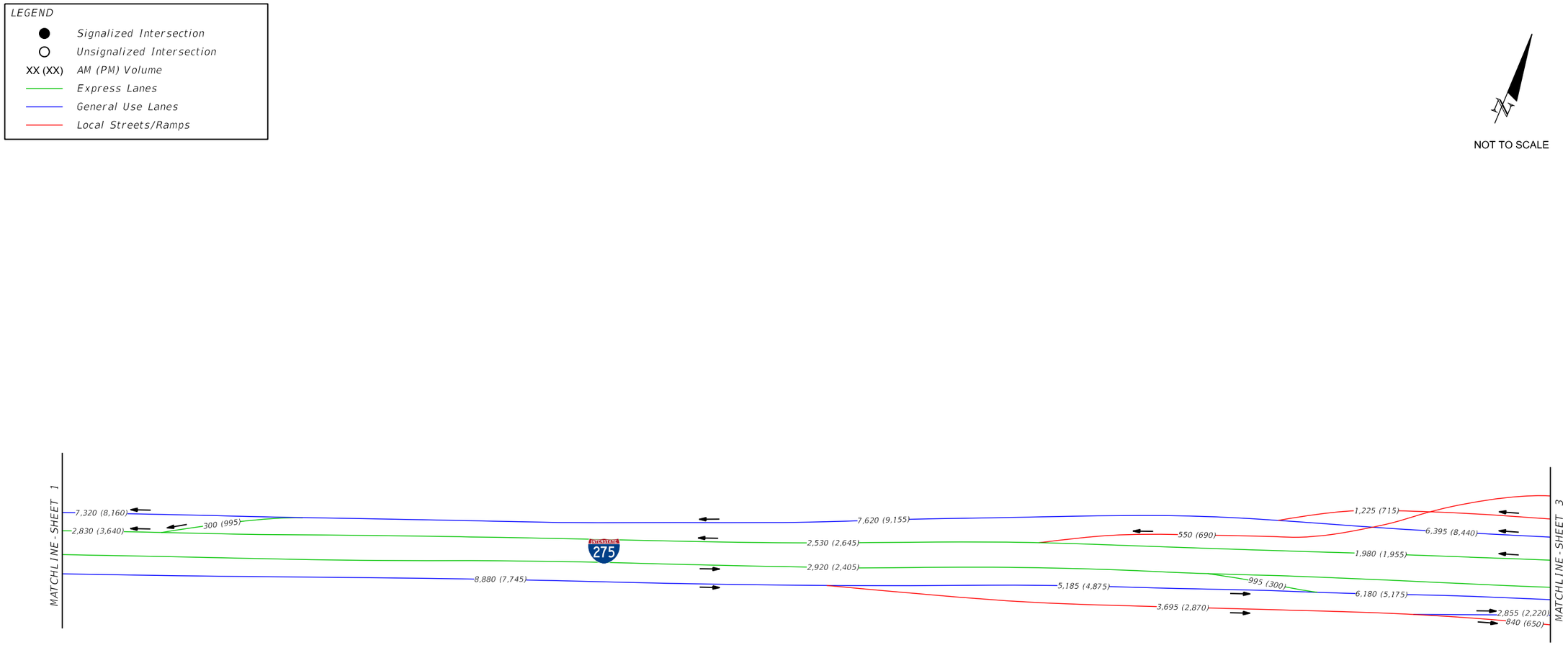

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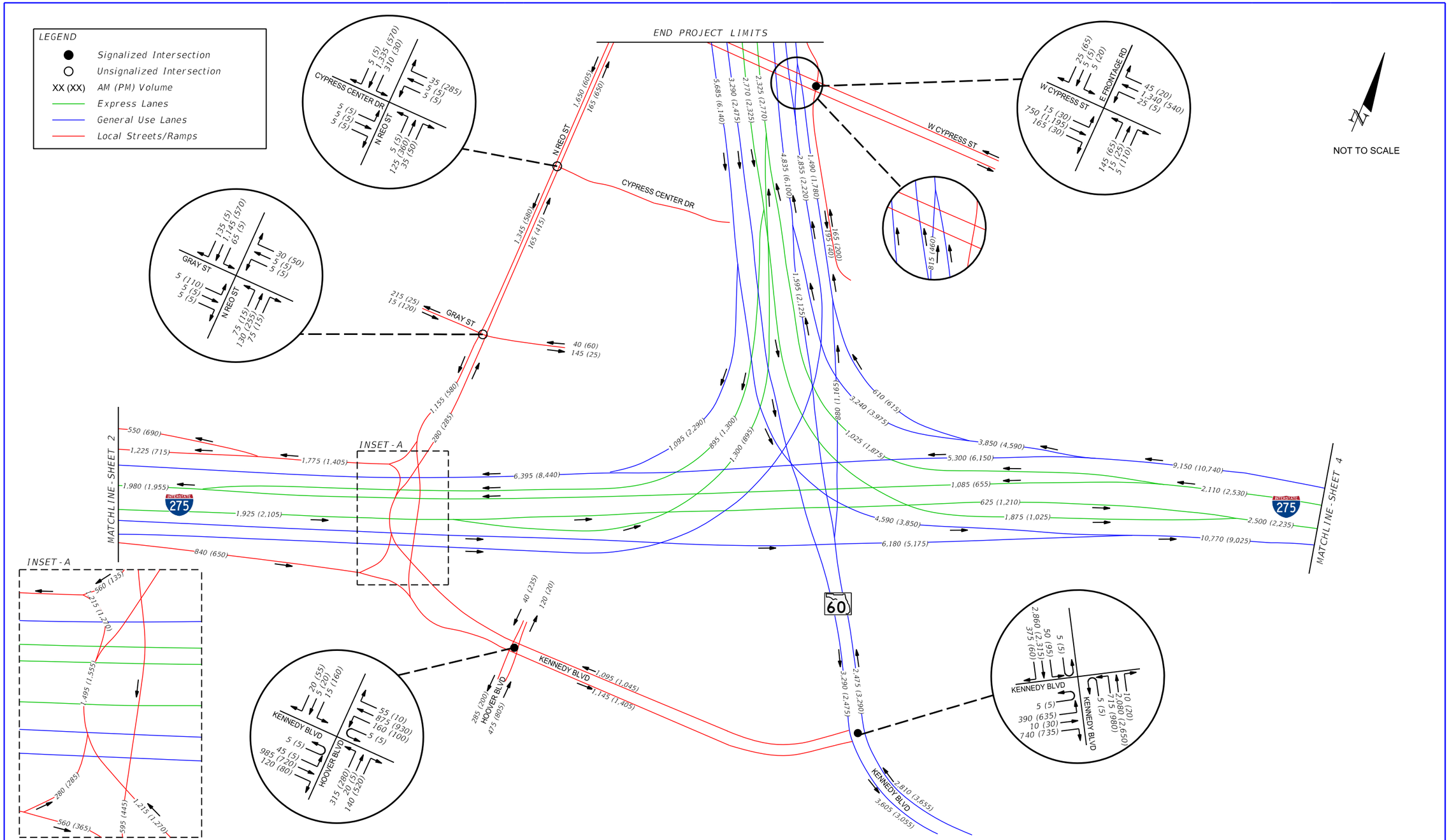

SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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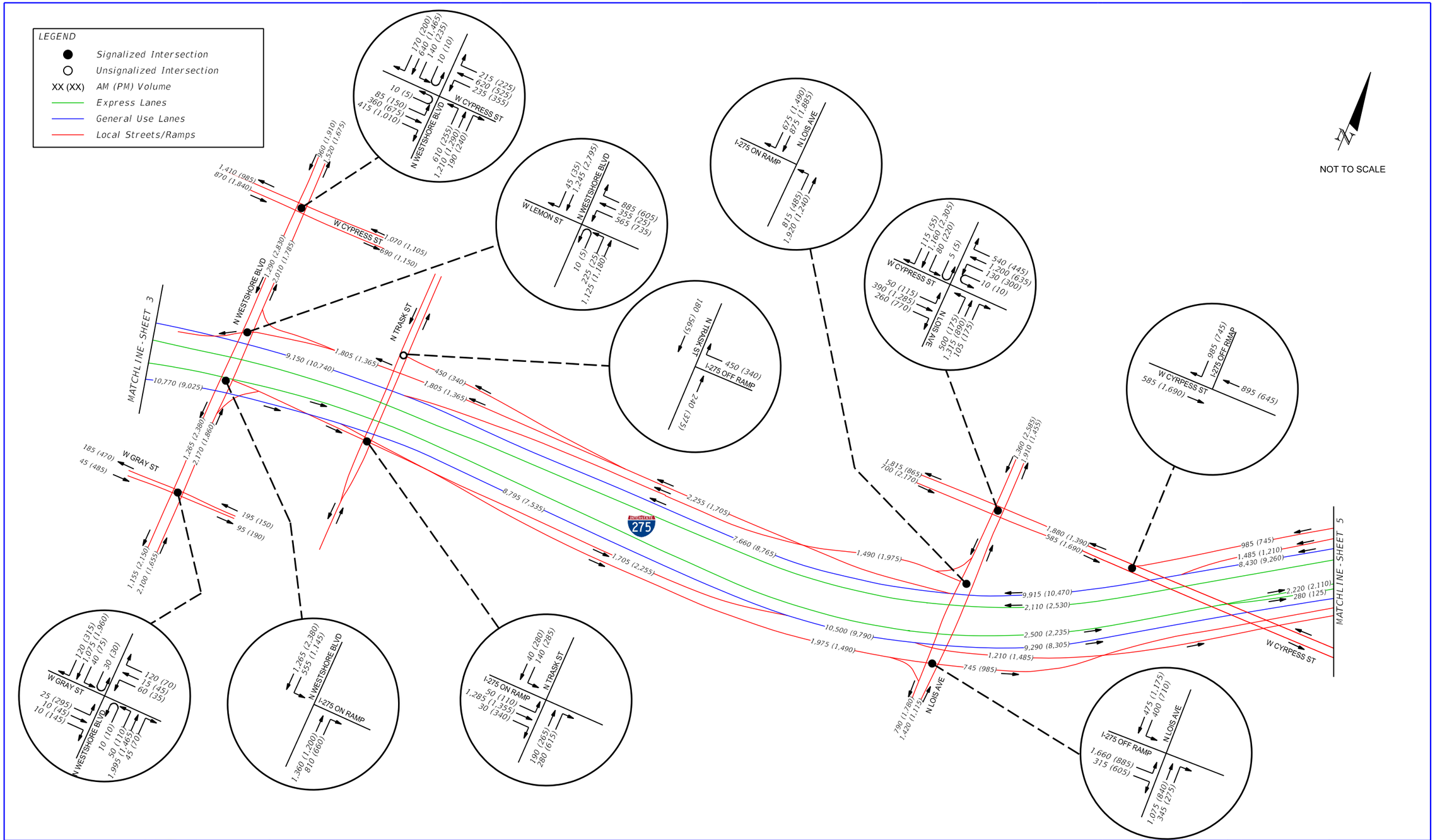

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SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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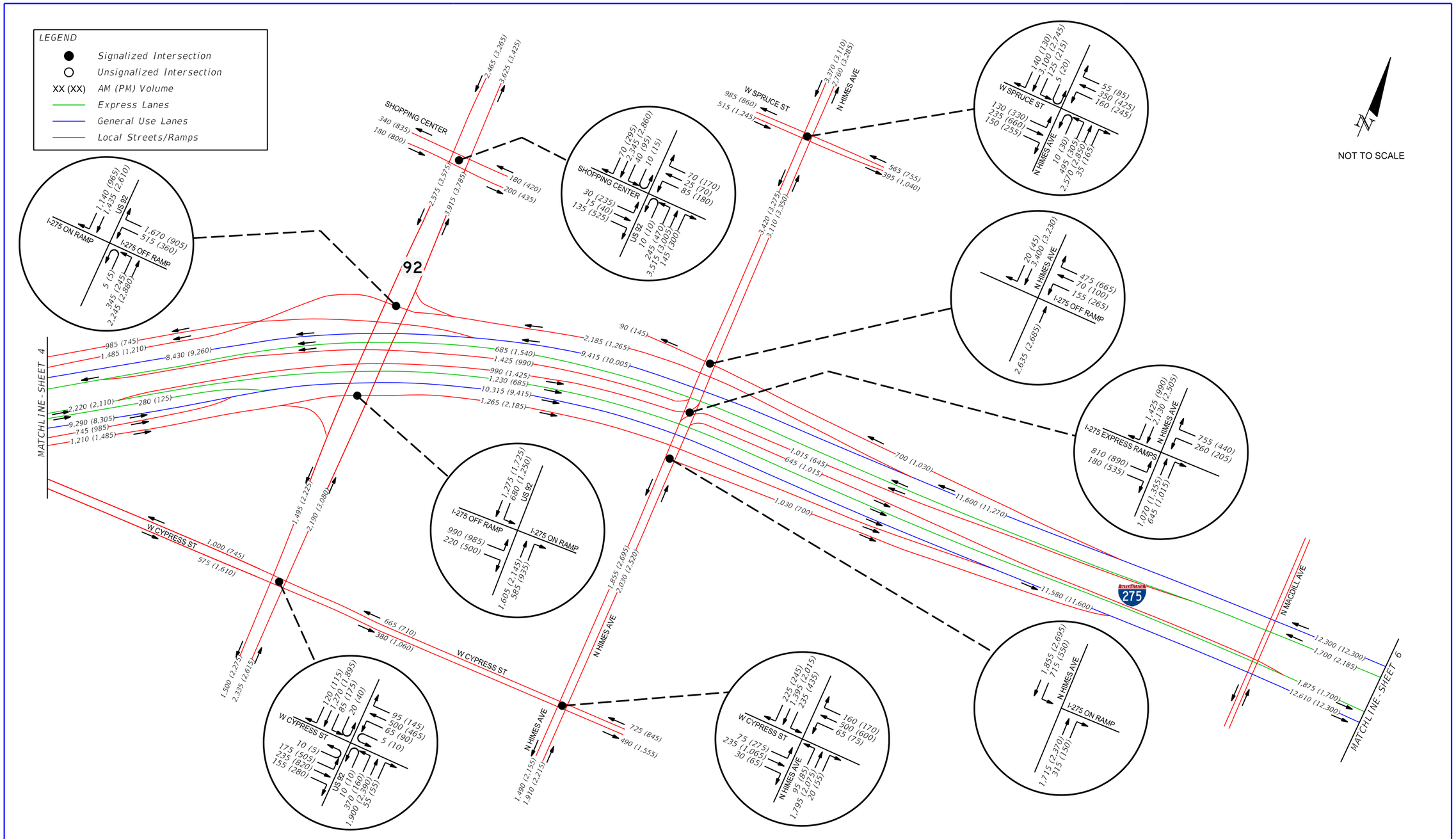

SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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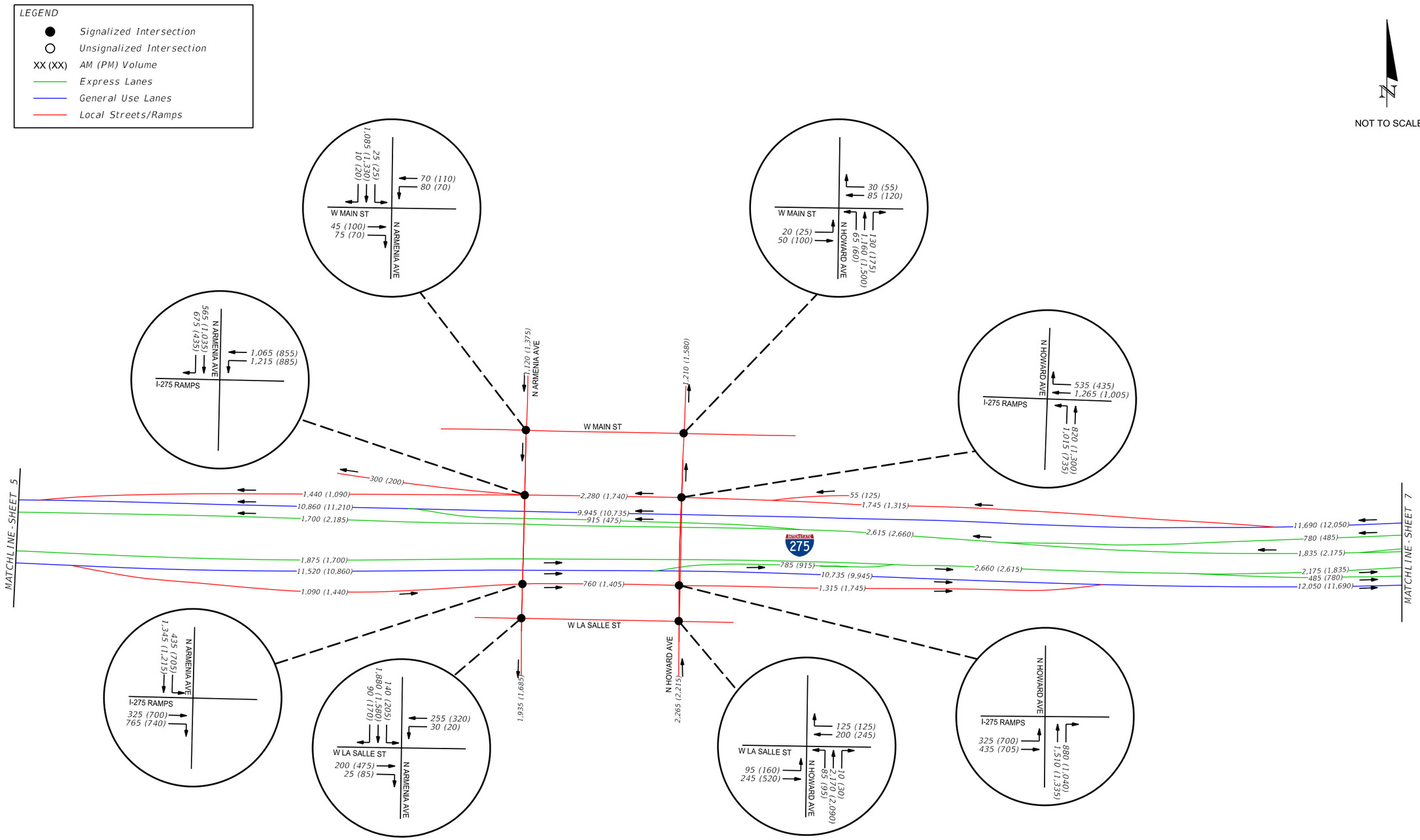

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SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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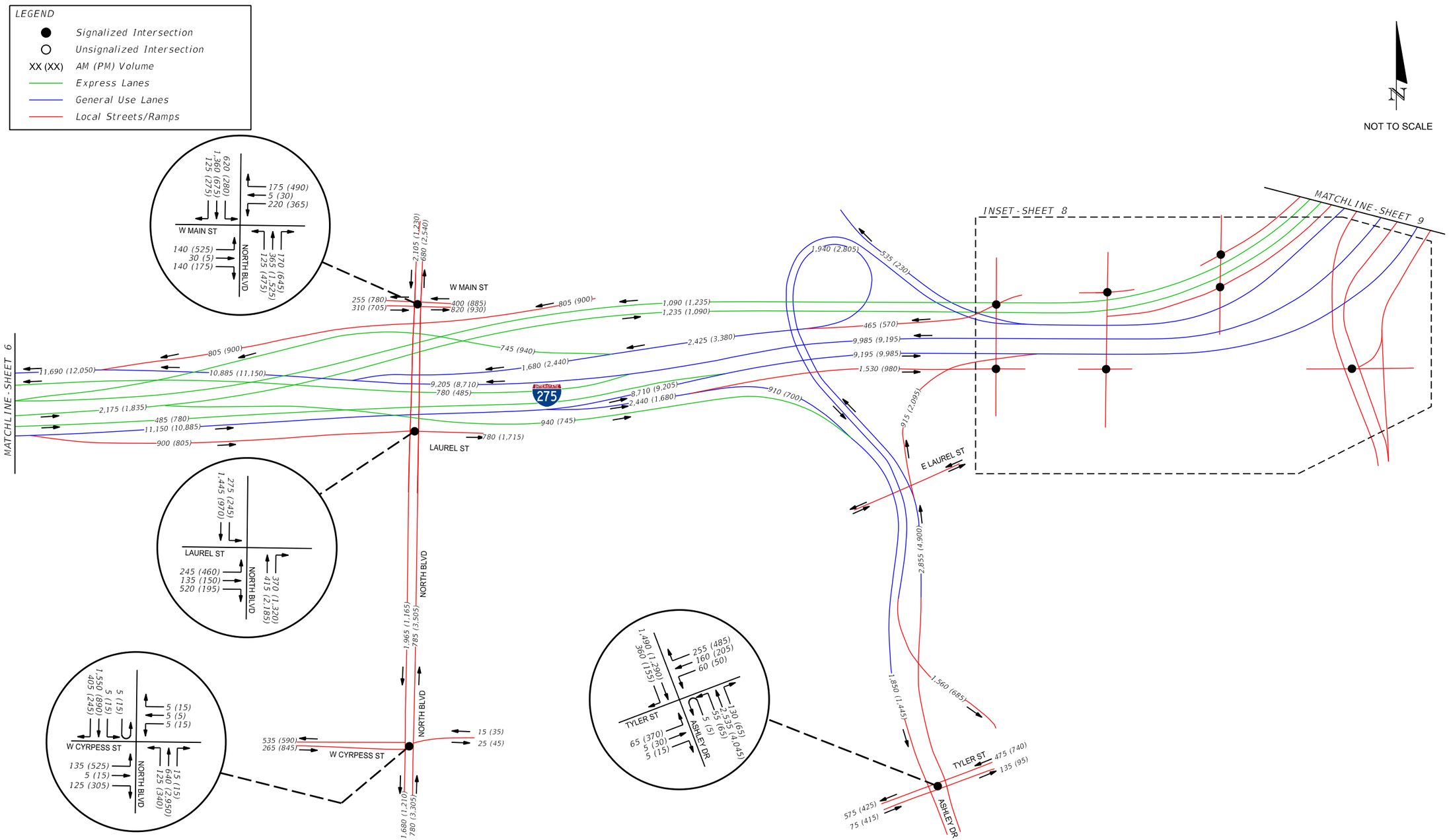

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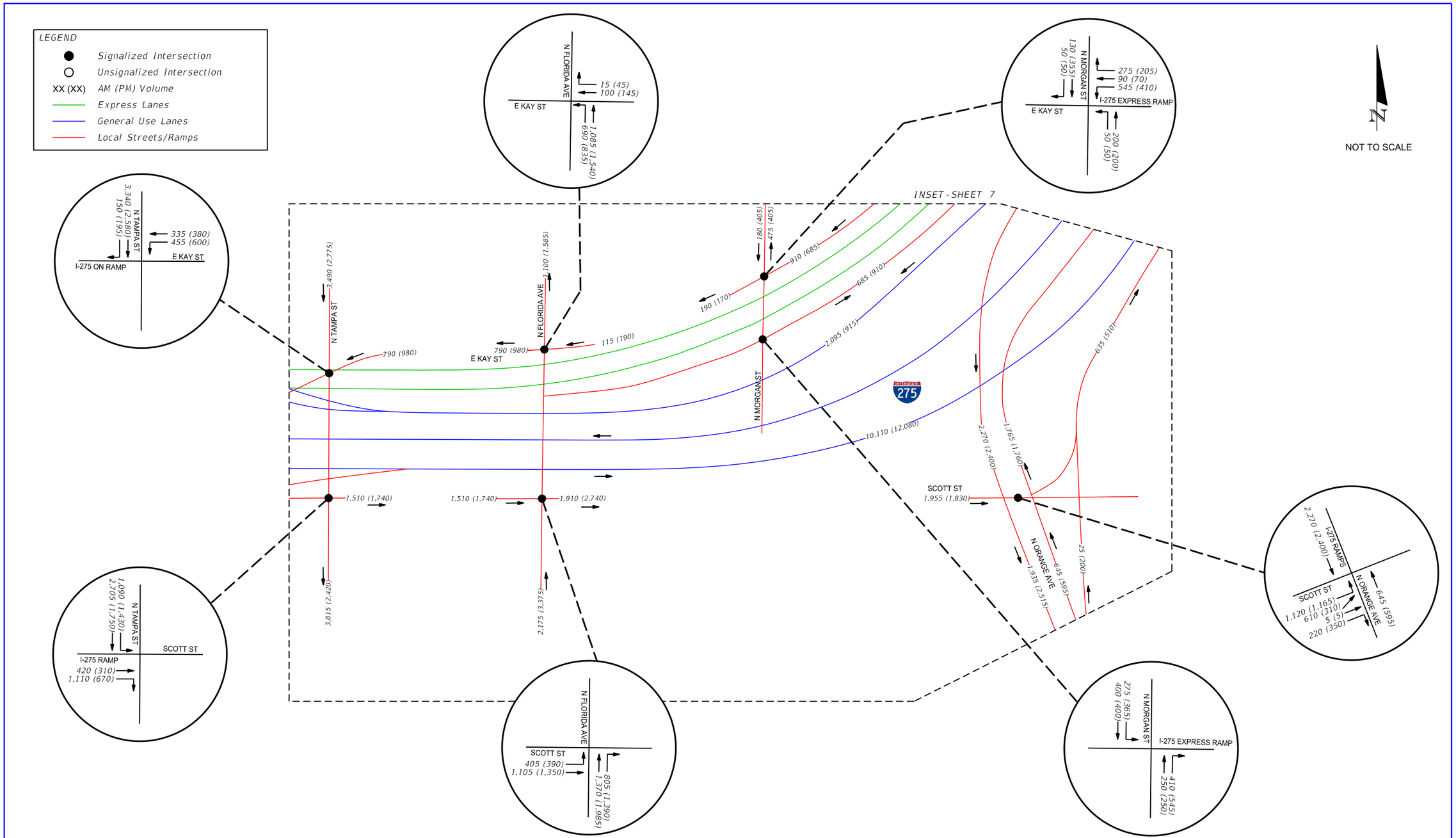

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SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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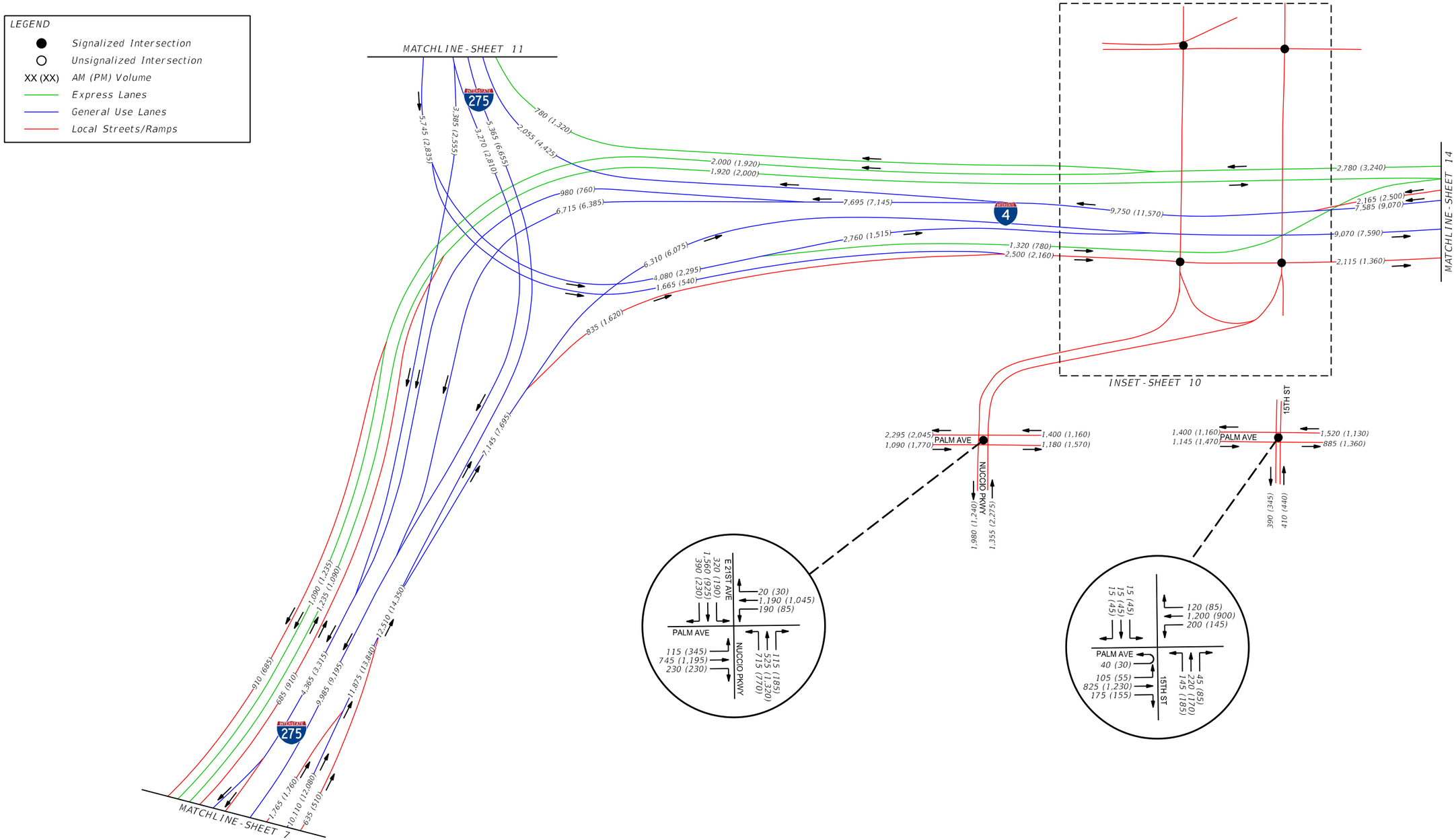

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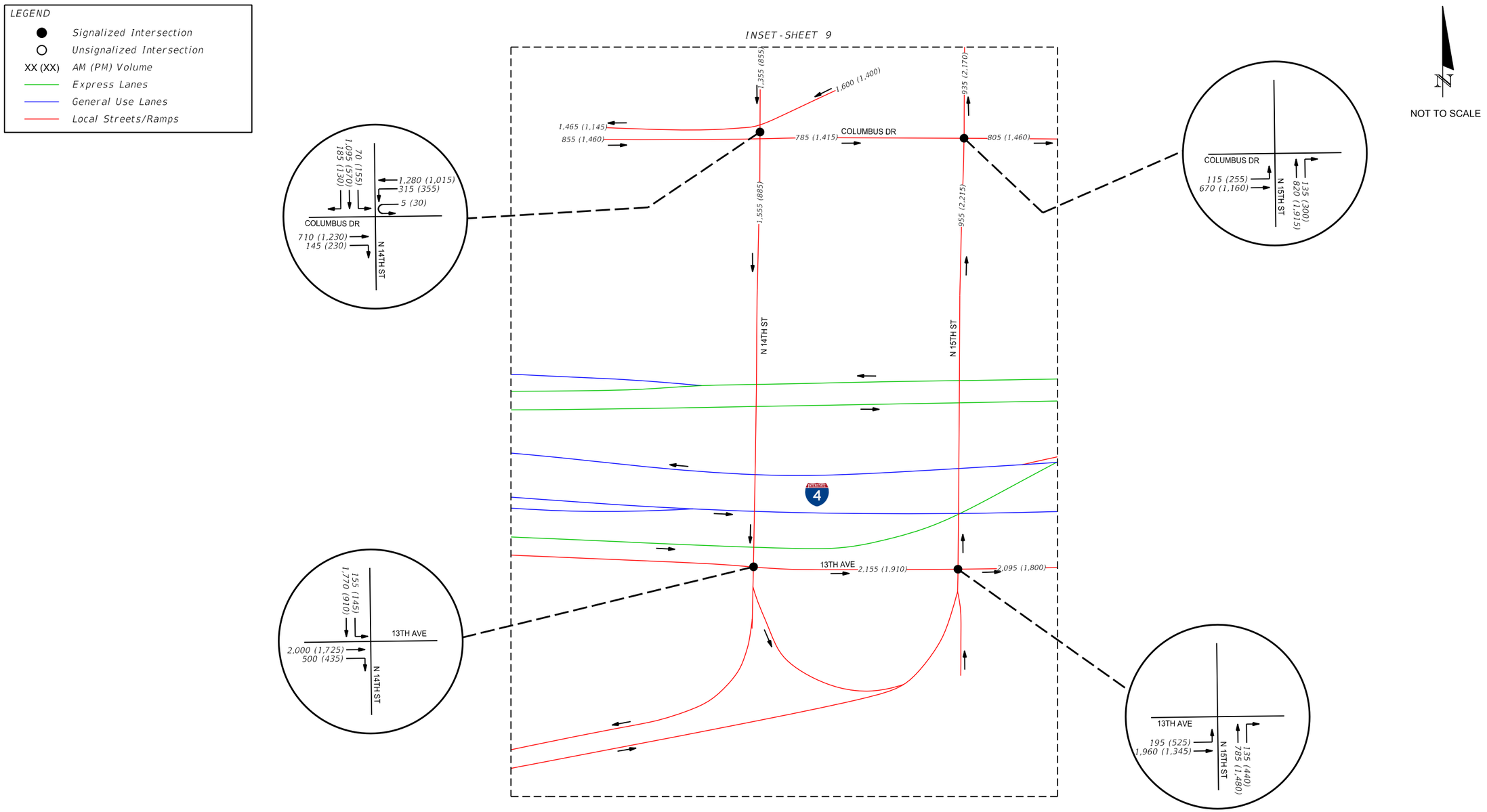

SEIS Re-evaluation

Build Alternative - Option D - Design Year (2045) - AM & PM DDHVs

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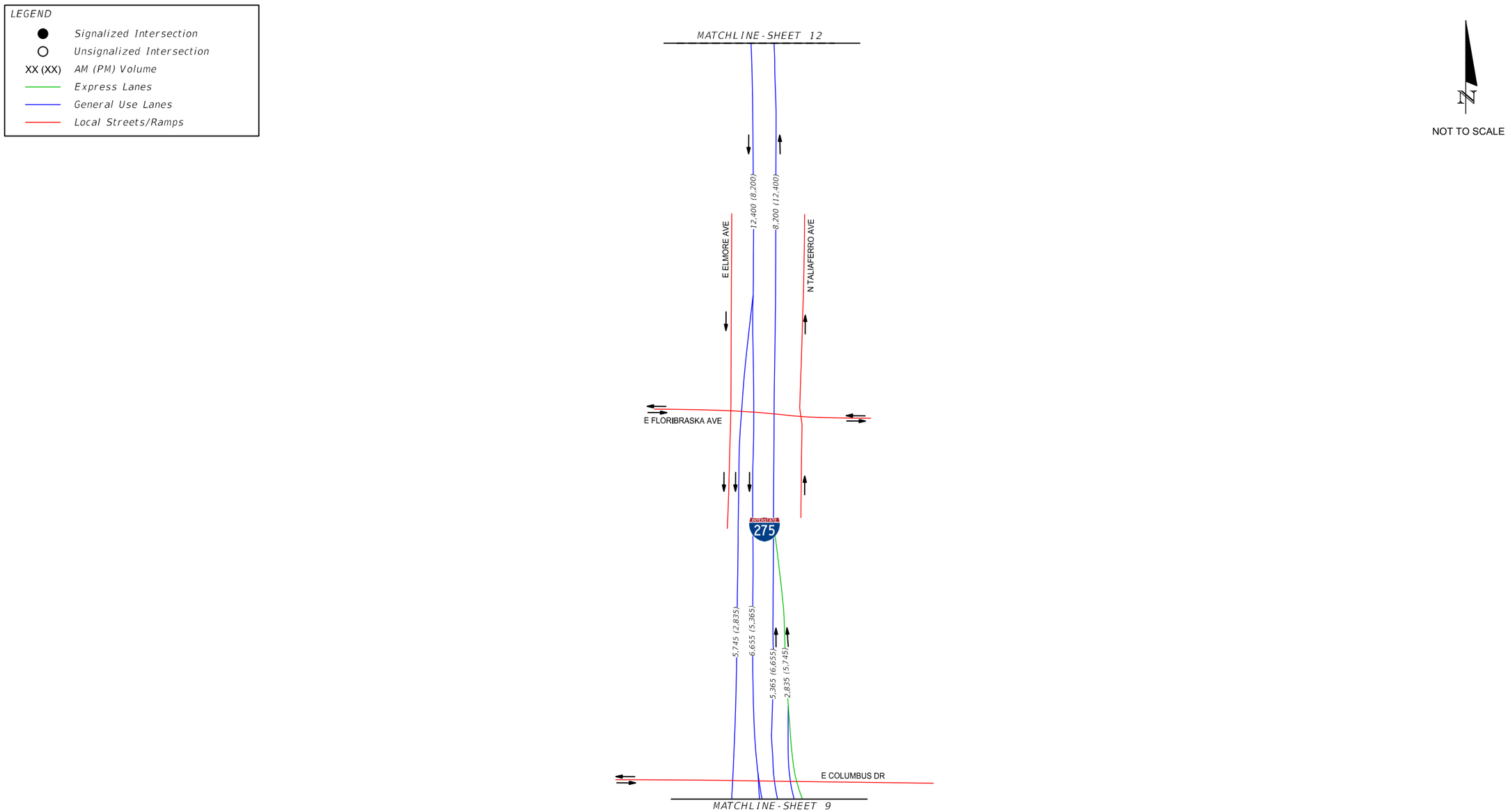
WPI # 258337-2



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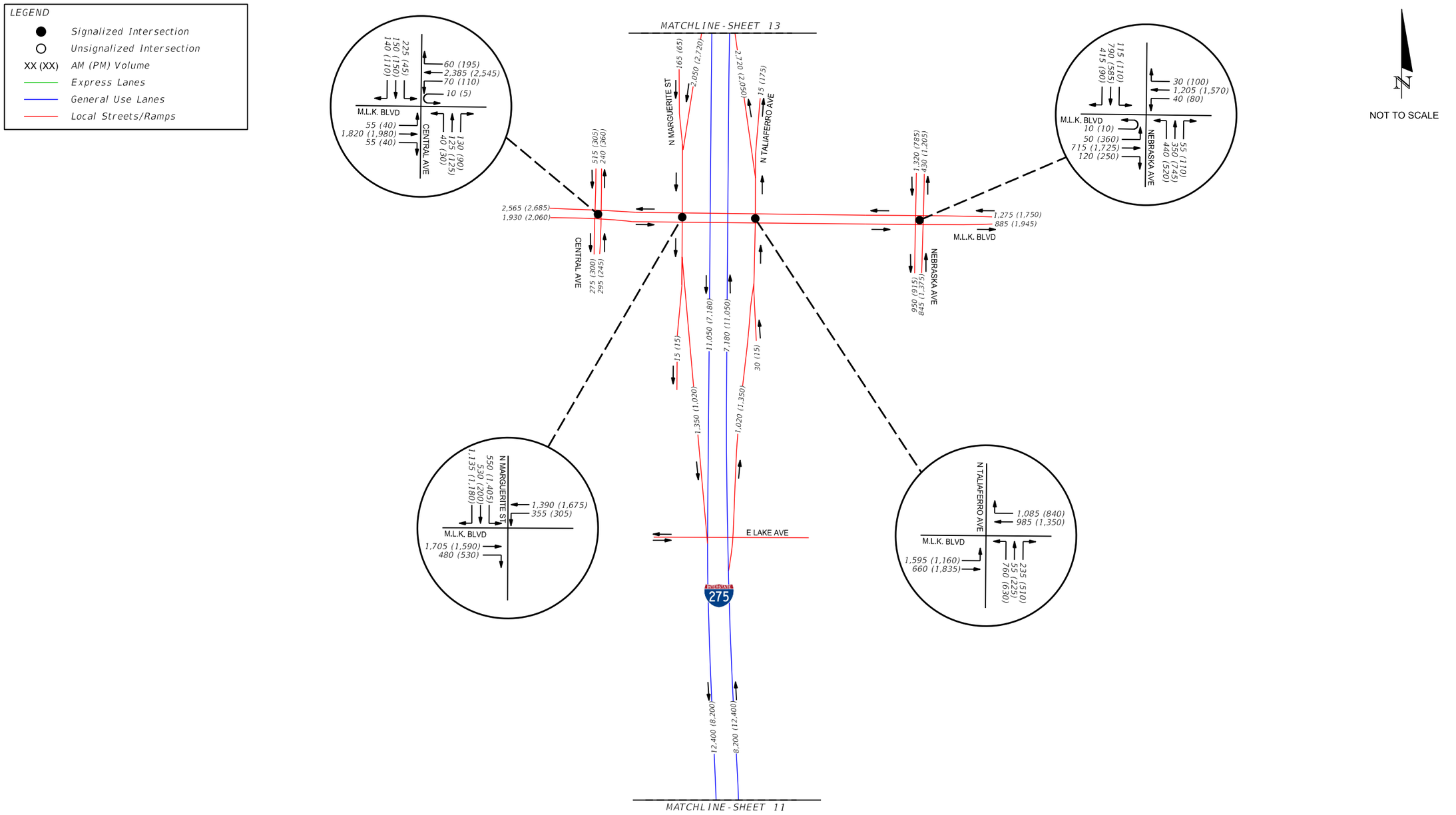

FDOT	SEIS Re-evaluation Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs	Figure 3-22	Sheet 12 of 16

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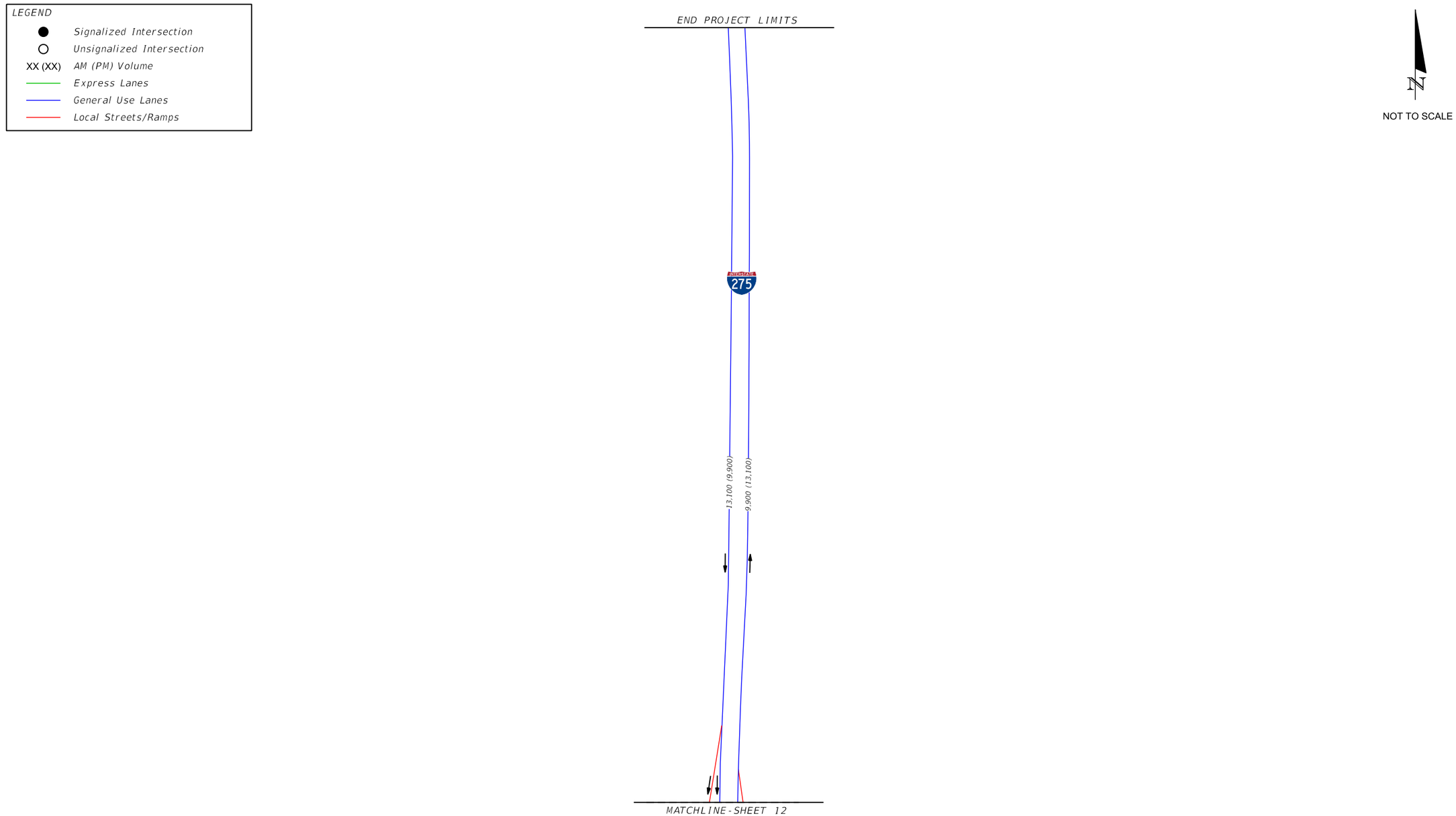

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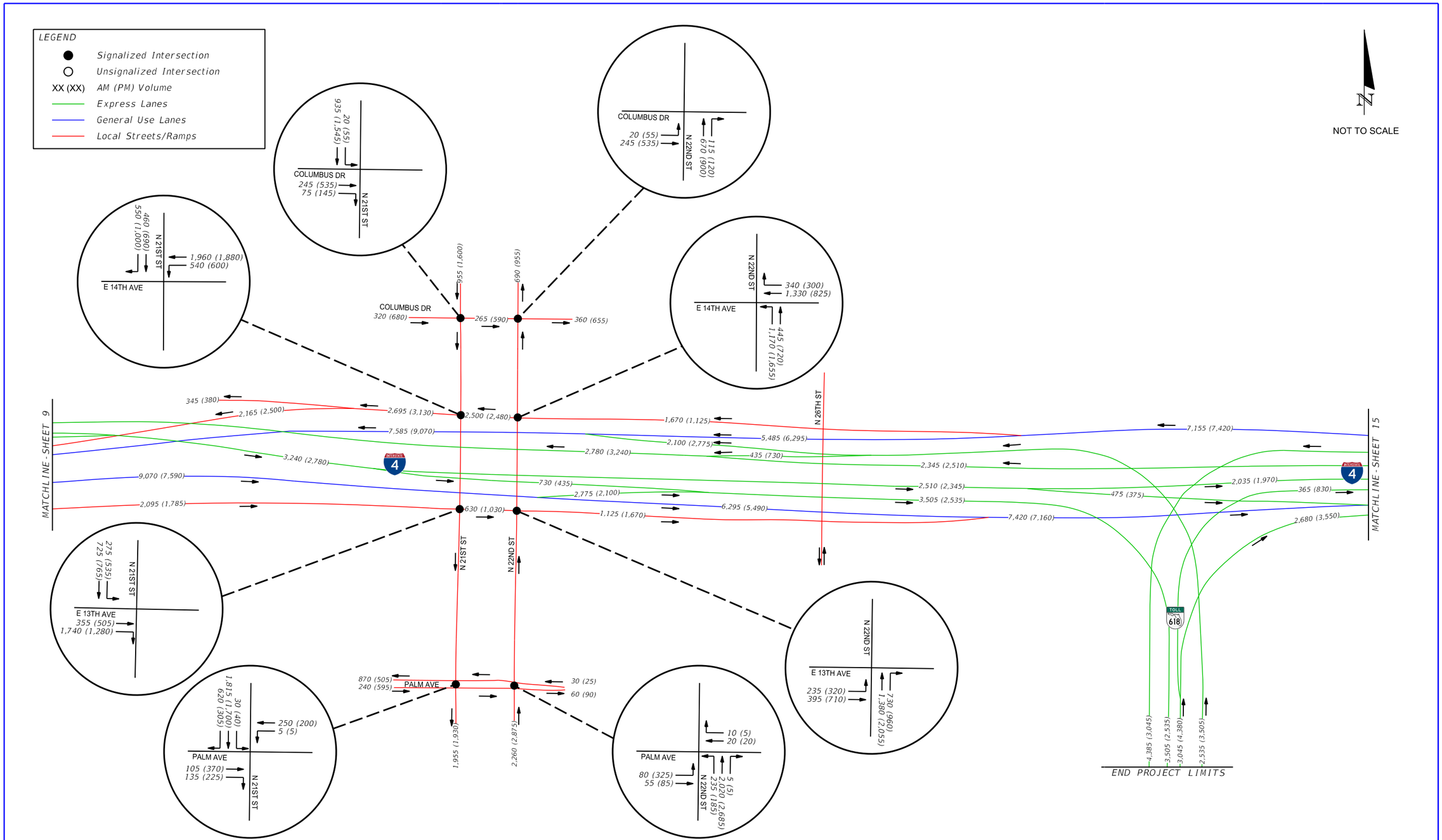

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SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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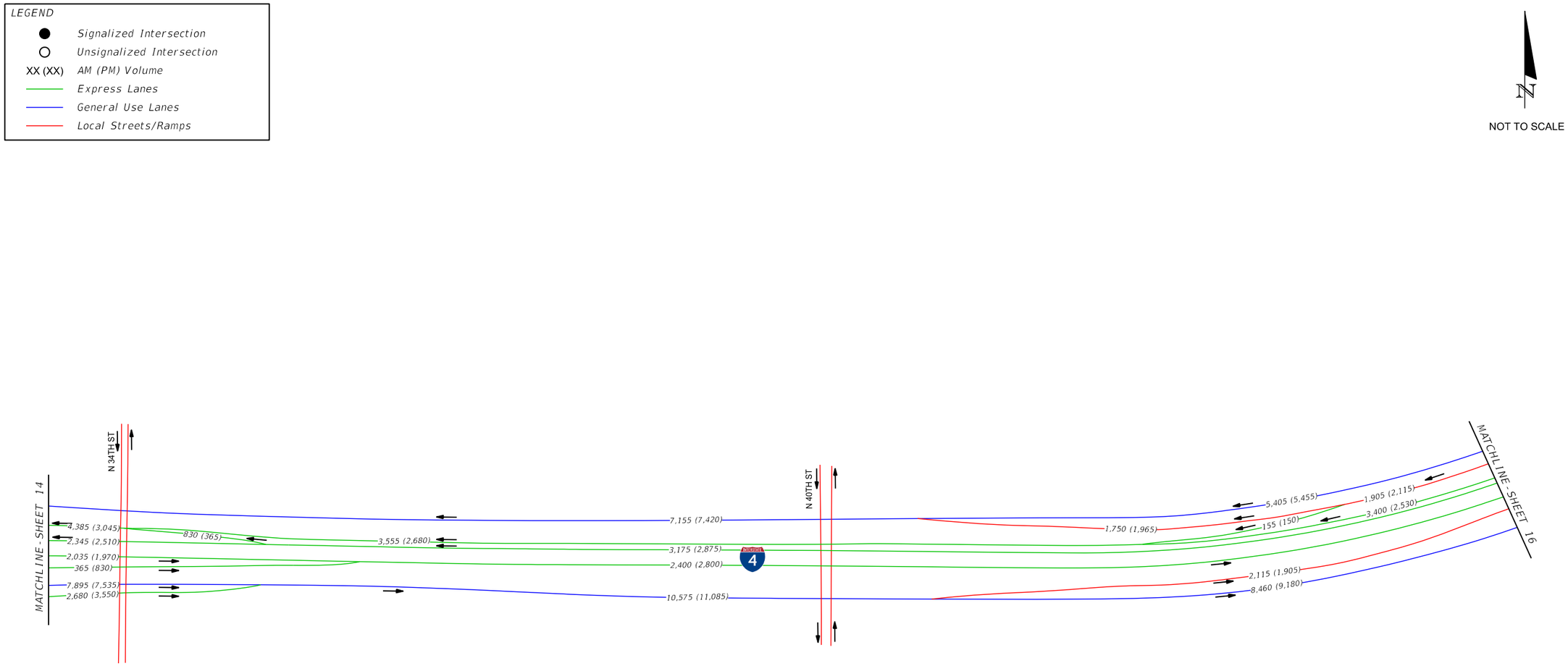

SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

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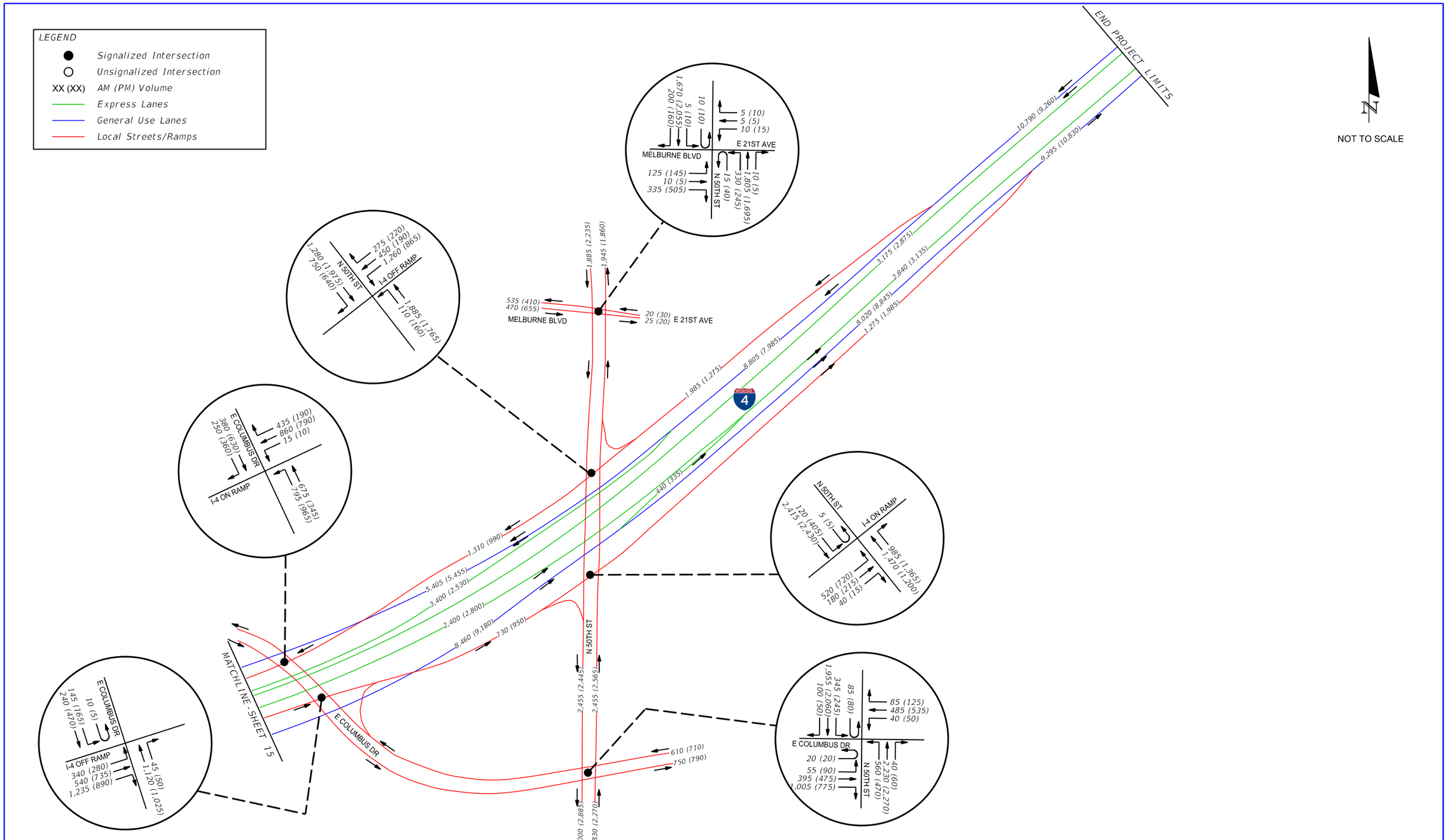

SEIS Re-evaluation

Build Alternative – Option D – Design Year (2045) – AM & PM DDHVs

Figure 3-22

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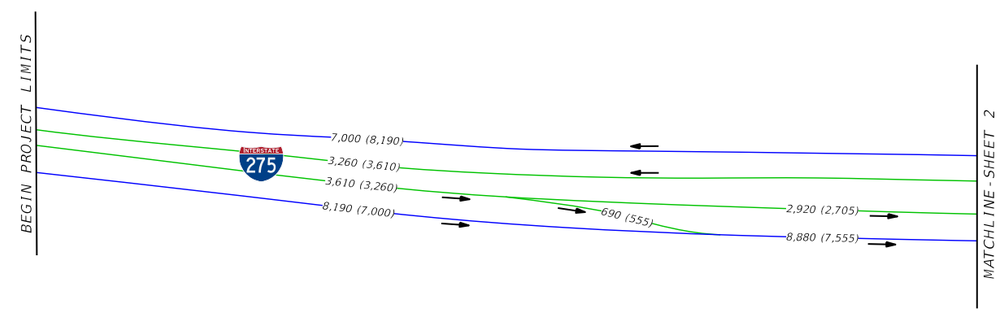
LEGEND

- Signalized Intersection
- Unsignalized Intersection
- XX (XX) AM (PM) Volume
- Express Lanes
- General Use Lanes
- Local Streets/Ramps

NOT TO SCALE



SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

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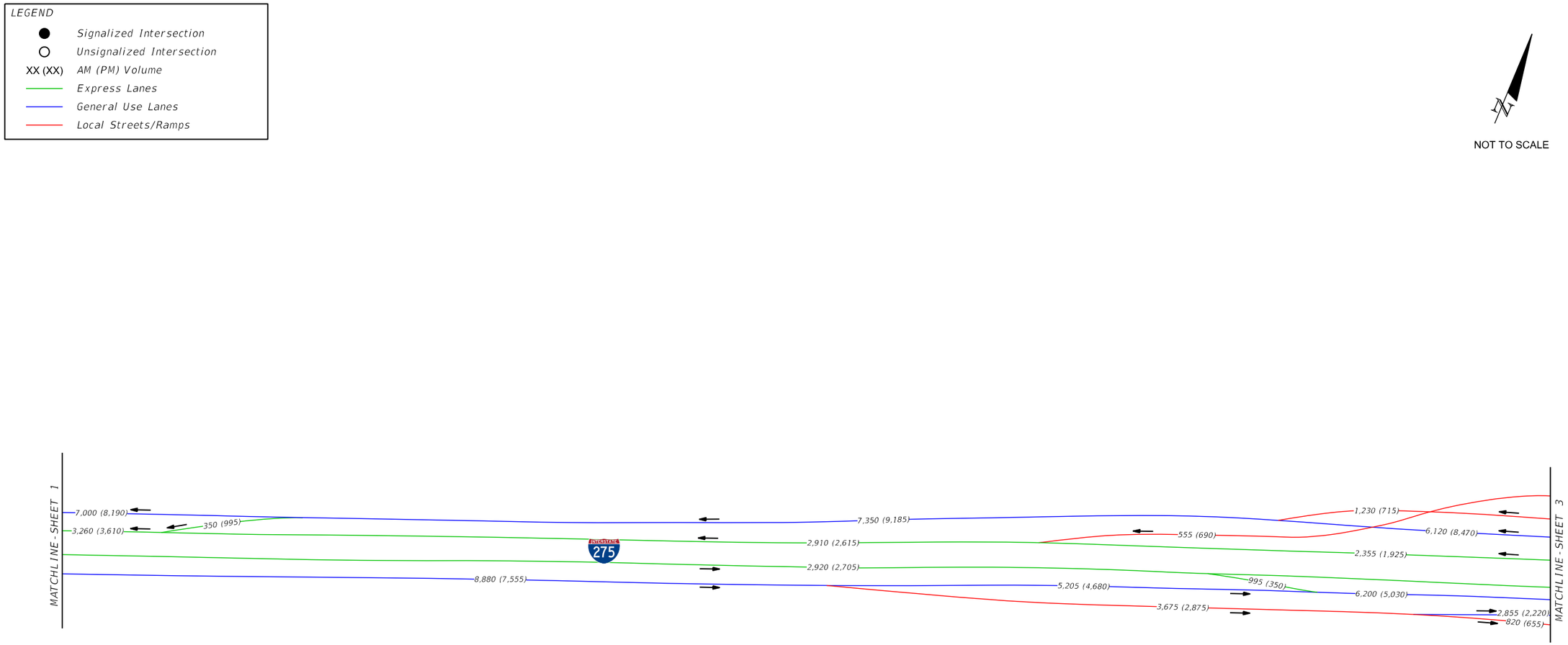
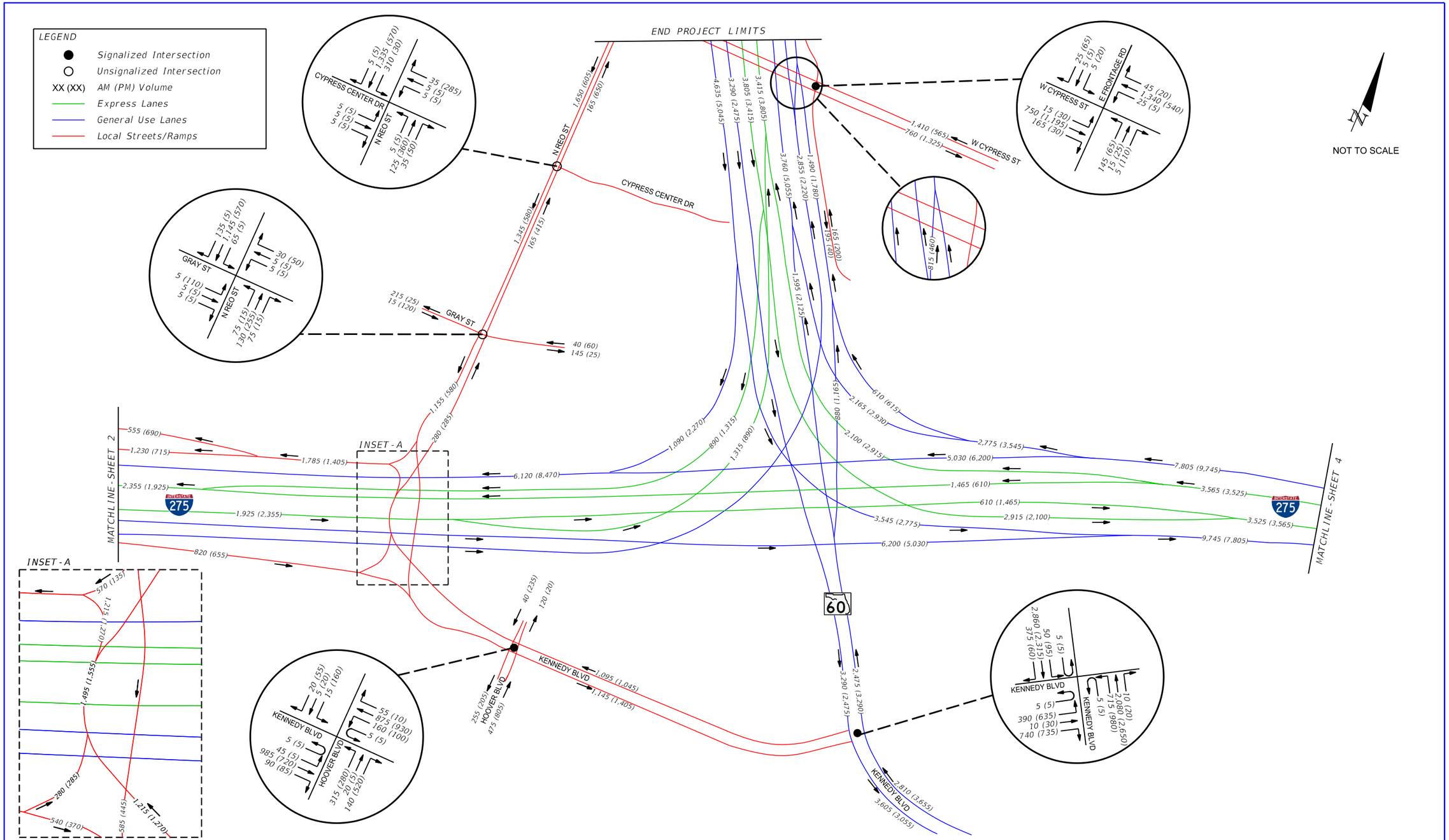
WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 2 of 16

WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

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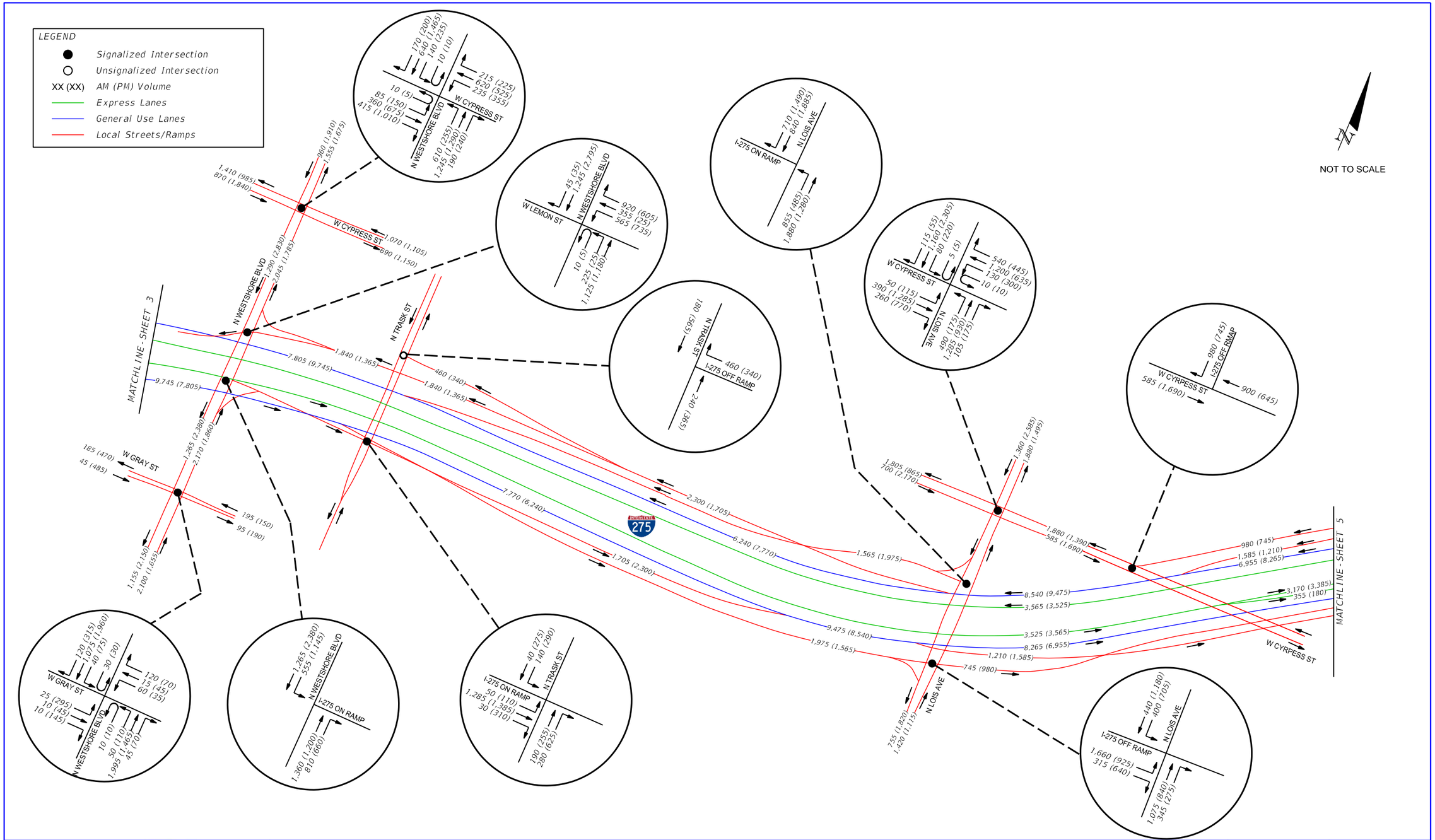
WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

Figure 3-23

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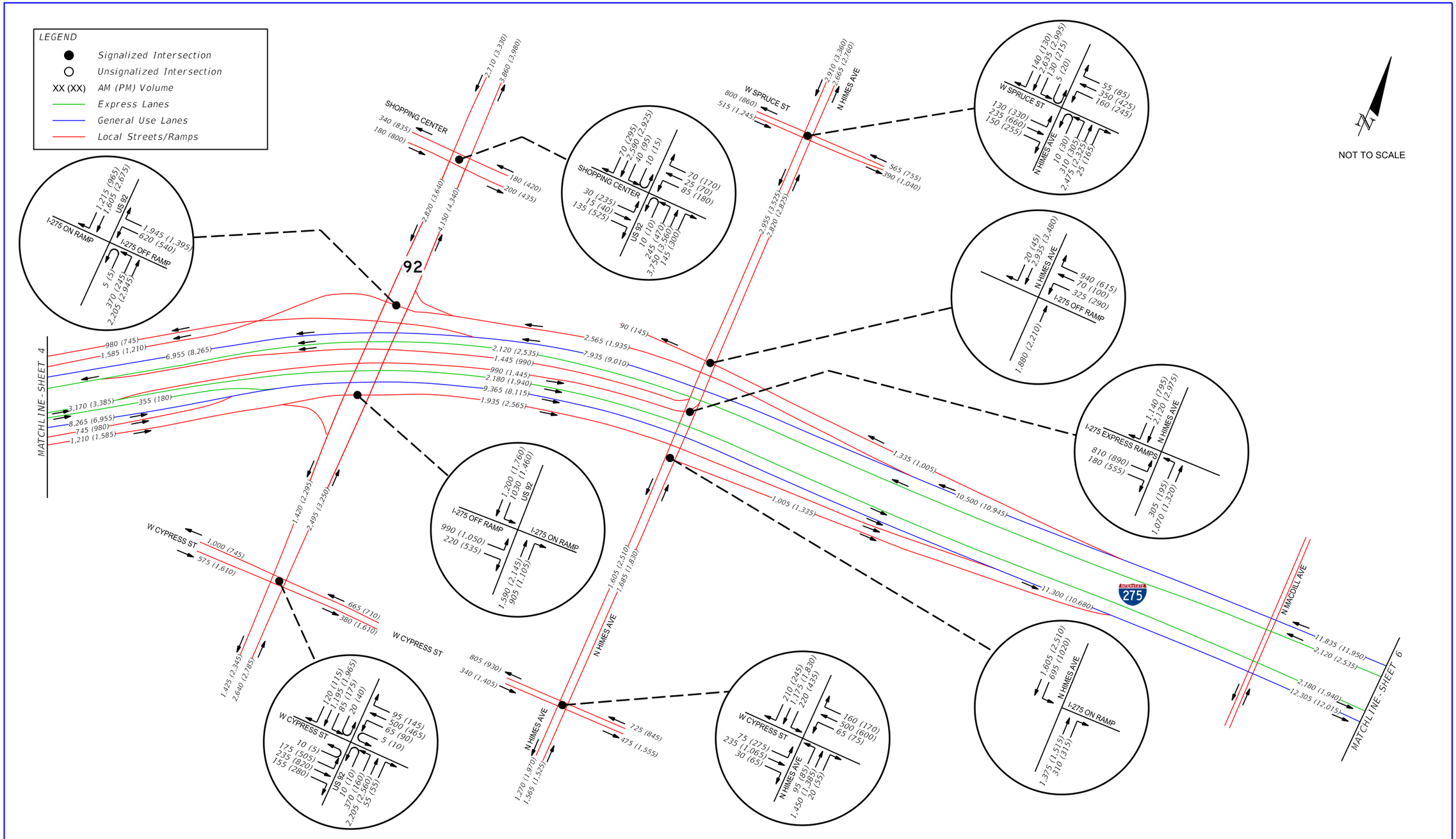
WPI # 258337-2



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SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

Figure 3-23

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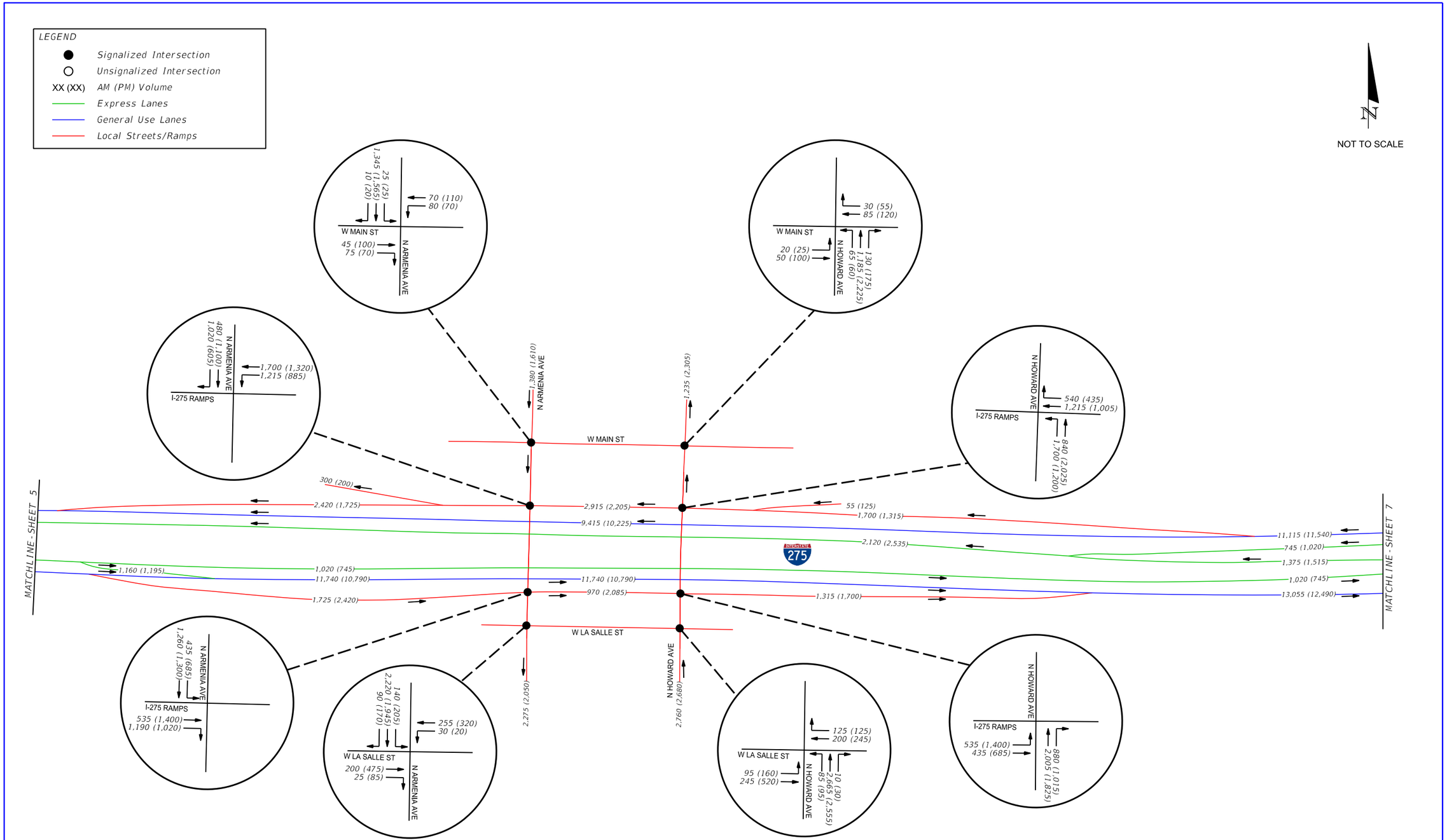


FDOT

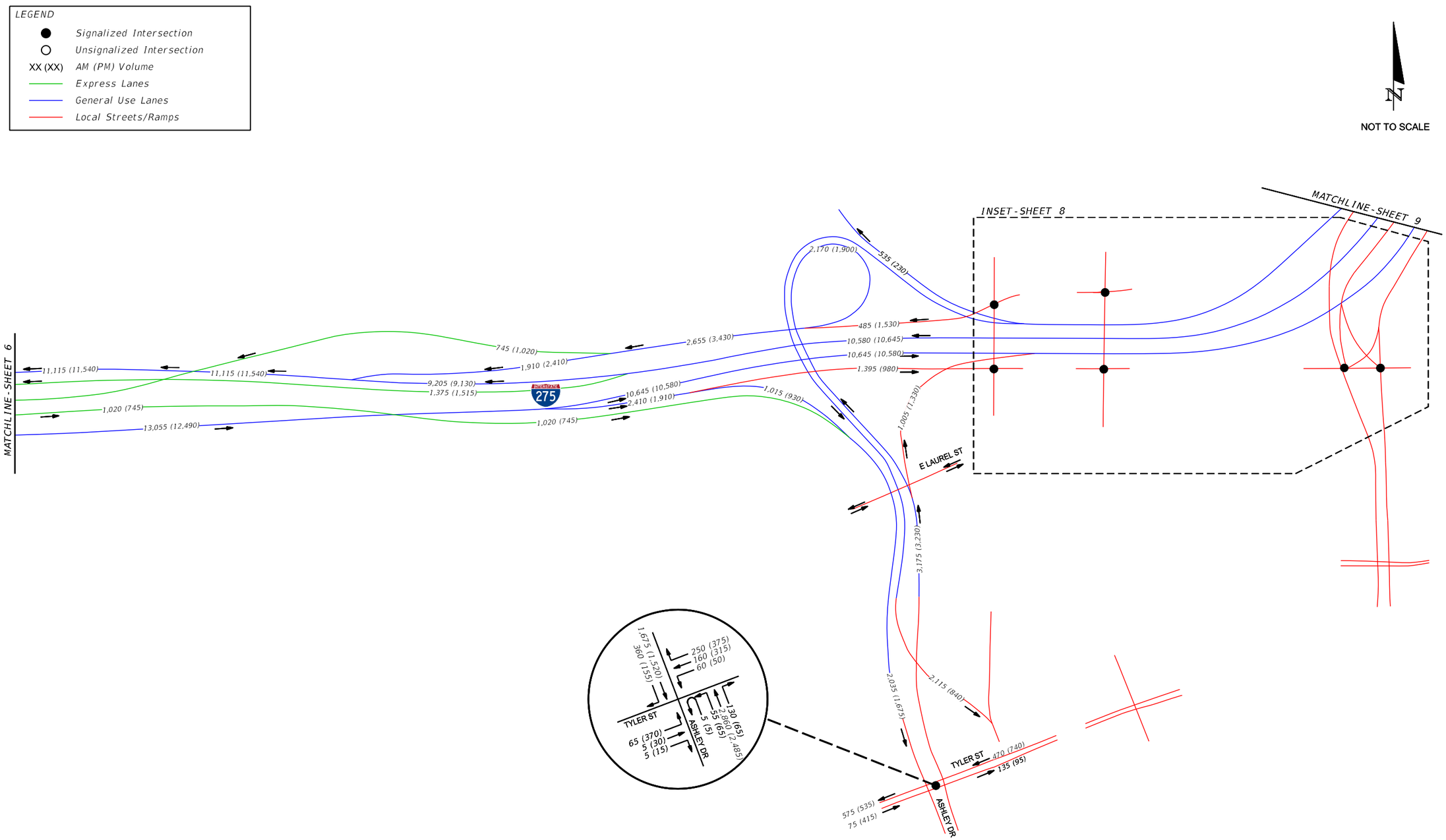
SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

Figure 3-23

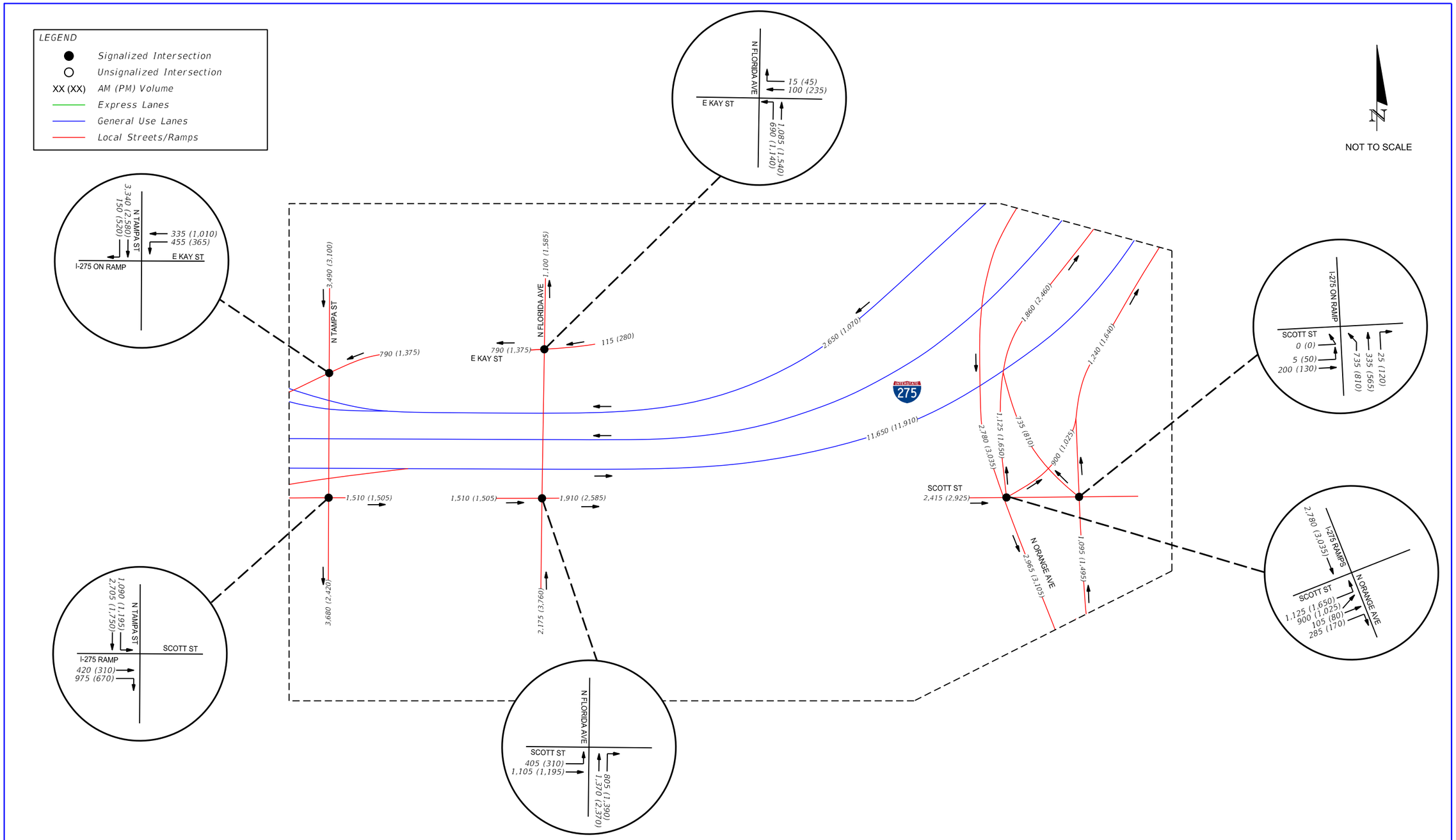
Sheet 6 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 7 of 16

WPI # 258337-2



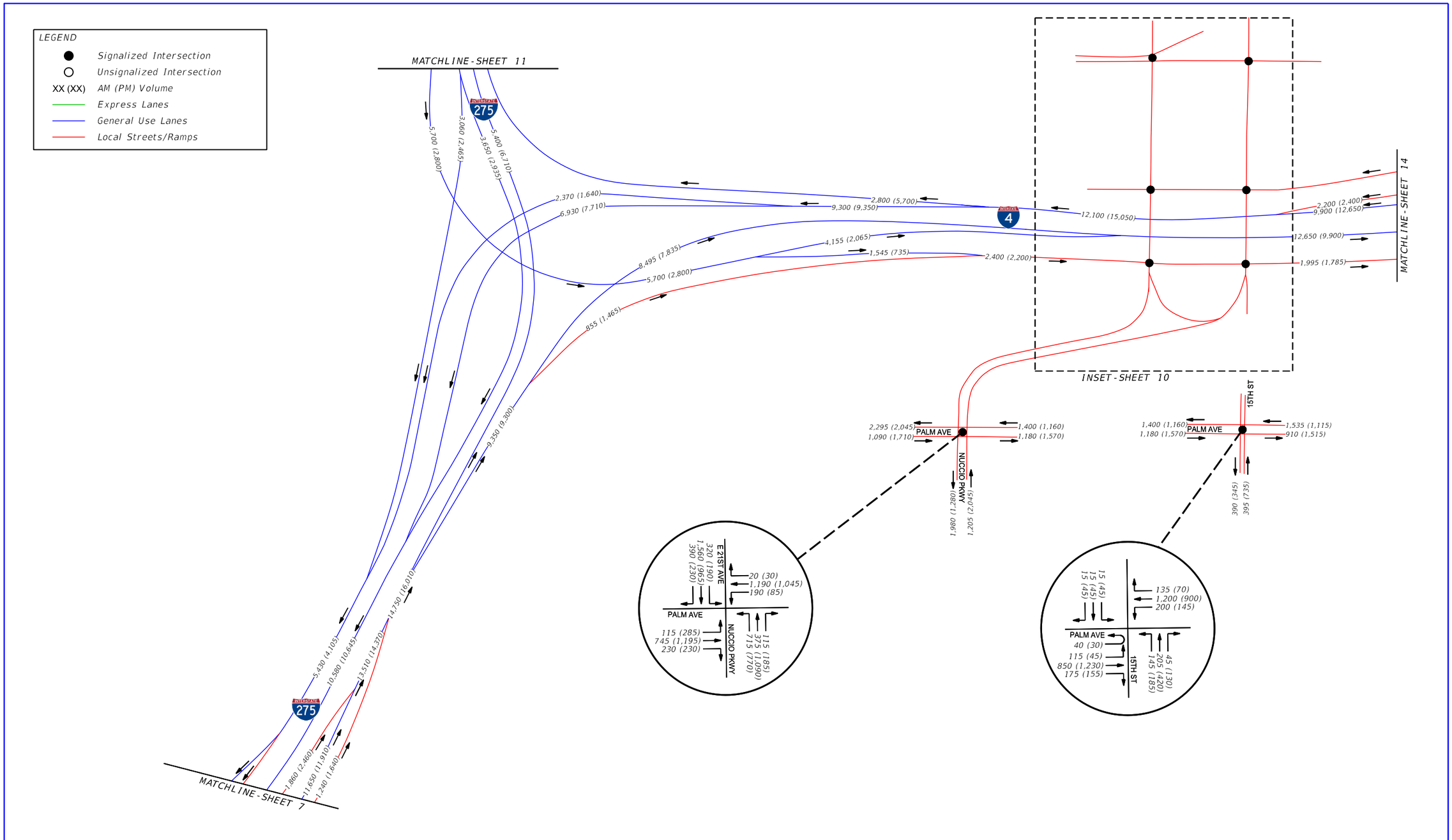
SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

Figure 3-23

Sheet 8 of 16

WPI # 258337-2



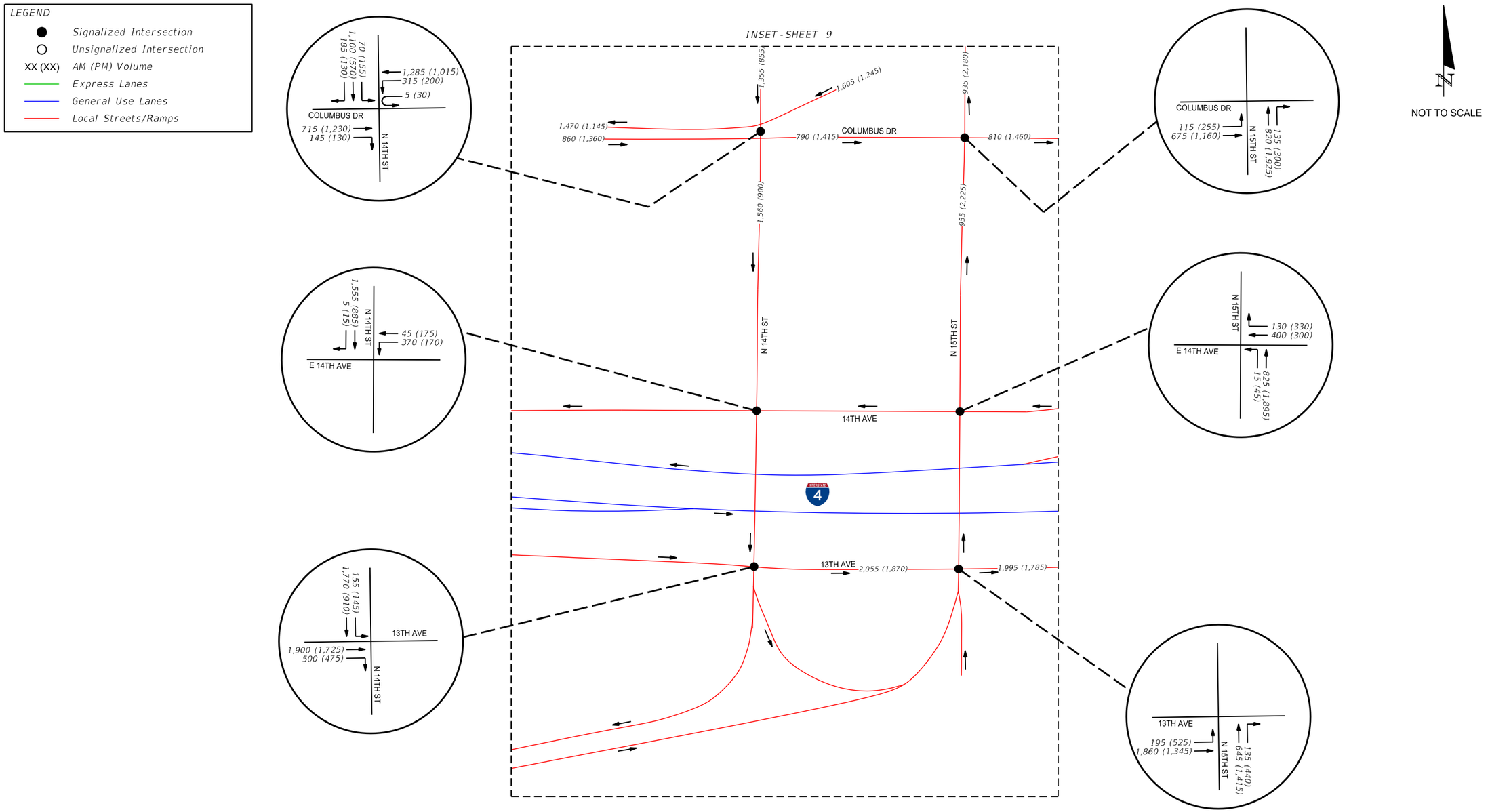
SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

Figure 3-23

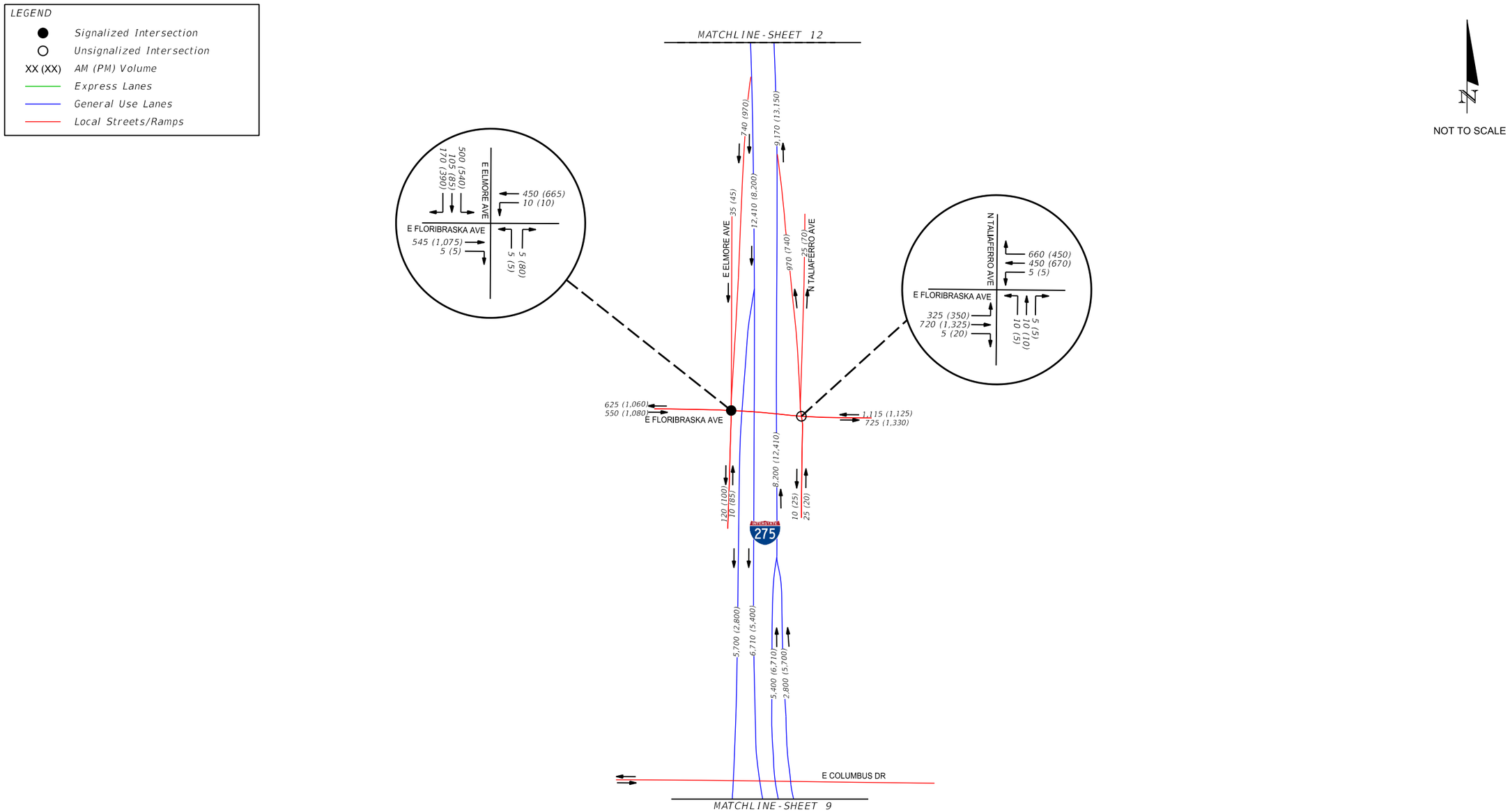
Sheet 9 of 16

WPI # 258337-2



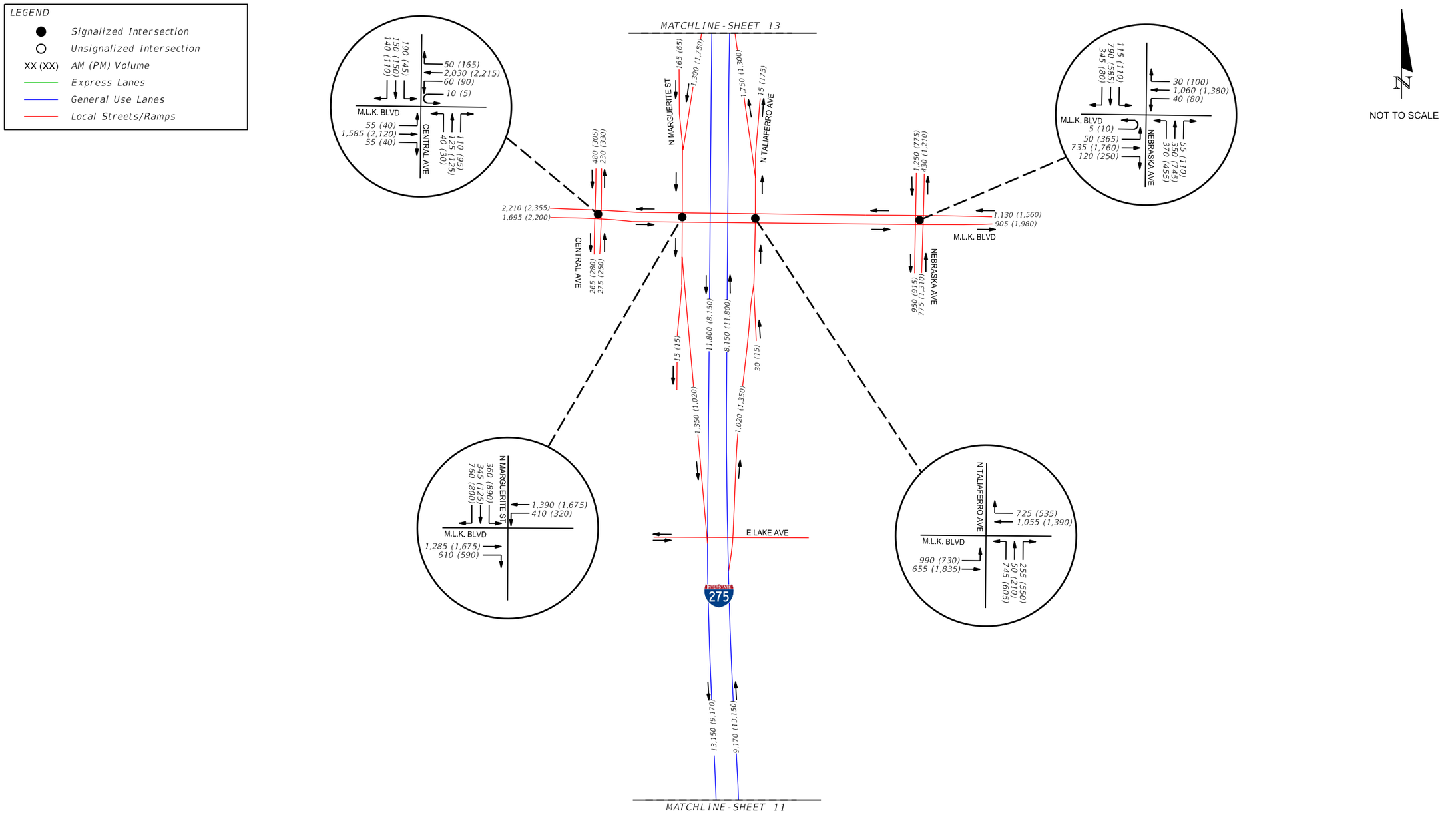
FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 10 of 16

WPI # 258337-2



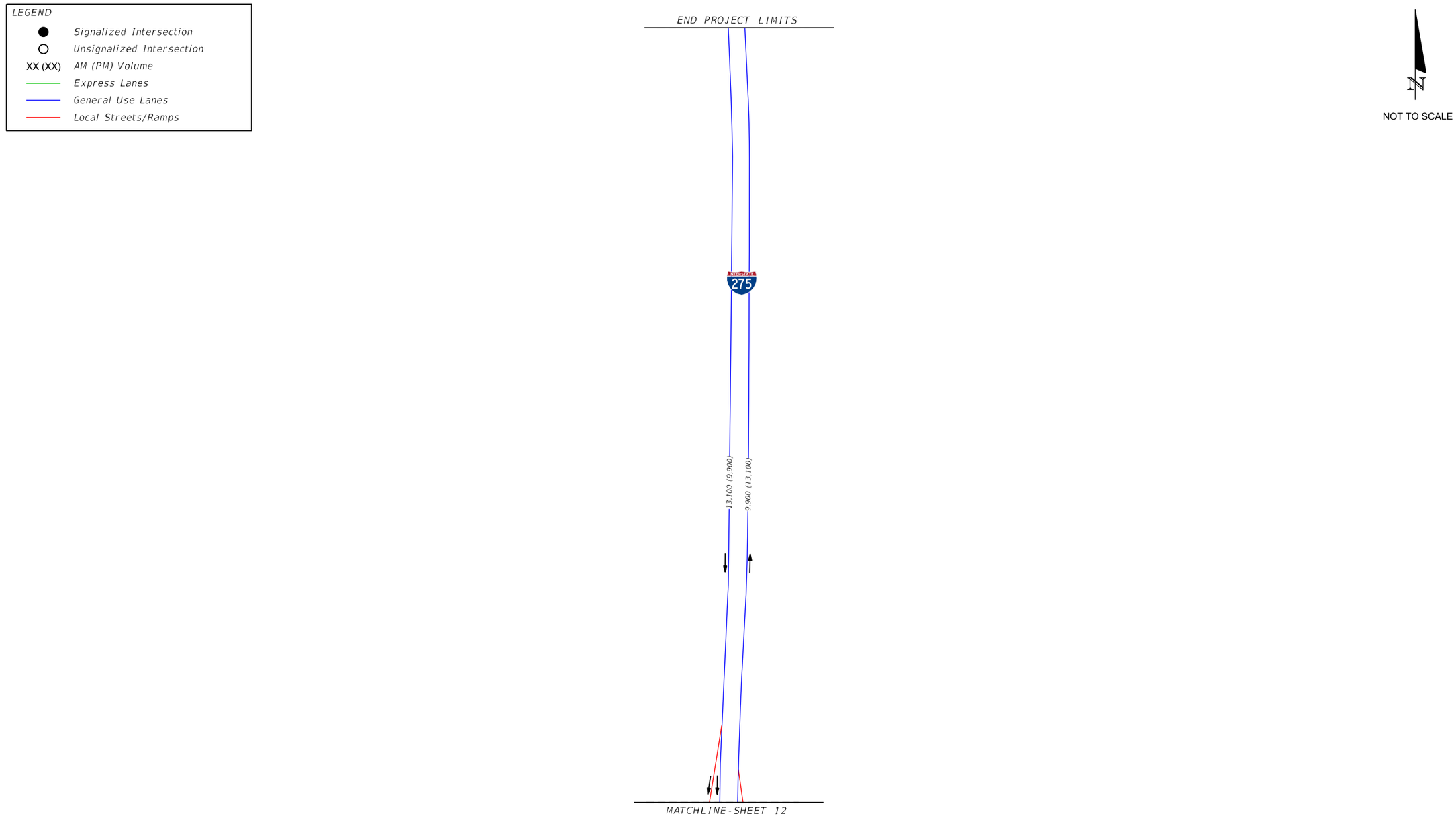
FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 11 of 16

WPI # 258337-2



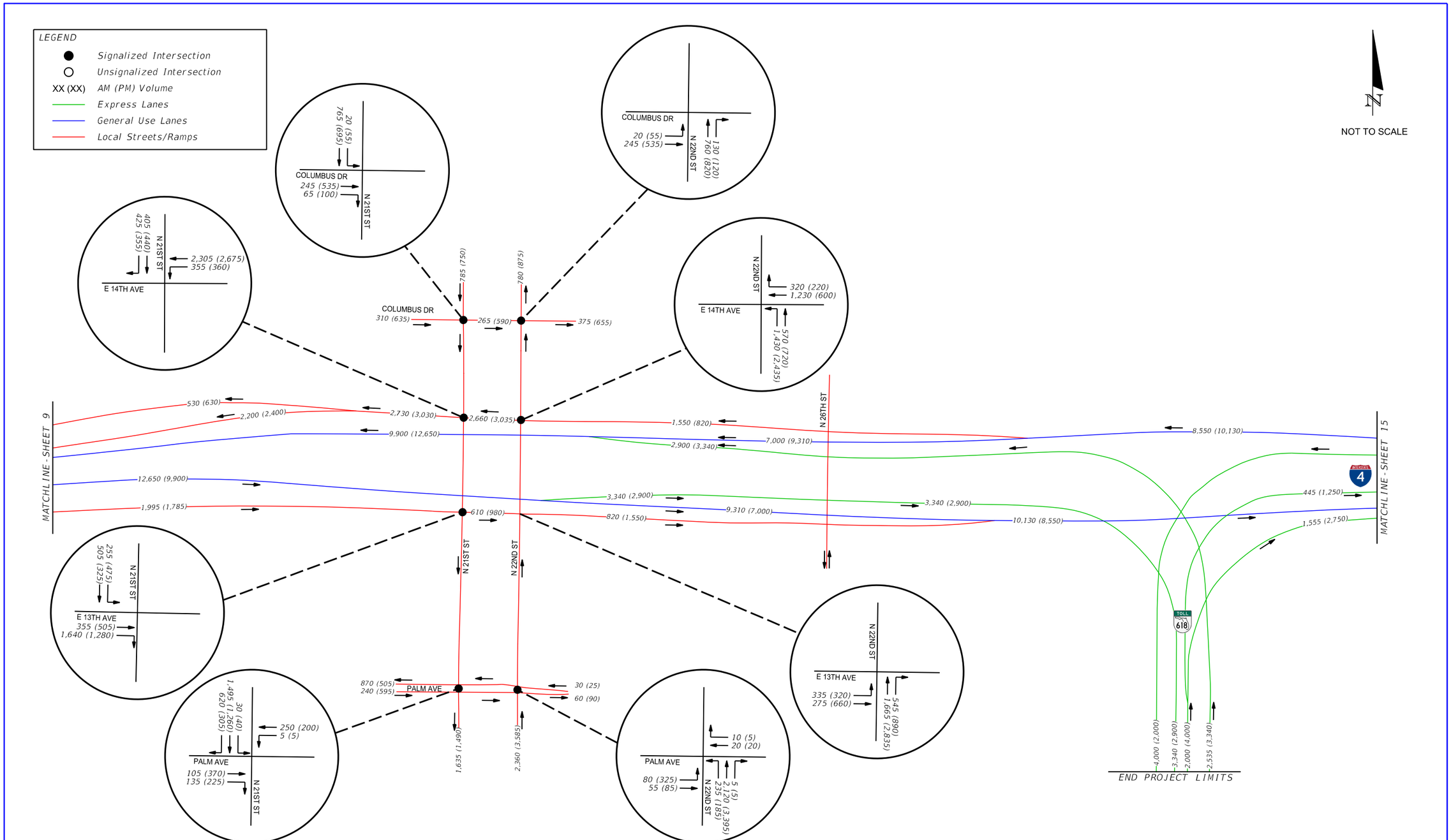
FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 12 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 13 of 16

WPI # 258337-2



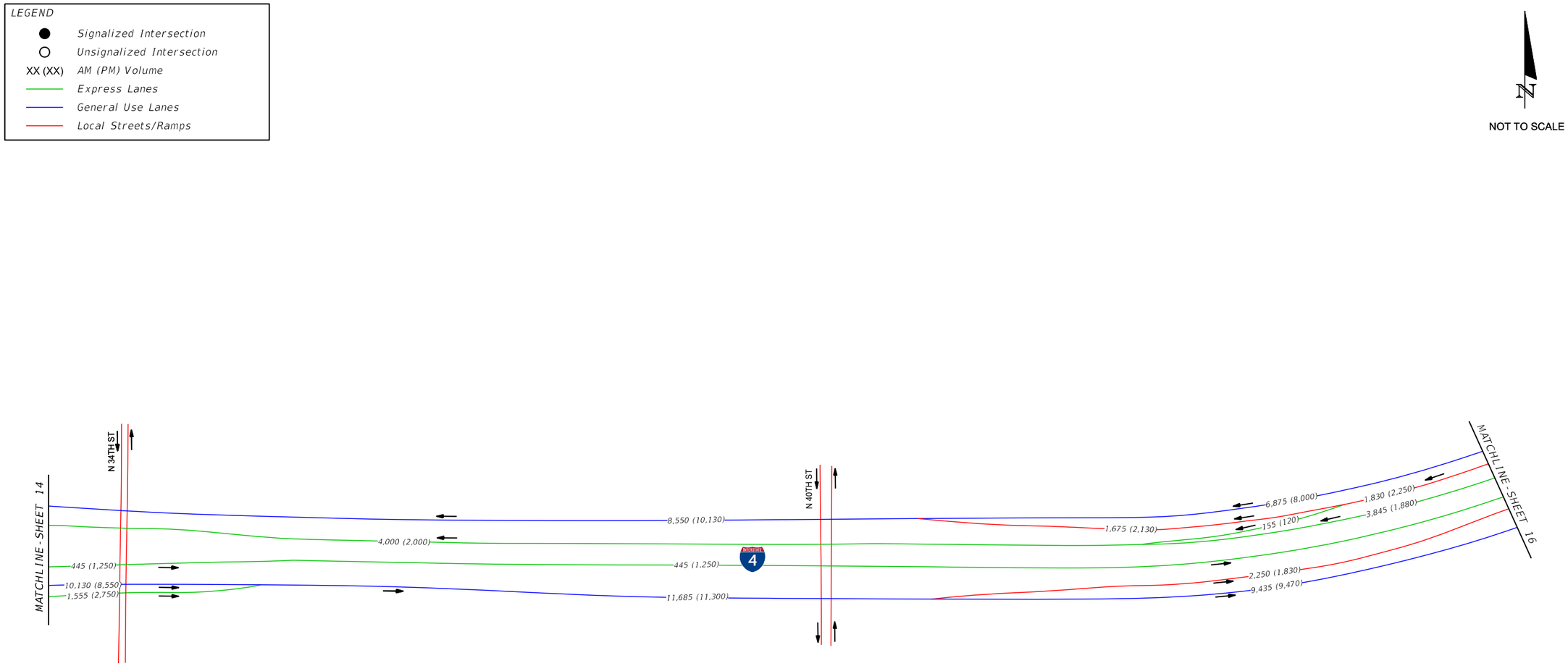
SEIS Re-evaluation

Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs

Figure 3-23

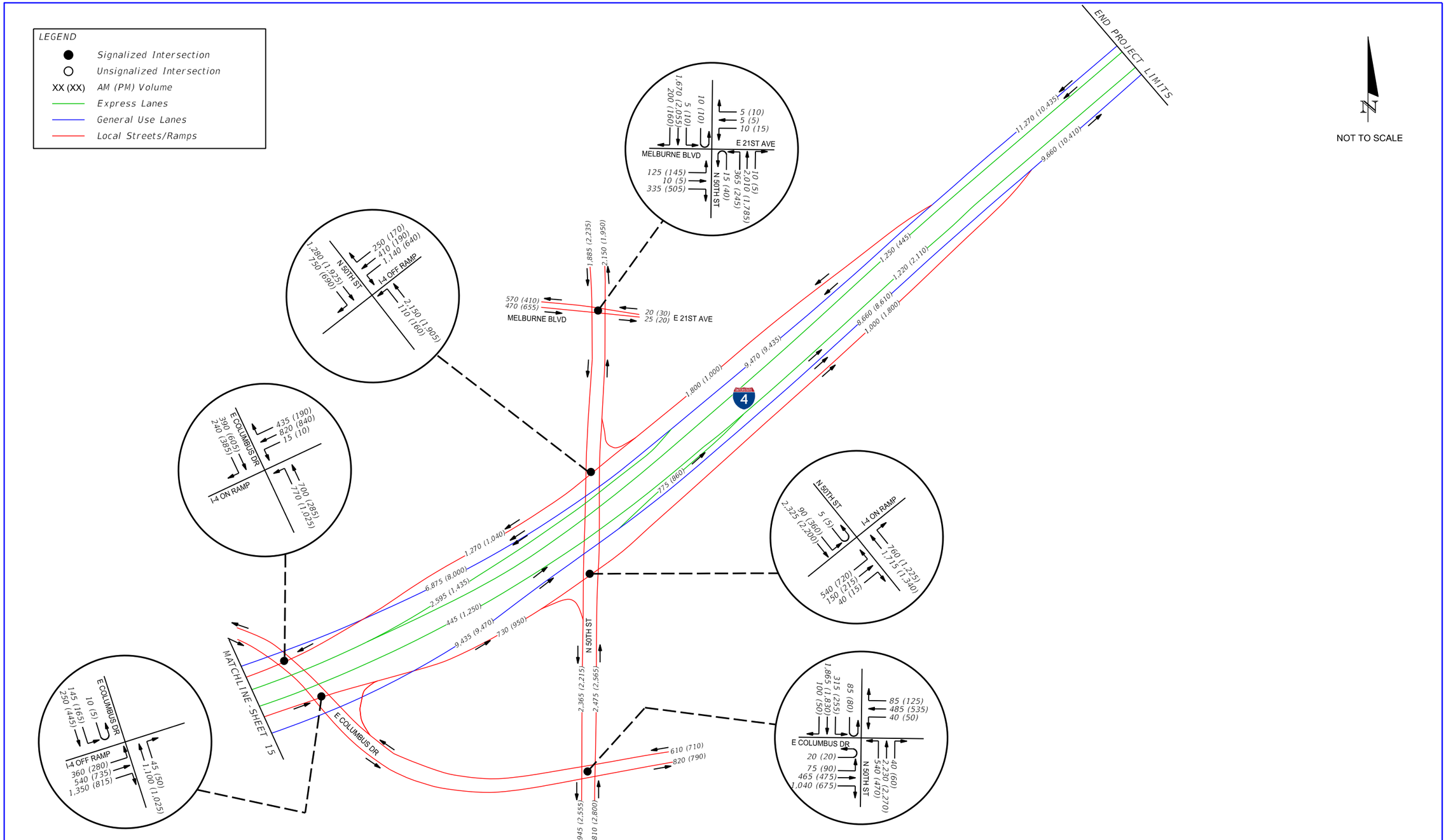
Sheet 14 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 15 of 16

WPI # 258337-2



FDOT	SEIS Re-evaluation Build Alternative – Option E – Design Year (2045) – AM & PM DDHVs	Figure 3-23	Sheet 16 of 16

WPI # 258337-2

3.7 Simulation (CORSIM) Traffic Analysis

The calibrated CORSIM model was used to analyze the NFA and Build alternatives. The model-simulated traffic volumes and traffic measures of effectiveness were reviewed for the NFA and Build alternatives.

3.7.1 Opening Year (2025) Traffic Measures of Effectiveness

The CORSIM models were run 10 times using different random seed numbers to account for potential variations between model runs. The results of the simulation were averaged to ensure that the differences in the results were related to the geometric configuration of the network and control strategies, rather than the randomness of the simulation itself. Overall, multiple runs of the simulation prevent biases in the results due to the stochastic nature of the software. The results of the traffic simulation were used to estimate the traffic operations conditions at the freeway segments within the study area for the year 2025 Opening Year traffic conditions. **Table 3-3 and 3-4** provide the 2025 Opening Year summary matrix for the NFA and Build Options during the AM and PM peak hours.

The CORSIM-estimated freeway traffic throughput, speeds, and densities for the NFA are shown in **Figures 3-24 to 3-27**. The CORSIM-estimated freeway traffic throughput, speeds, and densities for the Build Options A, B, C, D and E are shown in **Figures 3-28 to 3-47**.

The CORSIM model results were used to evaluate the study intersection performance for NFA and all five Build scenarios. Signal timing plans were optimized using Synchro 10 for future year evaluation. It should be noted that the intersection evaluation from CORSIM may not provide an accurate representation of the demand traffic and accounts for bottlenecks that may be present in each of the alternatives. The CORSIM intersection and approach performance results presented in **Appendix S** were used to draw comparison between NFA and Build scenarios for the 2025 Opening Year.

Since the proposed improvements are along I-275, SR 60, and I-4 corridors, roadway geometric conditions at all signalized intersections within the study limits are identical for NFA and for all five Build scenarios. Operational analysis results indicate that the traffic conditions are very similar for NFA and Build conditions during AM and PM peak hours. However, a few study intersections under Build conditions experience more delays compared to NFA conditions. This is primarily due to improved freeway geometry under various Build alternatives that allows more traffic to downstream ramp terminal intersections. Based on visual observation of all Build scenarios, none of the off-ramp queues are expected to extend beyond the gore point and have no significant impacts on freeway operations during AM and PM peak hours, except Dr. MLK, Jr. Boulevard interchange PM peak hour traffic demand significantly exceeds available capacity for a single lane SB off-ramp. This causes long queues that extend beyond the Hillsborough Avenue interchange.

Table 3-3 2025 Alternatives Operations Summary Matrix – AM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between Howard Frankland Bridge & Himes Avenue Interchange	Northbound: • On average, 67 percent of the demand is processed. • Moderate congestion south of SR 60. • Heavy congestion between SR 60 and Himes. • Moderate Congestion near merge to I-275 on Express Lanes. Southbound • On average, 66 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate to heavy congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 82 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion between SR 60 and Lois. • Heavy congestion between Lois and Himes. • No Significant Congestion on Express Lanes. Southbound • On average, 79 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion between Westshore Blvd. and Lois Ave. • Moderate congestion near Dale Mabry Hwy. • No Significant Congestion on Express Lanes. Southbound • On average, 70 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion between Westshore Blvd. and Lois Ave. • Moderate congestion between Dale Mabry Hwy. and Himes Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 61 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion North of Westshore. • No Significant Congestion on Express Lanes. Southbound • On average, 80 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between Himes Avenue & North Boulevard Interchanges	Northbound: • On average, 82 percent of the demand is processed. • Heavy congestion was observed. Southbound • On average, 67 percent of the demand is processed. • Moderate congestion North of Howard Ave.	Northbound: • On average, 98 percent of the demand is processed. • Moderate congestion South of Armenia Ave. and north of North Blvd. • No Significant Congestion on Express Lanes. Southbound • On average, 89 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 97 percent of the demand is processed. • Moderate congestion South of Armenia Ave. and near North Blvd. • No delay on Express Lanes. Southbound • On average, 86 percent of the demand is processed. • Moderate congestion North of Armenia Ave. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 85 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion South of Howard Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 85 percent of the demand is processed. • Moderate congestion near Howard Ave. • No Significant Congestion on Express Lanes.	Northbound: • On average, 96 percent of the demand is processed. • Moderate congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 91 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between North Blvd. & I-4 Interchanges	Northbound: • On average, 84 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 65 percent of the demand is processed. • Moderate congestion near I-4.	Northbound: • On average, 98 percent of the demand is processed. • Moderate congestion near North Blvd. • No Significant Congestion on Express Lanes. Southbound • On average, 89 percent of the demand is processed. • Moderate congestion South of Tampa St. • No Significant Congestion on Express Lanes.	Northbound: • On average, 99 percent of the demand is processed. • Moderate congestion near North Blvd. • No delays on Express Lanes. Southbound • On average, 87 percent of the demand is processed. • Moderate congestion was observed Near North Blvd. Interchange. • No Significant Congestion on Express Lanes.	Northbound: • On average, 91 percent of the demand is processed. • Moderate congestion near Orange Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 83 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion between Tampa St. and I-4. • Moderate congestion near Orange Ave. on Express Lanes. Southbound • On average, 83 percent of the demand is processed. • No significant congestion was observed. • Moderate congestion near Orange Ave. on Express Lanes.	Northbound: • On average, 93 percent of the demand is processed. • Heavy congestion near Florida Ave. • Moderate congestion near Ashley and I-4 interchange. Southbound • On average, 83 percent of the demand is processed. • Moderate congestion near Express Lane entry.

Heavy Congestion: Speeds < 25 mph
Moderate Congestion: Speeds - 25-50 mph
No Significant Congestion: Speeds > 50 mph

Table 3-3 cont'd 2025 Alternatives Operations Summary Matrix – AM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between I-4 & North of Martin Luther King Jr. Boulevard Interchanges	Northbound: • On average, 84 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 71 percent of the demand is processed. • Heavy congestion North of I-4. Moderate congestion near I-4	Northbound: • On average, 100 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 93 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard. • No Significant Congestion on Express Lanes.	Northbound: • On average, 98 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 94 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 83 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 80 percent of the demand is processed. • Moderate congestion near Dr. MLK, Jr. Boulevard.	Northbound: • On average, 98 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 80 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 97 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 81 percent of the demand is processed. • Moderate congestion between MLK and Floribraska. • Heavy congestion North of Dr. MLK, Jr. Boulevard.
I-4 Between I-275 & West of Selmon Connector	Eastbound: • On average, 82 percent of the demand is processed. • Moderate congestion near N 21st/22nd St. Westbound: • On average, 57 percent of the demand is processed. • Heavy congestion was observed.	Eastbound: • On average, 94 percent of the demand is processed. • No significant congestion was observed. • No delay on Express Lanes. Westbound: • On average, 100 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 94 percent of the demand is processed. • No significant congestion was observed. • No delay on Express Lanes. Westbound: • On average, 94 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 97 percent of the demand is processed. • No significant congestion was observed. • No delay on Express Lanes. Westbound: • On average, 100 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 94 percent of the demand is processed. • No significant congestion was observed. • No delay on Express Lanes. Westbound: • On average, 100 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 90 percent of the demand is processed. • Moderate congestion near I-275. Westbound: • On average, 100 percent of the demand is processed. • Moderate congestion near 21st /22nd St.

Heavy Congestion: Speeds < 25 mph
Moderate Congestion: Speeds - 25-50 mph
No Significant Congestion: Speeds > 50 mph

Table 3-4 2025 Alternatives Operations Summary Matrix – PM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between Howard Frankland Bridge & Himes Avenue Interchange	Northbound: • On average, 47 percent of the demand is processed. • Heavy congestion was observed. • Heavy Congestion on Express Lanes. Southbound • On average, 60 percent of the demand is processed. • Moderate congestion between Lois Ave. and SR 60. • No Significant Congestion on Express Lanes.	Northbound: • On average, 97 percent of the demand is processed. • Moderate congestion near Lois Ave., Dale Mabry Hwy., and Himes Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 80 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 99 percent of the demand is processed. • Moderate congestion near Lois Ave., Dale Mabry Hwy., and Himes Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 80 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 98 percent of the demand is processed. • Moderate congestion near Lois Ave. and Dale Mabry Hwy. • No Significant Congestion on Express Lanes. Southbound • On average, 71 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 98 percent of the demand is processed. • Moderate congestion near Lois Ave. and North of Dale Mabry Hwy. • No Significant Congestion on Express Lanes. Southbound • On average, 69 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Heavy congestion between Express Lane egress near Dale Mabry and Himes. • Moderate congestion between Lois and Express Lane egress near Dale Mabry. • No Significant Congestion on Express Lanes. Southbound • On average, 73 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between Himes Avenue & North Boulevard Interchanges	Northbound: • On average, 62 percent of the demand is processed. • Heavy congestion was observed. Southbound • On average, 56 percent of the demand is processed. • Moderate to Heavy congestion near North Blvd.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion South of Armenia Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 84 percent of the demand is processed. • Moderate congestion near North Blvd. • No Significant Congestion on Express Lanes.	Northbound: • On average, 98 percent of the demand is processed. • Moderate congestion South of Armenia Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 82 percent of the demand is processed. • Moderate congestion near North Blvd. • No Significant Congestion on Express Lanes.	Northbound: • On average, 100 percent of the demand is processed. • Moderate congestion near Himes Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 75 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 99 percent of the demand is processed. • Moderate congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 71 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Northbound: • On average, 88 percent of the demand is processed. • Heavy congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 79 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between North Blvd. & I-4 Interchanges	Northbound: • On average, 69 percent of the demand is processed. • Moderate congestion North of Orange Ave. was observed. Southbound • On average, 57 percent of the demand is processed. • Heavy congestion was observed.	Northbound: • On average, 92 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 84 percent of the demand is processed. • Moderate congestion near North Blvd. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 84 percent of the demand is processed. • Moderate congestion South of Tampa St. and near I-4. • No Significant Congestion on Express Lanes.	Northbound: • On average, 95 percent of the demand is processed. • Moderate congestion near Orange Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 76 percent of the demand is processed. • Moderate to Heavy congestion south of I-4. • No Significant Congestion on Express Lanes.	Northbound: • On average, 94 percent of the demand is processed. • Moderate congestion South of Orange Ave. • No Significant Congestion on Express Lanes. Southbound • On average, 72 percent of the demand is processed. • Moderate congestion near Orange Ave. • Moderate Congestion near Orange Ave. on Express Lanes.	Northbound: • On average, 84 percent of the demand is processed. • Heavy congestion South of Orange. • Moderate congestion North of Orange. Southbound • On average, 84 percent of the demand is processed. • Moderate congestion was observed.

Heavy Congestion: Speeds < 25 mph
Moderate Congestion: Speeds - 25-50 mph
No Significant Congestion: Speeds > 50 mph

Table 3-4 cont'd 2025 Alternatives Operations Summary Matrix – PM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between I-4 & North of Martin Luther King Jr. Boulevard Interchanges	Northbound: • On average, 69 percent of the demand is processed. • Moderate congestion near I-4. Southbound • On average, 93 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 87 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 79 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard. • No Significant Congestion on Express Lanes.	Northbound: • On average, 89 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard. Southbound • On average, 78 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 89 percent of the demand is processed. • Moderate congestion near MLK. Southbound • On average, 79 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 86 percent of the demand is processed. • Moderate to heavy congestion North of I-4. Southbound • On average, 80 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 79 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 96 percent of the demand is processed. • No significant congestion was observed.
I-4 Between I-275 & West of Selmon Connector	Eastbound: • On average, 71 percent of the demand is processed. • No significant congestion was observed. Westbound: • On average, 23 percent of the demand is processed. • Heavy congestion was observed.	Eastbound: • On average, 89 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Westbound: • On average, 96 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 89 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Westbound: • On average, 96 percent of the demand is processed. • Moderate congestion between Selmon Connector and I-275. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 97 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Westbound: • On average, 88 percent of the demand is processed. • Heavy congestion was observed. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 94 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes. Westbound: • On average, 77 percent of the demand is processed. • Heavy congestion between Selmon Connector and I-275. • Moderate congestion near 50th St. • No Significant Congestion on Express Lanes.	Eastbound: • On average, 93 percent of the demand is processed. • No significant congestion was observed. Westbound: • On average, 81 percent of the demand is processed. • Heavy congestion was observed.

Heavy Congestion: Speeds < 25 mph
Moderate Congestion: Speeds - 25-50 mph
No Significant Congestion: Speeds > 50 mph

Figure 3-24 I-275 NB Analysis Summary – 2025 No Further Action (NFA)

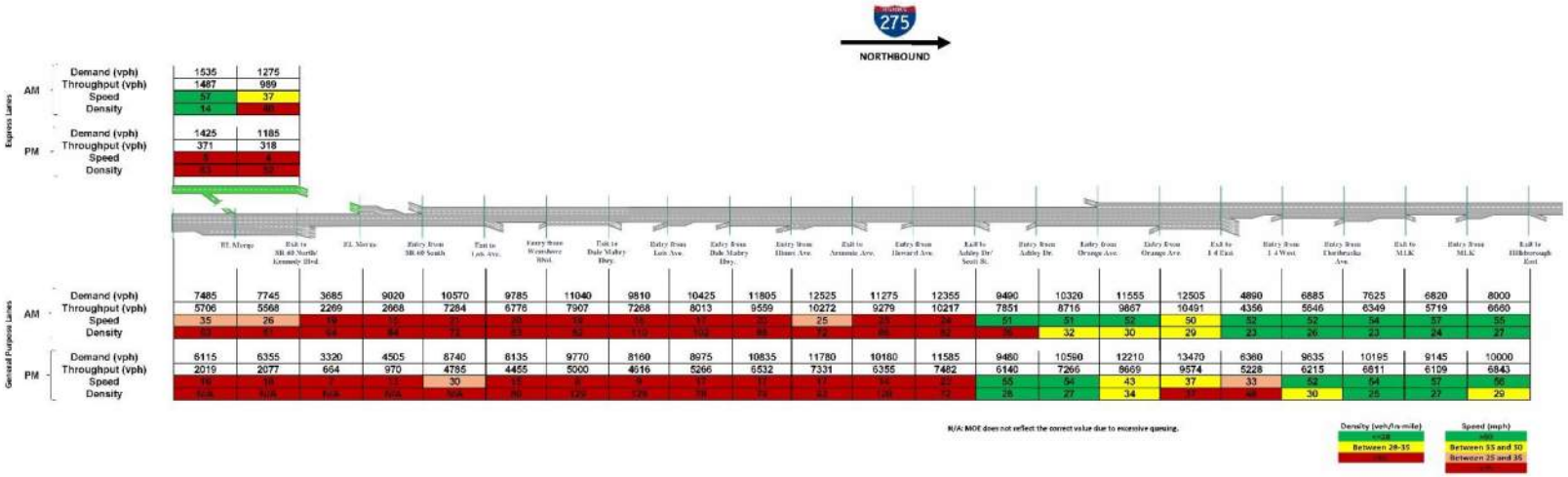


Figure 3-25 I-275 SB Analysis Summary – 2025 No Further Action (NFA)

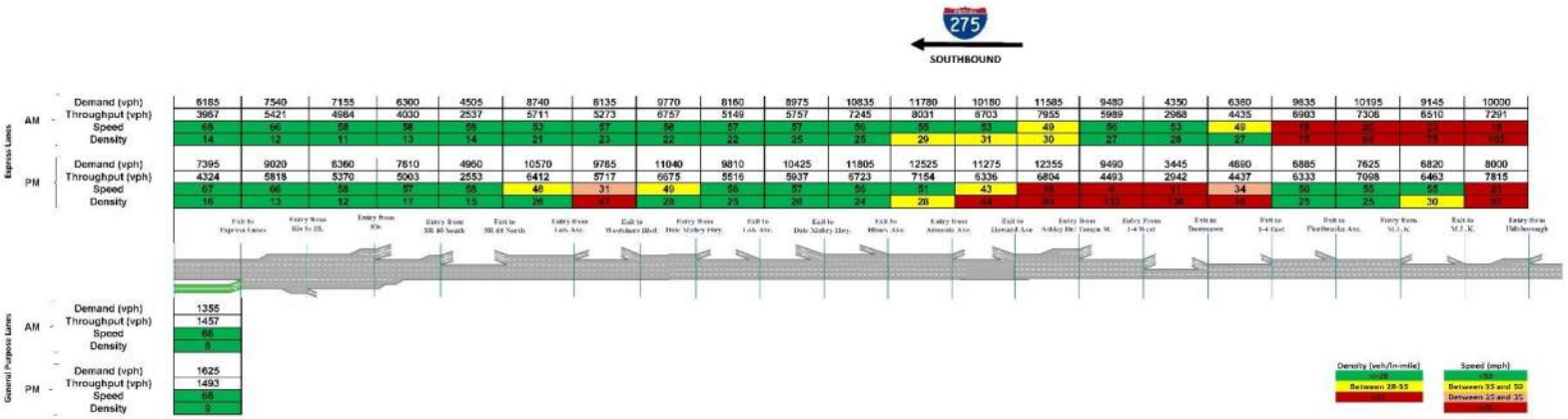
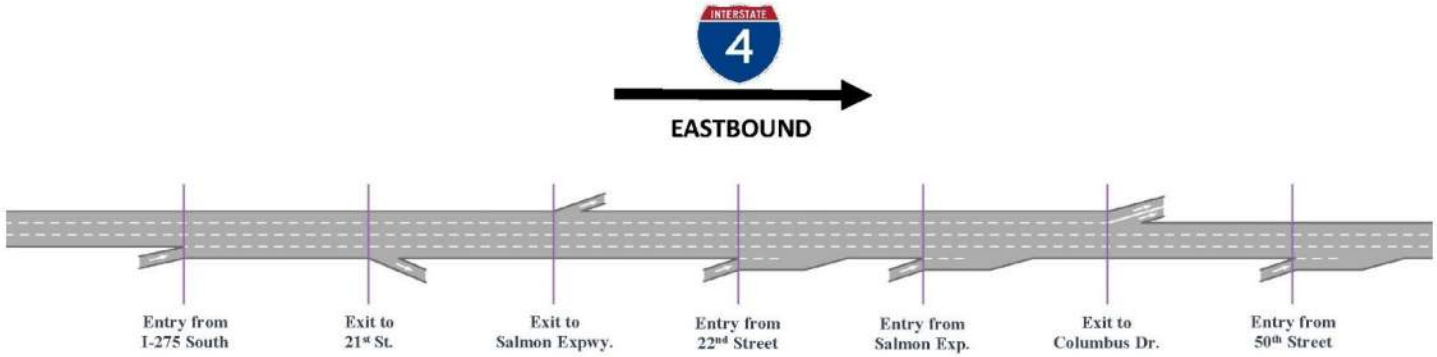


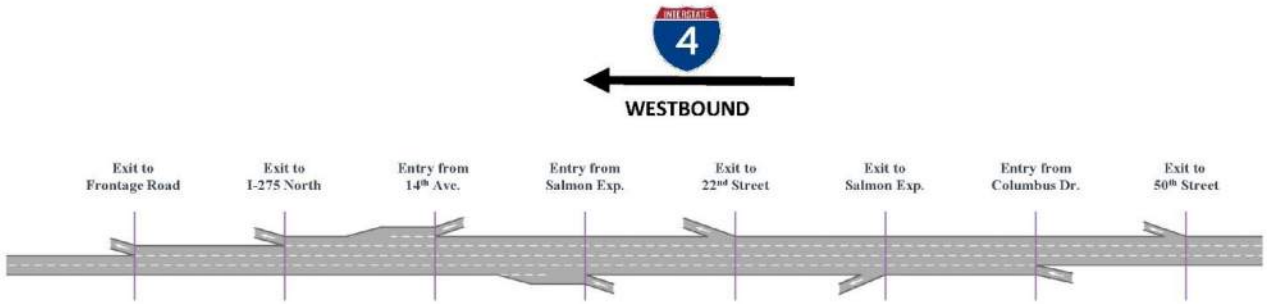
Figure 3-26 I-4 EB Analysis Summary – 2025 No Further Action (NFA)



		Entry from I-275 South	Exit to 21st St.	Exit to Salmon Expwy.	Entry from 22nd Street	Entry from Salmon Exp.	Exit to Columbus Dr.	Entry from 50th Street
AM	Demand (vph)	10890	9235	6805	7465	8725	7030
	Throughput (vph)	8605	7546	5724	6268	7533	6006
	Speed	50	49	57	57	51	55
	Density	41	38	24	25	33	35
PM	Demand (vph)	9105	7645	5555	6605	8825	7570
	Throughput (vph)	6238	5418	4050	4724	6948	5704
	Speed	53	55	58	57	52	54
	Density	29	25	18	19	32	35

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-27 I-4 WB Analysis Summary – 2025 No Further Action (NFA)



		Exit to Frontage Road	Exit to I-275 North	Entry from 14th Ave.	Entry from Salmon Exp.	Exit to 22nd Street	Exit to Salmon Exp.	Entry from Columbus Dr.	Exit to 50th Street
AM	Demand (vph)	7110	9105	7645	5555	6605	8825	7570
	Throughput (vph)	4262	5533	4533	2960	3522	4923	4122
	Speed	20	19	14	7	9	14	16
	Density	69	65	76	104	100	89	101
PM	Demand (vph)	7615	10890	9235	6805	7465	8725	7030
	Throughput (vph)	2021	3014	1999	1413	1568	1841	1592
	Speed	5	8	11	8	7	7	8
	Density	151	90	41	44	60	74	80

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-28 I-275 NB Analysis Summary – 2025 Build Option A

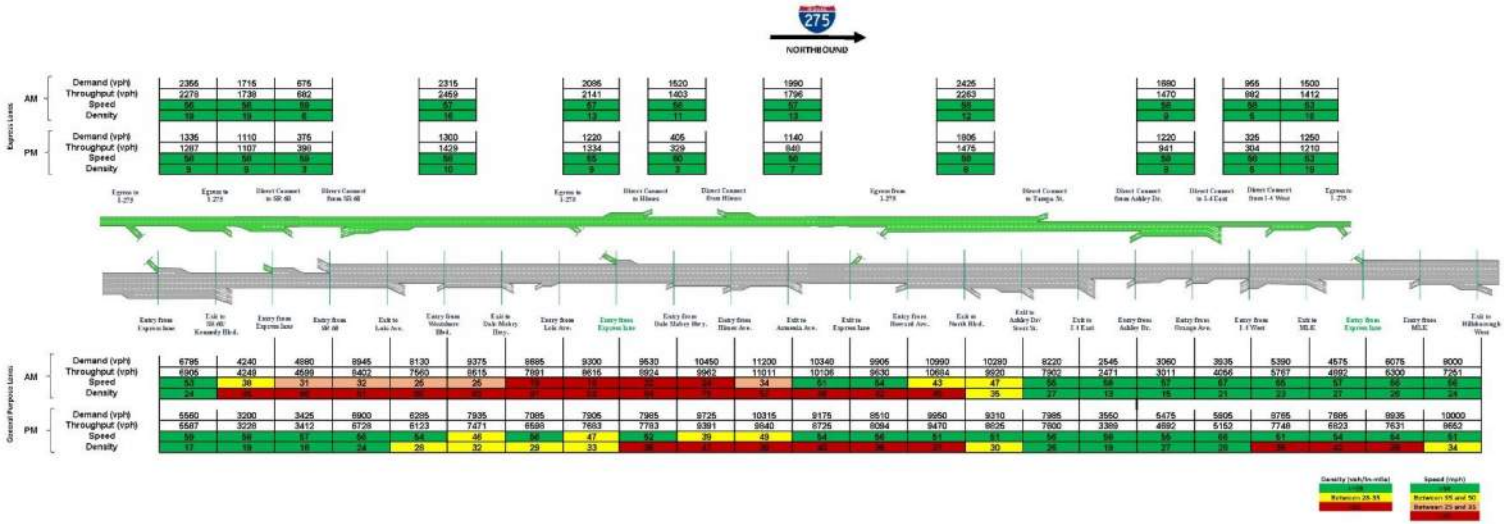
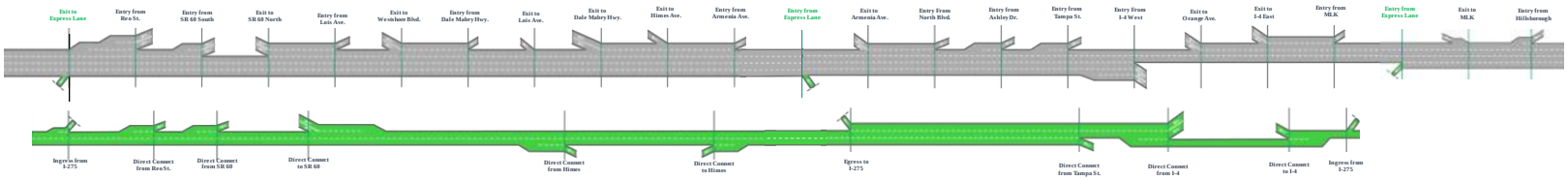


Figure 3-29 I-275 SB Analysis Summary – 2025 Build Option A

General Purpose Lanes

AM	Demand (vph)	5410	4405	3505	6980	6365	8015	7165	7985	9725	10315	9175	8510	9950	9310	8240	7985	3550	5905	8765	7685	8935	10000
	Throughput (vph)	4092	3175	2352	5554	5108	6875	5979	6814	8791	9524	8030	7207	9116	8477	7337	7112	3133	5254	7907	7131	8361	9582
	Speed	63	58	58	53	56	55	57	56	54	53	52	56	46	30	45	55	57	53	52	54	48	29
	Density	12	12	12	19	20	22	24	27	29	32	33	29	35	50	34	25	25	29	34	39	38	62
PM	Demand (vph)	7125	6680	5110	9175	8360	9605	8915	9530	10450	11200	10340	9905	10990	10280	8570	8220	2545	3935	5390	4575	6075	8000
	Throughput (vph)	5439	5042	3616	7364	6678	7917	7251	7798	8803	9659	8555	8035	9469	8762	7608	7304	1920	2986	4126	3590	4798	6389
	Speed	62	57	57	52	55	55	56	55	55	54	52	55	47	35	52	56	59	56	57	57	54	19
	Density	18	21	21	28	30	29	32	34	31	36	39	36	40	51	34	28	17	18	18	21	22	77



Express Lanes

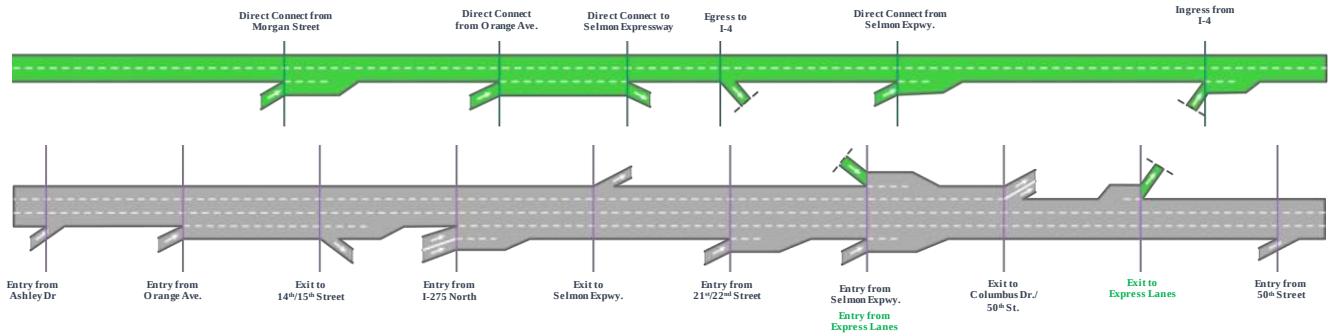
AM	Demand (vph)	1485	1030		295		1220			405		1140			1805			1220		325		1250
	Throughput (vph)	1152	727		693		886			409		1218			2043			1475		324		1231
	Speed	58	57		58		58			59		57			58			58		58		56
	Density	8	5		5		6			3		9			11			10		5		11
PM	Demand (vph)	2015	1485		445		2085			1520		1990			2425			1680		955		1500
	Throughput (vph)	1614	1128		1470		1472			1470		1969			2489			1765		773		1210
	Speed	58	56		58		58			58		57			58			57		56		56
	Density	13	8		12		12			13		16			14			13		14		12

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-30 I-4 EB Analysis Summary – 2025 Build Option A

EASTBOUND

Express Lanes	AM	Demand (vph)	1325	2250	1655	1225	1525
		Throughput (vph)	1007	1913	743	635	946
		Speed	45	56	59	59	59
		Density	10	10	6	5	7
	PM	Demand (vph)	1480	2025	1660	1380	1990
		Throughput (vph)	1080	1519	803	735	1400
		Speed	51	57	59	59	58
		Density	9	9	7	6	11



General Purpose Lanes	AM	Demand (vph)	5780	6290	5375	7160	5280	6145	7605	5780	5605
		Throughput (vph)	5442	5799	5123	6760	4986	5781	6869	5273	5109
		Speed	54	57	48	53	58	56	53	56	56
		Density	28	23	28	28	20	22	26	28	28
	PM	Demand (vph)	4865	5335	4315	5390	3645	4765	7050	5800	5605
		Throughput (vph)	4242	4694	3995	4832	3300	4218	5889	5073	4912
		Speed	56	57	49	56	58	57	53	56	56
		Density	23	20	23	21	14	17	23	28	29

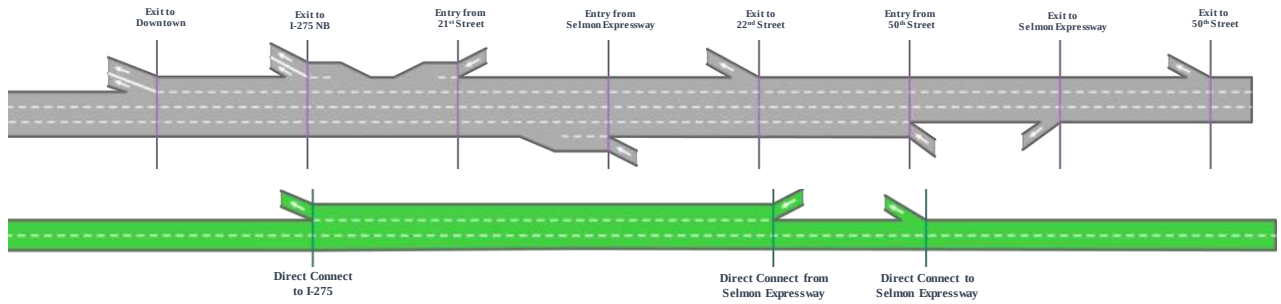
Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-31 I-4 WB Analysis Summary – 2025 Build Option A

WESTBOUND

General Purpose Lanes

AM	Demand (vph)	5335	6410	5390	3645	4765	3685	5520
	Throughput (vph)	5048	6438	5341	3596	4771	3852	5620
	Speed	56	55	56	58	56	62	57
	Density	20	21	20	14	19	19	30
PM	Demand (vph)	6290	8075	7160	5280	6145	4515	5350
	Throughput (vph)	6187	7914	6860	4973	5838	4568	5377
	Speed	54	50	51	57	56	61	59
	Density	28	31	31	22	26	25	30



Express Lanes

AM	Demand (vph)	1480	2025	1660	2270
	Throughput (vph)	1496	2021	1657	2271
	Speed	48	57	58	56
	Density	15	11	14	19
PM	Demand (vph)	1325	2250	1655	1955
	Throughput (vph)	1352	2259	1675	1955
	Speed	48	57	57	57
	Density	14	13	14	16

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-32 I-275 NB Analysis Summary – 2025 Build Option B

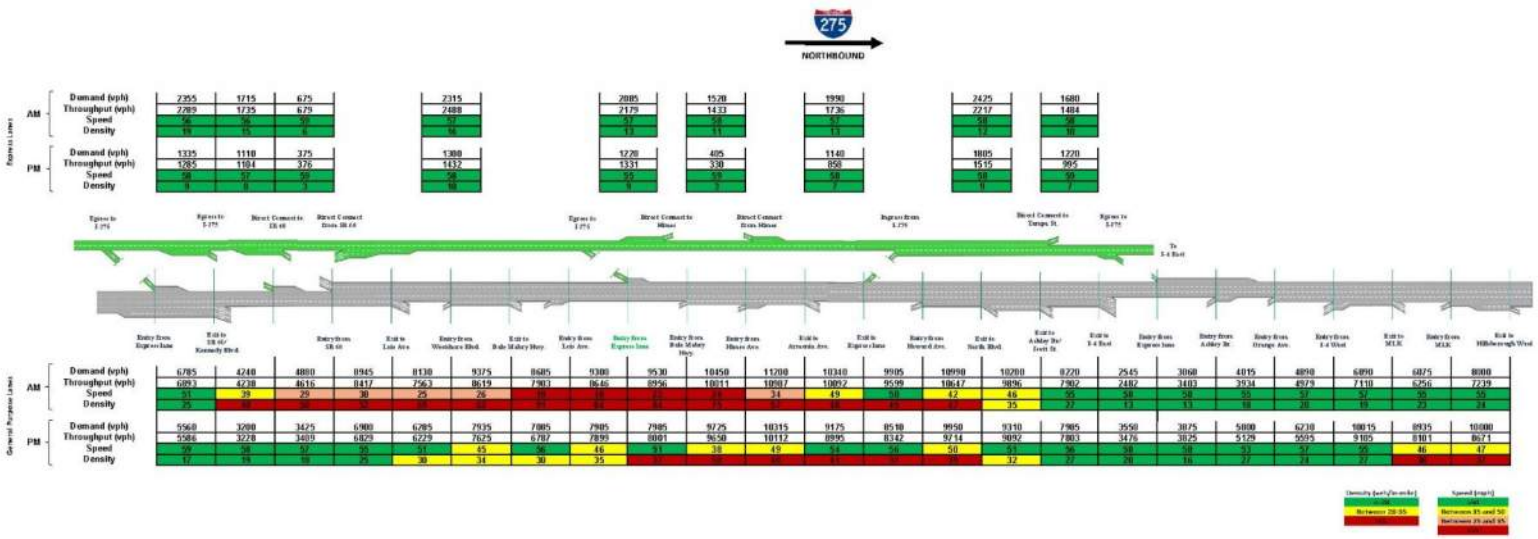
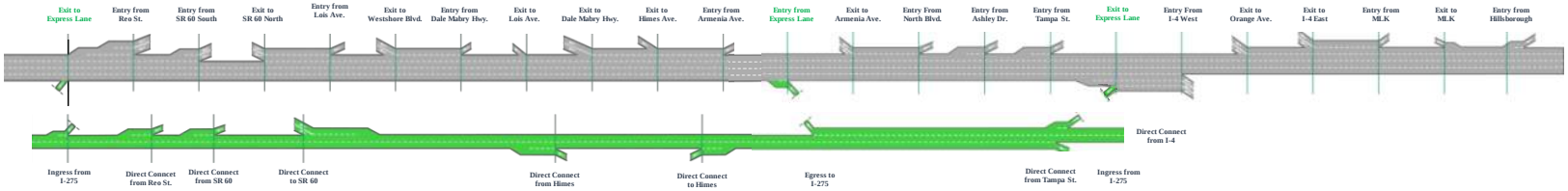


Figure 3-33 I-275 SB Analysis Summary – 2025 Build Option B

General Purpose Lanes

AM	Demand (vph)	5410	4405	3505	6980	6365	8015	7165	7985	9725	10315	9175	8510	9950	9310	8240	7985	8310	3875	6230	10015	8935	10000
	Throughput (vph)	4073	3116	2277	5386	4938	6648	5752	6549	8488	9190	7731	6894	8700	8065	6929	6714	7276	3493	5660	9173	8383	9608
	Speed	63	58	58	53	56	55	57	56	54	53	52	56	47	36	53	56	56	58	54	51	55	47
	Density	12	11	12	18	20	22	23	26	28	31	32	28	33	42	27	25	20	18	23	32	33	40
PM	Demand (vph)	7125	6680	3505	9175	8360	9605	8915	9530	10450	11200	10340	9905	10990	10280	8570	8220	9175	3500	4890	6890	6075	8000
	Throughput (vph)	5412	5014	3556	7241	6542	7767	7064	7611	8581	9438	8344	7855	9297	8589	7429	7126	7878	2670	3699	5275	4737	6385
	Speed	62	57	57	52	55	55	56	56	55	54	53	55	46	33	48	54	34	58	56	57	57	21
	Density	18	20	20	27	29	28	31	33	30	35	37	35	40	53	35	30	38	15	16	18	21	71



Express Lanes

AM	Demand (vph)	1485	1030		295		1220			405			1140			1805			1220	895			
	Throughput (vph)	1155	715		650		834			383			1158			2001			1442	571			
	Speed	58	56		58		58			59			57			58			59	59			
	Density	8	5		5		6			3			9			11			8	7			
PM	Demand (vph)	2015	1485		445		2085			1520			1990			2425			1680	725			
	Throughput (vph)	1607	1117		224		1199			1201			1654			2142			1424	755			
	Speed	58	56		60		58			58			57			58			58	59			
	Density	13	8		2		10			10			14			12			9	6			

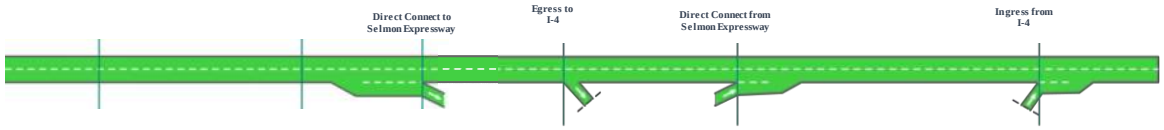
Density (veh/lin-mile)	Speed (mph)
LOS A	LOS A
Between 28-35	Between 35 and 50
LOS F	Between 25 and 35
	LOS F

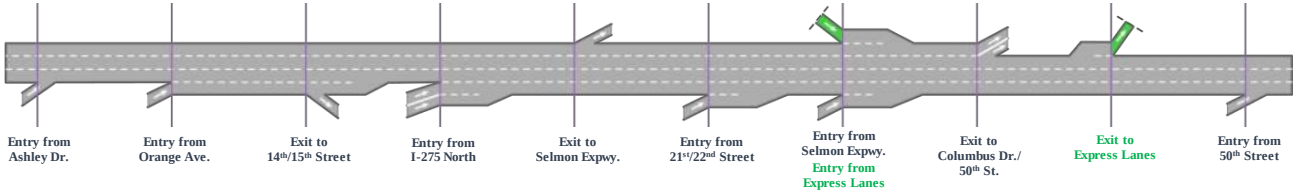
Figure 3-34 I-4 EB Analysis Summary – 2025 Build Option B

EASTBOUND

Express Lanes

AM	Demand (vph)	1325	730	300		600
	Throughput (vph)	985	294	184		495
	Speed	53	59	59		59
	Density	8	2	1		4
PM	Demand (vph)	1480	1115	835		1445
	Throughput (vph)	1088	615	542		1196
	Speed	53	59	59		58
	Density	9	5	5		10





General Purpose Lanes

AM	Demand (vph)	5780	6290	5375	8085	6205	7070	8530	6705	6530
	Throughput (vph)	5426	5784	5130	7662	5833	6619	7714	6169	5844
	Speed	54	57	48	52	57	55	48	55	56
	Density	28	23	28	32	23	26	32	33	32
PM	Demand (vph)	4865	5335	4315	5935	4190	5310	7595	6345	6150
	Throughput (vph)	4363	4806	4082	5349	3760	4654	6342	5600	5427
	Speed	56	57	49	55	58	57	52	56	54
	Density	23	20	24	23	16	19	26	32	33

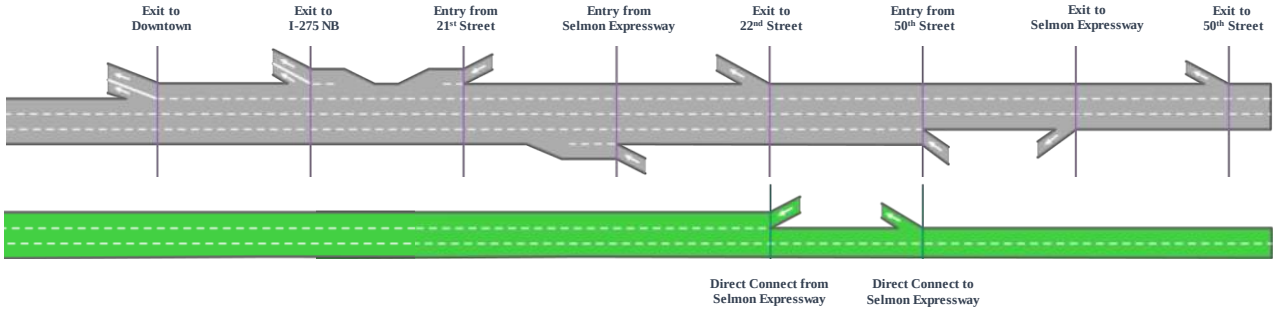
Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-35 I-4 WB Analysis Summary – 2025 Build Option B

WESTBOUND

General Purpose Lanes

AM	Demand (vph)	5335	6955	5935	4190	5310	4230	6065
	Throughput (vph)	4777	6637	5589	3829	4873	3956	5507
	Speed	56	55	55	58	57	62	49
	Density	20	22	22	16	20	20	35
PM	Demand (vph)	6290	9000	8085	6205	7070	5440	6275
	Throughput (vph)	6066	8828	7758	5873	6762	5488	6291
	Speed	55	48	47	54	55	61	57
	Density	27	36	37	26	30	29	36



Express Lanes

AM	Demand (vph)	1480	1115	1725
	Throughput (vph)	1475	1123	1726
	Speed	59	58	57
	Density	8	9	15
PM	Demand (vph)	1325	730	1030
	Throughput (vph)	1316	728	1030
	Speed	59	59	58
	Density	7	6	8

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-36 I-275 NB Analysis Summary – 2025 Build Option C

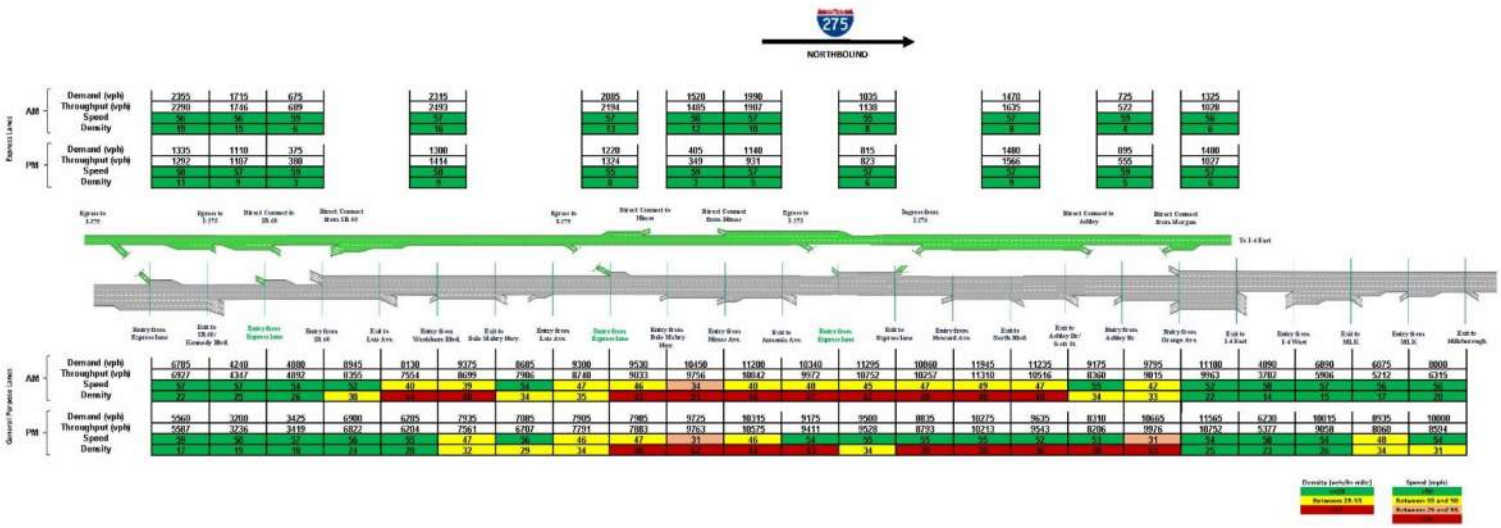


Figure 3-37 I-275 SB Analysis Summary – 2025 Build Option C

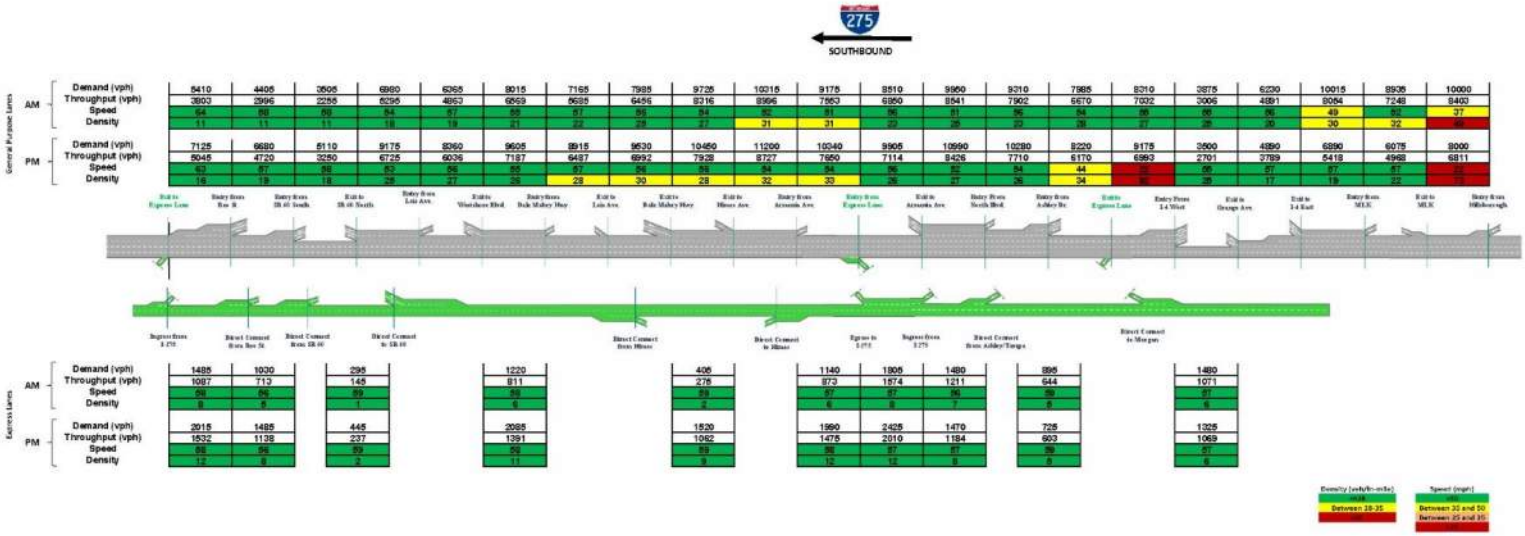
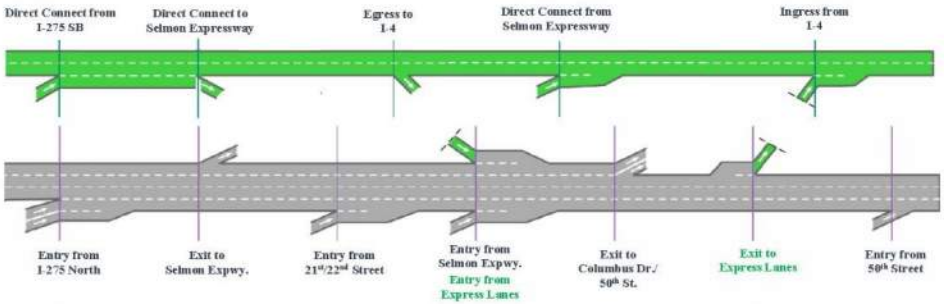


Figure 3-38 I-4 EB Analysis Summary – 2025 Build Option C

EASTBOUND

Express Lanes

AM	Demand (vph)	2250	1655	1225	1525
	Throughput (vph)	1809	1163	782	1096
	Speed	57	58	59	59
	Density	10	9	6	8
PM	Demand (vph)	2025	1660	1380	1990
	Throughput (vph)	1482	1106	878	1557
	Speed	58	58	59	58
	Density	8	9	7	12



General Purpose Lanes

AM	Demand (vph)	7160	5280	6575	7605	5780	5605
	Throughput (vph)	6857	5235	6446	7464	5604	5425
	Speed	54	58	57	50	56	56
	Density	26	21	21	30	29	29
PM	Demand (vph)	5390	3645	5045	7050	5800	5605
	Throughput (vph)	5184	3664	4748	6690	5368	5208
	Speed	56	58	57	53	56	55
	Density	20	15	16	27	30	30

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-39 I-4 WB Analysis Summary – 2025 Build Option C

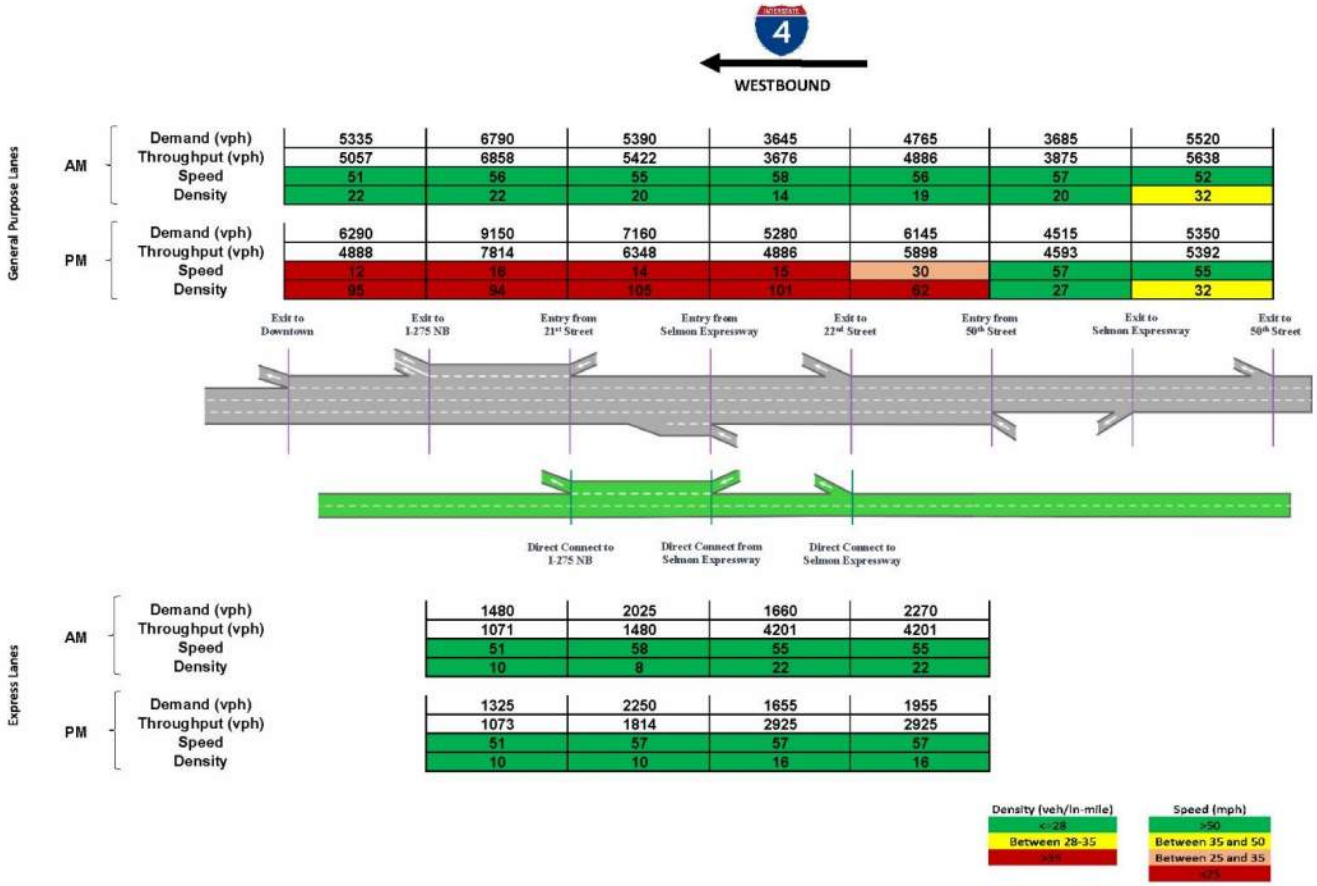


Figure 3-40 I-275 NB Analysis Summary – 2025 Build Option D

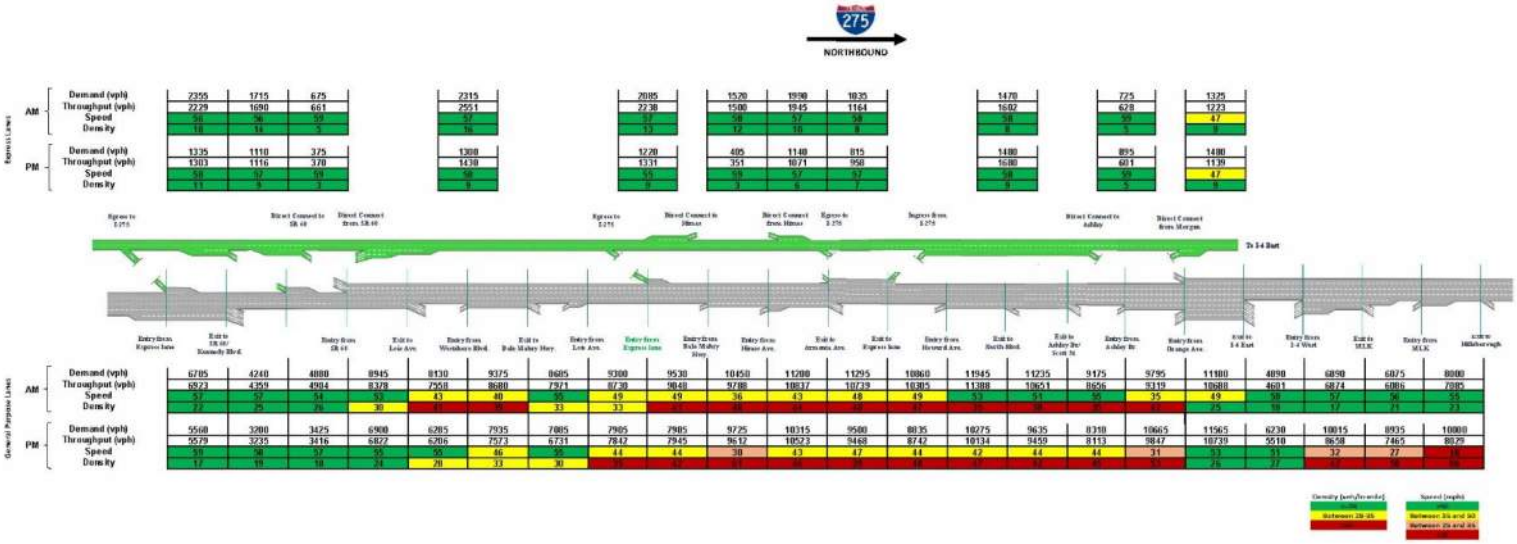


Figure 3-41 I-275 SB Analysis Summary – 2025 Build Option D

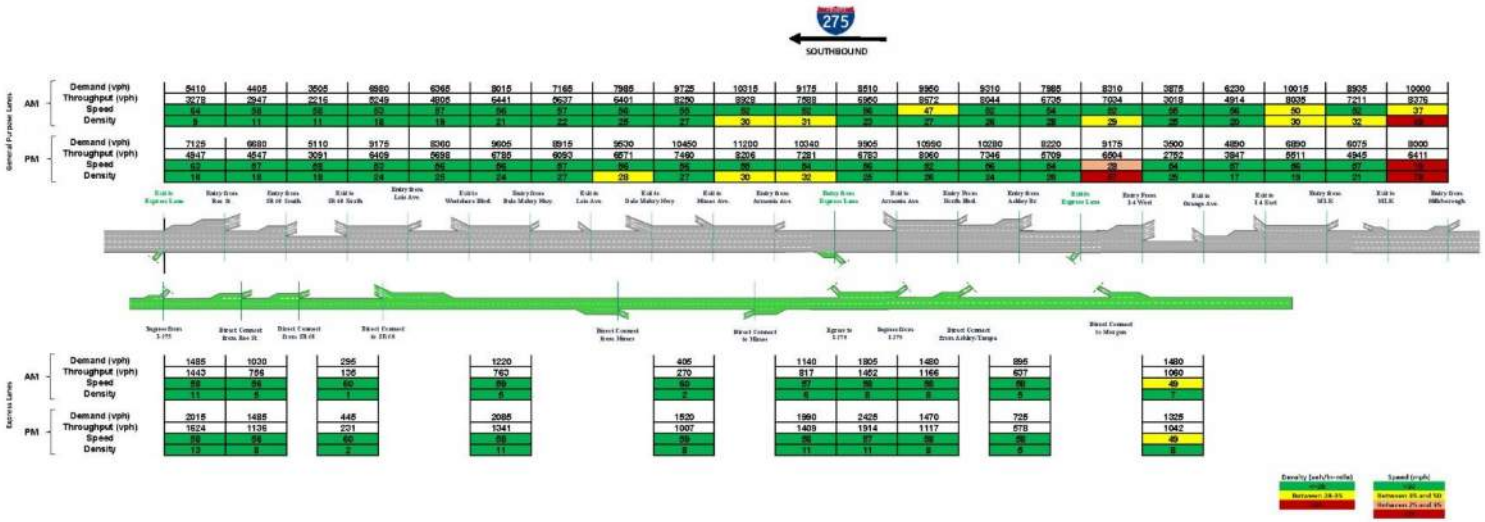


Figure 3-42 I-4 EB Analysis Summary – 2025 Build Option D

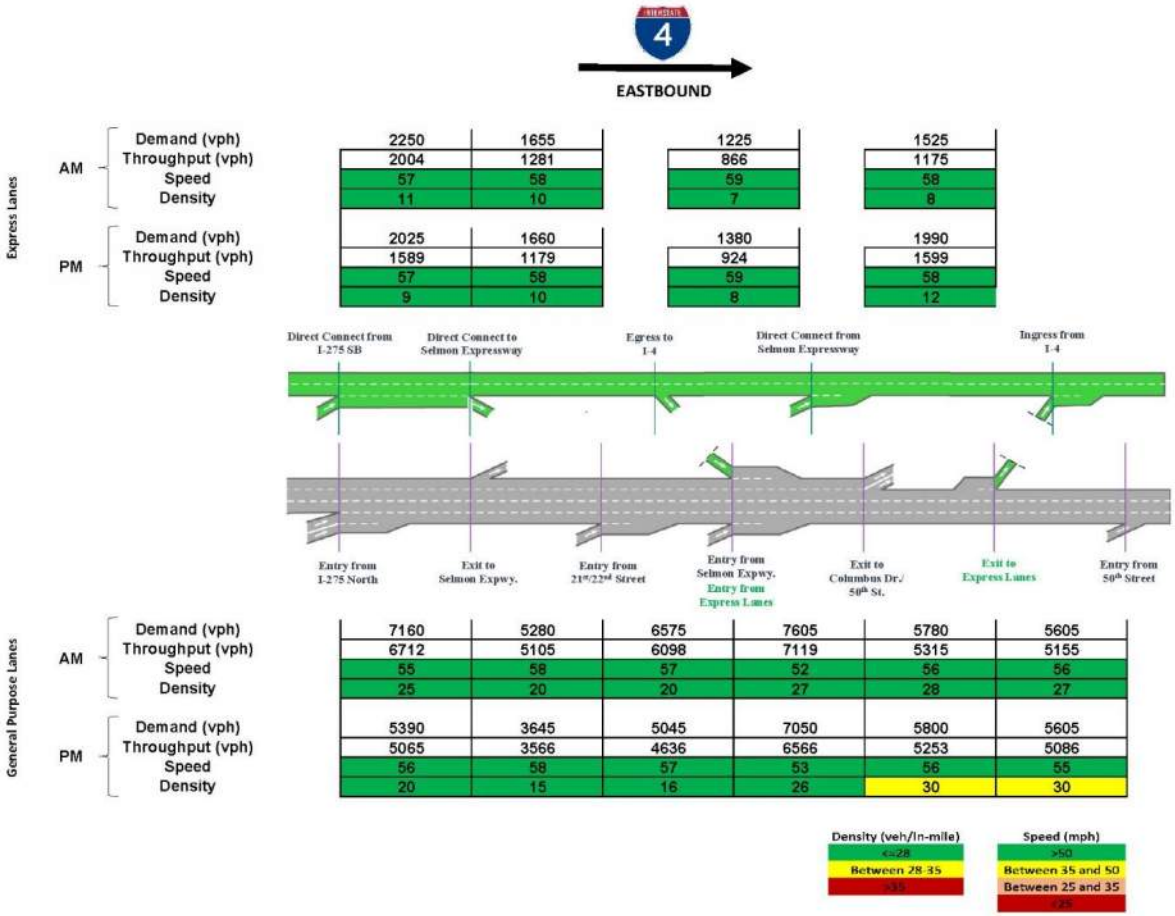


Figure 3-43 I-4 WB Analysis Summary – 2025 Build Option D

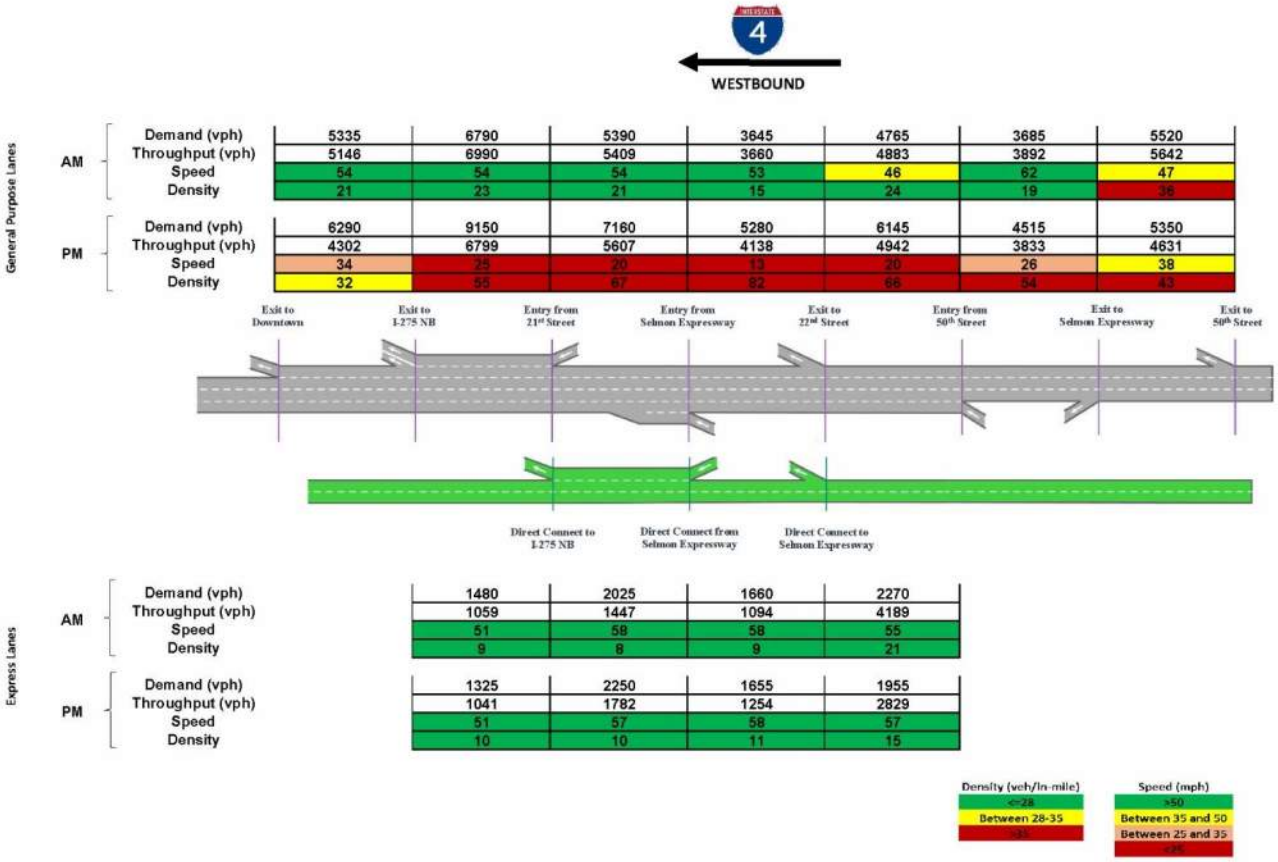
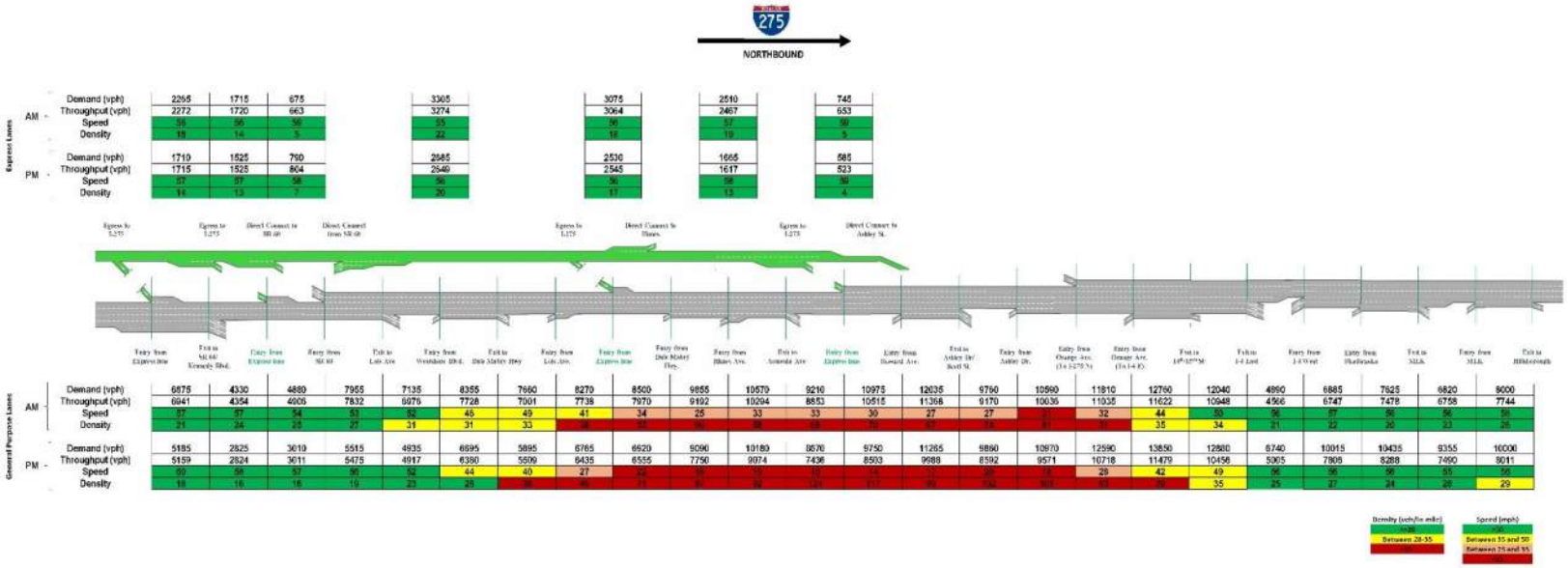


Figure 3-44 I-275 NB Analysis Summary – 2025 Build Option E



Express Lanes																									
AM	Demand (vph)	2265	1715	675		3365				3075				2510				745							
	Throughput (vph)	2272	1720	663		3274				3064				2467				653							
	Speed	59	56	56		55				56				57				59							
	Density	19	14	5		22				18				19				5							
PM	Demand (vph)	1710	1525	760		2585				2530				1665				585							
	Throughput (vph)	1715	1525	804		2549				2545				1617				523							
	Speed	57	57	58		56				56				58				59							
	Density	14	13	7		20				17				13				4							

General Purpose Lanes																									
AM	Demand (vph)	6875	4330	4880	7955	7135	8355	7660	8270	8500	9855	10570	9210	10975	12035	9760	10590	11810	12760	12040	4990	6885	7625	6820	8000
	Throughput (vph)	6941	4354	4906	7832	6976	7728	7001	7738	7970	9192	10294	8853	10515	11368	9170	10036	11035	11622	10948	4566	6747	7478	6758	7744
	Speed	57	57	54	53	52	46	49	41	34	25	33	33	30	27	27	[illegible]	32	44	53	56	57	56	56	56
	Density	21	24	25	27	31	31	33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35	34	21	22	20	23	26
PM	Demand (vph)	5185	2825	3610	5515	4935	6995	5895	6765	6520	9090	10180	8670	9750	11265	9860	10970	12590	13850	12880	6740	10015	10435	9355	10000
	Throughput (vph)	5159	2824	3611	5475	4917	6380	5509	6435	6555	7750	9074	7436	8503	9988	8592	9571	10718	11479	10456	5905	7905	8288	7490	8011
	Speed	60	58	57	56	52	44	40	27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	29	42	49	56	56	56	55	56
	Density	18	16	16	19	23	25	[illegible]	[illegible]	71	81	92	101	117	96	102	103	[illegible]	[illegible]	35	25	27	24	28	29

Figure 3-45 I-275 SB Analysis Summary – 2025 Build Option E

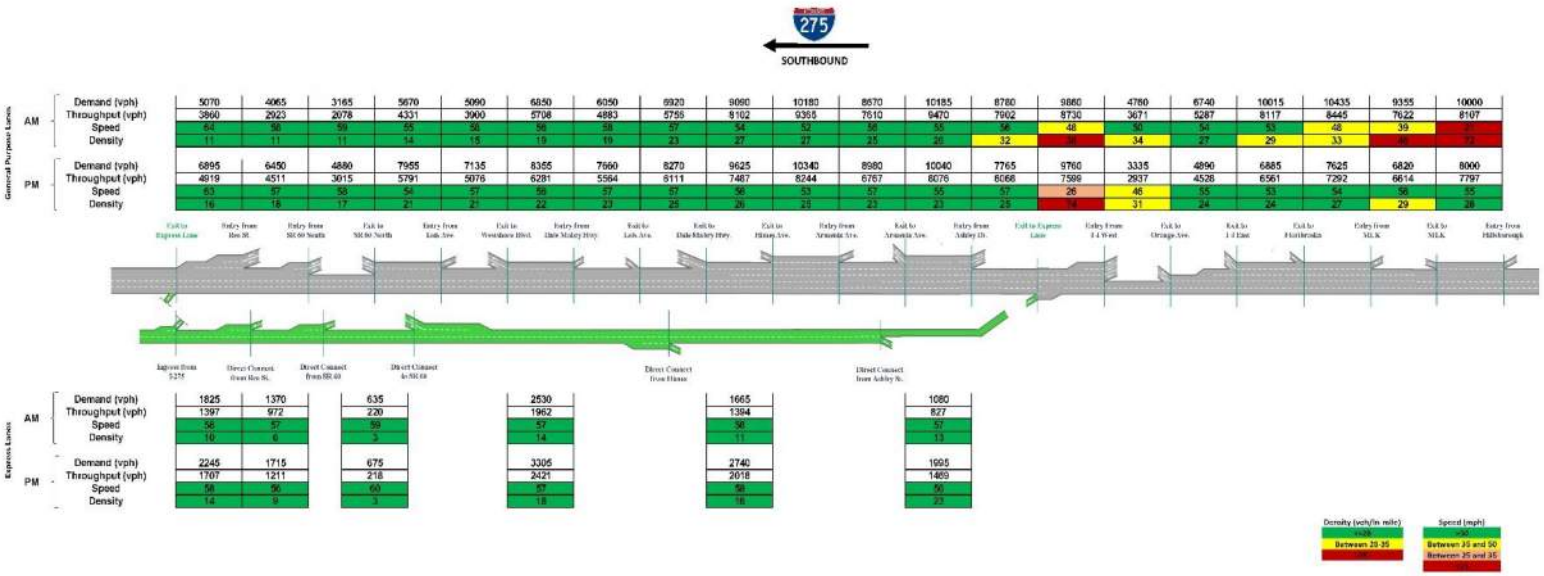
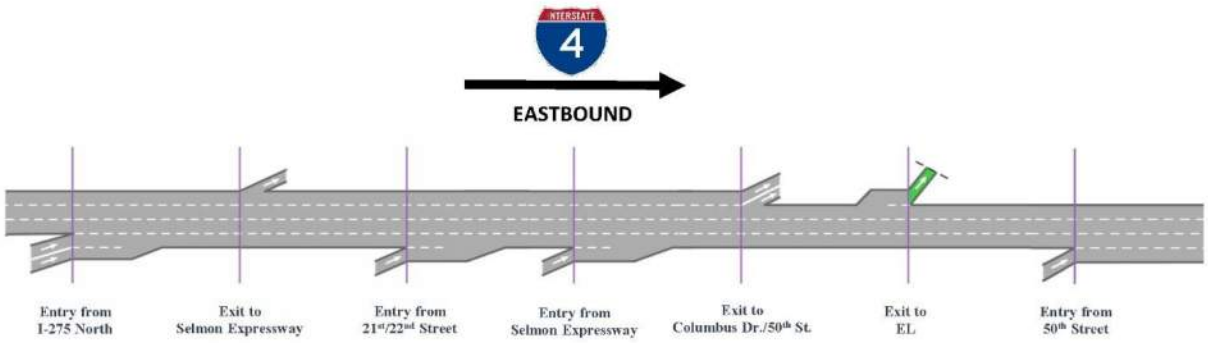


Figure 3-46 I-4 EB Analysis Summary – 2025 Build Option E



General Purpose Lanes

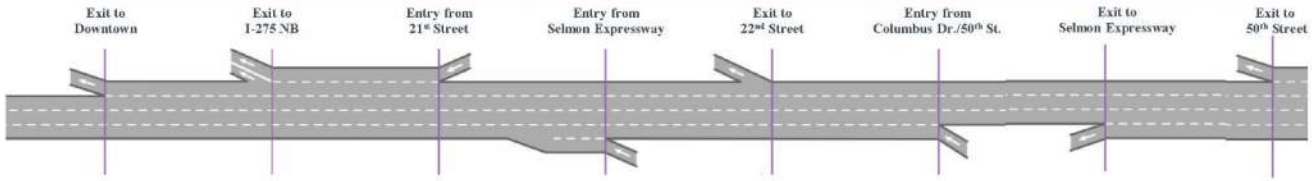
		Entry from I-275 North	Exit to Selmon Expressway	Entry from 21st/22nd Street	Entry from Selmon Expressway	Exit to Columbus Dr./50th St.	Exit to EL	Entry from 50th Street
AM	Demand (vph)	9440	6965	7465	8445	6750	6195	7045
	Throughput (vph)	8379	6346	6822	7811	6185	5748	6576
	Speed	49	57	56	48	55	56	56
	Density	37	26	27	35	34	32	27
PM	Demand (vph)	7645	5555	6605	7920	6665	6060	7555
	Throughput (vph)	6989	5261	6079	7398	6149	5691	7067
	Speed	54	57	56	51	55	56	56
	Density	30	23	26	33	36	34	31

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and
>35	Between 25 and
	<25

Figure 3-47 I-4 WB Analysis Summary – 2025 Build Option E

General Purpose Lanes

AM	Demand (vph)	7110	9105	7645	5555	6605	5455	6665
	Throughput (vph)	6923	9098	7642	5530	6592	5647	6797
	Speed	47	50	45	52	55	56	56
	Density	34	33	36	24	27	31	28
PM	Demand (vph)	7870	11145	9440	6965	7465	5845	6750
	Throughput (vph)	5934	8834	7609	5973	6678	5727	6699
	Speed	22	24	24	28	36	49	53
	Density	75	75	85	85	66	44	28



Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

The following freeway measures of effectiveness (MOEs) were compared for the 2025 Build Alternative and 2025 NFA Alternative at the end of peak hours:

- Average Speed (mph)
- Total Travel Delay (in vehicle-hours)
- Travel Delay per Vehicle-Mile (in min/veh/mi)

Table 3-5 provides the summary of the 2025 Opening Year peak hour MOE's for the NFA and all five Build Options (A, B, C, D and E). **Figures 3-48 through 3-50** provides the peak hour average speed, total travel delay, and travel delay per vehicle-mile for the NFA and Build Options. The results of the CORSIM simulation analysis showed significant improvements to the overall system MOEs during AM and PM peak hours due to the Build Options compared to the NFA:

Table 3-5 2025 Opening Year Peak Hour MOE Summary

MOEs	Time Period (Peak Hour)	NFA	Option A	Option B	Option C	Option D	Option E
Average Speed (MPH)	AM	33	49	49	50	50	42
	PM	25	45	46	40	39	42
Total Travel Delay (Hours)	AM	5,099	1,494	1,521	1,231	1,183	2,987
	PM	6,758	2,235	2,012	3,434	3,597	2,742
Delay per Vehicle-Mile (min/veh/mi)	AM	0.8	0.2	0.2	0.2	0.2	0.4
	PM	1.3	0.3	0.3	0.5	0.5	0.4

Figure 3-48 Average Peak Hour Speed Summary for 2025 Opening Year

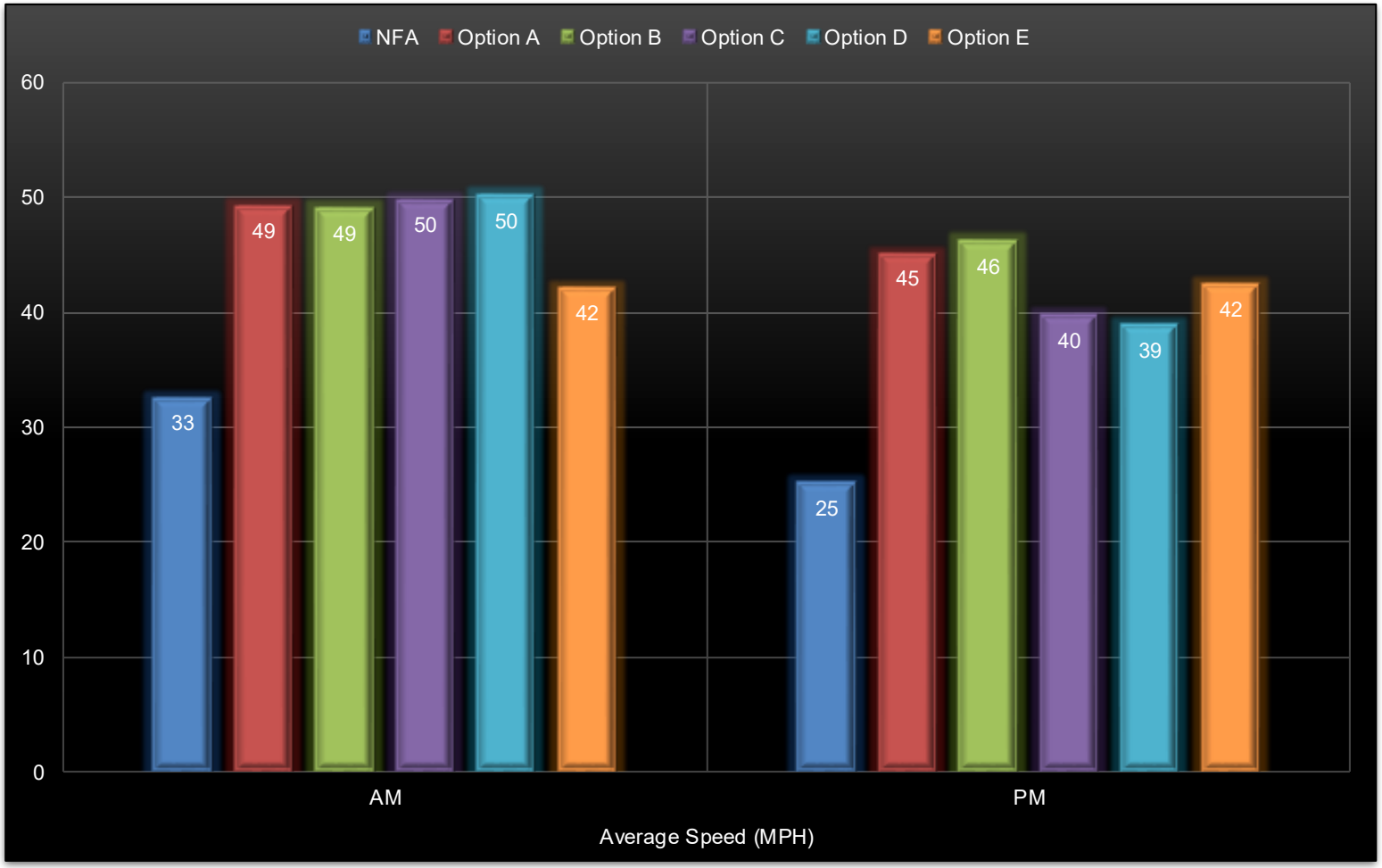


Figure 3-49 Total Peak Hour Travel Delay Summary for 2025 Opening Year

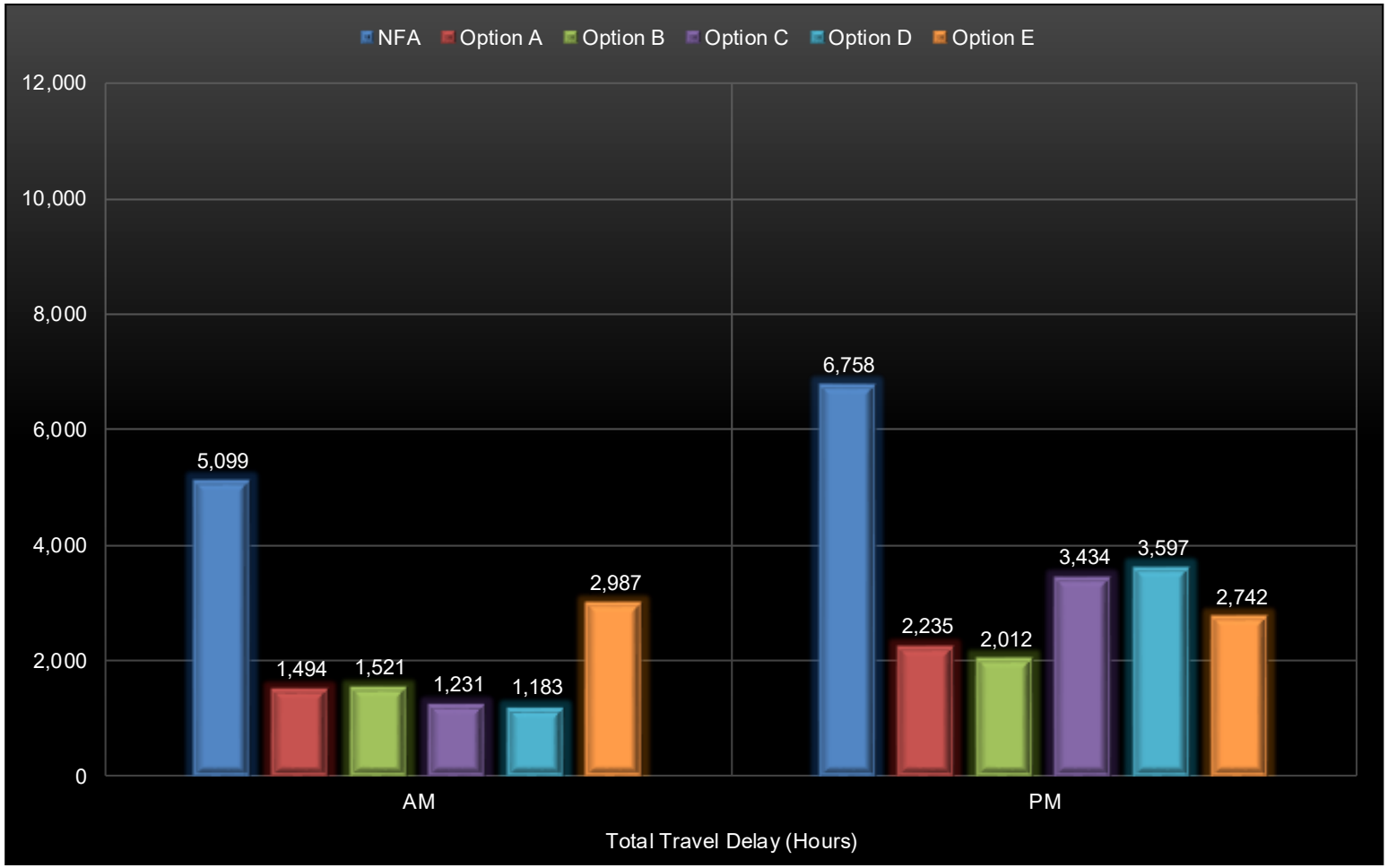
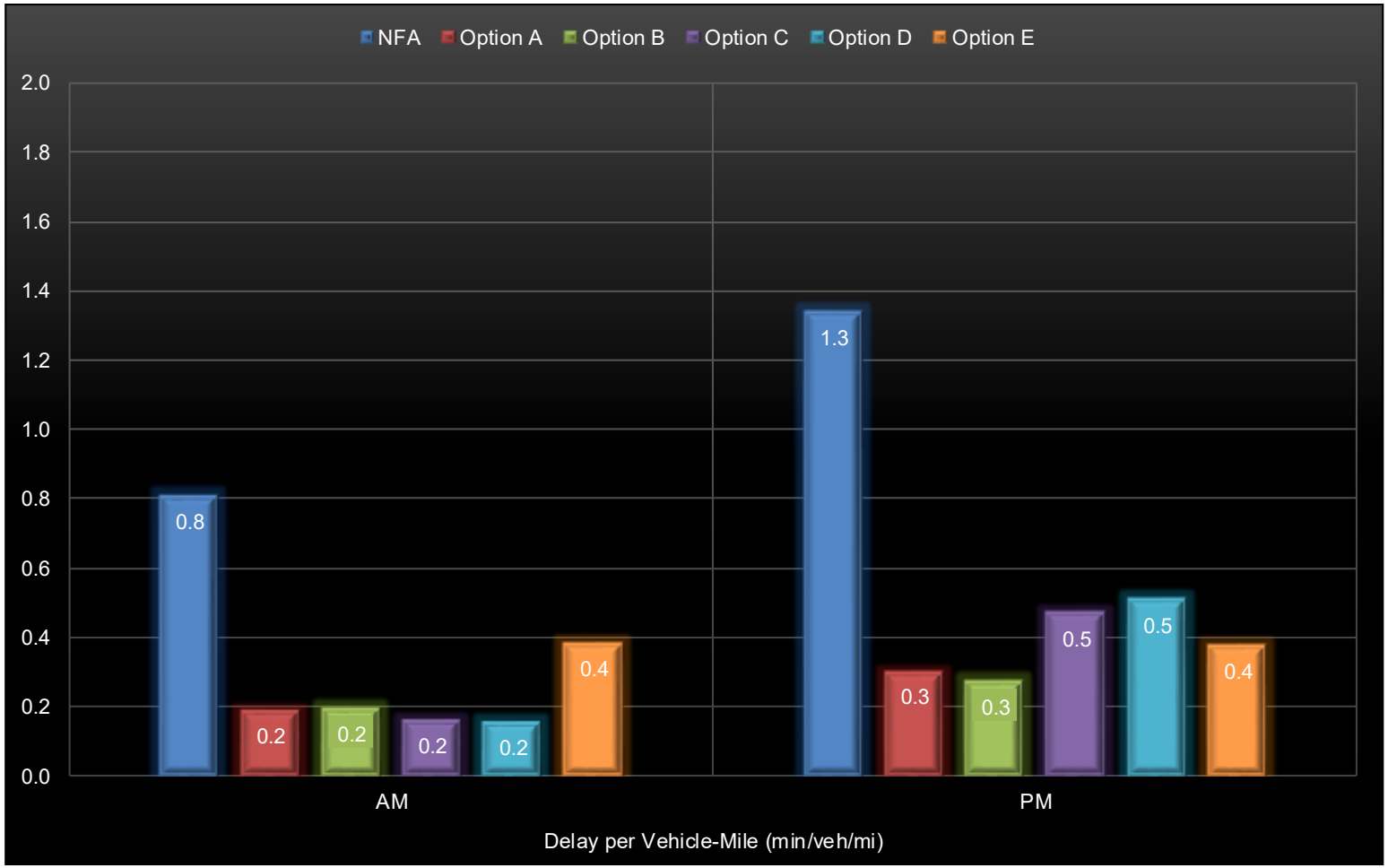


Figure 3-50 Peak Hour Travel Delay per Vehicle-Mile Summary for 2025 Opening Year



3.7.2 Design Year (2045) Traffic Measures of Effectiveness

The CORSIM models were run 10 times using different random seed numbers to account for potential variations between model runs. The results of the simulation were averaged to ensure that the differences in the results were related to the geometric configuration of the network and control strategies, rather than the randomness of the simulation itself. Overall, multiple runs of the simulation prevent biases in the results due to the stochastic nature of the software. The results of the traffic simulation were used to estimate the traffic operations conditions at the freeway segments within the study area for the year 2045 Design Year traffic conditions. **Table 3-6 and 3-7** provides the 2045 Design Year summary matrix for the NFA and Build Options during the AM and PM peak hours.

The CORSIM-estimated freeway traffic throughput, speeds, and densities for the NFA are shown in **Figures 3-51 to 3-54**. The CORSIM-estimated freeway traffic throughput, speeds, and densities for the Build Options A, B, C, D and E are shown in **Figures 3-55 to 3-74**.

The CORSIM model results were used to evaluate the study intersections performance for NFA and all five Build scenarios. Signal timing plans were optimized using Synchro 10 for future year evaluation. It should be noted that the intersection evaluation from CORSIM may not provide an accurate representation of the demand traffic and accounts for bottlenecks that may be present in each of the alternatives. The CORSIM intersection and approach performance results presented in **Appendix T** were used to draw comparison between NFA and Build scenarios for the 2045 Design Year.

Since the proposed improvements are along I-275, SR 60, and I-4 corridors, roadway geometric conditions at all signalized intersections within the study limits are identical for NFA and for all five Build scenarios. Operational analysis results indicate that the traffic conditions are very similar for NFA and Build conditions during AM and PM peak hours. However, a few study intersections under Build conditions experience more delays compared to NFA conditions. This is primarily due to improved freeway geometry under various Build alternatives that allows more traffic to downstream ramp terminal intersections. Based on visual observation of all Build scenarios, none of the off-ramp queues are expected to extend the gore point and have no significant impacts on freeway operations during AM and PM peak hours, except Dr. MLK, Jr. Boulevard interchange PM peak hour traffic demand significantly exceeds available capacity for a single lane SB off-ramp. This causes long queues that extend beyond the Hillsborough Avenue interchange “

Table 3-6 2045 Alternatives Operations Summary Matrix – AM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between Howard Frankland Bridge & Himes Avenue Interchange	Northbound: • On average, 48 percent of the demand is processed. • Heavy congestion was observed. • Heavy congestion on Express Lanes. Southbound • On average, 54 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 91 percent of the demand is processed. • Moderate congestion between SR 60 and Lois Ave. • Heavy congestion between Lois Ave and Himes Ave. • No significant congestion on Express Lanes. Southbound • On average, 68 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 91 percent of the demand is processed. • Moderate congestion between SR 60 and Lois Ave. • Heavy congestion between Lois Ave. and Himes Ave. • No significant congestion on Express Lanes. Southbound • On average, 65 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 90 percent of the demand is processed. • Moderate congestion South of Dale Mabry Hwy. • Heavy congestion North of Dale Mabry Hwy. • No significant congestion on Express Lanes. Southbound • On average, 63 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 87 percent of the demand is processed. • Moderate congestion South of Dale Mabry Hwy. • Heavy congestion North of Dale Mabry Hwy. • Moderate congestion near SR 60 on Express Lanes. Southbound • On average, 63 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 74 percent of the demand is processed. • Moderate congestion south of Lois. • Heavy congestion between Lois and Himes. • Moderate congestion on Express Lanes near slip ramp near SR 60. Southbound • On average, 68 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between Himes Avenue & North Boulevard Interchanges	Northbound: • On average, 70 percent of the demand is processed. • Heavy congestion was observed. Southbound • On average, 57 percent of the demand is processed. • Moderate congestion near North Blvd.	Northbound: • On average, 87 percent of the demand is processed. • Moderate congestion South of Armenia Ave and near North Blvd. • No significant congestion on Express Lanes. Southbound • On average, 74 percent of the demand is processed. • Moderate congestion between North Blvd. and Howard Ave. • No significant congestion on Express Lanes.	Northbound: • On average, 87 percent of the demand is processed. • Moderate congestion South of Armenia Ave, and North of Howard Ave. • No significant congestion on Express Lanes. Southbound • On average, 69 percent of the demand is processed. • Moderate congestion between North Blvd. and Howard Ave. • No significant congestion on Express Lanes.	Northbound: • On average, 87 percent of the demand is processed. • Heavy congestion near Himes Ave. • Moderate congestion North of Armenia Ave. • No significant congestion on Express Lanes. Southbound • On average, 68 percent of the demand is processed. • Moderate congestion near Armenia Ave. • No significant congestion on Express Lanes.	Northbound: • On average, 85 percent of the demand is processed. • Heavy congestion between Himes Ave. and Armenia Ave. • Moderate congestion North of Armenia Ave. • No significant congestion on Express Lanes. Southbound • On average, 69 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 74 percent of the demand is processed. • Heavy congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 78 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between North Blvd. & I-4 Interchanges	Northbound: • On average, 74 percent of the demand is processed. • Moderate congestion near I-4. Southbound • On average, 47 percent of the demand is processed. • No significant congestion was observed.	Northbound: • On average, 90 percent of the demand is processed. • Moderate congestion between North Blvd. and Ashley Dr. • No significant congestion on Express Lanes. Southbound • On average, 70 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes.	Northbound: • On average, 89 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes. Southbound • On average, 67 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes.	Northbound: • On average, 88 percent of the demand is processed. • Moderate congestion near Orange Ave. • No significant congestion on Express Lanes. Southbound • On average, 60 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 85 percent of the demand is processed. • Moderate congestion near Orange Ave. • Moderate congestion near Orange Ave. on Express Lanes. Southbound • On average, 62 percent of the demand is processed. • No significant congestion was observed. • Moderate congestion near Orange Ave. on Express Lanes.	Northbound: • On average, 74 percent of the demand is processed. • Heavy congestion between Ashley and Orange. • Moderate congestion near I-4 interchange. Southbound • On average, 68 percent of the demand is processed. • No significant congestion was observed.

Heavy congestion: Speeds < 25 mph
Moderate congestion: Speeds - 25-50 mph
No significant congestion: Speeds > 50 mph

Table 3-6 cont'd 2045 Alternatives Operations Summary Matrix – AM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between I-4 & North of Martin Luther King Jr. Boulevard Interchanges	Northbound: • On average, 78 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 41 percent of the demand is processed. • Heavy congestion was observed.	Northbound: • On average, 89 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 74 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 88 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 75 percent of the demand is processed. • Moderate congestion near I-4 and North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 89 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes. Southbound • On average, 65 percent of the demand is processed. • Moderate congestion near North and South of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 89 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 64 percent of the demand is processed. • Moderate congestion South of MLK and Heavy congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 81 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 63 percent of the demand is processed. • Moderate congestion South of Dr. MLK, Jr. Boulevard. • Heavy congestion North of Dr. MLK, Jr. Boulevard.
I-4 Between I-275 & West of Selmon Connector	Eastbound: • On average, 61 percent of the demand is processed. • Moderate congestion North of 22nd St. and South of 21st St. was observed. Westbound: • On average, 55 percent of the demand is processed. • Moderate to Heavy congestion was observed.	Eastbound: • On average, 83 percent of the demand is processed. • Moderate congestion between I-275 and Selmon Connector. • No significant congestion on Express Lanes. Westbound: • On average, 71 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Eastbound: • On average, 80 percent of the demand is processed. • Moderate congestion West of 21st St. and heavy congestion east of Selmon Connector. • No significant congestion on Express Lanes. Westbound: • On average, 68 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Eastbound: • On average, 86 percent of the demand is processed. • Heavy congestion near Selmon Connector. • No significant congestion on Express Lanes. Westbound: • On average, 64 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Eastbound: • On average, 81 percent of the demand is processed. • Moderate congestion near Selmon Connector. • No significant congestion on Express Lanes. Westbound: • On average, 69 percent of the demand is processed. • Moderate congestion near 50th St. • No significant congestion on Express Lanes.	Eastbound: • On average, 68 percent of the demand is processed. • Heavy congestion was observed. Westbound: • On average, 83 percent of the demand is processed. • Heavy congestion near Selmon. • Moderate congestion West of 21st St.

Heavy congestion: Speeds < 25 mph
Moderate congestion: Speeds - 25-50 mph
No significant congestion: Speeds > 50 mph

Table 3-7 2045 Alternatives Operations Summary Matrix – PM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between Howard Frankland Bridge & Himes Avenue Interchange	Northbound: • On average, 36 percent of the demand is processed. • Heavy congestion was observed. • Heavy congestion on Express Lanes. Southbound • On average, 53 percent of the demand is processed. • Moderate congestion between Lois Ave. and SR 60. • No significant congestion on Express Lanes.	Northbound: • On average, 93 percent of the demand is processed. • Moderate congestion North of SR 60. • No significant congestion on Express Lanes. Southbound • On average, 69 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 94 percent of the demand is processed. • Moderate to Heavy congestion South of Lois Ave. • Moderate congestion North of Dale Mabry Hwy. • No significant congestion on Express Lanes. Southbound • On average, 68 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 85 percent of the demand is processed. • Moderate to Heavy congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 65 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 85 percent of the demand is processed. • Moderate to heavy congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 64 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 83 percent of the demand is processed. • Moderate congestion south of Lois. • Heavy congestion between Lois and Himes. • No Significant Congestion on Express Lanes. Southbound • On average, 63 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between Himes Avenue & North Boulevard Interchanges	Northbound: • On average, 53 percent of the demand is processed. • Heavy congestion was observed. Southbound • On average, 47 percent of the demand is processed. • Moderate congestion North of Howard Ave.	Northbound: • On average, 88 percent of the demand is processed. • Moderate congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 73 percent of the demand is processed. • Moderate congestion South of Armenia Ave. and North of Howard Ave. • No significant congestion on Express Lanes.	Northbound: • On average, 89 percent of the demand is processed. • Moderate congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 72 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes.	Northbound: • On average, 78 percent of the demand is processed. • Heavy congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 73 percent of the demand is processed. • Moderate congestion near Howard Ave. • No significant congestion on Express Lanes.	Northbound: • On average, 77 percent of the demand is processed. • Heavy congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 69 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 75 percent of the demand is processed. • Heavy congestion was observed. • No Significant Congestion on Express Lanes. Southbound • On average, 73 percent of the demand is processed. • No significant congestion was observed. • No Significant Congestion on Express Lanes.
I-275 Between North Blvd. & I-4 Interchanges	Northbound: • On average, 61 percent of the demand is processed. • Heavy congestion was observed. Southbound • On average, 29 percent of the demand is processed. • Moderate congestion from Tampa St. to Orange Ave. • Heavy congestion between Orange Ave. and I-4.	Northbound: • On average, 86 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes. Southbound • On average, 77 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes.	Northbound: • On average, 85 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes. Southbound • On average, 75 percent of the demand is processed. • Moderate congestion near North Blvd. • No significant congestion on Express Lanes.	Northbound: • On average, 77 percent of the demand is processed. • Heavy congestion South of Tampa St. • Moderate congestion near Orange St. • No significant congestion on Express Lanes. Southbound • On average, 73 percent of the demand is processed. • No significant congestion was observed. • No significant congestion on Express Lanes.	Northbound: • On average, 77 percent of the demand is processed. • Heavy congestion South of Tampa St. • Moderate congestion between Tampa St. and Orange St. • Moderate congestion near Orange Ave. on Express Lanes. Southbound • On average, 69 percent of the demand is processed. • No significant congestion was observed. • Moderate congestion near Orange Ave. on Express Lanes.	Northbound: • On average, 74 percent of the demand is processed. • Heavy congestion between Ashley and Orange. • Moderate congestion near I-4 interchange. Southbound • On average, 76 percent of the demand is processed. • Moderate congestion near Express Lane entry.

Heavy congestion: Speeds < 25 mph
Moderate congestion: Speeds - 25-50 mph
No significant congestion: Speeds > 50 mph

Table 3-7 cont'd 2045 Alternatives Operations Summary Matrix – PM Peak Hour

Segment	No Further Action	Build Option A	Build Option B	Build Option C	Build Option D	Build Option E
I-275 Between I-4 & North of Martin Luther King Jr. Boulevard Interchanges	Northbound: • On average, 63 percent of the demand is processed. • No significant congestion was observed. Southbound • On average, 74 percent of the demand is processed. • Moderate congestion South of Dr. MLK, Jr. Boulevard. • Heavy congestion North of Dr. MLK, Jr. Boulevard.	Northbound: • On average, 81 percent of the demand is processed. • Moderate congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 91 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 78 percent of the demand is processed. • Moderate congestion South of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes. Southbound • On average, 89 percent of the demand is processed. • Heavy congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 85 percent of the demand is processed. • Moderate congestion South of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes. Southbound • On average, 88 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 83 percent of the demand is processed. • Moderate congestion was observed. • No significant congestion on Express Lanes. Southbound • On average, 86 percent of the demand is processed. • Moderate congestion South of MLK. • Heavy congestion North of Dr. MLK, Jr. Boulevard. • No significant congestion on Express Lanes.	Northbound: • On average, 73 percent of the demand is processed. • Moderate congestion near Dr. MLK, Jr. Boulevard. Southbound • On average, 89 percent of the demand is processed. • Moderate congestion North of Dr. MLK, Jr. Boulevard.
I-4 Between I-275 & West of Selmon Connector	Eastbound: • On average, 58 percent of the demand is processed. • No significant congestion was observed. Westbound: • On average, 27 percent of the demand is processed. • Heavy congestion was observed.	Eastbound: • On average, 90 percent of the demand is processed. • Heavy congestion east of Selmon connector. • No significant congestion on Express Lanes. Westbound: • On average, 76 percent of the demand is processed. • Moderate congestion near N 21st/22nd St. • No significant congestion on Express Lanes.	Eastbound: • On average, 83 percent of the demand is processed. • Heavy congestion east of Selmon connector. • No significant congestion on Express Lanes. Westbound: • On average, 74 percent of the demand is processed. • Moderate congestion near N 21st/22nd St. • No significant congestion on Express Lanes.	Eastbound: • On average, 84 percent of the demand is processed. • Moderate to Heavy congestion east of 22nd St. • No significant congestion on Express Lanes. Westbound: • On average, 73 percent of the demand is processed. • Moderate congestion West of 22st St. • No significant congestion on Express Lanes.	Eastbound: • On average, 88 percent of the demand is processed. • Heavy congestion east of 22nd St. • No significant congestion on Express Lanes. Westbound: • On average, 72 percent of the demand is processed. • Moderate congestion near 50th St. • No significant congestion on Express Lanes.	Eastbound: • On average, 75 percent of the demand is processed. • No significant congestion was observed. Westbound: • On average, 73 percent of the demand is processed. • Heavy congestion between 21st St. and Selmon. • Moderate congestion near I-275.

Heavy congestion: Speeds < 25 mph
Moderate congestion: Speeds - 25-50 mph
No significant congestion: Speeds > 50 mph

Figure 3-51 I-275 NB Analysis Summary – 2045 No Further Action (NFA)

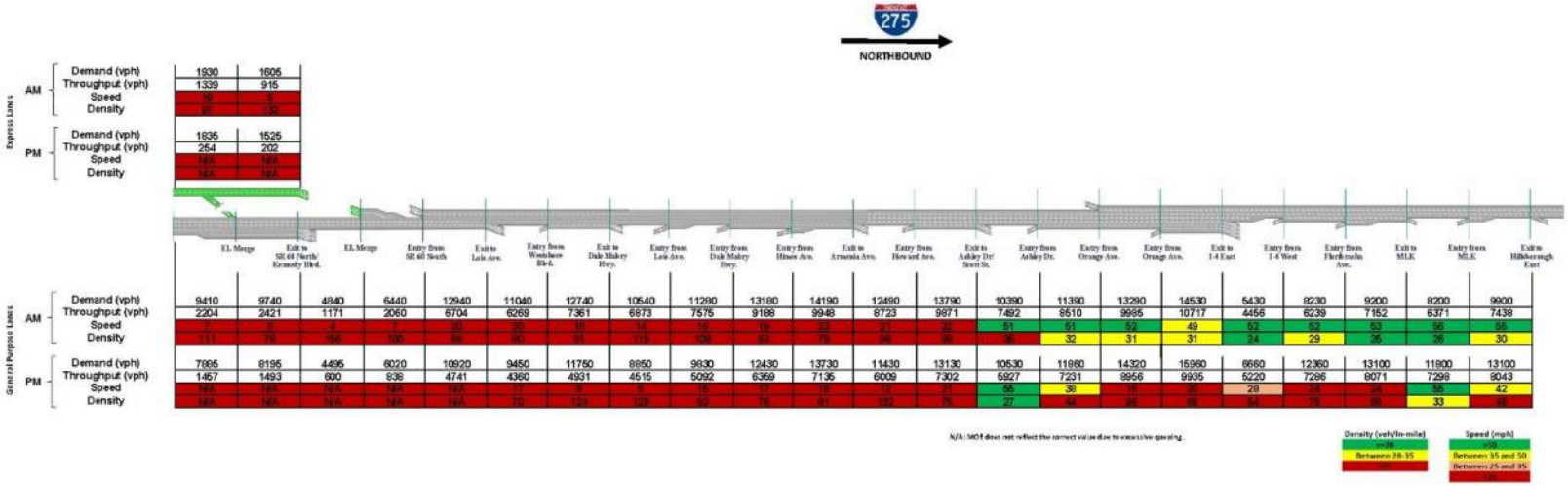


Figure 3-52 I-275 SB Analysis Summary – 2045 No Further Action (NFA)

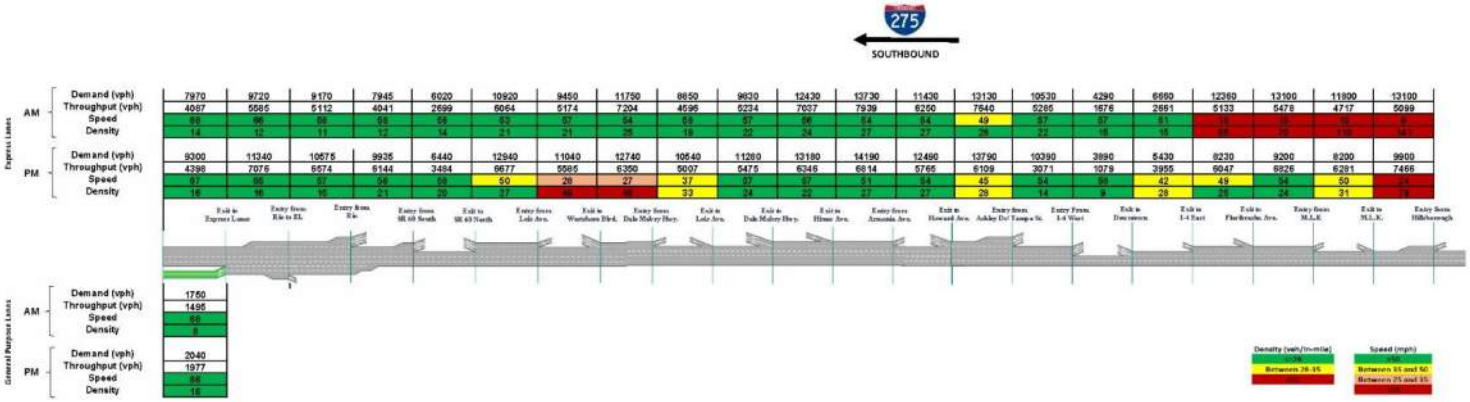
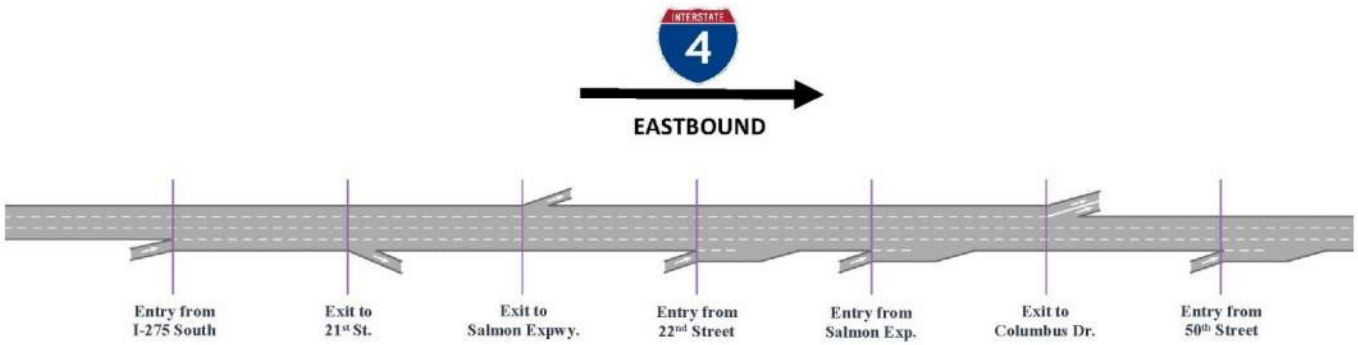


Figure 3-53 I-4 EB Analysis Summary – 2045 No Further Action (NFA)



		Entry from I-275 South	Exit to 21st St.	Exit to Salmon Expwy.	Entry from 22nd Street	Entry from Salmon Exp.	Exit to Columbus Dr.	Entry from 50th Street
AM	Demand (vph)	14800	12400	9210	10030	12030	9880
	Throughput (vph)	8735	7578	5729	6277	8205	6591
	Speed	50	47	53	50	39	53
	Density	41	39	26	30	47	39
PM	Demand (vph)	12100	9900	7000	8550	12550	10720
	Throughput (vph)	6817	5786	4232	5018	7394	6103
	Speed	52	54	58	57	47	35
	Density	32	27	18	21	36	59

Density (veh/ln-mile)
<=28
Between 28-35
>35

Speed (mph)
>50
Between 35 and 50
Between 25 and 35
<25

Figure 3-54 I-4 WB Analysis Summary – 2045 No Further Action (NFA)

		Exit to Frontage Road	Exit to I-275 North	Entry from 14th Ave.	Entry from Salmon Exp.	Exit to 22nd Street	Exit to Salmon Exp.	Entry from Columbus Dr.	Exit to 50th Street
AM	Demand (vph)	9300	12100	9900	7000	8550	12550	10720
	Throughput (vph)	5485	7260	5852	3592	4404	6703	5588
	Speed	34	26	23	35	49	24	25
	Density	50	57	53	24	21	69	70
PM	Demand (vph)	9100	14800	12400	9210	10030	12030	9880
	Throughput (vph)	2871	4943	3845	1809	1970	2552	1230
	Speed	53	23	14	9	11	12	7
	Density	17	52	66	51	44	53	66

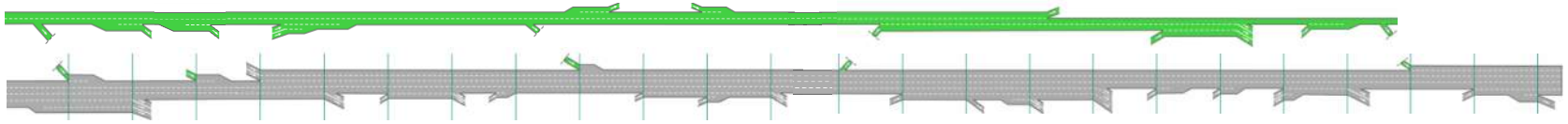
Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-55 I-275 NB Analysis Summary – 2045 Build Option A

NORTHBOUND

Express Lanes

		Egress to I-275	Egress to I-275	Direct Connect to SR 60	Direct Connect from SR 60	Egress to I-275	Direct Connect to Himes	Direct Connect from Himes	Egress from I-275	Direct Connect to Tampa St.	Direct Connect from Ashley Dr.	Direct Connect to I-4 East	Direct Connect from I-4 West	Egress to I-275
AM	Demand (vph)	2920	1925	625	2500	2220	1230	1875	2660		1720	485	1265	
	Throughput (vph)	2855	2855	595	2638	2263	1013	1318	1908		1108	341	1190	
	Speed	56	56	59	56	55	59	58	58		58	58	53	
	Density	24	24	5	16	13	8	10	10		9	5	16	
PM	Demand (vph)	2405	2105	1210	2235	2110	685	1700	2615		1870	780	2100	
	Throughput (vph)	2399	2399	1200	2301	2145	581	974	1692		1104	522	1815	
	Speed	56	56	58	57	54	59	58	58		58	57	49	
	Density	20	20	10	16	14	5	8	10		9	8	29	



General Purpose Lanes

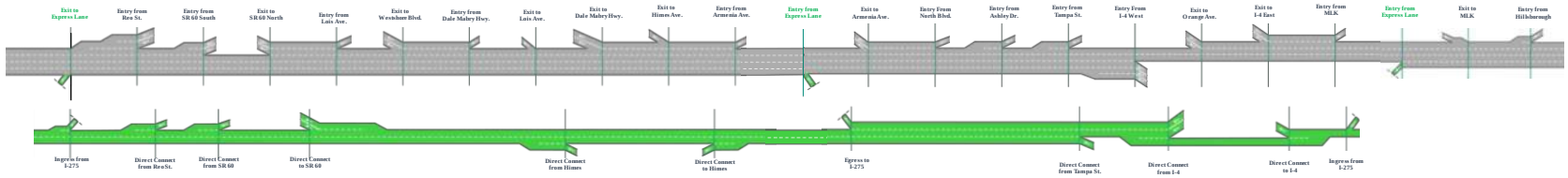
		Entry from Express lane	Exit to SR 60/ Kennedy Blvd.	Entry from Express lane	Entry from SR 60	Exit to Lois Ave.	Entry from Westshore Blvd.	Exit to Dale Mabry Hwy.	Entry from Lois Ave.	Entry from Express lane	Entry from Dale Mabry Hwy.	Entry from Himes Ave.	Exit to Armenia Ave.	Exit to Express lane	Entry from Howard Ave.	Exit to North Blvd.	Exit to Ashley Dr/ Scott St.	Exit to I-4 East	Entry from Ashley Dr.	Entry from Orange Ave.	Entry from I-4 West	Exit to MLK	Entry from Express lane	Entry from MLK	Exit to Hillsborough West
AM	Demand (vph)	8880	5185	6180	10770	8795	10500	9290	10035	10315	11580	12610	11520	10735	12050	11150	8710	2325	3115	4880	6935	5915	7180	9900	
	Throughput (vph)	8940	5226	6170	10427	8461	9187	7862	8419	8762	10151	10937	9927	9331	10566	9743	7579	2092	2926	4730	6621	5625	6784	7635	
	Speed	50	56	44	45	42	37	25	20	22	24	34	51	55	48	48	55	59	57	56	54	56	56	55	
	Density	31	29	40	42	46	46	74	74	80	74	56	44	39	40	32	25	11	15	24	26	30	27	25	
PM	Demand (vph)	7745	4875	5175	9025	7535	9790	8305	9290	9415	11600	12300	10860	9945	11690	10885	9205	2490	4115	5875	10300	8950	11050	13100	
	Throughput (vph)	7679	4823	5131	8737	7249	9021	7546	8370	8500	10244	10768	9490	8747	10302	9577	8108	2200	3302	4714	8541	7394	9216	9903	
	Speed	53	52	40	35	27	38	45	40	36	27	34	43	43	39	44	54	59	57	56	43	49	49	45	
	Density	26	31	39	48	64	46	40	41	55	72	59	53	50	51	37	29	12	18	25	46	49	45	42	

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<=25

Figure 3-56 I-275 SB Analysis Summary – 2045 Build Option A

General Purpose Lanes

AM	Demand (vph)	7620	6395	5300	9150	7660	9915	8430	9415	11600	12300	10860	9945	11690	10885	9530	9205	2490	5875	10300	8950	11050	13100
	Throughput (vph)	4931	3816	2855	5904	5129	7286	5861	6706	8872	9644	7917	6808	8796	7993	6587	6296	1731	4130	7318	6628	8256	9977
	Speed	63	58	58	54	57	55	57	56	54	52	51	56	46	32	52	57	58	54	53	55	50	33
	Density	14	14	15	20	20	24	23	27	30	34	33	28	34	46	27	22	14	23	31	37	37	63
PM	Demand (vph)	9155	8440	6150	10740	8765	10470	9260	10005	11270	12300	11210	10735	12050	11150	9125	8710	2325	4880	6935	5915	7180	9900
	Throughput (vph)	6099	5430	3425	7073	6105	7646	6554	7157	8333	9297	8027	7481	9064	8164	6811	6471	2036	4255	6091	5693	6979	8410
	Speed	62	56	58	52	56	55	56	56	54	44	47	55	46	34	52	57	58	54	55	56	50	23
	Density	20	22	19	26	27	27	28	31	30	41	40	33	38	48	29	24	16	24	25	31	31	80



Express Lanes

AM	Demand (vph)	2530	1980		1085		2110			685			1700			2615			1870		780		2100
	Throughput (vph)	1706	1199		918		1096			649			1759			2859			2310		596		1627
	Speed	58	56		58		58			59			51			57			57		57		55
	Density	12	8		7		8			5			15			15			15		10		15
PM	Demand (vph)	2645	1955		655		2530			1540			2185			2660			1720		485		1265
	Throughput (vph)	2121	1457		1709		1835			1522			2262			2857			2016		485		1286
	Speed	57	55		57		57			58			56			57			57		57		56
	Density	17	11		13		14			12			18			16			13		8		12

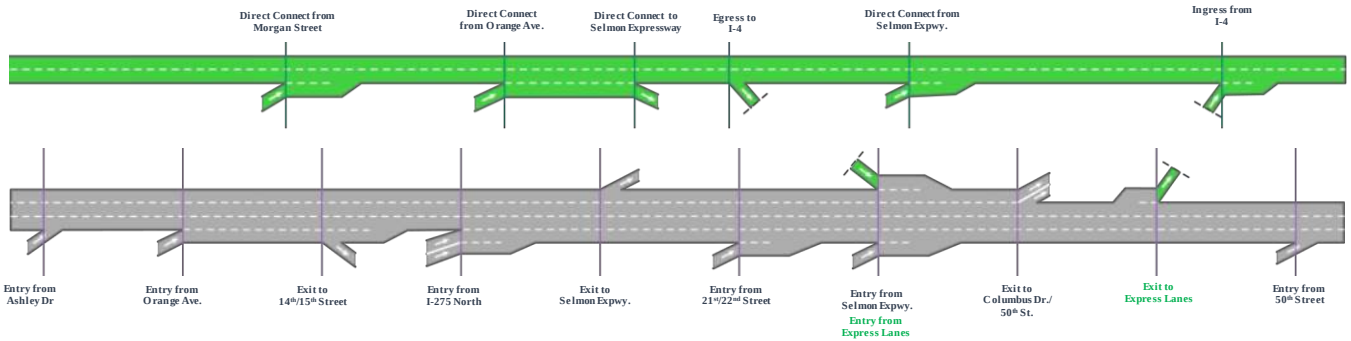
Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-57 I-4 EB Analysis Summary – 2045 Build Option A

EASTBOUND

Express Lanes

AM	Demand (vph)	1920	3240	2510	2035	2400
	Throughput (vph)	1240	2271	1068	956	1535
	Speed	46	56	58	59	58
	Density	11	12	8	7	11
PM	Demand (vph)	2000	2780	2345	1970	2800
	Throughput (vph)	1284	2084	1000	919	1606
	Speed	43	56	59	59	58
	Density	14	12	8	8	13



General Purpose Lanes

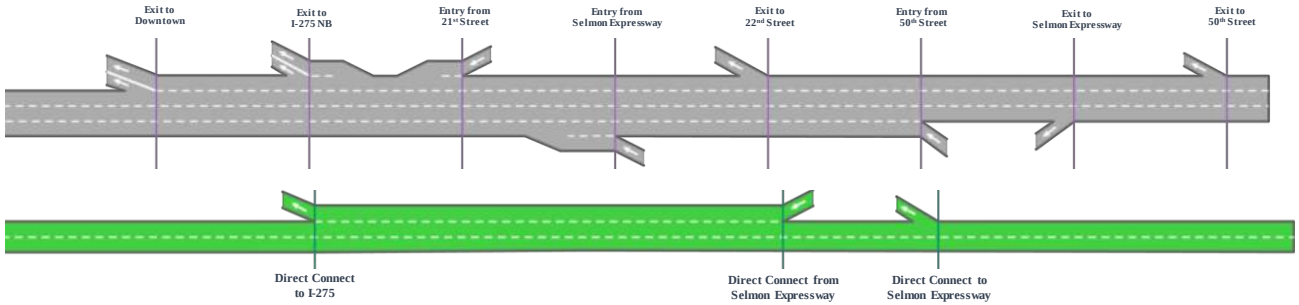
AM	Demand (vph)	6510	7145	6310	9070	6295	7370	10420	8305	7865
	Throughput (vph)	5527	6141	5582	7567	5169	6177	7969	6573	6236
	Speed	54	57	47	42	57	43	30	54	54
	Density	28	24	30	39	20	29	49	35	34
PM	Demand (vph)	7185	7695	6070	7585	5485	7105	10915	9010	8675
	Throughput (vph)	5938	6669	5592	6955	4968	6303	7687	6343	6048
	Speed	53	56	47	51	57	31	25	22	18
	Density	33	28	33	31	21	46	64	85	104

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-58 I-4 WB Analysis Summary – 2045 Build Option A

General Purpose Lanes

AM	Demand (vph)	7695	9210	7585	5485	7105	5355	8635
	Throughput (vph)	5506	6995	5615	3256	4306	3036	4780
	Speed	56	54	54	58	57	62	44
	Density	23	24	22	13	18	16	35
PM	Demand (vph)	7145	9905	9070	6470	7545	5545	7955
	Throughput (vph)	5165	7849	6998	4532	5324	3905	5459
	Speed	56	54	49	57	57	61	46
	Density	23	29	32	20	23	21	39



Express Lanes

AM	Demand (vph)	2000	2780	2345	3175
	Throughput (vph)	2128	2927	2346	3176
	Speed	47	57	57	55
	Density	21	16	19	27
PM	Demand (vph)	1920	3240	2510	2800
	Throughput (vph)	1935	3228	2514	2796
	Speed	48	56	56	56
	Density	19	18	21	23

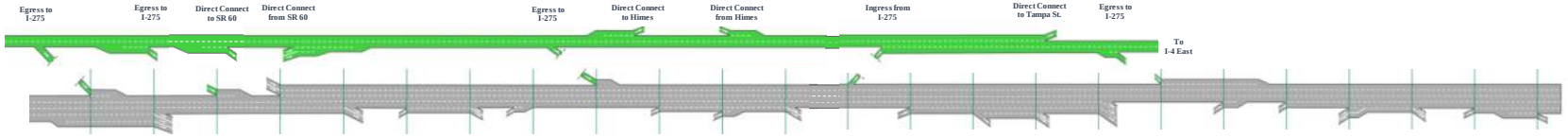
Density (veh/ln-mile)
<=28
Between 28-35
>35

Speed (mph)
>50
Between 35 and 50
Between 25 and 35
<25

Figure 3-59 I-275 NB Analysis Summary – 2045 Build Option B

Express Lanes

AM	Demand (vph)	2920	1925	625		2500		2220	1230		1875		2660	1720
	Throughput (vph)	2934	1946	623		2665		2306	1052		1366		1946	1176
	Speed	55	56	59		56		55	59		58		58	58
	Density	25	16	5		17		14	8		10		10	8
PM	Demand (vph)	2405	2105	1210		2235		2110	685		1700		2615	1870
	Throughput (vph)	2387	2068	1183		2271		2131	585		986		1738	1178
	Speed	56	56	58		57		54	59		58		58	58
	Density	20	18	10		16		14	5		8		10	8



General Purpose Lanes

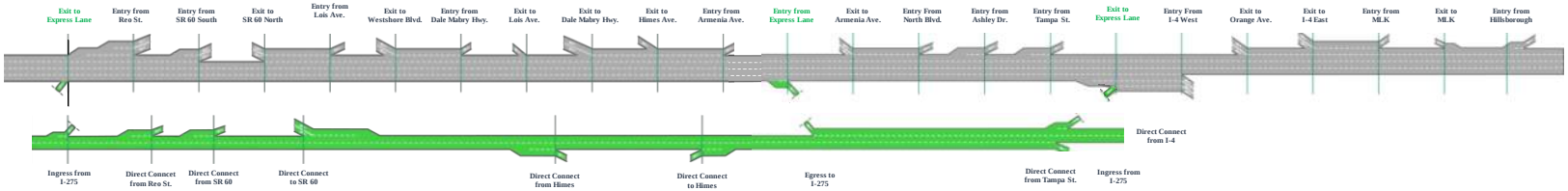
		Entry from Express lane	Exit to SR 60/ Kennedy Blvd.	Entry from SR 60	Exit to Lois Ave.	Entry from Westshore Blvd.	Exit to Dale Mabry Hwy.	Entry from Lois Ave.	Entry from Express lane	Entry from Dale Mabry Hwy.	Entry from Himes Ave.	Exit to Armenia Ave.	Exit to Express lane	Entry from Howard Ave.	Exit to North Blvd.	Exit to Ashley Dr/ Scott St.	Exit to I-4 East	Entry from Express lane	Entry from Ashley Dr.	Entry from Orange Ave.	Entry from I-4 West	Exit to MLK	Entry from MLK	Exit to Hillsborough West
AM	Demand (vph)	8880	5185	6180	10770	8795	10500	9290	10035	10315	11580	12610	11520	10735	12050	11150	8710	2325	3115	3600	5365	8200	7180	9900
	Throughput (vph)	8978	5225	6163	10372	8395	9099	7815	8386	8717	10106	10915	9916	9342	10559	9755	7574	2091	2484	3322	5129	7775	6761	7643
	Speed	50	52	40	43	41	35	24	20	22	23	34	51	55	47	48	55	59	59	57	57	56	52	55
	Density	32	32	45	44	47	48	74	74	81	74	56	44	39	40	33	25	11	10	15	20	21	26	25
PM	Demand (vph)	7745	4875	5175	9025	7535	9790	8305	9290	9415	11600	12300	10860	9945	11690	10885	9205	2490	4115	4895	6655	12400	11050	13100
	Throughput (vph)	7727	4848	5162	8752	7294	9097	7584	8461	8606	10385	10909	9623	8870	10437	9701	8238	2270	2856	3973	5387	10082	8911	9590
	Speed	49	35	20	29	27	39	56	52	45	31	38	51	55	46	48	55	58	59	55	57	49	39	54
	Density	29	45	76	58	66	45	34	33	46	65	54	46	40	45	35	29	13	12	20	23	33	50	35

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-60 I-275 SB Analysis Summary – 2045 Build Option B

General Purpose Lanes

AM	Demand (vph)	7620	6395	5300	9150	7660	9915	8430	9415	11600	12300	10860	9945	11690	10885	9530	9205	9985	3270	6655	12400	11050	13100
	Throughput (vph)	4785	3669	2722	5655	4884	6953	5528	6291	8337	9059	7329	6331	8218	7410	5996	5736	6627	2357	4856	9049	8377	10140
	Speed	63	58	58	54	57	55	57	56	55	53	52	56	47	38	56	57	56	58	53	37	52	40
	Density	14	13	14	19	19	23	22	25	28	31	30	26	32	37	23	21	18	12	21	44	37	54
PM	Demand (vph)	9155	8440	5300	10740	8765	10470	9260	10005	11270	12300	11210	10735	12050	11150	9125	8710	9195	2810	5365	8200	7180	9900
	Throughput (vph)	6079	5400	3363	6983	6007	7524	6439	7056	8209	9165	7874	7296	8835	7938	6596	6260	6863	2471	4740	7309	6901	8378
	Speed	62	56	58	52	56	55	56	56	55	53	53	56	47	39	55	57	55	58	54	55	56	28
	Density	20	22	19	26	26	27	27	30	28	33	34	32	36	40	26	24	20	13	20	25	28	75



Express Lanes

AM	Demand (vph)	2530	1980		1085		2110			685			1700		2615			1870	1090			
	Throughput (vph)	1646	1141		834		1022			555			1547		2544			2013	889			
	Speed	58	56		58		58			59			56		58			58	59			
	Density	12	8		6		7			4			12		13			11	9			
PM	Demand (vph)	2645	1955		655		2530			1540			2185		2660			1720	1235			
	Throughput (vph)	2078	1405		367		1646			1329			2006		2582			1762	601			
	Speed	57	55		59		57			58			57		57			58	59			
	Density	17	10		3		13			11			16		14			10	10			

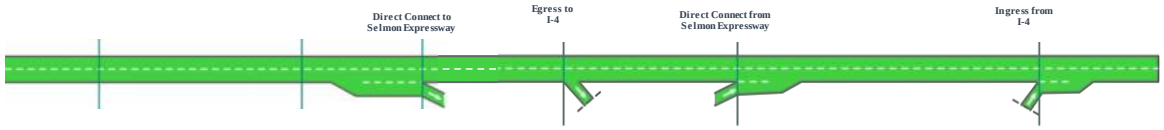
Density (veh/ln-mile)	Speed (mph)
0-28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

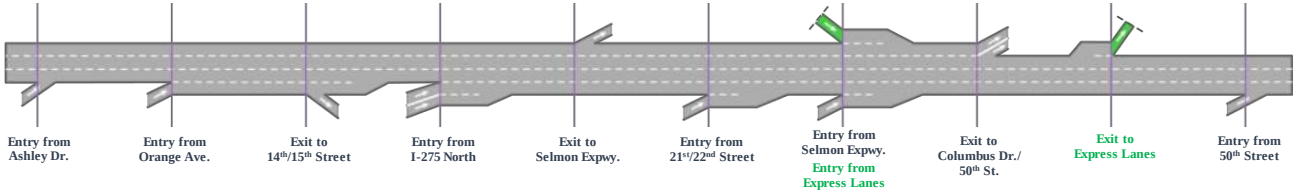
Figure 3-61 I-4 EB Analysis Summary – 2045 Build Option B

EASTBOUND

Express Lanes

AM	Demand (vph)	1920	1190	715	1080
	Throughput (vph)	1254	506	397	913
	Speed	53	59	59	60
	Density	10	4	3	6
PM	Demand (vph)	2000	1565	1190	2020
	Throughput (vph)	1295	764	675	1321
	Speed	53	59	59	59
	Density	11	6	6	11





General Purpose Lanes

AM	Demand (vph)	6510	7145	6310	10390	7615	8690	11740	9625	9185
	Throughput (vph)	5518	6119	5545	8481	5993	6768	8274	6958	6592
	Speed	54	57	40	31	27	15	23	53	43
	Density	28	24	36	58	51	89	72	38	45
PM	Demand (vph)	7185	7695	6070	8365	6265	7885	11695	9790	9455
	Throughput (vph)	6002	6711	5566	7422	5292	5886	7249	6279	6084
	Speed	53	52	36	28	12	10	16	19	18
	Density	34	32	50	72	109	135	98	100	109

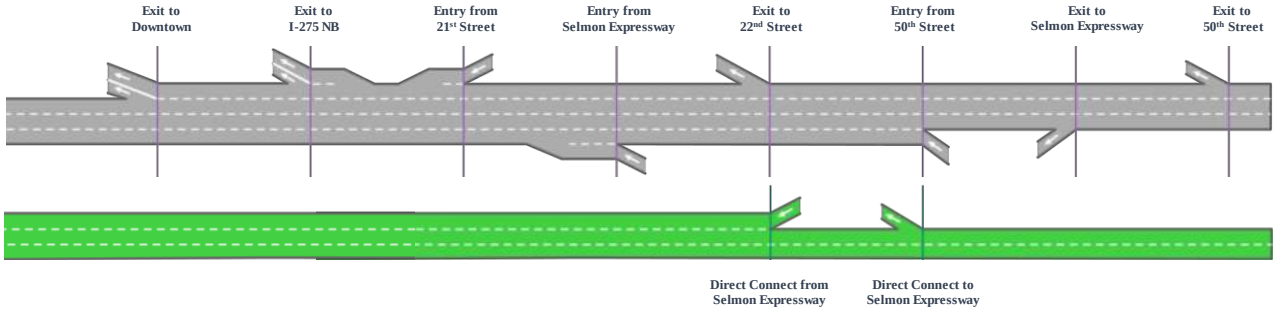
Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-62 I-4 WB Analysis Summary – 2045 Build Option B

WESTBOUND

General Purpose Lanes

AM	Demand (vph)	7695	9990	8365	6265	7885	6135	9415
	Throughput (vph)	5141	7285	5907	3533	4550	3285	4953
	Speed	56	54	53	58	57	62	44
	Density	21	25	24	15	19	17	36
PM	Demand (vph)	7145	11225	10390	7790	8865	6865	9275
	Throughput (vph)	5055	8636	7795	5441	6227	4826	6406
	Speed	56	52	47	54	56	61	51
	Density	22	32	38	24	27	26	41



Express Lanes

AM	Demand (vph)	2000	1565	2395
	Throughput (vph)	2121	1556	2395
	Speed	58	58	56
	Density	11	13	20
PM	Demand (vph)	1920	1190	1480
	Throughput (vph)	1900	1176	1476
	Speed	58	58	58
	Density	11	10	13

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-63 I-275 NB Analysis Summary – 2045 Build Option C

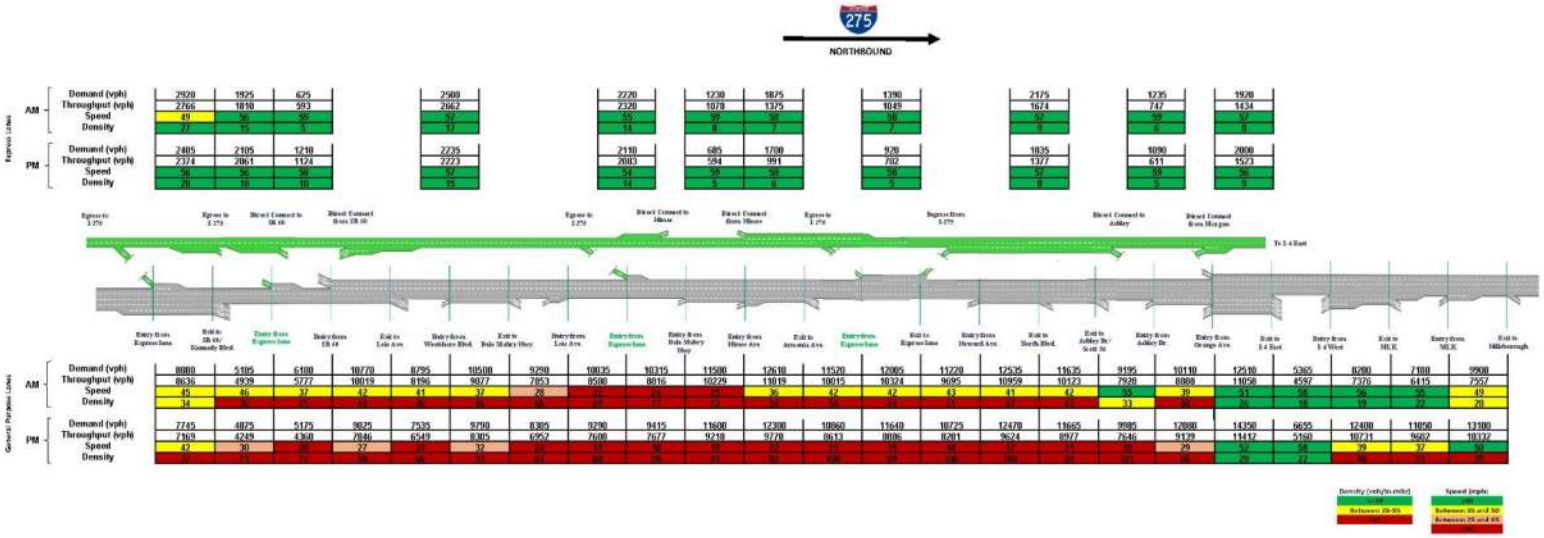


Figure 3-64 I-275 SB Analysis Summary – 2045 Build Option C

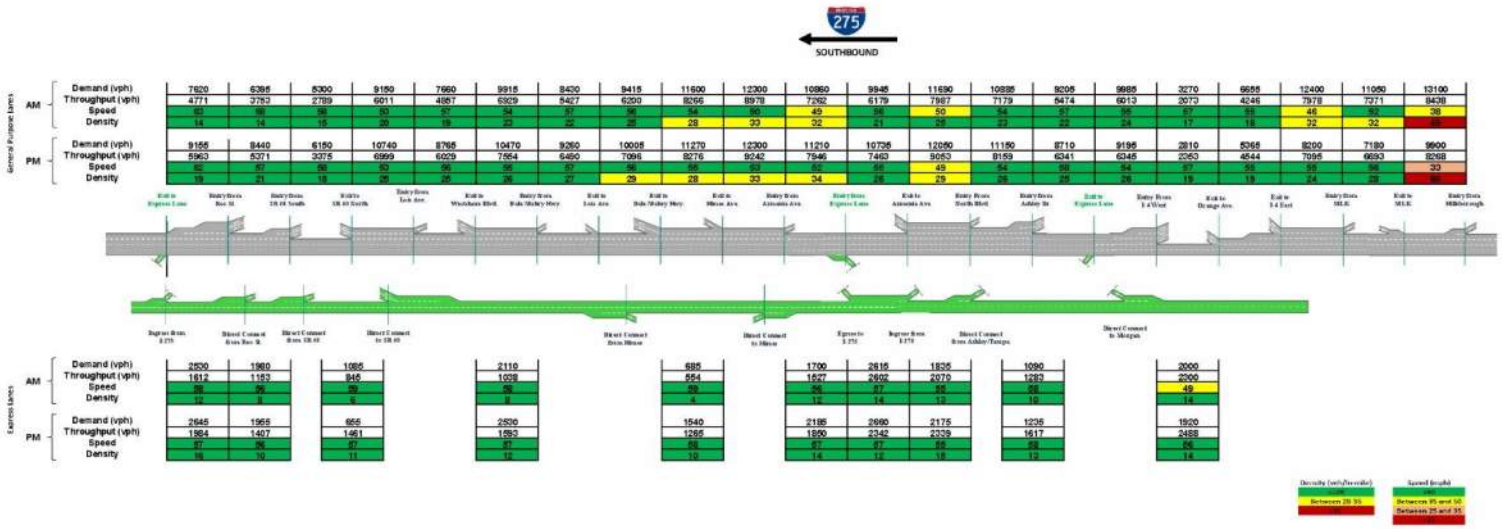


Figure 3-65 I-4 EB Analysis Summary – 2045 Build Option C

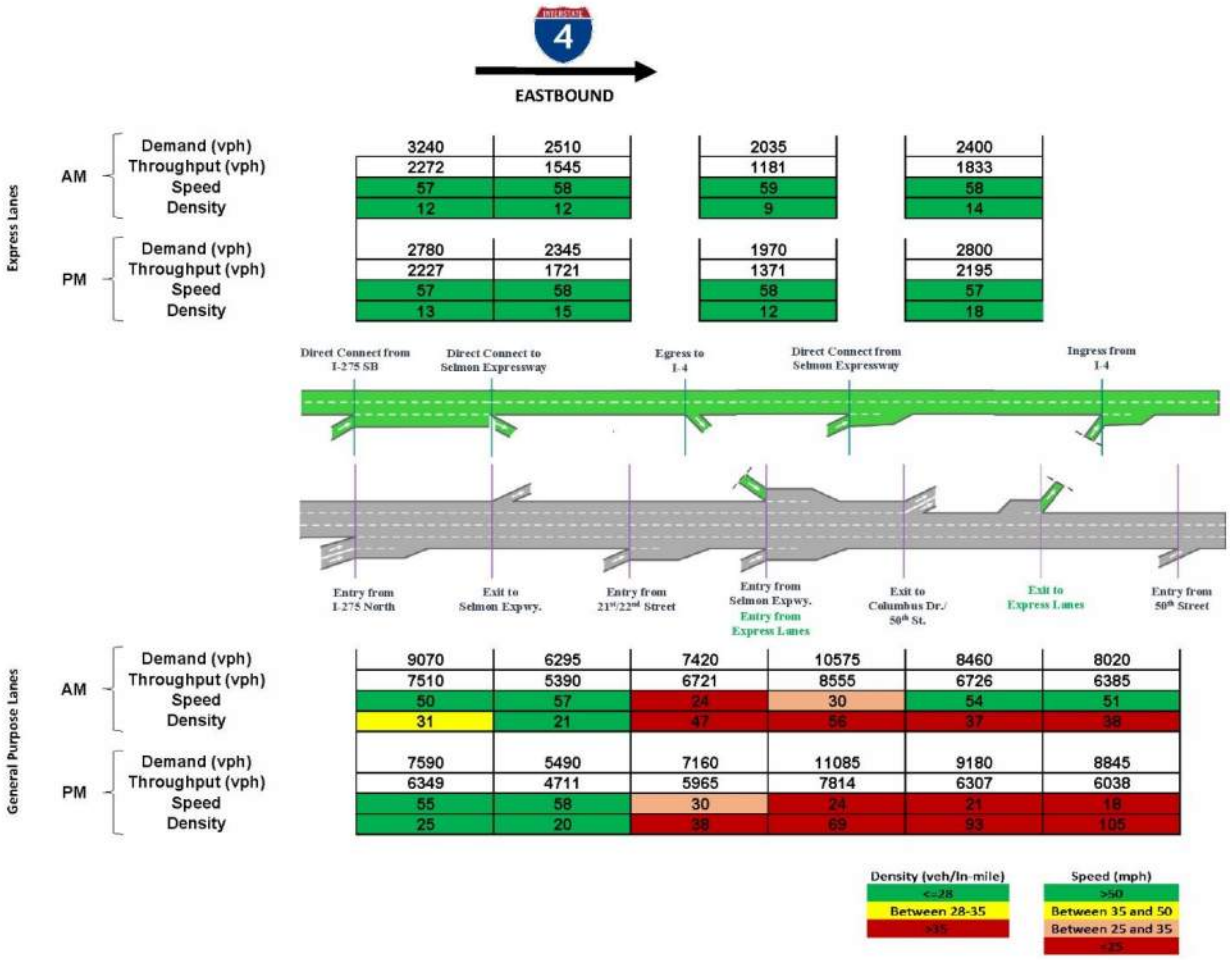


Figure 3-66 I-4 WB Analysis Summary – 2045 Build Option C

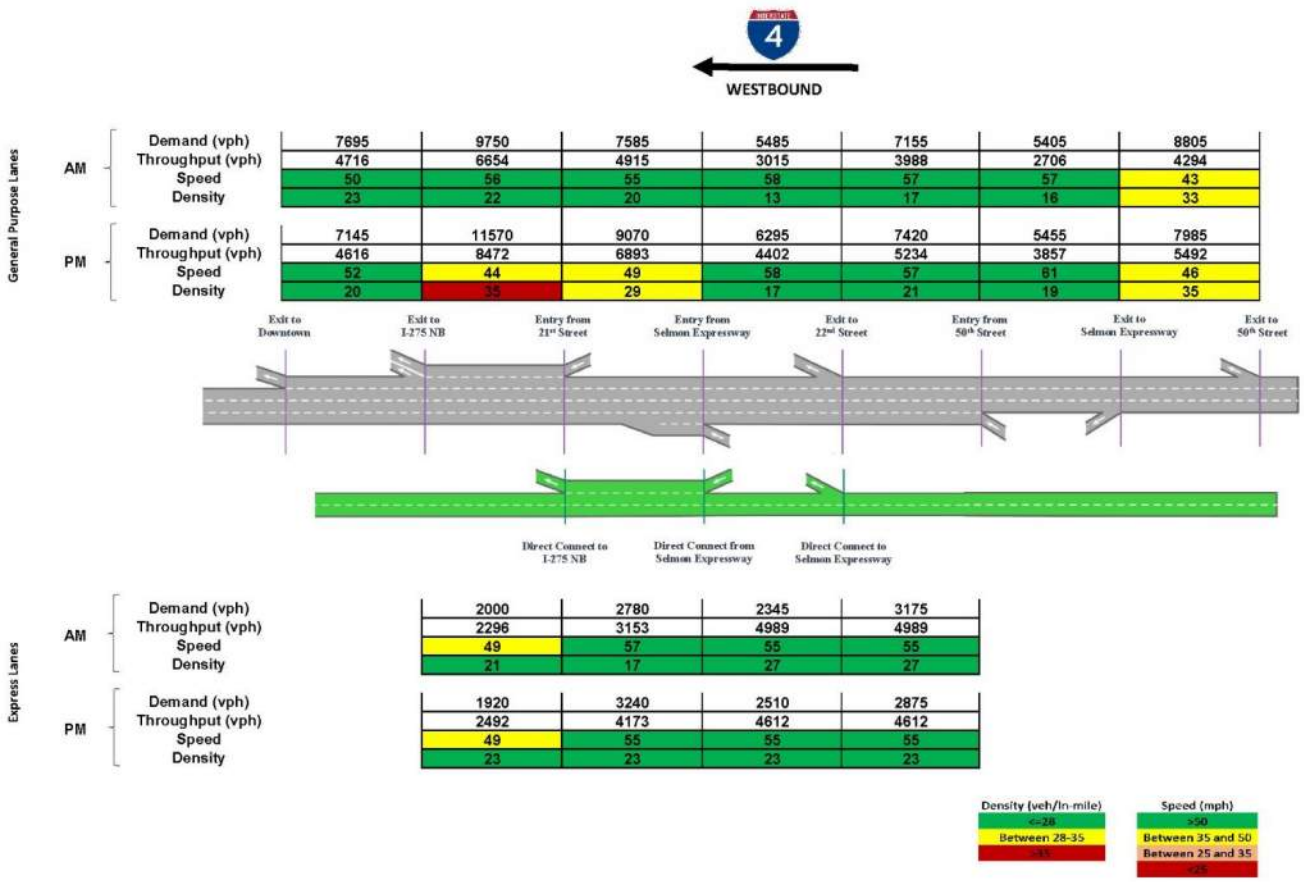


Figure 3-67 I-275 NB Analysis Summary – 2045 Build Option D

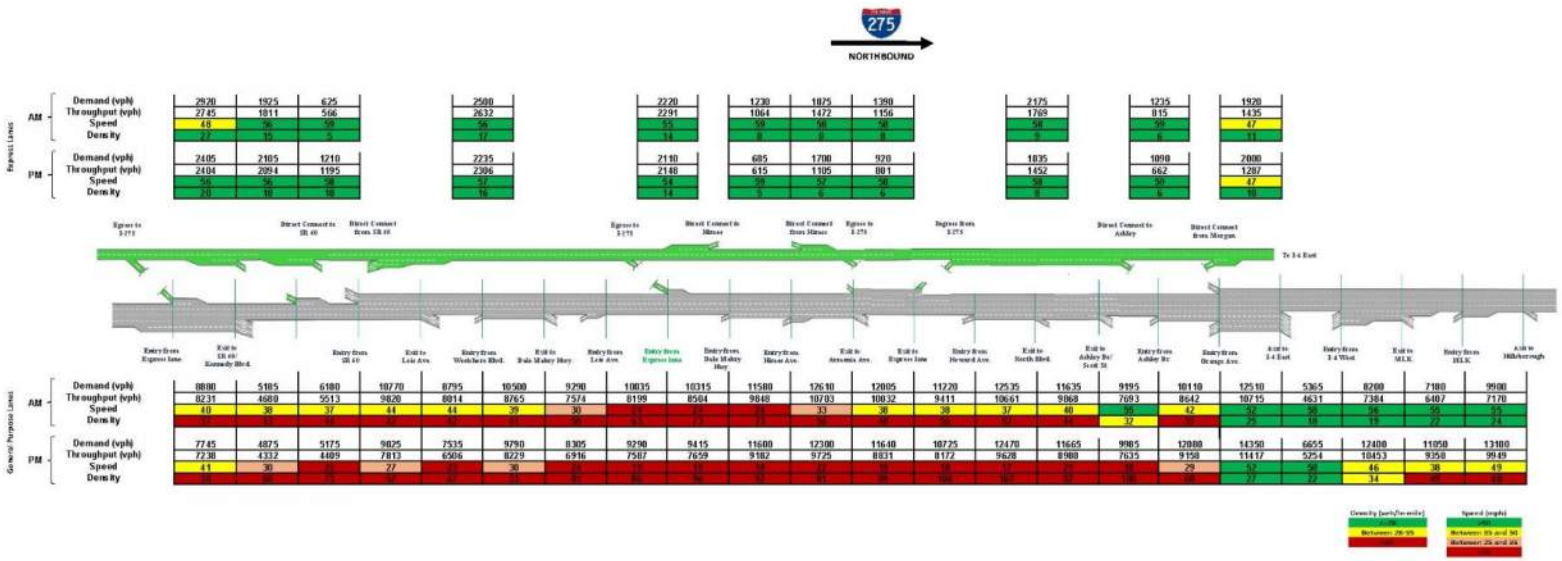


Figure 3-68 I-275 SB Analysis Summary – 2045 Build Option D

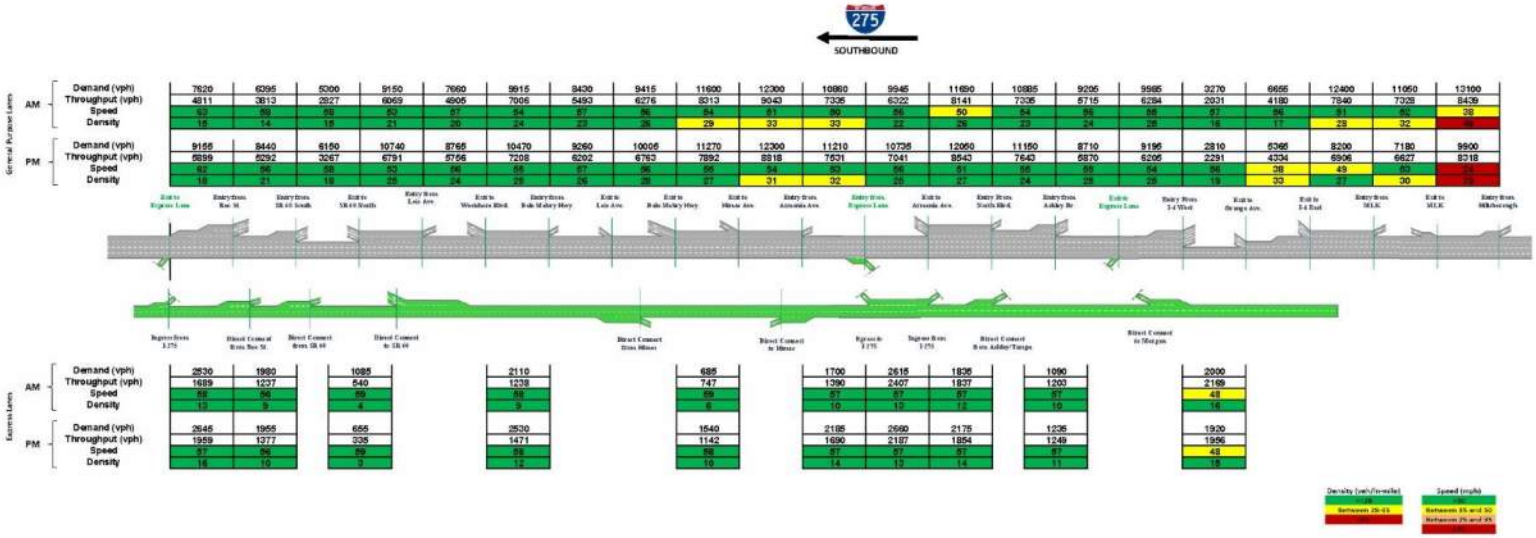


Figure 3-69 I-4 EB Analysis Summary – 2045 Build Option D

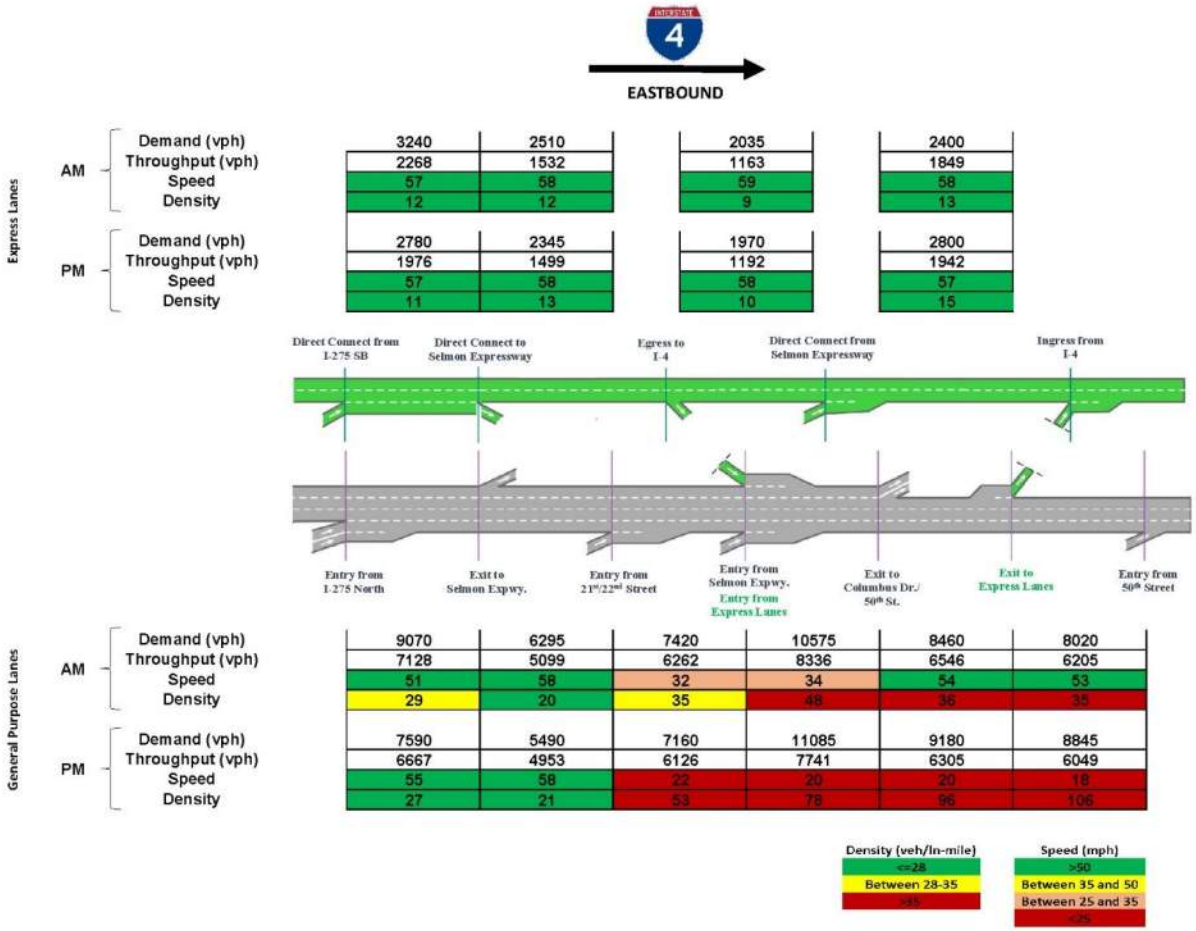
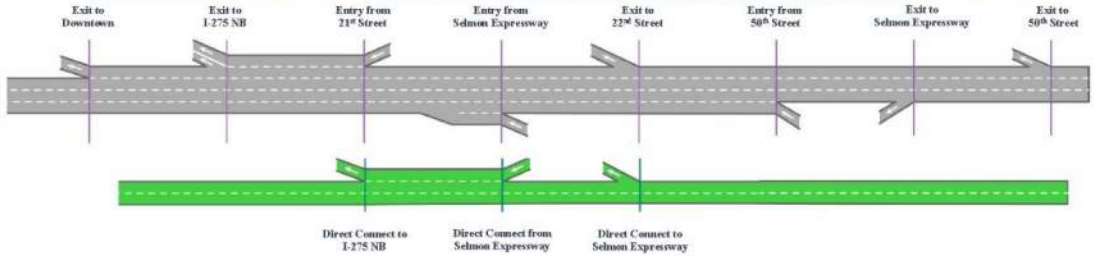


Figure 3-70 I-4 WB Analysis Summary – 2045 Build Option D

General Purpose Lanes

AM	Demand (vph)	7695	9750	7585	5485	7155	5405	8805
	Throughput (vph)	5133	7026	5406	3303	4408	2986	4741
	Speed	54	54	55	58	57	62	43
	Density	22	24	21	14	18	16	35
PM	Demand (vph)	7145	11570	9070	6295	7420	5455	7985
	Throughput (vph)	4567	8362	6770	4259	5057	3656	5239
	Speed	56	50	53	58	57	61	45
	Density	19	31	27	17	20	18	34



Express Lanes

AM	Demand (vph)	2000	2780	2345	3175
	Throughput (vph)	2170	2992	2558	5050
	Speed	50	57	57	55
	Density	19	16	21	27
PM	Demand (vph)	1920	3240	2510	2875
	Throughput (vph)	1955	3288	2608	4566
	Speed	50	56	56	56
	Density	19	20	23	25

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-71 I-275 NB Analysis Summary – 2045 Build Option E

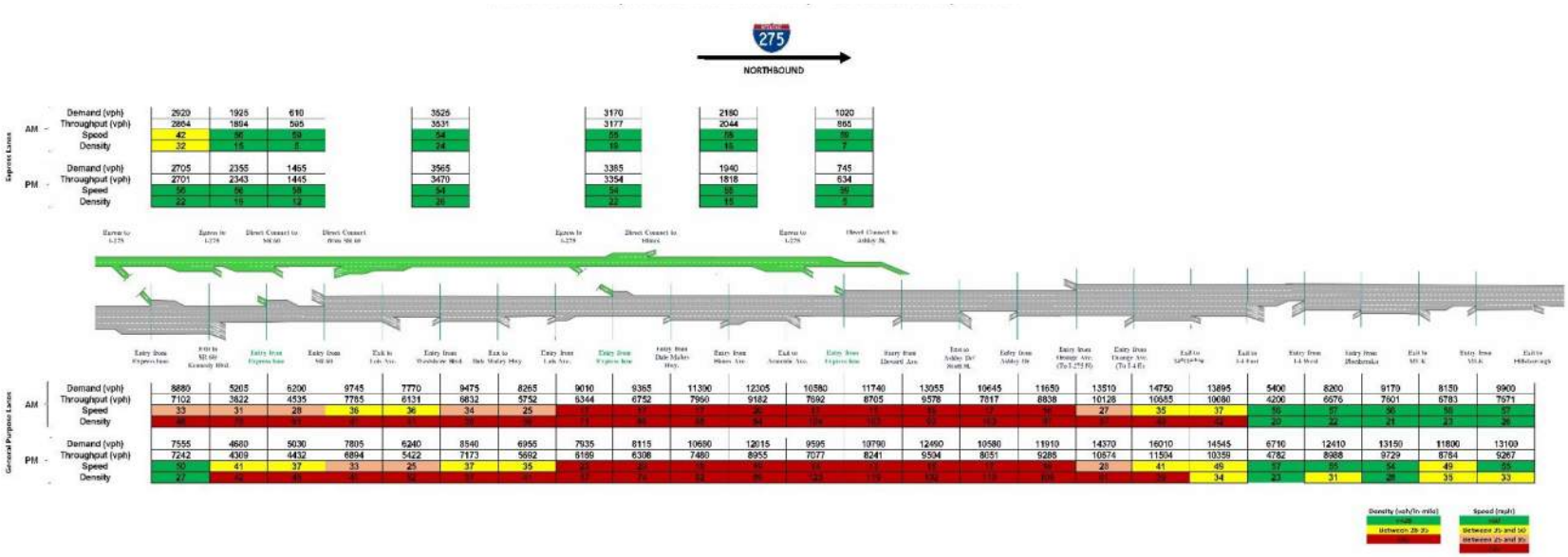


Figure 3-72 I-275 SB Analysis Summary – 2045 Build Option E

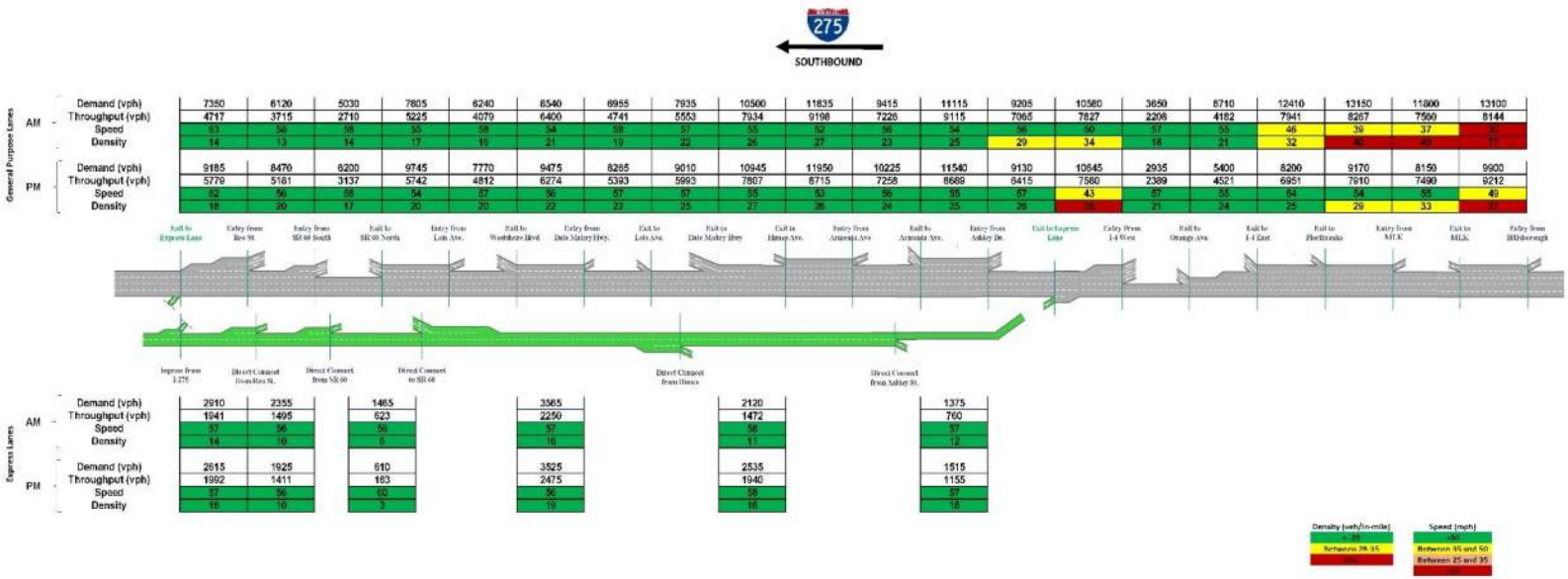
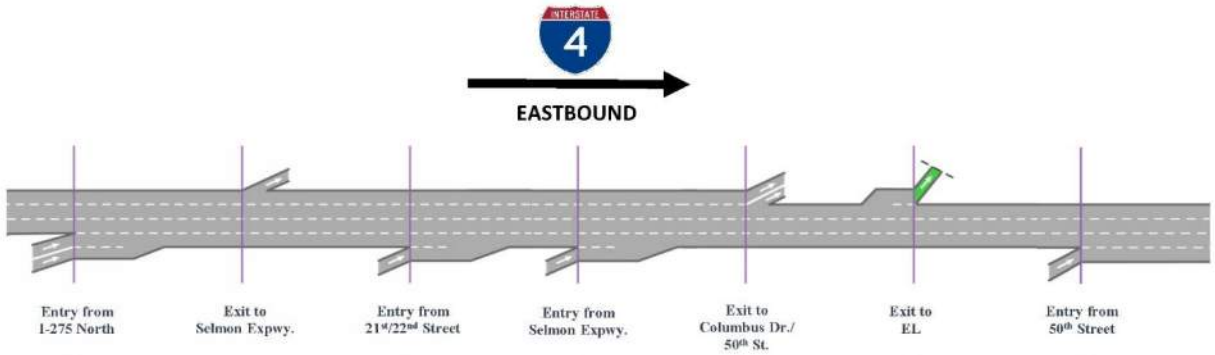


Figure 3-73 I-4 EB Analysis Summary – 2045 Build Option E

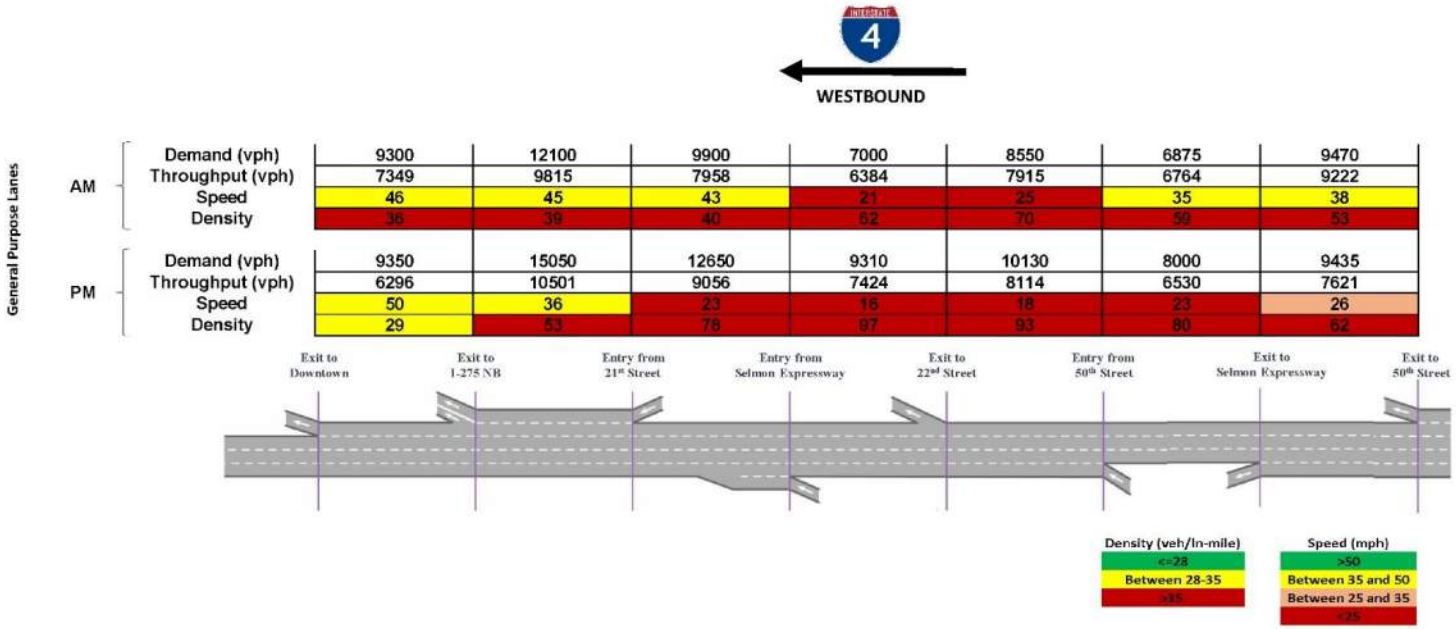


General Purpose Lanes

		Entry from I-275 North	Exit to Selmon Expwy.	Entry from 21st/22nd Street	Entry from Selmon Expwy.	Exit to Columbus Dr./ 50th St.	Exit to EL	Entry from 50th Street
AM	Demand (vph)	12650	9310	10130	11685	9435	8660	9660
	Throughput (vph)	8454	6367	6981	8506	6810	6358	7196
	Speed	21	18	13	23	54	55	56
	Density	86	80	107	79	38	36	30
PM	Demand (vph)	9900	7000	8550	11300	9470	8610	10410
	Throughput (vph)	7379	5402	6351	8487	6978	6504	8003
	Speed	53	57	53	29	54	55	55
	Density	32	23	28	64	41	38	34

Density (veh/ln-mile)	Speed (mph)
<=28	>50
Between 28-35	Between 35 and 50
>35	Between 25 and 35
	<25

Figure 3-74 I-4 WB Analysis Summary – 2045 Build Option E



AM	Demand (vph)	9300	12100	9900	7000	8550	6875	9470
	Throughput (vph)	7349	9815	7958	6384	7915	6764	9222
	Speed	46	45	43	21	25	35	38
	Density	36	39	40	62	70	59	53
PM	Demand (vph)	9350	15050	12650	9310	10130	8000	9435
	Throughput (vph)	6296	10501	9056	7424	8114	6530	7621
	Speed	50	36	23	16	18	23	26
	Density	29	53	78	97	93	80	62

The following freeway measures of effectiveness (MOEs) are compared for the 2045 Build Alternative and 2045 NFA Alternative at the end of peak hours:

- Average Speed (mph)
- Total Travel Delay (in vehicle-hours)
- Travel Delay per Vehicle-Mile (in min/veh/mi)

Table 3-8 provides the summary of the 2045 Design Year peak hour MOE's for the NFA and all the five Build Options (A, B, C, D and E). **Figures 3-75 through 3-77** provides the peak hour average speed, total travel delay, and travel delay per vehicle-mile for the NFA and Build Options. The results of the CORSIM simulation analysis showed significant improvements to the overall system MOEs during AM and PM peak hours due to the Build Options compared to the NFA:

Table 3-8 2045 Design Year Peak Hour MOE

MOEs	Time Period (Peak Hour)	NFA	Option A	Option B	Option C	Option D	Option E
Average Speed (MPH)	AM	22	41	40	38	38	33
	PM	24	38	37	34	34	35
Total Travel Delay (Hours)	AM	9,833	3,870	4,149	4,649	4,695	6,869
	PM	7,555	4,690	5,075	6,382	6,204	5,678
Delay per Vehicle-Mile (min/veh/mi)	AM	1.7	0.4	0.5	0.5	0.5	0.8
	PM	1.4	0.5	0.6	0.7	0.7	0.7

Appendix U provides the summary of potential benefits to the local street(surface) network based on the 2045 TBRPM model results for Build Options A-E in comparison with the NFA. All the Build options indicate the shift in the traffic from the local street network to the I-275 freeway mainline thereby providing relief to the surface street network.

Figure 3-75 Average Peak Hour Speed Summary for 2045 Design Year

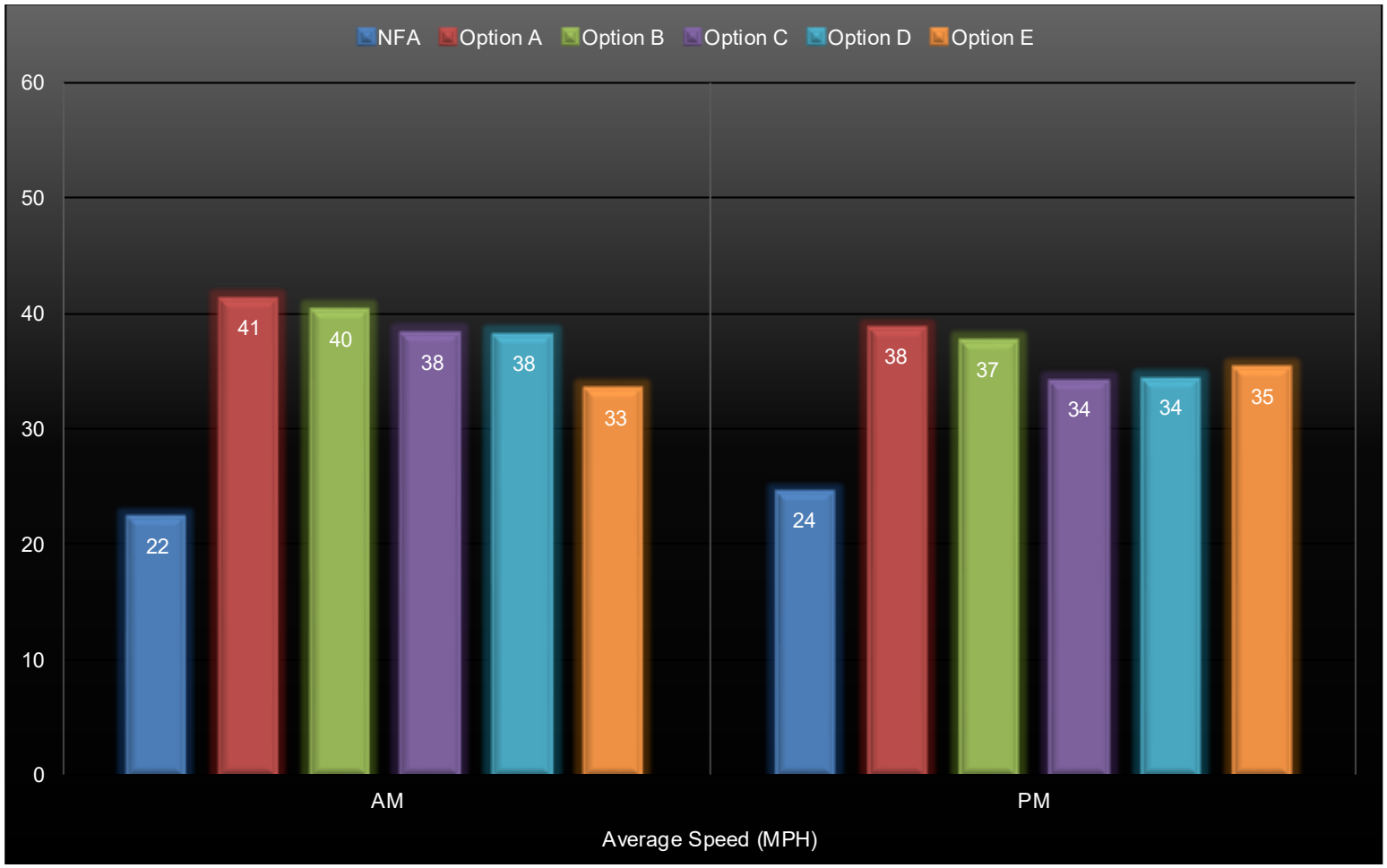


Figure 3-76 Total Peak Hour Travel Delay Summary for 2045 Design Year

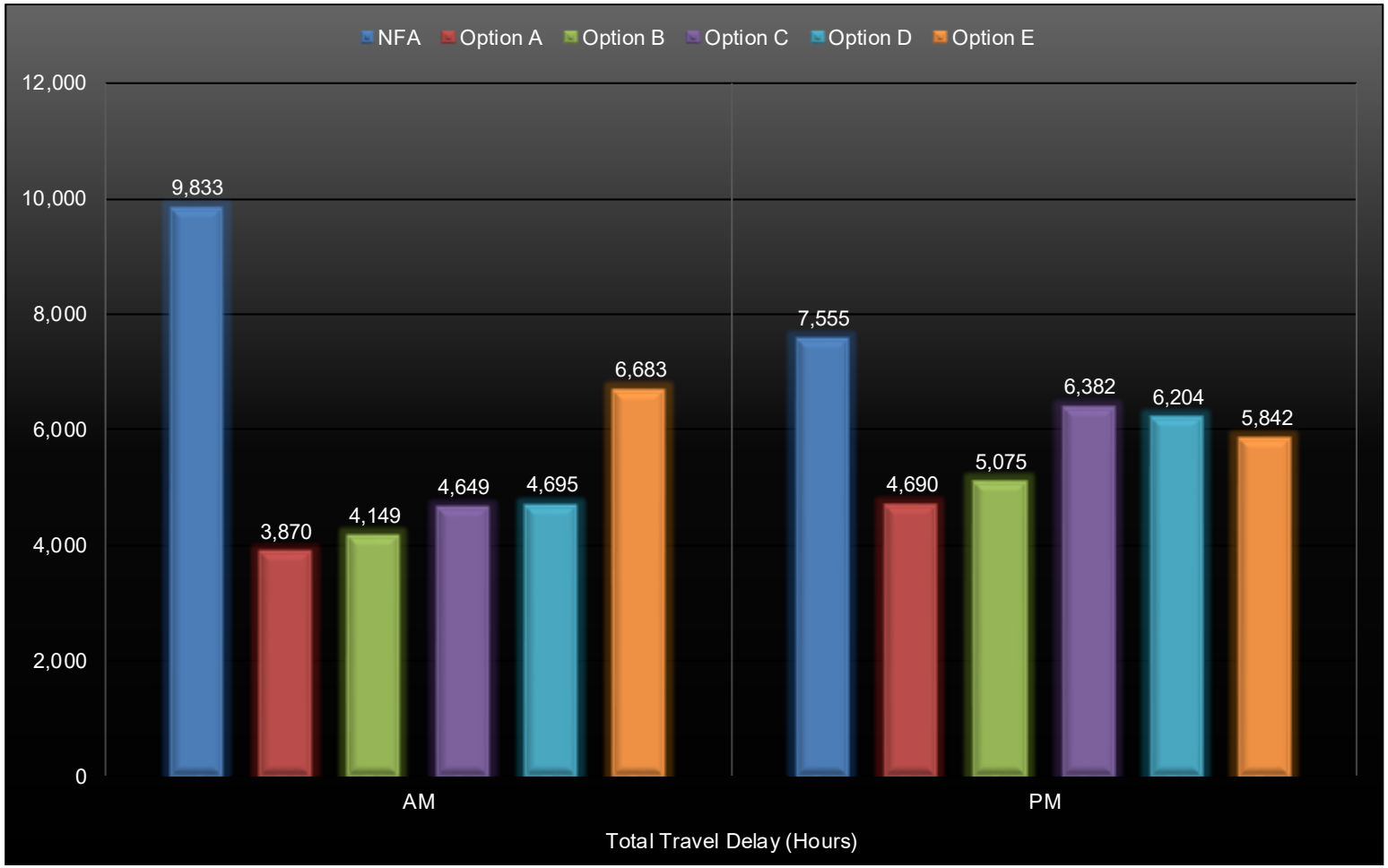
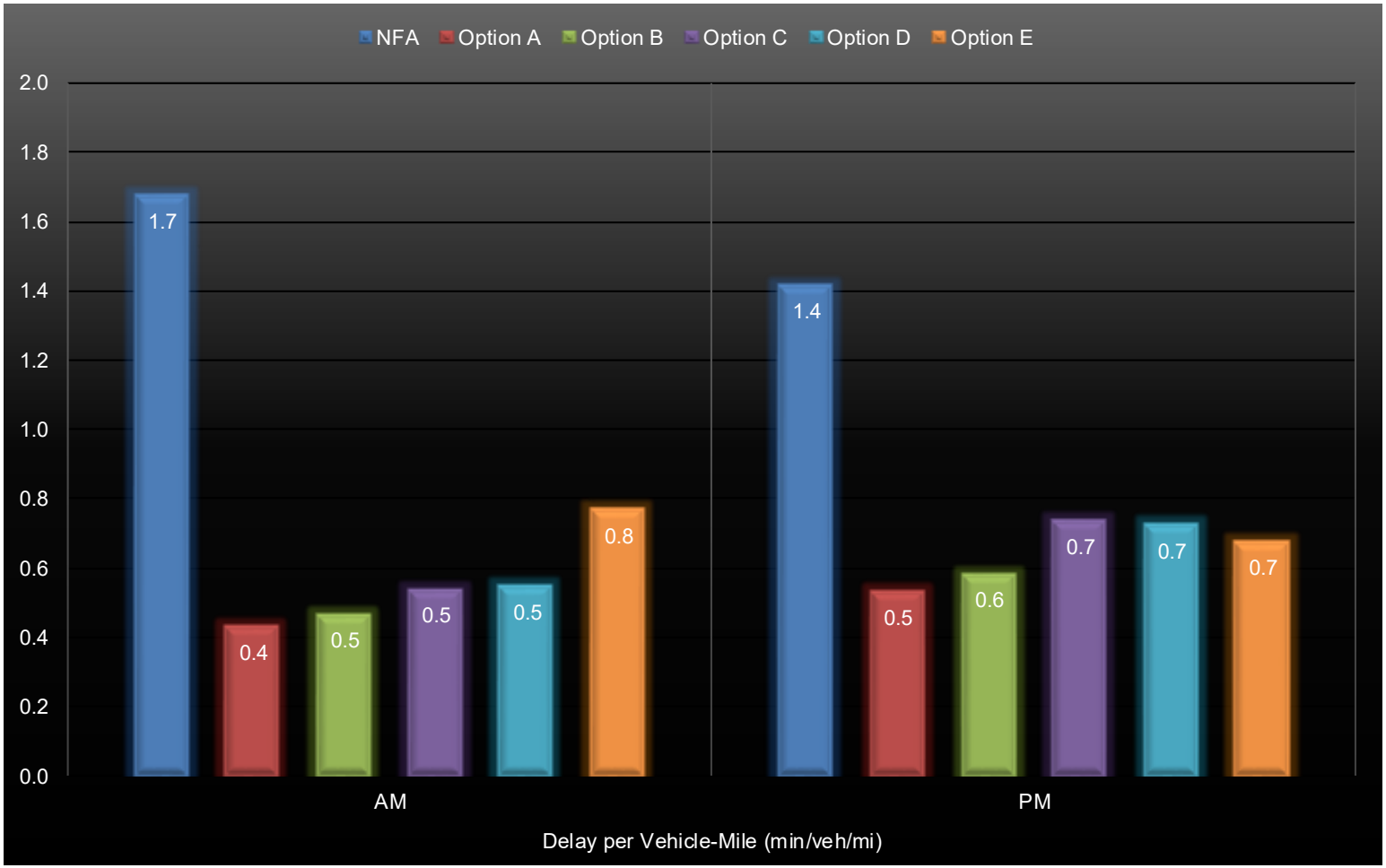


Figure 3-77 Peak Hour Delay per Vehicle-Mile Summary for 2045 Design Year



3.8 Predicted Crash Analysis with Highway Safety Manual Methodology

An HSM Predictive Crash Analysis was conducted to compare the anticipated number of crashes between the NFA and Build Alternatives within the study period. This analysis was completed using ISATe, an Excel based worksheet that helps analyze the safety performance of freeways, ramps, and ramp terminals based on facility type, traffic volumes, and roadway geometric conditions. The HSM freeway crash-predictive models have not been calibrated with Florida jurisdiction-specific data. However, since the objective is to compare the difference between the two alternatives, rather than the predicted crash frequency, calibration rates are not necessary.

3.8.1 Study Limits

The predictive crash analysis study area comprises approximately 11 miles of I-275 and I-4, an approximate 4.4-mile segment of the Selmon Expressway, and an approximate 0.8-mile segment of the I-4/Selmon Connector. Predicted crashes are calculated for roadways and ramps within the study area for both the NFA and Build Alternatives to compare their safety performance. The roadways are segmented based on number of lanes, shoulder width changes, on and off ramp locations, and other geometric factors. This information is then coded into ISATe worksheets. The study period for this project is between 2025 and 2045.

3.8.2 Predicted Crashes for the NFA Alternative

The ISATe worksheet was utilized to analyze the predicted crashes for the NFA Alternative using 2045 traffic projections. The summary results for the I-275, SR 60, and I-4 NFA Alternatives by severity are shown in **Table 3-9**, **Table 3-10**, and **Table 3-11**, respectively, while the results by crash type are shown in **Table 3-12**, **Table 3-13**, **and Table 3-14**, respectively.

The predicted number of crashes on I-275 over the study period is 29,709.6, with 212.6 fatal (K) crashes, 630.6 incapacitating injury (A) crashes, 3,448.2 non-incapacitating (B) crashes, 9,804.3 possible injury (C) crashes and 15,614.0 property damage only (PDO) crashes. Approximately 53 percent of crashes are PDO crashes. Of the 29,709.6 total crashes, 18,623.2 crashes occur on freeway segments, accounting for 63 percent of the total crashes. The top three collision types are rear-end crashes (58%), sideswipe crashes (18%), and crashes with fixed objects (12%). Eighty four percent of crashes involved multiple-vehicle crashes.

The predicted number of crashes on SR 60 over the study period is 2,014.6, with 9.7 fatal (K) crashes, 28.5 incapacitating injury (A) crashes, 179.5 non-incapacitating (B) crashes, 512.3 possible injury (C) crashes and 1,284.8 property damage only (PDO) crashes. Approximately 64 percent of crashes are PDO crashes. Of the 2,014.6 total crashes, 1,381.2 crashes occur on freeway segments, accounting for 69 percent of the total crashes. The top three collision types are rear-end crashes (57%), sideswipe crashes (20%), and crashes with fixed objects (12%). Eighty four percent of crashes involved multiple-vehicle crashes.

The predicted number of crashes on I-4 over the study period is 7,313.9, with 28.7 fatal (K) crashes, 83.2 incapacitating injury (A) crashes, 454.6 non-incapacitating (B) crashes, 1,523.4 possible injury (C) crashes and 5,224.0 property damage only (PDO) crashes. Approximately 71 percent of crashes

are PDO crashes. Of the 7,313.9 total crashes, 6,674.0 crashes occur on freeway segments, accounting for 91 percent of the total crashes. The top three collision types are rear-end crashes (58%), sideswipe crashes (20%), and crashes with fixed objects (13%). Eighty three percent of crashes involved multiple-vehicle crashes.

Table 3-9 Predicted Crashes for the I-275 NFA Alternative by Severity

Crash Severity	No-Build	
K	212.6	1%
A	630.6	2%
B	3,448.2	12%
C	9,804.3	33%
PDO	15,614.0	53%
Total Freeway Crashes	18,623.2	63%
Total Ramp Crashes	11,086.4	37%
Total Crashes	29,709.6	

Table 3-10 Predicted Crashes for the SR 60 NFA Alternative by Severity

Crash Severity	No-Build	
K	9.7	0%
A	28.5	1%
B	179.5	9%
C	512.3	25%
PDO	1,284.8	64%
Total Freeway Crashes	1,381.2	69%
Total Ramp Crashes	633.4	31%
Total Crashes	2,014.6	

Table 3-11 Predicted Crashes for the SR 60 NFA Alternative by Severity

Crash Severity	No-Build	
K	28.7	0%
A	83.2	1%
B	454.6	6%
C	1,523.4	21%
PDO	5,224.0	71%
Total Freeway Crashes	6,674.0	91%
Total Ramp Crashes	639.9	9%
Total Crashes	7,313.9	

Table 3-12 Predicted Crashes for the I-275 NFA Alternative by Crash Type

Crash Type	Crash Type Category	No-Build	
Multiple vehicle	Head-on crashes:	188.4	1%
	Right-angle crashes:	418.5	1%
	Rear-end crashes:	17,341.2	58%
	Sideswipe crashes:	5,220.5	18%
	Other multiple-vehicle crashes:	1,650.3	6%
	Total multiple-vehicle crashes:	24,818.9	
Single vehicle	Crashes with animal:	56.5	0%
	Crashes with fixed object:	3,628.6	12%
	Crashes with other object:	379.8	1%
	Crashes with parked vehicle:	69.1	0%
	Other single-vehicle crashes	756.6	3%
	Total single-vehicle crashes:	4,890.7	

Table 3-13 Predicted Crashes for the SR 60 NFA Alternative by Crash Type

Crash Type	Crash Type Category	No-Build	
Multiple vehicle	Head-on crashes:	10.7	1%
	Right-angle crashes:	29.1	1%
	Rear-end crashes:	1,154.9	57%
	Sideswipe crashes:	399.0	20%
	Other multiple-vehicle crashes:	94.4	5%
	Total multiple-vehicle crashes:	1,688.3	
Single vehicle	Crashes with animal:	4.0	0%
	Crashes with fixed object:	241.1	12%
	Crashes with other object:	26.3	1%
	Crashes with parked vehicle:	4.7	0%
	Other single-vehicle crashes	50.3	2%
	Total single-vehicle crashes:	326.3	

Table 3-14 Predicted Crashes for the SR 60 NFA Alternative by Crash Type

Crash Type	Crash Type Category	NFA	
Multiple vehicle	Head-on crashes:	24.3	0%
	Right-angle crashes:	122.3	2%
	Rear-end crashes:	4,239.7	58%
	Sideswipe crashes:	1,471.9	20%
	Other multiple-vehicle crashes:	188.0	3%
	Total multiple-vehicle crashes:	6,046.3	
Single vehicle	Crashes with animal:	16.7	0%
	Crashes with fixed object:	930.6	13%
	Crashes with other object:	115.8	2%
	Crashes with parked vehicle:	17.3	0%
	Other single-vehicle crashes	187.1	3%
	Total single-vehicle crashes:	1,267.6	

3.8.3 Predicted Crashes for the Build Alternative

The ISATe worksheet was utilized to analyze the predicted crashes for the Build Alternative using 2045 traffic projections. The summary results for the I-275, SR 60, and I-4 Build Alternatives by severity are shown in **Table 3-15, Table 3-16**, and **Table 3-17**, respectively, while the results by crash type are shown in **Table 3-18**, **Table 3-19**, and **Table 3-20**, respectively. The predictive analysis results of the Build Alternative consist of analyzing both the general use and express lanes. The results of these facilities are presented in the following tables separately and as a total for the entire Build Alternative.

The predicted number of crashes on I-275 over the study period is 21,132.1, with 115.3 fatal (K) crashes, 333.1 incapacitating injury (A) crashes, 1,793.4 non-incapacitating (B) crashes, 4,919.0 possible injury (C) crashes, and 13,971.3 property damage only (PDO) crashes. Sixty six percent of crashes are PDO crashes. Of the 21,132.1 total crashes, 16,374.2 crashes occur on freeway segments, accounting for 77 percent of the total crashes. The top three collision types are rear-end crashes (49%), crashes with fixed objects (21%), and sideswipe crashes (17%). Seventy two percent of crashes involved multiple-vehicle crashes.

The predicted number of crashes on SR 60 over the study period is 1,369.1, with 8.6 fatal (K) crashes, 24.8 incapacitating injury (A) crashes, 133.8 non-incapacitating (B) crashes, 299.5 possible injury (C) crashes, and 902.4 property damage only (PDO) crashes. Sixty six percent of crashes are PDO crashes. Of the 1,369.1 total crashes, 589.4 crashes occur on freeway segments, accounting for 43 percent of the total crashes. The top three collision types are rear-end crashes (43%), crashes with fixed objects (25%), and sideswipe crashes (17%). Sixty seven percent of crashes involved multiple-vehicle crashes.

The predicted number of crashes on I-4 over the study period is 6,348.9, with 26.1 fatal (K) crashes, 75.3 incapacitating injury (A) crashes, 414.9 non-incapacitating (B) crashes, 1,335.7 possible injury (C) crashes, and 4,496.9 property damage only (PDO) crashes. Seventy one percent of crashes are PDO crashes. Of the 6,348.9 total crashes, 5,747.5 crashes occur on freeway segments, accounting

for 91 percent of the total crashes. The top three collision types are rear-end crashes (57%), sideswipe crashes (20%), and crashes with fixed objects (14%). Eighty one percent of crashes involved multiple-vehicle crashes.

Table 3-15 Predicted Crashes for the I-275 Build Alternative by Severity

Crash Severity	Build General Use Lanes	Build Managed Lanes	Total Build	
K	98.6	16.7	115.3	1%
A	286.0	47.1	333.1	2%
B	1,540.9	252.5	1,793.4	8%
C	4,367.1	551.9	4,919.0	23%
PDO	12,141.0	1,830.3	13,971.3	66%
Total Freeway Crashes	14,226.6	2,147.6	16,374.2	77%
Total Ramp Crashes	4,207.0	551.0	4,758.0	23%
Total Crashes	18,433.6	2,698.5	21,132.1	

Table 3-16 Predicted Crashes for the I-275 Build Alternative by Severity

Crash Severity	Build General Use Lanes	Build Managed Lanes	Total Build	
K	5.3	3.3	8.6	1%
A	15.7	9.1	24.8	2%
B	84.7	49.1	133.8	10%
C	210.7	88.8	299.5	22%
PDO	566.6	335.8	902.4	66%
Total Freeway Crashes	166.3	423.1	589.4	43%
Total Ramp Crashes	716.6	63.1	779.7	57%
Total Crashes	882.9	486.2	1,369.1	

Table 3-17 Predicted Crashes for the I-4 Build Alternative by Severity

Crash Severity	Build General Use Lanes	Build Managed Lanes	Total Build	
K	24.2	1.9	26.1	0%
A	69.7	5.6	75.3	1%
B	383.5	31.4	414.9	7%
C	1,267.2	68.5	1,335.7	21%
PDO	4,275.5	221.4	4,496.9	71%
Total Freeway Crashes	5,638.0	109.5	5,747.5	91%
Total Ramp Crashes	382.1	219.3	601.4	9%
Total Crashes	6,020.1	328.8	6,348.9	

Table 3-18 Predicted Crashes for the I-275 Build Alternative by Crash Type

Crash Type	Crash Type Category	Build General Use Lanes	Build Managed Lanes	Total Build	
Multiple vehicle	Head-on crashes:	73.9	7.7	81.6	0%
	Right-angle crashes:	259.9	24.8	284.7	1%
	Rear-end crashes:	9,539.3	750.2	10,289.5	49%
	Sideswipe crashes:	3,279.4	337.9	3,617.3	17%
	Other multiple-vehicle crashes:	613.3	65.3	678.6	3%
	Total multiple-vehicle crashes:	13,765.8	1,376.5	15,142.3	
Single vehicle	Crashes with animal:	56.7	19.1	75.8	0%
	Crashes with fixed object:	3,454.1	963.4	4,417.5	21%
	Crashes with other object:	378.4	129.1	507.5	2%
	Crashes with parked vehicle:	66.5	19.7	86.2	0%
	Other single-vehicle crashes	712.1	190.7	902.8	4%
	Total single-vehicle crashes:	4,667.8	1,322.0	5,989.8	

Table 3-19 Predicted Crashes for the SR 60 Build Alternative by Crash Type

Crash Type	Crash Type Category	Build General Use Lanes	Build Managed Lanes	Total Build	
Multiple vehicle	Head-on crashes:	6.9	1.2	8.1	1%
	Right-angle crashes:	5.8	4.9	10.7	1%
	Rear-end crashes:	415.8	169.1	584.9	43%
	Sideswipe crashes:	170.9	59.1	230.0	17%
	Other multiple-vehicle crashes:	69.9	9.3	79.2	6%
	Total multiple-vehicle crashes:	669.4	243.6	913.0	
Single vehicle	Crashes with animal:	2.0	3.7	5.7	0%
	Crashes with fixed object:	162.9	176.1	339.0	25%
	Crashes with other object:	12.3	24.9	37.2	3%
	Crashes with parked vehicle:	2.9	3.7	6.6	0%
	Other single-vehicle crashes	33.4	34.2	67.6	5%
	Total single-vehicle crashes:	213.5	242.6	456.1	

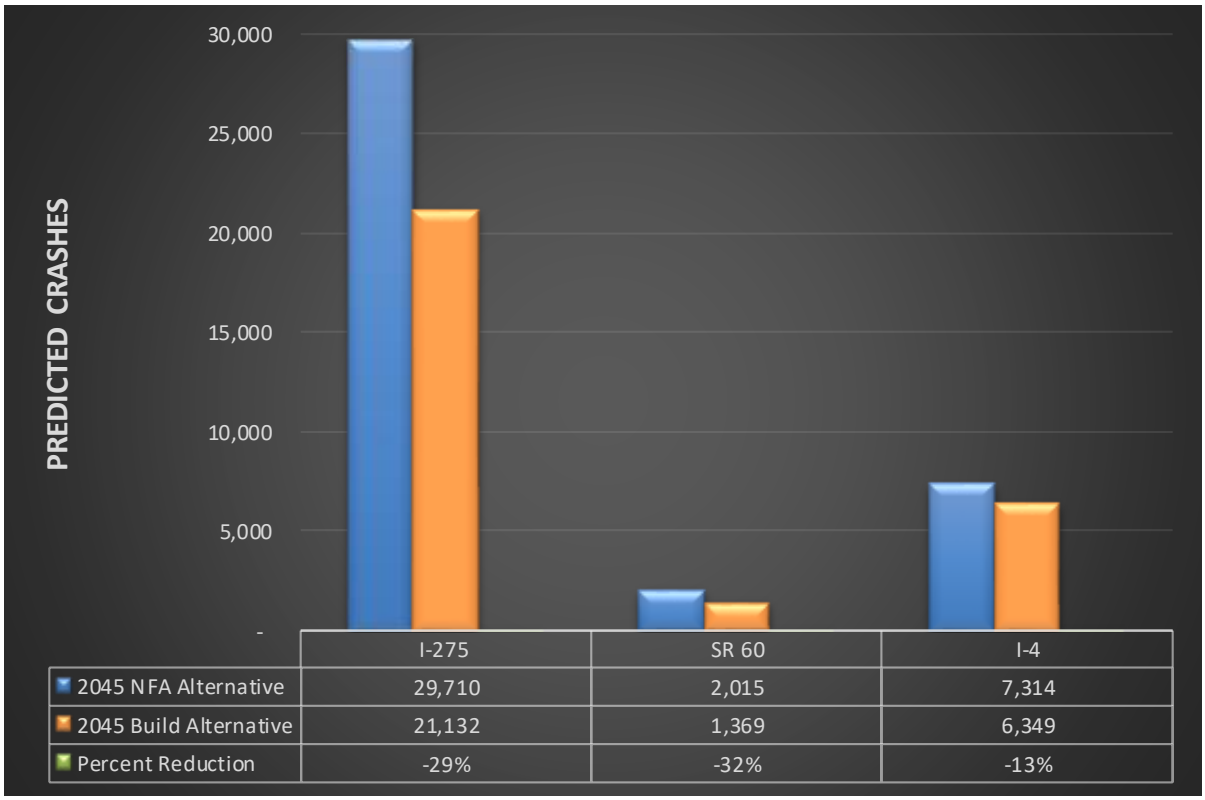
Table 3-20 Predicted Crashes for the I-4 Build Alternative by Crash Type

Crash Type	Crash Type Category	Build General Use Lanes	Build Managed Lanes	Total Build	
Multiple vehicle	Head-on crashes:	19.4	1.8	21.2	0%
	Right-angle crashes:	102.1	1.9	104.0	2%
	Rear-end crashes:	3,467.1	120.5	3,587.6	57%
	Sideswipe crashes:	1,201.6	51.5	1,253.1	20%
	Other multiple-vehicle crashes:	146.7	18.2	164.9	3%
	Total multiple-vehicle crashes:	4,937.0	193.9	5,130.9	
Single vehicle	Crashes with animal:	15.0	1.4	16.4	0%
	Crashes with fixed object:	789.4	101.5	890.9	14%
	Crashes with other object:	104.6	9.2	113.8	2%
	Crashes with parked vehicle:	15.6	1.9	17.5	0%
	Other single-vehicle crashes	158.6	20.9	179.5	3%
	Total single-vehicle crashes:	1,083.1	134.9	1,218.0	

3.8.4 Summary of Results

The results of the predictive analysis show that there is an anticipated reduction in crashes over the length of the study period by implementing the Build Alternative, even though there is an increase in the AADT, as well as number of lanes. I-275 is expected to see a reduction in crashes of 29 percent, SR 60 is expected to see a reduction of 32 percent, and I-4 is expected to see a reduction of 13 percent, as seen in **Figure 3-78**. This reduction is most likely due to volumes now being split between the general use lanes and express lanes. With the volumes split, crashes are decreased on the general use lanes and less severe crashes are experienced on the express lanes. In addition, the volume on the express lanes will be constrained to preserve adequate operations, as well as be confined to two travel lanes, reducing the amount of sideswipe type crashes.

Figure 3-78 Predicted Crash Summary – NFA Alternative & Build Alternative



	I-275	SR 60	I-4
2045 NFA Alternative	29,710	2,015	7,314
2045 Build Alternative	21,132	1,369	6,349
Percent Reduction	-29%	-32%	-13%

The I-275 corridor sees the largest reduction in individual severity types, with the largest decreases in possible injury and non-incapacitating injury crashes, 50 and 48 percent, respectively. SR 60 sees large reductions in possible injury and PDO crashes, 42 and 30 percent, respectively. Finally, I-4 also sees some minor reductions in PDO and possible injury crashes, 14 and 12 percent, respectively. The Build Alternative is also expected to reduce the number of total multiple vehicle crashes along I-275, SR 60, and I-4, 39, 46, and 15 percent, respectively. This is most likely due to a reduction in rear-end and sideswipe crashes due to splitting the volumes between general use lanes and express lanes. However, the I-275 and SR 60 corridors see an increase in total single-vehicle crashes 22 and 40 percent, respectively. This is most likely due to an increased amount of barrier walls and delineators throughout the study limits due to separating the general use lanes from the express lanes.

4. SUMMARY OF THE STUDY

4.1 Operations

The existing simulation models show congestion along the mainline at the following locations:

- Travelers experience heavier congestion during the PM peak hour compared to the AM peak hour. I-275 northbound experiences higher delays compared to I-275 southbound during both AM and PM peak hours.

- I-275 northbound, south of SR 60, was observed to be a critical bottleneck segment for both AM and PM peak hours, leading to higher delays due to high exiting traffic volumes to SR 60 off-ramp and due to vehicle slowdowns on SR 60 westbound off-ramp curve. In addition, heavy congestion is experienced during the PM peak hour along I-275 northbound, north of SR 60, primarily due to the downstream congestion. The traffic queues from I-275 and I-4 merge extend beyond Westshore Boulevard interchange.

- Overall, traffic delays for the I-4 westbound segment were higher than the I-4 eastbound segment during both the AM and PM peak hours. In the I-4 westbound segment, average traffic flow speeds were slower during the AM peak hour than during the PM peak hour.

- Critical bottleneck leading to congestion was experienced on the I-4 westbound segment from the Selmon Connector to the I-4 off-ramp to I-275 southbound caused by high exiting traffic volumes and vehicle slowdown on the off-ramp curve.

From the NFA Alternative analysis, it is observed that the current geometry will be unable to handle the future growth in traffic. This study examined the need for additional mainline improvements in each direction to increase the capacity and improve the operations and safety of I-275, I-4 and SR 60 within the study area.

The following freeway measures of effectiveness (MOEs) are compared for the Build Alternative and NFA Alternative at the end of peak hours for the 2025 Opening Year:

- Average Speed (mph)
- Total Travel Delay (in vehicle-hours)
- Travel Delay per Vehicle-Mile (in min/veh/mile)

For the NFA alternative, apart from the volume to capacity constraints on a systemwide basis, several segments experience significant delay during the AM and PM peak hours. The following segments experience heavy congestion:

- I-275 northbound between Howard Frankland Bridge and Ashley Drive off-ramp (AM/PM Peak – NFA): This segment experiences moderate to heavy congestion due to closely spaced ramps and heavy on/off-ramp demand traffic. Heavy congestion is observed south of Ashley Drive off-ramp during the AM peak hour and along the whole segment during the PM peak hour. Significant mainline and interchange improvements are necessary along this segment to address the deficiencies.
- I-275 southbound between Downtown off-ramp and Howard Avenue off-ramp (PM Peak – NFA): This segment experiences heavy congestion due to heavy on/off-ramp demand traffic.
- I-275 southbound between Hillsborough Ave on-ramp and I-4 off-ramp (AM Peak – NFA): This segment experiences heavy congestion due to heavy off-ramp demand traffic to I-4.
- I-4 westbound between I-275 interchange and 50th Street off-ramp (AM/PM Peak – NFA): This segment experiences heavy congestion due to heavy on-ramp demand traffic from Selmon Connector and off-ramp demand traffic to I-275.

The results of the CORSIM simulation analysis showed significant improvements to the overall system MOEs during AM and PM peak hours due to the Build Options compared to the NFA.

Based on the analysis, Build Options addresses most of the NFA congestion locations. However, as seen below there are segments within the Build Options that experience congestion.

- I-275 northbound between Lois Avenue off-ramp and Himes Avenue on-ramp (AM/PM Peak – All Build Options): This congestion occurs due to closely spaced ramps within this segment. There is approximately 1,000-foot spacing between the Westshore Boulevard on-ramp and Dale Mabry Highway on-ramp. Also, Dale Mabry Highway on-ramp and Himes Avenue on-ramp are approximately 650 feet apart. In addition, the traffic demand from these ramps is also significantly higher compared to the existing traffic counts. Interchange improvements are necessary along this segment specially to address the insufficient weaving distance between Westshore Boulevard on-ramp and Dale Mabry Highway off-ramp.
- I-275 northbound between Himes Avenue on-ramp and Ashley Drive off-ramp (PM Peak – Options C & D): This congestion occurs only in Options C and D due to significant increase in traffic demand in the future.
- I-275 southbound north of Dr. MLK, Jr. Boulevard off-ramp (PM Peak – All Build Options: This segment experiences congestion due to the significantly higher traffic demand for Dr. MLK, Jr. Boulevard off-ramp than a single-lane off-ramp can process. Interchange improvements are necessary to address the increase in traffic demand.
- I-4 eastbound between I-275 and Selmon Connector (PM Peak – Option B): This segment experiences congestion due to lack of direct express lane connections from I-275 north of I-4 to I-4 eastbound. This leads to additional traffic merging into the general purpose (GP) lanes along

this segment of I-4. In Options A, C and D, a direct connect ramp/slip ramp flyover connection is provided from I-275 southbound to I-4 eastbound GP ramp to the I-4 express lanes. This reduces the traffic along this segment.

Table 4-1 provides summary of the 2025 Opening Year peak hour MOE's comparing all the five Build Options (A, B, C, D and E) to the NFA Option.

Figures 4-1 through 4-3 show the peak hour Average speed, Total Travel delay and Travel Delay per Vehicle-Mile comparison of the five Build Options (A, B, C, D and E) to the NFA for the 2025 Opening Year.

Table 4-1 2025 Opening Year Peak Hour MOE Comparison vs NFA

MOEs	Time Period	Option A Vs. NFA	Option B Vs. NFA	Option C Vs. NFA	Option D Vs. NFA	Option E Vs. NFA
Average Speed (MPH)	AM	51%	51%	53%	54%	29%
	PM	80%	84%	58%	55%	69%
Total Travel Delay (Hours)	AM	-71%	-70%	-76%	-77%	-41%
	PM	-67%	-70%	-49%	-47%	-59%
Delay per Vehicle-Mile (min/veh/mi)	AM	-77%	-76%	-80%	-81%	-53%
	PM	-77%	-80%	-65%	-62%	-72%

Figure 4-1 Average Peak Hour Speed Improvement Vs NFA (2025 Opening Year)

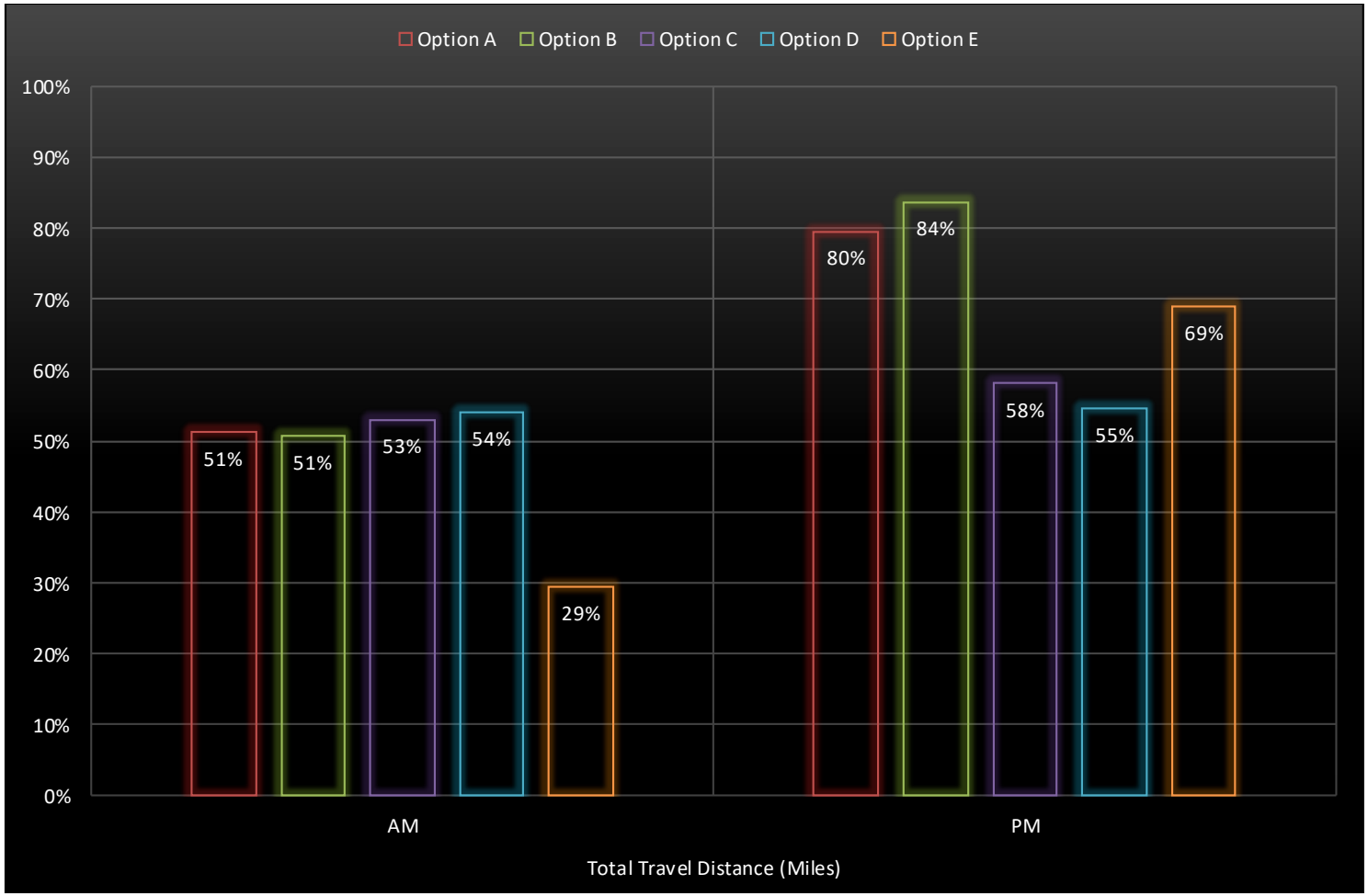


Figure 4-2 Total Peak Hour Travel Delay Reduction Vs NFA (2025 Opening Year)

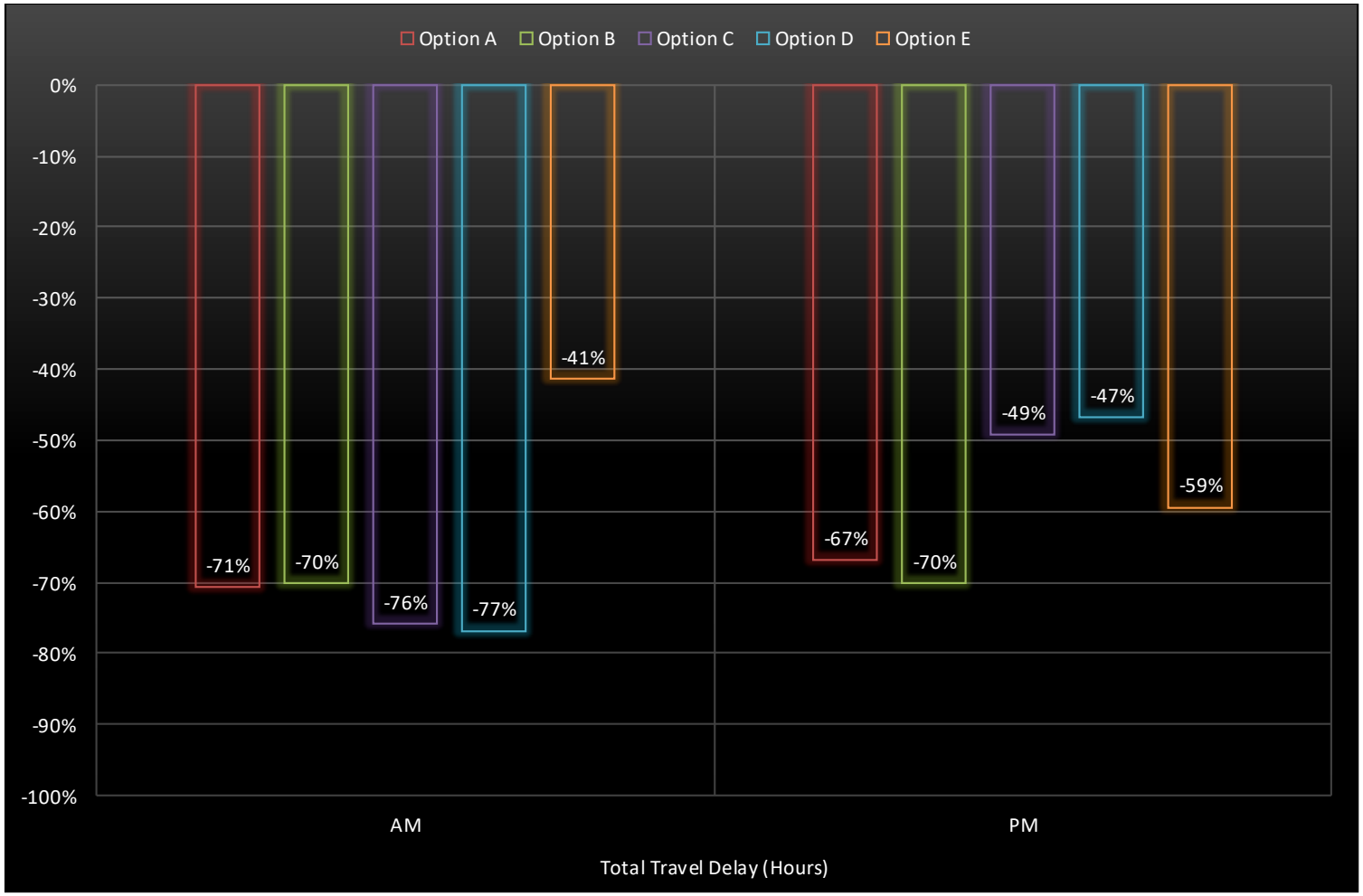
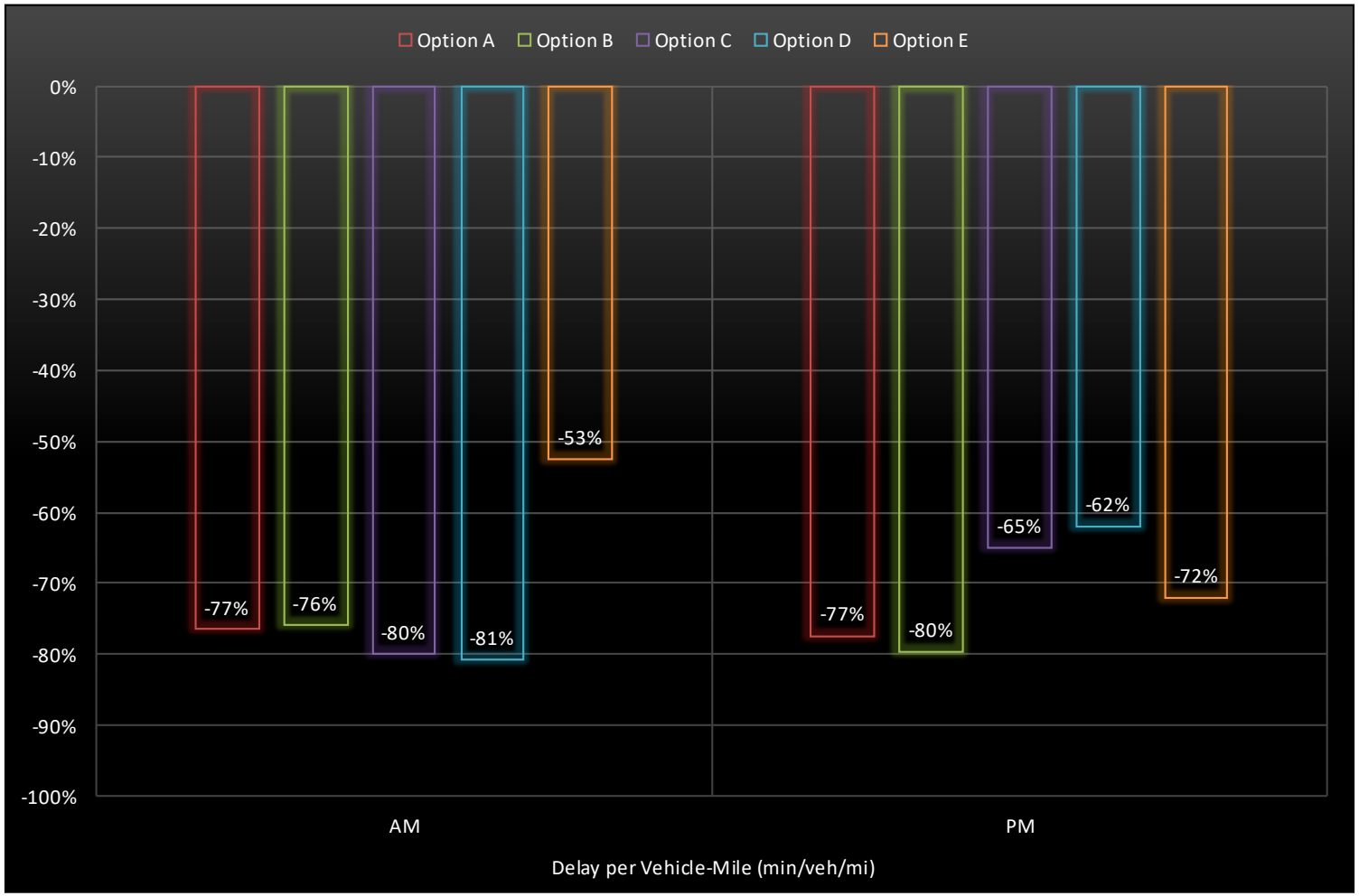


Figure 4-3 Peak Hour Travel Delay per Vehicle-Mile Reduction Vs NFA (2025 Opening Year)



Similar to the 2025 Opening year, the results of the CORSIM simulation analysis showed significant improvements to the overall system MOEs during AM and PM peak hours due to the Build Options compared to the NFA for the 2045 Design Year. **Table 4-2** provides the summary of the 2045 Design Year peak hour MOE's comparing all the five Build Options (A, B, C, D and E) to the NFA Option.

Figures 4-4 through 4-6 show the peak hour Average speed, Total Travel delay and Travel Delay per Vehicle-Mile comparison of the five Build Options (A, B, C, E and E) to the NFA for the 2045 Design Year.

Table 4-2 2045 Design Year Peak Hour MOE Comparison vs NFA

MOEs	Time Period	Option A Vs. NFA	Option B Vs. NFA	Option C Vs. NFA	Option D Vs. NFA	Option E Vs. NFA
Average Speed (MPH)	AM	86%	82%	72%	72%	48%
	PM	59%	54%	40%	40%	46%
Total Travel Delay (Hours)	AM	-61%	-58%	-53%	-52%	-30%
	PM	-38%	-33%	-16%	-18%	-25%
Delay per Vehicle-Mile (min/veh/mi)	AM	-74%	-72%	-68%	-67%	-53%
	PM	-63%	-59%	-48%	-49%	-54%

Peak Period Benefits Comparison (Value of Time)

In addition, to the benefits seen during the AM and PM peak hours, each of the options provide significant delay reduction during the 4-hour AM peak period and 4-hour PM peak period by the 2045 design year. Note that the delay reduction is much more by the 2025 Opening year for each of the options compared to the NFA. The annual savings calculated are based on the value of delay time of $25.00 per vehicle. https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-2017-10.pdf

- Option A provides a delay reduction of 16,293 vehicle-hours during the 4-hour AM peak period and 7,924 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $157.4 million compared to the NFA.
- Option B provides a delay reduction of 15,397 vehicle-hours during the 4-hour AM peak period and 6,785 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $144.2 million compared to the NFA.
- Option C provides a delay reduction of 13,689 vehicle-hours during the 4-hour AM peak period and 2,547 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $105.5 million compared to the NFA.

- Option D provides a delay reduction of 13,648 vehicle-hours during the 4-hour AM peak period and 3,163 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $109.3 million compared to the NFA.
- Option E provides a delay reduction of 6,564 vehicle-hours during the 4-hour AM peak period and 5,430 vehicle-hours during the 4-hour PM peak period. This results in annual savings due to peak period delay of $76.8 million compared to the NFA.

Figure 4-4 Average Peak Hour Speed Improvement Vs NFA (2045 Design Year)

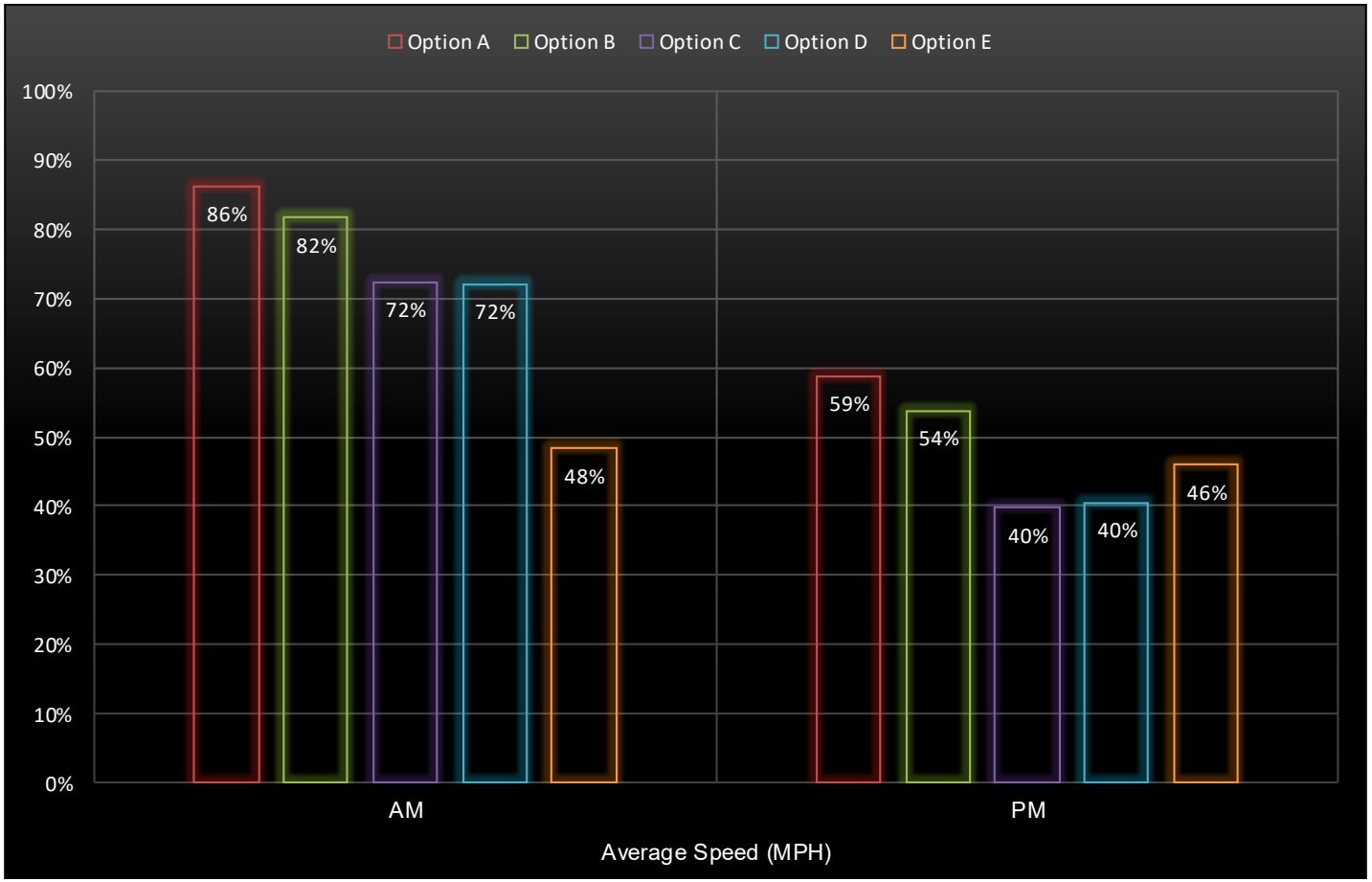


Figure 4-5 Total Peak Hour Travel Delay Reduction Vs NFA (2045 Design Year)

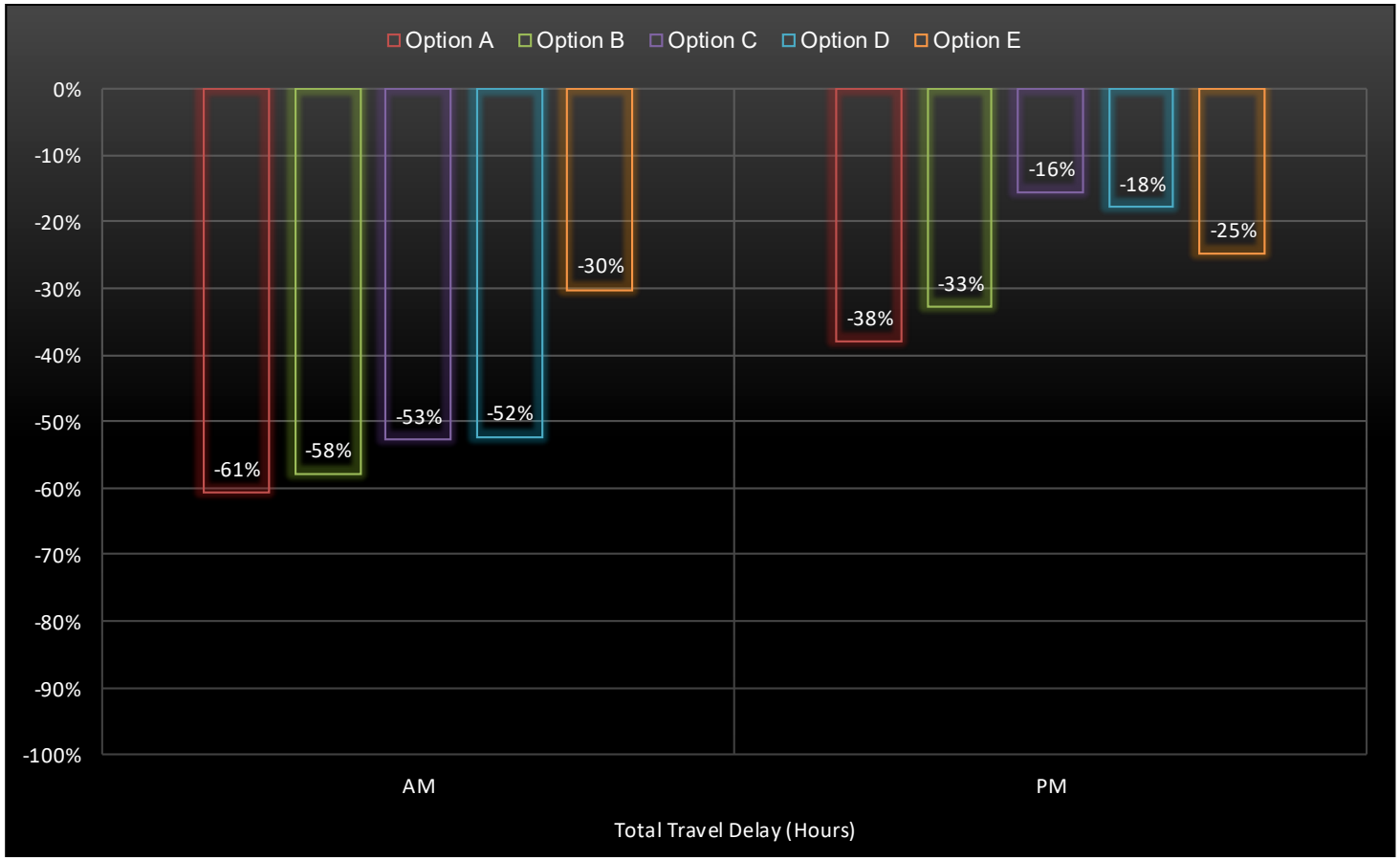
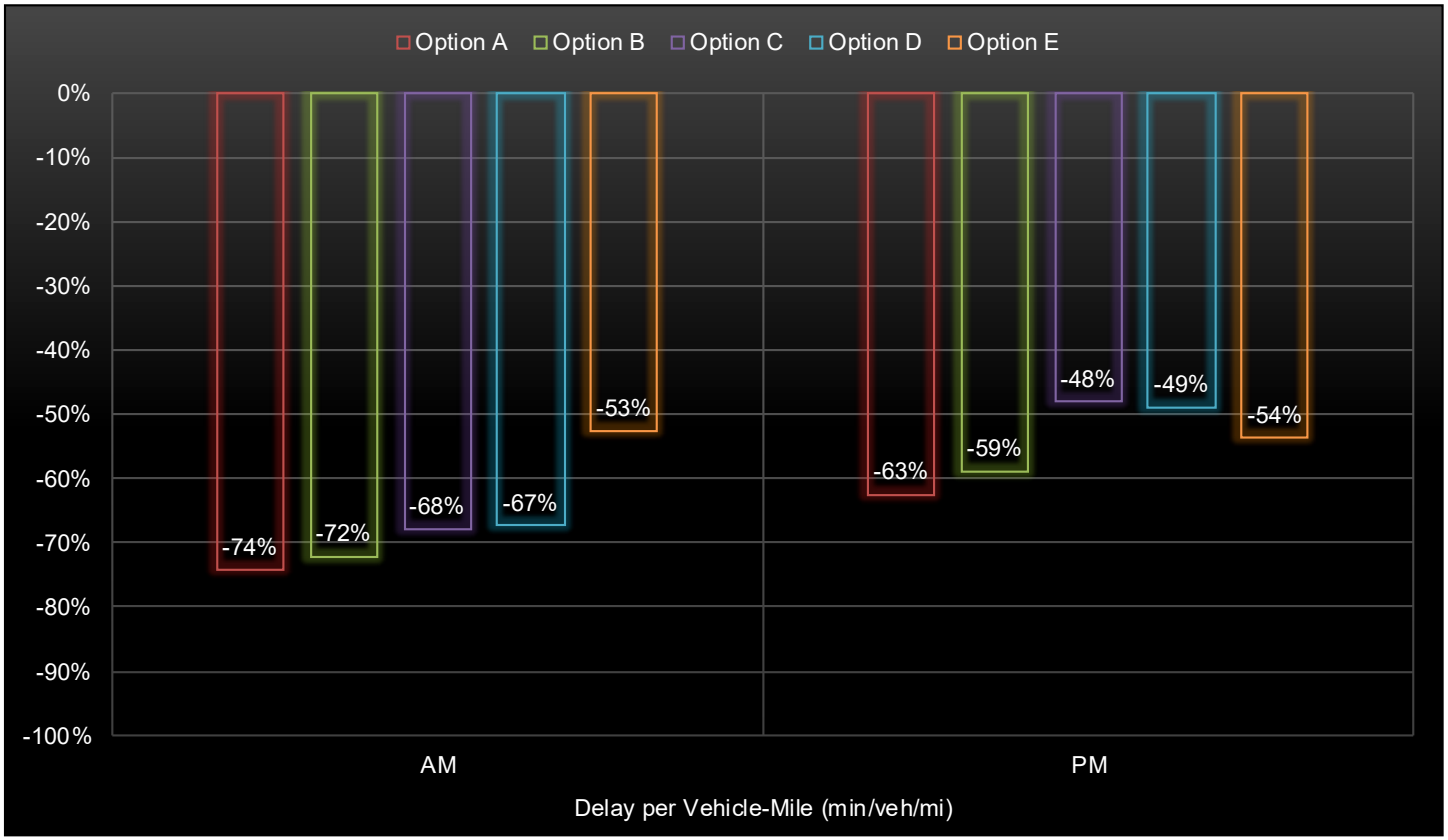


Figure 4-6 Peak Hour Travel Delay per Vehicle-Mile Reduction Vs NFA (2045 Design Year)



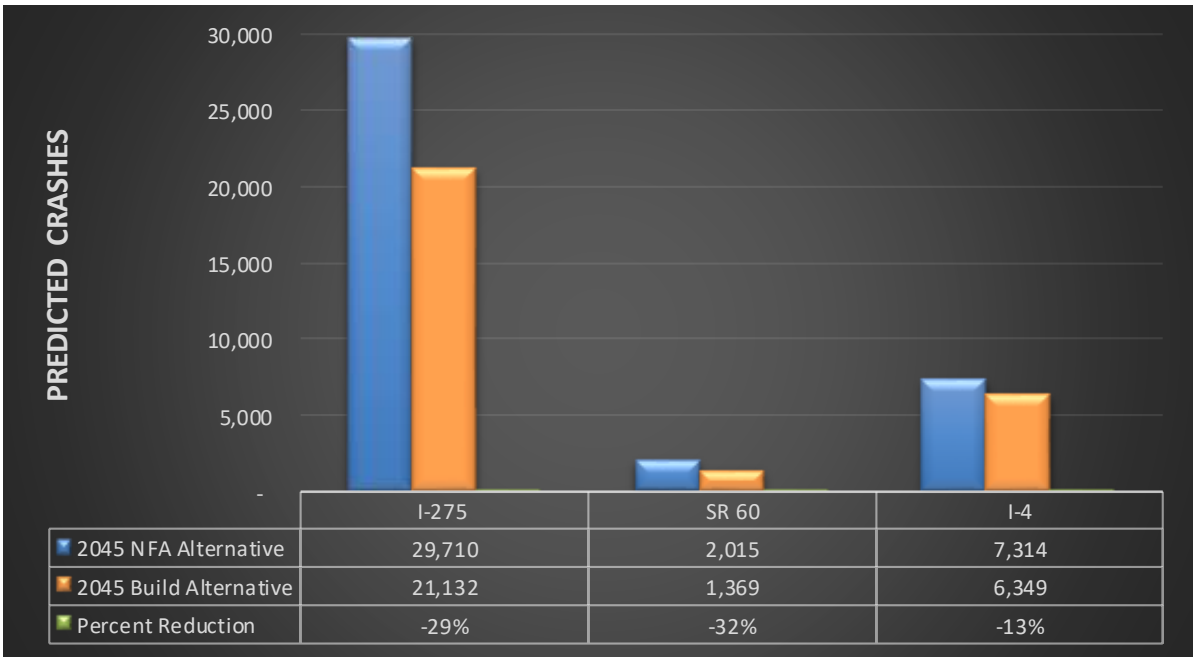
4.2 Safety

Over the five-year period a total of 7,440 crashes were reported within the SEIS limits of TIS Segments 1A/2A and 2B/3A/3B. Of these, the majority were rear-end crashes, which comprised 64% of the total crashes, followed by sideswipes at 18%. Additional crash types include hitting a fixed object (6%) and run off the road (5%). Segments 2B/3A/3B, which includes the downtown interchange area, experienced the most crashes of the two Segments, but also covers over twice the distance as Segment 1A/2A.

In total, there were 9 crashes involving a fatality and 2,145 crashes resulting in an injury. Six of the nine fatal crashes occurred within Segments 2B/3A/3B; all six occurred on I-275.

The ISATe worksheet was utilized to analyze the predicted crashes for the NFA Alternative using 2045 traffic projections. The results of the predictive analysis show that there is an anticipated reduction in crashes over the length of the study period by implementing the Build Alternative, even though there is an increase in the AADT, as well as number of lanes. I-275 is expected to see a reduction in crashes of 29 percent, SR 60 is expected to see a reduction of 32 percent, and I-4 is expected to see a reduction of 13 percent, as seen in **Figure 4-7**. This reduction is most likely due to volumes now being split between the general use lanes and express lanes. With the volumes split, crashes are decreased on the general use lanes and less severe crashes are experienced on the express lanes. In addition, the volume on the express lanes will be constrained to preserve adequate operations, as well as be confined to two travel lanes, reducing the amount of sideswipe type crashes.

Figure 4-7 Predicted Crash Summary – NFA Alternative & Build Alternative



	I-275	SR 60	I-4
2045 NFA Alternative	29,710	2,015	7,314
2045 Build Alternative	21,132	1,369	6,349
Percent Reduction	-29%	-32%	-13%

The I-275 corridor sees the largest reduction in individual severity types, with the largest decreases in possible injury and non-incapacitating injury crashes, 50 and 48 percent, respectively. SR 60 sees large reductions in possible injury and PDO crashes, 42 and 30 percent, respectively. Finally, I-4 also sees some minor reductions in PDO and possible injury crashes, 14 and 12 percent, respectively. The Build Alternative is also expected to reduce the number of total multiple vehicle crashes along I-275, SR 60, and I-4, 39, 46, and 15 percent, respectively. This is most likely due to a reduction in rear-end and sideswipe crashes due to splitting the volumes between general use lanes and express lanes. However, the I-275 and SR 60 corridors see an increase in total single-vehicle crashes of 22 and 40 percent, respectively. This is most likely due to an increased amount of barrier walls and delineators throughout the study limits due to separating the general use lanes from the express lanes.