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Florida Department of Transportation

STATEWIDE WRONG WAY CRASH STUDY

Final Report | April 2015

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Statewide Wrong Way Crash Study

Statewide Wrong Way Crash Study Final Report

FDOT Central Office

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LIST OF ACRONYMS

ATSSA	American Traffic Safety Services Association
CARS	Crash Analysis Reporting System
CCTV	Closed Circuit Television
CFX	Central Florida Expressway
CUTR	Center for Transportation Research
DMS	Dynamic Message Signs
DTOE	District Traffic Operations Engineer
FDOT	Florida Department of Transportation
FHP	Florida Highway Patrol
FHWA	Federal Highway Administration
FSU	Florida State University
FTE	Florida's Turnpike Enterprise
HEFT	Homestead Extension of the Florida Turnpike
ITS	Intelligent Transportation Systems
LED	Light-Emitting Diode
MADD	Mothers Against Drunk Driving®
MoDOT	Missouri Department of Transportation
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NTSB	National Transportation Safety Board
PDO	Property Damage Only
PPM	Plans Preparations Manual
RCI	Roadway Characteristics Inventory
RRFB	Rectangular Rapid Flashing Beacons
TMC	Traffic Management Center
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
UCF	University of Central Florida
USF	University of South Florida

Section 1
Executive Summary

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) has studied wrong way crashes occurring on interstate freeways and expressways throughout the state of Florida. In the past five years (2009-2013), 280 crashes have occurred on Florida's freeways and expressways resulting in more than 400 injuries and 75 deaths. This study analyzed trends and contributing factors surrounding wrong way driving on freeways and expressways. It proposed systemic countermeasures to prevent or discourage wrong way occurrences, reducing wrong way crashes and driving down fatalities on Florida's freeways and expressways. The analysis findings, engineering countermeasures, and implementation plan for the study are summarized as follows:

FINDINGS

Literature Review

- The literature review included studies and reports from Federal Highway Administration (FHWA), the National Transportation Safety Board (NTSB), the American Traffic Safety Services Association (ATSSA), and the states of Michigan, Illinois, Texas, Wisconsin, and Rhode Island.
- The following characteristics associated with wrong way crashes were commonly cited in the literature:
    - Driver impairment
    - Late night / early morning driving
    - Driving on weekends
    - Urban areas
    - Multiple-vehicle crashes
    - Overrepresented age groups (16 to 24 years old and over 65 years old)
- The majority of wrong way movements are entering the freeway/expressway from an exit ramp
- Susceptible interchange types for wrong way entry include partial cloverleaf, diamond, and left-hand exit ramps. Full cloverleaf is considered the most desirable for preventing wrong way movements. The diverging diamond also provides opportunities to reduce wrong way movements over many traditional interchange configurations.
- Countermeasures to reduce wrong way driving include geometric design elements at the interchange exit ramps, signing and pavement marking within the interchange area, and a variety of dynamic/ITS technologies.

Pilot Projects

- TxDOT is implementing LED-illuminated WRONG WAY signs at frontage road exit ramps with a history of wrong way driving at typical cost of $14,000 per ramp installation. Low-mounted signs are being considered in a study by Texas Transportation Institute (TTI).
- Pilot projects in Florida include the following locations:
    - FDOT District 3: four locations on I-10 in Tallahassee
    - FDOT District 7: red RRFB installations at multiple locations in Tampa area
    - Turnpike: ten locations on the Homestead Extension (HEFT), five locations on the Sawgrass Expressway in South Florida
    - Central Florida Expressway Authority (CFX): five locations in Central Florida
- The pilot projects include ITS technology to detect wrong way movement on ramps in combination with LED-illuminated WRONG WAY signs. The I-10 installations also include enhanced signage and geometric improvements at the ramp termini and on the cross-streets within the interchange areas.

Statewide Crash Summary

- Over the study period (2009-2013), more than 6,300 potential wrong way crashes were identified on freeways/expressways in Florida using the following criteria coded in Florida's Crash Analysis Reporting System (CARS) database:
    - Contributing cause coded as wrong way driving
    - Non-identical vehicular crash directions
    - Head-on harmful event type
    - Fatal crashes
- After review of the crash reports of the potential wrong way crashes, 280 wrong way crashes were confirmed in the five-year period.
- More than half (51 percent) of the crashes resulted in injury (411 injuries), and (18 percent) resulted in fatality (75 fatalities).
- Weekends and early morning hours (12am to 6am) were found to be more susceptible to wrong way crashes
- Alcohol and/or drugs were involved in 45 percent of wrong way crashes, more than 16 times the alcohol and/or dug involvement proportion for freeway/expressway crashes in Florida
- The majority of wrong way crashes (71 percent) occurred in dark conditions, reversing the proportion of general freeway/expressway crashes in the state (29 percent in dark conditions).

- Drivers less than 30 years old account for 42 percent of the wrong way crashes; statewide trends on freeway/expressway crashes indicate a proportion of 50 percent for the same age range. Therefore, driver age proportions appear to be similar for wrong way crashes and all freeway/expressway crashes.
- Drivers 75 years and older account for 4.6 percent of the wrong way crashes. However, this is more than three times the expected proportion from statewide trends on freeway/expressway crashes (1.4 percent for drivers 75 years and older). Therefore, drivers 75 years and older are more susceptible (i.e. at higher risk) of a wrong way-related crash.
- Approximately 75 percent of wrong way crashes occurred in urban areas and 25 percent in rural areas.
- Within FDOT district jurisdictions, the districts with the most wrong way crashes were District 2 (49 crashes), Turnpike System (49 crashes), District 6 (37 crashes), and District 5 (35 crashes).

High Crash Locations

- The crash data were analyzed to identify potential high crash locations associated with wrong way entry. The analysis centered on the location of each wrong way crash and a scoring system for potential wrong way entry points upstream of the wrong way driver.
- The interchange types with the highest crash scores included:
    - diamond/partial diamond (crash score of 98)
    - partial cloverleaf (crash score of 45)
    - trumpet (crash score of 17)
- The interchange type with the lowest crash score was:
    - full cloverleaf (crash score of 1)
- The crash score distribution was fairly consistent with the proportion of interchange types across the state. Therefore, the higher crash scores at certain interchange types are consistent with their higher levels of exposure across the state.
- From the high crash location analysis, 40 interchange locations were selected for field review. These locations were discussed and agreed upon with the District Traffic Operations Engineers (DTOE).
- At each of the 40 interchange locations, an existing conditions assessment was conducted, accompanied by an existing conditions diagram. Suggested systemic-type countermeasures for reducing wrong way driving on Florida's freeways/expressways were provided.

Interchange Field Reviews – General Observations

- Guide Signs
  - Multi-lane arterial cross-street guide signage in advance of the interchange often utilized interstate shield signs instead of large green destination signs.
  - Upgrading guide signage would provide a motorist with more information in advance of the interchange, such as the appropriate lane for the desired ramp/direction.
- Ramp Intersection Signage
  - Signage at the interchange exit ramp/cross-street intersections generally met the MUTCD (6) minimum requirements being:
    - One DO NOT ENTER sign
    - One WRONG WAY sign
    - The MUTCD allows for additional optional signs:
      - Redundant DO NOT ENTER and WRONG WAY signs
      - ONE WAY signs coupled with the DO NOT ENTER signs
      - Turn restriction signs (NO LEFT TURN signs, NO RIGHT TURN signs, etc.) on the cross-street
  - At interchanges where entrance and exit ramps were adjacent to each other (i.e. partial cloverleaf, trumpet), not all locations had the KEEP RIGHT sign on the median separating the entrance and exit ramps.
  - The majority of the wrong way signs observed could be replaced with larger signs, per the 2009 MUTCD (6).
- Pavement Markings
  - The condition of raised pavement markers (RPM) and the pavement markings (wrong way arrows, stop bars) varied greatly among the locations reviewed.
  - Dotted guide line stripes (also known as lane line extensions) were observed at many cross-street intersections, providing guidance to motorists of the appropriate intersection turn maneuvers.
  - Left turn arrows were occasionally painted in turn lanes extending through the upstream cross-street/ramp intersection, potentially encouraging a turning vehicle onto the first exit ramp.
  - In other instances, a straight arrow with a RAMP pavement marking message was used in advance of the upstream (first) cross-street/ramp intersection.
- Lighting

  - The lighting levels varied among the locations from no lighting, to high mast interchange lighting only, to both interchange and street-level lighting.
  - The interchanges providing the greatest nighttime visibility included street-level lighting at the entrance ramps.
- Geometric Design
  - A variety of median openings were observed at the cross-street/exit ramp intersections. Median openings formed to prevent left-turns from the cross-street (on to an exit ramp) are effective in discouraging wrong way movements.
  - Multiple locations were noted where median extensions could be constructed to further discourage wrong way left-turns.
- Maintenance
  - Signage appeared to be the most obvious deterrent to wrong way driving at the locations. However, many of the signs were worn from exposure to the elements. Many locations would benefit by replacing existing signs with larger signs having higher levels of retroreflectivity.

ENGINEERING COUNTERMEASURES

Engineering countermeasures were grouped into implementation levels for application purposes. The first level (Level 1a) describes Florida's current minimum requirements, primarily based upon the MUTCD (6) minimum requirements. The next level (Level 1b) is the proposed new minimum requirements, which adds the MUTCD "optional" signs and specifies other application details. Level 1a and Level 1b countermeasure implementations are compared visually in Figures 20 and 21. Levels 2 and 3 provide additional enhancements (static and dynamic/ITS, respectively) that may be considered for special application on a case-by-case basis. The countermeasure implementation levels are summarized as follows:

Level 1a – Current MUTCD and FDOT Minimum Requirements

- Proper signing sequences and level of interchange guide signage on cross-street approaches
- MUTCD (6) minimum sign package (MUTCD, Figure 2B-18 and report Figure 20)
  - One DO NOT ENTER sign
  - One WRONG WAY sign
- KEEP RIGHT signs, as appropriate, on side-by-side exit and entrance ramps
- Stop bars at end of exit ramps
- Wrong Way Arrows on exit ramp (Standard Index 17345)
- Entrance ramp directional assembly (e.g. MUTCD, Section 2D.32)
- Ramp and cross-street lighting (Plans Preparations Manual (PPM), Vol 1, Sect. 7.3.4)

Level 1b – Proposed New FDOT Minimum Requirements

- Add MUTCD "optional" signs
    - Second DO NOT ENTER sign
    - Second WRONG WAY sign
    - ONE WAY signs
    - Turn restriction signs (i.e. NO RIGHT TURN signs, NO LEFT TURN signs, etc.)
- Upgrade sign sizes to meet oversized sign sizes at minimum (MUTCD, Table 2B-1)
- Lower (4-foot) mounting height for WRONG WAY signs
- Add vertical retroreflective strip on sign supports (MUTCD, Figure 2A-1[E])
- Add Type XI retroreflective sheeting on signs
- Install higher standard of cross-street guide signage in advance of the interchange (e.g. overhead vs. side-mount, green sign vs. shield)
- Add 2-foot by 4-foot dotted guide line stripes (also known as lane line extensions) for left turns between ramps entrances/exits and cross-streets
- Install a minimum of two directional sign assemblies at the entrance ramp (one facing each cross-street direction), consisting of the following signs:
    - Cardinal Direction auxiliary sign (e.g. MUTCD, M3-1)
    - Interstate shield route sign (e.g. MUTCD, M1-1)
    - Directional Arrow auxiliary sign (e.g. MUTCD, M6-2a)
- Add retroreflective paint (yellow) on ramp median nose where applicable
- Use a straight arrow and interstate shield pavement marking in left-turn lanes extending from the far-side ramp intersection through the near-side ramp intersection to prevent premature left turns, where applicable
- Extend cross-street median noses at ramp exit intersections to discourage wrong way turning movements where opportunities exist (quick curb may also be used temporarily as needed in retrofit situations)
- Shape median openings to restrict/deter wrong way turning movements where appropriate (quick curb may be used temporarily as needed in retrofit situations)

Level 2 – Enhanced Static Treatments & Signal Indications

- Install a redundant entrance ramp directional sign assembly on the opposite side of the ramp
- Use FREEWAY ENTRANCE signs (e.g. MUTCD, D13-3) to enhance the entrance ramp directional sign assemblies
- Freeway-sized signs or larger (i.e. larger than MUTCD (6) guidance), particularly on multi-lane exit ramps
- Second set of WRONG WAY signs at staggered height, if ramp length allows
- Retroreflective sheeting border around WRONG WAY signs (MUTCD, Figure 2A-1[D])
- WRONG WAY signs on the back of existing structures (overhead signs, toll booths, etc.)
- Replace circular green with through green arrow indications on outside lane signal heads (where appropriate) to deter wrong way right-turns onto exit ramps

Level 3 – Dynamic/ITS Treatments

- LED-illuminated WRONG WAY signs with radar detection
- Red in-pavement flashers creating the illusion of a stop bar on the exit ramp
- Flashing RPMs along the exit ramp edge line
- Mainline wrong way detection (e.g. negative speed detection)
- Wrong way detection integration with traffic management centers (TMCs), closed circuit television (CCTV), dynamic message signs (DMS) to warn other motorists, and law enforcement
- Coordination with real-time travel information providers and in-vehicle applications, on-board navigation systems, and cellular device applications to provide advance warning to motorists of wrong way drivers
- Connected vehicle applications

IMPLEMENTATION PLAN

To support the Districts in providing a consistent, predictable, and repeatable plan to reduce the occurrence of wrong way incidents throughout the state, this report provides an implementation plan to assist in the prioritization and implementation of suggested countermeasures. The implementation plan consists of a unified approach to inspect and improve existing interchanges in each District, considerations for wrong way countermeasures in the planning and design stages of new (or reconstructed) interchanges, and suggestions for developing effective education and enforcement strategies.

Existing Interchanges

It is suggested each District bring the wrong way countermeasures at each interchange up to the proposed new minimum standard (Level 1b) over a three-to-five year timeframe through a unified approach to inspect interchanges, apply countermeasures, and provide maintenance. Priority interchange locations and interchange types are provided in the report.

New or Reconstructed Interchanges

Designers should actively consider wrong way countermeasures in the planning and design stages of interchange projects. The Department's development of a consistent approach for wrong way countermeasures is recommended to support consistent and robust designs against wrong way driving at interchange ramp/cross-street intersections.

Education and Enforcement Task Force

Further coordination at the district levels with local law enforcement and impaired driving advocacy groups has the potential to yield a deeper understanding of the driver behavior issues at the root of wrong way driving. It is suggested each district safety office form a special task force made up of representatives from FDOT, local advocacy groups (e.g. MADD), educators, and local law enforcement

agencies. The wrong way driving issues could also be taken on by existing Community Traffic Safety Teams (CTST) in each district. FDOT representatives of the special task force for each district should regularly meet to share insights and craft education and enforcement strategies with a sharp focus toward target audiences, locations, and timeframes, that can be consistently implemented statewide (as appropriate). These efforts should also be coordinated with Central Office to effectively identify potential funding sources for the agreed-upon strategies.

Section 2
Introduction

INTRODUCTION

BACKGROUND

The Florida Department of Transportation (FDOT) has studied wrong way crashes occurring on interstate freeways and expressways throughout the state of Florida. In the past five years (2009-2013), 280 crashes have occurred on Florida's freeways and expressways resulting in more than 400 injuries and 75 deaths. This study analyzes trends and contributing factors surrounding wrong way driving on freeways and expressways. It proposes systemic countermeasures to prevent or discourage wrong way occurrences, reducing wrong way crashes and driving down fatalities on Florida's freeways and expressways.

LITERATURE REVIEW

The National Transportation Safety Board (NTSB) defines wrong way driving as "vehicular movement along a travel lane in a direction opposing the legal flow of traffic on high-speed divided highways or access ramps" (1). Many states and federal organizations have conducted research on wrong way driving since the advent of the Interstate Highway System. Wrong way driving is of great interest due to its propensity to result in fatal and severe injury crashes. The literature review conducted for this study included studies from national organizations such as the Federal Highway Administration (FHWA), the NTSB, and the American Traffic Safety Services Association (ATSSA), as well as studies from other states, including Michigan, Illinois, Texas, Wisconsin, and Rhode Island. General characteristics surrounding wrong way crashes include the following (1)(2)(3):

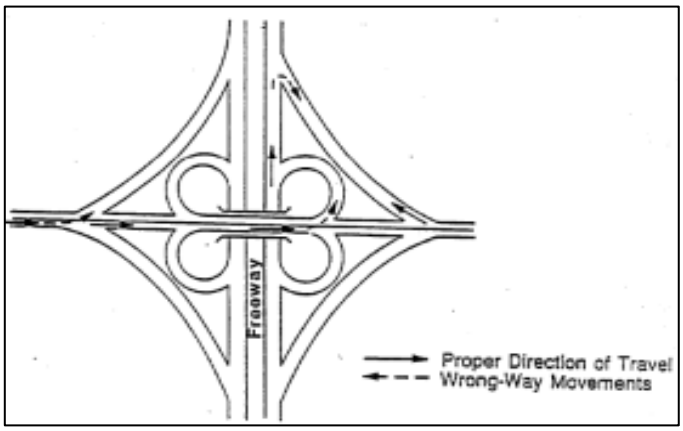
- Driver impairment – higher levels of alcohol and/or drug impairment are associated with at-fault drivers in wrong way crashes (i.e. wrong way drivers) than in other freeway/expressway crashes. Multiple sources listed ranges upwards of 50 percent.
- Early morning period – wrong way crashes are disproportionately skewed toward the early morning hours, with nearly half occurring between midnight and 6am.
- Weekends – wrong way crashes are disproportionately skewed toward weekends, with more than half occurring on Friday, Saturday, or Sunday.
- Age of wrong way driver – age ranges of 16 to 24 years old, and 65 years and older, have been noted as more susceptible to wrong way driving.
- Urban areas – wrong way crashes tend to occur in urban areas more frequently than rural areas.
- Multiple-vehicle crashes – majority of wrong way crashes involve hitting another motor vehicle as opposed to a highway barrier, ditch, or some other fixed object (1).
- Wrong way entry – entering the freeway/expressway system in the wrong direction from an exit ramp is the most commonly identified origin of wrong way driving.

Interchange Types

Many researchers have pointed to particular interchange types as more conducive to wrong way entry. Partial cloverleaf and other interchange types with adjacent or parallel ramps were noted as the most susceptible interchange types for wrong way entry in the literature review. Full cloverleaf interchanges were noted as the most desirable interchange type to avoid wrong way entry maneuvers. Copelan (4) provided an excellent discussion on a variety of interchange types and design recommendations to discourage wrong way driving. A summary of Copelan's findings and recommendations is provided below. Quotations are from the author (Copelan).

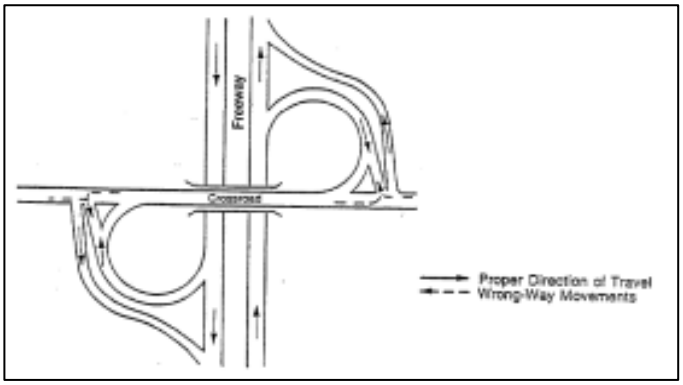
Full Cloverleaf

- Copelan states this interchange type is "most desirable" to avoid wrong way movements.
- Providing a median separator or double-yellow barrier striping with reflective markers on the overcrossing bridge may help motorists stay on proper side of road and avoid an incorrect left-turn onto the exit ramp.



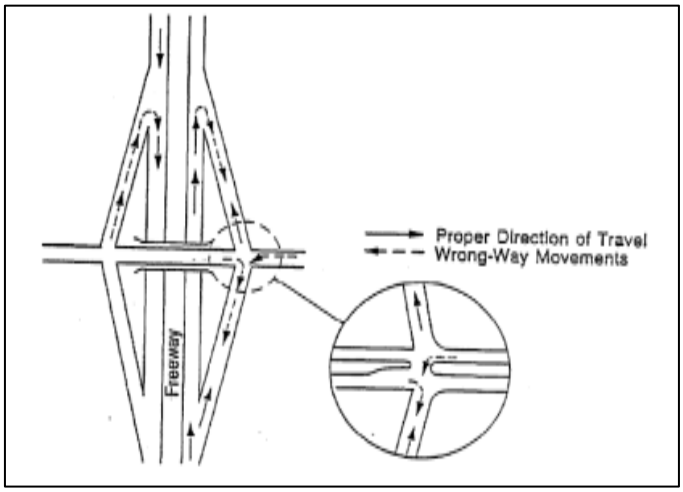
Partial / Two-quadrant cloverleaf

- Potential improvements include separating entrance and exit ramps, making entrance ramps easier to access, and reconstructing curb nose between adjacent ramps.



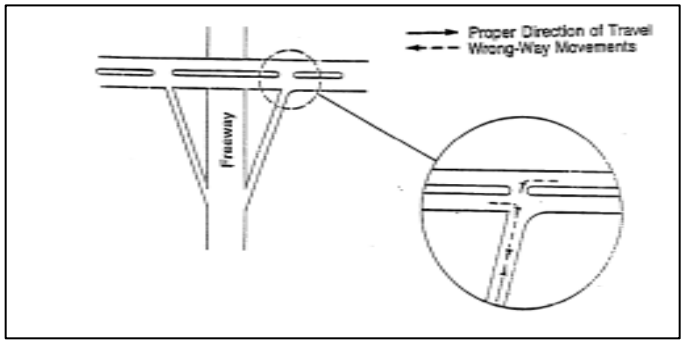
Full diamond interchange

- Options to prevent left turns on to the exit ramp include constructing a separator island and better distinguishing the exit ramp from frontage road.



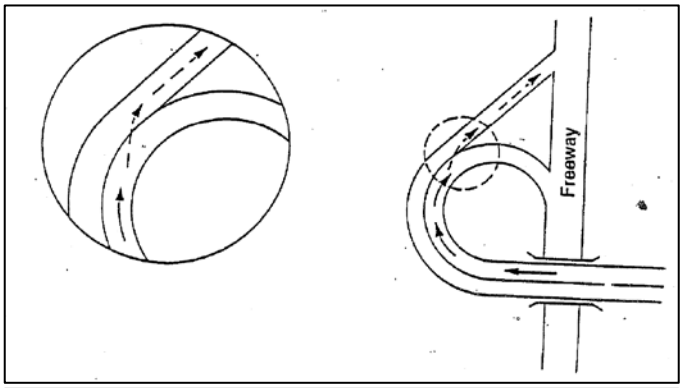
Half diamond interchange

- Good signing is extremely important.
- Drivers may attempt U-turns to access ramps.



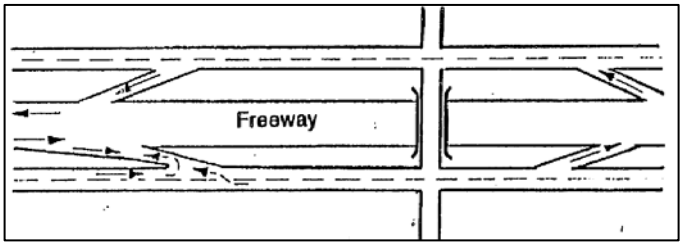
Trumpet interchange

- Curbed medians, barrier striping of double yellow lines and reflectors, or concrete median barrier may be used to avoid wrong way movements.



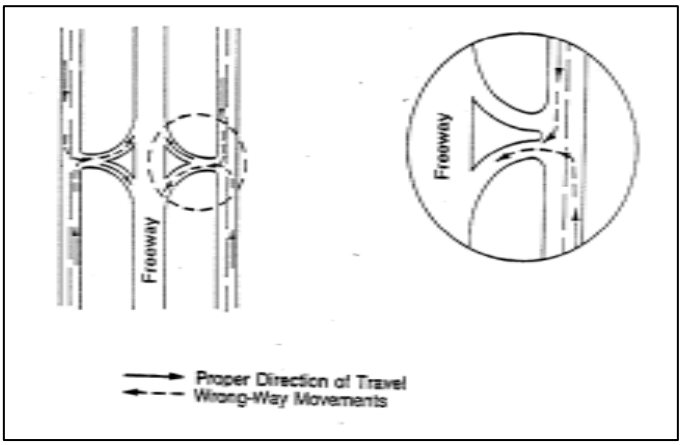
Slip ramps

- Problems may occur where a two-way frontage road terminates at a slip ramp
- Flat angles are more desirable to discourage turns on to one-way ramps.



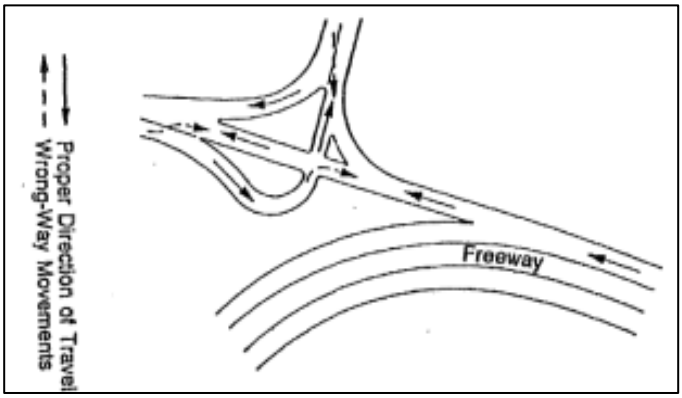
Buttonhook ramps

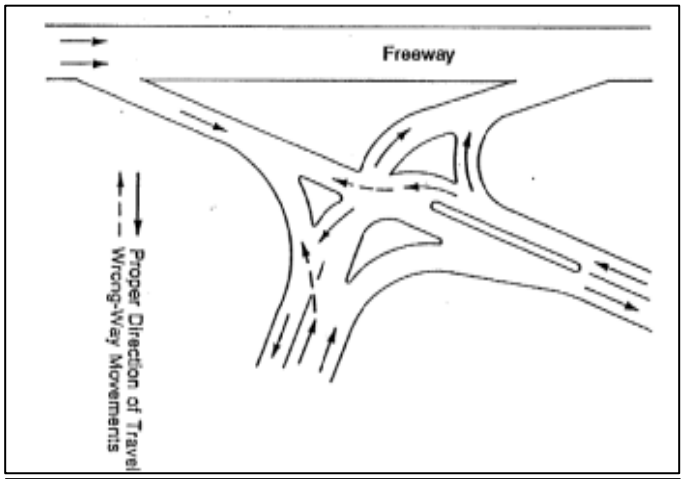
- Can be "very susceptible" to wrong way movements.
- Options for improvement include separating the entrance and exit ramps and reconstructing the nose to discourage wrong way movements.



Cul-de-sac intersection near off-ramp

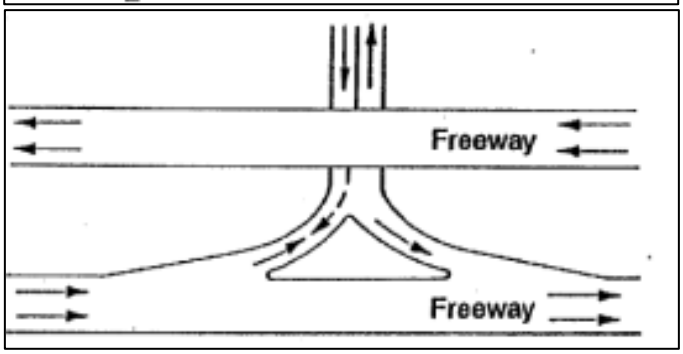
- This interchange type should be obsolete in new designs.
- Where old designs exist, options for improvement include using arrows, lead lines, reflective markers, and signs to avoid wrong way movements.





Scissors off-ramp

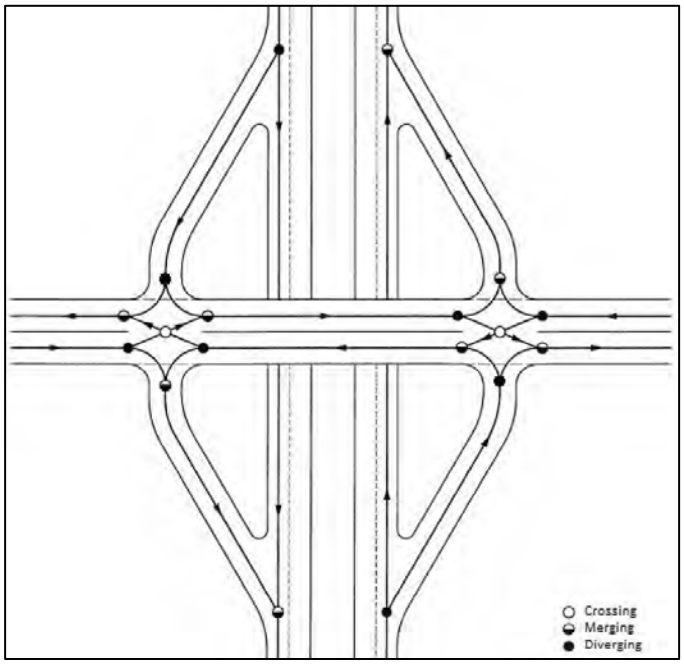
- This interchange type should be obsolete in new designs.
- Where old designs exist, options for improvement include using arrows, lead lines, reflective markers, and signs to avoid wrong way movements.



Left-hand off-ramp

- This interchange type should be obsolete in new designs.
- Copelan states this treatment ”must be avoided” in new construction.

Additional detailed information on the above summary can be found in Copelan’s report (4) referenced in Section 8 of this report. Within the last decade, a novel interchange concept known as the Diverging Diamond Interchange was developed, and the first Diverging Diamond Interchange was constructed by the Missouri Department of Transportation (MoDOT). MoDOT’s experience is summarized as follows (5):



Diverging Diamond

- The channelization creates a traffic calming effect.
- Wrong way movements to and from the ramps are “virtually eliminated” by making them physically difficult to accomplish.
- Diverging Diamonds typically cost less to construct than a Full Diamond and require comparable right-of-way.

Countermeasures

Potential countermeasures to reduce wrong way driving include a broad spectrum such as driver-focused measures (i.e. in-vehicle alcohol detection technologies), signing and pavement marking enhancements, geometric design elements, and intelligent transportation system (ITS) improvements.

Driver-focused measures are meant to address one of the key issues behind wrong way driving: driver impairment (1). These include in-vehicle alcohol detection technologies and increased law enforcement in target areas/time periods.

Signing and pavement marking enhancements provide the most low-cost opportunities to reduce wrong way driving by increasing the conspicuity of interchange entrance and exit ramps. The MUTCD (6) prescribes the minimum national standards for signing and pavement markings on interchange ramps, including optional signs and pavement markings. The optional signs and pavement markings provide a level of redundancy beneficial to increasing the conspicuity of allowed and prohibited movements. An example of minimum required signage and marking and additional optional signage and markings is provided in Figure 2B-18 of the MUTCD (6). The MUTCD increased the recommended sign size dimensions in the 2009 Edition, making signs more conspicuous. In addition to the MUTCD requirements, emerging signing and pavement marking countermeasures include the following (7):

- Low-mounted DO NOT ENTER signs and WRONG WAY signs to improve headlight visibility at night, as well as visibility for older drivers and impaired drivers
- LED-illuminated sign borders around WRONG WAY signs to improve visibility
- Red vertical retroreflective strips on DO NOT ENTER sign and WRONG WAY sign supports to improve conspicuity
- Enhanced DO NOT ENTER signs and WRONG WAY signs, such as larger sign sizes and multiple signs
- Enhanced pavement markings such as lane use arrows, lane line extensions, and stop lines at exit ramps

With signing and pavement marking countermeasures, an inspection and maintenance plan is essential to maintain appropriate retroreflectivity levels as signs and pavement markings age and become worn.

Geometric design countermeasures use access management and raised barriers, such as curb and/or median, to restrict turning movements in the interchange vicinity and at the exit ramps. The AASHTO Green Book (8) provides a discussion on the design of interchange exit ramp intersections with cross-streets to discourage wrong way entry (p.10-83). Countermeasures noted in the ATSSA report (7) include:

- Raised median extensions at the cross-street intersections to restrict wrong way turning movements
- Median barrier on the interchange ramp where the proximity of entrance and exit ramps can cause confusion
- Control radius to make a wrong way turning movement tighter, harder, or more awkward

- Channelizing island to narrow exit ramp width and decrease possibility of wrong way entry

Wrong way countermeasures utilizing ITS technologies have emerged in the past several years, and new technologies continue to expand opportunities to reduce crashes and wrong way driving events. Recent installations in Texas include radar-equipped wrong way detection devices and LED-illuminated WRONG WAY signs that flash when wrong way movements are detected (7). Similar ITS installations are being pilot tested in several locations throughout Florida. The wrong way detection installations in Texas utilize the existing ITS infrastructure to communicate wrong way events to law enforcement via the TMC, and the TMC is able to post messages to freeway mainline DMS to warn other motorists of a wrong way driver. The system has successfully led to law enforcement stopping wrong way drivers prior to collisions occurring. Other ITS technologies include in-pavement flashers and warning lights activated by wrong way detection, and in-vehicle navigation systems equipped to give wrong way warnings.

Ongoing Research

As part of this project, the project team interacted with two ongoing research projects related to human factors testing and wrong way driving. A Texas DOT project with Texas Transportation Institute (TTI) is studying the effects of alcohol impairment on wrong way driver behavior. An FDOT project with Florida State University (FSU) is studying how human factors relate to wrong way driving.

FLORIDA PILOT PROJECTS

A number of ITS installations are underway throughout Florida to discourage wrong way driving on interchange exit ramps. The projects include more than 30 installations on exit ramps in FDOT District 3, FDOT District 7, the Turnpike, and the Central Florida Expressway Authority (CFX). The pilot projects are summarized as follows:

FDOT District 3

- Four locations on I-10 in Tallahassee – SR 263 (Capital Circle NW), SR 63 (US 27/N Monroe St), SR 61 (Thomasville Rd), and SR 261 (US 319/Capital Circle NE)
- Installations include:
  - LED-illuminated WRONG WAY signs and vehicle detection
  - Enhanced DO NOT ENTER and static WRONG WAY signage
  - Overhead WRONG WAY signage
  - Enhanced signage (no right-turn, left-turn, no U-turn) and pavement markings on cross-streets
  - Median curb extensions to discourage early left-turns
  - Wrong way arrows (RRPMs)

- Red in-pavement flashers creating the illusion of a stop bar on the exit ramp will be implemented at locations in District 3
    - Tested at FDOT's Traffic Engineering Research Lab (TERL)
    - Approved for experimentation by FHWA

FDOT District 7

- Microwave vehicle detectors capable of detecting wrong way movement are being added in 15 locations in the high risk area
- Closed circuit television cameras (single focus) capable of wrong way detection are being installed at each interchange along with other equipment.
- Red rectangular rapid flashing beacon (RRFB) assembly coupled with a WRONG WAY sign
    - Three locations on I-275 in Hillsborough County – Fowler Ave, Fletcher Ave, and Bearrs Ave
    - Approved for experimentation by FHWA
    - Will be installed on six exit ramps
    - Wrong way detection-based activation
    - Experimentation period will be analyzed by the Center for Urban Transportation Research (CUTR) at the University of South Florida (USF)

Florida's Turnpike Enterprise

- 15 locations in South Florida
    - Homestead Extension (HEFT) – 10 locations
    - Sawgrass Expressway – 5 locations
- Installations include:
    - Two radars (one front-facing, one rear-facing)
    - Camera (rear-facing to confirm wrong way activity and license plate capture)
    - LED-illuminated WRONG WAY signs activated by forward radar
    - Solar power
    - Communication software

Central Florida Expressway Authority (CFX)

- Five locations on SR 408 in Orlando
- Focus of project is on lost or confused drivers
    - Tourists (UK/left-side drivers)
    - Elderly population
    - University of Central Florida (UCF) will analyze data for one year
- Installations include:
    - Combination of two manufacturer's devices
    - Two sets of each establishing 4 detection zones

  - Redundancy to study when they enter, how far they get before turning around
  - 2 sets of LED-illuminated signs on both sides of road
  - High retroreflectivity sheeting and large sign size
  - Activated by detection devices
  - Rear-facing camera takes photo to confirm wrong way activity
- Bids expected to be $25,000 to $30,000 per ramp

The pilot projects were in the design or construction phases at the time of this study. Prior to completion of the study, some of the District 3 and Florida's Turnpike pilot projects were installed and operational.

Section 3
Wrong Way Crash History

WRONG WAY CRASH HISTORY

A statewide historical crash review was conducted to identify and analyze wrong way crashes on limited-access freeways and expressways. The crash data collection and analysis are summarized in the following sections.

CRASH DATA COLLECTION

The crash data collection was conducted using the CARS database over a five-year study period (2009-2013). The collection of crash data actually included through the end of February 2014; however, the 2014 CARS data was not yet up-to-date for many counties when the analysis was conducted and no wrong way crashes were identified post-2013.

Methodology

The CARS database is made up of crash data entered directly from police crash reports. Therefore, queries into the CARS data are only as reliable as the data entered by the police officer in the field. Oftentimes, crash data is entered inconsistently or mistakenly miscoded. In order to obtain a reasonably complete dataset of wrong way crashes, the following five-step methodology was utilized to identify and confirm statewide wrong way crashes populating the final crash dataset:

Step 1: Identify all applicable roadway IDs and milepost ranges, by District

The roadway IDs and associated milepost ranges for all freeways and expressways in the state were identified for each District.

Step 2: Obtain total crash data from CARS on interstate freeways and expressways

All crash data (wrong way crashes and others) were obtained for the freeways and expressways over the study period (Jan 2009 through Feb 2014). As previously mentioned, many counties were noted as not having up-to-date information in the CARS database for 2014. A total of 157,531 crash records were obtained on the study roadways over the study period. Crashes occurring on freeway and expressway mainlines, ramps, and at ramp/cross-street intersections were included in the query.

Step 3: Reduce the total reported crashes to "potential" wrong way crashes

The 157,531 crash records were brought into a spreadsheet and sorted to identify "potential wrong way crashes". A crash was considered a potential wrong way crash if it met at least one of the following criteria:

- If contributing cause 1 or 2 was coded as 21 (i.e. driving wrong side/way)
- If vehicular crash directions (i.e. VEH DIR 1, VEH DIR 2) were not identical
- If the harmful event was coded as 02 (i.e. head-on collision)

In addition to the criteria noted above, all fatal crashes were flagged for review as a conservative measure. A total of 6,313 crash records were identified as potential wrong way crashes and flagged for further review.

Step 4: Obtain crash reports for all "potential" wrong way crashes

Crash reports for all potential wrong way crashes were requested to further review the circumstances of each potential wrong way crash.

Step 5: Identify wrong way crashes from crash reports

After obtaining crash reports for potential wrong way crashes, each crash report was reviewed individually to confirm each wrong way crash event. Crashes were considered wrong way crashes if they involved wrong way entry on a ramp, driving on the mainline opposite the direction of traffic, U-turns followed by wrong way driving, and reversing on the mainline or on ramps. 306 crashes occurring between 2009 and 2013 were initially identified as wrong way crashes. However, after a detailed review of the wrong way crash reports, 26 crashes were removed from the dataset due to construction zone activity, traffic stop activity, etc.

Through the crash data collection process, 280 wrong way crashes statewide were identified and confirmed over the five-year study period (2009-2013) on Florida's freeways and expressways. A summary table of all wrong way crashes over the study period is provided in Appendix A.

Considerations for Future Wrong Way Studies

The methodology for confirming wrong way crashes (as described above) was very time-intensive. This was due mostly to the additional measures taken to review the crash reports of all potential wrong way crashes. Three primary criteria were used to narrow down potential wrong way crashes – the contributing cause, the vehicular crash directions, and the harmful event. When considered separately, each criterion identified only a percentage of the total confirmed wrong way crashes:

- Contributing cause "driving wrong side/way" – indicated in 65 percent of the 280 wrong way crashes
- Non-identical vehicular crash directions – indicated in 88 percent of the 280 wrong way crashes
- Head-on harmful event – indicated in 39 percent of the 280 wrong way crashes

The vehicular crash directions yielded the highest positive hit rate of the confirmed wrong way crashes. However, the criterion also has a high false positive rate. The crash directions criterion yielded 4,170 potential wrong way crashes, of which 246 were confirmed (94 percent false positive rate). Contributing cause was the next highest criterion, with a positive hit rate of 65 percent. The contributing cause criterion yielded 223 potential wrong way crashes, of which 183 were confirmed wrong way crashes (18 percent false positive rate).

When taken together, the crash directions and contributing cause criteria effectively identified 98 percent of the 280 wrong way crashes. Unfortunately, the criteria combination also yields a high false positive rate (93.5 percent). The combination of crash directions and contributing cause criteria identified 4,220 potential wrong way crashes, of which only 274 were confirmed wrong way crashes, making the time-consuming task of reviewing crash reports an essential step in the data collection process. Many of the false positives for the vehicular crash directions involved crashes at ramp intersections.

For future studies, options remain to consider multiple criteria and spend additional resources obtaining a fuller data set, or to save resources by relying on a particular criterion (such as contributing cause) resulting in a reduced data set. Factors surrounding the study should be considered, including the potential size of the crash data set depending on study area, time period, and roadway type. FDOT has expressed interest in conducting a wrong way crash study on state arterials in the future. A wrong way crash study on state arterials would likely yield a much larger data set than the limited-access facilities data set, and the presence of at-grade intersections would only increase the false positive rate of the crash directions criterion.

Additional resources could be saved if the contributing cause were more accurately reflected in the crash reports. There may be opportunities for additional law enforcement education and training to more accurately code wrong way crashes in the crash reports.

HISTORICAL CRASH ANALYSIS

There were 280 wrong way crashes identified on Florida's freeways and expressways over the five-year study period (2009-2013). The following section details the statistical analysis of the crash history.

Frequency and Severity

The wrong way crash severity distribution is summarized in **Table 1** and compared to the typical crash severity distribution of urban and rural freeways in Florida. Compared to the typical crash distribution of Florida freeways, wrong way crashes are more severe, resulting in higher proportions of injuries and fatalities. More than half of the crashes resulted in injury, and nearly one-in-five resulted in fatality. A total of 411 injuries and 75 fatalities were reported over the study period.

Table 1 Crash Severity Distribution

Roadway Class / Crash Type	PDO (Property Damage Only)	Injury	Fatal
Wrong Way Crashes (2009-2013)	85 30%	144 51%	51 18%
Rural Freeways in Florida (2007-2011)*	49%	48%	2%
Urban Freeways in Florida (2007-2011)*	54%	45%	1%

*Note: *Florida crash distribution percents obtained from PPM Vol. 1, Table 23.5.3*

Collision Type and Contributing Cause

Table 2 summarizes the wrong way crash collision types as coded in the police reports. Wrong way crashes resulted in head on collisions more than any other crash type. Nearly one-third of the crashes were characterized as "other" or "unknown" crash types in the police reports. One-third of the crashes occurred in the lane nearest the center median, and one-quarter of the crashes occurred in the lane second nearest the center median.

Table 2 Wrong Way Crash Collision Types

Crash Type	Crash Frequency	Percentage
Head On	110	39%
Angle	25	9%
Fixed Object	19	7%
Sideswipe	15	5%
Backed Into	11	4%
Rear End	9	3%
Left Turn	1	0%
Right Turn	1	0%
Parked Car	1	0%
Other	88	31%
Total Crashes	**280**	**100%**

Table 3 summarizes the wrong way crash contributing causes as coded in the police reports. Oftentimes, multiple contributing causes are reported in a crash report, so the data set contains more contributing causes than crashes. The majority of crashes (54 percent) included "driving wrong side/way" as a contributing cause. The influence of alcohol and/or drugs was also noted more than 10 percent of the time.

Table 3 Wrong Way Crash Contributing Causes

Contributing Cause	Frequency	Percentage
Driving Wrong Side/Way	183	54%
Alcohol-Under Infl	32	9%
Improper Backing	21	6%
Improper Turn	4	1%
Drugs-Under Infl	3	1%
Alc & Drugs-Under Infl	2	1%
Other	95	28%
Total Crashes	**340**	**100%**

Time

The crash frequency and severity are depicted *by year* and *by month* in **Figure 1** and **Figure 2**, respectively. Wrong way crashes ranged between 42 and 64 per year over the study period. Wrong way crashes involving fatalities ranged between five and 16 per year.

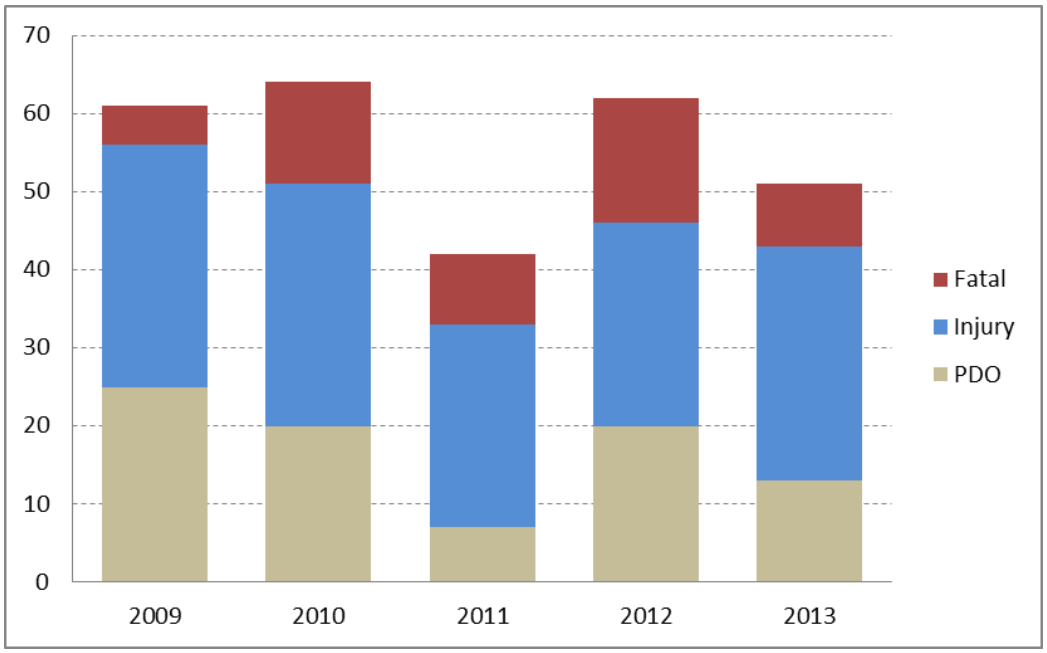


Figure 1 Crash Severity by Year

The months experiencing the most wrong way crashes include January through April, June, and July. The majority of fatal crashes occurred between March and July, with July experiencing the most fatal crashes (10).

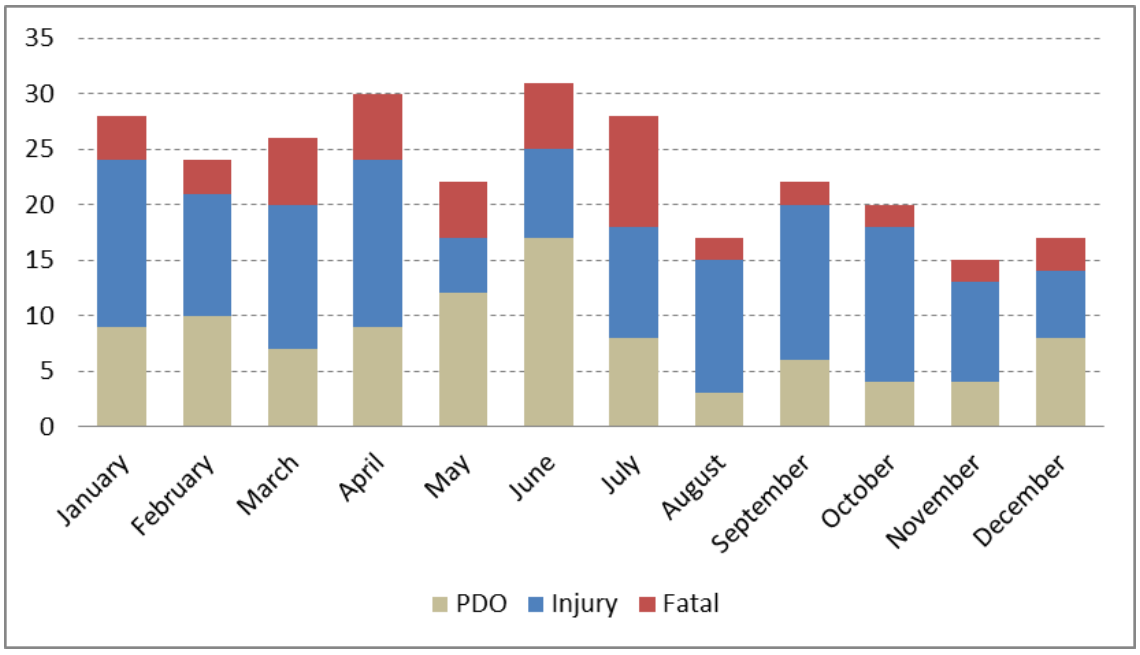


Figure 2 Crash Severity by Month

The crash frequency and severity are depicted by day of week and by time of day in **Figure 3** and **Figure 4**, respectively. The majority (61 percent) of crashes occurred on Friday, Saturday, or Sunday. While the proportion of Friday crashes is not atypical for freeways and expressways in Florida, the number of crashes on Saturday and Sunday are 1.7 times more than expected. Therefore, weekends are more susceptible to a wrong way crash.

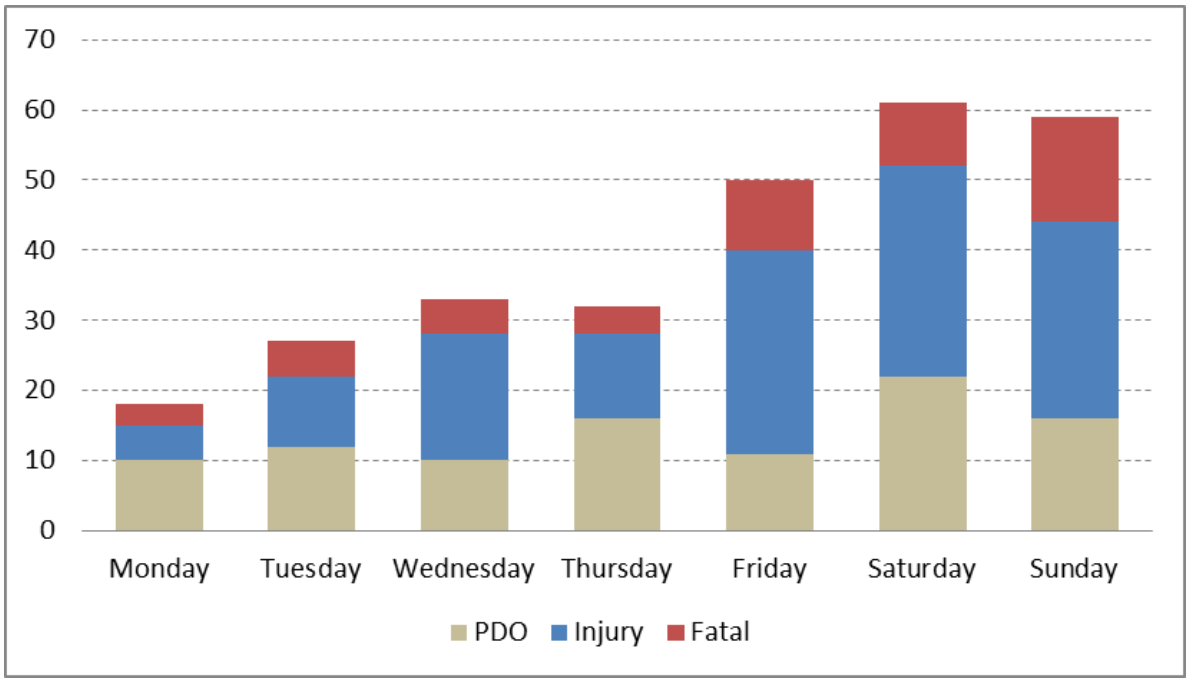


Figure 3 Crash Severity by Day of Week

The majority of wrong way crashes (55 percent) occurred between midnight and 6am, and 70 percent of the fatal crashes occurred during the same time period. Compared to the typical distribution of crashes on Florida freeways and expressways, there are 4.1 times more wrong way crashes than expected between midnight and 6am. Conversely, the time period between 6am and 6pm experience 63 percent less wrong way crashes compared to all freeway/expressway crashes. Therefore, the midnight to 6am time period is more susceptible to wrong way crashes, and the time period from 6am to 6pm is less susceptible to wrong way crashes. This relationship likely relates to the relatively large number of vehicles on the freeway/expressway ramps during the daytime hours, which may deter wrong way driving behavior at the cross-street/ramp intersection. It is also noted that the susceptible time periods of midnight to 6am and weekend days coincides with generally higher levels of recreational/social activity and alcohol consumption, which is known to be a factor in wrong way driving.

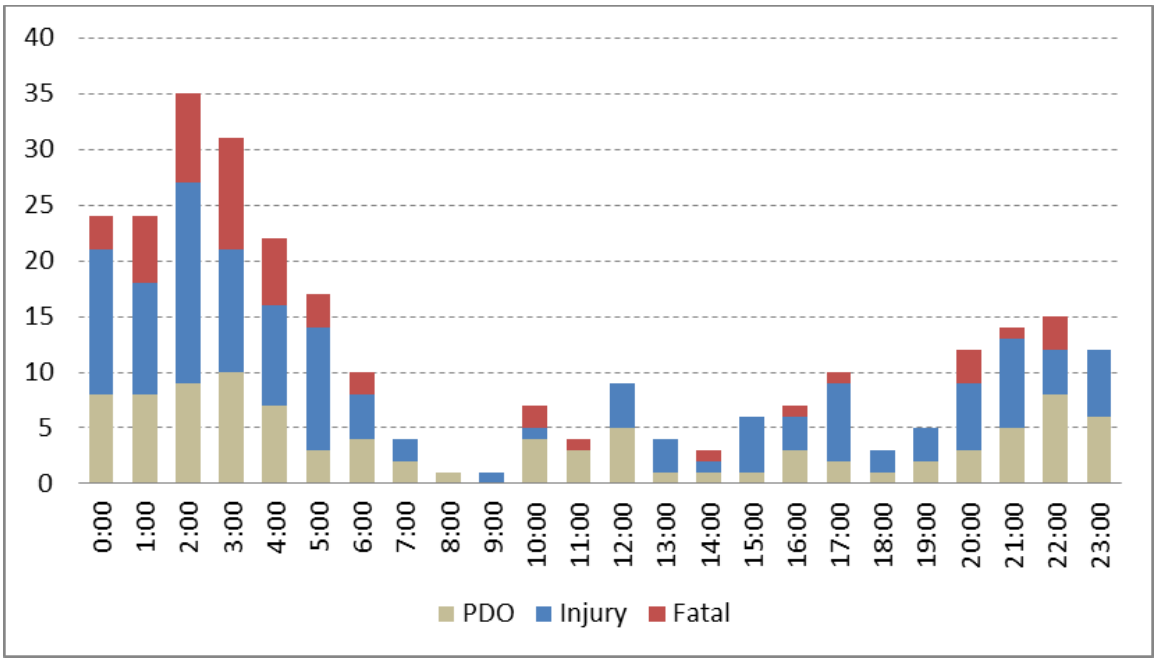


Figure 4 Crash Severity by Time of Day

Alcohol and Drug Use

In addition to contributing causes (previously shown in **Table 3**), alcohol/drug use by motorists is coded separately in the crash reports. **Figure 5** displays the alcohol/drug use as noted in the police reports. Alcohol and/or drug use was present in 45 percent of the wrong way crashes. This is consistent with the literature review findings that approximately 50 percent of wrong way crashes involved the influence of alcohol/drugs. It is also noted that alcohol/drug use is generally believed to be under-reported. One example includes a scenario when the drivers die in the crash and no toxicology report is ordered. Compared to all crashes on freeways/expressways, in which less than 3 percent of crashes involve alcohol and/or drugs, wrong way crashes are 16 times more likely to involve alcohol and/or drugs.

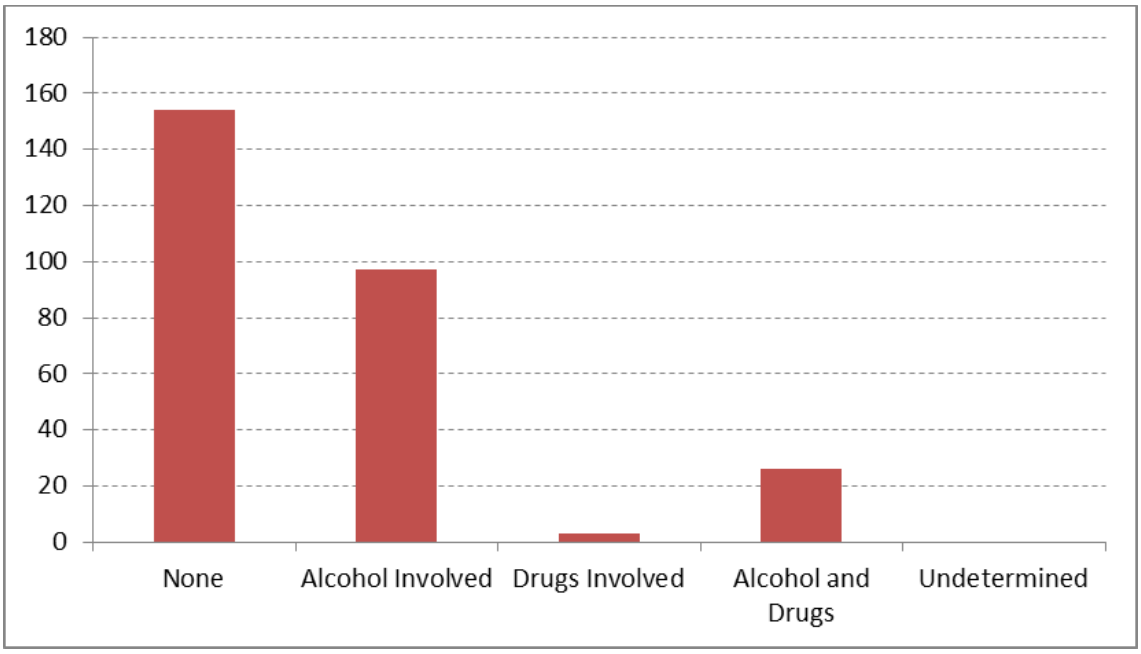


Figure 5 Crash Frequency by Alcohol/Drug Use

Lighting

Figure 6 displays the distribution of crash lighting conditions. Seventy-one percent of wrong way crashes occurred in dark conditions (44 percent with street lighting, 27 percent without street lighting). In contrast, only 29 percent of all freeway/expressway crashes occur in dark conditions (with or without lighting). Therefore, when a crash occurs in dark conditions (with or without lighting) the probability that it is a wrong way crash increases 2.4 times. Alternatively, when a wrong way crash occurs, it is 2.4 times more likely to have occurred in dark conditions than are other crash types.

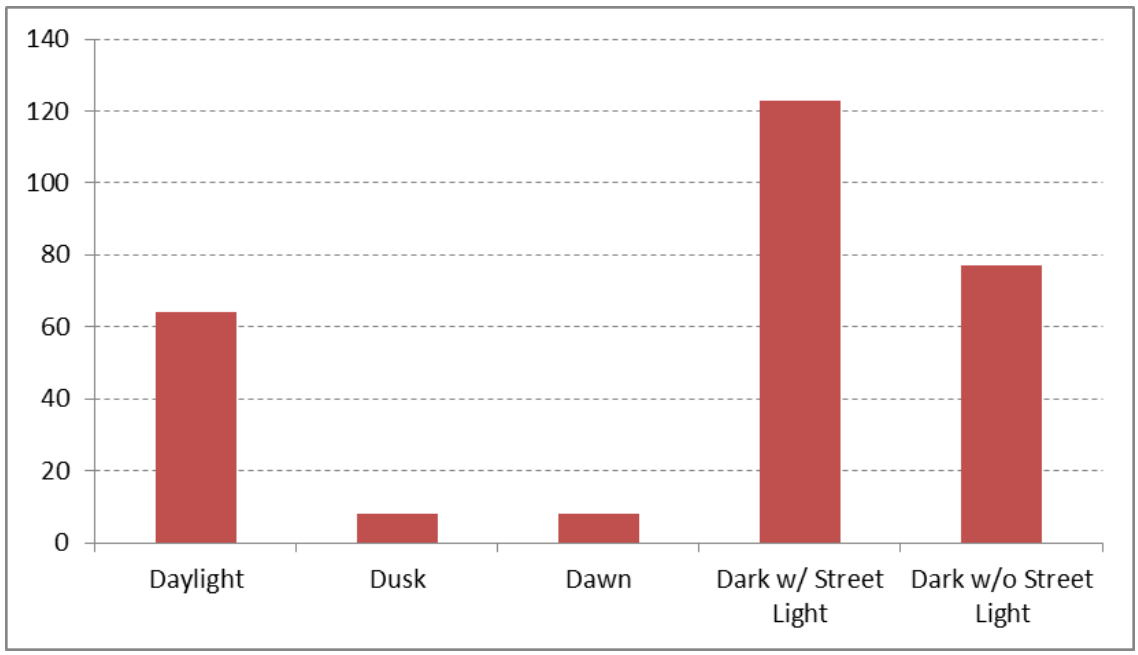


Figure 6 Crash Frequency by Lighting Condition

Weather

Figure 7 displays the distribution of crashes by weather condition. The vast majority (72 percent) occurred in clear weather conditions, and only six percent occurred in rain. Over the same time period, rain was present in 18 percent of freeway/expressway crashes in Florida. Therefore, a wrong way crash is three times less likely to occur in rainy conditions than other freeway/expressway crashes. This is likely correlated with the wrong way crash emphasis on midnight to 6am time period, and Florida rain showers tend to occur more often in the afternoon.

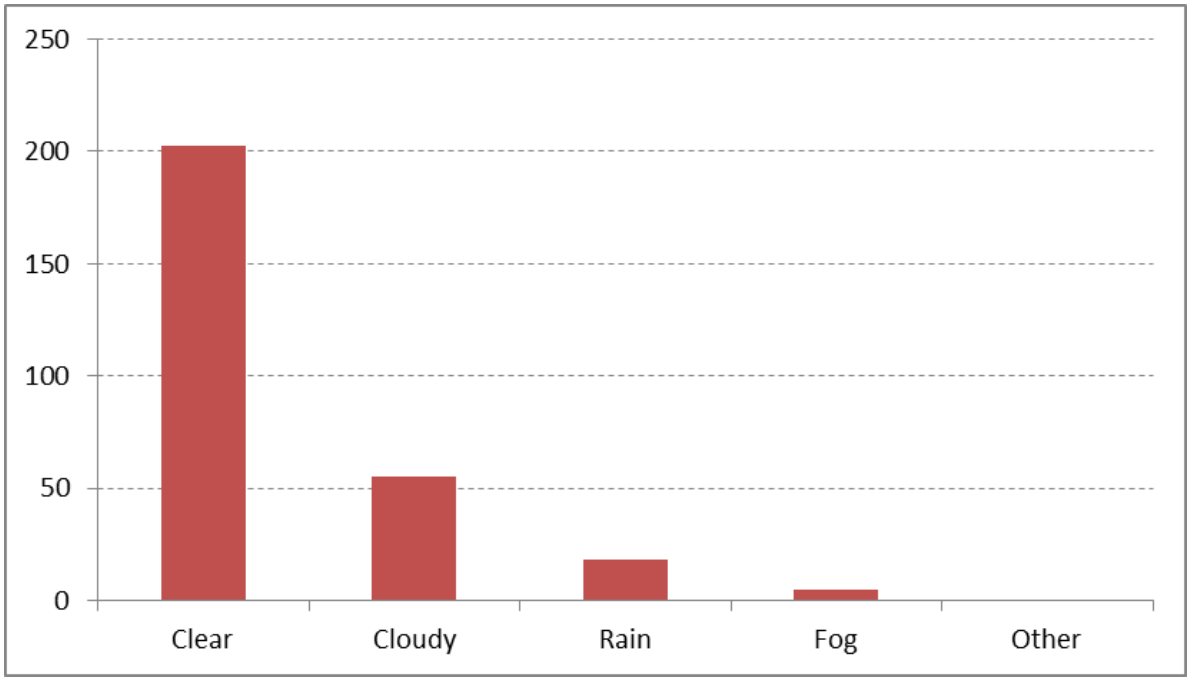


Figure 7 Crash Frequency by Weather Condition

Age of Wrong Way Driver

Figure 8 displays the distribution of the wrong way driver's age. The literature review noted age groups 16 to 24 years old and over 65 years old are overrepresented in wrong way crashes. Approximately 43 percent of wrong way drivers were less than 30 years old. Compared to all freeway/expressway crashes in Florida, 50 percent involve drivers under the age of 30. Therefore, this age group does not appear to be overrepresented in wrong way driving as compared to other freeway/expressway crashes.

The proportions taper down moving into the older age groups, with drivers 75 years and older accounting for less than five percent of wrong way drivers. However, this is more than three times the expected proportion from statewide trends on freeway/expressway crashes (1.4 percent for drivers 75 years and older). Therefore, drivers aged 75 years and older are more susceptible (i.e. at higher risk) to a wrong way-related crash.

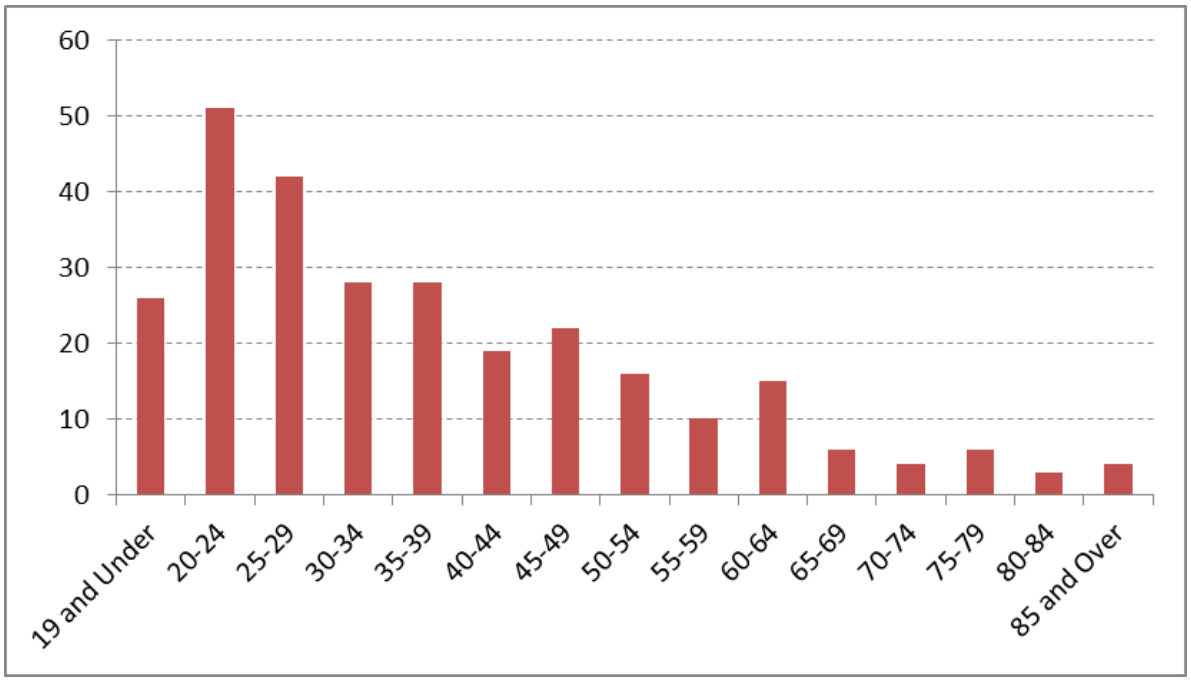


Figure 8 Crash Frequency by Wrong Way Driver Age

Area Type

The crash report includes a code for "Type", specifying the facility type on which the crash occurred. The facility type includes a description of the area type: "U" and "S" are within city or urban area boundaries, and "R" is outside a city or urban boundary. Based upon the reported facility types, the majority of wrong way crashes (76 percent) occurred within city/urban boundaries, and 24 percent occurred in rural areas outside city/urban boundaries. This wrong way crash distribution between urban and rural areas is relatively similar to the overall crash trends on freeways and expressways in Florida (17 percent rural, 83 percent urban).

Summary

There were confirmed 280 wrong way crashes on Florida's freeways and expressways over the five-year study period (2009-2013). The major points detailed in the previous sections are summarized as follows:

- More than half of the crashes resulted in injury (411 injuries), and nearly one-in-five resulted in fatality (75 fatalities).
- Weekends (Saturday and Sunday) and early morning hours (midnight to 6am) were found to be more susceptible to wrong way crashes.
- Alcohol and/or drug use was involved in 45 percent of wrong way crashes.
- The majority of wrong way crashes (71 percent) occurred in dark conditions, reversing the proportion of general freeway/expressway crashes in the state (29 percent in dark conditions).

- Drivers less than 30 years old account for 42 percent of the wrong way crashes; statewide trends on freeway/expressway crashes indicate a proportion of 50 percent for the same age range. Therefore, driver age proportions appear to be similar for wrong way crashes and all freeway/expressway crashes.
- Drivers 75 years and older account for 4.6 percent of the wrong way crashes. However, this is more than three times the expected proportion from statewide trends on freeway/expressway crashes (1.4 percent for drivers 75 years and older). Therefore, drivers 75 years and older are more susceptible (i.e. at higher risk) to a wrong way-related crash.
- Approximately 76 percent of wrong way crashes occurred in urban areas and 24 percent in rural areas.

CRASH LOCATION ANALYSIS

There were 280 wrong way crashes identified on Florida's freeways and expressways over the five-year study period (2009-2013). The following section depicts the analysis of crashes by location throughout the state.

FDOT Districts

The FDOT operates in seven regional districts throughout the state of Florida, and Florida's Turnpike Enterprise (FTE) operates the FDOT's tolled facilities separately from the regional districts. FTE is often more simply referred to as the Turnpike or District 8. Each district is responsible for the traffic operations aspects of state facilities within its boundaries, with the exception of Turnpike facilities and other tolled facilities managed by regional tolling authorities. SR 408 (East-West Expressway) in Orlando is an example of a tolled facility managed by the Central Florida Expressway Authority (CFX) and not by its regional FDOT district, District 5.

Of the 280 wrong way crashes on Florida's freeways and expressways, 24 wrong way crashes occurred on tolled facilities operated by regional authorities. The remaining crashes were distinguished by FDOT district and are summarized in **Table 4**. The information is also depicted in **Figure 9**.

Table 4 Wrong Way Crashes by FDOT District (2009-2013)

District	Crash Frequency		Fatal Crashes	
	No. Crashes	Percentage	No. Crashes	Percentage
District 1	19	6.8%	3	5.9%
District 2	49	17.5%	11	21.6%
District 3	18	6.4%	8	15.7%
District 4	25	8.9%	5	9.8%
District 5	35	12.5%	3	5.9%
District 6	37	13.2%	7	13.7%
District 7	24	8.6%	7	13.7%
Turnpike	49	17.5%	6	11.8%
Other Tolled Facilities	24	8.6%	1	2.0%
Total Crashes	**280**	**100%**	**51**	**100%**

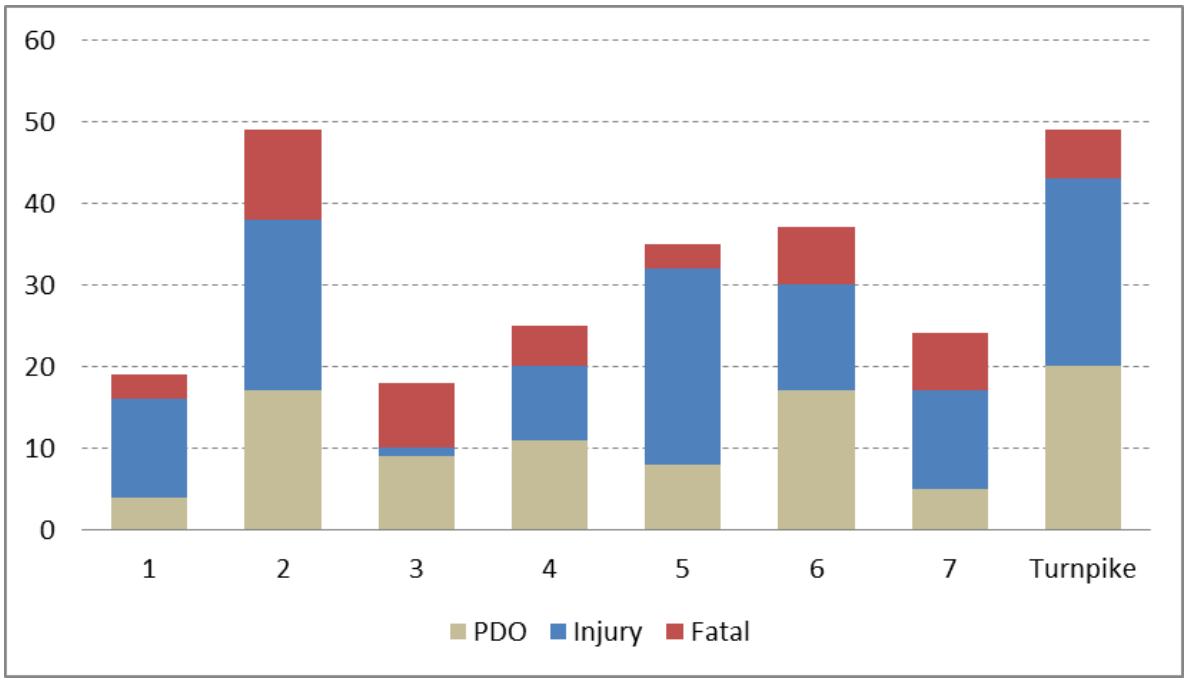
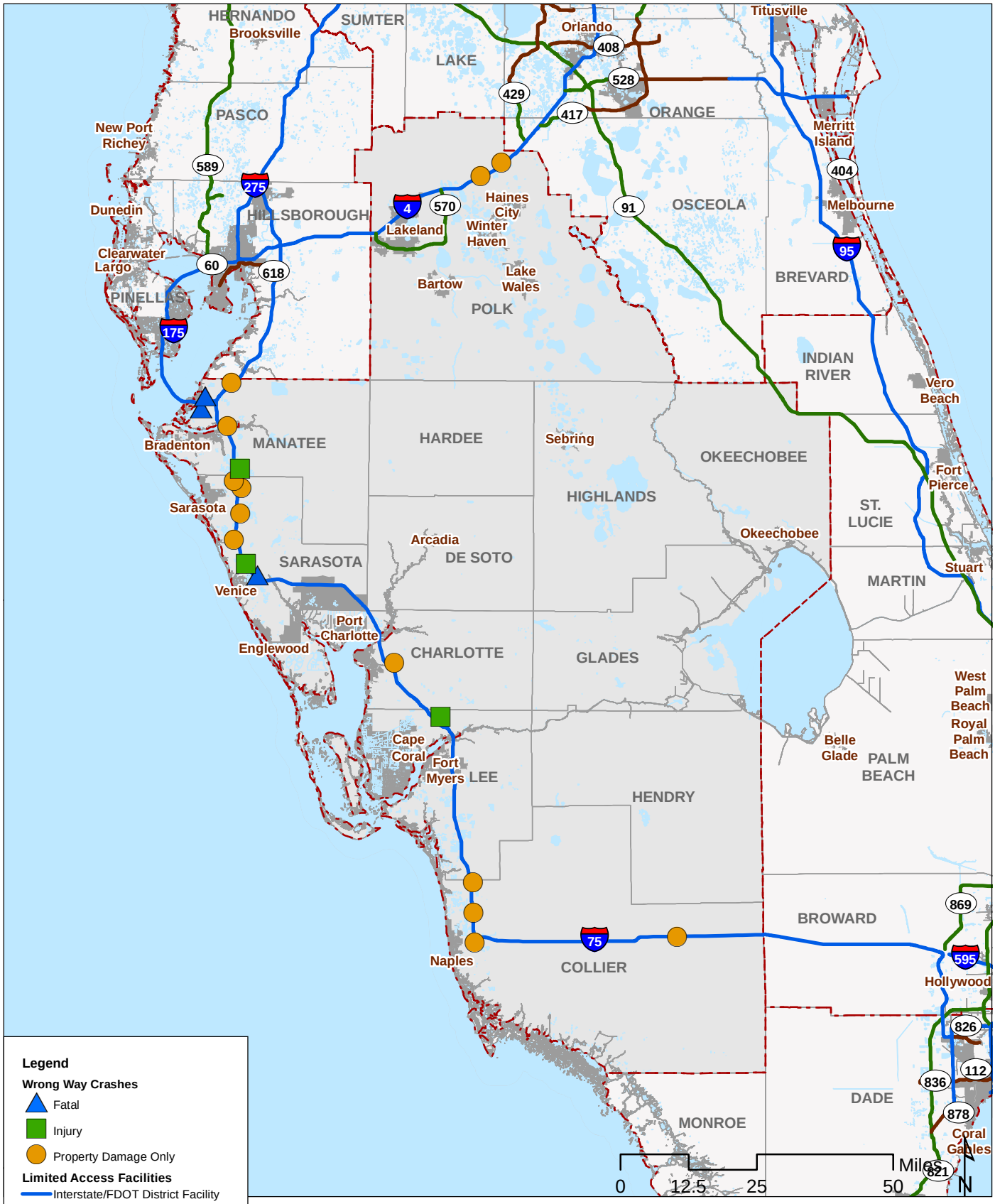


Figure 9 Crash Frequency/Severity by FDOT District (2009-2013)

FDOT districts with the highest frequency of wrong way crashes include District 2, Turnpike, District 6, and District 5. District 1 and District 3 have the lowest occurrence of wrong way crashes. Wrong way crashes resulting in fatalities were proportionally higher in Districts 2, 3, and 7, and they were proportionally lower in District 5 and on tolled facilities. The wrong way crashes were mapped for each FDOT district and are provided in **Figures 10 - 17**.



2009-2013 Wrong Way Crashes On District 1 Facilities Statewide Wrong Way Crash Study

Figure **10**

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Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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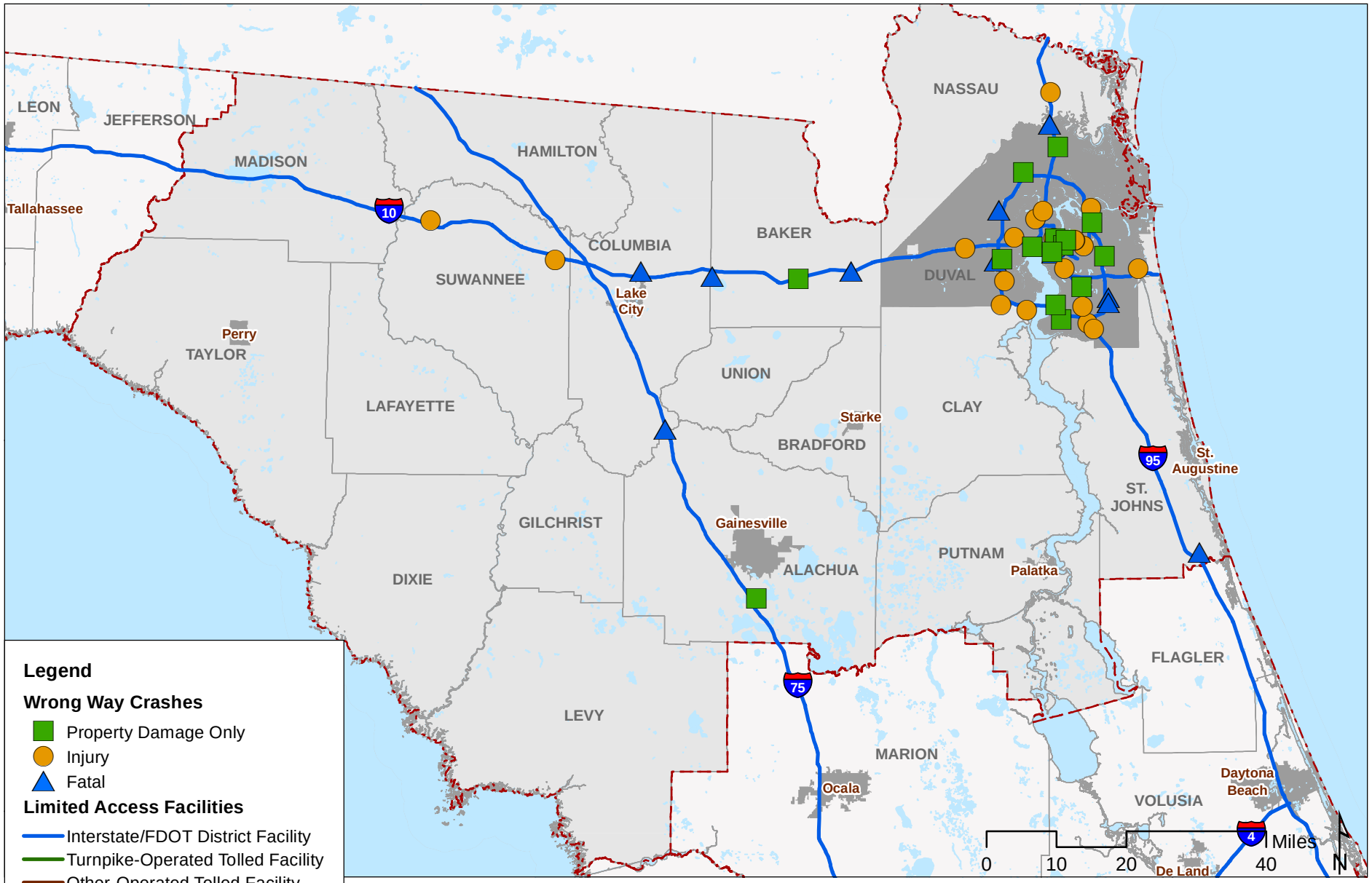

2009-2013 Wrong Way Crashes
On District 2 Facilities
Statewide Wrong Way Crash Study

Figure
11

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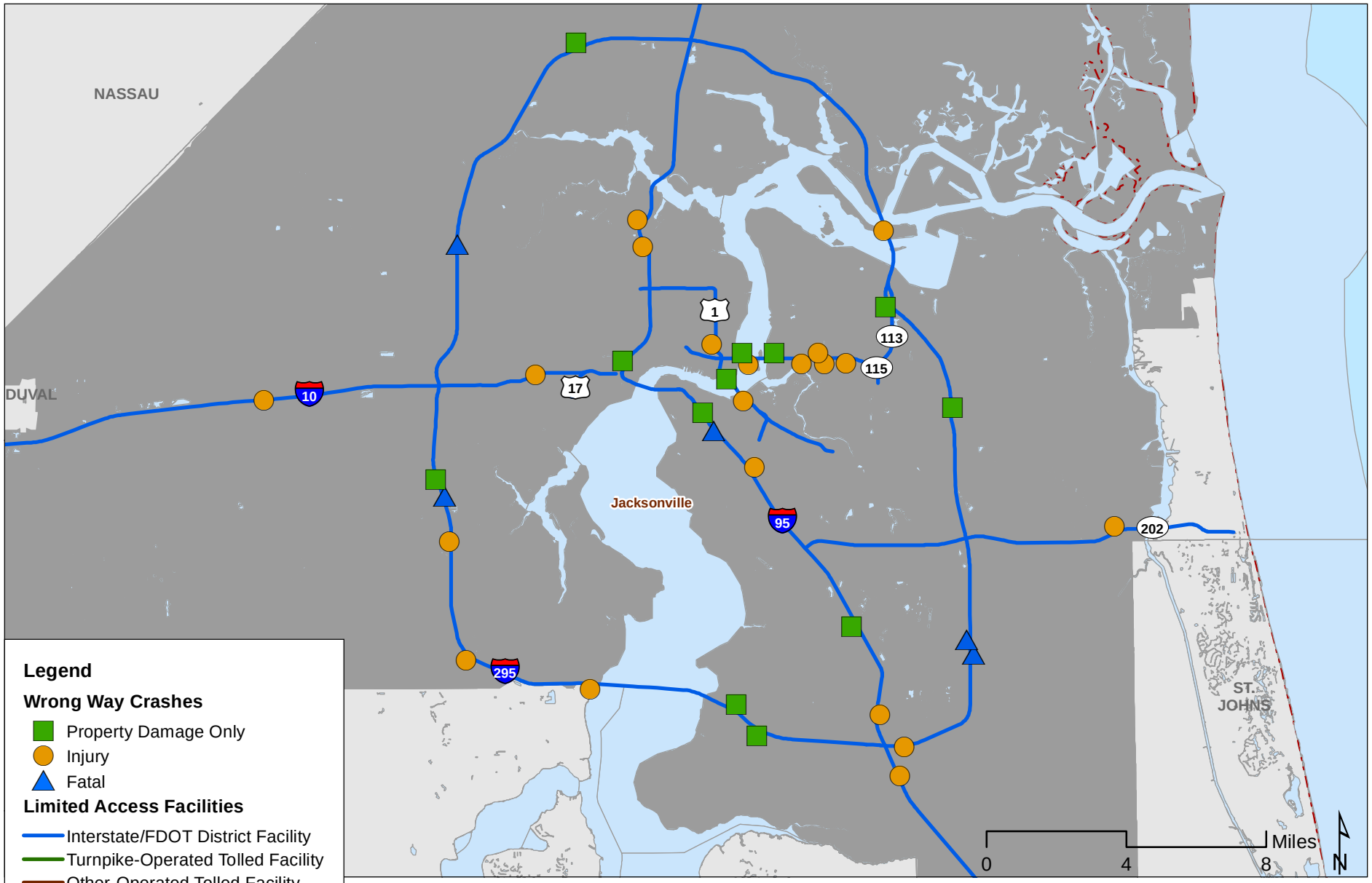

2009-2013 Wrong Way Crashes
On District 1 Facilities in Jacksonville
Statewide Wrong Way Crash Study

Figure
11a

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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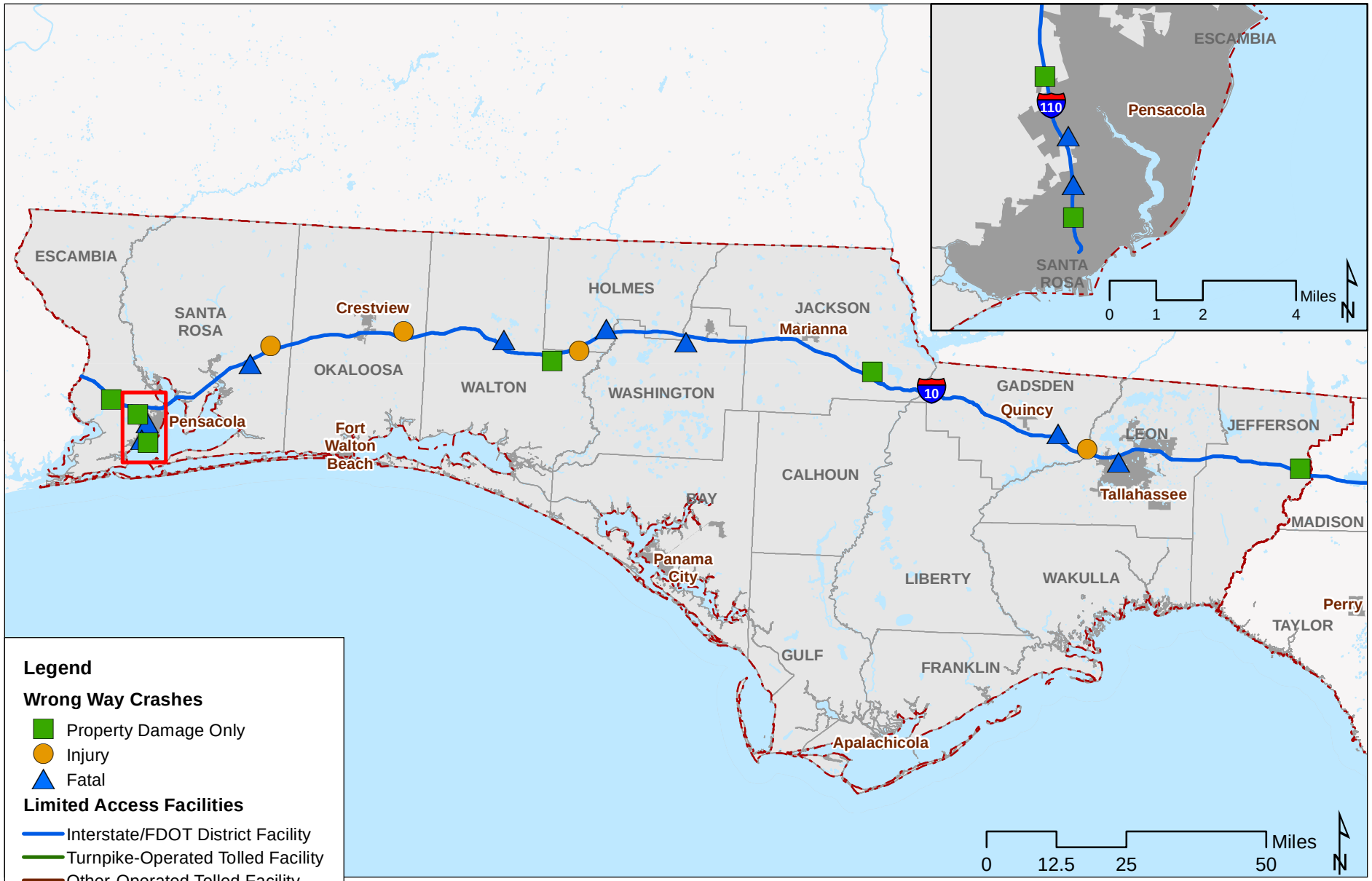

2009-2013 Wrong Way Crashes On District 3 Facilities Statewide Wrong Way Crash Study

Figure **12**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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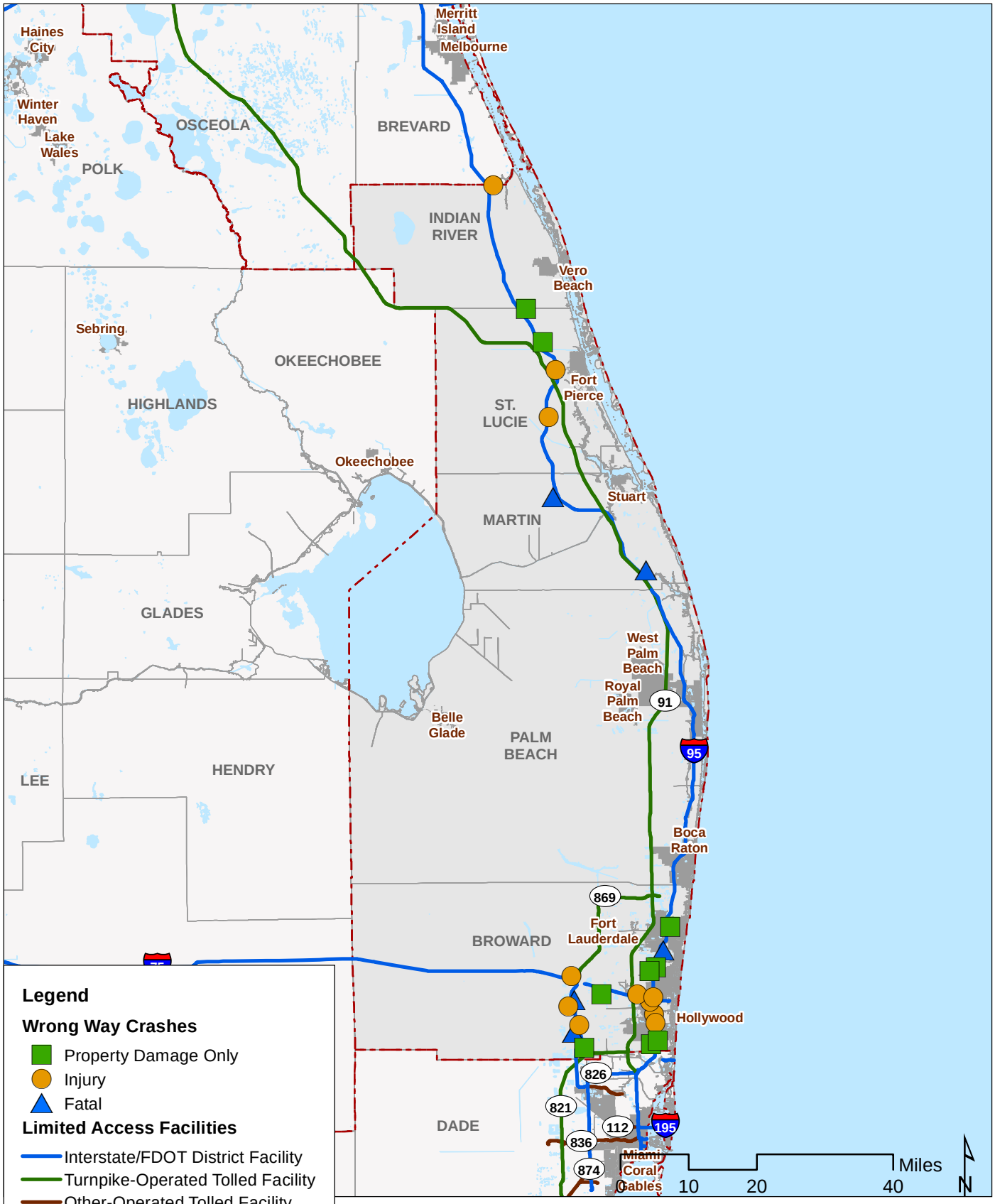

2009-2013 Wrong Way Crashes On District 4 Facilities Statewide Wrong Way Crash Study

Figure **13**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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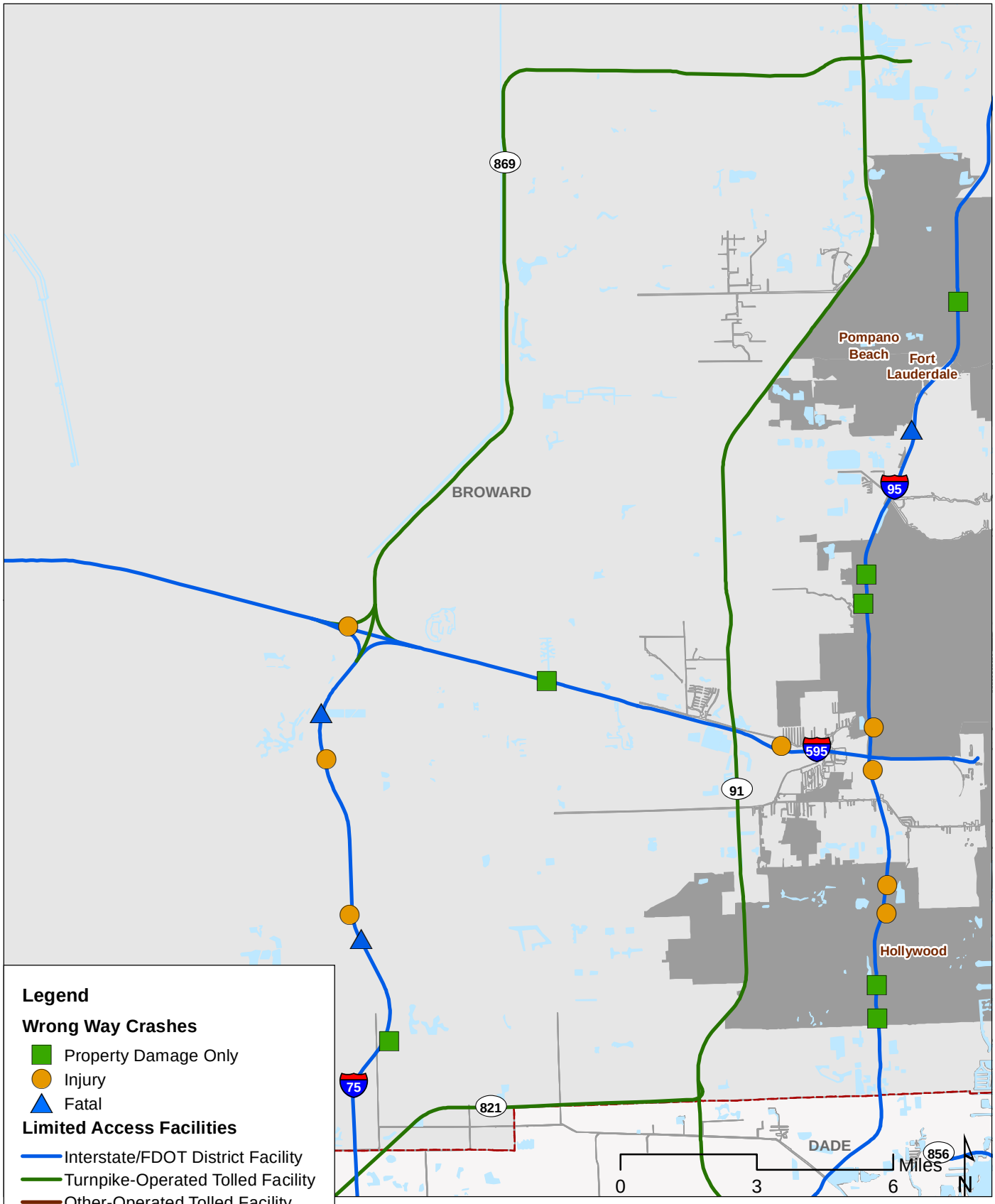

2009-2013 Wrong Way Crashes
On District 4 Facilities in Broward County
Statewide Wrong Way Crash Study

Figure **13a**

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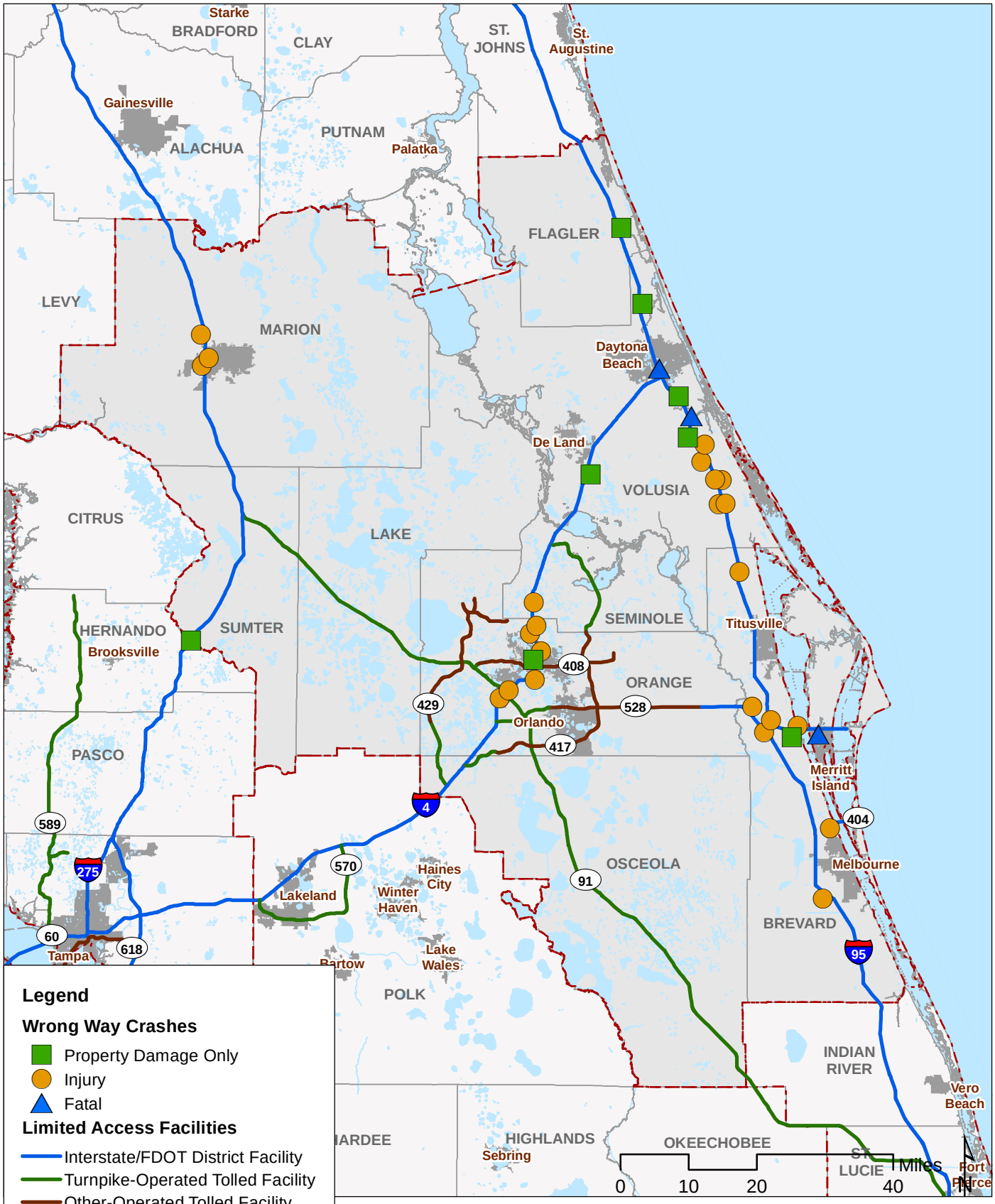

Legend

Wrong Way Crashes

- Property Damage Only
- Injury
- Fatal

Limited Access Facilities

- Interstate/FDOT District Facility
- Turnpike-Operated Tolled Facility
- Other-Operated Tolled Facility
- Major City
- County Boundary
- District Boundary

2009-2013 Wrong Way Crashes On District 5 Facilities Statewide Wrong Way Crash Study

Figure **14**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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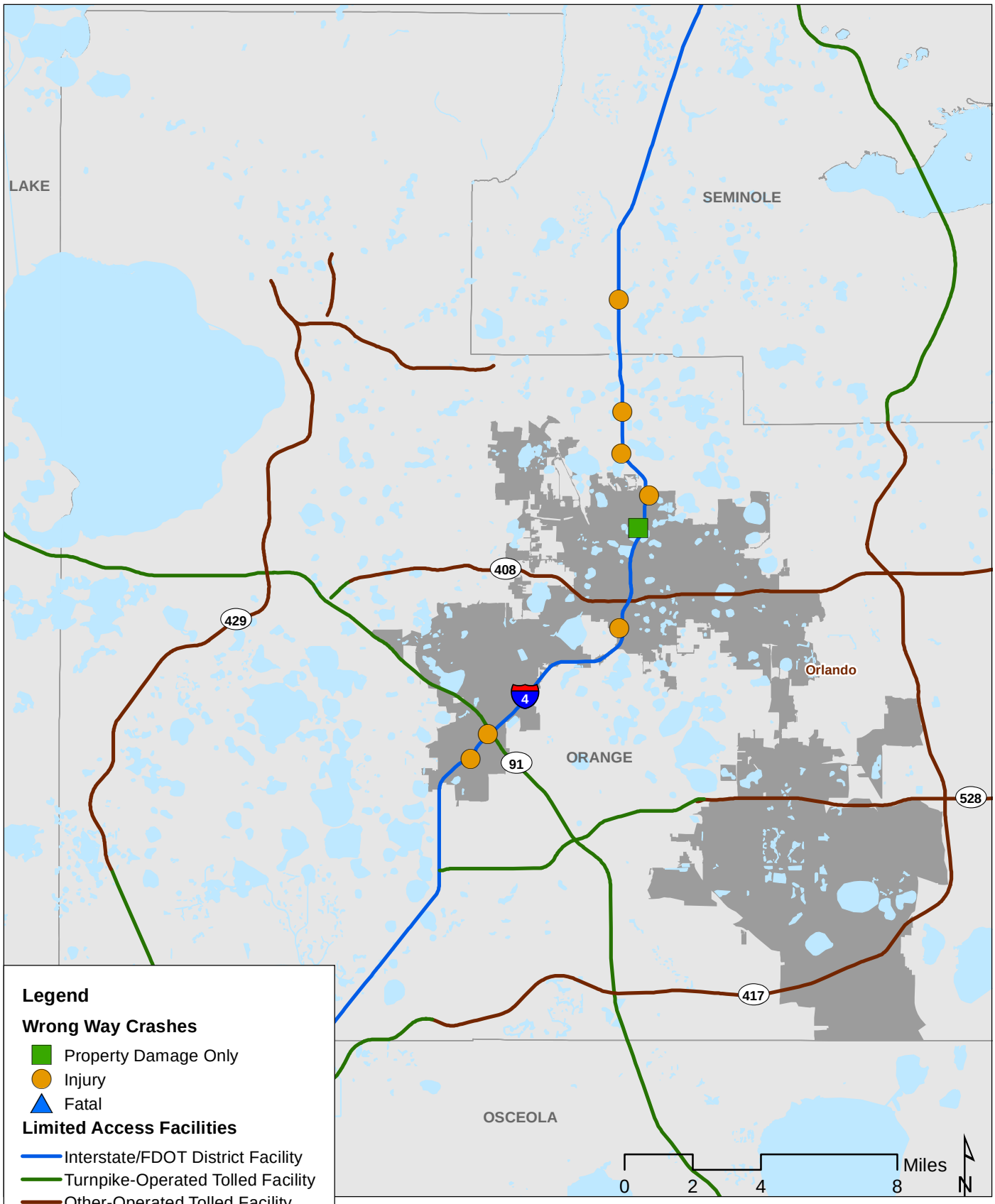
Centennial FDOT 1915 ★ 2015



2009-2013 Wrong Way Crashes On District 5 Facilities in Orlando Statewide Wrong Way Crash Study

Figure **14a**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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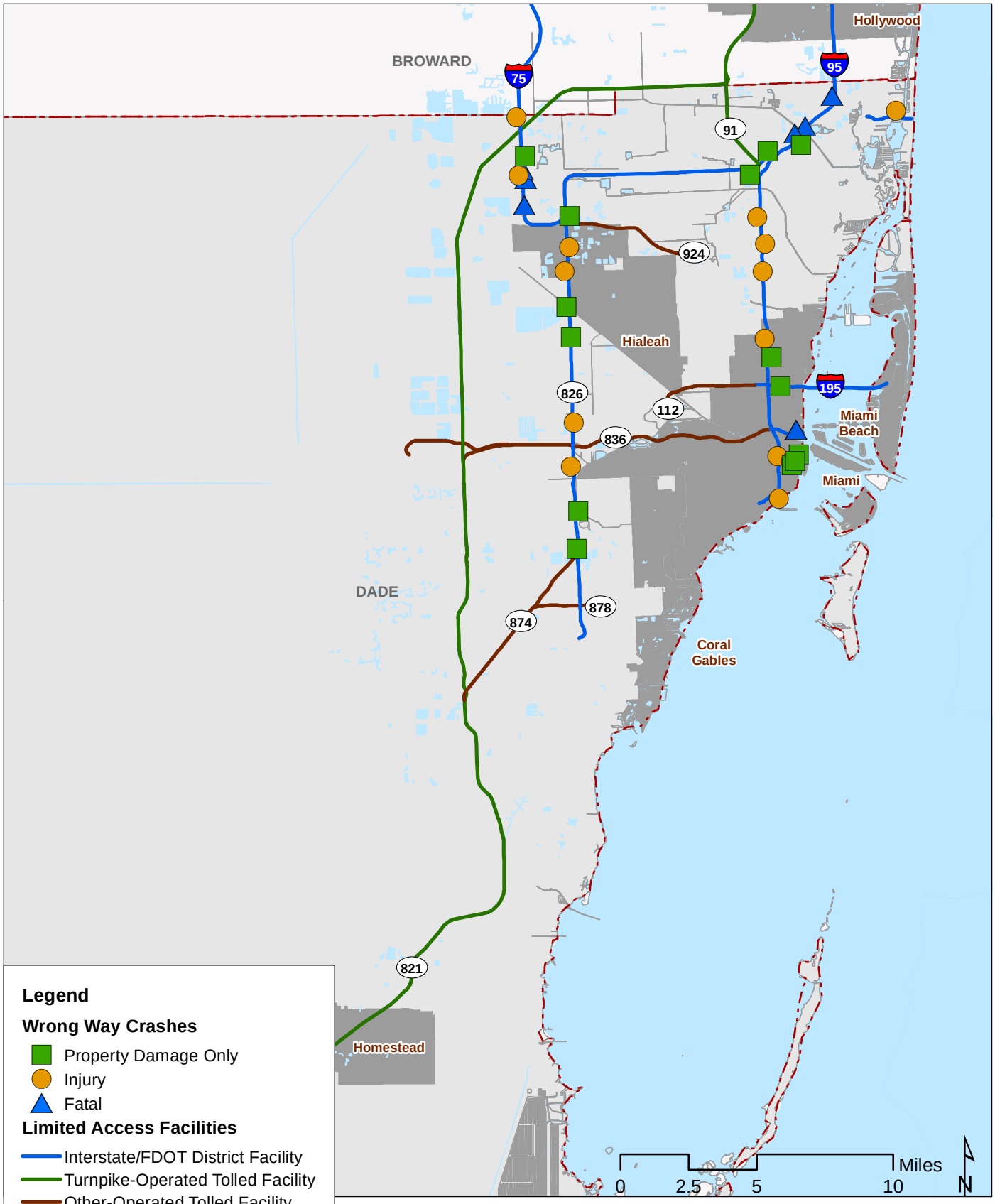

2009-2013 Wrong Way Crashes On DIstrict 6 Facilities Statewide Wrong Way Crash Study

Figure **15**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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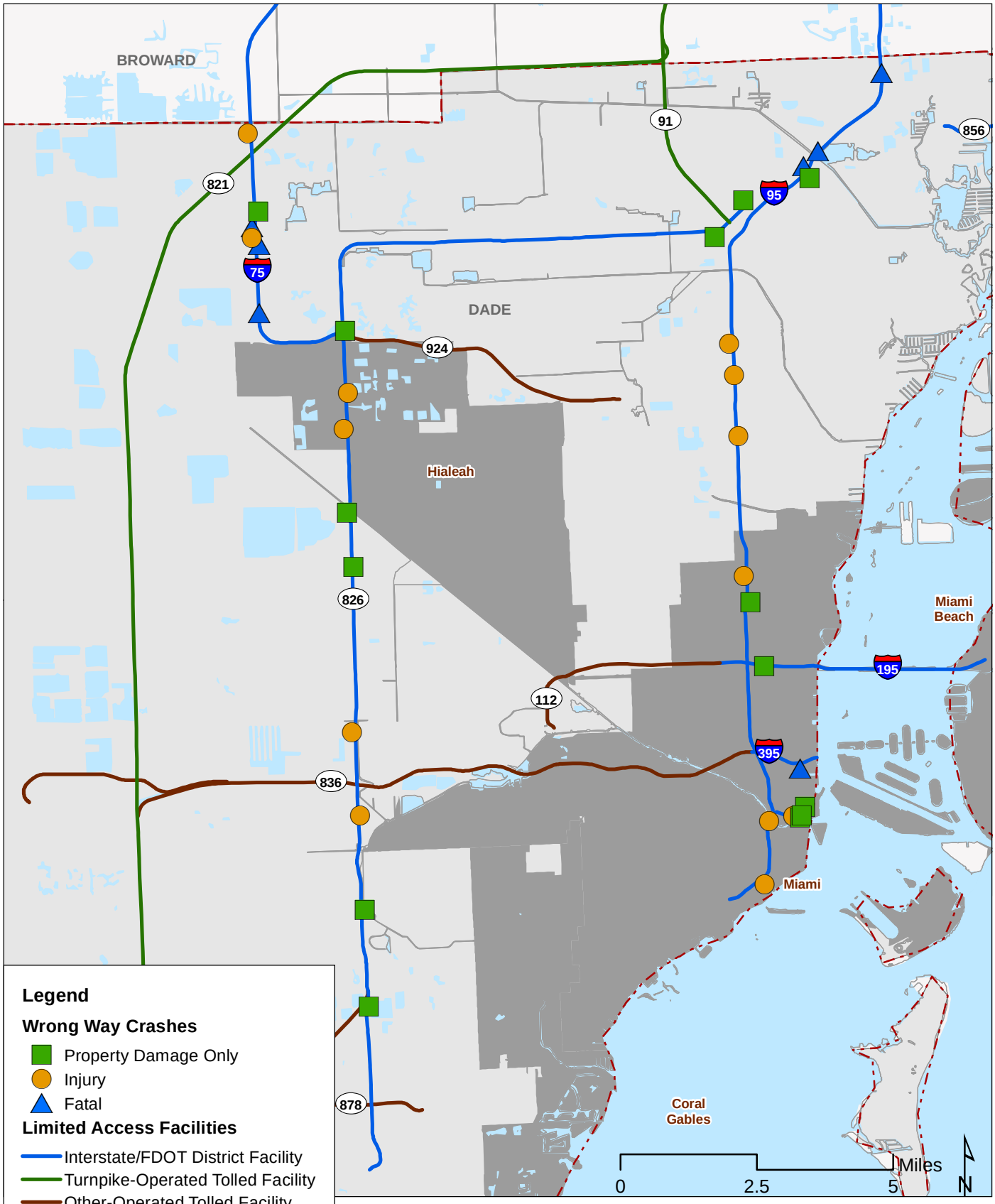


Legend

Wrong Way Crashes

- Property Damage Only
- Injury
- Fatal

Limited Access Facilities

- Interstate/FDOT District Facility
- Turnpike-Operated Tolled Facility
- Other-Operated Tolled Facility
- Major City
- County Boundary
- District Boundary

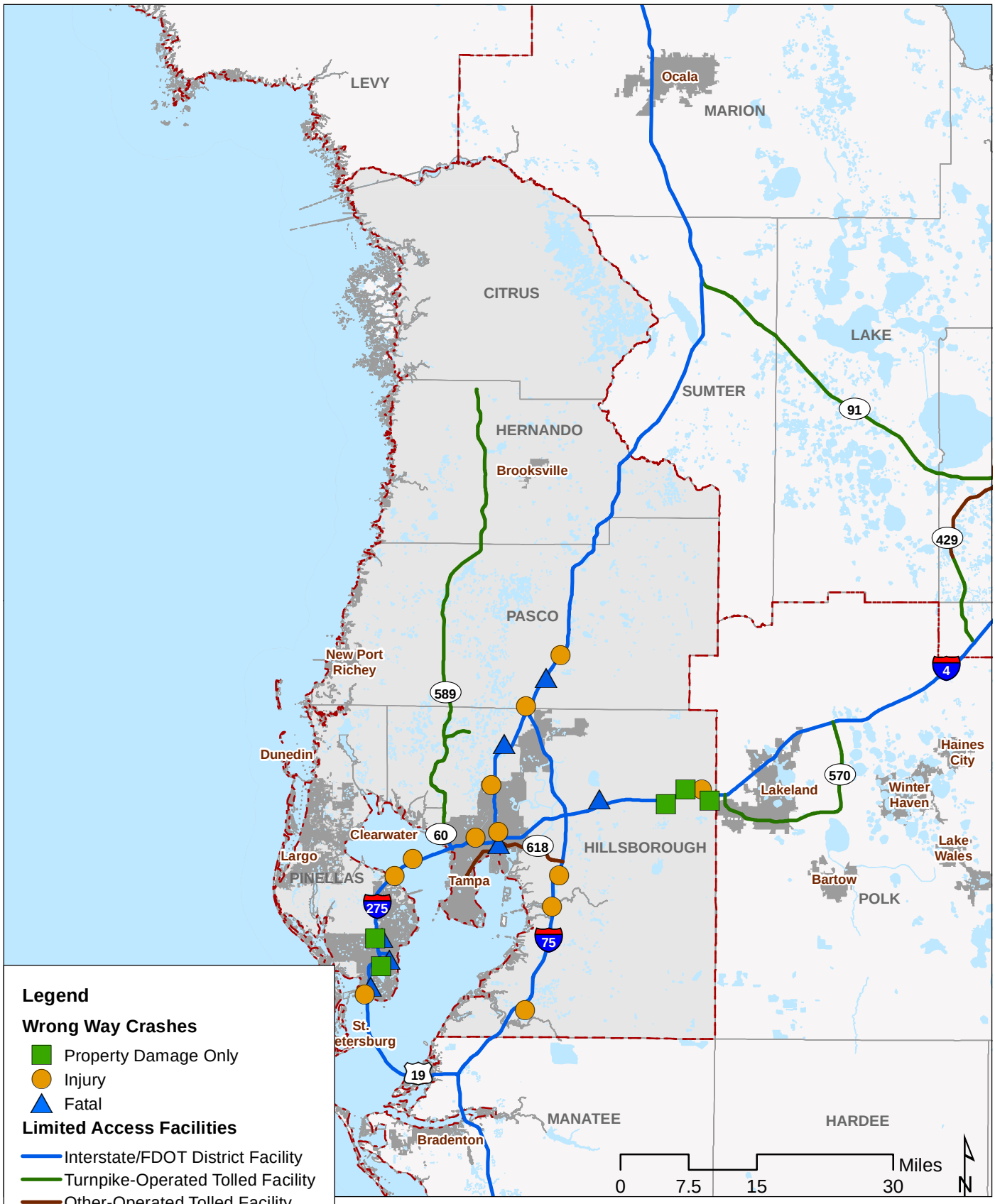
2009-2013 Wrong Way Crashes
On District 6 Facilities in Miami-Dade County
Statewide Wrong Way Crash Study

Figure **15a**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

C:\Workspace\12274 - Wrong Way Crashes\GIS\District6 MIA Inset.mxd - cromano - 5:08 PM 7/14/2014

Centennial FDOT 1915 ★ 2015



Legend

Wrong Way Crashes

- Property Damage Only
- Injury
- Fatal

Limited Access Facilities

- Interstate/FDOT District Facility
- Turnpike-Operated Tolled Facility
- Other-Operated Tolled Facility
- Major City
- County Boundary
- District Boundary

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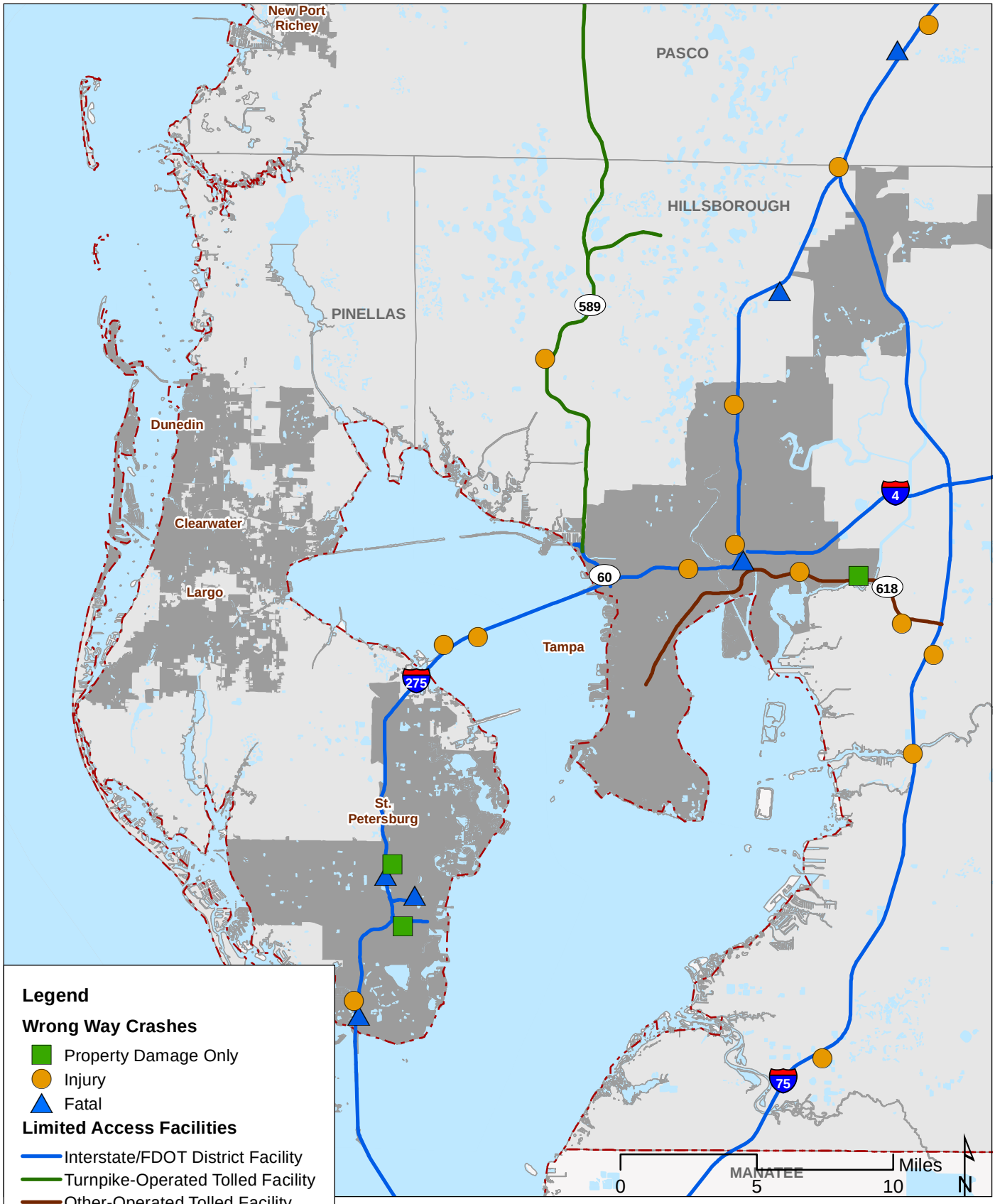
2009-2013 Wrong Way Crashes On District 7 Facilities Statewide Wrong Way Crash Study

Figure **16**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

Centennial FDOT 1915 ★ 2015



Legend

Wrong Way Crashes

- Property Damage Only
- Injury
- Fatal

Limited Access Facilities

- Interstate/FDOT District Facility
- Turnpike-Operated Tolled Facility
- Other-Operated Tolled Facility
- Major City
- County Boundary
- District Boundary

2009-2013 Wrong Way Crashes On District 7 Facilities in Tampa Statewide Wrong Way Crash Study

Figure **16a**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

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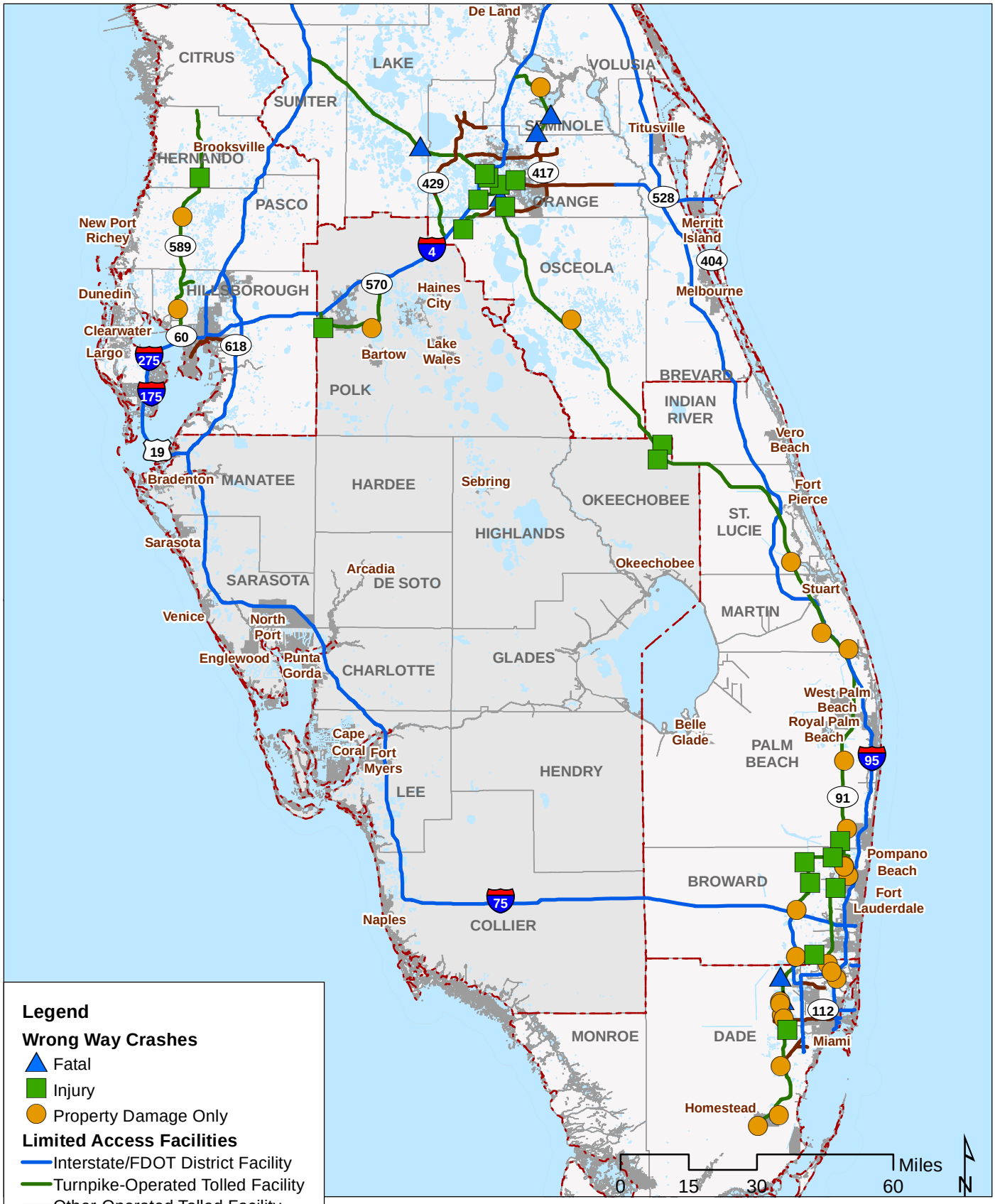
Centennial FDOT 1915 ★ 2015



Legend

Wrong Way Crashes
- Fatal
- Injury
- Property Damage Only

Limited Access Facilities
- Interstate/FDOT District Facility
- Turnpike-Operated Tolled Facility
- Other-Operated Tolled Facility
- Major City
- County Boundary
- District Boundary

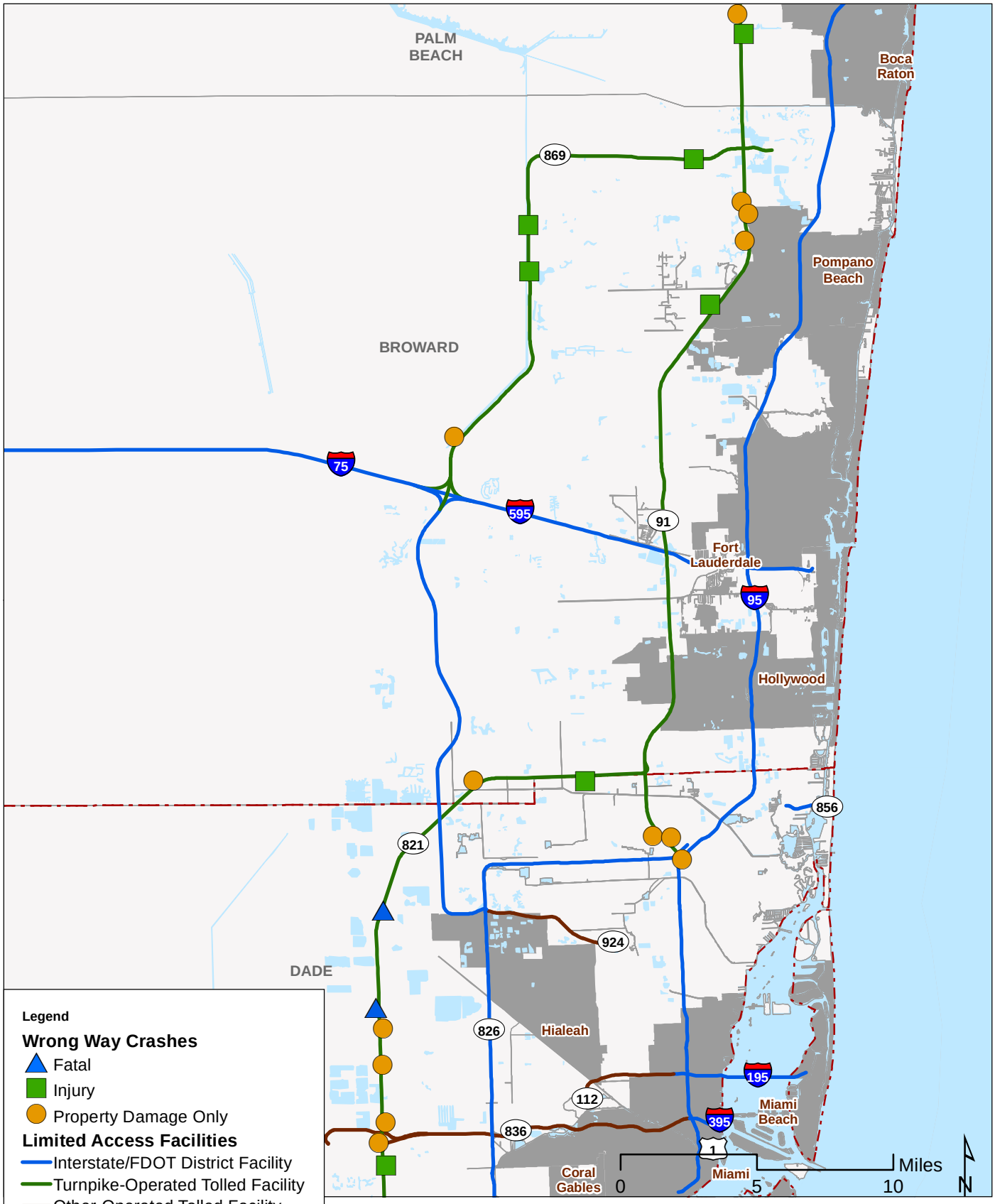
2009-2013 Wrong Way Crashes On Turnpike Facilities Statewide Wrong Way Crash Study

Figure **17**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

H:\profile\12274 - Jacobs FDOT Central Office Support\Task Orders\TO#3 - Wrong Way Crash Analysis\GIS\GIS\Turnpike.mxd - cromano - 10:45 AM 12/3/2014

Centennial FDOT 1915 ★ 2015



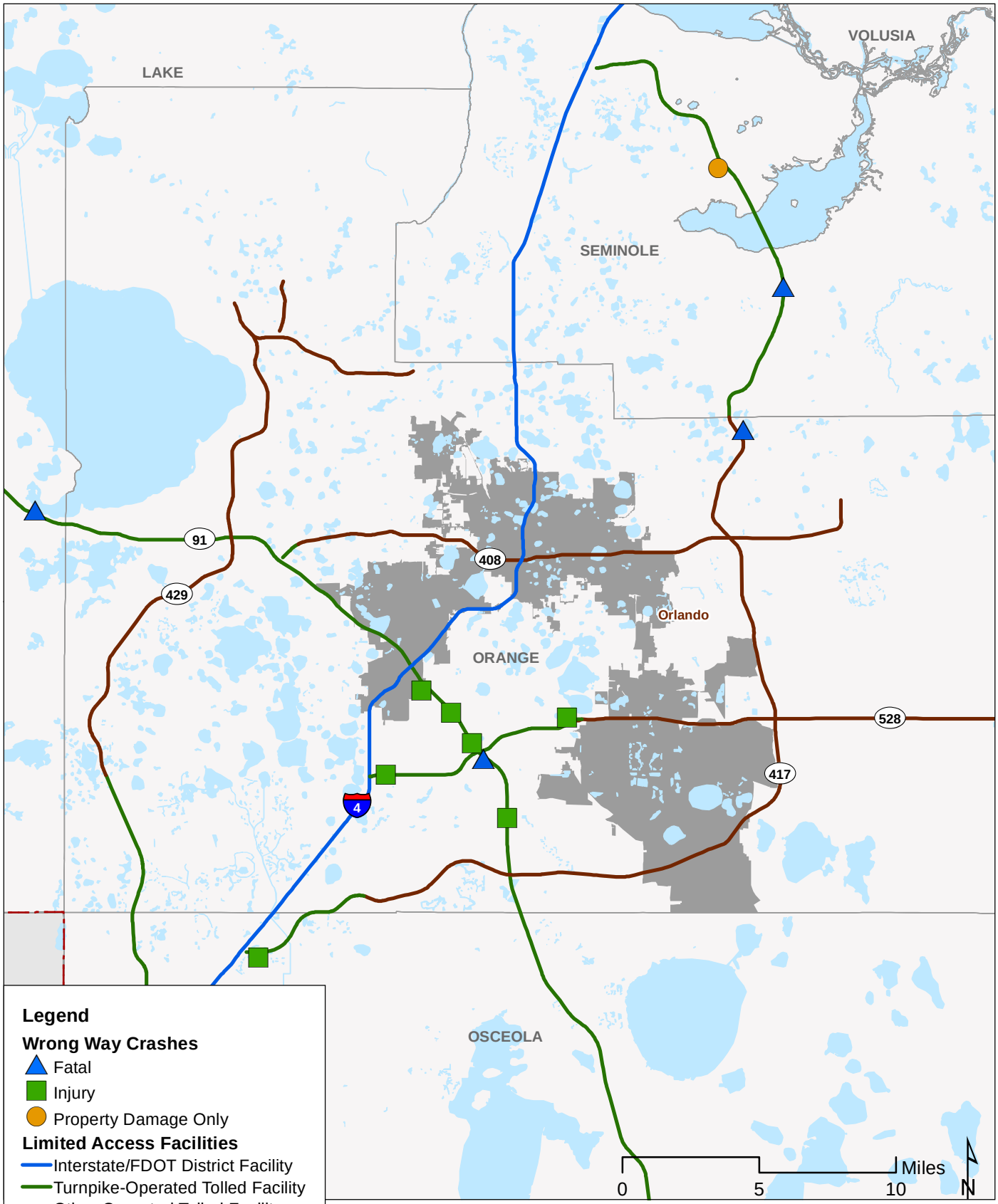
2009-2013 Wrong Way Crashes On Turnpike Facilities - South Florida Statewide Wrong Way Crash Study

Figure **17a**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

H:\profile\12274 - Jacobs FDOT Central Office Support\Task Orders\TO#3 - Wrong Way Crash Analysis\GIS\GIS\TurnpikeA.mxd - cromano - 10:56 AM 12/3/2014

Centennial FDOT 1915 ★ 2015



Legend

Wrong Way Crashes
- Fatal
- Injury
- Property Damage Only

Limited Access Facilities
- Interstate/FDOT District Facility
- Turnpike-Operated Tolled Facility
- Other-Operated Tolled Facility
- Major City
- County Boundary
- District Boundary

2009-2013 Wrong Way Crashes On Turnpike Facilities in Orange County Statewide Wrong Way Crash Study

Figure **17b**

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet

H:\profile\12274 - Jacobs FDOT Central Office Support\Task Orders\TO#3 - Wrong Way Crash Analysis\GIS\GIS\TurnpikeB.mxd - cromano - 10:52 AM 12/3/2014

Centennial FDOT 1915 ★ 2015

Crash Score Analysis

Countermeasures concentrated at wrong way entry points will reduce wrong way crashes on freeway and expressway mainlines by reducing the occurrence of wrong way driving at its point of origin. The wrong way crash data was analyzed to identify potential high crash locations (i.e. interchanges) associated with wrong way entry. The purpose of the crash score analysis is to prioritize interchange locations with a history of wrong way entry. Unfortunately, crash reports do not typically identify the wrong way entry point, and the information is not easily ascertained by law enforcement on-scene.

Methodology

A methodology developed by the Illinois Center for Transportation in the 2012 *Investigation of Contributing Factors Regarding Wrong-Way Driving on Freeways* (3) was utilized to determine high crash interchange locations. The analysis centered on the location of each wrong way crash and a scoring system for potential wrong way entry points upstream of the wrong way driver. The methodology to calculate crash scores is summarized as follows:

Step 1: Identify crashes where vehicle entered the system in wrong direction (i.e. wrong way entry)

The wrong way crash report narratives were reviewed in detail to identify crashes likely involving wrong way entry. Wrong way crashes not involving wrong way entry included those where a vehicle backed up on the mainline or on the ramp, or a vehicle attempted a U-turn without crossing the median. After reviewing the crash narratives, 80 percent of the wrong way crashes likely involved wrong way entry.

Step 2: Record the entry point location and interchange type

The entry point location was not typically identified in the crash report. Only 16 percent of crashes involving wrong way entry had the entry point identified in the crash report. For those crashes, the known entry point interchange/ramp was recorded along with the interchange type, which was obtained from FDOT's Roadway Characteristics Inventory (RCI) database.

For the majority of crashes, the wrong way entry point was not known. For each of these crashes, the location of the crash and the direction of the wrong way vehicle were used to identify the first and second nearest upstream interchange locations/ramps and their respective interchange types. The underlying assumption to this methodology is that the wrong way vehicle does not travel long ranges in the wrong direction prior to the crash. The methodology assumes the wrong way vehicle entered the system in the wrong direction not far from the location of the crash, within one to two interchange opportunities.

Step 3: Apply a weighted score to each interchange location and type:

After the interchange locations and interchange types have been recorded for each crash, the interchange locations and types receive a weighted score for each crash. A score of 1.0 is added to an interchange location and type that was a known entry point. For the unknown entry points, the score is divided as follows:

- 0.75 score for first upstream interchange location and type
- 0.25 score for second upstream interchange location and type

Following the assumption that a wrong way vehicle entered the system near the crash, the first nearest interchange is weighted more heavily than the second nearest interchange.

Step 4: Sum the weighted scores to obtain the crash scores

For each respective interchange location and interchange type, the weighted scores from each wrong way crash are summed together to obtain the crash score for the interchange location or interchange type.

Crash Score Results

The results of the crash score analysis were summarized into tables by district and are included in Appendix B. From the crash score analysis, interchange types with the highest crash scores were diamond/partial diamond (crash score of 98), partial cloverleaf (crash score of 45), and trumpet (crash score of 17). The interchange type with the lowest crash score was full cloverleaf (crash score of 1). These findings are consistent with the literature review, which identified diamond and partial cloverleaf interchange types as more susceptible to wrong way movements, and full cloverleaf as less susceptible to wrong way movements. The distribution of crash scores by interchange types is depicted in **Figure 18**.

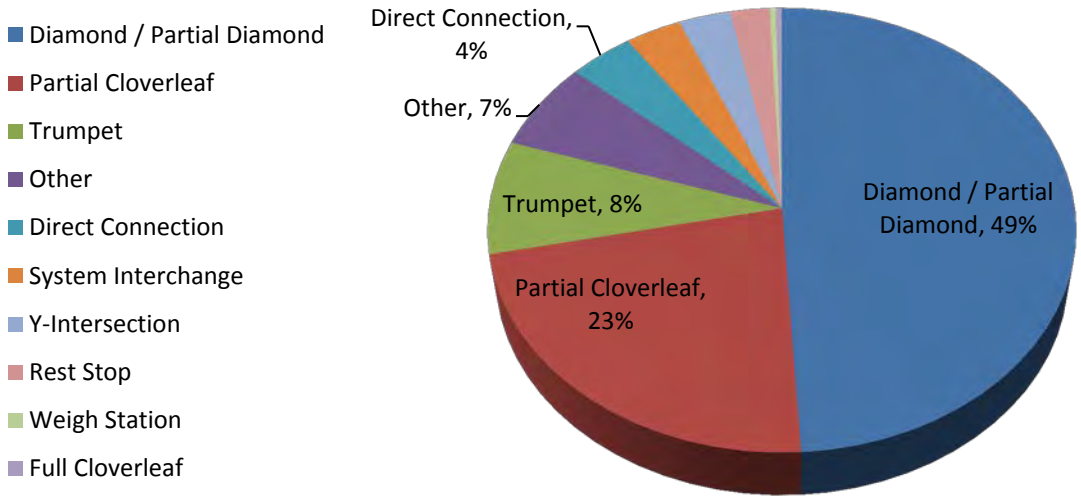


Figure 18 Crash Score Distribution by Interchange Type

The FDOT Roadway Characteristics Inventory (RCI) database was used to evaluate the proportion of different interchange types in Florida. **Table 5** summarizes the proportion of certain interchange types throughout the state and their corresponding wrong way crash scores.

Table 5 Statewide Distribution of Interchange Types

Interchange Type	Statewide Distribution Proportion	Wrong Way Crash Score Proportion
Diamond/Partial Diamond	55.7%	49.1%
2 Quadrant/Partial Cloverleaf	25.5%	22.7%
Trumpet	6.0%	8.3%
Direct Connection Design	5.7%	3.9%
Y Intersection	3.0%	3.1%

It is noted the crash score distribution is fairly consistent with the proportion of interchange types. Therefore, the higher crash scores at certain interchange types are consistent with their higher levels of exposure across the state.

Section 4
Interchange Field Reviews

INTERCHANGE FIELD REVIEWS

The project team conducted field reviews at 40 interchange locations to understand systemic issues and identify systemic countermeasures for application across the state.

FIELD REVIEW APPROACH

The purpose of the interchange field reviews was to understand systemic issues and identify systemic countermeasures for application across the state. In preparation for the field review, the project team familiarized itself further with the MUTCD (6) guidance and recommendations and prepared a checklist for use in the field.

MUTCD Guidance

The MUTCD (6) prescribes the minimum national standards for signing and pavement markings on interchange ramps, including optional signs and pavement markings. The optional signs and markings provide a level of redundancy beneficial to increasing the conspicuity of allowed and prohibited movements. Minimum required signage and markings and additional optional signs and markings are shown in Figure 2B-18 of the MUTCD (6), which is reproduced in **Figure 19**.

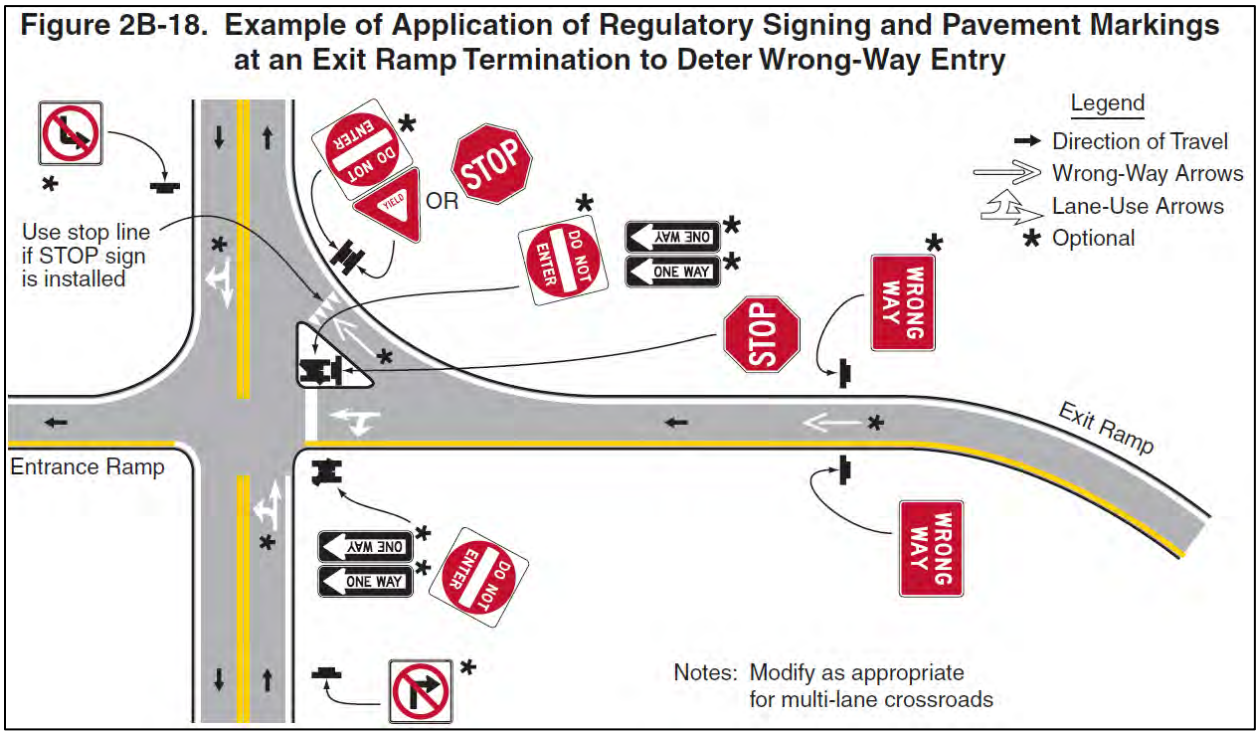


Figure 19 Wrong Way Signage and Markings for Exit Ramp (MUTCD)

In addition to ramp exit terminal signage, the MUTCD (6) provides standards on conventional road signing on approach to interchanges (guide signage) in Section 2D.45. The following sign sequences should be included on approach to an interchange:

a. Junction Assembly
b. Destination sign
c. Directional Assembly or Entrance Direction sign for the first ramp
d. Advance Route Turn Assembly or Advance Entrance Direction sign with an advance turn arrow
e. Directional Assembly or Entrance Direction sign for the second ramp

The size of the interchange (major/minor) and the cross-street (single lane/multilane) determines the level of signage that should be used on approach to the interchange, such as interchange shields (e.g. M1-1) or the larger and more conspicuous green guide signs. The MUTCD (6) provides examples of the appropriate combination in Figures 2D-11 through 2D-16.

Field Review Checklist

The project team developed a wrong way crash checklist to facilitate a systematic approach to the 40 interchange field reviews. Checklists developed by others found in the literature review were considered, including Zhou et al. (3), Copelan (4), and Cooner et al. (9). The field review checklist developed for this study included four areas focused on discouraging wrong way movements:

- Signage
    - DO NOT ENTER signs
    - WRONG WAY signs
    - ONE WAY signs
    - Turn Restriction signs
    - Guide signs on the cross-street
- Pavement markings
    - Wrong way arrows
    - Stop bar at terminus
    - Dotted guide line stripes
    - Turn/guide arrows on cross-street turn lanes
- Geometric design
    - Ramp median
    - Intersection skew
    - Narrow opening
    - Cross-street median
- Lighting
    - Cross-street lighting
    - Ramp lighting

The checklist was set up to be used at each ramp/cross-street intersection (typically two per interchange). The checklist developed for this project, as well as the example checklists obtained from the literature review, are provided in Appendix C.

INTERCHANGE LOCATIONS

With the results of the crash score analysis (Appendix B), the project team met with the DTOEs and district staff from each FDOT district to select interchange locations for field review. The interchanges selected included a range of locations across the various FDOT districts, including Florida's Turnpike Enterprise, as well as a range of area types (rural, urban) and interchange types (partial cloverleaf, diamond, trumpet, etc.). The interchange locations selected for review are summarized in **Table 6**.

Table 6 Interchange Locations Selected for Field Review

District	Interchange	Interchange Type
District 1	I-4 at US 27	Partial Cloverleaf
District 1	I-75 at University Parkway	Diamond / Partial Diamond
District 1	I-75 at CR 846 (Immokalee Rd)	Diamond / Partial Diamond
District 2	I-10 at SR 47	Diamond / Partial Diamond
District 2	I-295 at SR 208 (Wilson Blvd)	Diamond / Partial Diamond
District 2	I-295 at US 1	Partial Cloverleaf
District 2	I-95 at Prudential Dr/Mary St	Y-Intersection
District 2	I-95 at US 1	Partial Cloverleaf
District 2	Matthew's Expy at Gator Bowl Blvd	Partial Cloverleaf
District 2	SR 115 EB Exit to Arlington Exp Service Road (east of Oaks Ansley Ln)	Other
District 3	I-10 at Log Lake Rd	Diamond / Partial Diamond
District 3	I-10 at SR 285	Diamond / Partial Diamond
District 3	I-10 at SR 81 (Samson Hwy)	Diamond / Partial Diamond
District 4	I-75 at SR 822 (Sheridan St)	Partial Cloverleaf
District 4	I-75 at Miramar Pkwy (S 33rd St)	Partial Cloverleaf
District 4	I-95 at SR 820 (Hollywood Blvd)	Diamond / Partial Diamond
District 4	I-95 at SR 822 (Sheridan St)	Diamond / Partial Diamond
District 4	I-95 at SR838 (Sunrise Blvd)	Partial Cloverleaf
District 5	I-75 at SR 500/US 27	Diamond / Partial Diamond
District 5	I-95 at SR 44	Diamond / Partial Diamond
District 5	I-95 at SR 442 (Elkcam Blvd)	Diamond / Partial Diamond
District 5	I-95 at Stuckway Rd	Diamond / Partial Diamond
District 5	I-4 at Fairbanks Ave	Diamond / Partial Diamond
District 5	I-4 at SR 91 (Turnpike)	Trumpet
District 6	I-75 at 138th St (Hialeah Gardens Blvd)	Trumpet
District 6	I-75 at SR 860 (NW 186th St)	Partial Cloverleaf
District 6	I-95 at SR 916 (NE 135th St)	Diamond / Partial Diamond
District 6	I-95 at SR 922 (NW 125th St)	Diamond / Partial Diamond
District 6	SR 826 (Palmetto Expy) at SR 976 (SW 40th St)	Diamond / Partial Diamond
District 7	I-275 at 22nd Ave	Diamond / Partial Diamond
District 7	I-275 at Ashley Dr	Trumpet
District 7	I-275 at Pinellas Point Dr	Diamond / Partial Diamond
District 7	I-275 at SR 687 (4th St)	Direct Connection
Turnpike	SR 417 at Red Bug Lake Rd	Partial Cloverleaf
Turnpike	SR 91 (Turnpike) at Becker Rd	Diamond / Partial Diamond
Turnpike	SR 91 (Turnpike) at Coconut Creek Pkwy	Trumpet
Turnpike	SR 91 (Turnpike) at SR 714 (Martin Hwy)	Trumpet
Turnpike	SR 91 (Turnpike) at SR 834 (Sample Rd)	Trumpet
Turnpike	SR 91 (Turnpike) at NW 199 St	Y-Intersection
Turnpike	SR 821 (HEFT) at NW 12th St	Partial Cloverleaf

GENERAL OBSERVATIONS

The project team conducted existing conditions assessments during the daytime for each interchange location and conducted night observations to qualitatively assess the interchange area's lighting conditions, sign visibility, and retroreflectivity. Interchange characteristics were summarized in tables and a condition diagram on an aerial background was prepared for each interchange location. The condition diagrams show existing traffic control devices (i.e. signs, signals, pavement markings), geometric design, and other characteristics pertaining to potential wrong way movements on the facilities. The tables and condition diagrams for each of the 40 interchange locations are provided by FDOT district in Appendix D. General systemic observations from the field review are summarized as follows.

Guide Signs on Cross-Street Approach

As discussed previously, guide signs on the cross-street approach to an interchange are an integral part of providing motorists with advanced information and the appropriate context of the interchange. This is particularly important in areas with relatively higher levels of tourist traffic that may be unfamiliar with the area. Guide signs provide motorists with an expectation of which side of the road the entrance ramp will be on, and which lane they need to be in (for multilane cross-streets). This information in advance of the interchange provides a proper orientation and sets the expectation for motorists, providing smoother channelization on approach to the interchange.

Interchange shield signs (e.g. MUTCD M1-1 sign) were often used on multilane cross-street approaches to major interchanges instead of the larger and more conspicuous green guide signs (e.g. MUTCD Figure 2D-13). Upgrading guide signage would provide motorists with more information in advance of the interchange, such as the appropriate lane for the desired ramp/direction, improving channelization.

Wrong Way Signage at Ramp Intersections

Signage provided at the cross-street/ramp intersections is essential to direct motorists *away* from exit ramp openings and *toward* entrance ramp openings. Signage at the exit ramp intersections with the cross-street often met (and in some cases exceeded) the MUTCD (6) minimum requirements. An example of the minimum requirements includes installation of one DO NOT ENTER sign and one WRONG WAY sign, with no installations of ONE WAY signs coupled with the DO NOT ENTER signs, and no installations of turn restriction signs (NO LEFT TURN, NO RIGHT TURN, etc.). The addition of optional signs (see **Figure 19** or MUTCD Figure 2B-18) would likely increase the conspicuity of the wrong way traffic control devices at the ramp intersections.

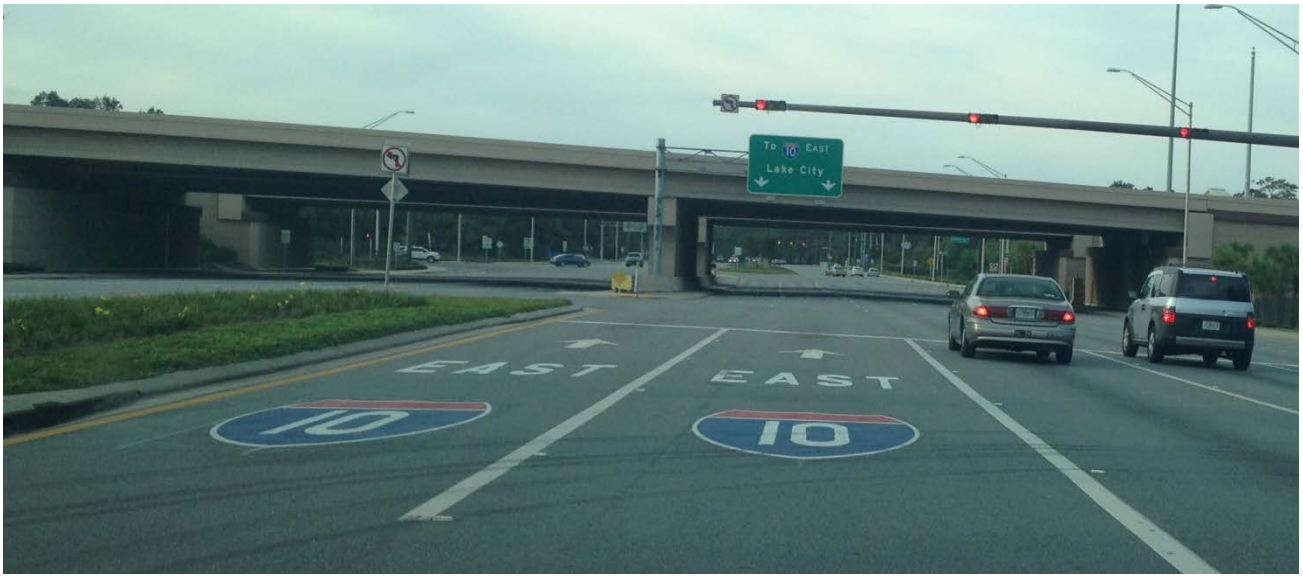
Guidance on the size of signs was updated in the 2009 Edition of the MUTCD (6), providing larger sign options at interchange exit ramps and intersections (see MUTCD, Table 2B-1). The majority of the signs observed in the field were installed prior to the 2009 update and could be replaced with the larger sign sizes.

Pavement Markings

Stop bars, lane use arrows, and wrong way arrows were present on the majority of exit ramps, though the condition of the RPMs and the pavement markings varied greatly among the locations reviewed. In some locations, the RPMs and pavement marking retroreflectivity were worn by exposure to the elements and to traffic.

Dotted guide line stripes (also known as lane line extensions) were observed at many intersections, providing guidance to motorists of the appropriate intersection turn maneuvers. Turning guide stripes are not typically provided at intersections having a single lane left-turn movement, but they are particularly helpful at cross-street/exit ramp intersections to further delineate the appropriate direction of turning movements.

At locations with a left-turn bay extending through the cross-street/exit ramp intersection (such as a tight diamond interchange), left-turn arrows were occasionally observed that may misdirect a turning vehicle onto the exit ramp. In other instances, a through arrow with a RAMP pavement marking legend or interstate shield pavement marking was used in advance of the near-side ramp intersection, as shown below. The photo shown below with the use of an interstate shield pavement marking is the preferable treatment as it discourages a wrong way left-turn at the near-side ramp intersection.



Lighting

Lighting levels varied among the 40 locations from no lighting, to high mast interchange lighting only, to both high-mast interchange and street-level lighting. The interchanges providing the greatest nighttime visibility included street-level lighting on the cross-streets and at the entrance ramps. Locations with no or limited lighting were heavily reliant upon sign retroreflectivity for nighttime visibility.

The latest guidance in the FDOT PPM requires all interchanges on the interstate highway system to be lighted (Vol 1, Sect. 7.3.4). The process of adding lighting to the currently unlit interchanges is currently

underway. Street-level lighting should be included on the ramps and cross-streets within the limits of the interchange influence area where reasonably possible.

Geometric Design

A variety of median openings were observed at the exit ramp intersections. Median openings formed to prevent premature left-turns from the cross-street (on to an exit ramp) are effective in discouraging wrong way movements by making the movements more difficult. Many interchange locations throughout the state have median openings that are shaped and designed to discourage wrong way movements. Multiple locations were also noted where median extensions could be constructed to further discourage premature left-turns onto the exit ramp.

Maintenance

Signage appeared to be the most obvious deterrent to wrong way driving at the locations. However, many of the signs were worn from exposure to the elements. Maintaining interchange signage to discourage wrong way driving should be of the highest priority. Many interchanges would benefit by replacing existing signs with oversized signs (as discussed previously) having higher levels of retroreflectivity. Section 2A.08 of the MUTCD (6) addresses maintaining minimum retroreflectivity on signs.

Section 5
Countermeasures for Wrong Way Driving

COUNTERMEASURES FOR WRONG WAY DRIVING

Having conducted the wrong way historical crash analysis and completed field reviews of 40 interchanges throughout the state, general countermeasures are suggested to reduce wrong way driving incidents and to provide a consistent approach to wrong way treatments at interchanges statewide.

ENGINEERING COUNTERMEASURES AND CONCEPTS

Based upon the general observations made during the interchange field reviews and as previously discussed, the following general countermeasures were considered.

Guide Signs on Cross-Street Approach

Cross-street interchange approaches should be reviewed in each district to determine whether adequate guide signage is provided. The following sign sequence should be used for multi-lane conventional roads approaching an interchange (MUTCD, Section 2D.45):

A. Junction Assembly
B. Advanced Entrance Direction sign(s) for both directions (if applicable) of travel on the freeway or expressway
C. Entrance Direction sign for first ramp
D. Advance Turn Assembly
E. Entrance Direction sign for the second ramp

It is recommended multi-lane cross-streets be given a higher level treatment than single lane cross-streets. For example, large green guide signs and destination signage should be used on multi-lane roads rather than interstate shields alone. Overhead guide signs or bridge-mounted guide signs should be considered where appropriate, especially on multi-lane cross-streets when the second entrance ramp will be on the motorists' left-hand side (i.e. a diamond interchange). Examples of right-sized guide signs for a given context are provided in MUTCD (6), Figures 2D-11 through 2D-16.

At the ramp intersection, the ramp entrance was typically distinguished using a route shield and directional arrow. The FREEWAY ENTRANCE signs (MUTCD (6), D13-3, D13-3a) are a recommended option to further enhance the freeway entrance directional assembly at the cross-street/ramp intersection.

Wrong Way Signage at Ramp Intersections

Signage provided at the ramp intersections is essential to direct motorists *away* from exit ramp openings and *toward* entrance ramp openings. This area provides the greatest opportunity for low-cost countermeasures having the greatest impact at the origin point of wrong way incidents.

Additional Signs

As previously discussed, signage at the exit ramp intersections with the cross-street often met but did not exceed the MUTCD (6) minimum requirements. The addition of optional signs (MUTCD, Figure 2B-18) would substantially increase the conspicuity of the wrong way traffic control devices at the ramp intersections, where the majority of wrong way incidents are suspected to originate.

Where ramp lengths allow, a second set of WRONG WAY signs could be considered as a low cost countermeasure. A second set of WRONG WAY signs would increase the sign conspicuity and would further emphasize the message to wrong way drivers. It is recommended the signs be installed at staggered heights, with the closer pair installed at a low height (i.e. four feet, as discussed previously), and the farther pair be installed a standard height (i.e. seven feet). This would improve driver sight lines for visibility of both sets of WRONG WAY signs simultaneously.

Sign Size

Guidance on the size of signs was updated in the 2009 Edition of the MUTCD (6), providing larger sign options at interchange exit ramps and intersections (MUTCD, Table 2B-1 or **Figure 19**). Existing, smaller wrong way signage should be systematically replaced with the larger sign sizes. Relevant portions of the MUTCD, Table 2B-1, are reproduced in **Table 7**.

Table 7 MUTCD Regulatory Sign Sizes

Sign or Plaque	Sign Destination	Expressway	Freeway	Oversized
Movement Prohibition	R3-1,2,3,4,18,27	36 x 36	-	48 x 48
Keep Right	R4-7,7a,7b	36 x 48	48 x 60	36 x 48
Do Not Enter	R5-1	36 x 36	48 x 48	36 x 36
Wrong Way	R5-1a	36 x 24	42 x 30	42 x 30
One Way	R6-1	54 x 18	54 x 18	54 x 18

MUTCD (6) guidance in Section 2A.11 regarding sign dimensions includes the following:

> *Guidance:*
>
> *[04] The sizes shown in the Freeway and Expressway columns in the various sign size tables in this Manual should be used on freeways and expressways, and for other higher-speed applications based upon engineering judgment, to provide larger signs for increased visibility and recognition.*
>
> *[05] The sizes shown in the Oversized columns in the various sign size tables in this Manual size should be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility is needed, as determined by engineering judgment or study.*
>
> *[06] Increases above the prescribed sizes should be used where greater legibility or emphasis is needed. If signs larger than the prescribed sizes are used, the overall sign dimensions should be increased in 6-inch increments.*

Based upon the guidance in Section 2A.11, oversized sign sizes are suggested for typical interchange ramp installations. The freeway sign size may also be used at locations where another level of increased visibility and recognition is desired.

Sign Height

The height of signs should also be considered. Mounting DO NOT ENTER signs and WRONG WAY signs at lower heights may be more conspicuous to impaired drivers, as well as elderly drivers and fatigued drivers, and lower-mounted signs will improve the interaction of vehicle headlights with the signs' retroreflectivity. Section 2B.41(7) of the MUTCD (6) provides DO NOT ENTER or WRONG WAY signs to be installed at a minimum height of 3 feet, measured vertically from the bottom of the sign to the elevation of the near edge of pavement. Ongoing human factors and wrong way driving studies at Florida State University and Texas Transportation Institute are researching effective sign heights. WRONG WAY signs should also be posted as near to the edge of pavement as allowed or as feasible to increase their conspicuity (MUTCD, Section 2A.16).

Sign Orientation

Signs should be orientated directly in view of the intended road user (MUTCD (6), Section 2B.37(2)). In other states throughout the U.S., the DO NOT ENTER signs and WRONG WAY signs are commonly installed at an angle oriented toward the road user. Installations in Florida are typically perpendicular to the travel way, but angling the DO NOT ENTER signs and WRONG WAY signs to optimize their orientation to the intended user's view would be beneficial. Special care should be made on a case-by-case basis to orient signs toward the intended road users, particularly when two DO NOT ENTER signs are used at the corner of an exit ramp/cross-street intersection.

Retroreflectivity

Given the majority of wrong way crashes occurred in non-daylight hours, the sign retroreflectivity is important to visibility. All new wrong way sign installations (WRONG WAY, DO NOT ENTER, etc.) and replacements should be of Type XI retroreflective grade to maximize their retroreflectivity.

Pavement Markings

Stop bars, lane use arrows, and wrong way arrows should be provided on exit ramps. Regular inspections are necessary to determine the condition of the RPMs and the pavement markings. Where left-turn movements are allowed from an exit ramp or onto an adjacent entrance ramp (i.e. partial cloverleaf interchange), dotted guide line stripes (also known as lane line extensions) are recommended, even for single lane left-turn movements. Dotted guide line stripes are particularly helpful at exit ramp intersections to further delineate the appropriate direction of turning movements.

Pavement markings on the cross-street should properly orient and direct motorists through the interchange. Where a left-turn bay extends through the cross-street/ramp intersection (e.g. tight diamond interchange), the “left-turn lane” should be designated with a through arrow and an interstate shield pavement marking leading the motorist to the far side of the interchange. Left-turn arrow pavement markings in advance of the near-side exit ramp/cross-street intersection should be removed and replaced with a through arrow and an interstate shield pavement marking.

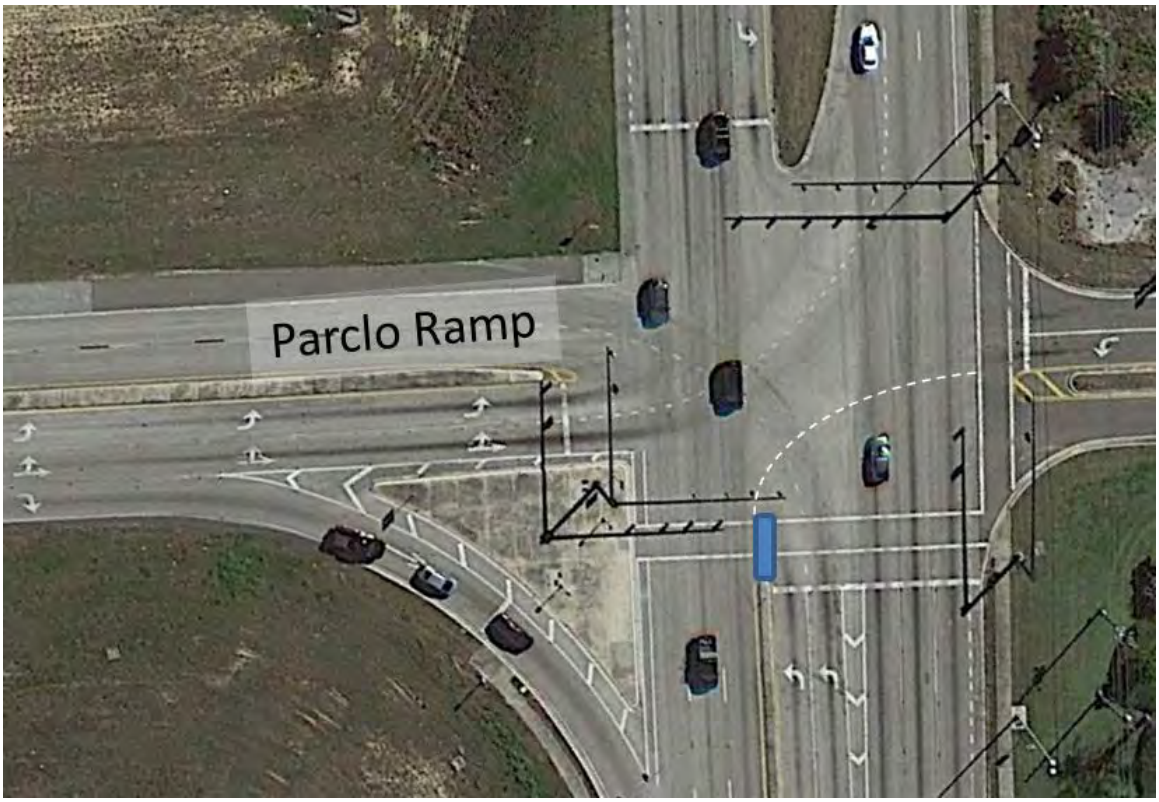
Other cross-street pavement marking options include marking the outside (right-hand) lane with a right-turn arrow (or shared through-right arrow, where appropriate) at cross-street/entrance ramp intersections and a through arrow at cross-street/exit ramp intersections, where right-turns are prohibited. Pavement markings like these reiterate turn restriction signage but appeal more to those whose cone of vision may be focused on the road pavement (e.g. elderly drivers, impaired drivers).

Lighting

The latest guidance in the FDOT PPM requires all interchanges on the interstate highway system to be lighted (Vol 1, Sect. 7.3.4). The process of adding lighting to the currently unlit interchanges is currently underway. Street-level lighting should be included on the ramps and cross-streets within the limits of the interchange influence area where reasonably possible.

Geometric Design

Where medians are present on divided cross-streets, median openings are necessary at the ramp intersections to facilitate allowable turning movements. Wherever possible, consideration should be given to carefully design the median openings to directionally facilitate allowed turning movements but restrict wrong way movements. Improvements to existing interchanges should be considered where median extensions would increase the difficulty of making wrong way movements, as shown in the example below.



Interchange types having two-way traffic on a ramp, such as a partial cloverleaf or trumpet interchange, should have physically separated entrance and exit ramp movements wherever possible. Increased separation distances (i.e. wider medians) between the exit ramp and entrance ramp movements will provide additional opportunities to discourage wrong way movements and allow for more positive guidance onto the correct ramp, as demonstrated in the following examples. The example on the left has a narrow concrete median separator, and the example on the right has a wide grass median. The wider median provides more opportunity to discourage a wrong way left-turn onto the exit-side of the ramp.

Narrow Ramp Median

Wider Ramp Median

For new or modified interchanges, designers should actively consider ways to discourage wrong way movements, including the following:

- Select interchange configuration
    - Diamond and partial cloverleaf configurations provide more opportunity for wrong way movements
    - Full cloverleaf configurations provide less opportunity for wrong way movements. However, higher right-of-way costs and propensity for other crash types (e.g. sideswipes in the weaving section) should also be considered.
    - Diverging diamond configurations reduce opportunities for wrong way movements and require comparable right-of-way to full diamonds (less right-of-way than cloverleaf)
- Provide physical separation (i.e. median) on ramps serving both entering and exiting traffic movements, and maximize the separation distance to the extent possible
- Design median openings to restrict or discourage wrong way movements
- Narrow exit ramp pavement width to discourage wrong way entry
- Skew cross-street/exit ramp intersection angle to discourage wrong way right turns from the cross-street
- Utilize basic concepts of positive guidance to lead motorists to ramp entry points

Districtwide Inspections and Maintenance

Signing and pavement markings are some of the most effective deterrents to wrong way driving at the interchange ramp intersections. However, both are subject to wear-and-tear under the stress of weather conditions, heavy traffic volumes, and even traffic collisions. It is essential that the FDOT regularly inspect the interchanges in each district to keep signing and pavement markings well-maintained. Special attention should be given to the retroreflectivity of signs and pavement markings (MUTCD, Section 2A.08). It is recommended each district systematically inspect each interchange every three years and replace signs or refresh pavement markings as needed. The districts may elect to use the interchange inspection checklist developed as part of this study (see Appendix C).

Intelligent Transportation Systems Treatments

Significant advances are being made in ITS treatments related to wrong way countermeasures. As discussed previously, FDOT and others in the state are experimenting with wrong way detection devices and LED-illuminated signs to increase the conspicuity of WRONG WAY signs in pilot projects throughout the state.

The ability to automatically detect wrong way movements on exit ramps and mainline facilities and seamlessly communicate with law enforcement and TMCs is under development. As this technology is perfected and implemented, it will enhance the ability of law enforcement to detain wrong way drivers prior to crash occurrences. It will also enable more efficient use of DMS to provide other motorists on the mainline facility with advanced warning of the wrong way driver. Texas DOT uses the following

message on DMS to warn of wrong way drivers: "WRONG WAY DRIVER REPORTED---USE EXTREME CAUTION".

In-ground pavement lighting on exit ramps has been proposed and is under testing at FDOT's Traffic Engineering Research Lab (TERL). The red in-ground pavement lights would be placed across the exit ramp, in the vicinity of the WRONG WAY signs. They would flash when wrong way movement is detected, creating the illusion of a lighted stop bar on the exit ramp to the wrong way driver.

Applications of existing on-board navigation systems (i.e. in-vehicle systems, portable systems, cellular devices) may be an opportunity for future development of wrong way detection and cross-system communication to notify a wrong way driver he/she is heading in the wrong direction and to warn other motorists. FDOT recently signed an agreement to share data with the WAZE application (www.waze.com), "a free navigation app that uses information from millions of drivers to outsmart traffic in real-time" (http://www.dot.state.fl.us/agencyresources/documents/centraloffice.pdf). FDOT has requested WAZE to consider application options for wrong way driving detection and notification.

ITS treatments such as these (and others) should be considered in interchange areas with a history of suspected wrong way movements. In the installation of wrong way detection devices, consideration should be given to the presence of existing ITS infrastructure and network to support multiple installations and facilitate communication between the installations and the TMC.

LEVELS OF COUNTERMEASURE IMPLEMENTATION

With consideration of the historical wrong way crash data, observations made during the field reviews, and the wrong way countermeasures at FDOT's disposal, countermeasures were grouped into implementation levels for application purposes. The first level (Level 1a) describes Florida's current minimum requirements, primarily based upon the MUTCD (6) minimum requirements. The next level (Level 1b) is the proposed new minimum standard, which adds the MUTCD "optional" signs and specifies other application details. Levels 2 and 3 provide additional enhancements (static and dynamic/ITS, respectively) that may be considered for special application on a case-by-case basis. The levels of countermeasure implementation are summarized as follows:

Level 1a – Current MUTCD and FDOT Minimum Requirements

FDOT minimum standards currently rely on Standard Index No. 17345 (markings only) and the minimum requirements of the MUTCD (6), being generally described in Section 2B.41 and Figure 2B-18 of the MUTCD and summarized below:

- Proper signing sequences and level of interchange guide signage on cross-street approaches
- MUTCD (6) minimum sign package (MUTCD, Figure 2B-18 and report Figure 20)
    - One DO NOT ENTER sign
    - One WRONG WAY sign
- KEEP RIGHT signs, as appropriate, on side-by-side exit and entrance ramps

- Stop bars at end of exit ramps
- Wrong Way Arrows on exit ramp (Standard Index 17345)
- Entrance ramp directional assembly (e.g. MUTCD, Section 2D.32)
- Ramp and cross-street lighting (PPM, Vol 1, Sect. 7.3.4)

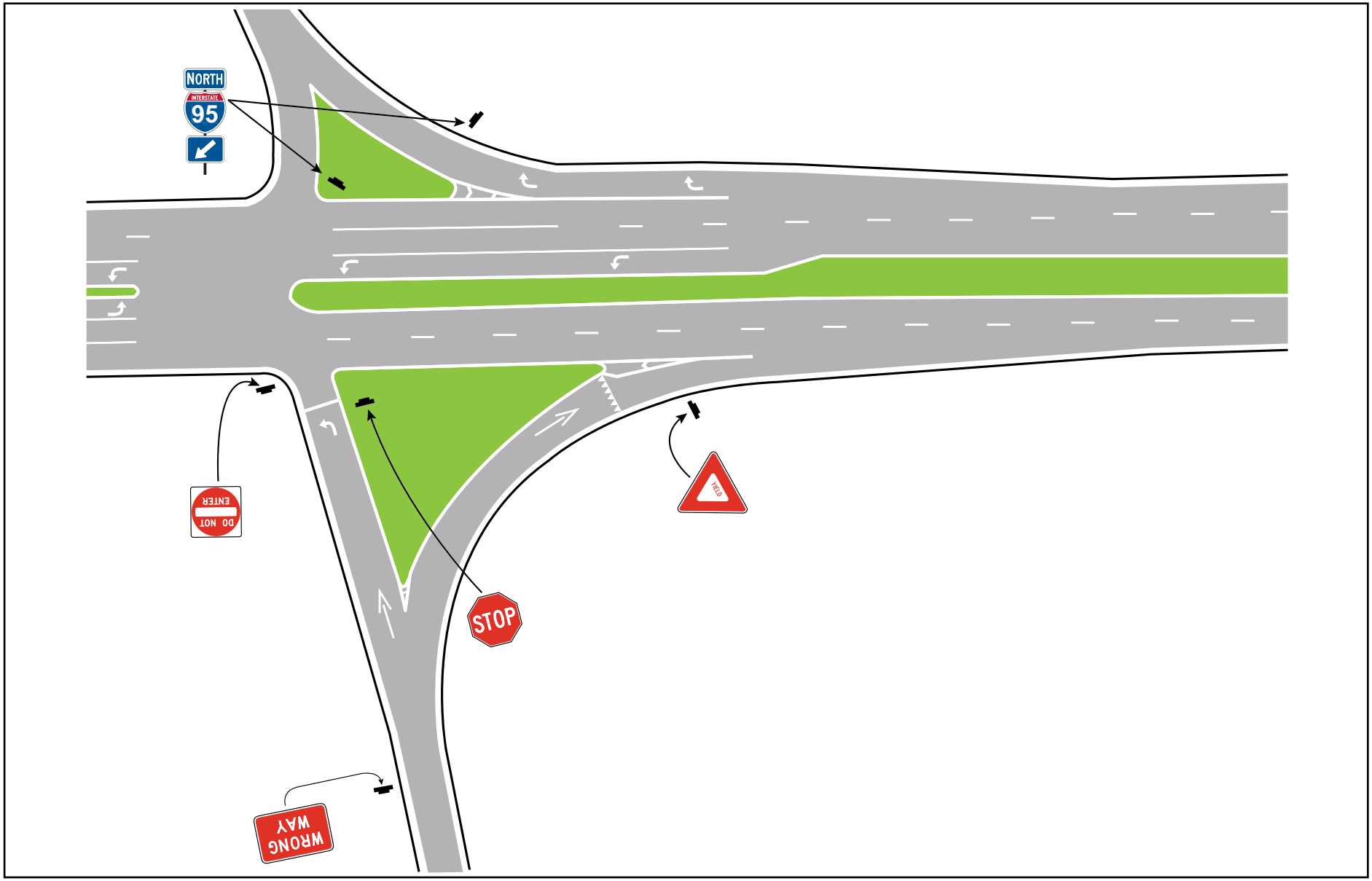
Schematics of typical interchanges with Level 1a implementation are provided in **Figure 20**. Schematics are provided for a one-way ramp (Figure 20a), such as a diamond interchange, as well as a two-way ramp (Figure 20b), such as a partial cloverleaf or a trumpet interchange.

Level 1b – Proposed New FDOT Minimum Requirements

It is proposed that FDOT increase its minimum requirements to create redundancy and improve sign conspicuity. The following is recommended in addition to Level 1a countermeasures at all interchanges throughout the state:

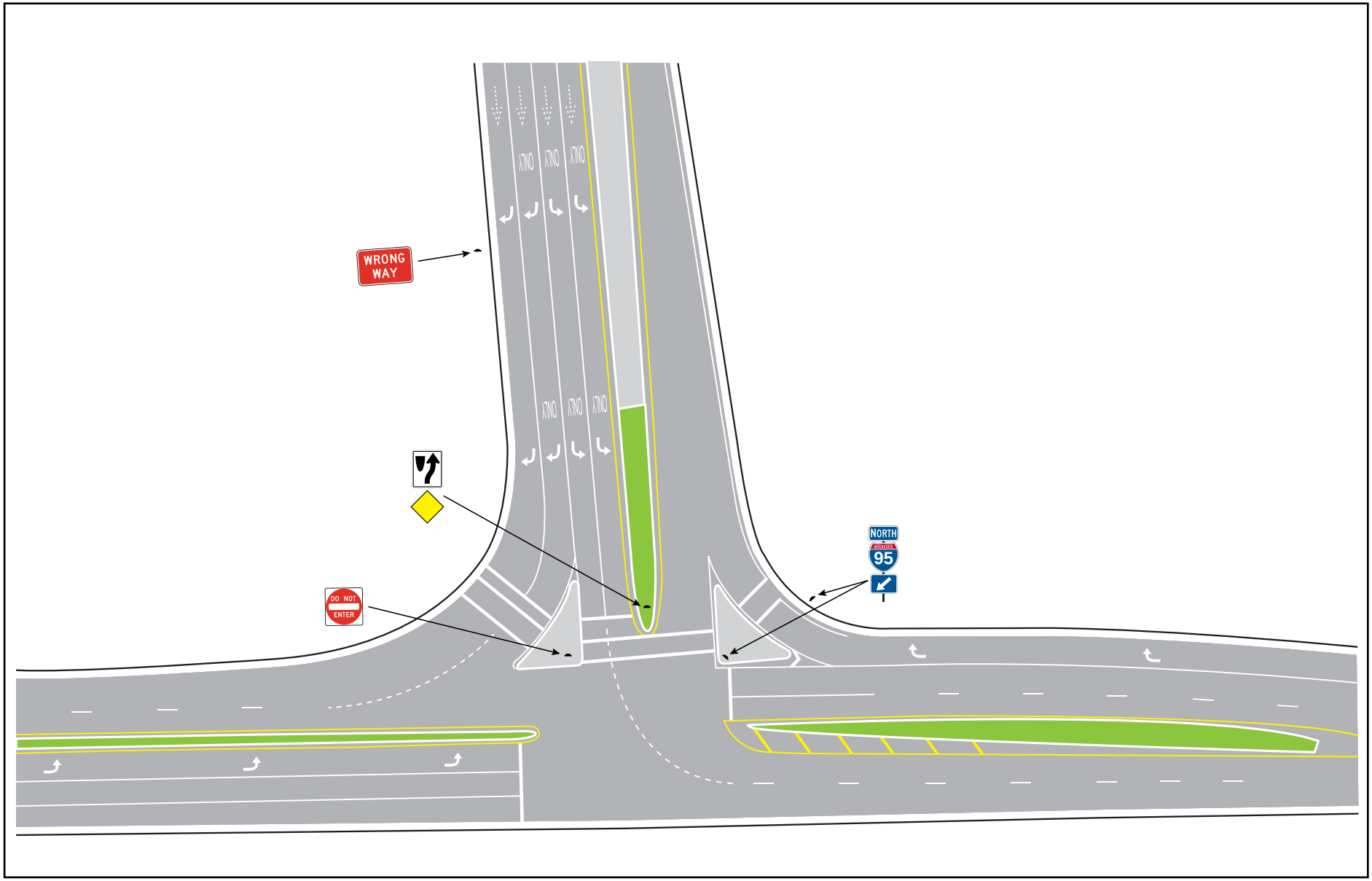
- Add MUTCD "optional" signs
    - Second DO NOT ENTER sign
    - Second WRONG WAY sign
    - ONE WAY signs
    - Turn restriction signs (i.e. NO RIGHT TURN signs, NO LEFT TURN signs, etc.)
- Upgrade sign sizes to meet oversized sign sizes at minimum (MUTCD, Table 2B-1)
- Lower (4-foot) mounting height for WRONG WAY signs
- Add vertical retroreflective strip on sign supports (MUTCD, Figure 2A-1[E])
- Use Type XI retroreflective sheeting on signs
- Install higher standard of cross-street guide signage in advance of the interchange (e.g. overhead vs. side-mount, green sign vs. shield)
- Add 2-foot by 4-foot dotted guide line stripes (also known as lane line extensions) for left turns between ramps entrances/exits and cross-streets
- Install a minimum of two directional sign assemblies at the entrance ramp (one facing each cross-street direction), consisting of the following signs:
    - Cardinal Direction auxiliary sign (e.g. MUTCD, M3-1)
    - Interstate shield route sign (e.g. MUTCD, M1-1)
    - Directional Arrow auxiliary sign (e.g. MUTCD, M6-2a)
- Add retroreflective paint (yellow) on ramp median nose where applicable
- Use a straight arrow and interstate shield pavement marking in left-turn lanes extending from the far-side ramp intersection through the near-side ramp intersection to prevent premature left turns, where applicable
- Extend cross-street median noses at ramp exit intersections to discourage wrong way turning movements where opportunities exist (quick curb may be also used temporarily as needed in retrofit situations)
- Shape median openings to restrict/deter wrong way turning movements where appropriate (quick curb may be used temporarily as needed in retrofit situations)

Schematics of typical interchanges with Level 1b implementation are provided in **Figure 21**. Schematics are provided for a one-way ramp (Figure 21a), such as a diamond interchange, as well as a two-way ramp (Figure 21b), such as a partial cloverleaf or a trumpet interchange.



Typical Level 1a Implementation
Diamond Interchange
Statewide Wrong Way Crash Study

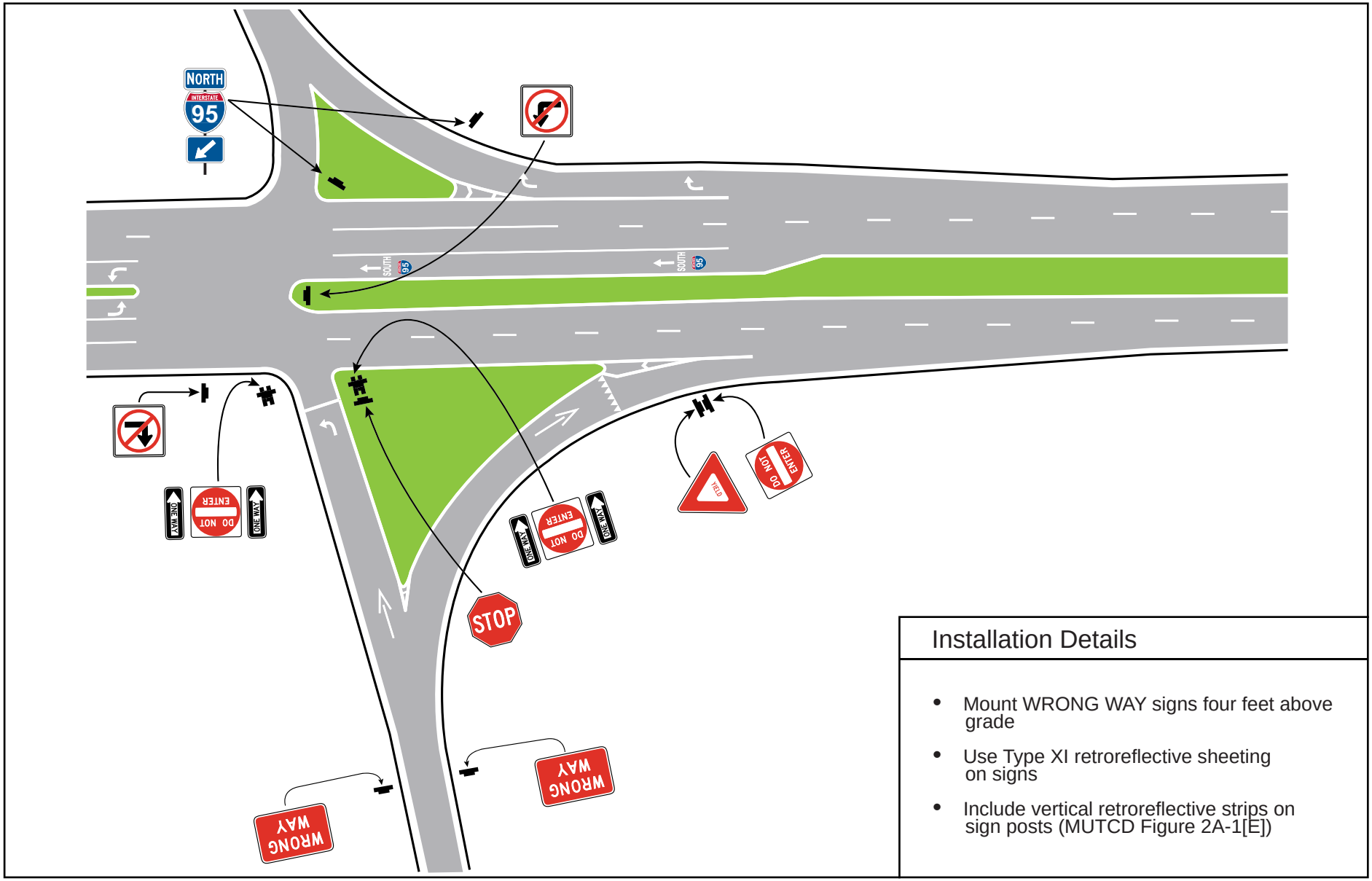
Figure
20a



Typical Level 1a Implementation
Partial Cloverleaf / Trumpet Interchange
Statewide Wrong Way Crash Study

Figure
20b

FDOT



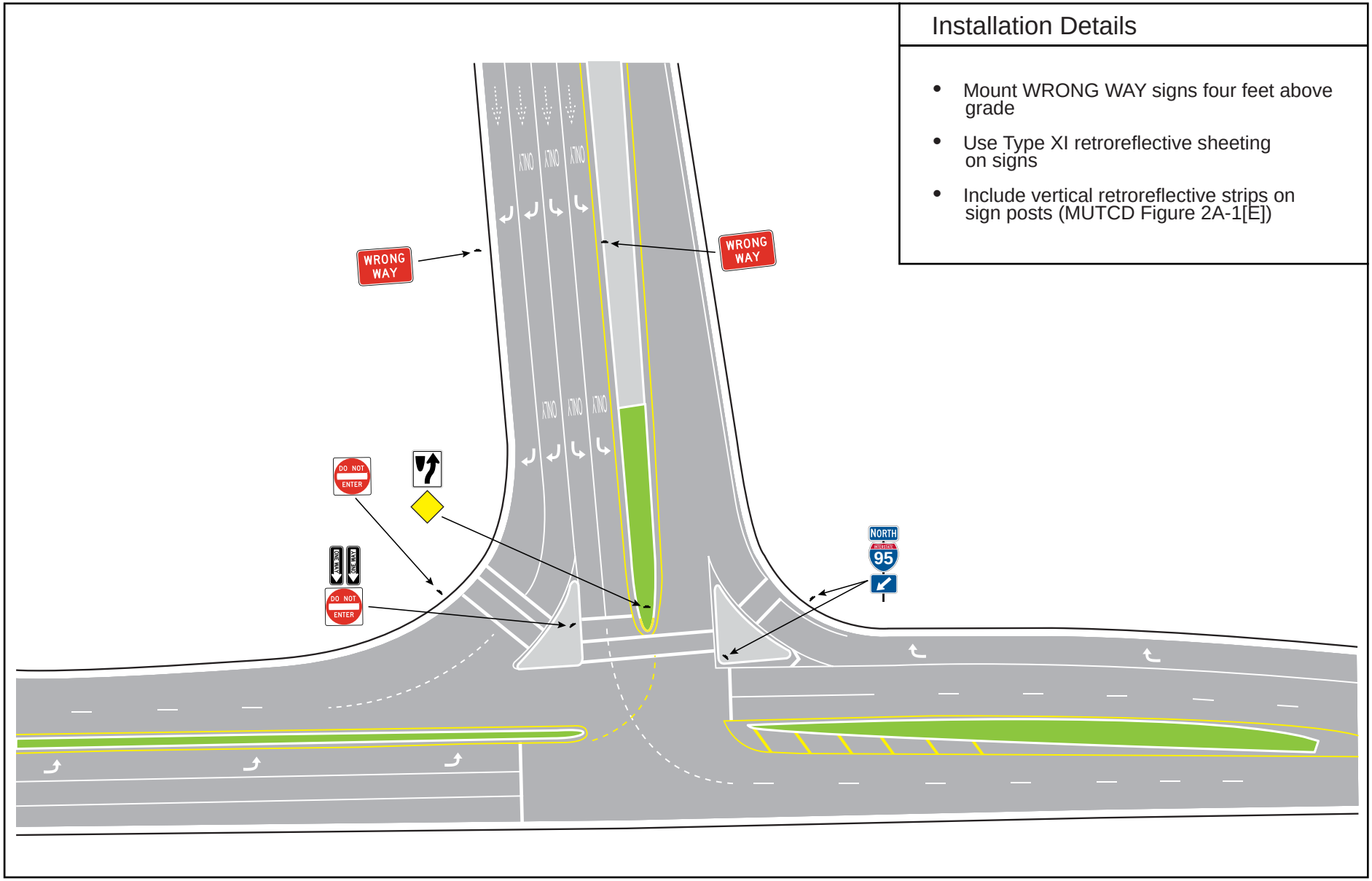
Installation Details

- Mount WRONG WAY signs four feet above grade
- Use Type XI retroreflective sheeting on signs
- Include vertical retroreflective strips on sign posts (MUTCD Figure 2A-1[E])

Typical Level 1b Implementation
Diamond Interchange
Statewide Wrong Way Crash Study

Figure
21a

FDOT



Typical Level 1b Implementation
Partial Cloverleaf / Trumpet Interchange
Statewide Wrong Way Crash Study

Figure
21b

Level 2 – Enhanced Static Treatments & Signal Indications

Depending on the location and context, additional enhancements in excess of Level 1b (the proposed FDOT minimum) may be installed at the district's discretion on a case-by-case basis:

- Install a redundant entrance ramp directional sign assembly on the opposite side of the ramp
- Use FREEWAY ENTRANCE signs (e.g. MUTCD, D13-3) to enhance the entrance ramp directional sign assemblies
- Freeway-sized signs or larger (i.e. larger than MUTCD (6) guidance), particularly on multi-lane exit ramps
- Second set of WRONG WAY signs at staggered height, if ramp length allows
- Retroreflective sheeting border around WRONG WAY signs (MUTCD, Figure 2A-1[D])
- WRONG WAY signs on the back of existing structures (overhead signs, toll booths, etc.)
- Replace circular green with through green arrow indications on outside lane signal heads (where appropriate) to deter wrong way right-turns onto exit ramps

Level 3 – Dynamic/ITS Treatments

Dynamic ITS treatments exist beyond the minimum-required and enhanced static treatments. ITS treatments should be considered on a case-by-case basis where interchanges have a known history or suspected issues regarding wrong way incidents. Available ITS treatments may include, but are not limited to, the following:

- LED-illuminated WRONG WAY signs with radar detection
- Red in-pavement flashers creating the illusion of a stop bar on the exit ramp
- Flashing RPMs along the exit ramp edge line
- Mainline wrong way detection (e.g. negative speed detection)
- Wrong way detection integration with TMCs, closed circuit television (CCTV), DMS to warn other motorists, and law enforcement
- Coordination with real-time travel information providers and in-vehicle applications, on-board navigation systems, and cellular device applications to provide advance warning to motorists of wrong way drivers
- Connected vehicle applications

U-TURN MOVEMENTS ON THE MAINLINE

The scope of this study included the identification and analysis of wrong way crashes and the identification of countermeasures with a focus to reduce wrong way movements at interchange exit ramps. During the course of this study, five fatal crashes involving wrong way driving occurred on interstates in the Tampa area (January to September 2014), killing 11 people. Investigation by the Florida Highway Patrol (FHP) revealed the wrong way driving originated as U-turns on I-275 in three instances. Wrong way entry at an interchange was not the origin point in these crashes. While combating U-turn activity on limited-access facilities is beyond the purview of this study, the project team would like to recognize the emerging issue and to note the leadership shown by District 7 in its response. District 7 is working with Central Office to find suitable technologies to detect interstate U-

turn or mainline wrong way movements early, with communication capabilities to notify FHP and the ITS TMC for prompt response.

Engineering solutions to prevent motorists from making U-turns within a facility and driving in the wrong direction are very limited. Opportunities exist to place large WRONG WAY signs on the backs of existing signs along the mainline. The most effective tools to address wrong way driving originating as a U-turn on the facility may be a combination of education, ITS detection and communication technologies, and law enforcement. Examples of emerging ITS detection and communication technologies for wrong way movements on the mainline include combinations of dual beam detectors, LED lighting, and cameras.

EDUCATION AND ENFORCEMENT STRATEGIES

As described in the previous section, wrong way driving on interstates has been brought to the forefront in District 7 in 2014. Increased coordination with FHP in response to the high number of wrong way crashes has produced additional insights and opportunities to combat wrong way driving. A brief summary of District 7 interaction with law enforcement to this point includes the following:

- Beyond the wrong way crashes that occur, FHP averages nearly 40 arrests for wrong way driving annually.
- Investigation to this point indicates a heavy correlation between driving under the influence (DUI) and wrong way driving on the interstate.
- Impaired Driving Grants in excess of $100,000 are provided to law enforcement offices to combat DUI and may be used toward wrong way related offenses.
- Attempts by FDOT to gain additional information on those drivers arrested have so far been unsuccessful for stated privacy reasons.
- FDOT is working with local incident management teams and law enforcement agencies to gain any understanding/perspectives on wrong way driving.
- The Hillsborough County Sherriff's Office is tracking the "last drink" locations of all DUI and wrong way drivers to pinpoint problem locations.
- FDOT District 7 Safety Office created a special task force with representatives from FDOT, MADD Hillsborough, the Hillsborough Metropolitan Planning Organization (MPO) Technical Advisory Committee (TAC), educators, and selected enforcement officers to find suitable education and enforcement actions to combat wrong way driving.

District 7's response is commendable and an example for other districts. Further coordination at the district levels with local law enforcement and impaired driving advocacy groups has the potential to yield a deeper understanding of the driver behavior issues at the root of wrong way driving. Law enforcement citations for wrong way driving and DUI will provide additional helpful information to supplement the crash records. Education and enforcement strategies can then be crafted with a sharper focus toward target audiences, locations, and timeframes.

Section 6
Implementation Plan

IMPLEMENTATION PLAN

To support the Districts in providing a consistent, predictable, and repeatable plan to reduce the occurrence of wrong way incidents throughout the state, this report provides an implementation plan to assist in the prioritization and implementation of suggested countermeasures. The implementation plan consists of a unified approach to inspect and improve existing interchanges in each District, considerations for wrong way countermeasures in the planning and design stages of new (or reconstructed) interchanges, and suggestions for developing effective education and enforcement strategies.

EXISTING INTERCHANGES

Each district should prioritize the improvement of existing interchanges to bring the wrong way countermeasures at each interchange up to the proposed new minimum standard (Level 1b). It is recommended FDOT set a goal to bring all interchanges in the state up to the Level 1b standards over a three-to-five year timeframe.

Inspect Interchanges

Within each district, interchange inspections should be conducted to prepare existing interchanges for wrong way countermeasure improvements. Specific interchanges may be prioritized based upon their crash score and interchange type. The crash score analysis, summarized in Appendix B, provides an estimate of interchange locations within each district's jurisdiction with the highest exposure to wrong way movements over the study period (2009-2013). A sample of interchange locations for each district is provided in **Table 8**.

Beyond those locations identified in Appendix B, other interchanges may be prioritized for improvement by interchange type as follows:

- Diamond and Partial Diamond
- Partial Cloverleaf
- Trumpet
- Other Interchange Types

Table 8 Sample of High Crash Score Interchanges (see Appendix B)

Interchange	Crash Score	Interchange Type
District One		
I-75_University Parkway	2.25	Diamond / Partial Diamond
I-75_CR 846 (Immokalee Rd)	1.50	Diamond / Partial Diamond
I-4_US 27	1.50	Partial Cloverleaf
District Two		
I-295_US 1	2.25	Partial Cloverleaf
I-95_US 1	2.00	Partial Cloverleaf
I-95_Prudential Drive/Mary St	1.75	Y-Intersection
District Three		
I-10_SR 81 (Samson Hwy)	2.25	Diamond / Partial Diamond
I-10_SR 285	1.50	Diamond / Partial Diamond
I-10_Log Lake Rd	1.50	Diamond / Partial Diamond
District Four		
I-75_SR 822 (Sheridan St)	1.75	Partial Cloverleaf
I-95_SR 820 (Hollywood Blvd)	1.75	Diamond / Partial Diamond
I-95_SR 838 (Sunrise Blvd)	1.75	Partial Cloverleaf
District Five		
I-95_SR 44	3.50	Diamond / Partial Diamond
I-95_SR 442 (Elkcam Blvd)	2.00	Diamond / Partial Diamond
I-95_Stuckway Rd	1.50	Diamond / Partial Diamond
District Six		
I-95_SR 970 (Downtown Distr)	2.00	Y-Intersection
I-95_SR 860 (NE 183rd St)	2.00	Partial Cloverleaf
SR 826_SR 976 (SW 40th St)	1.75	Diamond / Partial Diamond
District Seven		
I-275_Ashley Dr	1.75	Trumpet
I-275_22nd Ave	1.50	Diamond / Partial Diamond
I-275_SR 687 (4th St N)	1.50	Direct Connection
District Eight / Turnpike		
SR 91_SR 714 (Martin Hwy)	1.75	Trumpet
SR 91_SR 834 (Sample Road)	1.50	Trumpet
SR 91_Coconut Creek Pkwy	1.50	Trumpet

Apply Countermeasures

It is proposed that FDOT increase its minimum standards to create redundancy and improve sign conspicuity. Interchange signs, pavement markings, and geometric design (e.g. medians and median openings) should be brought up to the new minimum Level 1b, as described in Section 5 of this report.

District staff should look for opportunities to apply Level 2 and Level 3 countermeasures to interchanges with known issues as reported by law enforcement and others in the community, or as evident in the historical crash records. The crash score list in Appendix B provides a starting point for

interchanges suspected of being associated with wrong way movements between 2009 and 2013. Based upon the feedback from the various ITS pilot projects around the state, districts should begin considering several locations for potential ITS implementations and testing periods.

Maintenance

As part of the inspection process, the districts should review their regular maintenance procedures for interchanges and consider upgrades to maintain a high standard addressing wrong way countermeasures. Sign and pavement marking retroreflectivity should be inspected on a regular basis.

NEW OR RECONSTRUCTED INTERCHANGES

Wrong way movements should be a consideration for new interchanges or for interchange modification/reconstruction projects. Designers should actively consider ways to discourage wrong way movements, including the following:

- Select interchange configuration
    - Diamond and partial cloverleaf configurations provide more opportunity for wrong way movements
    - Full cloverleaf configurations provide less opportunity for wrong way movements
    - Diverging diamond configurations reduce opportunities for wrong way movements and require comparable right-of-way to full diamonds (less right-of-way than cloverleaf)
- Provide physical separation (i.e. median) on ramps serving both entering and exiting traffic movements, and maximize the separation distance to the extent possible
- Design median openings to restrict or discourage wrong way movements
- Narrow exit ramp pavement width to discourage wrong way entry
- Skew cross-street/exit ramp intersection angle to discourage wrong way right turns from the cross-street
- Utilize basic concepts of positive guidance to lead motorists to ramp entry points

At the planning stage, wrong way movements should be considered within the Interchange Justification Report (IJR) or the Interchange Modification Report (IMR). Pros and cons to wrong way movements should be considered in evaluating design alternatives during the Project Development and Environment (PD&E) Study. During the design stage, the preferred alternative should provide a robust package of countermeasures to deter wrong way driving, including the appropriate level of signs and pavement markings, and a tight geometric design to deter wrong way turning movements and encourage motorists toward the correct entry points.

The FDOT should consider supporting consistent and robust designs against wrong way driving through the development of a consistent approach for wrong way countermeasures at interchange ramp/cross-street intersections.

EDUCATION AND ENFORCEMENT TASK FORCE

Further coordination at the district levels with local law enforcement and impaired driving advocacy groups has the potential to yield a deeper understanding of the driver behavior issues at the root of wrong way driving. It is suggested each district safety office form a special task force made up of representatives from FDOT, local advocacy groups, educators, and local law enforcement agencies. The activities of the special task force may include:

- Coordination to gain further understanding and perspectives on wrong way driving, including the link to DUI behavior and other potential human factors
- Detailed review of recent wrong way crashes within the district to understand circumstances beyond the crash report
- Review of recent citations or arrests within the district related to wrong way driving on interstates, freeways, or expressways
- Coordination to obtain "last drink" drink information on all DUI and wrong way drivers to pinpoint problem locations
- Combined effort to find suitable education and enforcement actions to combat wrong way driving

The above tasks could also be taken on by existing CTSTs in each district. FDOT representatives of the special task force for each district should regularly meet to share insights and craft education and enforcement strategies with a sharp focus toward target audiences, locations, and timeframes, that can be consistently implemented statewide (as appropriate). These efforts should also be coordinated with Central Office to effectively identify potential funding sources for the agreed-upon strategies.

Section 7
Conclusions and Recommendations

CONCLUSIONS AND RECOMMENDATIONS

The FDOT has studied wrong way crashes occurring on interstate freeways and expressways throughout the state of Florida. In the past five years (2009-2013), 280 crashes have occurred on Florida's freeways and expressways resulting in more than 400 injuries and 75 deaths. This study analyzed trends and contributing factors surrounding wrong way driving on freeways and expressways. It proposed systemic countermeasures to prevent or discourage wrong way occurrences, reducing wrong way crashes and driving down fatalities on Florida's freeways and expressways. The analysis findings, engineering countermeasures, and implementation plan for the study are summarized as follows:

FINDINGS

Literature Review

- The literature review included studies and reports from Federal Highway Administration (FHWA), the National Transportation Safety Board (NTSB), the American Traffic Safety Services Association (ATSSA), and the states of Michigan, Illinois, Texas, Wisconsin, and Rhode Island.
- The following characteristics associated with wrong way crashes were commonly cited in the literature:
    - Driver impairment
    - Late night / early morning driving
    - Driving on weekends
    - Urban areas
    - Multiple-vehicle crashes
    - Overrepresented age groups (16 to 24 years old and over 65 years old)
- The majority of wrong way movements are entering the freeway/expressway from an exit ramp
- Susceptible interchange types for wrong way entry include partial cloverleaf, diamond, and left-hand exit ramps. Full cloverleaf is considered the most desirable for preventing wrong way movements. The diverging diamond also provides opportunities to reduce wrong way movements over many traditional interchange configurations.
- Countermeasures to reduce wrong way driving include geometric design elements at the interchange exit ramps, signing and pavement marking within the interchange area, and a variety of dynamic/ITS technologies.

Pilot Projects

- TxDOT is implementing LED-illuminated WRONG WAY signs at frontage road exit ramps with a history of wrong way driving at typical cost of $14,000 per ramp installation. Low-mounted signs are being considered in a study by Texas Transportation Institute (TTI).
- Pilot projects in Florida include the following locations:
    - FDOT District 3: four locations on I-10 in Tallahassee
    - FDOT District 7: red RRFB installations at multiple locations in Tampa area
    - Turnpike: ten locations on the HEFT, five locations on the Sawgrass Expressway in South Florida
    - CFX: five locations in Central Florida
- The pilot projects include ITS technology to detect wrong way movement on ramps in combination with LED-illuminated WRONG WAY signs. The I-10 installations also include enhanced signage and geometric improvements at the ramp termini and on the cross-streets within the interchange areas.

Statewide Crash Summary

- Over the study period (2009-2013), more than 6,300 potential wrong way crashes were identified on freeways/expressways in Florida using the following criteria coded in Florida's CARS database:
    - Contributing cause coded as wrong way driving
    - Non-identical vehicular crash directions
    - Head-on harmful event type
    - Fatal crashes
- After review of the crash reports of the potential wrong way crashes, 280 wrong way crashes were confirmed in the five-year period.
- More than half (51 percent) of the crashes resulted in injury (411 injuries), and (18 percent) resulted in fatality (75 fatalities).
- Weekends and early morning hours (12am to 6am) were found to be more susceptible to wrong way crashes
- Alcohol and/or drugs were involved in 45 percent of wrong way crashes, more than 16 times the alcohol and/or dug involvement proportion for freeway/expressway crashes in Florida
- The majority of wrong way crashes (71 percent) occurred in dark conditions, reversing the proportion of general freeway/expressway crashes in the state (29 percent in dark conditions).

- Drivers less than 30 years old account for 42 percent of the wrong way crashes; statewide trends on freeway/expressway crashes indicate a proportion of 50 percent for the same age range. Therefore, driver age proportions appear to be similar for wrong way crashes and all freeway/expressway crashes.
- Drivers 75 years and older account for 4.6 percent of the wrong way crashes. However, this is more than three times the expected proportion from statewide trends on freeway/expressway crashes (1.4 percent for drivers 75 years and older). Therefore, drivers 75 years and older are more susceptible (i.e. at higher risk) of a wrong way-related crash.
- Approximately 75 percent of wrong way crashes occurred in urban areas and 25 percent in rural areas.
- Within FDOT district jurisdictions, the districts with the most wrong way crashes were District 2 (49 crashes), Turnpike System (49 crashes), District 6 (37 crashes), and District 5 (35 crashes).

High Crash Locations

- The crash data were analyzed to identify potential high crash locations associated with wrong way entry. The analysis centered on the location of each wrong way crash and a scoring system for potential wrong way entry points upstream of the wrong way driver.
- The interchange types with the highest crash scores included:
    - diamond/partial diamond (crash score of 98)
    - partial cloverleaf (crash score of 45)
    - trumpet (crash score of 17)
- The interchange type with the lowest crash score was:
    - full cloverleaf (crash score of 1)
- The crash score distribution was fairly consistent with the proportion of interchange types across the state. Therefore, the higher crash scores at certain interchange types are consistent with their higher levels of exposure across the state.
- From the high crash location analysis, 40 interchange locations were selected for field review. These locations were discussed and agreed upon with the DTOEs.
- At each of the 40 interchange locations, an existing conditions assessment was conducted, accompanied by an existing conditions diagram. Suggested systemic-type countermeasures for reducing wrong way driving on Florida's freeways/expressways were provided.

Interchange Field Reviews – General Observations

- Guide Signs
  - Multi-lane arterial cross-street guide signage in advance of the interchange often utilized interstate shield signs instead of large green destination signs.
  - Upgrading guide signage would provide a motorist with more information in advance of the interchange, such as the appropriate lane for the desired ramp/direction.
- Ramp Intersection Signage
  - Signage at the interchange exit ramp/cross-street intersections generally met the MUTCD (6) minimum requirements being:
    - One DO NOT ENTER sign
    - One WRONG WAY sign
    - The MUTCD allows for additional optional signs:
      - Redundant DO NOT ENTER and WRONG WAY signs
      - ONE WAY signs coupled with the DO NOT ENTER signs
      - Turn restriction signs (NO LEFT TURN signs, NO RIGHT TURN signs, etc.) on the cross-street
  - At interchanges where entrance and exit ramps were adjacent to each other (i.e. partial cloverleaf, trumpet), not all locations had the KEEP RIGHT sign on the median separating the entrance and exit ramps.
  - The majority of the wrong way signs observed could be replaced with larger signs, per the 2009 MUTCD (6).
- Pavement Markings
  - The condition of raised pavement markers (RPM) and the pavement markings (wrong way arrows, stop bars) varied greatly among the locations reviewed.
  - Dotted guide line stripes (also known as lane line extensions) were observed at many cross-street intersections, providing guidance to motorists of the appropriate intersection turn maneuvers.
  - Left turn arrows were occasionally painted in turn lanes extending through the upstream cross-street/ramp intersection, potentially encouraging a turning vehicle onto the first exit ramp.
  - In other instances, a straight arrow with a RAMP pavement marking message was used in advance of the upstream (first) cross-street/ramp intersection.
- Lighting

  - The lighting levels varied among the locations from no lighting, to high mast interchange lighting only, to both interchange and street-level lighting.
  - The interchanges providing the greatest nighttime visibility included street-level lighting at the entrance ramps.
- Geometric Design
  - A variety of median openings were observed at the cross-street/exit ramp intersections. Median openings formed to prevent left-turns from the cross-street (on to an exit ramp) are effective in discouraging wrong way movements.
  - Multiple locations were noted where median extensions could be constructed to further discourage wrong way left-turns.
- Maintenance
  - Signage appeared to be the most obvious deterrent to wrong way driving at the locations. However, many of the signs were worn from exposure to the elements. Many locations would benefit by replacing existing signs with larger signs having higher levels of retroreflectivity.

ENGINEERING COUNTERMEASURES

Engineering countermeasures were grouped into implementation levels for application purposes. The first level (Level 1a) describes Florida's current minimum requirements, primarily based upon the MUTCD (6) minimum requirements. The next level (Level 1b) is the proposed new minimum standard, which adds the MUTCD "optional" signs and specifies other application details. Levels 2 and 3 provide additional enhancements (static and dynamic/ITS, respectively) that may be considered for special application on a case-by-case basis. The countermeasure implementation levels are summarized as follows:

Level 1a – Current MUTCD and FDOT Minimum Requirements

- Proper signing sequences and level of interchange guide signage on cross-street approaches
- MUTCD (6) minimum sign package (MUTCD Figure 2B-18 and report Figure 20)
  - One DO NOT ENTER sign
  - One WRONG WAY sign
- KEEP RIGHT signs, as appropriate, on side-by-side exit and entrance ramps
- Stop bars at end of exit ramps
- Wrong Way Arrows on exit ramp (Standard Index 17345)
- Entrance ramp directional assembly (e.g. MUTCD, Section 2D.32)
- Ramp and cross-street lighting (PPM, Vol 1, Sect. 7.3.4)

Level 1b – Proposed New FDOT Minimum Requirements (Figure 21)

- Add MUTCD "optional" signs
    - Second DO NOT ENTER sign
    - Second WRONG WAY sign
    - ONE WAY signs
    - Turn restriction signs (i.e. NO RIGHT TURN signs, NO LEFT TURN signs, etc.)
- Upgrade sign sizes to meet oversized sign sizes at minimum (MUTCD, Table 2B-1)
- Lower (4-foot) mounting height for WRONG WAY signs
- Add vertical retroreflective strip on sign supports (MUTCD, Figure 2A-1[E])
- Use Type XI retroreflective sheeting on signs
- Install higher standard of cross-street guide signage in advance of the interchange (e.g. overhead vs. side-mount, green sign vs. shield)
- Add 2-foot by 4-foot Dotted guide line stripes (also known as lane line extensions) for left turns between ramps entrances/exits and cross-streets
- Install a minimum of two directional sign assemblies at the entrance ramp (one facing each cross-street direction), consisting of the following signs:
    - Cardinal Direction auxiliary sign (e.g. MUTCD, M3-1)
    - Interstate shield route sign (e.g. MUTCD, M1-1)
    - Directional Arrow auxiliary sign (e.g. MUTCD, M6-2a)
- Add retroreflective paint (yellow) on ramp median nose where applicable
- Use a straight arrow and interstate shield pavement marking in left-turn lanes extending from the far-side ramp intersection through the near-side ramp intersection to prevent premature left turns, where appropriate
- Extend cross-street median noses at ramp exit intersections to discourage wrong way turning movements where opportunities exist (quick curb may also be used temporarily as needed in retrofit situations)
- Shape median openings to restrict/deter wrong way turning movements where appropriate (quick curb may be used temporarily as needed in retrofit situations)

Level 2 – Enhanced Static Treatments & Signal Indications

- Install a redundant entrance ramp directional sign assembly on the opposite side of the ramp
- Use FREEWAY ENTRANCE signs (e.g. MUTCD, D13-3) to enhance the entrance ramp directional sign assemblies
- Freeway-sized signs or larger (i.e. larger than MUTCD (6) guidance), particularly on multi-lane exit ramps
- Second set of WRONG WAY signs at staggered height, if ramp length allows
- Retroreflective sheeting border around WRONG WAY signs (MUTCD, Figure 2A-1[D])
- WRONG WAY signs on the back of existing structures (overhead signs, toll booths, etc.)
- Replace circular green with through green arrow indications on outside lane signal heads (where appropriate) to deter wrong way right-turns onto exit ramps

Level 3 – Dynamic/ITS Treatments

- LED-illuminated WRONG WAY signs with radar detection
- Red in-pavement flashers creating the illusion of a stop bar on the exit ramp
- Flashing RPMs along the exit ramp edge line
- Mainline wrong way detection (e.g. negative speed detection)
- Wrong way detection integration with TMCs, CCTV, DMS to warn other motorists, and law enforcement
- Coordination with real-time travel information providers and in-vehicle applications, on-board navigation systems, and cellular device applications to provide advance warning to motorists of wrong way drivers
- Connected vehicle applications

IMPLEMENTATION PLAN

To support the Districts in providing a consistent, predictable, and repeatable plan to reduce the occurrence of wrong way incidents throughout the state, this report provides an implementation plan to assist in the prioritization and implementation of suggested countermeasures. The implementation plan consists of a unified approach to inspect and improve existing interchanges in each District, considerations for wrong way countermeasures in the planning and design stages of new (or reconstructed) interchanges, and suggestions for developing effective education and enforcement strategies.

Existing Interchanges

It is suggested each district bring the wrong way countermeasures at each interchange up to the proposed new minimum standard (Level 1b) over a three-to-five year timeframe through a unified approach to inspect interchanges, apply countermeasures, and provide maintenance. Priority interchange locations and interchange types are provided in the report.

New or Reconstructed Interchanges

Designers should actively consider wrong way countermeasures in the planning and design stages of interchange projects. The Department's development of a consistent approach for wrong way countermeasures is recommended to support consistent and robust designs against wrong way driving at interchange ramp/cross-street intersections.

Education and Enforcement Task Force

Further coordination at the district levels with local law enforcement and impaired driving advocacy groups has the potential to yield a deeper understanding of the driver behavior issues at the root of wrong way driving. It is suggested each district safety office form a special task force made up of representatives from FDOT, local advocacy groups, educators, and local law enforcement agencies. The

wrong way driving issues could also be taken on by existing CTSTs in each district. FDOT representatives of the special task force for each district should regularly meet to share insights and craft education and enforcement strategies with a sharp focus toward target audiences, locations, and timeframes, that can be consistently implemented statewide (as appropriate). These efforts should also be coordinated with Central Office to effectively identify potential funding sources for the agreed-upon strategies.

Section 8
References

REFERENCES

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4. Copelan, J.E. *Prevention of Wrong-Way Accidents on Freeways*. Report No. FHWA/CA-TE-89-2. California Department of Transportation, 1989.

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9. Cooner, S.A., A.S. Cothron, and S.E. Ranft. *Countermeasures for Wrong-Way Movements on Freeways: Guidelines and Recommended Practices*. Report No. FHWA/TX-04/4128-2. Texas Transportation Institute, 2003.

Appendix A
Wrong Way Crash Summary

District	Geographic District	CRASH_NUMBER	ROADWAYID	MILEPOST	NEAREST_NODE	STATE_ROAD	ADT	YEAR	MONTH	DAY	HOUR	CRASH_RATE_CLASS_CATEG.	ALC_INV	HARMFUL_EVENT1	LIGHTING	WEATHER	RD_SURF	TRAFFIC_CONTROL	ROAD_CONDITIONS	SITE_LOCATION	ROAD_SD	ACC_LN	VEHICLE_TYPE1	VEHICLE_USE1	VEHICLE_MOVEMT1	VEH_DIR1	POINT_OF_IMPACT1	CONTRIB_CAUSE1	DRIV/PED_AGE1	VEHICLE_TYPE2	VEHICLE_USE2	VEHICLE_MOVEMT2	VEH_DIR2	POINT_OF_IMPACT2	CONTRIB_CAUSE2	DRIV/PED_AGE2	#_OF_VEHICLES	#_OF_KILLED	#_OF_INJURED	DATE	TIME	DAY OF WEEK	County	Crash Direction Different?	Harmful Event Head-On?	Contributing Cause Wrong Way?	Fatal Crash?	Crash Report Obtained?	WWD Confirmed?
1	1	769724470	3175000	52.694	705	93	34000	9	6	19	23	U-INT	1	2	5	1	1	1	1	1	R	2	1	1	1	S	1	21	37	1	1	1	N	1	7	34	2	0	3	6/19/2009	11:00 PM	Friday	Collier	Yes	Yes	Yes	No	Y	Y
1	1	772342610	17075000	34.69	1499	93	88452	9	5	6	4	U-INT	1	3	4	1	1	3	1	1	L	3	1	1	4	N	3	4	25	6	3	1	S	14	7	51	2	0	1	5/6/2009	4:00 AM	Wednesday	Sarasota	Yes	No	No	No	Y	Y
1	1	772342750	17075000	23.34	1472	93	70500	9	6	2	0	R-INT	0	2	5	1	1	3	1	1	L	2	11	1	1	W	1	21	24	6	1	1	E	2	0	44	2	1	0	6/2/2009	12:00 AM	Tuesday	Sarasota	Yes	Yes	Yes	Yes	Y	Y
1	1	772343240	12075000	31.008	2100	93	35000	9	7	21	16	R-INT	0	77	1	2	1	1	1	1	R	1	1	1	4	S	0	4	51	1	1	1	N	8	0	69	5	0	0	7/21/2009	4:00 PM	Tuesday	Lee	Yes	No	No	No	Y	Y
1	1	772348510	1075000	10.315	647	93	40000	9	4	24	5	R-INT	1	3	3	1	1	3	1	1	R	1	2	1	1	S	2	21	43	1	1	1	N	14	7	40	2	0	1	4/24/2009	5:00 AM	Friday	Charlotte	Yes	No	Yes	No	Y	Y
1	1	772358350	13075000	8.891	104	93	88000	9	7	14	2	U-INT	0	0	5	1	1	3	1	6	R	S	1	1	1	S	0	21	75	1	1	1	S	8	0	20	2	0	1	7/14/2009	2:00 AM	Tuesday	Manatee	No	No	Yes	No	Y	Y
1	1	772430910	13075000	0.297	67	93	1E+05	10	5	4	3	U-INT	0	29	5	1	1	3	1	1	M	M	1	1	1	N	1	21	0				1		0	0	1	0	0	5/4/2010	3:00 AM	Tuesday	Manatee	No	No	Yes	No	Y	Y
1	1	819575150	12075000	0.512	1045	93	77500	11	10	29	2	U-INT	0	9	5	3	2	1	1	1	L	2	3	1	1	N	2	21	21	1	1	1	S	2	0	19	2	0	2	10/29/2011	2:00 AM	Saturday	Lee	Yes	No	Yes	No	Y	Y
1	1	819670910	3175000	58.593	717	93	61224	11	4	15	21	U-INT	0	77	5	1	1	1	1	1	R	S	1	1	1	S	0	21	76	1	1	1	N	4	0	26	2	0	1	4/15/2011	9:00 PM	Friday	Collier	Yes	No	Yes	No	Y	Y
1	1	820269930	13175000	3.307	460	93	35000	11	2	12	2	R-INT	1	2	5	1	1	1	1	1	R	1	1	1	1	E	1	21	37	3	1	1	W	1	0	50	2	1	1	2/12/2011	2:00 AM	Saturday	Manatee	Yes	Yes	Yes	Yes	Y	Y
1	1	822429630	17075000	41.354	1013	93	1E+05	11	8	6	0	U-INT	1	9	5	1	1	1	1	1	R	3	3	1	1	S	2	21	24	2	1	1	N	3	0	25	3	0	4	8/6/2011	12:00 AM	Saturday	Sarasota	Yes	No	Yes	No	Y	Y
1	1	822720860	17075000	42.577	6002	93	1E+05	11	7	18	13	U-INT	3	2	1	1	1	1	1	1	M	M	1	1	1	N	2	21	46	1	1	1	S	13	0	19	6	0	3	7/18/2011	1:00 PM	Monday	Sarasota	Yes	Yes	Yes	No	Y	Y
1	1	824711740	13075000	18.25	140	93	59500	12	8	6	3	R-INT	0	2	5	1	1	1	1	1	R	2	1	1	1	S	1	21	34	1	1	77	N	1	0	21	3	0	6	8/6/2012	3:00 AM	Monday	Manatee	Yes	Yes	Yes	No	Y	Y
1	1	828703010	16320000	24.168	753	400	77500	12	6	8	0	R-INT	3	77	5	1	2	1	8	1	R	2	1	1	1	W	0	21	35	1	1	1	E	19	2	38	2	0	1	6/8/2012	12:00 AM	Friday	Polk	Yes	No	Yes	No	Y	Y
1	1	828978540	13175000	4.113	465	93	36500	12	4	15	2	R-INT	1	2	5	1	1	1	1	1	L	1	1	1	1	W	2	21	37	3	1	1	E	2	0	24	2	1	3	4/15/2012	2:00 AM	Sunday	Manatee	Yes	Yes	Yes	Yes	Y	Y
1	1	829107960	17075000	30.77	1487	93	74500	12	8	12	0	R-INT	1	9	5	1	1	1	1	1	L	2	3	1	1	N	2	21	46	5	3	1	S	21	2	69	3	0	1	8/12/2012	12:00 AM	Sunday	Sarasota	Yes	No	Yes	No	Y	Y
1	1	833872950	16320000	27.168	4514	400	77500	12	12	25	0	R-INT	1	2	5	1	1	1	1	1	R	3	1	1	1	W	0	21	36	1	1	1	E	0	2	57	2	0	2	12/25/2012	12:00 AM	Tuesday	Polk	Yes	Yes	Yes	No	Y	Y
1	1	828221700	3175000	16.202	991	93	17100	13	3	10	0	R-INT	1	2	5	1	1	1	1	1	R	1	1	1	1	W	2	21	25	1	1	1	E	2	0	22	2	0	2	3/10/2013	12:00 AM	Sunday	Collier	Yes	Yes	Yes	No	Y	Y
1	1	833381750	17075000	24.785	2066	93	61000	13	9	17	16	R-INT	0	1	1	2	2	1	1	7	R	A	4	3	4	S	21	4	25	1	1	2	N	1	0	27	2	0	0	9/17/2013	4:00 PM	Tuesday	Sarasota	Yes	No	No	No	Y	Y
2	2	769994110	74160000	3.217	66	9	49500	9	4	15	7	R-INT	0	29	1	1	1	3	1	1	R	S	2	1	1	S	1	21	47				1		77	0	1	0	1	4/15/2009	7:00 AM	Wednesday	Nassau	No	No	Yes	No	Y	Y
2	2	771032480	29170000	11.04	1917	8	20140	9	7	3	1	R-INT	1	0	5	2	1	1	1	1	L	1	1	1	1	E	14	7	37	1	1	1	W	14	0	25	2	1	1	7/3/2009	1:00 AM	Friday	Columbia	Yes	No	No	Yes	Y	Y
2	2	772521330	78080000	1.471	1141	9	46000	9	4	7	14	R-INT	1	0	1	1	1	3	1	1	L	3	1	1	1	N	1	21	43	1	1	1	S	14	7	34	3	1	5	4/7/2009	2:00 PM	Tuesday	St. John's	Yes	No	Yes	Yes	Y	Y
2	2	772532250	72280000	9.098	129	9	1E+05	9	3	28	4	U-INT	1	2	4	1	1	3	1	1	R	2	1	1	1	S	2	21	26	6	3	1	N	21	0	41	2	0	0	3/28/2009	4:00 AM	Saturday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	772532260	72280000	4.345	6225	9	84944	9	4	1	1	U-INT	1	0	5	3	2	3	1	1	R	2	1	1	1	S	2	21	22	6	3	1	N	21	7	49	2	0	1	4/1/2009	1:00 AM	Wednesday	Duval	Yes	No	Yes	No	Y	Y
2	2	772532350	72002000	14.203	5904	9	60500	9	11	24	0	U-OLA	1	2	4	1	1	3	1	1	L	1	1	1	1	S	2	21	24	1	1	1	N	2	7	18	2	0	0	11/24/2009	12:00 AM	Tuesday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	804388680	72040000	12.158	2263	10	56500	9	6	25	2	U-OLA	0	3	1	1	1	1	1	1	L	K	2	2	1	W	10	2	21	3	1	5	E	1	0	46	2	0	1	6/25/2009	2:00 AM	Thursday	Duval	Yes	No	No	No	Y	Y
2	2	905286740	72280000	16.318	143	9	1E+05	9	5	15	1	U-INT	1	2	4	1	1	3	1	1	R	1	1	1	1	S	1	2	24	1	1	1	N	2	7	20	2	0	0	5/15/2009	1:00 AM	Friday	Duval	Yes	Yes	No	No	Y	Y
2	2	906619070	72290000	7.375	304	9	60515	9	7	31	21	U-INT	3	4	4	3	2	1	1	1	L	2	3	1	10	N	4	6	52	3	1	1	S	10	0	45	2	0	0	7/31/2009	9:00 PM	Friday	Duval	Yes	No	No	No	Y	Y
2	2	909392870	72020000	2.721	445	9	1E+05	9	1	8	23	U-INT	0	77	5	1	1	1	1	6	R	2	0	0	77	S	0	21	0	1	1	1	N	3	0	18	3	0	0	1/8/2009	11:00 PM	Thursday	Duval	Yes	No	Yes	No	Y	Y
2	2	910108130	72001000	3.821	111	9	1E+05	9	4	1	1	U-INT	0	3	4	3	2	3	1	1	R	2	1	1	1	S	14	21	22	1	1	1	N	1	0	21	2	0	0	4/1/2009	1:00 AM	Wednesday	Duval	Yes	No	Yes	No	Y	Y
2	2	769780630	72002000	20.9	5501	9	80500	10	1	14	3	U-INT	1	0	4	1	1	3	1	1	R	1	3	1	1	N	14	0	26	1	8	1	S	14	0	44	2	1	1	1/14/2010	3:00 AM	Thursday	Duval	Yes	No	No	Yes	Y	Y
2	2	769783310	72020000	7.096	6802	9	1E+05	10	3	5	2	U-INT	1	77	4	1	1	1	1	6	M	M	1	1	1	S	0	21	28	1	1	1	N	1	7	45	2	0	2	3/5/2010	2:00 AM	Friday	Duval	Yes	No	Yes	No	Y	Y
2	2	769986520	72292000	9.645	4072	202	75000	10	9	12	0	U-OLA	1	2	4	1	1	3	1	1	R	2	1	1	1	W	14	7	39	1	1	1	E	14	21	24	2	0	1	9/12/2010	12:00 AM	Sunday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	771121330	26260000	6.701	499	93	61367	10	2	6	4	R-INT	1	6	5	2	1	3	1	1	R	2	1	1	1	S	14	21	22	1	1	1	N	14	7	76	2	0	0	2/6/2010	4:00 AM	Saturday	Alachua	Yes	No	Yes	No	Y	Y
2	2	771158740	37120000	4.397	389	8	20500	10	10	28	20	R-INT	1	3	5	1	1	3	1	1	R	1	3	1	1	W	14	21	41	1	1	1	E	14	7	21	2	0	2	10/28/2010	8:00 PM	Thursday	Suwanee	Yes	No	Yes	No	Y	Y
2	2	772533660	72020000	6.596	5340	9	1E+05	10	3	5	2	U-INT	3	0	4	1	1	3	1	1	R	1	1	1	1	S	1	7	28	1	1	1	N	1	8	38	2	0	6	3/5/2010	2:00 AM	Friday	Duval	Yes	No	No	No	Y	Y
2	2	772535840	27090000	0.465	214	8	20476	10	5	8	22	R-INT	1	0	5	1	1	3	1	1	L	1	1	1	1	E	14	0	59	1	1	1	W	14	0	42	2	1	4	5/8/2010	10:00 PM	Saturday	Baker	Yes	No	No	Yes	Y	Y
2	2	772538900	72001000	9.067	16	9	1E+05	10	10	30	2	U-INT	0	18	4	2	1	3	1	1	L	S	1	1	1	S	3	21	22				1		7	0	1	0	2	10/30/2010	2:00 AM	Saturday	Duval	No	No	Yes	No	Y	Y
2	2	772576770	72001000	12.712	24	9	83000	10	3	12	2	U-INT	1	0	4	2	1	1	1	1	L	3	3	1	1	N	14	0	29	6	3	1	S	12	0	60	2	0	1	3/12/2010	2:00 AM	Friday	Duval	Yes	No	No	No	Y	Y
2	2	819512140	26260000	34.426	479	93	45000	11	3	4	1	R-INT	0	2	5	1	1	1	1	1	R	1	1	1	1	S	1	77	47	2	1	1	N	1	0	19	4	1	2	3/4/2011	1:00 AM	Friday	Alachua	Yes	Yes	No	Yes	Y	Y
2	2	819995510	72002000	21	5501	9	78500	11	4	19	1	U-INT	0	2	4	2	1	1	1	1	R	1	3	1	1	N	1	21	48	1	1	1	S	1	0	23	3	2	2	4/19/2011	1:00 AM	Tuesday	Duval	Yes	Yes	Yes	Yes	Y	Y
2	2	820202560	72280000	6.047	6233	9	1E+05	11	2	16	5	U-INT	3	9	3	1	1	1	1	1	R	1	1	1	1	S	3	21	25	1	1	1	N	13	0	47	2	0	1	2/16/2011	5:00 AM	Wednesday	Duval	Yes	No	Yes	No	Y	Y
2	2	820249680	72290000	9.004	3740	9	59313	11	11	11	3	U-INT	1	2	5	1	1	1	1	1	R	1	1	1	1	S	2	2	33	3	1	1	N	2	0	73	2	1	1	11/11/2011	3:00 AM	Friday	Duval	Yes	Yes	No	Yes	Y	Y
2	2	820523510	72001000	4.802	5525	9	1E+05	11	2	17	2	U-INT	0	18	4	4	2	1	1	1	M	M	3	1	6	N	2	21	27				1		0	0	1	0	0	2/17/2011	2:00 AM	Thursday	Duval	No	No	Yes	No	Y	Y
2	2	820719850	72040000	13.876	2307	10	67500	11	9	5	2	U-OLA	3	77	4	1	1	1	1	6	M	M	3	1	77	E	14	21	19	1	1	1	W	14	20	47	3	0	5	9/5/2011	2:00 AM	Monday	Duval	Yes	No	Yes	No	Y	Y
2	2	820819590	72001000	16.211	29	9	95500	11	5	25	20	U-INT	1	3	4	1	1	1	1	1	R	3	1	1	77	S	2	21	20	2	1	77	N	6	0	60	2	0	1	5/25/2011	8:00 PM	Wednesday	Duval	Yes	No	Yes	No	Y	Y
2	2	821711920	72040000	11.705	2317	10	53000	11	1	16	13	U-OLA	0	2	4	1	1	1	1	1	L	1	1	1	1	W	1	21	48	1	0	1	E	1	20	23	2	0	2	1/16/2011	1:00 PM	Sunday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	827595110	72090000	8.046	1908	228	30000	11	4	22	23	U-OLA	1	2	4	1	1	1	1	6	L	1	3	1	1	S	2	21	20	1	1	1	N	2	0	28	2	0	4	4/22/2011	11:00 PM	Friday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	829168560	72040000	10.994	2257	10	56000	11	7	28	21	U-OLA	0	9	4	1	1	0	1	1	L	1	0	0	88	E	1	77	0	2	1	1	W	4	0	47	2	0	5	7/28/2011	9:00 PM	Thursday	Duval	Yes	No	No	No	Y	Y
2	2	829183110	72270000	11.21	461	8	43827	11	9	8	15	U-INT	3	77	1	1	1	1	1	1	L	1	3	1	1	W	1	2	21	1	1	1	E	2	21	40	2	0	1	9/8/2011	3:00 PM	Thursday	Duval	Yes	No	Yes	No	Y	Y
2	2	831111870	72040000	12.993	2309	10	67500	11	12	21	22	U-OLA	3	9	4	1	1	1	1	1	L	1	1	1	1	W	2	77	31	1	1	88	E	3	0	27	2	0	0	12/21/2011	10:00 PM	Wednesday	Duval	Yes	No	No	No	Y	Y
2	2	820711630	27090000	20.818	189	8	20000	12	10	12	2	U-INT	1	2	5	1	1	1	1	1	L	1	3	1	1	W	2	21	47	2	1	1	E	2	0	20	2	2	9	10/12/2012	2:00 AM	Friday	Baker	Yes	Yes	Yes	Yes	Y	Y
2	2	828289040	27090000	12.825	182	8	20400	12	1	30	2	R-INT	3	27	5	1	1	1	1	1	R	S	1	1	1	W	14	21	44				1		0	0	1	0	0	1/30/2012	2:00 AM	Monday	Baker	No	No	Yes	No	Y	Y
2	2	828548170	37120000	22.716	309	8	24753	12	2	5	4	R-INT	0	2	5	2	1	77	1	1	L	1	1	1	1	E	2	21	59	2	1	1	W	2	0	26	2	0	11	2/5/2012	4:00 AM	Sunday	Suwanee	Yes	Yes	Yes	No	Y	Y

District	Geographic District	CRASH_NUMBER	ROADWAYID	MILEPOST	NEAREST_NODE	STATE_ROAD	ADT	YEAR	MONTH	DAY	HOUR	CRASH_RATE_CLASS_CATEG.	ALC_INV	HARMFUL_EVENT1	LIGHTING	WEATHER	RD_SURF	TRAFFIC_CONTROL	ROAD_CONDITIONS	SITE_LOCATION	ROAD_SD	ACC_LN	VEHICLE_TYPE1	VEHICLE_USE1	VEHICLE_MOVEMT1	VEH_DIR1	POINT_OF_IMPACT1	CONTRIB_CAUSE1	DRIV/PED_AGE1	VEHICLE_TYPE2	VEHICLE_USE2	VEHICLE_MOVEMT2	VEH_DIR2	POINT_OF_IMPACT2	CONTRIB_CAUSE2	DRIV/PED_AGE2	#_OF_VEHICLES	#_OF_KILLED	#_OF_INJURED	DATE	TIME	DAY OF WEEK	County	Crash Direction Different?	Harmful Event Head-On?	Contributing Cause Wrong Way?	Fatal Crash?	Crash Report Obtained?	WWD Confirmed?
2	2	828700340	72002000	10.336	4779	9	59000	12	3	4	4	U-INT	3	9	4	3	2	1	1	1	L	2	1	1	1	N	3	2	39	1	1	1	S	14	0	56	2	0	0	3/4/2012	4:00 AM	Sunday	Duval	Yes	No	No	No	Y	Y
2	2	830507220	72001000	31.829	2880	9	54000	12	2	11	2	U-INT	1	29	4	3	2	1	1	1	L	H	1	1	6	E	12	2	34				1		21	0	1	0	0	2/11/2012	2:00 AM	Saturday	Duval	No	No	Yes	No	Y	Y
2	2	831484460	72280004	0.872	6058	9	2200	12	4	28	16	RRAMP	0	2	1	1	1	1	1	7	L	X	3	1	10	N	13	21	31	1	1	1	S	2	0	18	2	0	3	4/28/2012	4:00 PM	Saturday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	832281590	72001000	17.729	34	9	94000	12	12	1	4	U-INT	0	77	4	2	1	1	1	1	M	M	1	1	1	N	3	21	21				1		0	0	1	0	0	12/1/2012	4:00 AM	Saturday	Duval	No	No	Yes	No	Y	Y
2	2	832448270	72280000	16.102	138	9	1E+05	12	12	26	0	U-INT	0	9	5	1	1	1	1	1	R	2	1	1	1	S	2	21	46	1	1	1	N	2	0	24	3	1	0	12/26/2012	12:00 AM	Wednesday	Duval	Yes	No	Yes	Yes	Y	Y
2	2	832546960	72090000	7.489	4706	228	38000	12	12	20	23	U-OLA	3	3	4	1	1	1	1	6	L	1	1	1	1	E	14	21	35	1	1	1	W	14	0	23	2	0	0	12/20/2012	11:00 PM	Thursday	Duval	Yes	No	Yes	No	Y	Y
2	2	832469760	72002000	8.062	4770	9	66139	13	1	13	21	U-INT	0	1	4	1	1	1	1	6	L	3	1	1	4	S	7	77	38	1	1	1	N	14	0	86	2	0	3	1/13/2013	9:00 PM	Sunday	Duval	Yes	No	No	No	Y	Y
2	2	832600890	72270000	19.067	448	8	1E+05	13	1	27	4	U-INT	1	77	4	1	1	1	1	1	L	2	1	1	1	E	1	2	43	1	1	1	W	1	21	36	2	0	4	1/27/2013	4:00 AM	Sunday	Duval	Yes	No	Yes	No	Y	Y
2	2	832937420	72280000	14.284	3729	9	1E+05	13	4	27	17	U-INT	0	3	1	1	1	1	1	1	L	2	3	1	77	S	14	21	26	1	1	1	N	14	0	27	4	0	4	4/27/2013	5:00 PM	Saturday	Duval	Yes	No	Yes	No	Y	Y
2	2	833285190	72001000	17.562	86	9	94000	13	7	7	4	U-INT	3	2	4	1	1	1	1	1	L	2	1	1	1	S	2	21	28	1	1	1	N	2	0	21	2	1	3	7/7/2013	4:00 AM	Sunday	Duval	Yes	Yes	Yes	Yes	Y	Y
2	2	833300770	72001000	24.989	1397	9	54000	13	6	18	4	U-INT	0	2	4	2	1	1	1	1	M	M	1	1	1	N	14	2	28	9	2	1	N	14	0	61	2	1	0	6/18/2013	4:00 AM	Tuesday	Duval	No	Yes	No	Yes	Y	Y
2	2	836540980	72040000	11.743	2317	10	48000	13	9	14	18	U-OLA	1	2	1	2	2	1	1	1	L	2	1	1	1	E	1	21	53	1	1	1	W	1	0	50	2	0	3	9/14/2013	6:00 PM	Saturday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	838655270	72090164	0.879	3949	115	0	13	4	3	3	R1WAY	0	2	4	1	1	1	1	1	L	X	1	1	1	N	1	21	30	1	1	1	S	1	0	31	2	0	2	4/3/2013	3:00 AM	Wednesday	Duval	Yes	Yes	Yes	No	Y	Y
2	2	843257660	72040000	13.876	2307	10	56500	13	11	22	21	U-OLA	1	77	4	1	1	1	1	6	L	1	1	1	1	W	14	21	38				1		77	0	2	0	0	11/22/2013	9:00 PM	Friday	Duval	No	No	Yes	No	Y	Y
3	3	770814700	53002000	24.131	964	8	20000	9	5	12	10	R-INT	0	7	1	1	1	1	1	1	L	S	77	7	4	E	0	4	37	77	8	2	W	14	0	29	2	0	0	5/12/2009	10:00 AM	Tuesday	Jackson	Yes	No	No	No	Y	Y
3	3	770843030	48270000	0.801	2499	8	44000	9	4	15	3	U-INT	0	29	1	1	1	3	1	7	R	X	3	1	4	S	19	21	41				1		0	0	1	0	0	4/15/2009	3:00 AM	Wednesday	Escambia	No	No	Yes	No	Y	Y
3	3	770852010	52002000	2.574	483	8	15600	9	5	25	0	R-INT	1	2	5	2	2	1	1	1	L	1	3	1	1	E	13	21	25	4	1	1	W	14	7	62	2	0	1	5/25/2009	12:00 AM	Monday	Holmes	Yes	Yes	Yes	No	Y	Y
3	3	770900100	48260000	5.758	696	8	31500	9	12	3	11	U-INT	0	7	1	2	1	3	1	3	L	1	5	1	4	E	0	4	48	2	1	2	W	1	0	33	3	0	0	12/3/2009	11:00 AM	Thursday	Escambia	Yes	No	No	No	Y	Y
3	3	770125670	54001000	18.109	373	8	25241	10	4	9	7	R-INT	0	0	2	1	1	3	1	1	R	2	1	1	1	W	0	21	85	3	1	1	E	2	0	40	3	0	0	4/9/2010	7:00 AM	Friday	Jefferson	Yes	No	Yes	No	Y	Y
3	3	770873830	57002000	19.863	1522	8	17200	10	4	6	20	R-INT	0	2	5	1	1	3	1	1	R	1	3	1	1	W	2	21	46	6	3	1	E	2	0	54	2	0	2	4/6/2010	8:00 PM	Tuesday	Okaloosa	Yes	Yes	Yes	No	Y	Y
3	3	770934540	48270000	2.443	1013	8	34000	10	5	1	5	U-INT	1	0	3	4	2	3	1	1	L	2	3	1	1	N	1	7	30	1	1	1	S	1	21	54	3	1	2	5/1/2010	5:00 AM	Saturday	Escambia	Yes	No	Yes	Yes	Y	Y
3	3	819929790	60002000	14.523	1507	8	19526	10	11	30	20	R-INT	0	2	5	3	2	1	1	1	L	1	1	1	1	E	2	21	64	6	3	1	W	2	0	44	3	2	2	11/30/2010	8:00 PM	Tuesday	Walton	Yes	Yes	Yes	Yes	Y	Y
3	3	819946000	50001000	27.335	690	8	26626	12	7	14	21	R-INT	3	2	5	1	1	1	1	1	L	1	1	1	1	E	1	2	35	3	1	1	W	1	21	25	2	2	1	7/14/2012	9:00 PM	Saturday	Gadsden	Yes	Yes	Yes	Yes	Y	Y
3	3	828546340	52002000	6.574	495	8	17900	12	5	13	22	U-INT	0	2	5	1	1	1	1	1	L	1	2	1	1	E	1	21	52	1	1	1	W	1	0	45	2	2	0	5/13/2012	10:00 PM	Sunday	Holmes	Yes	Yes	Yes	Yes	Y	Y
3	3	828566710	48270000	4.035	2909	8	35000	12	2	29	23	U-INT	1	9	4	2	1	1	1	1	L	2	3	1	1	N	12	21	45	3	1	1	N	12	0	23	2	0	0	2/29/2012	11:00 PM	Wednesday	Escambia	No	No	Yes	No	Y	Y
3	3	828839000	60002000	23.599	1515	8	18372	12	5	26	18	R-INT	1	9	1	1	1	1	1	1	R	1	1	1	1	W	13	21	62	2	1	6	E	13	0	64	2	0	0	5/26/2012	6:00 PM	Saturday	Walton	Yes	No	Yes	No	Y	Y
3	3	828841100	61001000	13.828	491	8	18000	12	4	30	5	R-INT	0	2	5	1	1	1	1	1	L	1	1	1	1	E	14	2	60	1	1	1	W	14	21	42	3	2	0	4/30/2012	5:00 AM	Monday	Washington	Yes	Yes	Yes	Yes	Y	Y
3	3	828947940	48270000	1.384	2502	8	35000	12	7	7	20	U-INT	0	2	4	1	1	1	1	6	L	1	11	1	1	N	1	21	42	1	1	1	S	2	0	25	2	1	2	7/7/2012	8:00 PM	Saturday	Escambia	Yes	Yes	Yes	Yes	Y	Y
3	3	831446450	58002000	21.73	890	8	25000	12	6	15	3	R-INT	1	9	5	1	1	1	1	1	R	1	3	1	1	W	13	21	25	3	7	1	E	9	0	31	2	0	1	6/15/2012	3:00 AM	Friday	Santa Rosa	Yes	No	Yes	No	Y	Y
3	3	831434800	55320000	5.154	2050	8	43500	13	5	1	3	U-INT	1	2	4	1	1	1	1	1	R	3	1	1	1	W	1	21	22	8	3	1	E	1	0	42	2	1	30	5/1/2013	3:00 AM	Wednesday	Leon	Yes	Yes	Yes	Yes	Y	Y
3	3	832885130	58002000	18.73	891	8	25000	13	6	16	2	R-INT	0	2	5	2	1	1	1	1	R	1	3	1	1	W	1	21	22	3	1	1	E	1	0	44	2	3	0	6/16/2013	2:00 AM	Sunday	Santa Rosa	Yes	Yes	Yes	Yes	Y	Y
3	3	832943050	50001000	33.309	7011	8	31000	13	9	15	4	R-INT	1	9	5	1	1	1	1	1	R	1	1	1	1	W	2	21	27	1	1	1	E	2	0	19	2	0	1	9/15/2013	4:00 AM	Sunday	Gadsden	Yes	No	Yes	No	Y	Y
4	4	773256780	86070000	15.066	2442	9	3E+05	9	3	27	4	U-INT	1	0	4	1	1	3	1	1	L	2	1	1	1	N	1	0	31	2	1	1	S	1	0	39	2	1	4	3/27/2009	4:00 AM	Friday	Broward	Yes	No	No	No	Y	Y
4	4	773271370	86070000	4.653	1513	9	3E+05	9	4	7	13	U-INT	0	2	1	1	1	3	1	1	M	M	1	1	1	N	1	21	56	1	1	1	N	1	0	43	2	0	2	4/7/2009	1:00 PM	Tuesday	Broward	No	Yes	Yes	No	Y	Y
4	4	773290260	86070000	1.813	1521	9	3E+05	9	5	3	1	U-INT	0	6	4	1	1	3	1	1	R	3	1	1	1	S	0	2	0	1	1	1	N	9	0	62	2	0	0	5/3/2009	1:00 AM	Sunday	Broward	Yes	No	No	No	Y	Y
4	4	773292500	86070043	0	1890	9	0	9	2	28	5	URAMP	1	2	1	1	1	1	1	8	L	X	3	1	2	S	14	1	68	1	1	1	N	14	0	51	2	0	0	2/28/2009	5:00 AM	Saturday	Broward	Yes	Yes	No	No	Y	Y
4	4	773293780	86070067	0	2045	9	0	9	5	12	0	URAMP	0	6	1	2	1	3	1	8	R	X	2	1	88	N	2	21	0	1	1	1	N	6	0	30	2	0	0	5/12/2009	12:00 AM	Tuesday	Broward	No	No	Yes	No	Y	Y
4	4	773298610	86075000	5.475	3122	93	20000	9	5	12	22	U-INT	1	2	4	1	1	3	1	1	M	M	1	1	1	S	1	2	53	3	1	8	S	1	0	0	2	0	1	5/12/2009	10:00 PM	Tuesday	Broward	No	Yes	No	No	Y	Y
4	4	770504920	86075000	10.028	3683	93	1E+05	10	7	24	3	U-INT	1	0	4	3	2	3	1	1	R	2	1	1	1	N	1	0	41	6	3	1	N	1	0	42	2	1	0	7/24/2010	3:00 AM	Saturday	Broward	No	No	No	No	Y	Y
4	4	773285860	86070000	8.066	5173	9	3E+05	10	7	4	16	U-INT	0	77	1	3	2	3	1	1	M	M	1	1	1	S	14	1	42	1	1	10	N	0	0	43	2	0	1	7/4/2010	4:00 PM	Sunday	Broward	Yes	No	No	No	Y	Y
4	4	773335850	94001000	20.708	1160	9	35000	10	2	26	15	U-INT	0	77	1	1	1	1	1	1	M	M	1	1	10	N	0	21	0	6	3	1	N	21	0	50	2	0	0	2/26/2010	3:00 PM	Friday	St Lucie	No	No	Yes	No	Y	Y
4	4	773338900	94001000	26.171	640	9	35000	10	6	3	17	U-INT	0	6	1	3	2	1	1	1	L	1	1	1	1	S	2	21	78	5	3	1	S	21	0	45	2	0	0	6/3/2010	5:00 PM	Thursday	St Lucie	No	No	Yes	No	Y	Y
4	4	773369980	86070000	4.152	1877	9	3E+05	10	6	6	5	U-INT	0	0	4	1	1	3	1	1	M	M	1	1	1	N	0	21	0	2	1	1	S	1	0	42	2	0	1	6/6/2010	5:00 AM	Sunday	Broward	Yes	No	Yes	No	Y	Y
4	4	773378080	89095000	2.441	726	9	66000	10	7	4	5	R-INT	1	0	5	2	1	3	1	1	R	1	1	1	1	S	1	0	23	1	1	1	N	14	0	63	2	1	1	7/4/2010	5:00 AM	Sunday	Martin	Yes	No	No	No	Y	Y
4	4	773390780	86070000	11.032	1888	9	3E+05	10	8	17	20	U-INT	0	77	4	1	1	3	1	1	R	1	1	1	1	S	0	2	0	1	1	2	N	8	0	31	3	0	0	8/17/2010	8:00 PM	Tuesday	Broward	Yes	No	No	No	Y	Y
4	4	773393810	86075038	0	3679	93	12500	10	9	26	7	URAMP	1	2	1	2	1	3	1	8	R	X	1	1	1	S	2	21	21	1	1	1	N	2	7	49	2	0	2	9/26/2010	7:00 AM	Sunday	Broward	Yes	Yes	Yes	No	Y	Y
4	4	819969140	86075000	12.353	4246	93	51500	10	12	29	19	U-INT	0	77	4	1	1	1	3	2	R	S	3	1	1	S	0	21	28	1	1	1	N	1	0	23	2	0	2	12/29/2010	7:00 PM	Wednesday	Broward	Yes	No	No	No	Y	Y
4	4	819685730	86070000	2.423	1520	9	3E+05	11	4	21	4	U-INT	0	3	4	1	1	1	1	1	R	5	1	1	1	N	14	1	28	1	1	1	S	10	0	28	2	0	0	4/21/2011	4:00 AM	Thursday	Broward	Yes	No	No	No	Y	Y
4	4	820944240	86075000	5.162	3118	93	1E+05	11	6	23	1	U-INT	0	2	4	1	1	5	1	1	R	2	3	1	1	S	1	21	45	1	1	1	N	1	17	37	2	2	0	6/23/2011	1:00 AM	Thursday	Broward	Yes	Yes	Yes	No	Y	Y
4	4	828446190	86095000	3.076	3708	862	2E+05	12	1	2	2	U-INT	0	77	5	1	1	1	1	1	M	M	1	1	1	E	0	21	84	1	1	1	W	1	77	19	2	0	0	1/2/2012	2:00 AM	Monday	Broward	Yes	No	Yes	No	Y	Y
4	4	828446260	86075000	2.749	5946	93	1E+05	12	1	14	1	U-INT	0	9	5	1	1	1	1	1	R	2	1	1	1	S	4	21	24	1	1	1	N	4	77	28	2	0	0	1/14/2012	1:00 AM	Saturday	Broward	Yes	No	Yes	No	Y	Y
4	4	828490420	89095000	22.077	707	9	51090	12	5	13	2	R-INT	3	2	4	1	1	1	1	1	L	3	3	1	1	S	1	21	41	3	1	1	N	1	0	28	2	4	1	5/13/2012	2:00 AM	Sunday	Martin	Yes	Yes	Yes	No	Y	Y
4	4	828565960	94001000	15.411	536	9	63000	12	11	7	5	U-INT	1	3	4	1	1	1	1	1	L	1	1	1	1	N	2	21	28	1	1	1	S	2	0	38	3	0	3	11/7/2012	5:00 AM	Wednesday	St Lucie	Yes	No	Yes	No	Y	Y
4	4	831818260	86070000	7.365	4520	9	3E+05	12	10	3	3	U-INT	0	2	4	2	2	1	8	1	L	1	1	1	1	S	2	21	23	1	1	1	S	2	0	24	2	0	3	10/3/2012	3:00 AM	Wednesday	Broward	No	Yes	Yes	No	Y	Y

District	Geographic District	CRASH_NUMBER	ROADWAYID	MILEPOST	NEAREST_NODE	STATE_ROAD	ADT	YEAR	MONTH	DAY	HOUR	CRASH_RATE_CLASS_CATEG.	ALC_INV	HARMFUL_EVENT1	LIGHTING	WEATHER	RD_SURF	TRAFFIC_CONTROL	ROAD_CONDITIONS	SITE_LOCATION	ROAD_SD	ACC_LN	VEHICLE_TYPE1	VEHICLE_USE1	VEHICLE_MOVEMT1	VEH_DIR1	POINT_OF_IMPACT1	CONTRIB_CAUSE1	DRIV/PED_AGE1	VEHICLE_TYPE2	VEHICLE_USE2	VEHICLE_MOVEMT2	VEH_DIR2	POINT_OF_IMPACT2	CONTRIB_CAUSE2	DRIV/PED_AGE2	#_OF_VEHICLES	#_OF_KILLED	#_OF_INJURED	DATE	TIME	DAY OF WEEK	County	Crash Direction Different?	Harmful Event Head-On?	Contributing Cause Wrong Way?	Fatal Crash?	Crash Report Obtained?	WWD Confirmed?
4	4	828858810	94001000	8.033	1063	9	51500	13	2	27	18	U-INT	0	3	2	1	1	1	1	1	R	2	1	1	10	W	10	2	61	5	3	1	N	14	0	36	2	0	1	2/27/2013	6:00 PM	Wednesday	St Lucie	Yes	No	No	No	Y	Y
4	4	832888300	88081000	18.233	7001	9	44000	13	3	24	12	R-INT	1	9	1	1	1	1	1	1	R	S	1	1	1	S	14	2	52	1	1	1	N	19	0	30	3	0	3	3/24/2013	12:00 PM	Sunday	Indian River	Yes	No	No	No	Y	Y
4	4	833054090	86095000	8.553	4072	862	2E+05	13	4	18	0	U-INT	1	9	5	1	1	1	1	1	L	3	2	1	1	E	13	21	48	2	1	1	W	14	2	46	2	0	1	4/18/2013	12:00 AM	Thursday	Broward	Yes	No	Yes	No	Y	Y
5	5	769991920	73001000	4.265	654	9	66000	9	3	27	5	U-INT	1	6	5	1	1	3	1	1	R	2	1	1	1	S	12	9	19	1	1	1	N	11	21	25	2	0	0	3/27/2009	5:00 AM	Friday	Flagler	Yes	No	Yes	No	Y	Y
5	5	771046890	36210000	19.441	32	93	56500	9	2	3	1	U-INT	0	2	5	1	2	1	1	1	R	1	3	1	77	S	1	77	25	3	1	1	N	1	0	61	2	0	2	2/3/2009	1:00 AM	Tuesday	Marion	Yes	Yes	No	No	Y	Y
5	5	771056410	36210000	16.406	1540	93	67000	9	1	30	2	U-INT	0	3	5	3	2	3	1	1	L	2	1	1	4	W	11	4	43	6	3	1	S	1	0	39	3	0	1	1/30/2009	2:00 AM	Friday	Marion	Yes	No	No	No	Y	Y
5	5	771110780	36210000	17.505	31	93	62000	9	10	25	21	U-INT	0	2	4	1	1	3	1	1	L	2	3	1	1	S	2	21	54	1	1	1	N	2	0	62	2	0	3	10/25/2009	9:00 PM	Sunday	Marion	Yes	Yes	Yes	No	Y	Y
5	5	774347500	79002000	14.291	95	9	32000	9	3	8	22	R-INT	1	0	5	1	1	3	1	1	L	2	1	1	1	S	14	21	60	1	1	1	N	14	7	25	2	0	1	3/8/2009	10:00 PM	Sunday	Volusia	Yes	No	Yes	No	Y	Y
5	5	774349460	70004000	0.634	1594	404	40500	9	10	28	2	S-4DR	1	2	5	2	1	3	1	1	L	1	2	1	1	E	1	21	34	1	1	1	W	1	0	32	2	0	1	10/28/2009	2:00 AM	Wednesday	Brevard	Yes	Yes	Yes	No	Y	Y
5	5	774399290	79002000	15.291	95	9	32000	9	3	8	21	U-INT	0	2	5	1	1	1	1	1	R	1	1	1	1	S	2	21	60	1	1	1	N	2	0	24	2	0	2	3/8/2009	9:00 PM	Sunday	Volusia	Yes	Yes	Yes	No	Y	Y
5	5	774431370	70225000	4.001	174	9	45500	9	4	4	3	U-INT	1	2	5	1	1	3	1	1	R	1	1	1	1	S	14	2	31	1	1	1	N	14	0	21	2	0	2	4/4/2009	3:00 AM	Saturday	Brevard	Yes	Yes	No	No	Y	Y
5	5	774479270	77160000	1.608	4	400	1E+05	9	10	24	4	U-INT	1	0	5	2	1	3	1	1	L	3	1	1	6	E	1	7	27	1	1	1	W	1	0	55	2	0	2	10/24/2009	4:00 AM	Saturday	Seminole	Yes	No	No	No	Y	Y
5	5	776657810	18130000	1.565	402	93	35500	9	5	18	14	R-INT	0	77	1	3	2	3	1	1	L	S	3	1	1	S	0	21	73	3	1	1	N	2	0	29	2	0	0	5/18/2009	2:00 PM	Monday	Sumter	Yes	No	Yes	No	Y	Y
5	5	776771450	79002000	23.011	85	9	37432	9	10	15	10	U-INT	0	7	1	1	1	1	1	1	R	2	1	1	4	S	7	4	54	3	1	1	N	21	0	54	2	0	0	10/15/2009	10:00 AM	Thursday	Volusia	Yes	No	No	No	Y	Y
5	5	776808440	79002000	18.339	16	9	37432	9	10	18	22	U-INT	0	22	5	1	1	3	1	1	L	S	3	1	1	N	0	21	86	3	1	1	S	2	0	19	2	0	0	10/18/2009	10:00 PM	Sunday	Volusia	Yes	No	Yes	No	Y	Y
5	5	776833150	79002000	38.349	66	9	68500	9	10	3	21	R-INT	0	9	5	1	1	1	1	1	R	3	4	77	10	W	21	6	46	1	1	1	N	14	0	69	3	0	0	10/3/2009	9:00 PM	Saturday	Volusia	Yes	No	No	No	Y	Y
5	5	776833540	75280000	22.822	408	400	2E+05	9	10	25	4	U-INT	0	20	4	1	1	1	1	1	M	M	0	1	1	W	0	21	0	1	1	1	E	1	0	25	2	0	1	10/25/2009	4:00 AM	Sunday	Orange	Yes	No	Yes	No	Y	Y
5	5	908158050	75280000	10.627	346	400	2E+05	9	9	7	19	U-INT	1	2	2	2	1	1	1	1	R	2	1	1	10	S	14	21	66	1	1	1	N	1	0	46	2	0	1	9/7/2009	7:00 PM	Monday	Orange	Yes	Yes	Yes	No	Y	Y
5	5	914725000	75280000	19.166	425	400	2E+05	9	6	7	12	U-INT	0	6	1	1	1	1	1	6	L	S	0	0	1	1	0	21	0	1	1	1	W	13	0	29	2	0	0	6/7/2009	12:00 PM	Sunday	Orange	No	No	Yes	No	Y	Y
5	5	914737140	75280049	0	437	400	0	9	1	22	2	RRAMP	1	2	4	1	1	1	1	7	R	X	1	1	1	W	1	21	24	1	1	1	E	1	7	24	2	0	1	1/22/2009	2:00 AM	Thursday	Orange	Yes	Yes	Yes	No	Y	Y
5	5	776894990	70225000	26.787	145	9	27811	10	3	27	1	R-INT	1	0	5	1	1	3	1	1	R	1	3	1	1	S	14	7	62	3	1	1	N	2	0	20	2	0	2	3/27/2010	1:00 AM	Saturday	Brevard	Yes	No	No	No	Y	Y
5	5	806310600	79002000	29.281	73	9	70500	10	7	18	1	U-INT	1	0	5	1	1	3	1	1	R	2	2	1	1	S	1	0	25	1	1	1	N	1	0	46	3	1	4	7/18/2010	1:00 AM	Sunday	Volusia	Yes	No	No	Yes	Y	Y
5	5	806318400	79110000	9.815	1378	400	76000	10	9	2	22	U-INT	0	0	5	1	1	1	1	1	M	M	1	1	1	E	0	21	0	3	1	1	W	14	0	20	2	0	0	9/2/2010	10:00 PM	Thursday	Volusia	Yes	No	Yes	No	Y	Y
5	5	806345780	75280000	21.6	398	400	2E+05	10	10	23	1	U-INT	1	2	4	1	1	3	1	1	L	2	1	1	1	E	1	21	20	6	3	1	W	1	0	35	2	0	1	10/23/2010	1:00 AM	Saturday	Orange	Yes	Yes	Yes	No	Y	Y
5	5	903950800	70070000	5.384	6049	528	37500	10	7	13	22	U-OLA	0	2	4	1	1	3	1	2	L	U	0	0	1	1	0	21	0	1	1	1	W	2	0	21	2	0	0	7/13/2010	10:00 PM	Tuesday	Brevard	No	Yes	Yes	No	Y	Y
5	5	912378020	75280000	16.08	4292	400	1E+05	10	6	5	2	U-INT	1	2	4	1	1	1	1	1	R	2	1	1	1	S	1	21	31	1	1	1	N	14	9	26	4	0	4	6/5/2010	2:00 AM	Saturday	Orange	Yes	Yes	Yes	No	Y	Y
5	5	912398140	75280000	10.095	345	400	2E+05	10	6	29	17	U-INT	0	20	1	1	1	1	1	1	M	M	1	1	1	E	14	21	24				1		77	0	1	0	1	6/29/2010	5:00 PM	Tuesday	Orange	No	No	Yes	No	Y	Y
5	5	828357620	70225000	3.85	104	9	36500	11	10	1	14	U-INT	0	1	1	1	1	1	1	1	L	1	1	1	4	N	8	2	19	1	1	1	S	1	0	53	2	0	1	10/1/2011	2:00 PM	Saturday	Brevard	Yes	No	No	No	Y	Y
5	5	822740510	70070000	9.025	6078	528	35500	12	1	29	2	U-OLA	1	2	5	1	1	1	1	1	L	2	1	1	1	E	1	21	52	3	1	1	W	1	0	34	2	1	1	1/29/2012	2:00 AM	Sunday	Brevard	Yes	Yes	Yes	Yes	Y	Y
5	5	828615440	79002000	9.469	8	9	30000	12	3	10	15	R-INT	1	2	1	2	2	1	1	1	R	1	1	1	1	S	1	21	46	3	1	1	N	1	0	20	2	0	1	3/10/2012	3:00 PM	Saturday	Volusia	Yes	Yes	Yes	No	Y	Y
5	5	828830970	79002000	7.469	8	9	30000	12	1	29	3	R-INT	1	3	5	1	1	1	1	1	L	2	1	1	1	N	1	21	31	1	1	1	S	13	0	24	2	0	2	1/29/2012	3:00 AM	Sunday	Volusia	Yes	No	Yes	No	Y	Y
5	5	832598060	79002000	20.711	89	9	36921	13	3	3	20	U-INT	0	2	5	1	1	1	1	1	L	2	1	1	1	N	1	21	24	6	3	1	S	1	0	49	2	1	1	3/3/2013	8:00 PM	Sunday	Volusia	Yes	Yes	Yes	Yes	Y	Y
5	5	833227120	79002000	9.531	8	9	30000	13	8	23	17	R-INT	1	9	1	2	1	1	1	1	R	1	3	1	10	S	2	6	58	1	1	1	N	4	21	47	2	0	1	8/23/2013	5:00 PM	Friday	Volusia	Yes	No	Yes	No	Y	Y
5	5	833591750	75280000	20.461	418	400	1E+05	13	1	2	0	U-INT	0	2	4	1	1	1	1	1	L	2	1	1	1	W	0	2	23	1	1	1	E	0	0	30	2	0	3	1/2/2013	12:00 AM	Wednesday	Orange	Yes	Yes	No	No	Y	Y
5	5	836542160	70220000	18.29	75	9	68000	13	9	12	12	U-INT	0	2	1	1	1	1	1	1	L	1	1	1	1	N	2	21	74	1	1	1	S	2	0	34	2	0	2	9/12/2013	12:00 PM	Thursday	Brevard	Yes	Yes	Yes	No	Y	Y
5	5	836690490	79002000	7.545	8	9	30000	13	8	23	17	R-INT	1	9	1	1	1	1	1	1	R	1	3	1	1	S	3	2	58	1	1	1	N	6	21	32	2	0	2	8/23/2013	5:00 PM	Friday	Volusia	Yes	No	Yes	No	Y	Y
5	5	836950730	70070000	5.292	1041	528	35000	13	11	1	2	U-OLA	0	2	5	1	1	1	1	1	R	1	1	1	1	W	1	21	25	1	1	1	E	1	0	23	2	0	2	11/1/2013	2:00 AM	Friday	Brevard	Yes	Yes	Yes	No	Y	Y
5	5	837123310	70007000	2.261	73	528	28500	13	12	19	10	R-TOL	0	1	1	1	1	1	1	1	L	1	3	1	1	E	6	21	75	1	1	1	W	8	0	41	3	0	1	12/19/2013	10:00 AM	Thursday	Brevard	Yes	No	Yes	No	Y	Y
6	6	772178440	87270000	6.347	2304	9	2E+05	9	2	12	2	U-INT	0	0	4	1	1	1	1	1	R	1	3	1	8	N	7	1	0	88	88	88	U	0	0	34	2	0	1	2/12/2009	2:00 AM	Thursday	Miami Dade	Yes	No	No	No	Y	Y
6	6	772244100	87004000	0.85	457	112	96000	9	4	9	20	U-INT	0	6	4	1	1	3	1	1	L	2	1	1	1	E	14	2	0	1	1	1	W	10	0	54	2	0	0	4/9/2009	8:00 PM	Thursday	Miami Dade	Yes	No	No	No	Y	Y
6	6	774507780	87260000	12.341	2695	826	2E+05	9	6	27	23	U-OLA	1	2	4	1	1	1	1	2	L	2	1	1	1	N	12	2	32	1	1	1	S	12	0	21	2	0	0	6/27/2009	11:00 PM	Saturday	Miami Dade	Yes	No	No	No	Y	Y
6	6	774518200	87270000	14.559	2277	9	2E+05	9	7	4	11	U-INT	0	20	1	2	1	3	4	1	L	1	1	1	1	N	1	21	81	3	1	1	S	1	0	41	2	1	1	7/4/2009	11:00 AM	Saturday	Miami Dade	Yes	No	Yes	Yes	Y	Y
6	6	774575170	87270505	0.487	7499	9	0	9	11	11	4	RRAMP	0	2	4	2	1	3	1	8	L	X	1	1	1	N	14	21	28	1	1	1	S	14	0	26	2	0	1	11/11/2009	4:00 AM	Wednesday	Miami Dade	Yes	Yes	Yes	No	Y	Y
6	6	774563180	87260400	0	9321	826	14500	10	6	1	22	RRAMP	0	7	4	2	1	5	1	8	R	X	1	1	4	S	8	4	35	2	1	2	N	1	0	49	2	0	0	6/1/2010	10:00 PM	Tuesday	Miami Dade	Yes	No	No	No	Y	Y
6	6	774591780	87260515	0	2111	826	42500	10	5	17	0	RRAMP	0	2	4	1	1	3	1	8	R	X	1	1	1	W	2	21	52	3	1	1	E	2	0	35	2	0	0	5/17/2010	12:00 AM	Monday	Miami Dade	Yes	Yes	Yes	No	Y	Y
6	6	774640400	87270000	10.842	7895	9	3E+05	10	6	4	1	U-INT	0	20	4	1	2	3	1	1	L	S	1	1	1	N	0	21	0	1	1	1	S	1	0	18	2	0	1	6/4/2010	1:00 AM	Friday	Miami Dade	Yes	No	Yes	No	Y	Y
6	6	774643650	87270000	14.864	2279	9	2E+05	10	6	18	3	U-INT	1	0	4	1	1	3	1	1	L	2	1	1	1	N	14	0	33	1	1	1	S	14	0	29	2	2	0	6/18/2010	3:00 AM	Friday	Miami Dade	Yes	No	No	Yes	Y	Y
6	6	774645170	87075000	5.158	6782	93	1E+05	10	5	9	3	U-INT	0	0	4	1	1	1	1	1	R	1	1	1	1	S	14	0	25	1	1	1	N	14	0	19	3	0	3	5/9/2010	3:00 AM	Sunday	Miami Dade	Yes	No	No	No	Y	Y
6	6	774653210	87075000	3.737	6771	93	1E+05	10	8	12	21	U-INT	1	6	4	1	1	3	1	1	L	3	1	1	1	N	14	21	50	3	1	1	S	13	7	64	2	0	0	8/12/2010	9:00 PM	Thursday	Miami Dade	Yes	No	Yes	No	Y	Y
6	6	774659420	87260136	0	2176	826	17000	10	6	11	6	URAMP	1	17	1	1	1	77	1	8	L	X	1	1	1	N	2	2	34				1		21	0	1	0	0	6/11/2010	6:00 AM	Friday	Miami Dade	No	No	Yes	No	Y	Y
6	6	774687980	87075000	1.973	6767	93	1E+05	10	10	27	10	U-INT	0	2	1	1	1	3	1	1	L	4	1	1	1	S	2	21	75	1	1	1	N	2	0	18	2	2	1	10/27/2010	10:00 AM	Wednesday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
6	6	911830200	87030001	0.166	6559	5	22500	10	1	28	7	U1WAY	0	5	1	1	1	77	1	2	R	1	1	1	3	S	14	1	62	3	1	5	N	18	0	20	2	0	0	1/28/2010	7:00 AM	Thursday	Miami Dade	Yes	Yes	No	No	Y	Y
6	6	816826250	87210000	1	3476	856	36500	11	8	14	5	U-OLA	0	2	4	1	1	1	1	1	R	2	1	0	1	E	2	1	28	1	1	77	W	2	0	20	2	0	2	8/14/2011	5:00 AM	Sunday	Miami Dade	Yes	Yes	No	No	Y	Y
6	6	820293010	87260275	0	2058	826	5300	11	2	28	8	URAMP	0	2	1	1	1	1	1	8	R	X	3	1	6	S	1	3	49	1	1	1	N	2	0	57	2	0	0	2/28/2011	8:00 AM	Monday	Miami Dade	Yes	Yes	No	No	Y	Y

District	Geographic District	CRASH_NUMBER	ROADWAYID	MILEPOST	NEAREST_NODE	STATE_ROAD	ADT	YEAR	MONTH	DAY	HOUR	CRASH_RATE_CLASS_CATEG.	ALC_INV	HARMFUL_EVENT1	LIGHTING	WEATHER	RD_SURF	TRAFFIC_CONTROL	ROAD_CONDITIONS	SITE_LOCATION	ROAD_SD	ACC_LN	VEHICLE_TYPE1	VEHICLE_USE1	VEHICLE_MOVEMT1	VEH_DIR1	POINT_OF_IMPACT1	CONTRIB_CAUSE1	DRIV/PED_AGE1	VEHICLE_TYPE2	VEHICLE_USE2	VEHICLE_MOVEMT2	VEH_DIR2	POINT_OF_IMPACT2	CONTRIB_CAUSE2	DRIV/PED_AGE2	#_OF_VEHICLES	#_OF_KILLED	#_OF_INJURED	DATE	TIME	DAY OF WEEK	County	Crash Direction Different?	Harmful Event Head-On?	Contributing Cause Wrong Way?	Fatal Crash?	Crash Report Obtained?	WWD Confirmed?
6	6	820294360	87200000	12.66	9082	836	1E+05	11	2	11	3	U-INT	1	2	4	2	1	77	1	6	R	2	1	1	1	W	1	21	22	1	1	1	E	1	0	26	2	1	1	2/11/2011	3:00 AM	Friday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
6	6	820305530	87260000	5.027	8497	826	2E+05	11	1	26	2	U-OLA	0	9	4	3	2	1	1	1	R	3	3	1	1	N	12	21	21	3	1	1	S	7	0	42	2	0	0	1/26/2011	2:00 AM	Wednesday	Miami Dade	Yes	No	Yes	No	Y	Y
6	6	820330120	87270000	0.71	2319	9	77500	11	1	15	4	U-INT	0	3	4	1	1	1	1	1	R	1	1	1	1	S	14	21	35	1	1	1	N	12	0	37	2	0	2	1/15/2011	4:00 AM	Saturday	Miami Dade	Yes	No	Yes	No	Y	Y
6	6	820695010	87260000	13.866	2727	826	2E+05	11	4	22	5	U-OLA	0	9	4	1	1	1	1	1	L	S	3	1	1	N	12	2	33	1	1	1	S	12	0	27	2	0	1	4/22/2011	5:00 AM	Friday	Miami Dade	Yes	No	No	No	Y	Y
6	6	822569450	87260146	0.189	2067	826	10000	11	6	22	1	RRAMP	3	2	4	1	1	1	1	7	R	X	1	1	1	N	1	21	40	1	1	1	S	1	0	36	2	0	4	6/22/2011	1:00 AM	Wednesday	Miami Dade	Yes	Yes	Yes	No	Y	Y
6	6	822715270	87075000	3.327	6770	93	1E+05	11	8	19	4	U-INT	0	2	5	2	2	1	8	1	L	1	1	1	1	N	1	21	51	1	1	1	S	1	0	40	2	2	2	8/19/2011	4:00 AM	Friday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
6	6	828375400	87075000	3.451	6770	93	1E+05	12	1	27	16	U-INT	0	2	1	2	1	1	1	1	L	2	1	1	77	N	2	21	65	3	1	1	S	1	0	53	2	1	1	1/27/2012	4:00 PM	Friday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
6	6	828668960	87075000	3.451	6770	93	1E+05	12	2	5	21	U-INT	0	77	4	2	2	77	1	1	R	3	3	1	1	S	0	2	54	3	1	1	N	4	0	43	3	0	2	2/5/2012	9:00 PM	Sunday	Miami Dade	Yes	No	No	No	Y	Y
6	6	828925170	87270000	1.952	2246	9	2E+05	12	4	8	6	U-INT	0	2	3	1	1	1	1	1	R	1	1	1	1	S	1	21	26	3	1	2	N	1	0	21	2	0	5	4/8/2012	6:00 AM	Sunday	Miami Dade	Yes	Yes	Yes	No	Y	Y
6	6	831427190	87260000	14.338	2728	826	2E+05	12	7	27	2	U-OLA	1	2	4	1	1	1	1	1	R	3	3	1	1	S	2	21	31	1	1	1	N	2	0	30	2	0	2	7/27/2012	2:00 AM	Friday	Miami Dade	Yes	Yes	Yes	No	Y	Y
6	6	831497940	87270000	6.071	2306	9	2E+05	12	9	9	19	U-INT	0	7	2	1	1	5	1	2	L	7	3	1	4	N	9	4	33	1	1	10	W	12	0	50	2	0	0	9/9/2012	7:00 PM	Sunday	Miami Dade	Yes	No	No	No	Y	Y
6	6	831902770	87270217	0	2277	9	11000	12	12	6	1	URAMP	0	2	5	3	2	1	1	8	R	X	1	1	1	S	1	2	52	1	1	1	N	2	0	29	2	0	0	12/6/2012	1:00 AM	Thursday	Miami Dade	Yes	Yes	No	No	Y	Y
6	6	836135770	87260000	8.307	9345	826	2E+05	12	10	16	6	U-OLA	0	9	2	1	1	1	1	1	R	3	1	1	77	S	2	2	35	2	1	1	N	2	2	37	6	0	3	10/16/2012	6:00 AM	Tuesday	Miami Dade	Yes	No	No	No	Y	Y
6	6	832471990	87260519	0	5101	826	2000	13	1	23	17	RRAMP	0	9	2	1	1	5	1	8	R	X	1	1	6	E	11	77	70	3	1	1	W	21	0	51	2	0	0	1/23/2013	5:00 PM	Wednesday	Miami Dade	Yes	No	No	No	Y	Y
6	6	832504790	87270000	16.946	2281	9	2E+05	13	4	3	0	U-INT	3	2	4	1	1	1	1	1	L	4	3	1	1	N	14	2	25	3	1	1	S	2	21	33	2	4	1	4/3/2013	12:00 AM	Wednesday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
6	6	832573530	87270000	9.04	2298	9	3E+05	13	2	1	9	U-INT	0	1	1	1	1	1	1	1	R	6	3	1	4	S	8	2	61	8	77	1	N	1	0	50	3	0	3	2/1/2013	9:00 AM	Friday	Miami Dade	Yes	No	No	No	Y	Y
6	6	832791880	87005000	6.83	2776	874	76500	13	6	29	16	U-TOL	0	3	1	3	2	1	1	1	L	S	1	1	4	N	9	4	49	1	1	88	S	13	0	63	2	0	0	6/29/2013	4:00 PM	Saturday	Miami Dade	Yes	No	No	No	Y	Y
6	6	833359660	87270000	10.263	2295	9	2E+05	13	8	30	5	U-INT	0	3	4	1	1	1	1	1	L	2	3	1	77	N	6	21	40	11	1	1	S	19	0	43	2	0	1	8/30/2013	5:00 AM	Friday	Miami Dade	Yes	No	Yes	No	Y	Y
6	6	834333670	87030001	0.166	6559	5	20000	13	1	24	11	U1WAY	0	2	1	1	1	5	1	2	R	2	1	1	5	N	1	1	35	1	0	2	S	14	0	23	2	0	0	1/24/2013	11:00 AM	Thursday	Miami Dade	Yes	Yes	No	No	Y	Y
6	6	834337190	87030001	0.226	6560	5	20000	13	2	2	23	U1WAY	0	2	4	1	1	5	1	2	R	1	2	1	1	N	1	2	62	1	1	1	S	2	0	20	2	0	0	2/2/2013	11:00 PM	Saturday	Miami Dade	Yes	Yes	No	No	Y	Y
6	6	836739050	87260000	15.486	5093	826	1E+05	13	9	21	22	U-OLA	0	3	4	1	1	1	1	1	R	2	1	1	10	S	14	21	35	1	1	1	N	2	6	31	3	0	0	9/21/2013	10:00 PM	Saturday	Miami Dade	Yes	No	Yes	No	Y	Y
7	7	768847810	14140000	6.132	237	93	48500	10	1	23	0	R-INT	1	0	5	4	1	1	1	1	L	1	1	1	1	N	14	7	62	1	1	1	S	14	0	24	3	0	2	1/23/2010	12:00 AM	Saturday	Pasco	Yes	No	No	No	Y	Y
7	7	804696690	10075000	16.71	4260	93	1E+05	10	5	9	5	U-INT	1	2	5	1	1	3	1	2	R	A	3	1	1	S	1	21	28	3	1	1	N	1	7	48	2	0	2	5/9/2010	5:00 AM	Sunday	Hillsborough	Yes	Yes	Yes	No	Y	Y
7	7	804697640	10320000	10.826	2805	93	49000	10	4	25	3	U-INT	1	0	5	1	1	3	1	1	L	1	1	1	1	N	14	7	36	1	1	1	S	14	0	48	2	1	2	4/25/2010	3:00 AM	Sunday	Hillsborough	Yes	No	No	Yes	Y	Y
7	7	804732510	15190000	6.373	4548	93	1E+05	10	5	22	21	U-INT	0	6	2	1	1	3	1	1	L	2	3	1	1	N	12	77	80	1	1	1	S	12	21	55	2	0	0	5/22/2010	9:00 PM	Saturday	Pinellas	Yes	No	Yes	No	Y	Y
7	7	806060980	15002000	0.899	2160	592	18900	10	9	11	3	U-INT	1	0	4	1	1	3	1	6	R	2	1	1	1	W	1	7	45	1	1	1	E	1	0	33	2	1	1	9/11/2010	3:00 AM	Saturday	Pinellas	Yes	No	No	Yes	Y	Y
7	7	806084530	10075000	20.891	4442	93	75500	10	7	28	22	U-INT	1	77	4	1	1	3	1	1	R	2	11	1	1	S	1	21	38	88	88	88	U	0	7	28	1	0	2	7/28/2010	10:00 PM	Wednesday	Hillsborough	Yes	No	Yes	No	Y	Y
7	7	806107620	10190000	20.15	2746	400	1E+05	10	9	26	2	U-INT	2	0	4	1	1	3	1	1	L	2	1	1	1	E	1	8	49	3	1	1	W	1	0	29	3	2	4	9/26/2010	2:00 AM	Sunday	Hillsborough	Yes	No	No	Yes	Y	Y
7	7	820007040	10190000	5.273	2685	93	2E+05	11	1	22	3	U-INT	1	2	4	4	1	1	1	1	R	3	1	1	1	S	1	21	22	5	11	1	N	1	0	59	2	0	2	1/22/2011	3:00 AM	Saturday	Hillsborough	Yes	Yes	Yes	No	Y	Y
7	7	820483670	10190140	1.072	5376	400	5900	11	3	19	11	RRAMP	0	77	1	1	1	1	1	7	L	X	3	1	1	E	0	4	60	1	1	1	W	2	0	25	2	0	0	3/19/2011	11:00 AM	Saturday	Hillsborough	Yes	No	No	No	Y	Y
7	7	828691930	10190000	30.908	2766	400	1E+05	11	12	26	20	U-INT	1	9	5	1	1	1	1	1	R	1	3	1	1	W	13	21	26	3	1	1	E	13	2	50	2	0	1	12/26/2011	8:00 PM	Monday	Hillsborough	Yes	No	Yes	No	Y	Y
7	7	818671390	10190379	0.281	1984	400	4900	12	7	11	0	RRAMP	0	1	1	2	1	6	1	7	L	X	4	3	4	W	0	4	37	1	1	2	E	0	0	63	2	0	0	7/11/2012	12:00 AM	Wednesday	Hillsborough	Yes	No	No	No	Y	Y
7	7	820562730	14140000	4.585	265	93	81013	12	7	20	17	U-INT	0	3	1	1	1	1	1	1	R	1	1	1	1	S	11	77	17	3	1	1	N	14	0	25	3	1	2	7/20/2012	5:00 PM	Friday	Pasco	Yes	No	No	Yes	Y	Y
7	7	822673630	10320000	0.171	2712	93	1E+05	12	7	19	2	U-INT	0	2	4	1	1	1	1	1	R	3	1	1	1	S	1	2	22	1	1	1	N	14	0	20	2	1	3	7/19/2012	2:00 AM	Thursday	Hillsborough	Yes	Yes	No	Yes	Y	Y
7	7	828801510	10320000	15.739	4997	93	51000	12	1	22	3	U-INT	3	2	5	1	1	1	1	1	R	2	1	1	1	S	14	21	39	1	1	1	N	14	0	21	2	0	3	1/22/2012	3:00 AM	Sunday	Hillsborough	Yes	Yes	Yes	No	Y	Y
7	7	832281840	15190900	0.951	3562	55	50310	12	12	31	6	U-INT	0	2	3	2	1	1	1	6	L	1	1	1	1	N	1	21	58	2	1	1	S	1	0	44	2	1	4	12/31/2012	6:00 AM	Monday	Pinellas	Yes	Yes	Yes	Yes	Y	Y
7	7	832328960	10190071	0	1962	93	17000	12	12	27	23	RRAMP	1	9	4	1	1	1	1	7	L	X	1	1	77	N	2	21	28	1	1	1	S	2	2	19	4	0	2	12/27/2012	11:00 PM	Thursday	Hillsborough	Yes	No	Yes	No	Y	Y
7	7	832542840	15190000	16.818	586	93	1E+05	13	1	16	6	U-INT	0	9	4	2	1	1	1	6	L	1	1	1	1	N	12	21	24	1	1	1	S	12	0	45	2	0	1	1/16/2013	6:00 AM	Wednesday	Pinellas	Yes	No	Yes	No	Y	Y
7	7	832572180	10320000	5.515	2820	93	1E+05	13	1	29	1	U-INT	3	2	4	2	1	1	1	2	L	2	1	1	1	S	14	21	29	1	1	1	N	14	0	25	2	0	3	1/29/2013	1:00 AM	Tuesday	Hillsborough	Yes	Yes	Yes	No	Y	Y
7	7	832780930	15190000	6.363	1988	93	1E+05	13	3	3	22	U-INT	0	2	4	1	1	1	1	1	L	1	1	1	77	N	14	21	26	1	1	1	S	14	0	73	2	1	1	3/3/2013	10:00 PM	Sunday	Pinellas	Yes	Yes	Yes	Yes	Y	Y
7	7	833131550	15190000	15.388	4368	93	1E+05	13	7	14	6	U-INT	3	2	3	1	1	1	1	1	L	1	1	1	1	N	14	21	21	1	1	1	S	13	0	29	2	0	2	7/14/2013	6:00 AM	Sunday	Pinellas	Yes	Yes	Yes	No	Y	Y
7	7	836837780	10190000	31.736	595	400	1E+05	13	11	11	20	U-INT	0	1	4	1	1	1	1	1	R	3	5	3	4	W	21	4	56	1	1	2	E	1	0	38	3	0	0	11/11/2013	8:00 PM	Monday	Hillsborough	Yes	No	No	No	Y	Y
7	7	837129400	15190000	0.579	3166	93	82000	13	11	29	0	U-INT	0	2	5	1	1	1	1	1	L	2	1	1	1	N	1	77	49	1	1	1	S	1	0	46	2	0	2	11/29/2013	12:00 AM	Friday	Pinellas	Yes	Yes	No	No	Y	Y
7	7	837205170	15003000	0.591	2204	594	35000	13	12	14	2	U-INT	0	27	4	1	1	1	1	1	R	S	1	1	1	W	1	21	26				1		0	0	1	0	0	12/14/2013	2:00 AM	Saturday	Pinellas	No	No	Yes	No	Y	Y
7	7	842567350	10075000	4.949	3410	93	52500	13	9	27	17	U-INT	0	77	1	1	1	1	1	3	T	1	3	1	1	S	2	77	69	3	1	1	N	3	0	45	2	0	2	9/27/2013	5:00 PM	Friday	Hillsborough	Yes	No	No	No	Y	Y
8	1	768921650	16470033	0.008	3858	570	0	10	8	5	15	RRAMP	0	7	1	1	1	3	1	8	R	X	2	1	4	W	7	4	32	1	1	2	E	14	0	38	2	0	2	8/5/2010	3:00 PM	Thursday	Polk	Yes	No	No	No	Y	Y
8	1	776574340	16470007	0	3778	570	0	10	9	10	12	RRAMP	0	7	1	1	1	3	1	8	R	X	6	3	4	W	0	4	49	1	1	2	E	1	0	63	2	0	0	9/10/2010	12:00 PM	Friday	Polk	Yes	No	No	No	Y	Y
8	1	819784510	91470000	3.369	506	91	26000	12	6	7	19	R-TOL	0	18	2	2	1	1	1	1	M	M	1	1	1	S	1	21	30				1		0	0	1	0	0	6/7/2012	7:00 PM	Thursday	Okeechobee	No	No	Yes	No	Y	Y
8	1	829109760	91470000	4.218	574	91	26000	13	1	21	12	R-TOL	0	1	1	2	1	1	1	8	R	X	5	3	4	S	0	4	55	1	1	4	N	1	0	27	2	0	0	1/21/2013	12:00 PM	Monday	Okeechobee	Yes	No	No	No	Y	Y
8	4	770459240	86472000	1.326	3725	869	71500	9	2	13	5	U-TOL	1	0	4	4	1	3	1	1	L	2	1	1	1	N	2	0	19	1	1	1	S	2	0	37	3	0	1	2/13/2009	5:00 AM	Friday	Broward	Yes	No	No	No	Y	Y
8	4	770462370	86472000	10.628	3748	869	55100	9	7	4	10	U-TOL	2	0	1	1	1	3	1	1	M	M	1	1	1	S	0	21	44	3	1	1	N	11	8	31	2	0	0	7/4/2009	10:00 AM	Saturday	Broward	Yes	No	Yes	No	Y	Y
8	4	770462380	86472000	18.924	3780	869	63200	9	7	4	10	U-TOL	0	6	1	1	1	3	1	1	L	1	1	1	1	E	12	21	44	3	1	1	W	13	0	57	2	0	0	7/4/2009	10:00 AM	Saturday	Broward	Yes	No	Yes	No	Y	Y
8	4	770472430	93470000	18.175	4342	91	61100	9	9	22	12	U-TOL	0	3	1	1	1	1	1	1	L	S	1	1	1	S	14	21	79	1	1	1	N	14	0	21	2	0	2	9/22/2009	12:00 PM	Tuesday	Palm Beach	Yes	No	Yes	No	Y	Y
8	4	770487140	93470000	43.817	1468	91	35000	9	8	8	0	U-TOL	1	6	5	1	1	3	1	1	R	1	3	1	1	S	2	7	36	2	1	1	N	2	21	48	2	0	1	8/8/2009	12:00 AM	Saturday	Palm Beach	Yes	No	Yes	No	Y	Y

District	Geographic District	CRASH_NUMBER	ROADWAYID	MILEPOST	NEAREST_NODE	STATE_ROAD	ADT	YEAR	MONTH	DAY	HOUR	CRASH_RATE_CLASS_CATEG.	ALC_INV	HARMFUL_EVENT1	LIGHTING	WEATHER	RD_SURF	TRAFFIC_CONTROL	ROAD_CONDITIONS	SITE_LOCATION	ROAD_SD	ACC_LN	VEHICLE_TYPE1	VEHICLE_USE1	VEHICLE_MOVEMT1	VEH_DIR1	POINT_OF_IMPACT1	CONTRIB_CAUSE1	DRIV/PED_AGE1	VEHICLE_TYPE2	VEHICLE_USE2	VEHICLE_MOVEMT2	VEH_DIR2	POINT_OF_IMPACT2	CONTRIB_CAUSE2	DRIV/PED_AGE2	#_OF_VEHICLES	#_OF_KILLED	#_OF_INJURED	DATE	TIME	DAY OF WEEK	County	Crash Direction Different?	Harmful Event Head-On?	Contributing Cause Wrong Way?	Fatal Crash?	Crash Report Obtained?	WWD Confirmed?
8	4	770443330	89470000	7.153	566	91	36000	10	11	6	2	R-TOL	1	0	5	1	1	3	1	1	R	2	1	1	1	S	1	7	30	6	3	1	N	1	0	40	2	0	1	11/6/2010	2:00 AM	Saturday	Martin	Yes	No	No	No	Y	Y
8	4	773019510	86470000	21.145	4701	91	78800	10	2	19	2	U-TOL	0	6	4	1	1	3	1	1	L	2	1	1	1	N	14	21	39	3	1	1	S	14	0	53	3	0	1	2/19/2010	2:00 AM	Friday	Broward	Yes	No	Yes	No	Y	Y
8	4	773036640	86470000	21.945	3531	91	78800	10	8	22	22	U-TOL	1	77	4	1	1	3	1	1	R	3	1	1	1	S	0	21	38	1	1	1	S	6	0	30	3	0	1	8/22/2010	10:00 PM	Sunday	Broward	No	No	Yes	No	Y	Y
8	4	773037560	93470000	2.84	1419	91	78800	10	6	20	0	U-TOL	0	2	1	1	1	3	1	2	L	3	1	1	1	S	1	2	86	1	1	1	S	1	0	22	2	0	0	6/20/2010	12:00 AM	Sunday	Palm Beach	No	Yes	No	No	Y	Y
8	4	819721030	86470000	17.989	5582	91	92000	11	6	29	23	U-TOL	2	9	4	2	1	1	1	1	R	1	3	1	1	S	12	21	56	3	1	1	N	12	0	44	2	0	0	6/29/2011	11:00 PM	Wednesday	Broward	Yes	No	Yes	No	Y	Y
8	4	820475710	93470093	0.028	1421	91	0	11	1	22	15	RRAMP	0	2	1	2	1	1	1	8	R	X	3	1	77	W	1	21	25	1	1	77	E	1	0	53	2	0	4	1/22/2011	3:00 PM	Saturday	Palm Beach	Yes	Yes	Yes	No	Y	Y
8	4	819748540	94470000	2.905	463	91	38122	12	6	28	1	U-TOL	0	2	5	1	1	1	1	1	L	1	1	1	1	N	1	21	86	1	8	1	S	1	0	51	2	0	2	6/28/2012	1:00 AM	Thursday	St Lucie	Yes	Yes	Yes	No	Y	Y
8	4	819883670	86472000	8.52	3747	869	58000	12	2	4	22	U-TOL	3	77	4	2	2	1	1	1	M	M	1	1	1	N	0	21	40	1	1	1	S	2	0	34	2	0	0	2/4/2012	10:00 PM	Saturday	Broward	Yes	No	Yes	No	Y	Y
8	4	832835510	86471000	1.018	5495	821	64000	13	3	20	3	U-TOL	0	9	4	1	1	1	1	1	R	2	3	1	1	S	13	77	22	1	1	1	N	13	0	37	2	0	1	3/20/2013	3:00 AM	Wednesday	Broward	Yes	No	No	No	Y	Y
8	4	833022240	86471000	5.025	2122	821	64000	13	6	8	3	U-TOL	3	9	5	2	2	1	1	1	R	1	1	1	77	S	3	2	28	3	1	1	N	5	0	33	2	0	0	6/8/2013	3:00 AM	Saturday	Broward	Yes	No	No	No	Y	Y
8	4	836589210	86470000	22.183	3533	91	74000	13	11	9	23	U-TOL	1	2	4	2	1	1	1	1	L	2	1	1	1	N	14	21	24	1	1	1	S	14	0	19	2	0	2	11/9/2013	11:00 PM	Saturday	Broward	Yes	Yes	Yes	No	Y	Y
8	5	774447880	75471000	7.964	1621	528	63900	9	3	30	3	U-TOL	1	3	4	1	1	2	4	1	L	1	3	1	1	E	1	7	44	2	1	1	W	14	21	43	3	0	0	3/30/2009	3:00 AM	Monday	Orange	Yes	No	Yes	No	Y	Y
8	5	776952770	75471000	0.588	3732	528	75300	10	4	12	3	U-TOL	0	6	4	1	1	1	1	1	R	2	1	0	1	W	0	21	0	2	1	1	E	3	0	55	2	0	0	4/12/2010	3:00 AM	Monday	Orange	Yes	No	Yes	No	Y	Y
8	5	819761560	92472000	0.312	1672	417	13200	10	11	12	13	U-TOL	0	1	1	2	1	5	1	*	L	B	5	3	4	N	0	4	33	2	1	1	S	1	0	60	2	0	0	11/12/2010	1:00 PM	Friday	Osceola	Yes	No	No	No	Y	Y
8	5	819917320	92471000	11.549	4098	91	25000	11	9	6	0	R-TOL	0	9	5	2	1	5	1	1	R	1	3	1	1	S	2	21	24	2	1	1	N	3	0	19	2	0	3	9/6/2011	12:00 AM	Tuesday	Osceola	Yes	No	Yes	No	Y	Y
8	5	820089400	77470000	5.217	1326	417	40300	11	1	24	1	U-TOL	0	2	5	1	1	1	1	1	L	2	1	1	1	N	1	21	22	2	1	1	S	1	0	29	2	1	6	1/24/2011	1:00 AM	Monday	Seminole	Yes	Yes	Yes	Yes	Y	Y
8	5	820681270	75300000	10.72	2670	417	54500	11	3	24	3	U-TOL	1	2	4	1	1	1	1	1	R	1	1	1	1	S	1	2	31	1	1	1	N	1	0	44	2	2	0	3/24/2011	3:00 AM	Thursday	Orange	Yes	Yes	No	Yes	Y	Y
8	5	819707820	75470000	8.377	3314	91	71000	12	12	9	4	U-TOL	1	2	4	1	1	1	1	1	L	4	1	1	1	N	14	1	24	6	3	1	S	14	0	42	2	0	0	12/9/2012	4:00 AM	Sunday	Orange	Yes	Yes	No	No	Y	Y
8	5	819779910	75470000	3.527	3307	91	67000	12	2	5	0	U-TOL	1	9	5	1	1	1	1	1	L	1	1	1	1	N	14	21	30	1	1	1	S	11	0	23	2	0	0	2/5/2012	12:00 AM	Sunday	Orange	Yes	No	Yes	No	Y	Y
8	5	828208190	11470000	1.048	2206	91	40330	12	2	26	4	R-TOL	3	2	5	1	1	1	1	1	R	1	3	1	1	S	1	21	24	1	1	1	N	1	0	36	2	1	2	2/26/2012	4:00 AM	Sunday	Lake	Yes	Yes	Yes	Yes	Y	Y
8	5	819912670	75470000	6.304	8912	91	71000	13	6	19	10	U-TOL	0	7	1	1	1	1	1	1	R	2	2	1	4	S	8	4	38	3	1	1	N	1	0	34	2	1	1	6/19/2013	10:00 AM	Wednesday	Orange	Yes	No	No	Yes	Y	Y
8	5	828186820	75470000	9.551	8820	91	71000	13	5	1	2	U-TOL	3	27	4	2	1	77	1	8	R	B	1	1	77	N	14	21	36				1		2	0	1	0	0	5/1/2013	2:00 AM	Wednesday	Orange	No	No	Yes	No	Y	Y
8	5	832386480	75470000	6.548	8910	91	71000	13	5	5	1	U-TOL	0	2	4	1	1	1	1	1	L	4	3	1	1	N	14	21	50	5	3	1	S	14	0	32	2	0	0	5/5/2013	1:00 AM	Sunday	Orange	Yes	Yes	Yes	No	Y	Y
8	5	836733150	77470000	10.555	8	417	39000	13	11	1	20	U-TOL	0	3	5	1	1	1	1	1	R	1	1	1	1	S	14	21	65	2	1	1	N	14	0	27	3	0	3	11/1/2013	8:00 PM	Friday	Seminole	Yes	No	Yes	No	Y	Y
8	6	770481830	87470000	1.193	7271	91	70700	9	7	17	3	U-TOL	1	6	4	1	1	3	1	1	L	3	1	1	1	S	3	21	21	1	1	1	N	2	0	48	3	0	2	7/17/2009	3:00 AM	Friday	Miami Dade	Yes	No	Yes	No	Y	Y
8	6	770497200	87471000	27.268	9579	821	94800	9	11	29	1	U-TOL	0	20	4	1	1	1	1	1	M	M	1	1	1	S	1	21	62				1		0	0	1	0	1	11/29/2009	1:00 AM	Sunday	Miami Dade	No	No	Yes	No	Y	Y
8	6	773033090	87471000	1	3062	821	34800	10	6	8	21	U-TOL	0	77	5	2	2	3	1	1	M	M	1	1	1	N	0	21	73	1	1	1	S	1	0	50	2	0	2	6/8/2010	9:00 PM	Tuesday	Miami Dade	Yes	No	Yes	No	Y	Y
8	6	774592050	87471000	26.935	9281	821	95500	10	1	3	6	U-TOL	1	0	1	1	1	3	1	1	L	2	1	1	1	S	1	22	22	1	8	2	N	1	0	39	2	0	1	1/3/2010	6:00 AM	Sunday	Miami Dade	Yes	No	No	No	Y	Y
8	6	820099630	87471000	35.469	2395	821	80300	10	12	4	4	U-TOL	0	2	4	1	1	1	1	1	L	2	1	1	1	N	1	21	29	3	1	1	S	1	0	34	2	1	1	12/4/2010	4:00 AM	Saturday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
8	6	820099980	87470000	0.584	1829	91	74000	11	9	9	16	U-TOL	0	3	1	3	2	1	1	*	R	B	3	1	6	S	12	2	60	3	1	1	N	1	0	58	2	0	3	9/9/2011	4:00 PM	Friday	Miami Dade	Yes	No	No	No	Y	Y
8	6	822681800	87471000	5.047	2483	821	53000	11	10	19	23	U-TOL	1	9	5	1	1	1	1	1	L	1	3	1	1	N	14	21	20	1	1	1	S	11	77	36	2	0	1	10/19/2011	11:00 PM	Wednesday	Miami Dade	Yes	No	Yes	No	Y	Y
8	6	822715390	87470000	0	1824	91	74000	11	8	31	1	U-TOL	0	2	4	3	2	1	8	1	R	1	1	1	1	W	1	21	34	1	1	1	E	1	0	51	2	0	2	8/31/2011	1:00 AM	Wednesday	Miami Dade	Yes	Yes	Yes	No	Y	Y
8	6	819908140	87471000	18.024	6218	821	90000	12	2	17	3	U-TOL	0	2	4	1	1	1	1	1	L	2	2	1	77	S	1	21	61	3	1	1	N	1	0	27	2	0	3	2/17/2012	3:00 AM	Friday	Miami Dade	Yes	Yes	Yes	No	Y	Y
8	6	828449670	87471000	31.099	1774	821	96000	12	3	24	5	U-TOL	3	2	4	1	1	1	1	1	L	3	1	1	1	N	1	2	21	1	1	1	S	1	0	44	2	0	2	3/24/2012	5:00 AM	Saturday	Miami Dade	Yes	Yes	No	No	Y	Y
8	6	828688380	87471000	26.101	2429	821	2E+05	12	9	2	2	U-TOL	1	18	4	2	1	1	1	1	M	M	2	1	77	S	1	77	42				1		21	0	1	0	0	9/2/2012	2:00 AM	Sunday	Miami Dade	No	No	Yes	No	Y	Y
8	6	828810720	87471000	29.373	7691	821	96000	12	10	20	4	U-TOL	0	2	5	2	1	1	1	1	L	2	1	1	1	S	1	2	22	1	1	1	S	14	0	33	2	0	2	10/20/2012	4:00 AM	Saturday	Miami Dade	No	Yes	No	No	Y	Y
8	6	831913490	87471000	31.459	1299	821	96000	12	8	26	6	U-TOL	0	2	3	3	2	1	1	1	R	1	1	1	1	S	14	21	24	3	1	1	N	14	0	47	2	2	0	8/26/2012	6:00 AM	Sunday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
8	7	819980210	10470000	7.568	5075	589	51100	10	12	18	4	U-TOL	1	3	4	2	1	1	1	1	R	R	1	1	77	S	12	21	21	1	1	1	N	14	0	28	2	0	2	12/18/2010	4:00 AM	Saturday	Hillsborough	Yes	No	Yes	No	Y	Y
8	7	832035540	8470000	3.676	657	589	10600	12	10	6	6	U-TOL	0	2	3	2	1	1	1	1	L	1	1	1	77	N	14	2	17	3	1	1	S	14	0	50	2	0	0	10/6/2012	6:00 AM	Saturday	Hernando	Yes	Yes	No	No	Y	Y
8	7	832327780	14470000	13.099	1835	589	17600	12	10	20	17	R-TOL	0	2	1	1	1	1	1	1	L	S	3	1	1	S	14	2	67	1	1	1	S	14	0	34	2	0	3	10/20/2012	5:00 PM	Saturday	Pasco	No	Yes	No	No	Y	Y
N/A	5	774423070	75300000	7.491	2648	417	73000	9	3	1	19	U-TOL	0	2	4	1	1	3	1	1	L	1	1	1	1	N	1	21	53	1	1	1	S	1	0	22	2	0	2	3/1/2009	7:00 PM	Sunday	Orange	Yes	Yes	Yes	No	Y	Y
N/A	5	774486930	75340000	1.938	4537	414	0	9	7	17	15	U-TOL	0	0	1	1	1	3	1	1	T	S	3	1	1	N	0	16	0	1	1	1	S	1	24	32	2	0	2	7/17/2009	3:00 PM	Friday	Orange	Yes	No	No	No	Y	Y
N/A	5	908198160	75008000	8.637	11	408	1E+05	9	4	25	20	U-TOL	0	7	1	1	1	1	1	1	R	2	1	1	4	E	8	4	43	3	1	1	W	1	0	19	2	0	1	4/25/2009	8:00 PM	Saturday	Orange	Yes	No	No	No	Y	Y
N/A	5	776946720	75008160	0.817	4180	408	70500	10	3	26	1	U-TOL	1	3	4	2	2	3	1	1	R	1	1	1	1	W	13	21	32	1	1	1	E	13	7	41	2	0	1	3/26/2010	1:00 AM	Friday	Orange	Yes	No	Yes	No	Y	Y
N/A	5	776950390	75008000	1.017	3853	408	60000	10	6	27	3	U-TOL	0	2	4	1	1	3	1	1	R	2	1	1	1	W	14	21	25	1	1	1	E	14	0	26	2	0	3	6/27/2010	3:00 AM	Sunday	Orange	Yes	Yes	Yes	No	Y	Y
N/A	5	776951830	75002000	16.329	2984	528	63050	10	7	31	17	R-TOL	0	7	1	1	1	1	1	*	L	B	3	1	4	E	8	4	30	3	1	2	W	1	0	44	2	0	1	7/31/2010	5:00 PM	Saturday	Orange	Yes	No	No	No	Y	Y
N/A	5	914764570	75002000	9.554	5613	528	84500	10	4	16	1	U-TOL	1	6	4	2	1	2	1	*	R	6	1	1	1	W	14	21	22	1	1	1	E	11	7	28	2	0	0	4/16/2010	1:00 AM	Friday	Orange	Yes	No	Yes	No	Y	Y
N/A	5	819762470	75008000	10.201	1159	408	97000	11	2	27	2	U-TOL	1	2	4	1	1	1	1	1	L	1	1	1	1	E	14	21	22	1	1	1	W	14	0	26	2	0	4	2/27/2011	2:00 AM	Sunday	Orange	Yes	Yes	Yes	No	Y	Y
N/A	5	832368030	75300000	5.174	2848	417	48500	12	12	22	2	U-TOL	3	2	5	1	1	1	1	1	R	1	1	1	1	N	1	21	38	1	1	1	S	1	0	24	2	0	2	12/22/2012	2:00 AM	Saturday	Orange	Yes	Yes	Yes	No	Y	Y
N/A	5	833603180	75008000	9.149	1787	408	1E+05	13	3	23	0	U-TOL	0	2	4	1	2	1	1	1	R	1	1	0	88	W	0	2	0	1	1	1	E	13	21	31	2	0	1	3/23/2013	12:00 AM	Saturday	Orange	Yes	Yes	Yes	No	Y	Y
N/A	5	833672560	75008000	7.573	1551	408	1E+05	13	8	29	23	U-TOL	0	2	4	1	1	1	1	1	M	M	1	1	1	E	1	2	24	1	1	1	W	1	0	20	2	0	2	8/29/2013	11:00 PM	Thursday	Orange	Yes	Yes	No	No	Y	Y
N/A	6	774663110	87200117	0	6239	836	20500	10	8	13	5	URAMP	1	20	4	1	1	3	1	8	R	X	1	1	1	E	12	21	24	1	1	1	E	4	0	59	2	0	1	8/13/2010	5:00 AM	Friday	Miami Dade	No	No	Yes	No	Y	Y
N/A	6	774677060	87200080	0.221	402	836	16500	10	7	17	3	RRAMP	0	3	4	1	1	3	1	8	L	X	1	1	1	N	14	2	20	2	1	1	S	14	0	54	2	0	0	7/17/2010	3:00 AM	Saturday	Miami Dade	Yes	No	No	No	Y	Y
N/A	6	820693710	87030000	1.331	938	5	87500	11	4	17	3	U-6DR	0	2	4	1	1	1	1	1	L	3	1	1	1	N	1	2	17	1	1	1	S	1	0	36	2	0	2	4/17/2011	3:00 AM	Sunday	Miami Dade	Yes	Yes	No	No	Y	Y

District	Geographic District	CRASH_NUMBER	ROADWAYID	MILEPOST	NEAREST_NODE	STATE_ROAD	ADT	YEAR	MONTH	DAY	HOUR	CRASH_RATE_CLASS_CATEG.	ALC_INV	HARMFUL_EVENT1	LIGHTING	WEATHER	RD_SURF	TRAFFIC_CONTROL	ROAD_CONDITIONS	SITE_LOCATION	ROAD_SD	ACC_LN	VEHICLE_TYPE1	VEHICLE_USE1	VEHICLE_MOVEMT1	VEH_DIR1	POINT_OF_IMPACT1	CONTRIB_CAUSE1	DRIV/PED_AGE1	VEHICLE_TYPE2	VEHICLE_USE2	VEHICLE_MOVEMT2	VEH_DIR2	POINT_OF_IMPACT2	CONTRIB_CAUSE2	DRIV/PED_AGE2	#_OF_VEHICLES	#_OF_KILLED	#_OF_INJURED	DATE	TIME	DAY OF WEEK	County	Crash Direction Different?	Harmful Event Head-On?	Contributing Cause Wrong Way?	Fatal Crash?	Crash Report Obtained?	WWD Confirmed?
N/A	6	828925090	87300000	1.904	7483	924	47000	12	3	18	3	U-TOL	0	2	4	1	1	1	1	1	L	2	1	1	1	E	14	21	25	3	1	1	W	14	0	27	2	4	0	3/18/2012	3:00 AM	Sunday	Miami Dade	Yes	Yes	Yes	Yes	Y	Y
N/A	6	828977480	87200084	0	319	836	4400	12	3	17	22	URAMP	0	2	4	2	1	1	1	8	R	X	1	1	1	W	1	21	48	3	1	1	E	1	0	40	2	0	3	3/17/2012	10:00 PM	Saturday	Miami Dade	Yes	Yes	Yes	No	Y	Y
N/A	6	829048320	87200072	0.386	6224	836	10000	12	7	26	21	URAMP	0	2	4	1	1	5	1	7	L	X	1	1	1	E	1	2	19	1	1	1	W	1	0	33	2	0	1	7/26/2012	9:00 PM	Thursday	Miami Dade	Yes	Yes	No	No	Y	Y
N/A	6	831427000	87003000	2.085	442	112	1E+05	12	6	24	12	U-TOL	3	9	1	2	1	1	1	1	L	1	3	1	1	E	2	21	25	1	1	1	W	6	0	60	2	0	0	6/24/2012	12:00 PM	Sunday	Miami Dade	Yes	No	Yes	No	Y	Y
N/A	6	831427010	87003000	1.28	7534	112	1E+05	12	6	24	12	U-TOL	1	9	1	2	1	1	1	1	L	2	3	1	1	E	12	21	25	3	1	1	W	12	0	24	2	0	0	6/24/2012	12:00 PM	Sunday	Miami Dade	Yes	No	Yes	No	Y	Y
N/A	6	831433310	87003000	1.43	443	112	1E+05	12	6	24	12	U-TOL	0	9	1	1	1	1	1	1	L	2	3	1	1	E	11	21	25	1	1	1	W	12	0	72	2	0	1	6/24/2012	12:00 PM	Sunday	Miami Dade	Yes	No	Yes	No	Y	Y
N/A	6	836801200	87200000	7.878	329	836	2E+05	13	9	28	5	U-TOL	0	2	4	1	1	1	1	1	R	2	1	1	1	W	14	21	22	3	1	1	E	14	2	70	3	0	3	9/28/2013	5:00 AM	Saturday	Miami Dade	Yes	Yes	Yes	No	Y	Y
N/A	7	730676900	10002000	10.487	5567	618	35000	9	4	14	6	U-TOL	0	7	4	1	1	1	1	*	L	B	3	1	4	E	8	4	30	1	1	2	W	1	0	49	2	0	0	4/14/2009	6:00 AM	Tuesday	Hillsborough	Yes	No	No	No	Y	Y
N/A	7	828314320	10002000	8.15	4804	618	44000	11	11	18	0	U-TOL	1	8	4	1	1	1	1	1	R	1	1	1	1	E	1	21	59	66	0	77	1	0	0	0	2	0	2	11/18/2011	12:00 AM	Friday	Hillsborough	No	No	Yes	No	Y	Y
N/A	7	836783820	10002000	12.841	5826	618	33000	13	9	14	3	U-TOL	1	2	4	1	1	1	1	1	L	1	1	1	1	W	1	21	24	3	1	1	E	1	0	38	2	0	2	9/14/2013	3:00 AM	Saturday	Hillsborough	Yes	Yes	Yes	No	Y	Y
																																												246	110	183	46		280
																																												88%	39%	65%	16%		

Appendix B
Crash Score Analysis

District	Interchange	Occurences			ADT			Crash Score	Crash Score per MVPD	Interchange Type	Field Review Location
		1	0.75	0.25							
D1	I-75_University Parkway SB/NB Exits	0	3	0		108,333		2.25	20.77	Diamond / Partial Diamond	Suggested
	I-75_CR 846 (Immokalee Rd) NB/SB Exits	0	2	0		69,362		1.50	21.63	Diamond / Partial Diamond	Suggested
	I-4_US 27 EB Exit	0	2	0		77,500		1.50	19.35	Partial Cloverleaf	Suggested
	I-75 Rest Stop MP 63	0	1	0		17,100		0.75	43.86	Rest Stop	Alternate
	I-75_Golden Gate Pkwy NB Exit	0	1	0		34,000		0.75	22.06	Diamond / Partial Diamond	
	I-275_SR 55 WB Entrance	0	1	0		35,000		0.75	21.43	Diamond / Partial Diamond	
	I-275_SR 41 EB Exit	0	1	0		36,500		0.75	20.55	Diamond / Partial Diamond	
	I-75 Weigh Station MP 159	0	1	0		40,000		0.75	18.75	Weigh Station	
	I-75 Rest Stop MP 237	0	1	0		59,500		0.75	12.61	Rest Stop	
	I-75_Jacaranda Blvd EB Exit	0	1	0		70,500		0.75	10.64	Diamond / Partial Diamond	
	I-75_SR 681 SB Exit	0	1	0		74,500		0.75	10.07	Direct Connection	
	I-75_SR 43 NB Exit	0	1	0		88,000		0.75	8.52	Diamond / Partial Diamond	
	I-75_Pine Ridge Rd NB/SB Exits	0	0	2			55,750	0.50	8.97	Diamond / Partial Diamond	
	I-4_SR 532 EB Exit	0	0	2			77,500	0.50	6.45	Diamond / Partial Diamond	
	I-75_SR 780 SB Entrance	0	0	2			107,750	0.50	4.64	Diamond / Partial Diamond	
	I-75_Government Rd EB Exit	0	0	1			17,100	0.25	14.62	Diamond / Partial Diamond	
	I-275 Rest Area	0	0	1			35,000	0.25	7.14	Other	
	I-275_I-75 EB Exit	0	0	1			36,500	0.25	6.85	System Interchange	
	I-75_SR 768 NB Exit	0	0	1			40,000	0.25	6.25	Diamond / Partial Diamond	
	I-75_SR 674 NB Exit	0	0	1			59,500	0.25	4.20	Partial Cloverleaf	
	I-75_SR 865 NB Exit	0	0	1			61,224	0.25	4.08	Diamond / Partial Diamond	
	I-75_W River Rd EB Exit	0	0	1			70,500	0.25	3.55	Diamond / Partial Diamond	
	I-75_Laurel Road SB Exit	0	0	1			74,500	0.25	3.36	Diamond / Partial Diamond	
	I-75_I-275 NB Exit	0	0	1			88,000	0.25	2.84	Partial Cloverleaf	
	I-75_SR 70 NB Exit	0	0	1			109,500	0.25	2.28	Diamond / Partial Diamond	
D2	I-295_I-95 Interchange	1	1	3	54,000	84,944	90,333	2.50	32.71	System Interchange	
	I-295_SR5/US1/Philips Hwy SB Exit	0	3	0		66,750		2.25	33.71	Partial Cloverleaf	Suggested
	I-95_Philips Hwy/SR 5 NB Exit	0	2	2		78,250	72,129	2.00	26.60	Partial Cloverleaf	Suggested
	I-95_Prudential Dr/Mary St	0	2	1		110,250	123,731	1.75	14.96	Y-Intersection	Suggested
	I-10_SR47 EB Exit	0	2	0		20,308		1.50	73.86	Diamond / Partial Diamond	Suggested
	SR115 EB Exit to Arlington Exp Service Road, just east of Oaks Ansley Ln	0	2	0		50,500		1.50	29.70	Other	Suggested
	Matthew's Expy_Gator Bowl Blvd WB exit	0	2	0		62,000		1.50	24.19	Partial Cloverleaf	Suggested
	I-295_SR208/Wilson Blvd NB/SB Exits	0	2	0		94,750		1.50	15.83	Diamond / Partial Diamond	Suggested
	Arlington Exp Service Road EB/WB Entrances to SR115 at Arlington River Dr	1	0	1	30,000		67,500	1.25	25.64	Other	Alternate
	I-295_SR15 NB/SB Exits	0	1	2		121,000	98,000	1.25	11.42	Partial Cloverleaf	Alternate
	I-10_Howard St EB/WB Exits	0	1	1		20,500	24,753	1.00	44.20	Partial Cloverleaf	
	I-10_Ohio Ave EB/WB Exits	0	1	1		24,753	20,500	1.00	44.20	Diamond / Partial Diamond	Alternate
	I-95_SR152/Bay Meadows Rd NB exit	1	0	0	46,000			1.00	21.74	Diamond / Partial Diamond	
	South Entrance ramp to Hart Expressway	1	0	0	48,000			1.00	20.83	Other	
	SR 228_MLK exit ramp	1	0	0	53,000			1.00	18.87	System Interchange	
	Lem Turner Road	1	0	0	59,000			1.00	16.95	Diamond / Partial Diamond	
	I-295_SR134/103rd St SB Exit	0	1	1		94,000	94,000	1.00	10.64	Diamond / Partial Diamond	
	I-295_SR21/Blanding Blvd NB/SB Exits	0	1	1		83,000	121,000	1.00	9.80	Diamond / Partial Diamond	
	I-95_Tallulah Ave/Edgewood Ave NB Exit	0	1	1		108,000	108,000	1.00	9.26	Other	
	I-10_SR228 EB Exit	0	1	0		20,000		0.75	37.50	Diamond / Partial Diamond	
	I-10_SR125 EB exit	0	1	0		20,400		0.75	36.76	Diamond / Partial Diamond	
	Heart Bridge Expressway_Duval Street	0	1	0		38,000		0.75	19.74	Other	
	I-10_Chaffee Rd EB exit	0	1	0		43,827		0.75	17.11	Partial Cloverleaf	
	I-75 Rest Stop MP 412	0	1	0		45,000		0.75	16.67	Rest Stop	
	I-95_Dixie Hwy SB Exit	0	1	0		46,000		0.75	16.30	Diamond / Partial Diamond	
	SR115 EB Exit to Arlington Exp Service Road, just east of Cesery Blvd	0	1	0		56,500		0.75	13.27	Other	
	I-295_Monument Rd SB Exit	0	1	0		59,000		0.75	12.71	Diamond / Partial Diamond	
	I-95_The Buccaneer Trail NB Exit	0	1	0		59,313		0.75	12.64	Diamond / Partial Diamond	
	I-295_St Johns Bluff Rd NB Exit	0	1	0		60,500		0.75	12.40	Diamond / Partial Diamond	
	I-95_Pecan Park Rd SB Exit	0	1	0		60,515		0.75	12.39	Diamond / Partial Diamond	

District	Interchange	Occurences			ADT			Crash Score	Crash Score per MVPD	Interchange Type	Field Review Location
		1	0.75	0.25							
D2	I-75_SR331/121/Williston Rd NB exit	0	1	0		61,367		0.75	12.22	Partial Cloverleaf	
	Matthew's Bridge_University Blvd EB exit	0	1	0		67,500		0.75	11.11	Full Cloverleaf	
	SR202_San Pablo Rd EB Exit	0	1	0		75,000		0.75	10.00	Diamond / Partial Diamond	
	I-95_SR115/Lem Turner Rd/Hwy117/Norwood Ave NB Exit	0	1	0		108,000		0.75	6.94	Other	
	I-10_Casset Ave WB exit	0	1	0		111,000		0.75	6.76	Diamond / Partial Diamond	
	I-295_Old St Augstine Rd SB Exit	0	1	0		112,000		0.75	6.70	Diamond / Partial Diamond	
	I-295_SR13/San Jose Blvd NB Exit	0	1	0		113,000		0.75	6.64	Partial Cloverleaf	
	I-95_Emerson St NB Exit	0	1	0		123,731		0.75	6.06	Diamond / Partial Diamond	
	I-95_W Bay St/W Forsyth St NB Exit	0	1	0		148,000		0.75	5.07	Y-Intersection	
	I-10_SR41/Hwy100 EB Exit	0	0	2			20,308	0.50	24.62	Partial Cloverleaf	
	SR115 EB Exit to Arlington Exp Service Road, east of Oaks Plantation Dr	0	0	2			50,500	0.50	9.90	Other	
	I-295_SR10/Altantic Blvd NB/SB Exits	0	0	2			59,750	0.50	8.37	Diamond / Partial Diamond	
	Matthew's Expy_Spearing ST	0	0	2			62,000	0.50	8.06	Other	
	I-95_Park St	0	0	2			110,250	0.50	4.54	Diamond / Partial Diamond	
	I-10_SR301 EB Exit	0	0	1			20,000	0.25	12.50	Partial Cloverleaf	
	I-10_SR121 EB Exit	0	0	1			20,400	0.25	12.25	Partial Cloverleaf	
	Martin Luther King Jr Pkwy_Haines St	0	0	1			38,000	0.25	6.58	Trumpet	
	I-10_Greeland Ave EB Exit	0	0	1			43,827	0.25	5.70	Diamond / Partial Diamond	
	I-75_SR41 NB Exit	0	0	1			45,000	0.25	5.56	Diamond / Partial Diamond	
	I-95_Palm Coast Pkwy SB Exit	0	0	1			46,000	0.25	5.43	Diamond / Partial Diamond	
	I-95_ St Marys Rd NB Exit	0	0	1			49,500	0.25	5.05	Diamond / Partial Diamond	
	I-295_SR104/Dunn Ave NB Exit	0	0	1			54,000	0.25	4.63	Diamond / Partial Diamond	
	SR115 EB Arlington Exp Service Road at Arlington Rd	0	0	1			56,500	0.25	4.42	Other	
	I-95_Airport Rd SB Exit	0	0	1			60,515	0.25	4.13	Partial Cloverleaf	
	I-75_SR240Archer Rd NB exit	0	0	1			61,367	0.25	4.07	Diamond / Partial Diamond	
	SR202_S Beach Pkwy EB Exit	0	0	1			75,000	0.25	3.33	Diamond / Partial Diamond	
	I-295_Collins Rd SB Exit	0	0	1			94,000	0.25	2.66	Diamond / Partial Diamond	
	I-295_SR228/Normandy Blvd NB Exit	0	0	1			95,500	0.25	2.62	Diamond / Partial Diamond	
	I-95_Southside Blvd NB Exit	0	0	1			107,000	0.25	2.34	Y-Intersection	
	I-95_SR105/Broward Rd/Heckscher Dr	0	0	1			108,000	0.25	2.31	Partial Cloverleaf	
	I-10_Lane Ave WB Exit	0	0	1			111,000	0.25	2.25	Diamond / Partial Diamond	
	I-95_Adams St NB Exit	0	0	1			148,000	0.25	1.69	Diamond / Partial Diamond	
D3	I-10_SR 81 EB Exit	0	3	0		17,561		2.25	128.12	Diamond / Partial Diamond	Suggested
	I-10_SR 285 EB/WB Exits	0	2	0		18,363		1.50	81.69	Diamond / Partial Diamond	Suggested
	I-10_Log Lake Rd EB Exit	0	2	0		25,000		1.50	60.00	Diamond / Partial Diamond	Suggested
	I-10/US 27 EB Exit	1	0	0	25,000			1.00	40.00	Partial Cloverleaf	
	I-110_Maxwell St SB Exit	0	1	1		34,000	35,000	1.00	28.99	Diamond / Partial Diamond	Alternate
	I-110_US 98 SB Exit	0	1	1		35,000	34,000	1.00	28.99	Diamond / Partial Diamond	
	I-10_US 331 EB Exit	0	0	3			16,975	0.75	44.18	Diamond / Partial Diamond	
	I-10_SR 79 WB Exit	0	1	0		18,000		0.75	41.67	Diamond / Partial Diamond	
	I-10_US 221 EB Exit	0	1	0		25,241		0.75	29.71	Diamond / Partial Diamond	
	I-10_SR 267 WB Exit	0	1	0		26,626		0.75	28.17	Diamond / Partial Diamond	
	I-10_SR 263 EB Exit	0	1	0		31,000		0.75	24.19	Diamond / Partial Diamond	
	I-110_Fairfield Dr SB Exit	0	1	0		35,000		0.75	21.43	Diamond / Partial Diamond	
	I-10_CR 279 EB/WB Exits	0	0	2			18,186	0.50	27.49	Diamond / Partial Diamond	
	I-10_SR 87 EB Exit	0	0	2			25,000	0.50	20.00	Diamond / Partial Diamond	
	I-10_WB Rest Area	0	0	1			19,526	0.25	12.80	Other	
	I-10_SR 14 EB Exit	0	0	1			25,241	0.25	9.90	Diamond / Partial Diamond	
	I-10_SR 65 WB Exit	0	0	1			26,626	0.25	9.39	Diamond / Partial Diamond	
	I-10_US 27 EB Exit	0	0	1			31,000	0.25	8.06	Partial Cloverleaf	
	I-110_Garden St SB Exit	0	0	1			35,000	0.25	7.14	Other	

District	Interchange	Occurences			ADT			Crash Score	Crash Score per MVPD	Interchange Type	Field Review Location
		1	0.75	0.25							
D4	I-75_SR 822 (Sheridan St) NB Exit	0	2	1		81,000	137,000	1.75	16.06	Partial Cloverleaf	Suggested
	I-95_SR 820 SB Entrance SB/NB Exit	0	2	1		261,000	277,000	1.75	6.51	Diamond / Partial Diamond	Suggested
	I-95_SR838 NB/SB Exits	1	1	0	267,000	304,000		1.75	6.13	Partial Cloverleaf	Suggested
	I-75_S 33rd St NB Exit	0	1	2		148,000	111,000	1.25	9.65	Partial Cloverleaf	Suggested
	I-75_SR 869 NB Entrance	1	0	0	12,500			1.00	80.00	System Interchange	
	I-95_SR 84 SB Exit	1	0	0	145,000			1.00	6.90	Diamond / Partial Diamond	Alternate
	I-95_SR 822 NB Exit/SB Entrance	0	1	1		277,000	267,000	1.00	3.68	Diamond / Partial Diamond	
	I-75_Royal Palm Blvd NB Exit	1	0	0	304,000			1.00	3.29	Trumpet	Suggested
	I-95 Rest Stop MP 168	0	1	0		44,000		0.75	17.05	Rest Stop	
	I-95_SW Becker RD NB Exit	0	1	0		51,090		0.75	14.68	Diamond / Partial Diamond	
	I-95_SR 70 SB Entrance	0	1	0		63,000		0.75	11.90	Partial Cloverleaf	
	I-95 Weigh Station	0	1	0		66,000		0.75	11.36	Other	
	I-75_SR820 NB Exit	0	1	0		137,000		0.75	5.47	Partial Cloverleaf	
	I-75_I-595 NB Exit	0	1	0		145,000		0.75	5.17	System Interchange	
	I-595_Nob Hill Rd WB Entrance	0	1	0		152,000		0.75	4.93	Diamond / Partial Diamond	
	I-595_SR 7 WB Exit	0	1	0		184,000		0.75	4.08	Direct Connection	
	I-95_SR870 SB Entrance	0	1	0		267,000		0.75	2.81	Diamond / Partial Diamond	
	I-75_SR 818 NB Exit	0	0	2			81,000	0.50	6.17	Partial Cloverleaf	
	I-95_SR816 NB/SB Exits	0	0	2			285,500	0.50	1.75	Partial Cloverleaf	
	I-95_SR 716 (Gatlin Blvd) NB Exit	0	0	1			51,090	0.25	4.89	Diamond / Partial Diamond	
	I-95_CR 712 (Midway Rd) SB Exit	0	0	1			63,000	0.25	3.97	Diamond / Partial Diamond	
	I-95_SR 708 NB Exit	0	0	1			66,000	0.25	3.79	Diamond / Partial Diamond	
	I-75_SR 838 (Sunrise Blvd) NB Exit	0	0	1			145,000	0.25	1.72	Diamond / Partial Diamond	
	I-595_Hiatus Rd WB Exit	0	0	1			152,000	0.25	1.64	Diamond / Partial Diamond	
	I-595_SR 91 WB Entrance	0	0	1			184,000	0.25	1.36	Trumpet	
	I-95_SR 824 SB Exit	0	0	1			255,000	0.25	0.98	Diamond / Partial Diamond	
D5	I-95_SR44 NB/SB Exits	0	4	2		34,588	30,000	3.50	108.38	Diamond / Partial Diamond	Suggested
	I-95_SR442/Elkcam Blvd NB/SB Exits	0	2	2		30,000	37,177	2.00	59.54	Diamond / Partial Diamond	Suggested
	I-95_Stuckway Rd NB/SB Exits	0	2	0		28,906		1.50	51.89	Diamond / Partial Diamond	Suggested
	I-4_Maitland Blvd EB/WB Exits	0	2	0		151,000		1.50	9.93	Partial Cloverleaf	Suggested
	I-4_Fairbanks Ave EB/WB Exits	0	2	0		159,750		1.50	9.39	Diamond / Partial Diamond	Suggested
	I-75_SR500 SB exit	1	0	0	67,000			1.00	14.93	Diamond / Partial Diamond	Suggested
	I-4_SR91 exit (259) ramp	1	0	0	71,000			1.00	14.08	Trumpet	
	I-75_CR673 NB Exit	0	1	0		35,500		0.75	21.13	Diamond / Partial Diamond	Alternate
	I-95_Port St John Pkwy NB Exit	0	1	0		45,500		0.75	16.48	Diamond / Partial Diamond	
	I-95_Hwy100 NB Exit	0	1	0		66,000		0.75	11.36	Diamond / Partial Diamond	
	I-95_Palm Bay Rd SB exit	0	1	0		68,000		0.75	11.03	Diamond / Partial Diamond	
	I-95_LPGA Blvd NB Exit	0	1	0		70,500		0.75	10.64	Partial Cloverleaf	Alternate
	I-4_SR472 WB exit	0	1	0		76,000		0.75	9.87	Diamond / Partial Diamond	
	I-4_SR408 NB Exit	0	1	0		136,500		0.75	5.49	Partial Cloverleaf	
	I-4_Amelia St EB Exit	0	1	0		148,000		0.75	5.07	Diamond / Partial Diamond	Alternate
	I-4_Ivanhoe Blvd WB Exit	0	1	0		159,500		0.75	4.70	Partial Cloverleaf	
	I-95_SR4221/Taylor Rd NB Exit	0	0	2			32,000	0.50	15.63	Diamond / Partial Diamond	
	I-95_SR 514 (Malabar Rd) NB/SB exits	0	0	2			56,000	0.50	8.93	Diamond / Partial Diamond	
	I-4_SR423/Lee Rd EB/WB Exits	0	0	2			145,500	0.50	3.44	Diamond / Partial Diamond	
	I-4_Colonial Dr EB/WB Exits	0	0	2			159,500	0.50	3.13	Partial Cloverleaf	
	I-95_Indian River Blvd NB Exit	0	0	1			27,811	0.25	8.99	Diamond / Partial Diamond	
	I-95 Rest Stop MP 226	0	0	1			30,000	0.25	8.33	Rest Stop	
	I-75_SR48 NB Exit	0	0	1			35,500	0.25	7.04	Diamond / Partial Diamond	
	I-95_Challenger Memorial Pkwy NB Exit	0	0	1			45,500	0.25	5.49	Partial Cloverleaf	
	I-95_Palm Coast Pkwy NB Exit	0	0	1			66,000	0.25	3.79	Diamond / Partial Diamond	
	I-95_SR40 NB Exit	0	0	1			70,500	0.25	3.55	Diamond / Partial Diamond	
	I-4_Saxon Blvd WB Exit	0	0	1			76,000	0.25	3.29	Partial Cloverleaf	
	I-4_Anderson St NB Entrance	0	0	1			136,500	0.25	1.83	Diamond / Partial Diamond	
	I-4_Altamonte Dr EB exit	0	0	1			160,000	0.25	1.56	Diamond / Partial Diamond	
	I-4_Par St WB Entrance	0	0	1			170,500	0.25	1.47	Diamond / Partial Diamond	

District	Interchange	Occurences			ADT			Crash Score	Crash Score per MVPD	Interchange Type	Field Review Location
		1	0.75	0.25							
D6	I-95_SR 970 NB Exit	1	1	1	112,000		77,500	2.00	21.11	Y-Intersection	
	I-95_SR 860 SB/NB Exits	1	1	1	242,000	208,000	234,000	2.00	8.77	Partial Cloverleaf	Suggested
	SR 826_SR 976 NB/SB Exits	1	1	0	36,500	195,500		1.75	15.09	Diamond / Partial Diamond	Suggested
	I-75_138th St SB Exit	0	2	0		110,000		1.50	13.64	Trumpet	Suggested
	I-75_SR 860 NB Exit	0	2	0		111,000		1.50	13.51	Partial Cloverleaf	Suggested
	I-95_SR 916 SB Exit	0	1	1		182,500	208,000	1.00	5.12	Diamond / Partial Diamond	Suggested
	SR 826_SR 968 NB Exit (EB LT onto Exit Ramp)	1	0	0	200,000			1.00	5.00	Partial Cloverleaf	Alternate
	I-95_SR 922 SB Exit	0	1	1		258,000	182,500	1.00	4.54	Diamond / Partial Diamond	Alternate
	I-95_SR 932 SB Exit	0	1	1		245,000	258,000	1.00	3.98	Diamond / Partial Diamond	
	SR 856_A1A EB Exit	0	1	0		36,500		0.75	20.55	Direct Connection	
	I-95_SR 90 NB Exit	0	1	0		77,500		0.75	9.68	Partial Cloverleaf	
	I-195_I-95 WB Exit	0	1	0		96,000		0.75	7.81	System Interchange	
	I-395_Watson Island	0	1	0		129,000		0.75	5.81	Direct Connection	
	SR 826_SR 934 SB Exit	0	1	0		189,000		0.75	3.97	Diamond / Partial Diamond	
	SR 826_I-75 NB Exit	0	1	0		190,500		0.75	3.94	Partial Cloverleaf	
	SR 826_SR 932 SB Exit	0	1	0		200,000		0.75	3.75	Diamond / Partial Diamond	
	SR 826_SR 948 NB Exit	0	1	0		224,000		0.75	3.35	Partial Cloverleaf	
	I-95_NE 203rd St SB Exit	0	1	0		234,000		0.75	3.21	Diamond / Partial Diamond	
	I-75_SR 826 EB Exit	0	0	2			110,000	0.50	4.55	Partial Cloverleaf	
	SR 826_NW 58th NB/SB Streets	0	0	2			206,500	0.50	2.42	Diamond / Partial Diamond	
	I-95_SW 7th St SB Exit	0	0	1			20,500	0.25	12.20	Diamond / Partial Diamond	
	I-95_NW 40th Street WB Exit	0	0	1			96,000	0.25	2.60	Other	
	A1A_Fountain Street	0	0	1			129,000	0.25	1.94	Direct Connection	
	I-75_SR 820 NB Exit	0	0	1			148,000	0.25	1.69	Partial Cloverleaf	
	SR 826_SR 924 NB Exit	0	0	1			190,500	0.25	1.31	Partial Cloverleaf	
	SR 826_SR 874 SB Exit	0	0	1			195,500	0.25	1.28	Trumpet	
	SR 826_US 27 SB Exit	0	0	1			200,000	0.25	1.25	Diamond / Partial Diamond	
	I-95_NE 95th St SB Exit	0	0	1			245,000	0.25	1.02	Diamond / Partial Diamond	
D7	I-275_Ashley Dr SB/NB exits	1	1	0	50,310	190,500		1.75	14.53	Trumpet	Suggested
	I-275_22nd Ave SB Exit	0	2	0		130,250		1.50	11.52	Diamond / Partial Diamond	Suggested
	I-275_SR687	0	2	0		142,500		1.50	10.53	Direct Connection	Suggested
	I-275_Pinellas Point Dr	0	1	1		50,310	82,000	1.00	15.12	Diamond / Partial Diamond	Suggested
	I-75_Selmon Expy NB Exit	0	1	1		75,500	105,500	1.00	11.05	Trumpet	Alternate
	I-375_5th St	0	1	0		18,900		0.75	39.68	Direct Connection	Alternate
	I-175_6th St EB exit	0	1	0		35,000		0.75	21.43	Diamond / Partial Diamond	
	I-75_Wesley Chapel Blvd	0	1	0		48,500		0.75	15.46	Diamond / Partial Diamond	
	I-275_SR678 SB Exit	0	1	0		49,000		0.75	15.31	Diamond / Partial Diamond	
	I-275_SR56 NB Exit	0	1	0		51,000		0.75	14.71	Diamond / Partial Diamond	
	I-275_54th Ave SB Exit	0	1	0		82,000		0.75	9.15	Direct Connection	
	I-75_SR43 NB Exit	0	1	0		105,500		0.75	7.11	Partial Cloverleaf	
	I-4_Charlie Taylor Rd EB Exit	0	1	0		108,500		0.75	6.91	Diamond / Partial Diamond	
	I-4_SR579 WB exit	0	1	0		117,000		0.75	6.41	Diamond / Partial Diamond	
	I-275_SR582/Fowler Ave NB Exit	0	1	0		128,000		0.75	5.86	Diamond / Partial Diamond	
	I-275_Nebraska NB entrance	0	1	0		147,000		0.75	5.10	Diamond / Partial Diamond	
	I-75 Rest Stop MP 273	0	0	2			49,750	0.50	10.05	Rest Stop	
	I-275_SR579/Fletcher Ave NB/SB Exits	0	0	2			88,500	0.50	5.65	Diamond / Partial Diamond	
	I-275_5th Ave SB Exit	0	0	2			130,250	0.50	3.84	Y-Intersection	
	I-275_SR688	0	0	2			142,500	0.50	3.51	Direct Connection	
	I-375_4th St	0	0	1			18,900	0.25	13.23	Direct Connection	
	I-175_4th St	0	0	1			35,000	0.25	7.14	Direct Connection	
	I-275 Rest Stop MP 13	0	0	1			50,310	0.25	4.97	Rest Stop	
	I-75_Brandon Blvd NB Exit	0	0	1			75,500	0.25	3.31	Partial Cloverleaf	
	I-4_Country Line Rd EB Exit	0	0	1			108,500	0.25	2.30	Partial Cloverleaf	
	I-4_I-75 WB Exit	0	0	1			117,000	0.25	2.14	System Interchange	
	I-275_MLK Blvd NB Exit	0	0	1			147,000	0.25	1.70	Diamond / Partial Diamond	
	I-275_Orange St NB Exit	0	0	1			190,500	0.25	1.31	Direct Connection	

District	Interchange	Occurences			ADT			Crash Score	Crash Score per MVPD	Interchange Type	Field Review Location
		1	0.75	0.25							
D8	SR 91_SR 714 NB/SB Exits	0	2	1		35,500	38,122	1.75	47.54	Trumpet	Suggested
	SR 91_SR 834 SB Entrance/Exit	0	2	0		76,400		1.50	19.63	Trumpet	Suggested
	SR 91_Coconut Creek Pkwy NB/SB Exits	0	1	3		78,800	84,200	1.50	18.40	Trumpet	Suggested
	SR 821_NW 106th St NB/SB Exits	0	2	0		88,150		1.50	17.02	Trumpet	Pilot
	SR 91_Becker Rd SB/NB Exits	0	1	2		38,122	35,500	1.25	33.96	Diamond / Partial Diamond	Suggested
	SR 821_US 27 NB Exit	1	0	1	96,000		96,000	1.25	13.02	Partial Cloverleaf	Pilot
	SR 821_ NW 12th St NB Exit	1	0	0	34,800			1.00	28.74	Partial Cloverleaf	Suggested
	SR 91_NW 199 St NB Exit	1	0	0	39,000			1.00	25.64	Y-Intersection	Suggested
	SR 821_SR 5 SB Exit	0	1	1		34,800	53,000	1.00	22.78	Trumpet	Alternate
	SR417_SR 436/Aloma Ave NB Exit	0	1	1		54,500	40,300	1.00	21.10	Diamond / Partial Diamond	Alternate
	SR417_Red Bug Lake Rd NB/SB Exits	0	1	1		40,300	54,500	1.00	21.10	Partial Cloverleaf	Suggested
	Golden Glades SR 91_826	1	0	0	53,000			1.00	18.87	Other	
	SR 821_SR 817 EB Exit	0	1	1		64,000	64,000	1.00	15.63	Diamond / Partial Diamond	
	SR417_Lake Mary Blvd NB Exit	1	0	0	71,000			1.00	14.08	Diamond / Partial Diamond	
	SR91_Orange Blosson Trail SB Exit	0	1	1		71,000	71,000	1.00	14.08	Other	
	SR 821_SW 20th St NB Exit	1	0	0	74,000			1.00	13.51	Diamond / Partial Diamond	
	SR 91_SR 808 SB Entrance	1	0	0	78,800			1.00	12.69	Trumpet	
	SR 569_Gunn Hwy NB Exit 9	1	0	0	96,000			1.00	10.42	Diamond / Partial Diamond	
	SR 821_NW 12th St SB Exit	0	1	1		96,000	96,000	1.00	10.42	Partial Cloverleaf	
	Canoe Creek Service Plaza	0	1	0		25,000		0.75	30.00	Rest Stop	
	SR91_Exit 285 to Leesburg Clearmont NB Exit	0	1	0		40,330		0.75	18.60	Trumpet	
	SR 821_Campbell Dr SB Exit	0	1	0		53,000		0.75	14.15	Partial Cloverleaf	
	SR 869_SR 834 NB Exit	0	1	0		55,100		0.75	13.61	Diamond / Partial Diamond	
	SR 869_SR 814 (Atlantic Blvd) SB Exit	0	1	0		58,000		0.75	12.93	Diamond / Partial Diamond	
	SR 869_SR 7 WB Exit	0	1	0		63,200		0.75	11.87	Partial Cloverleaf	
	SR528_John Young Pkwy WB Exit	0	1	0		63,900		0.75	11.74	Partial Cloverleaf	
	SR 821_SR 823 EB Exit	0	1	0		64,000		0.75	11.72	Partial Cloverleaf	
	SR91_Osceola Pkwy SB exit	0	1	0		67,000		0.75	11.19	Diamond / Partial Diamond	
	SR91_SR528 SB Exit	0	1	0		71,000		0.75	10.56	Diamond / Partial Diamond	
	SR 869_SR 838 SB Exit	0	1	0		71,500		0.75	10.49	Diamond / Partial Diamond	
	SR528_International Dr Exit EB	0	1	0		75,300		0.75	9.96	Partial Cloverleaf	
	SR 91_SR 814 NB Exit	0	1	0		92,000		0.75	8.15	Diamond / Partial Diamond	
	SR 821_NW 41st St SB Exit	0	1	0		96,000		0.75	7.81	Partial Cloverleaf	
	SR91_SR525 NB Entrance ramp	0	0	1			25,000	0.25	10.00	Diamond / Partial Diamond	
	SR 821_9336 (Palm Dr)	0	0	1			34,800	0.25	7.18	Direct Connection	
	SR91_US27	0	0	1			40,330	0.25	6.20	Diamond / Partial Diamond	
	SR 869_Coral Ridge Rd EB Exit	0	0	1			55,100	0.25	4.54	Diamond / Partial Diamond	
	SR 869_SR 870 SB Exit	0	0	1			58,000	0.25	4.31	Diamond / Partial Diamond	
	SR 869_SR 817 WB Exit	0	0	1			63,200	0.25	3.96	Diamond / Partial Diamond	
	SR528_Orange Blosson Trail WB Exit	0	0	1			63,900	0.25	3.91	Other	
	SR 821_SR 91 EB Exit (NB HEFT to NB Mainline)	0	0	1			64,000	0.25	3.91	Partial Cloverleaf	
	SR91_Exit244 to Kissimee St Cloud SB Exit	0	0	1			67,000	0.25	3.73	Trumpet	
	SR91_Exit 254	0	0	1			71,000	0.25	3.52	Other	
	SR 869_I-595 SB Exit	0	0	1			71,500	0.25	3.50	System Interchange	
	SR528_Orangewood Blvd EB Exit	0	0	1			75,300	0.25	3.32	Other	
	SR 91_Coconut Creek Service Plaza	0	0	1			78,800	0.25	3.17	Other	
	SR 821_NW 74th St SB Exit	0	0	1			80,300	0.25	3.11	Trumpet	
	SR 821_SR 836 SB Exit	0	0	1			96,000	0.25	2.60	Partial Cloverleaf	

Appendix C
Field Review Checklists

Inspector:	Date / Time:	
Interchange:	Interchange Type:	
Ramp Description:	No. Lanes:	
Cross Street:	No. Lanes:	Speed:
Traffic Control:	Left Turn Phasing:	

SIGNAGE	CONFIRM		COMMENTS (INCLUDE SIZE/DATE)
DO NOT ENTER	# Signs Present		
	Visible from decision entry point		
	Mounted at standard MUTCD height		
	Night time visibility sufficient		
	High intensity sheeting		
	In good condition		
WRONG WAY	# Signs Present		
	Mounted at standard MUTCD height		
	Night time visibility sufficient		
	High intensity sheeting		
	In good condition		
ONE WAY	Present at Cross Street		
	Complete Installation		
TURN RESTRICTION SIGNS	NO RIGHT TURN		
	NO LEFT TURN		
	NO U-TURN		
	KEEP RIGHT		
	DIVIDED HIGHWAY		
GUIDE SIGNS ON CROSS STREET	Junction sign present		
	Advanced entrance directional signs		
	Entrance direction signs		

PAVEMENT MARKING	CONFIRM		COMMENTS
WRONG-WAY ARROWS	Present		
	RPMs present/good condition		
	Thermoplastic in good condition		
STOP BAR AT TERMINUS	Present		
	In good condition		
TURNING GUIDE STRIPE	Ramp to Cross Street		
	Cross Street to Ramp (if applicable)		
TURN/GUIDE ARROWS ON CROSS STREET	Present		
	Discourage WWD		

GEOMETRIC DESIGN	CONFIRM		COMMENTS
RAMP MEDIAN	Present		
	Separation distance btw entr/exit pts		
	Keep Right Sign		
INTERSECTION SKEW	Discouraging WWD		
NARROW OPENING	Discouraging WWD		
CROSS-STREET MEDIAN	Present		
	Openings discouraging WWD		

LIGHTING	CONFIRM		COMMENTS (INCLUDE TYPE)
CROSS STREET	Present		
	Adequate Coverage		
RAMP	Present		
	Adequate Coverage		

Technical Report Documentation Page

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FHWA/CA-TE-89-2		

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Prevention of Wrong-Way Accidents On Freeways	June, 1989
	6. Performing Organization Code: 51 358
7. Author: Joyce E. Copelan	8. Performing Organization NO.: EA 623219
9. Performing Organization Name and Address: Division of Traffic Operations, California Department of Transportation, 1120 "N" Street, Sacramento CA 95814	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address: California Department of Transportation, 1120 "N" Street, Sacramento CA 95814	13. Type of Report and Period Covered: Final
	14. Sponsoring Agency Code: F88TE10

15. Supplementary Notes

16. Abstract

Senate bill 233 (Davis 1987) required a current study on the wrong-way problem on freeways. This report discusses solutions developed over the years to prevent wrong-way driving by Caltrans, results of recent camera surveillance studies and the current annual wrong-way monitoring program. To determine if other states had developed any new solutions to the problem, traffic engineers from all the states were surveyed.

The recommendations to prevent wrong-way accidents are in the areas of sign maintenance, annual accident monitoring using a check-list process, ramp and intersection design, and reducing drunk drivers. It also recommends the purchase of new still camera, video, or movie camera and detector equipment, and continuing the pavement light experiment in San Diego.

17. Key Words	18. Distribution Statement
Wrong-Way, Wrong Direction, Sign, Pavement Arrow, Traffic Safety, Accident Prevention, Freeway, Interchange, Off-Ramp, On-Ramp, Design, Pavement Light, Spikes, Drunk Drivers, Accident Monitoring.	No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	95	

Appendix A

Check List for Wrong-Way Entry Review

Check List for Wrong-Way Entry Review

1. Review pertinent accident reports. Using the aerial photographs, review ramps, cross roads, and median openings 3 miles upstream (less in urban, more in rural areas), from the accident location. Field investigation of ramps located within these 3 miles of the wrong-way accident site may reveal needed improvements in signing and striping. Bring figures 4-15 to 4-24, 6-16, 6-24, and 6-38 from the Traffic Manual with you.

2. Inspect off-ramps during both daylight and dark conditions, especially if the accident occurred at night. It is desirable to check the general visibility close to the same time of day and weather condition as when the accident occurred (sunrise, sunset, dark, fog, rain, etc.) Choose a safe observation location near entry points to the off-ramp where a wrong-way driver may have driven. Get out of your vehicle and view the scene from the wrong-way driver's perspective.

3. Check if Do Not Enter sign packages (R11 over R11A) are:

- ☐ present in the minimum quantities (See Traffic Manual figures),
- ☐ visible from the entry decision point; not too far back,
- ☐ mounted at the recommended height (about 2' above the edge of the traveled way pavement but visible to headlights),
- ☐ unfaded (3M company will replace faded signs 2 for 1),
- ☐ not hidden by other objects or bushes ,
- ☐ oriented at the best possible viewing angle,
- ☐ in good repair (riveted or bolted connections, etc.),
- ☐ and free from graffiti,
- ☐ specify replacement and added signs made of high intensity sheeting.

4. Check if the 24' wrong-way pavement arrows (figure 6-23) are:

- ☐ in the proper locations starting at about 20' from the limit line,
- ☐ present in the minimum quantity (at least 2 per lane),
- ☐ visible, with a reflective freshly painted look,
- ☐ unfaded, not covered with grease, not chipped away,
- ☐ not embedded between directional arrows in left/right only lanes.
- ☐ Highly reflective thermoplastic material may be specified for replacement and added wrong-way arrows.

5. Check if other pavement directional arrows (figure 6-23) are:

- ☐ visible,
- ☐ unfaded, not covered with grease, not chipped away.

6. Check for the presence of other signs which discourage wrong-way movements:

- ☐ One Way (R10, R10A) about 1 1/2 ' above the edge of traveled way pavement, but visible to headlights;
- ☐ No Right/Left Turn (R16B, R17B);
- ☐ No U-Turn (R34, R34A);
- ☐ Keep Right (R7, R7A);
- ☐ Divided Highway (R98, R98A, W25, W25A, W26, W26A);
- ☐ Two Way Traffic (W44).

7. Off-ramp openings should discourage wrong-way entry from the cross street. The openings should:

- ☐ be narrow, and
- ☐ have an island or painted median dividing parallel, adjacent on and off-ramps,
- ☐ have small radius corners on either side of the throat and be aligned towards local street travel.
- ☐ Also, red-clear markers may be used on the freeway mainline approaching exit ramps (fig. 6-2, det. 14; fig. 6-9, det. 36-37; fig. 6-17).

8. Freeway entrances must be obvious and accessible.

- ☐ Check that pathfinder-trailblazing signs are adequate for motorists to find the freeway entrances,
- ☐ entrance packages are in place and in good condition,
- ☐ one 18' entrance arrow per lane exists, in good repair (fig. 6-23),
- ☐ freeway entrances are better lit than exits (fig. 9-15, 9-16),
- ☐ interchanges are complete so motorists never have to enter a freeway using an off-ramp.

9. Where left turning movements may be confusing in an intersection adjacent to an off-ramp, recommend:

- ☐ turning guide lines, either solid or broken,
- ☐ pavement markers to aid the turning movement,
- ☐ pavement markers on guide lines (good wear for high ADT),
- ☐ directional pavement arrows.

10. Consider eliminating factors which contribute to wrong way moves on adjacent right of way by:

- ☐ recommending removal of guide signs or privately owned directional signs located close to the off-ramp which may encourage wrong way entry,
- ☐ locating guide signs for frontage roads paralleling off-ramps far from the off-ramp opening,
- ☐ removing bushes and structures which decrease visibility.

- ☐ During the planning process, discourage the location of business driveways next to off-ramps in original right-of-way agreements,
- ☐ deny permission for bar permits near freeway ramps.

11. Any recommendations which result from the field investigation should be approved by a supervisor with Traffic Engineering experience before filling out the HT-65 form. Recommendations shown on the HT-65 form must be accomplished in a timely manner to prevent tort liability. Do not editorialize. Never write suggestions on the HT-65 form which will not be accomplished. Recommendation for the installation of wrong way preventive treatments such as wrong-way packages and pavement arrows do not require a safety index > 200, but do require engineering judgment; Minor B funding is at the discretion of the District.

12. In locations where sign theft is a problem, try:

- ☐ replacing any missing signs with those made of synthetic material,
- ☐ coating the backs of existing signs with a thick layer of grease.

13. For recurring problems, try:

- ☐ reviewing through another pair of eyes,
- ☐ installing more Do Not Enter sign packages, larger Do Not Enter sign packages, illuminating the signs, or increasing the number of pavement arrows,
- ☐ monitoring with camera or video to isolate the sources and patterns of the problem,
- ☐ observing traffic flow during different times of day,
- ☐ increasing traffic flow on low ADT off-ramps (reroute),
- ☐ closing the ramp or a road to the intersection,
- ☐ regrading or realigning ramps with limited sight distances,
- ☐ regrading or realigning portions of freeways where sight distances are < 1200 feet,
- ☐ constructing wrong-way, vehicle activated red pavement lights,
- ☐ contact Headquarters Traffic Operations or other districts for new ideas.

Figure 4-15

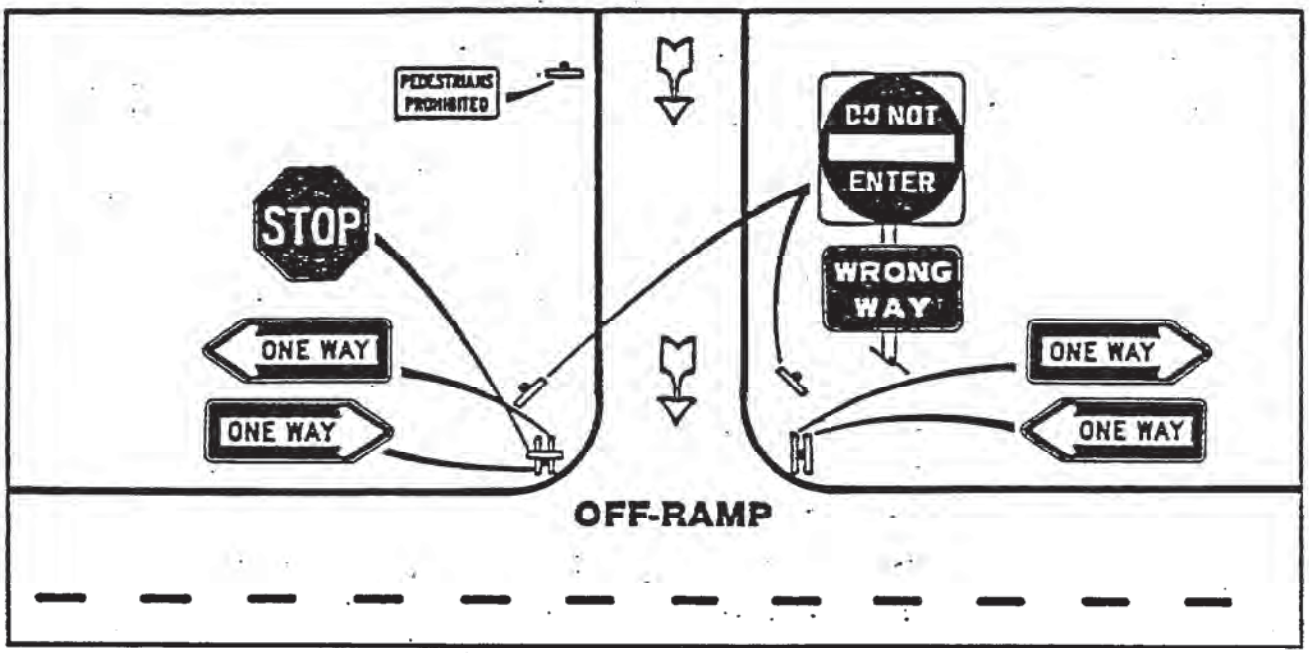


Figure 4-16

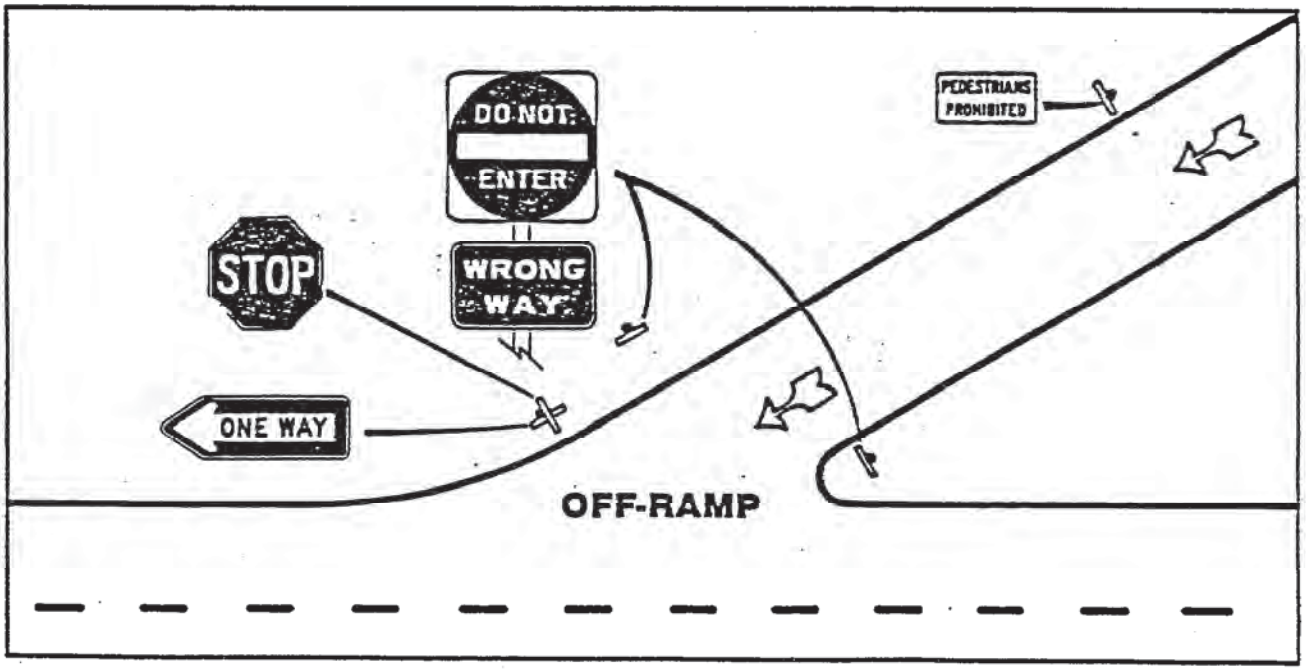


Figure 4-17

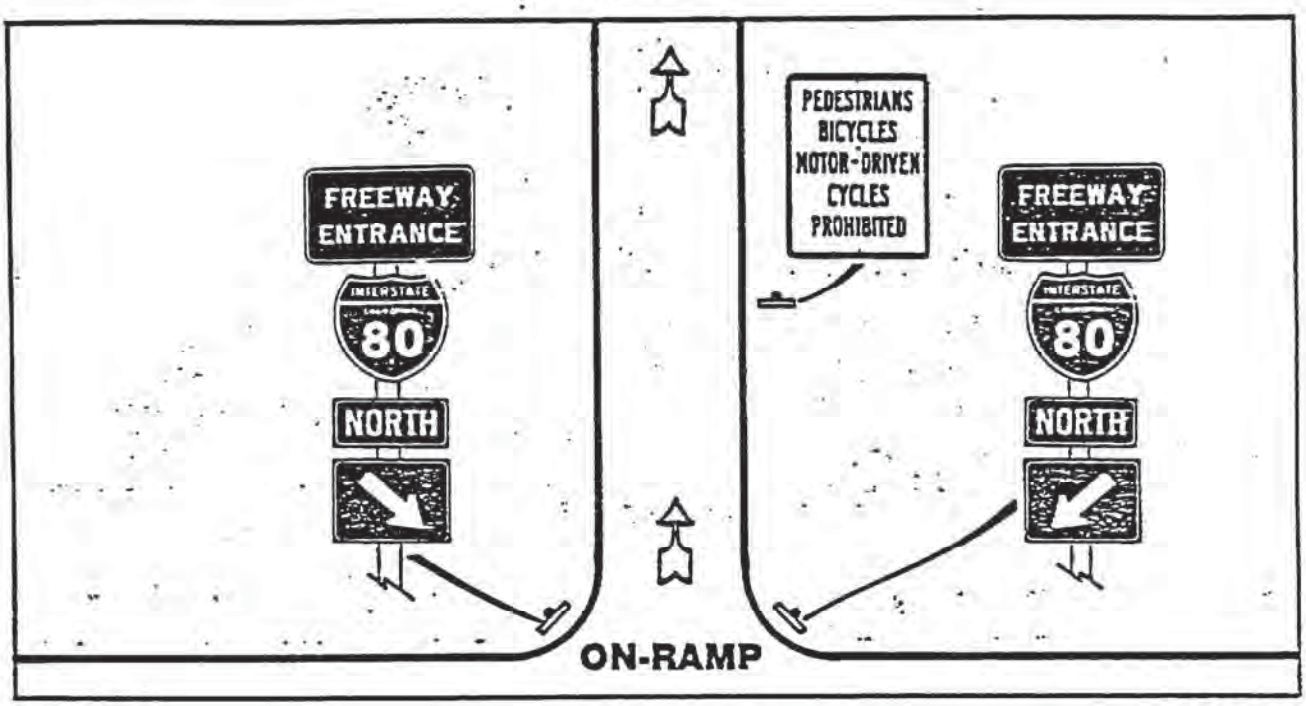


Figure 4-18

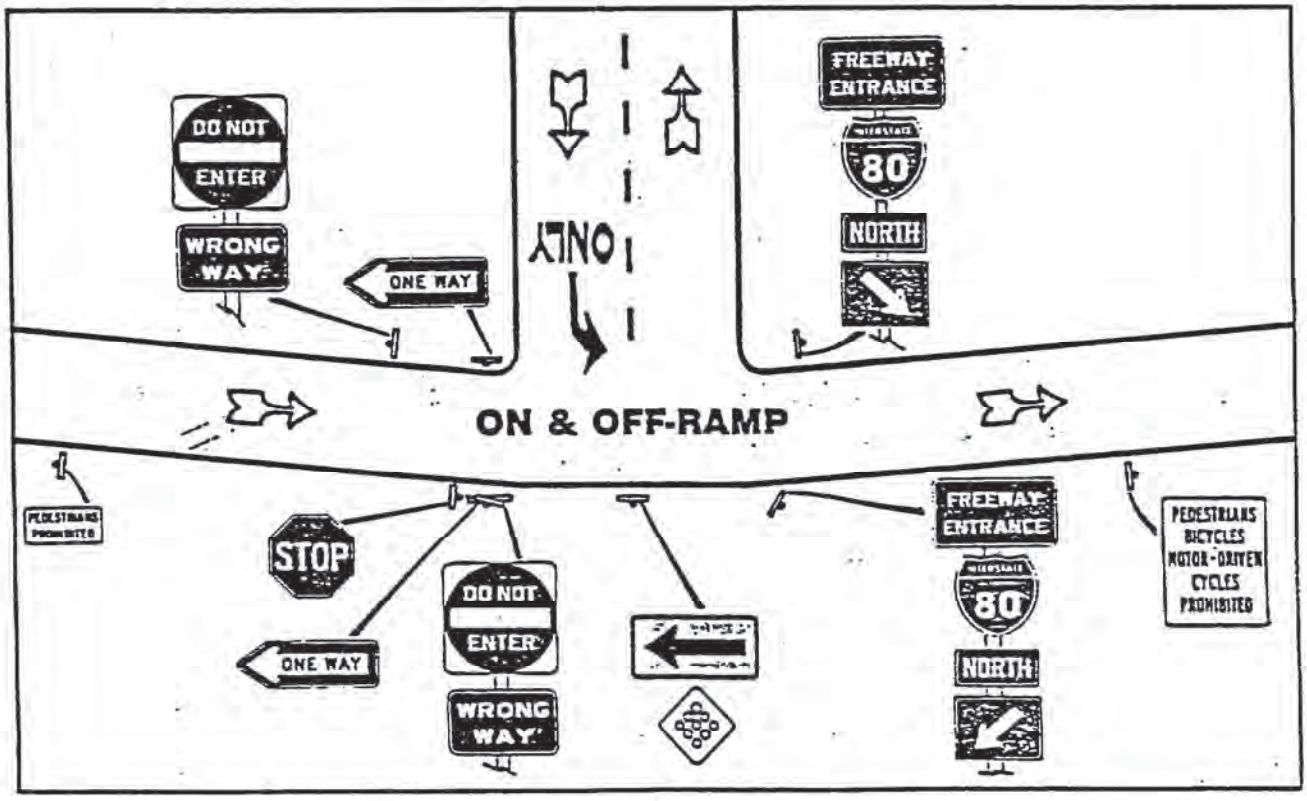


Figure 4-19

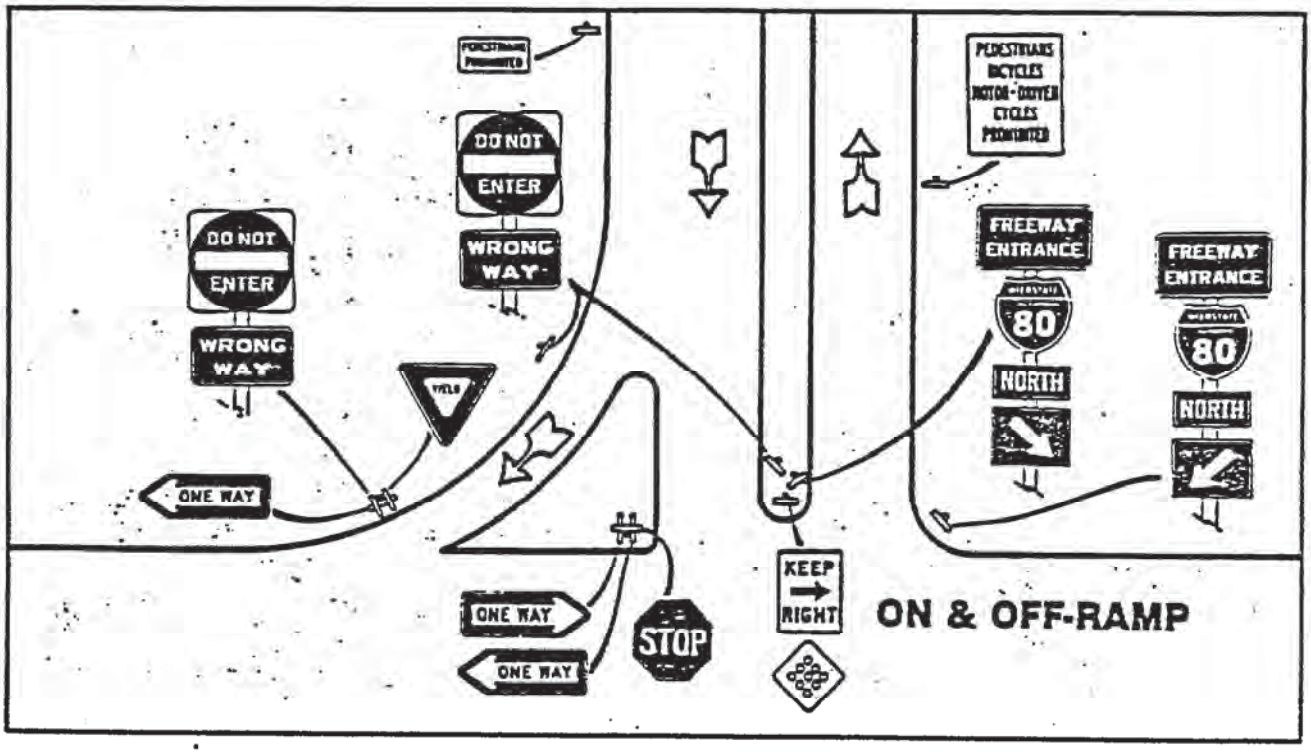


Figure 4-20

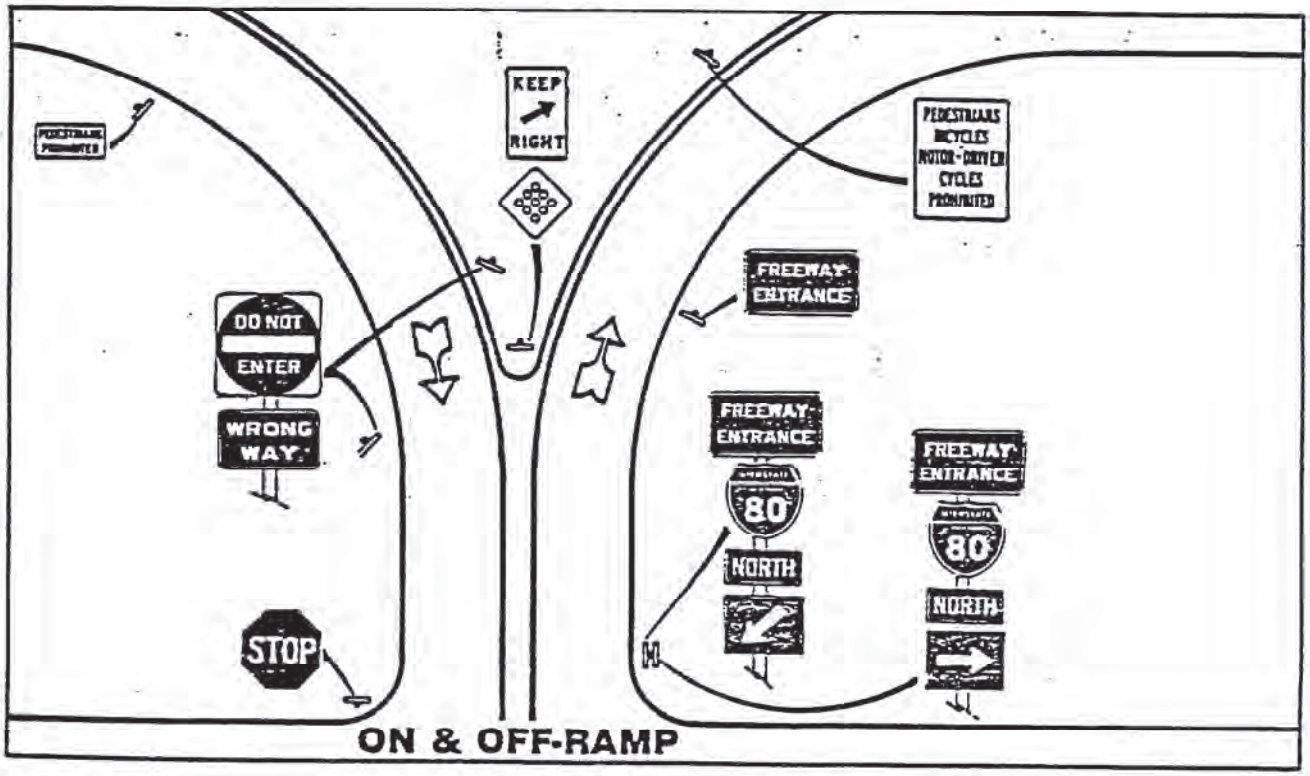


Figure 4-21

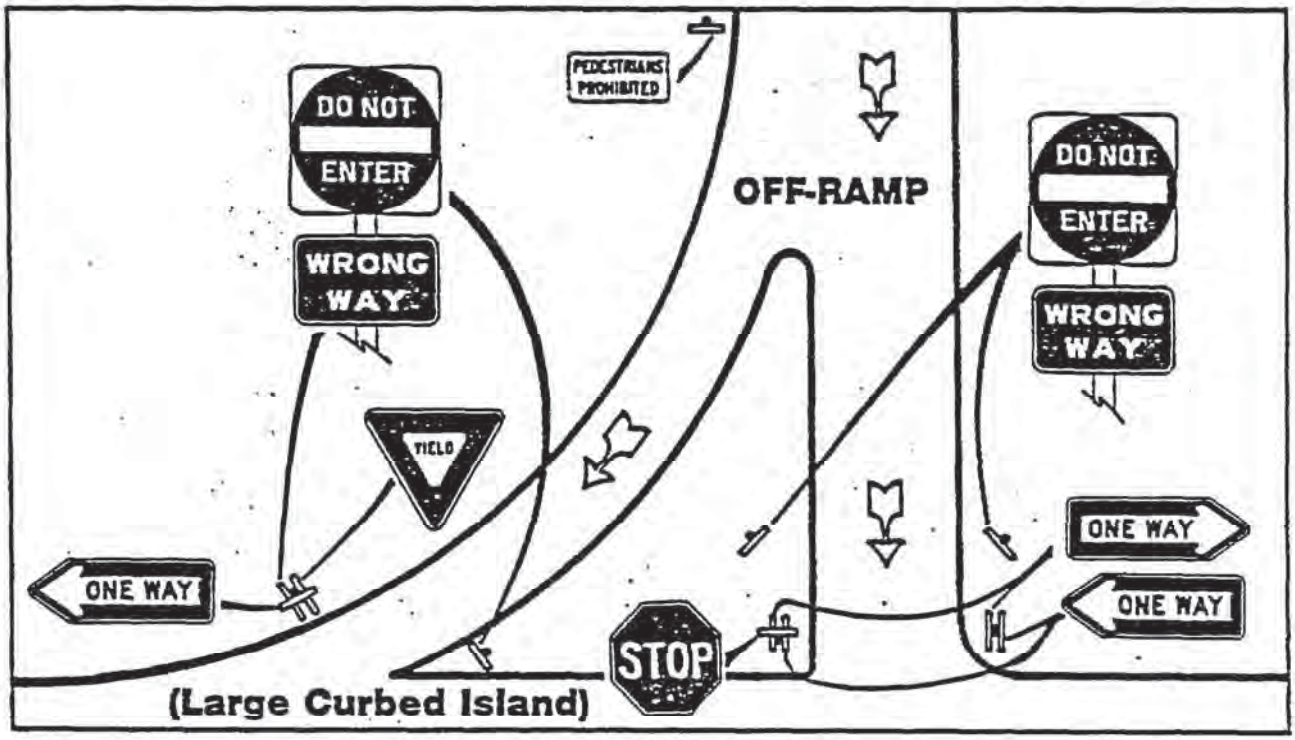


Figure 4-22

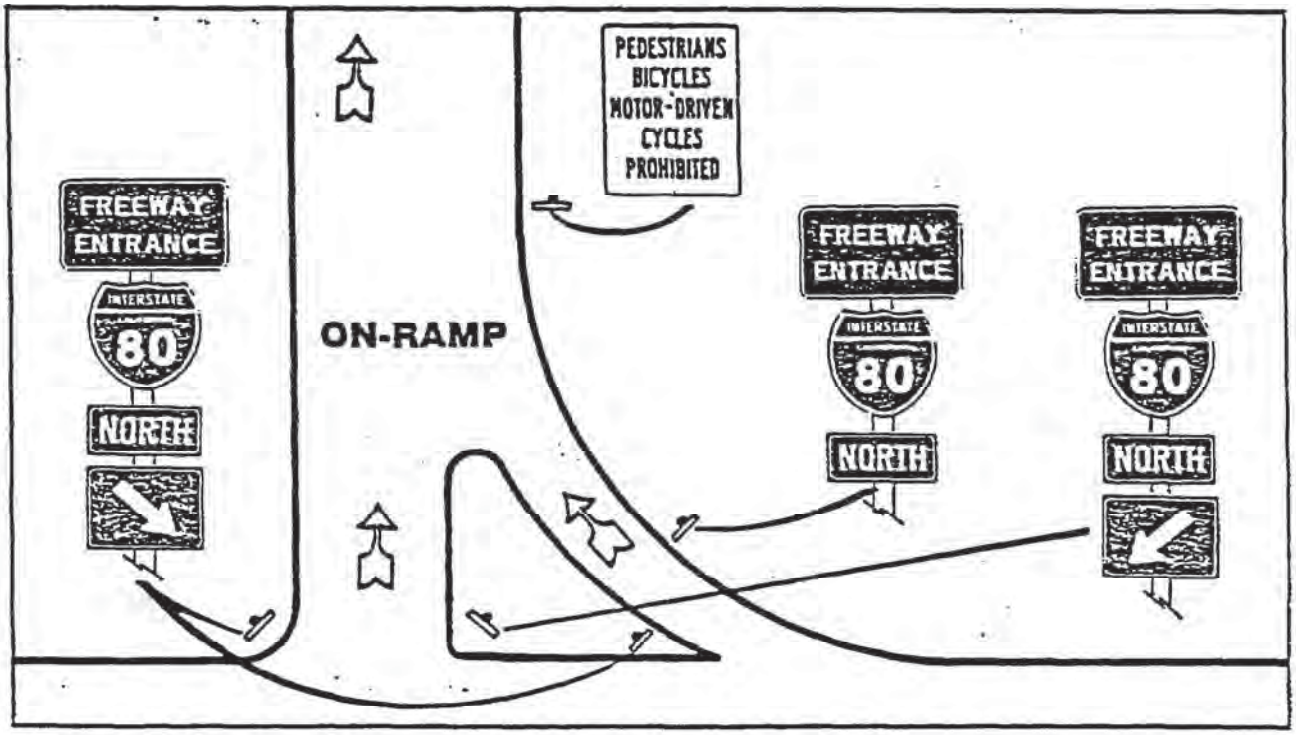


Figure 4-23

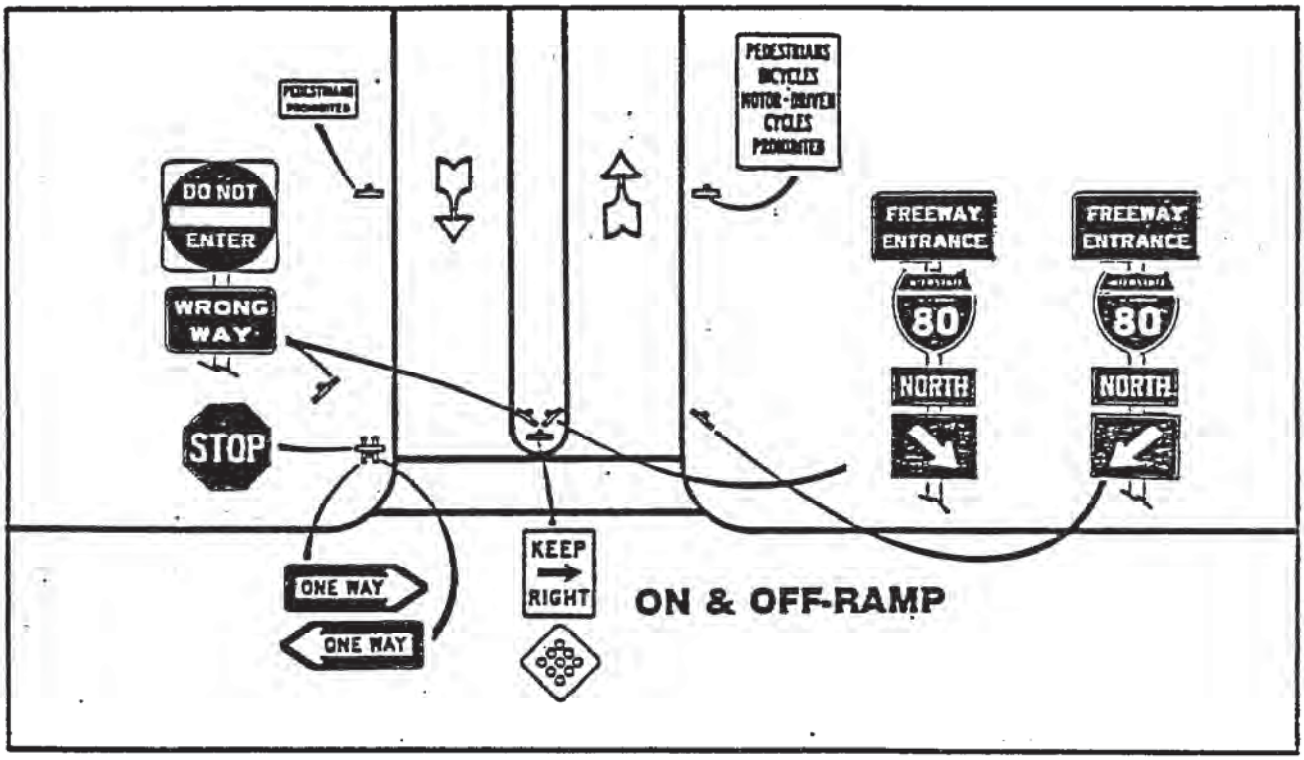
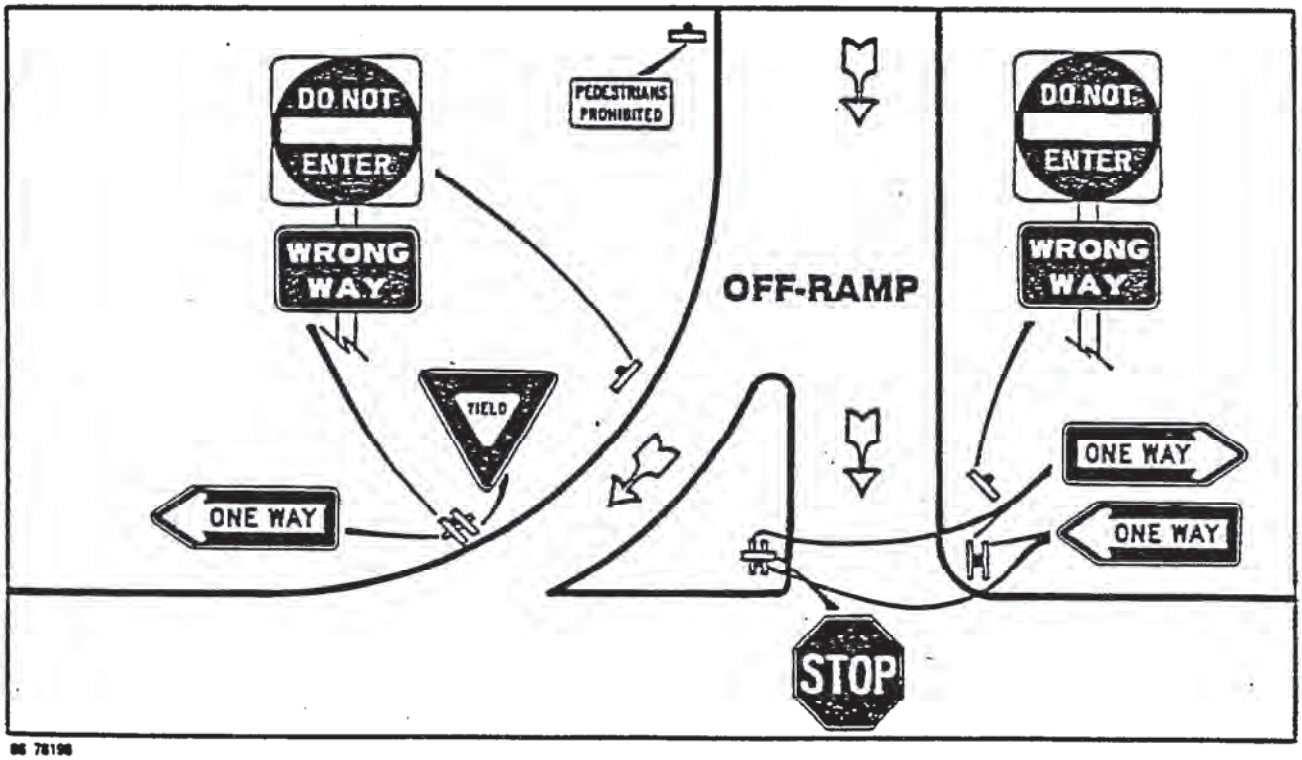


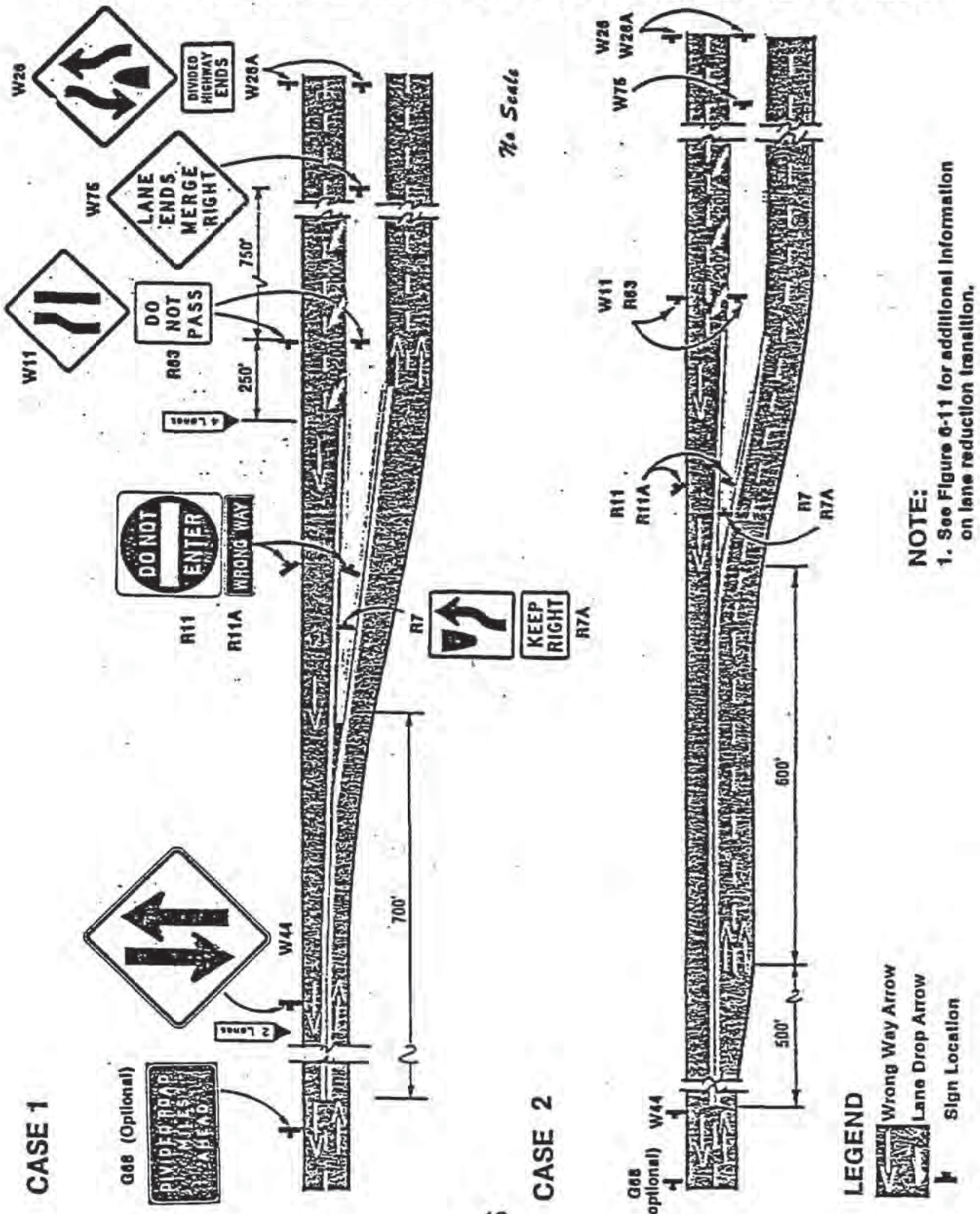
Figure 4-24

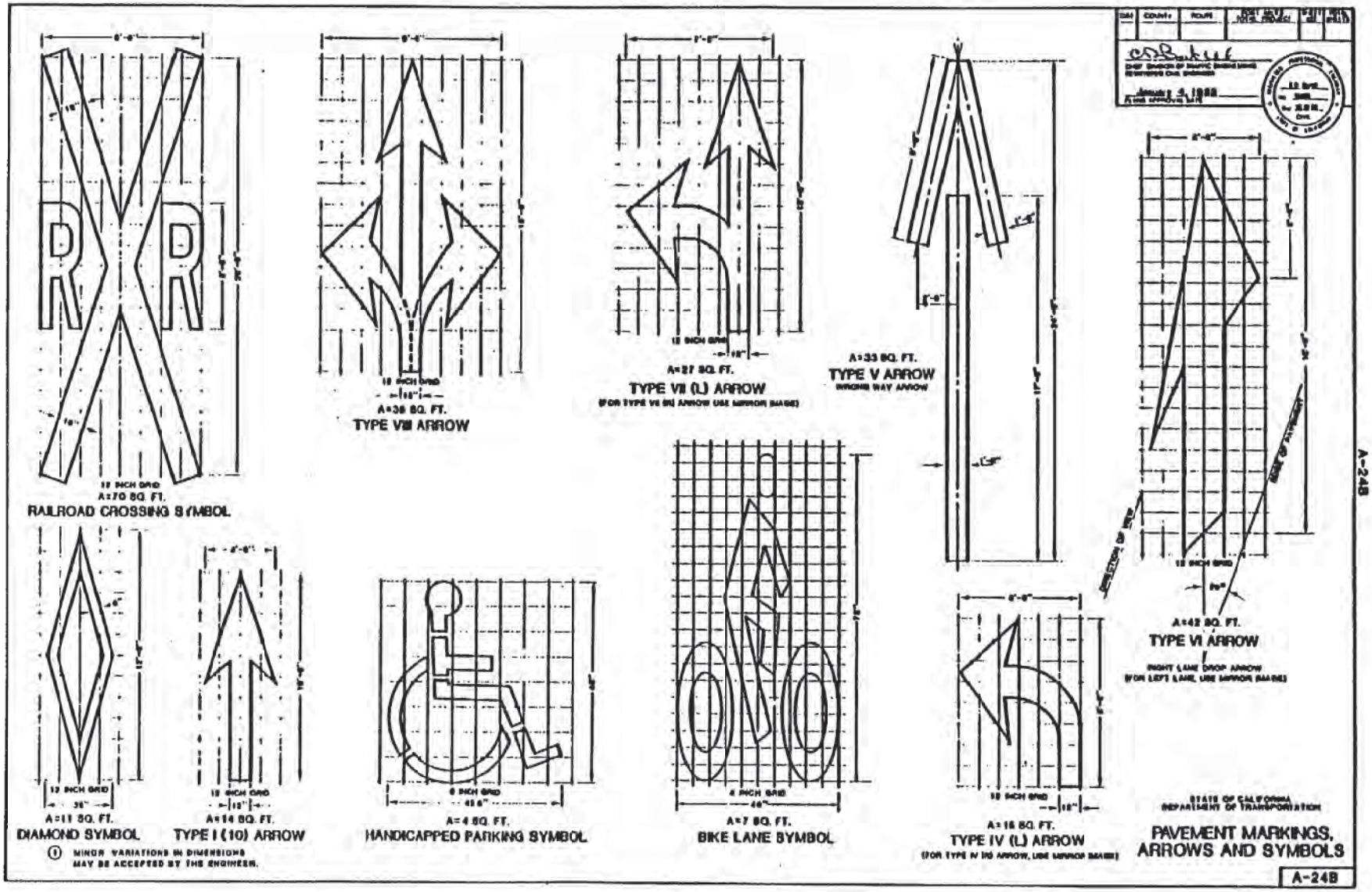


86 78198

Figure 6-16

TRANSITION FROM TWO-LANE TO FOUR-LANE DIVIDED

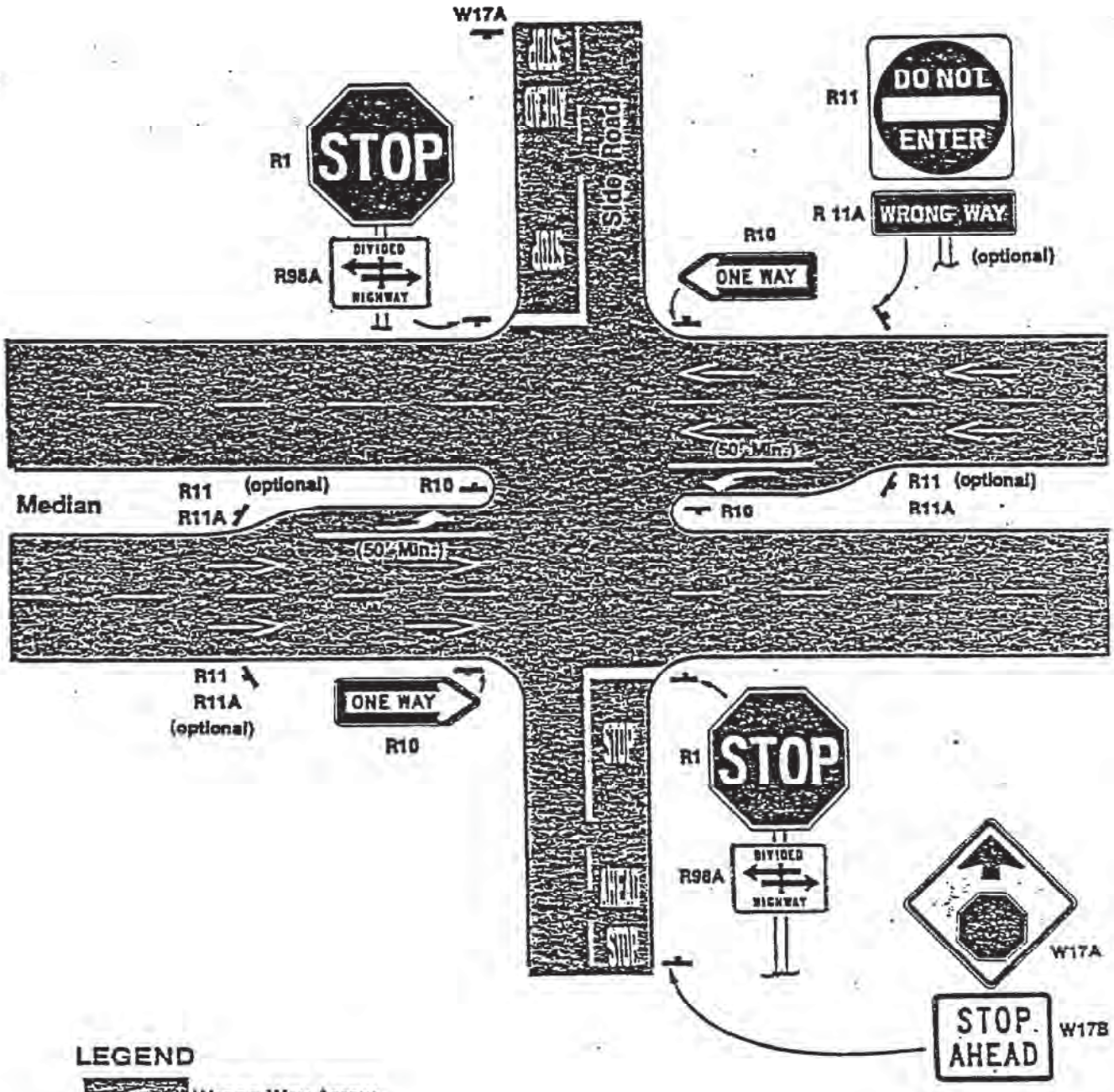



RAILROAD CROSSING SYMBOL
A=70 SQ. FT.
TYPE VIII ARROW
A=36 SQ. FT.
TYPE VII (L) ARROW
A=27 SQ. FT.
TYPE V ARROW
A=33 SQ. FT.
TYPE VI ARROW
A=42 SQ. FT.
DIAMOND SYMBOL
A=11 SQ. FT.
TYPE I (10) ARROW
A=14 SQ. FT.
HANDICAPPED PARKING SYMBOL
A=4 SQ. FT.
BIKE LANE SYMBOL
A=7 SQ. FT.
TYPE IV (L) ARROW
A=16 SQ. FT.
① MINOR VARIATIONS IN DIMENSIONS MAY BE ACCEPTED BY THE ENGINEER.
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PAVEMENT MARKINGS, ARROWS AND SYMBOLS
A-24B

A-24B

Figure 6-24

TYPICAL RURAL EXPRESSWAY INTERSECTION SIGNS AND MARKINGS



LEGEND

Wrong Way Arrow

Left Turn Arrow

Sign Location

NOTES:

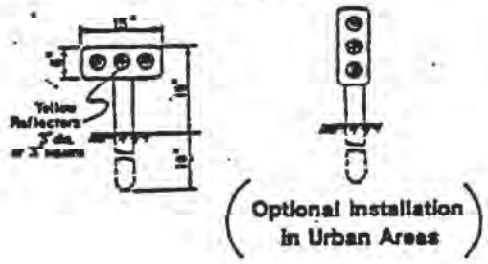
1. Distance between wrong way arrows is 100' ±.
2. See Figure 6-20 for location of intersection markings.
3. Use 8" white solid line for left turn lane.
4. The R98A sign may be placed as a separate installation in advance of stop sign.

Figure 6-38

TYPICAL OBJECT MARKERS

(See Section 6-05)

TYPE K

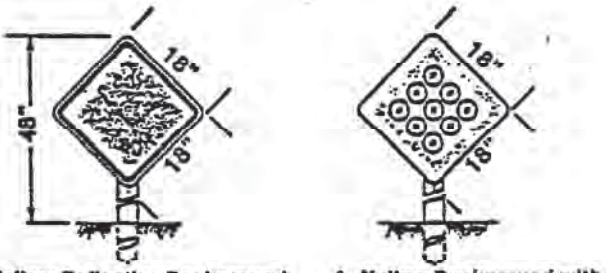


POLICY

Type K marker is used:

- In the far nose of median island openings
- Facing approaching traffic at the noses of islands forming right-turn lanes.
- In the nose of an island where traffic may proceed to either side.
- In the nose of exit ramps where there are curbs in the neutral area.

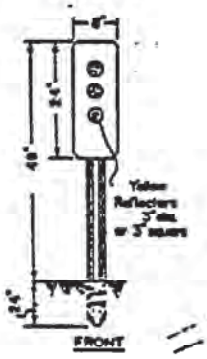
TYPE N



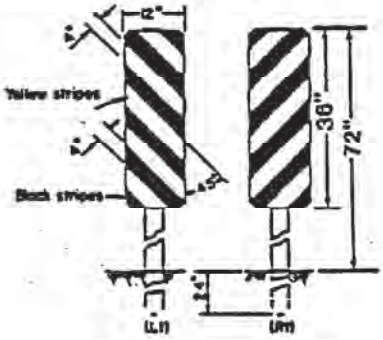
1. Yellow Reflective Background
2. Red Reflective Background
3. Orange Reflective Background
4. Yellow Background with 9-3" Yellow Reflectors
5. Red Background with 9-3" Red Reflectors

- Yellow Type N marker may be used below and on the same post with the W58 or W57 arrow signs to warn of an abrupt turn. Orange Type N marker is used in construction zones.
- Red Type N marker is normally mounted below and on the same post with the W31 END sign to mark the end of a street or highway.

TYPE L

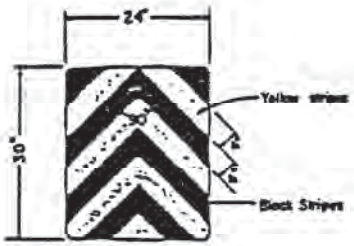


TYPE P



- Type L marker is used to mark obstructions adjacent to the roadbed (outside of paved shoulder).
- Type P marker is used to mark an obstruction within the roadbed (between edges of paved shoulders). Type P marker with orange and white stripes is used in construction zones.

TYPE R



- Type R marker is used to mark an obstruction within the roadbed where traffic may proceed on either side. It is mounted on the front of a crash cushion or guardrail protecting a fixed object. Except for crash cushions where traffic may pass to only one side of a fixed object, a Type P marker should be used instead of Type R. The bottom of the marker is normally mounted one foot above pavement.

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FHWA/TX-04/4128-2		

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COUNTERMEASURES FOR WRONG-WAY MOVEMENT ON FREEWAYS: GUIDELINES AND RECOMMENDED PRACTICES	October 2003 Resubmitted: January 2004
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Scott A. Cooner, A. Scott Cothron, and Steven E. Ranft	Report 4128-2

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135	11. Contract or Grant No. Project No. 0-4128

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Texas Department of Transportation Research and Technology Implementation Office P. O. Box 5080 Austin, Texas 78763-5080	Research: September 2002 - August 2003
	14. Sponsoring Agency Code

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Research performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.
Research Project Title: Countermeasures for Wrong-Way Movement on Freeways

16. Abstract

Drivers who make wrong-way entries onto freeways pose a serious risk to the safety of other motorists and themselves. Wrong-way driving often leads to head-on collisions. Wrong-way crashes are relatively infrequent but are more likely to produce serious injuries and fatalities compared to other types of crashes. Driving the wrong way on freeways has been a nagging traffic safety problem since the interstate highway system was started in the 1950s. Despite over forty years of highway design, marking, and signing improvements at freeway interchanges, the problem still persists.

Several crashes in the Texas Department of Transportation (TxDOT) Fort Worth District have brought attention to the hazard of wrong-way drivers. A search of newspaper articles revealed that the problem of wrong-way driving is not unique to Fort Worth and occurs throughout Texas. Members of the Fort Worth Traffic Management Team (TMT) identified locations with a history of wrong-way entries and assessed potential countermeasures. During this review process it was determined that research was needed to understand and develop effective countermeasures for wrong-way movements onto freeways and other restricted roads. This research provides TxDOT staff with preventative measures for reducing the frequency and severity of wrong-way entries onto freeway facilities throughout Texas.

This report documents the recommended guidelines and best practices developed during the project. The research team based the guidelines and best practices on the results of the literature review, surveys, analysis of freeway-related wrong-way crashes in Texas, and evaluation of available countermeasures. This report also provides a wrong-way entry checklist for engineers and field crews to use for reviewing wrong-way entry issues or suspected problem locations. This checklist was based on one currently used by the California Department of Transportation with some additions based on project findings.

17. Key Words	18. Distribution Statement
Wrong Way, Freeway, Countermeasures, Safety, Crash	No restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

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Unclassified	Unclassified	22	

CHAPTER 2. WRONG-WAY ENTRY CHECKLIST

TEXAS WRONG-WAY ENTRY ANALYSIS PROCEDURES

This document was developed for TxDOT engineers and field crews to use for reviewing wrong-way entry issues or suspected problem locations. The research team based the checklist on one currently used by Caltrans (*2*) with some additions and modifications based on project findings. The checklist was developed as part of the 0-4128 Countermeasures for Wrong-Way Movement on Freeways research project performed by the Texas Transportation Institute.

STEP 1: Review pertinent Department of Public Safety (DPS) crash reports.

Obtain copies of the original ST-3 crash reports from the DPS or local police agencies to have the officer's crash diagram and narrative of events. The best screening variable for wrong-way crashes is contributing factor code (CFC) 71 (*wrong way – one way road*). Some of the crash reports with CFC 71 will not be freeway-related crashes.

STEP 2: Analyze crash reports to determine wrong-way entry locations.

The information contained in the crash diagram and narrative is the best way to determine where the wrong-way entry occurred. Review the diagram and narrative and try to determine the location where the wrong-way entry occurred.

Other tools such as recent aerial photographs and online maps can be useful in determining wrong-way entry locations. The analyst should use the aerial photographs to review ramps, cross roads, and median openings approximately three miles upstream (can be less in urban and more in rural areas) from the actual location of the wrong-way crash.

STEP 3: Perform field inspections.

Field investigation of ramps located within three miles may also be necessary to inspect the condition of signing and marking. Field inspection should occur during both daylight and dark conditions, particularly if the crash occurred at night. Using proper safety procedures, inspectors should get out of the vehicle and view the scene from the wrong-way driver's perspective. Use the WRONG-WAY ENTRY CHECKLIST – FIELD INSPECTION SHEET to complete the field inspection.

STEP 4: Make recommendations.

Any recommendations for improvements that result from the field investigation should verbally be communicated to a management level engineer. Do not initially put these recommendations in writing to prevent tort liability.

WRONG-WAY ENTRY CHECKLIST
FIELD INSPECTION SHEET

Inspector name: _____

Location description: _____
_____
_____

Crash Report ID Number: _____

Table 1. Signing Checklist

Sign	Check if	Yes	No	Comments
DO NOT ENTER	Present in minimum quantity			
	Visible from entry decision point			
	Mounted at standard MUTCD height			
	Night time visibility is sufficient			
	High intensity sheeting			
	In good repair and free of graffiti			
WRONG WAY	Present in minimum quantity			
	Mounted at standard MUTCD height			
	Night time visibility is sufficient			
	High intensity sheeting			
	In good repair and free of graffiti			
ONE-WAY	Present at the location			
	Supplement to DO NOT ENTER sign			
TURN RESTRICTION SIGNS	NO RIGHT TURN			
	NO LEFT TURN			
	NO U-TURN			
	KEEP RIGHT			
	DIVIDED HIGHWAY			

Table 2. Pavement Markings Checklist

Pavement Marking	Check if	Yes	No	Comments
WRONG-WAY ARROWS	Present at the location			
	RPMs in arrow in good condition			
	Thermoplastic arrow in good condition			
RED-CLEAR MARKERS	Present on the freeway main lanes			
	In good condition			
OTHER MARKINGS	Elephant tracks (turning guide lines)			
	Stop lines at end of exit ramp			
	Other: _____			
	Other: _____			
	Other: _____			

Other items to review and note include:

- Location of nearby businesses (particularly bars)
- Geometry near the wrong-way entry point that might be confusing (driveways, islands, etc.)
- Any other factors that the inspector feels might contribute to wrong-way movements

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA-ICT-12-010		

4. Title and Subtitle
Investigation of Contributing Factors Regarding Wrong-Way Driving on Freeways

5. Report Date
October 2012

6. Performing Organization Code

7. Author(s)
Huaguo Zhou, Jiguang Zhao, Ryan Fries, Mostafa Reisi Gahrooei, Lin Wang, Brent Vaughn, Karzan Bahaaldin, and Balasubrahmanyam Ayyalasomayajula

8. Performing Organization Report No.
ICT-12-010
SIUE-ENG-2010-2012
UILU-ENG-2012-2022

9. Performing Organization Name and Address

Illinois Center for Transportation
Department of Civil and Environmental Engineering
University of Illinois at Urbana-Champaign
205 N. Mathews Ave, MC 250
Urbana, IL 61801

10. Work Unit (TRAIS)

11. Contract or Grant No.
ICT-R27-90

13. Type of Report and Period Covered

12. Sponsoring Agency Name and Address

Illinois Department of Transportation
Bureau of Materials and Physical Research
126 E. Ash Street
Springfield, IL 62704

14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

In Illinois, there were 217 wrong-way crashes on freeways from 2004 to 2009, resulting in 44 killed and 248 injured. This research project sought to determine the contributing factors to wrong-way crashes on freeways and to develop promising, cost-conscious countermeasures to reduce these driving errors and their related crashes. A thorough literature review was conducted to summarize the best practices on design, safety, and operational issues related to wrong-way driving on freeways by different states in the United States and abroad. Six-year crash data from the Illinois Department of Transportation were then collected for identifying wrong-way crashes. Out of 632 possible wrong-way crashes identified from the crash database, the 217 actual wrong-way crashes were verified by reviewing hard copies of those crash reports. General statistical characteristics of wrong-way crashes were analyzed, and the findings suggested that a large proportion of wrong-way crashes occurred during the weekend from 12 midnight to 5 a.m. Approximately 60% of wrong-way drivers were DUI drivers. Of those, more than 50% were confirmed to be impaired by alcohol, 5% were impaired by drugs, and more than 3% had been drinking. Causal tables, Haddon matrices, and significance tests were used to identify factors that contribute to wrong-way crashes on Illinois freeways. Alcohol impairment, age, gender, physical condition, driver's experience and knowledge, time of day, interchange type, and urban and rural areas were found to be significant factors. A new method was developed to rank the high-frequency crash locations based on the number of recorded or estimated wrong-way freeway entries. Twelve interchanges were identified for field reviews. Site-specific and general countermeasures were identified for future implementation.

17. Key Words	18. Distribution Statement
Wrong-Way Driving, Crash, Contributing Factors, Countermeasures, Traffic Safety, Freeways	No restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	62 plus appendices	

APPENDIX F A CHECKLIST FOR FIELD REVIEW

WRONG-WAY ENTRY CHECKLISTFIELD INSPECTION SHEET

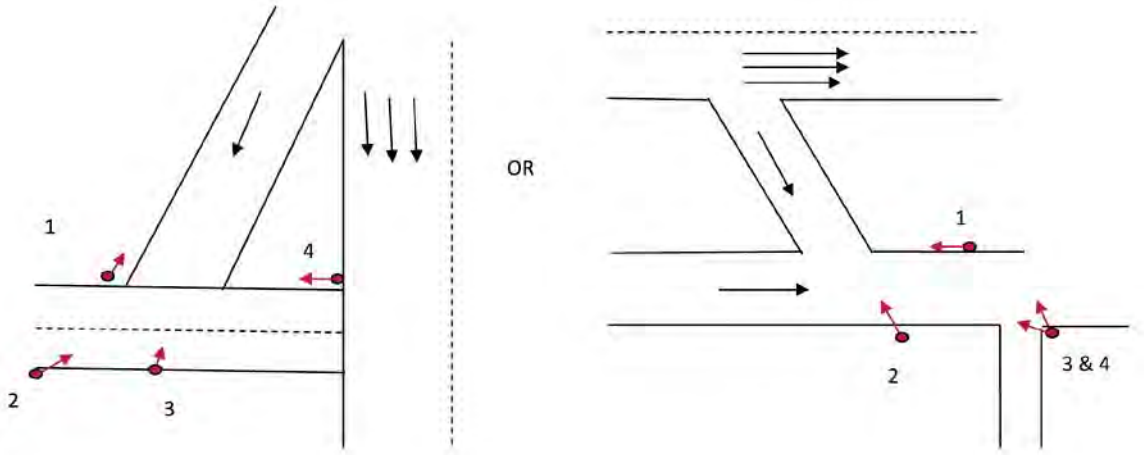
Inspector:		
Route Information:		Date:
Ramp Description:		Time:

SIGN	CHECK IF	YES	NO	COMMENTS
	At least one present			
	In good condition			
	At least one present			
	In good condition			
	Present at location for cross under/over traffic			
	NO RIGHT TURN			
	NO LEFT TURN			
	NO U-TURN			

PAVEMENT MARKNG	CHECK IF	YES	NO	COMMENTS
WRONG-WAY ARROWS	Present			
	Pieces in good condition			
Other Markings	Elephant tracks (turning guide line			
	Stopping lines at end of exit ramp			

GEOMETRC DESIGN FEATURES	CHECK IF	YES	NO	COMMENTS
Raised Curb Median on the crossroad	Present			
	Present			
	Present			
Design to Discourage Wrong-Way Entry	Present			

DESCRIBE ANY CONFUSING ROAD LAYOUT NEAR POSSIBLE WRONG-WAY ENTRY:



Appendix D
Interchange Field Review Notes

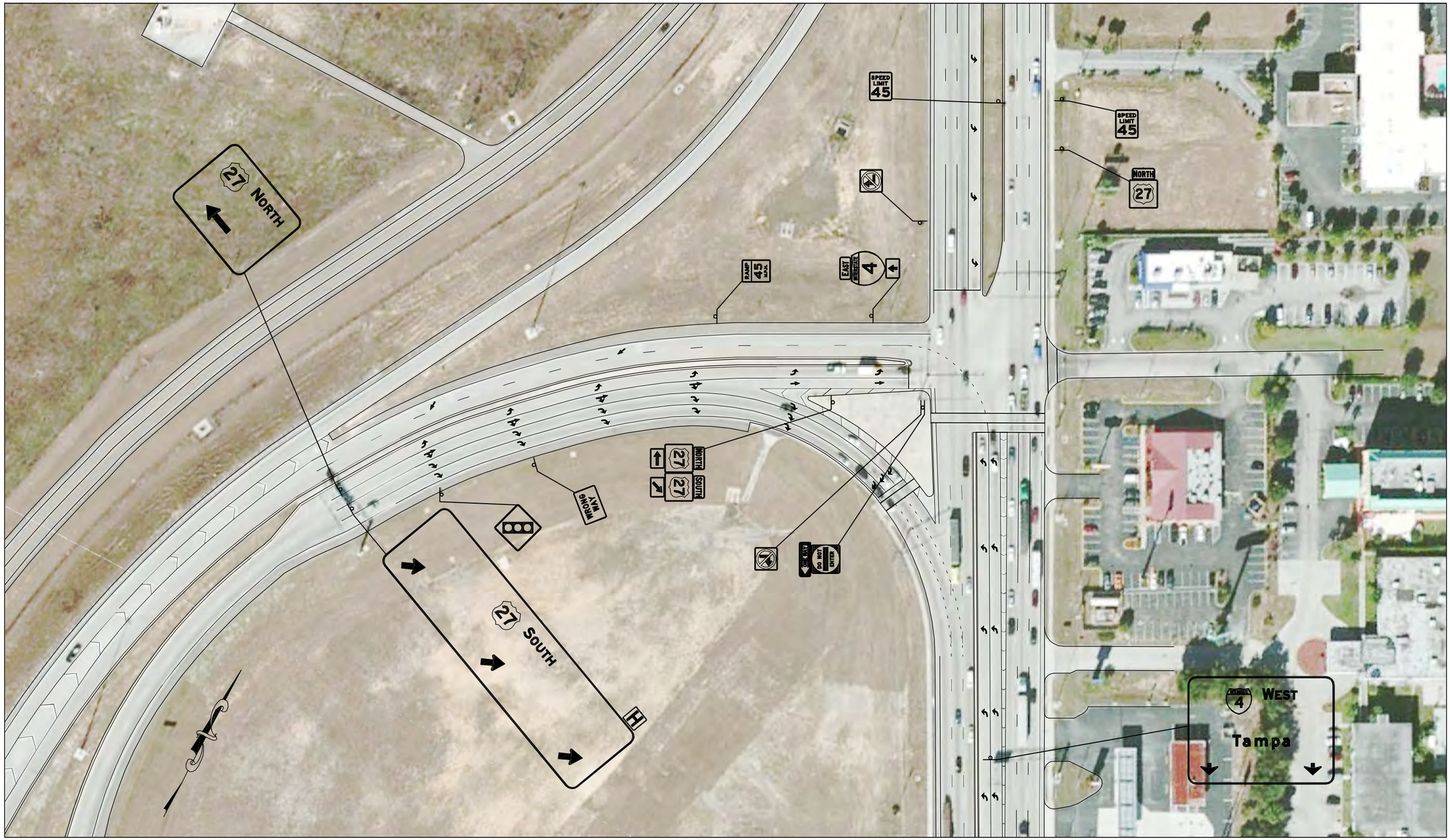
District 1

I-4 AT US 27

The interchange of I-4 and US 27, Exit 55, is located in Polk County, FL. The interchange is in a Partial Cloverleaf (ParClo) configuration. I-4 runs in a northeast-southwest direction through the interchange and US 27, a 6-lane arterial, runs southeast-northwest.

Interchange Details

Speed Limits:	• I-4: 65 mph • US 27: 45 mph
No. of Lanes:	• I-4: 6 • US 27: 6
Maintaining Agency:	• I-4: FDOT District 1 • US 27: FDOT District 1
Traffic Control at Ramp Terminals	• I-4 Eastbound On Ramp: Signalized • I-4 Westbound On Ramp: Signalized • I-4 Easbound Off Ramp: Signalized • I-4 Westbound Off Ramp: Signalized
Left-Turn to On-Ramp Traffic Control	• US 27 Northwest Bound Left: Protected • US 27 Southeast Bound Left: Protected
Lighting Level	• NW Quadrant: None • NE Quadrant: Street Light • SE Quadrant: None • SW Quadrant: Street Light
Guide Signage Along Crossroad (both directions)	• Junction Assembly • Directional Assembly for the first ramp • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Through/Left Turn Lane • 1 Right Turn Lane
WB Off-Ramp Lane Configuration:	• Two Lane Exit • 1 Left Turn Lane • 1 Through Lane • 3 Right Turn Lanes



SCALE

0 100 200

SYMBOLS

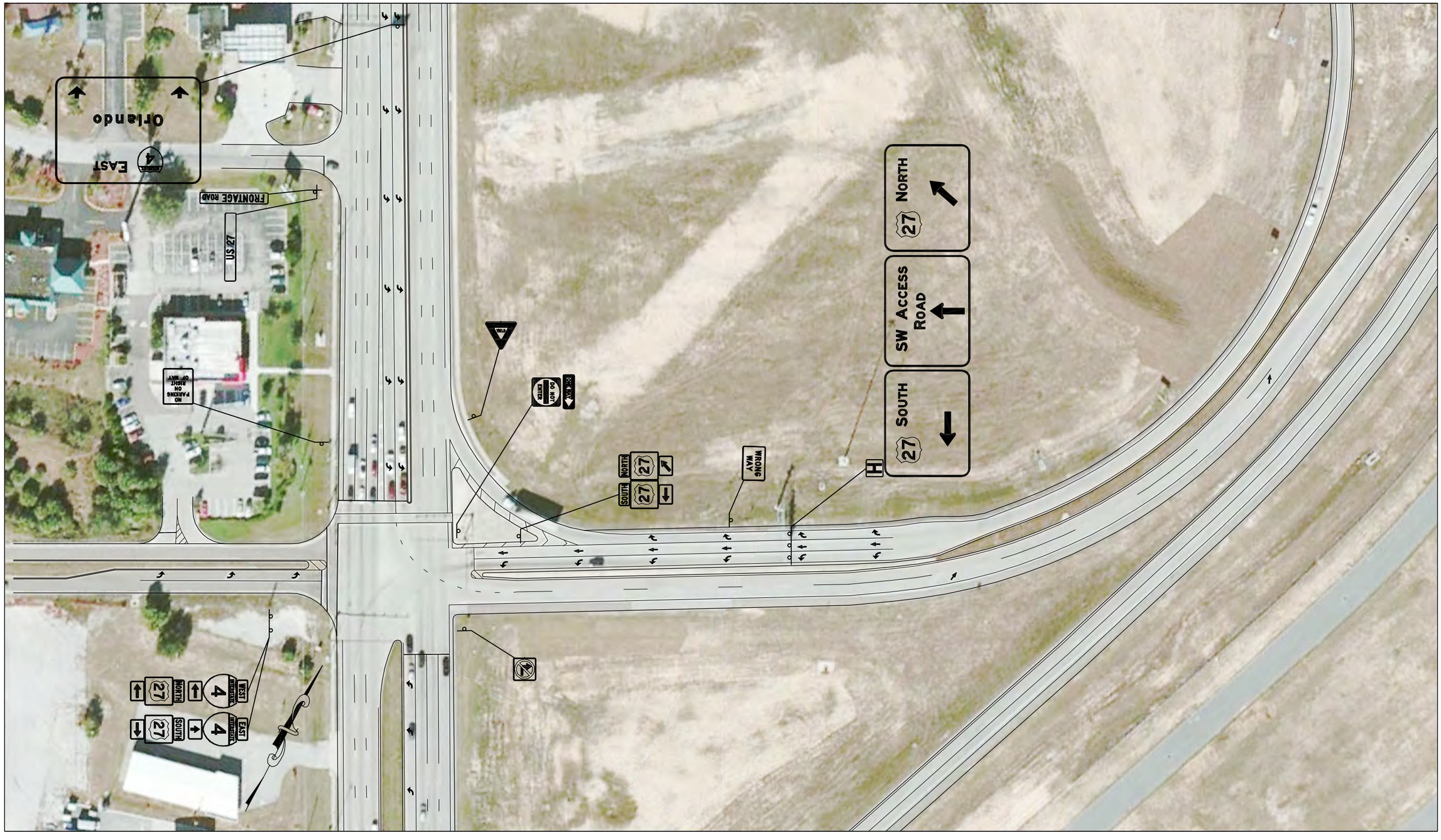
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-4 AND U.S.27 #1

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-4 AND U.S.27 #2

CONDITION DIAGRAM

FIGURE NO.
2

I-75 AT UNIVERSITY PARKWAY

The interchange of I-75 and University Pkwy, Exit 213, is located in the City of Sarasota, Sarasota County, FL. The interchange is in a Diamond configuration. I-75 runs in a north-south direction through the interchange and University Pkwy, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • University Pkwy: 50 mph
No. of Lanes:	• I-75: 6 DIV • University Pkwy: 6 DIV
Maintaining Agency:	• I-75: FDOT District 1 • Univerisy Pkwy: FDOT District 1
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Yield • I-75 Northbound Off Ramp: Signal • I-75 Southbound On Ramp: Yield • I-75 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• University Pkwy EB Left: Signal – Protected Only • University Pkwy WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lane • 2 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lane • 2 Right Turn lane

SCALE

0 100 200

SYMBOLS

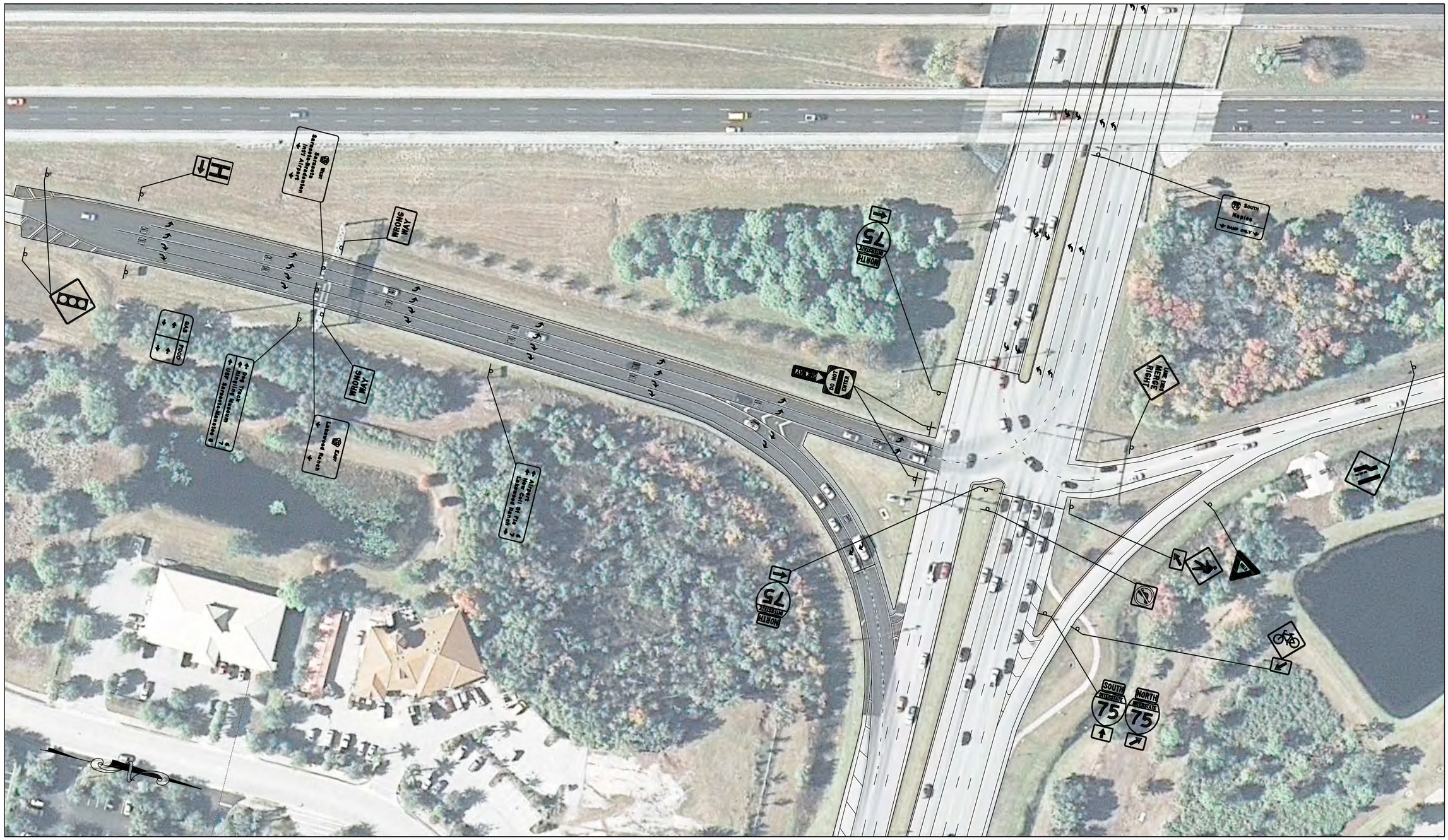
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I-75 UNIVERSITY PARKWAY SB/NB EXITS

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I–75 UNIVERSITY PARKWAY SB/NB EXITS

CONDITION DIAGRAM

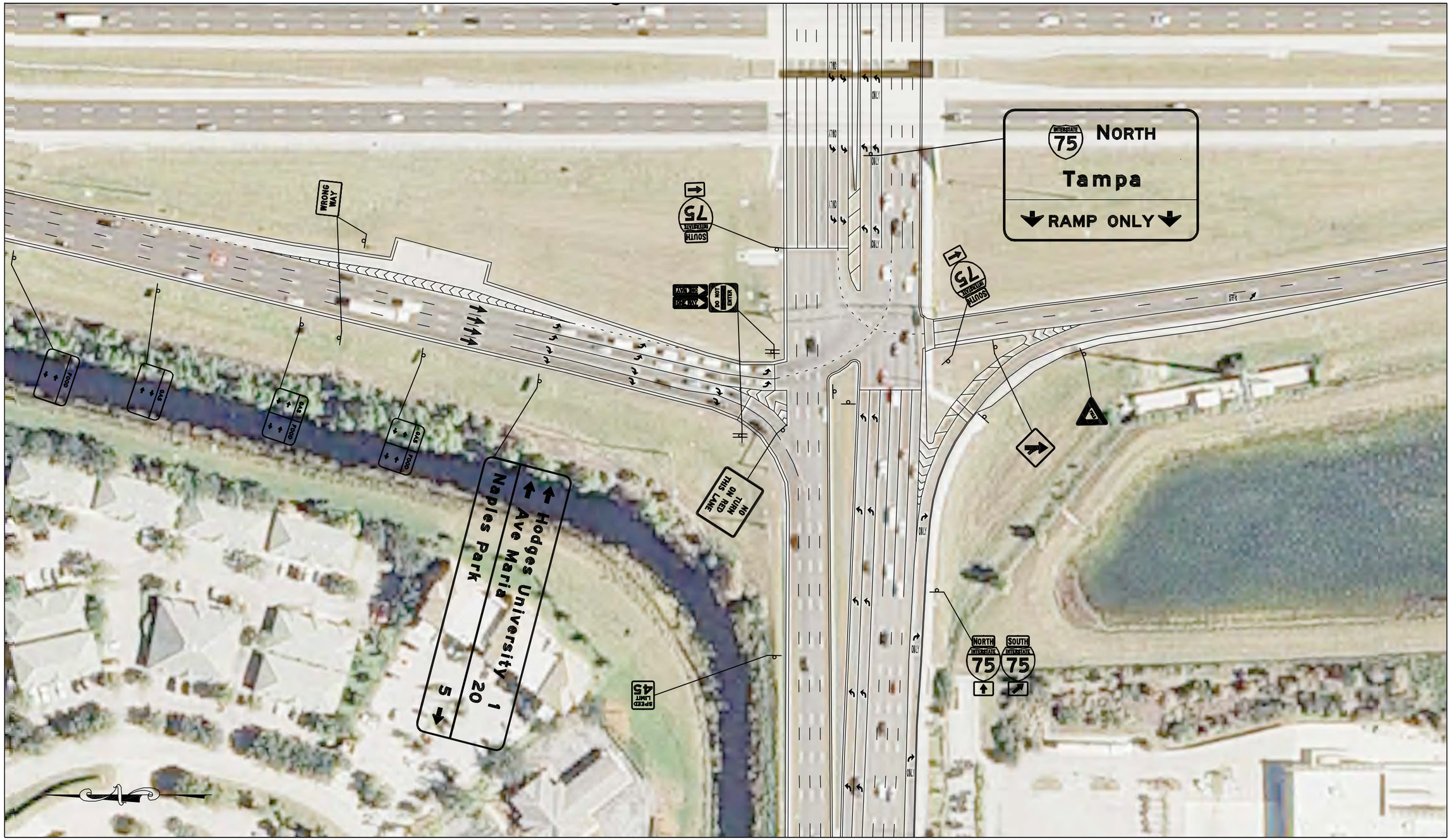
FIGURE NO.
2

I-75 AT CR 846 (IMMOKALEE RD)

The interchange of I-75 and CR 846, Exit 111, is located in the City of Naples, Collier County, FL. The interchange is in a Diamond configuration. I-75 runs in a north-south direction through the interchange and CR 846, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • CR 846: 45 mph
No. of Lanes:	• I-75: 6 DIV • CR 846: 6 DIV
Maintaining Agency:	• I-75: FDOT District 1 • CR 846: FDOT District 1
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Yield • I-75 Northbound Off Ramp: Signal • I-75 Southbound On Ramp: Yield • I-75 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• CR 846 EB Left: Signal – Protected Only • CR 846 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign (WB only) • Destination Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 2 Right Turn Lanes
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lanes • 2 Right Turn Lanes



SCALE

0 100 200

SYMBOLS

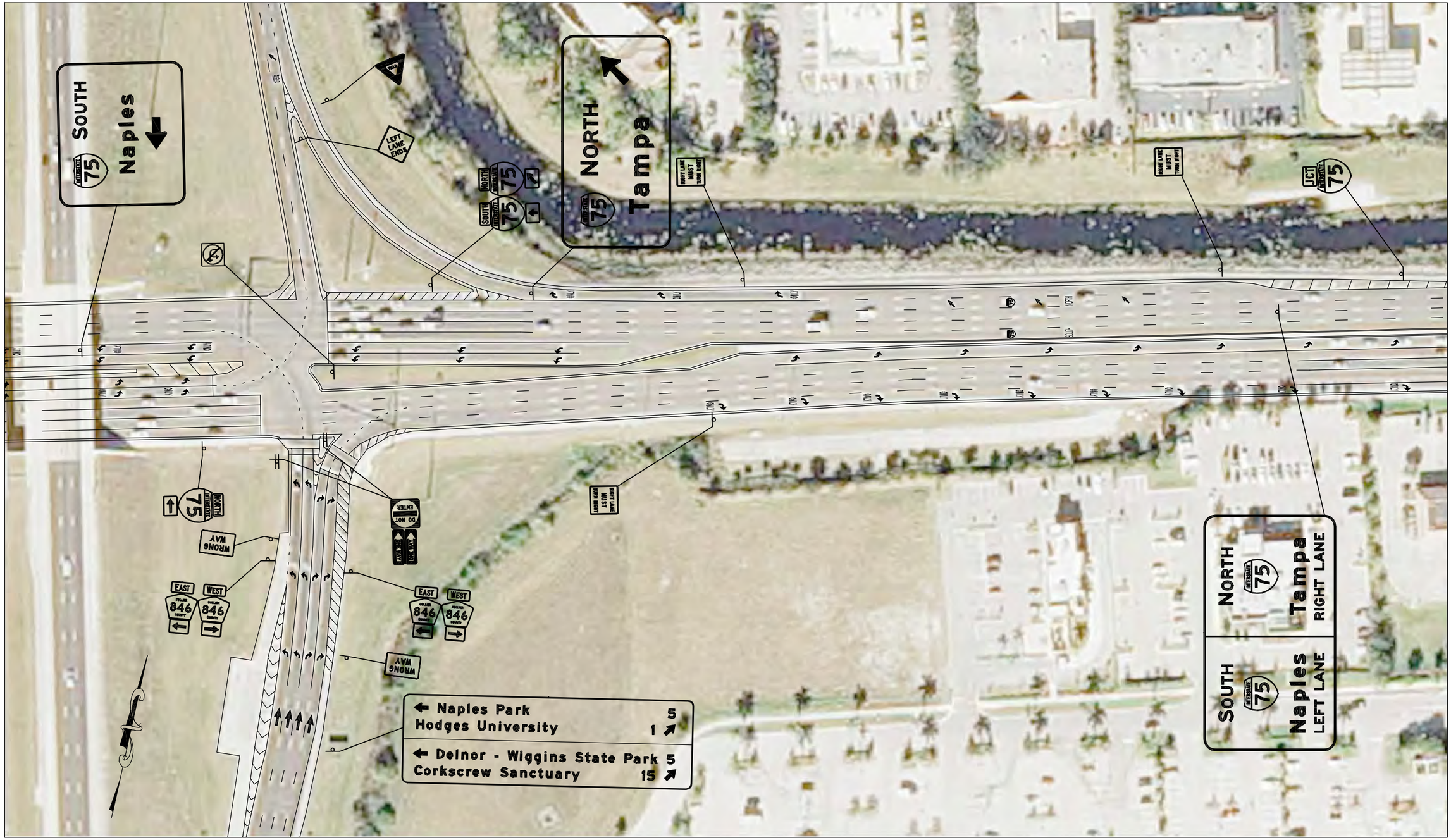
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-75 CR-846 (IMMOKALEE RD) NB/SB EXITS

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-75 CR-846 (IMMOKALEE RD) NB/SB EXITS

CONDITION DIAGRAM

FIGURE NO.
2

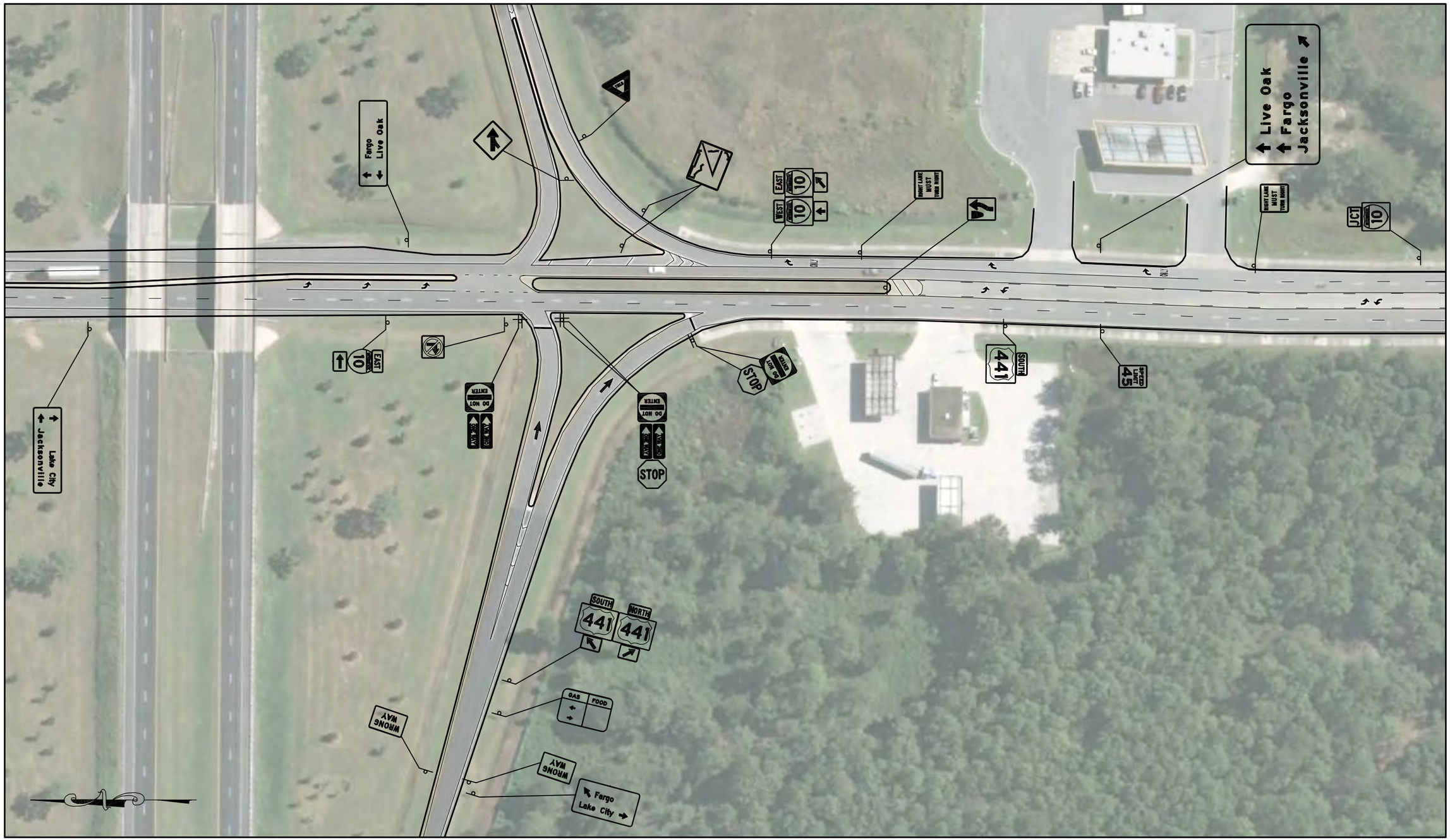
District 2

I-10 AT SR 47

The interchange of I-10 and SR 47, Exit 303, is located in the City of Lake City, Columbia County, FL. The interchange is in a Diamond configuration. I-10 runs in an east-west direction through the interchange and SR 47, a 4-lane divided highway, runs north-south.

Interchange Details

Speed Limits:	• I-10: 70 mph • SR 47: 45 mph
No. of Lanes:	• I-10: 4 DIV • SR 47: 4 DIV
Maintaining Agency:	• I-10: FDOT District 2 • SR 47: FDOT District 2
Traffic Control at Ramp Terminals	• I-10 Eastbound On Ramp: Yield • I-10 Eastbound Off Ramp: Stop • I-10 Westbound On Ramp: Yield • I-10 Westbound Off Ramp: Stop
Left-Turn to On-Ramp Traffic Control	• SR 47 NB Left: Yield • SR 47 SB Left: Yield
Lighting Level	• NW Quadrant: No Lighting • NE Quadrant: No Lighting • SE Quadrant: No Lighting • SW Quadrant: No Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Destination Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane
WB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

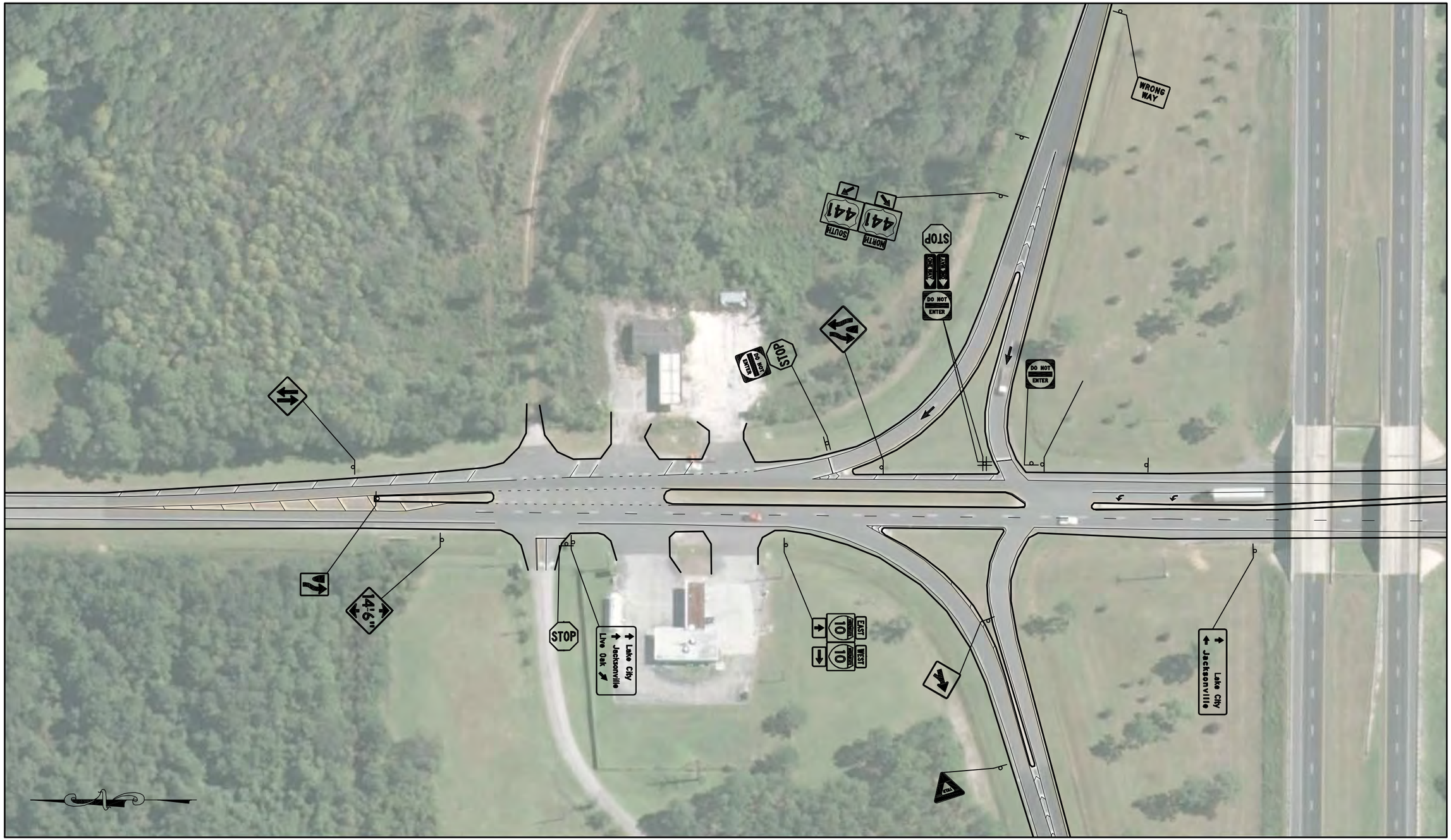
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-10 SR47 EB EXIT

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-10 SR47 WB EXIT

CONDITION DIAGRAM

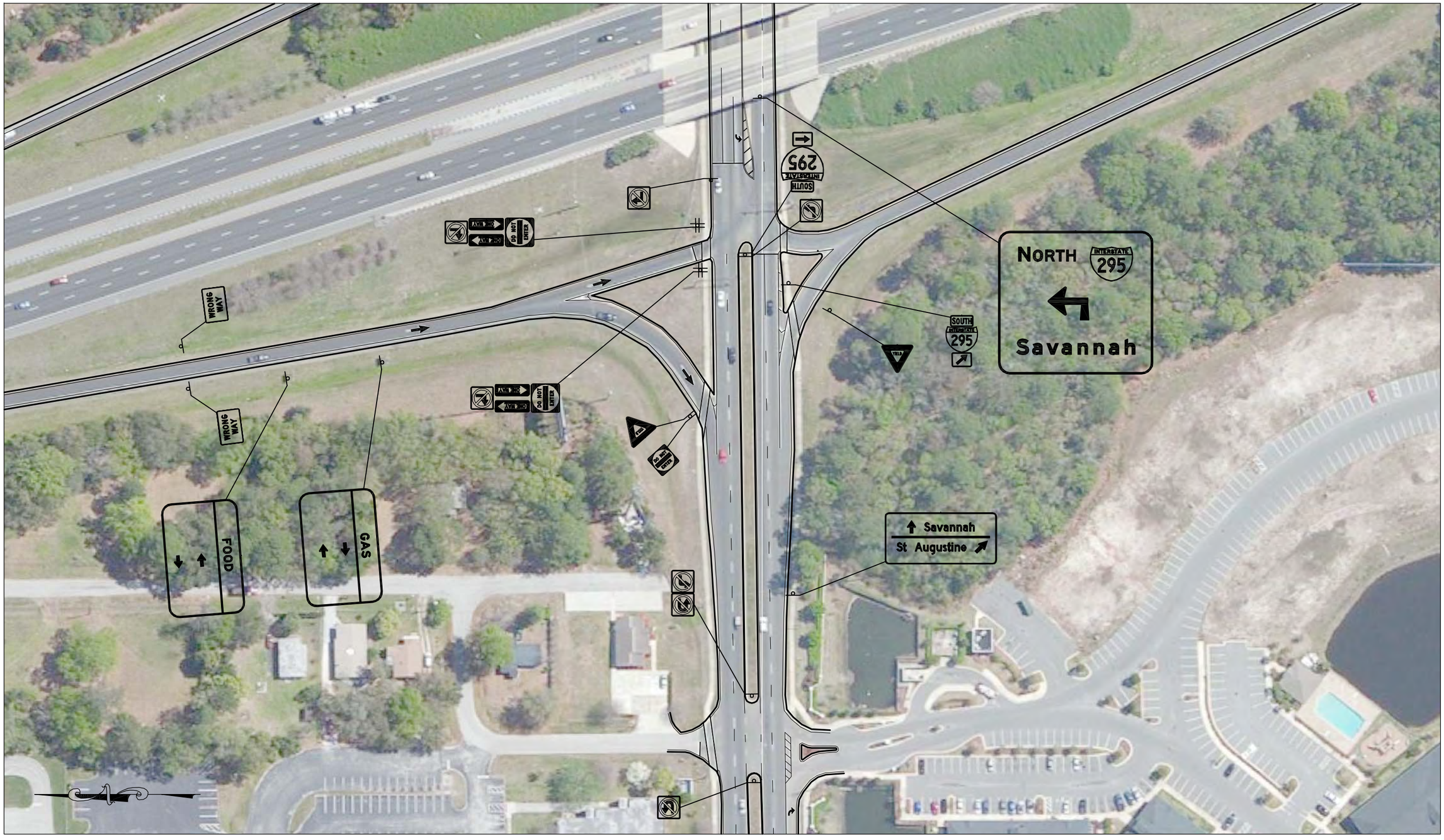
FIGURE NO.
2

I-295 AT SR 208 (WILSON BLVD)

The interchange of I-295 and SR 208, Exit 17, is located in the City of Jacksonville, Duval County, FL. The interchange is in a Diamond configuration. I-295 runs in a north-south direction through the interchange and SR 208, a 5-lane highway, runs east-west.

Interchange Details

Speed Limits:	• I-295: 65 mph • SR 208: 45 mph
No. of Lanes:	• I-295: 6 DIV • SR 208: 4 + TWLTL
Maintaining Agency:	• I-295: FDOT District 2 • SR 208: FDOT District 2
Traffic Control at Ramp Terminals	• I-295 Northbound On Ramp: Yield • I-295 Northbound Off Ramp: Signal/Yield • I-295 Southbound On Ramp: Yield • I-295 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• SR 208 EB Left: Signal • SR 208 WB Left: Signal
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Destination Sign • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn Lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn Lane



SCALE

0 100 200

SYMBOLS

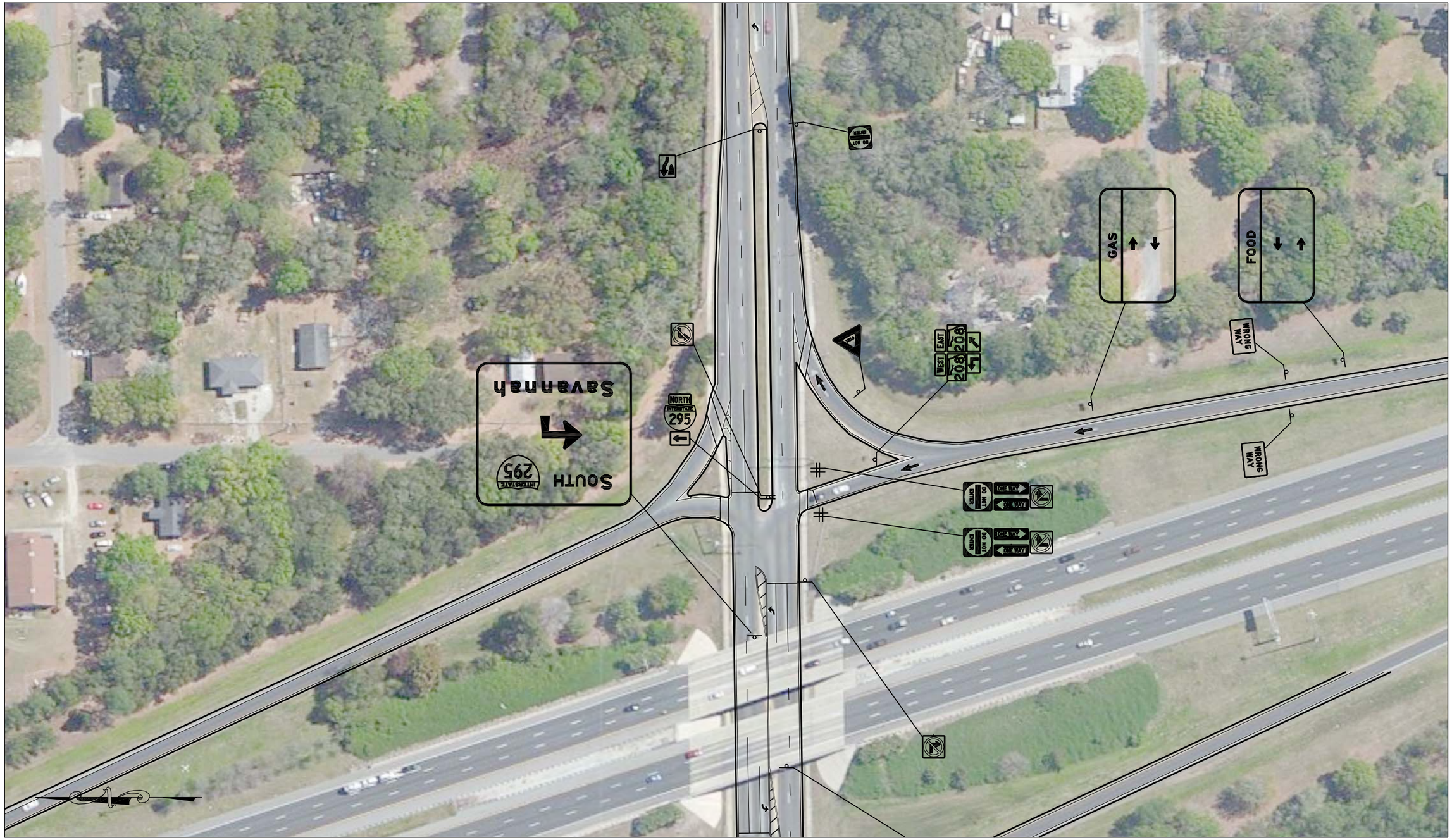
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I–295 & SR208/WILSON BLVD

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-295 & SR208/WILSON BLVD

CONDITION DIAGRAM

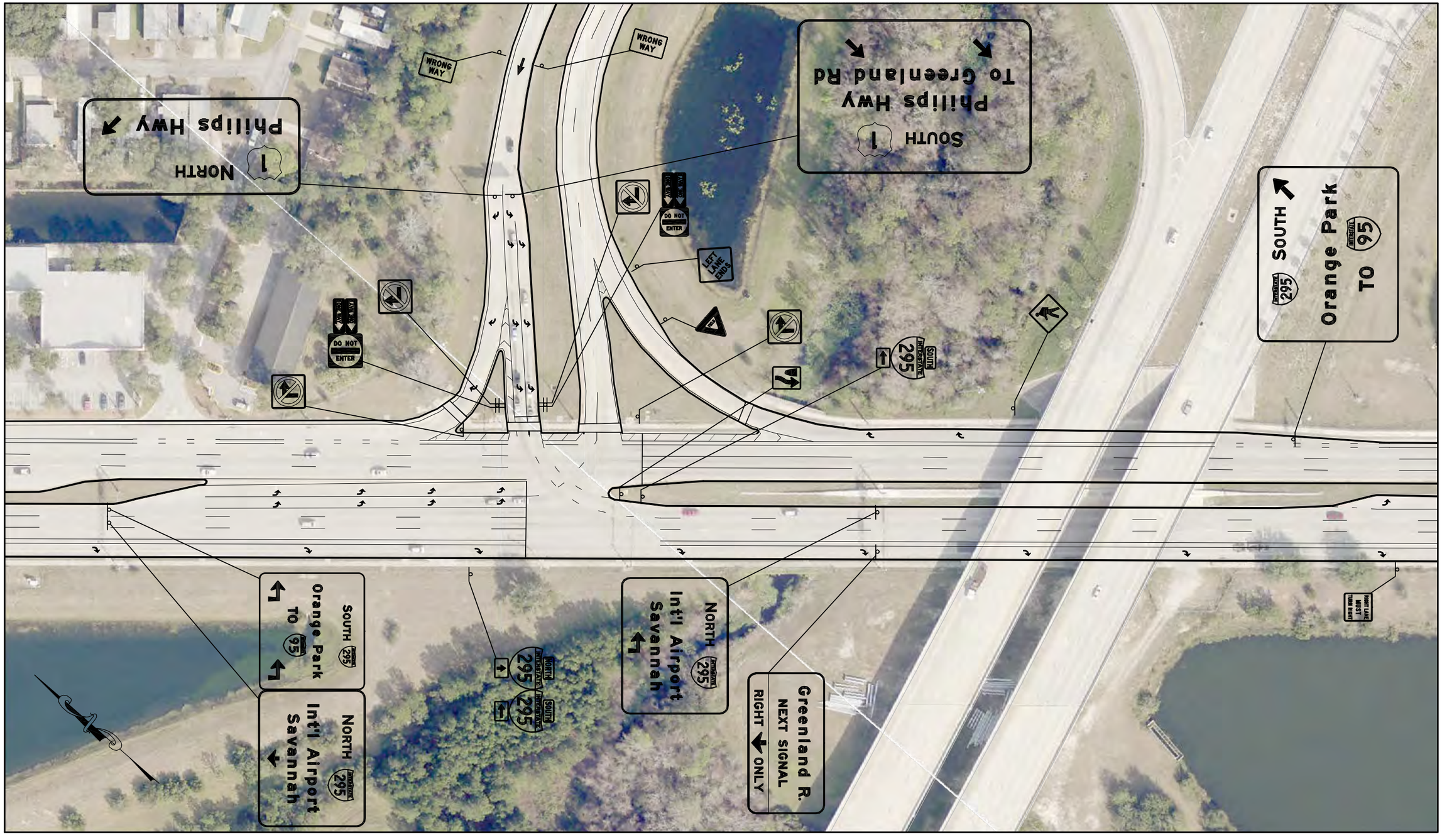
FIGURE NO.
2

I-295 AT US 1

The interchange of I-295 and US 1, Exit 60, is located in the City of Jacksonville, Duval County, FL. The interchange is in a Partial Cloverleaf (Parclo) configuration, with a loop ramp serving the I-295 East exit to US 1 and US 1 to I-295 West movements. I-295 runs in a west-east direction through the interchange and US 1, a 6-lane divided highway through the interchange, runs southeast-northwest.

Interchange Details

Speed Limits:	• I-295: 65 mph • US 1: 55 mph
No. of Lanes:	• I-95: 6 DIV • US 1: 6 DIV
Maintaining Agency:	• I-295: FDOT District 2 • US 1: FDOT District 2
Traffic Control at Ramp Terminals	• I-295 Westbound On Ramp: Signal • I-295 Westbound Off Ramp: Signal • I-295 Eastbound On Ramp: Signal • I-295 Eastbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• US 1 SB Left: Signal – Protected • US 1 NB Left: Signal – Protected
Lighting Level	• NW Quadrant: Interchange • NE Quadrant: Interchange • SE Quadrant: Interchange • SW Quadrant: Interchange
Guide Signage Along Crossroad (Southbound US 1)	• Junction Sign (Overhead and temporary road-side signs in place) • Advance Assembly for the first ramp • Directional Assembly (Overhead) for the first ramp • Advance Assembly (Overhead) for the second ramp • Directional Assembly for the second ramp
Guide Signage Along Crossroad (Northbound US 1)	• Junction Sign (Overhead and road-side) • Advance Assembly (Overhead) for the first ramp • Directional Assembly for the first ramp • Directional Assembly (Overhead) for the second ramp
WB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lane • 1 Right Turn lane (Slip w/ Yield)



SYMBOLS

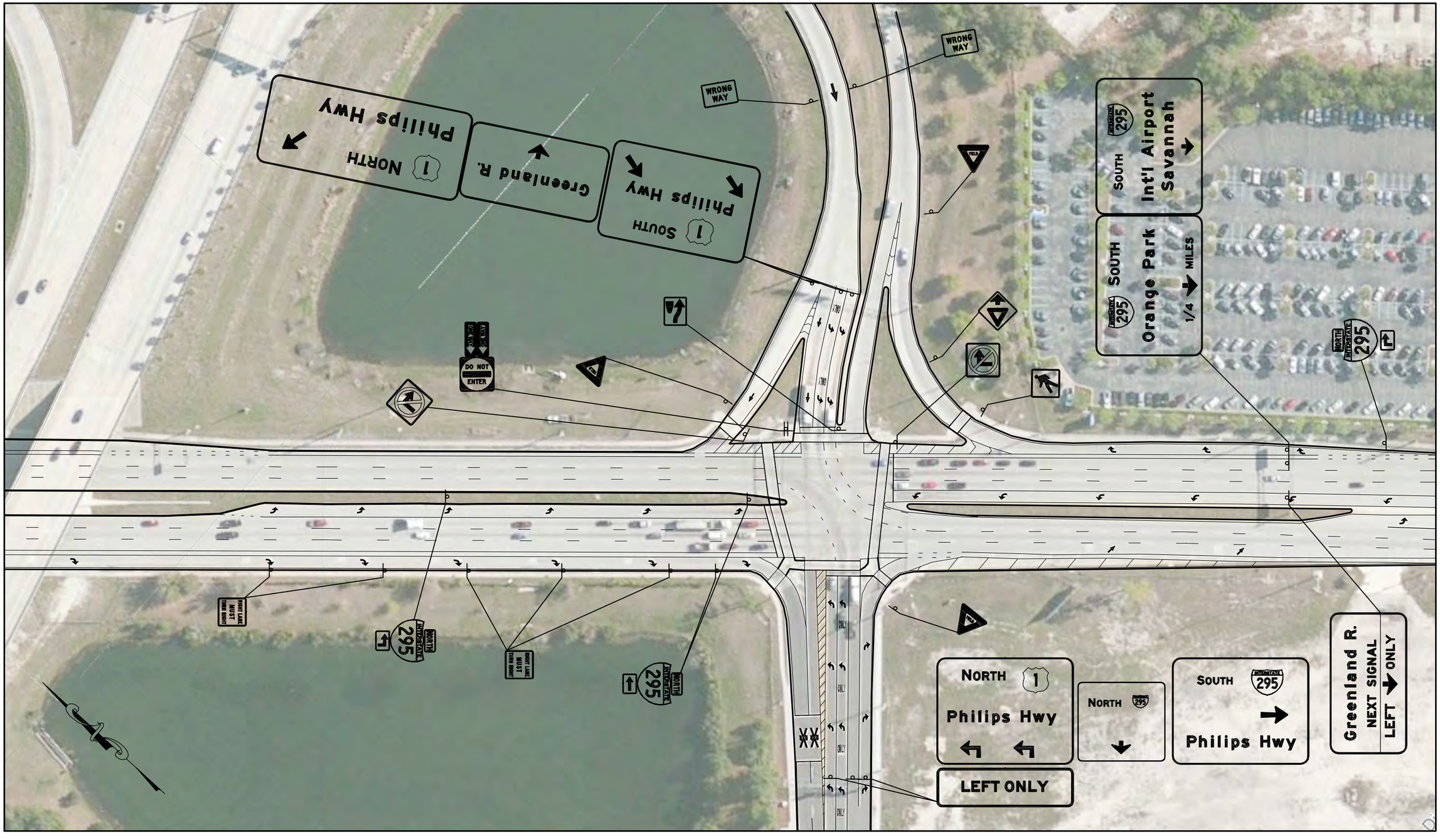
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-295 & US-1

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-295 & US-1

CONDITION DIAGRAM

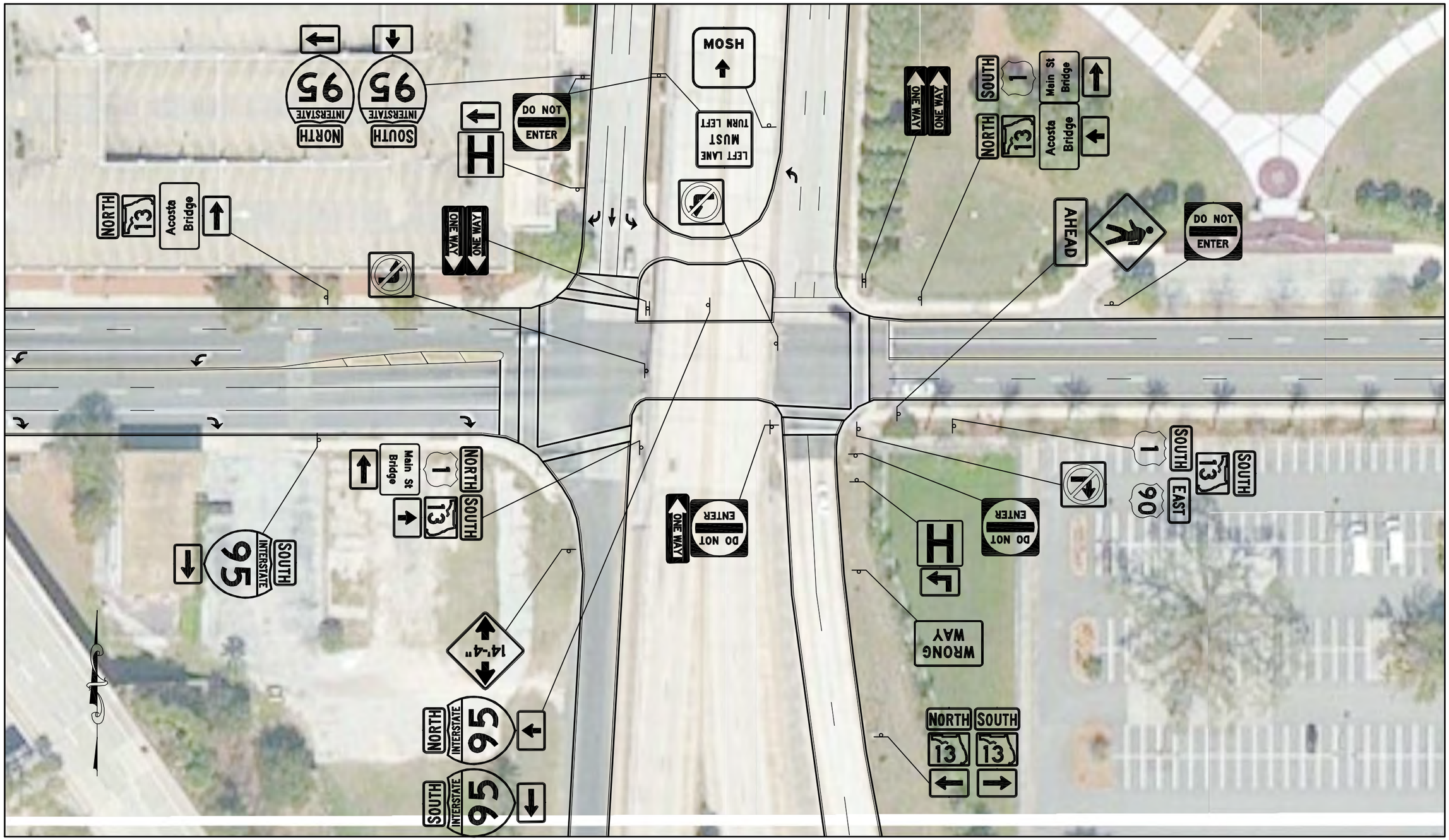
FIGURE NO.
2

I-95 AT PRUDENTIAL DR/MARY ST

The interchange of I-95 and Prudential Dr/Mary St is located in the City of Jacksonville, Duval County, FL. The interchange is in a Y-Intersection configuration, as seen in the image to the right. I-95 runs in an east-west direction through the interchange and Prudential Dr, a 4-lane arterial, runs east-west.

Interchange Details

Speed Limits:	• I-95: 55 mph • Prudential Dr: 30 mph
No. of Lanes:	• I-95: 6 DIV • Prudential Dr: 4
Maintaining Agency:	• I-95: FDOT District 2 • Prudential Dr: FDOT District 2
Traffic Control at Ramp Terminals	• I-95 Eastbound On Ramp: Signal • I-95 Eastbound Off Ramp: Signal • I-95 Westbound On Ramp: Signal • I-95 Westbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• Prudential Dr WB Left: Signal • Palm Ave NB Left: Signal
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• TO Auxiliary Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn/Thru Lane • 2 Thru Lanes • 1 Right Turn/Thru Lane
WB Off-Ramp Lane Configurations:	• Double Lane Exit • 2 Thru Lanes



SCALE

0 50 100

SYMBOLS

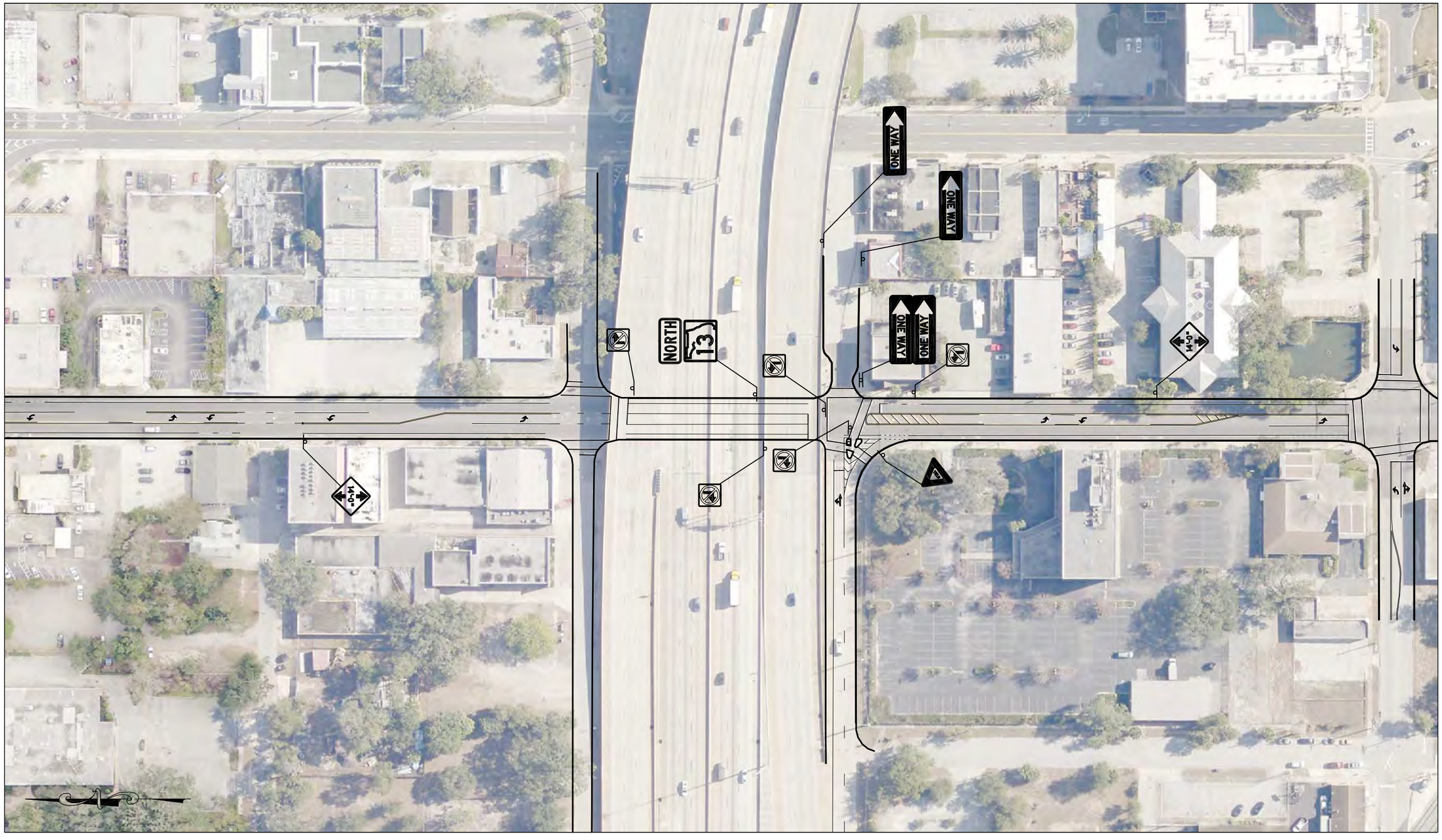
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 & PRUDENTIAL WAY

CONDITION DIAGRAM

FIGURE NO.
1



SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 & PRUDENTIAL WAY

CONDITION DIAGRAM

FIGURE NO.
2

I-95 AT US 1

The interchange of I-95 and US 1, Exit 339, is located in the City of Jacksonville, Duval County, FL. The interchange is in a Partial-Cloverleaf (Parclo) configuration, with loop ramps serving the US-1 to I-95 South and I-95 N exit to US-1 movements, as seen in the image to the right. I-95 runs in a north-south direction through the interchange and US-1, a 4- and 6-lane divided highway, runs southeast-northwest.

Interchange Details

Speed Limits:	• I-95: 65 mph • US-1: 45 mph
No. of Lanes:	• I-95: 8 DIV • SR 44: 5 DIV (2 NB and 3 SB lanes)
Maintaining Agency:	• I-95: FDOT District 2 • US-1: FDOT District 2
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Signal • I-95 Northbound Off Ramp: Signal (Free R/T to NB US-1) • I-95 Southbound On Ramp: Free • I-95 Southbound Off Ramp: Signal (Free R/T to NB US-1)
Left-Turn to On-Ramp Traffic Control	• US-1 NB Left: Loop • US-1 SB Left: Signal (Protected-Permitted Phasing)
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lane • 1 Right Turn lane (Directional Loop w/ merge)
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lane • 1 Right Turn lane (Slip w/ merge)

SCALE

0 100 200

SYMBOLS

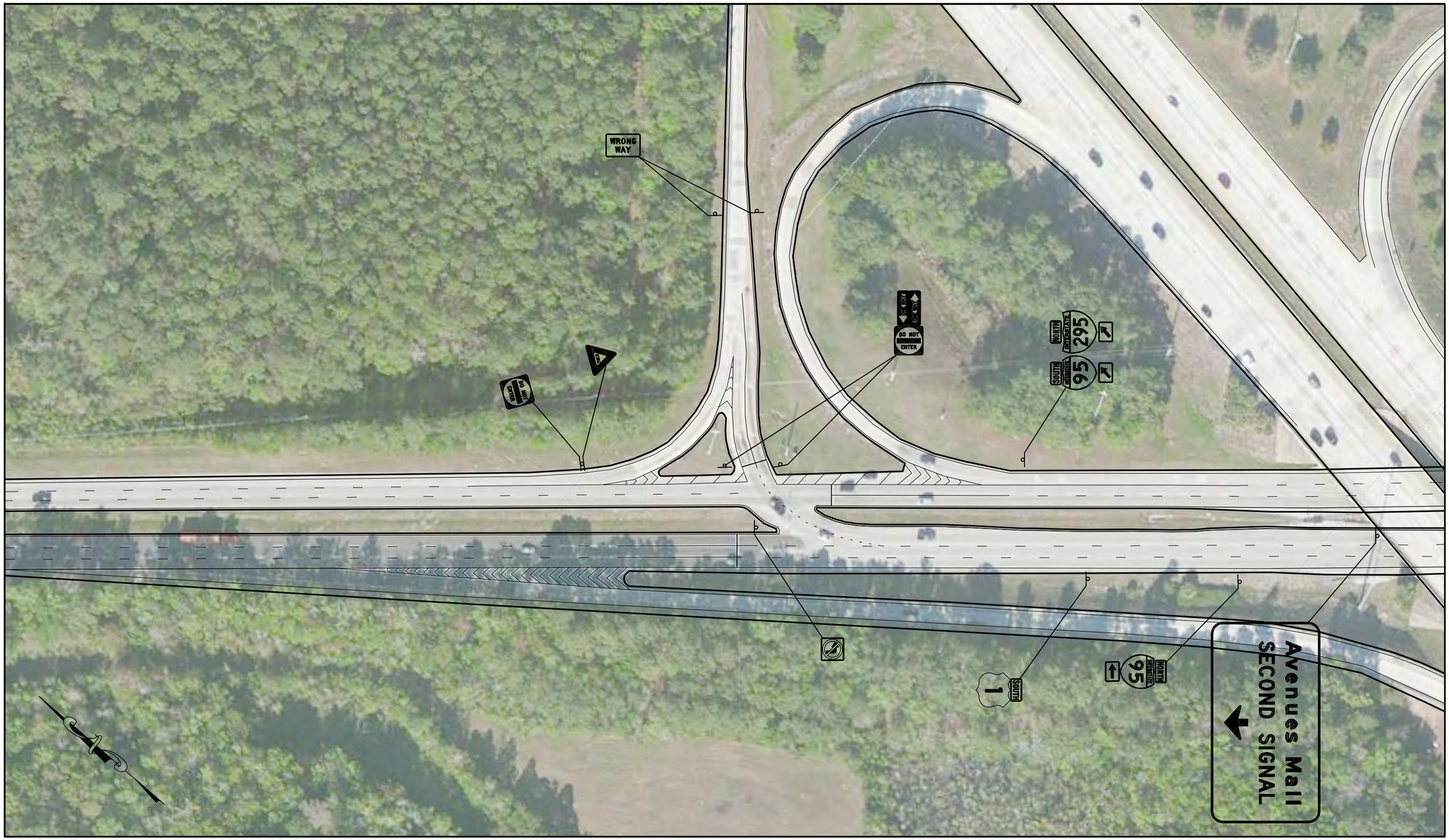
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 & US 1 NB Exit

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 & US 1 SB Exit

CONDITION DIAGRAM

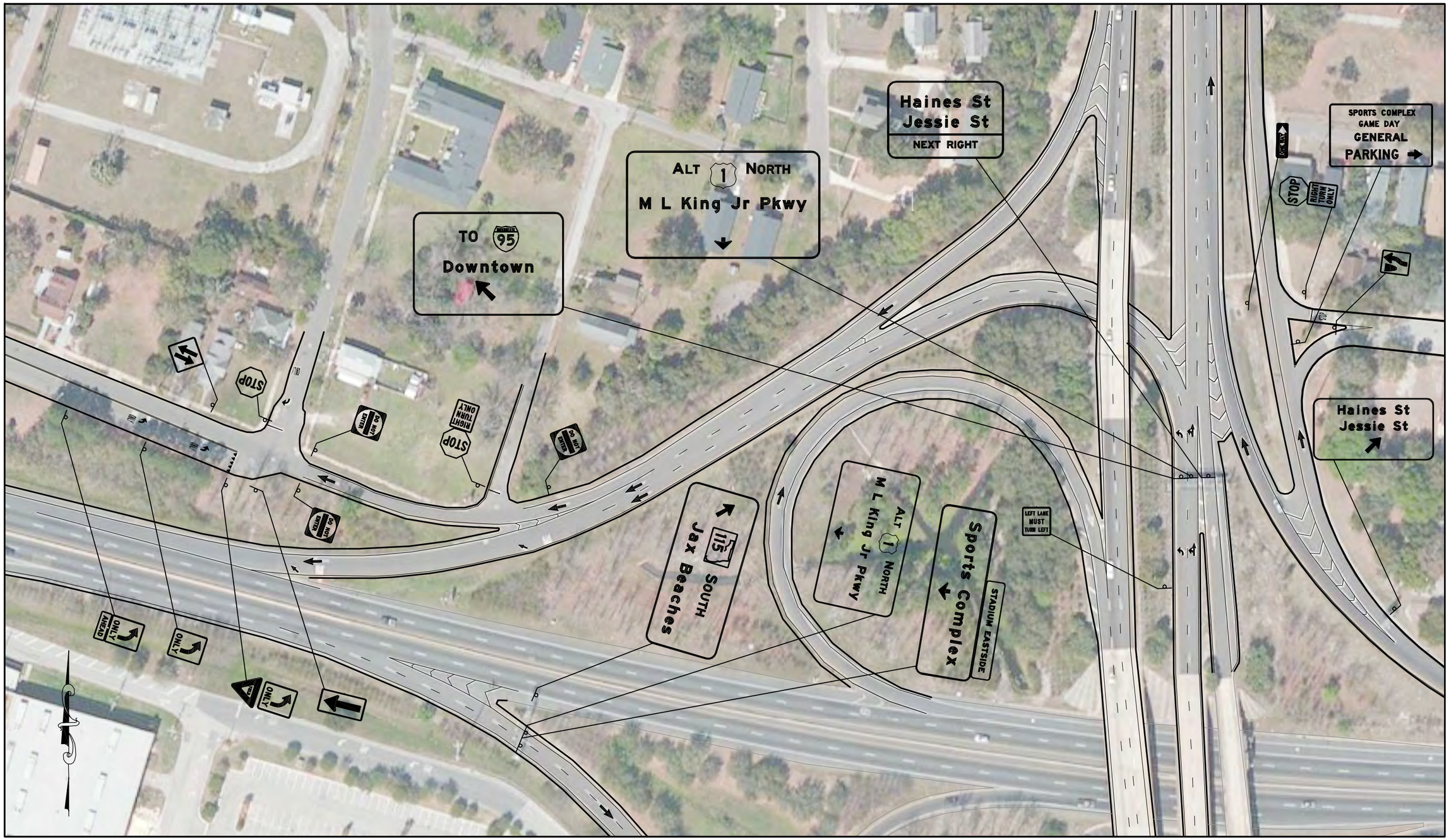
FIGURE NO.
2

MATTHEW'S EXPRESSWAY AT GATOR BOWL BLVD

The Gator Bowl Interchange, is located in the City of Jacksonville, Duval, FL. The interchange is in a Partial Cloverleaf (Parclo) configuration, with a loop ramp serving the WB SR 115 (Matthews Expy) to SB US 1 and SB US 1 to EB SR 115 (Matthews Expy) movements, as seen in the image to the right. Additionally, there is a directional flyover from EB Matthews Expy to NB US 1. US 1 runs in a north-south direction through the interchange and SR 115, a 4-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• US 1: 45 mph • SR 115: 45 mph
No. of Lanes:	• US 1: 4 DIV • SR 115: 4 DIV
Maintaining Agency:	• US 1: FDOT District 2 • SR 115: FDOT District 2
Traffic Control at Ramp Terminals	• SR 115 Eastbound On Ramp: Free • SR 115 Eastbound Off Ramp: Stop and Free • SR 115 Westbound On Ramp: Free • SR 115 Westbound Off-Ramp:Free • US 1 Southbound On Ramp: Free and Stop • US 1 Southbound Off Ramp: Free • US 1 Northbound On Ramp: Free • US 1 Northbound Off-Ramp: Free
Left-Turn to On-Ramp Traffic Control	• US 1 NB Left: Free
Lighting Level	• NW Quadrant: Interchange • NE Quadrant: Interchange • SE Quadrant: Interchange • SW Quadrant: Interchange
Guide Signage Along SR 115 (both directions)	• Advance Signage for first and second ramp • Directional Assembly for the first ramp • Directional Assembly for the second ramp • Falls under MUTCD 2009 Chapter 2E
Guide Signage Along US 1 SB	• Directional Assembly for the first ramp • Advance Assembly for the second ramp • Directional Assembly for the second ramp
Guide Signage Along US 1 NB	• Advance Signage for first and second ramp • Directional Assembly for the first ramp • Directional Assembly for the second ramp
US 1 NB Off- Ramp Lane Configuration:	• Single Lane Exit to EB SR 115 • Two Lane Exit to WB SR 115
US 1 SB Off-Ramp Lane Configurations:	• Single Lane Exit to EB SR 115 • Single Lane Exit to WB SR 115
SR 115 WB Off- Ramp Lane Configuration:	• Single Lane Exit to NB US 1 • Single Lane Exit to SB US 1
SR 115 EB Off- Ramp Lane Configuration:	• Two Lane Exit to NB and SB US 1



SCALE

0 100 200

SYMBOLS

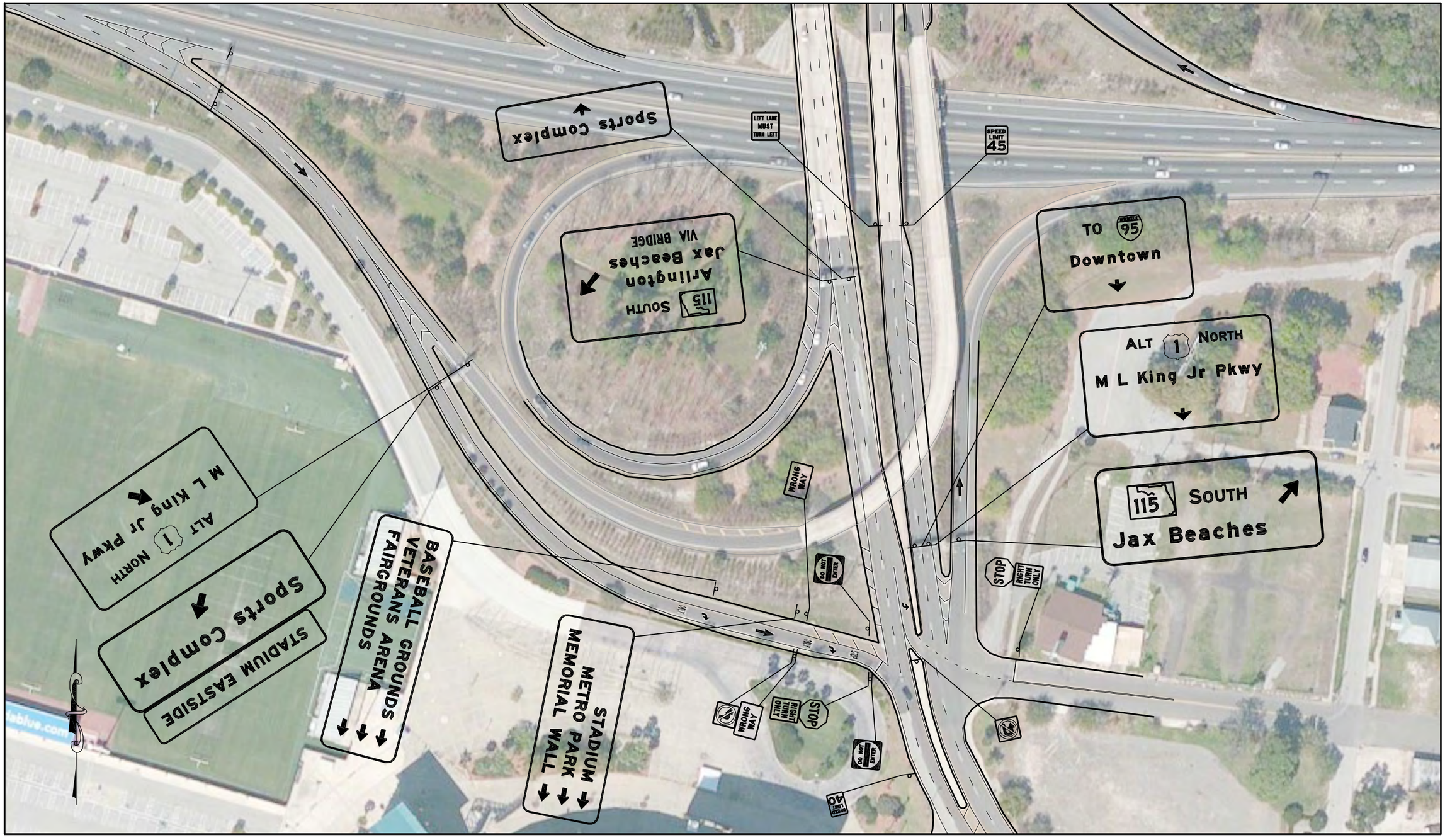
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
MATHEW'S EXPY & GATOR BOWL BLVD WB EXIT

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
MATHEW'S EXPY & GATOR BOWL BLVD WB EXIT

CONDITION DIAGRAM

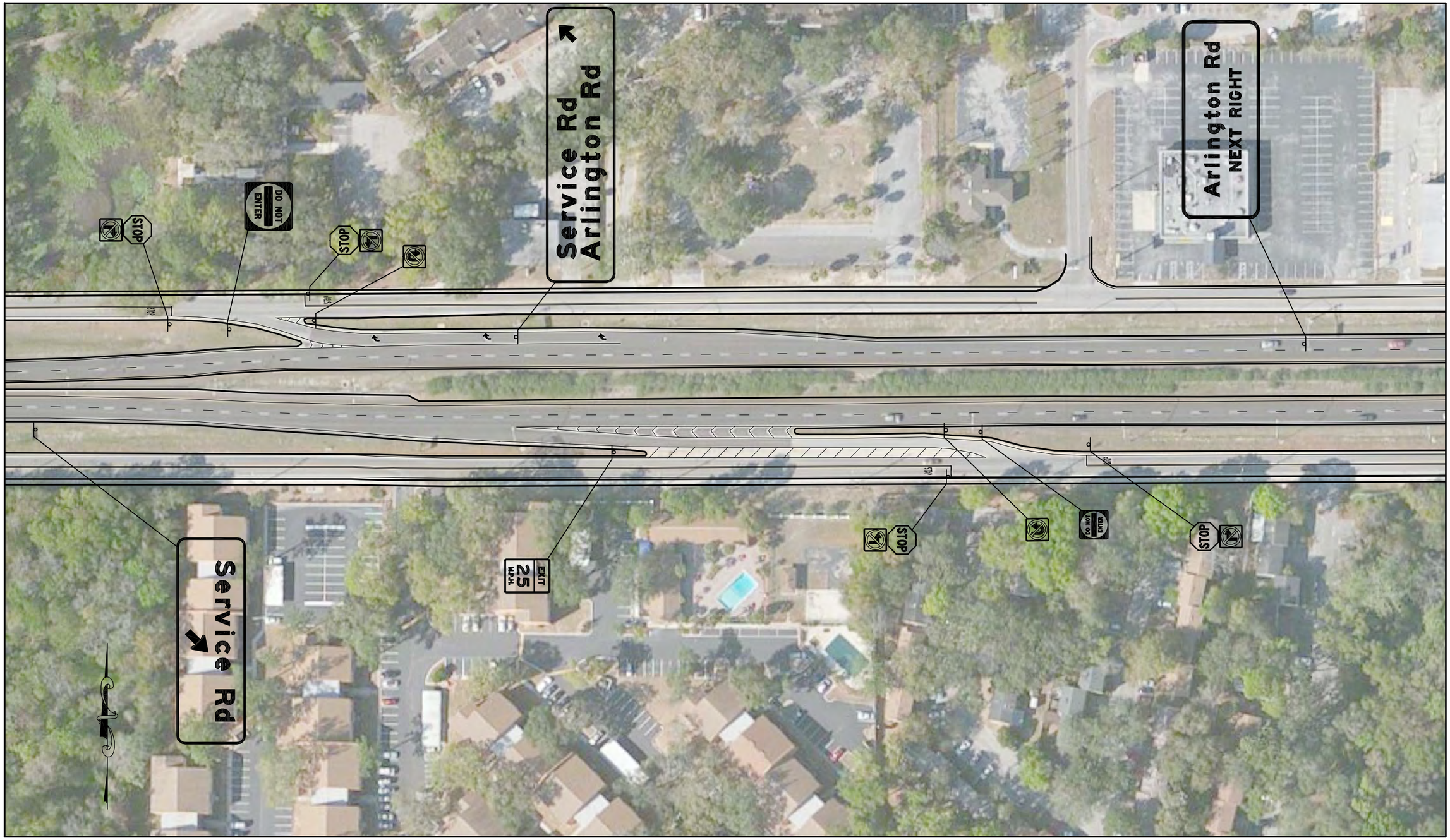
FIGURE NO.
2

ARLINGTON EXPRESSWAY AT SERVICE ROAD (EAST OF ARLINGTON RD)

The interchange of Arlington Expressway with the Service Road exits east of Arlington Road is located in the City of Jacksonville, Duval County, FL. The interchange is a direct access to frontage road. The Arlington Expressway runs in an east-west direction. The access/frontage road runs parallel to the expressway and in this section of the facility, is bi-directional on the north and south sides of Arlington Expressway.

Interchange Details

Speed Limits:	• Arlington Expressway: 50 mph • Service Road: 35 mph
No. of Lanes:	• Arlington Expressway: 4 DIV • Service Roads: 2 UNDIVIDED (Each)
Maintaining Agency:	• Arlington Expressway: FDOT District 2 • Service Road: FDOT District 2
Traffic Control at Ramp Terminals	• Arlington Expressway Eastbound Off Ramp: Yield • Arlington Expressway Service Road Eastbound: Stop • Arlington Expressway Service Road Westbound: Stop
Left-Turn to On-Ramp Traffic Control	• Service Road EB Left: Direct Access at On-Ramp
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• None
EB Off- Ramp Lane Configuration:	• Single Lane Exit



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR115 EB EXIT TO ARLINGTON EXPWY SERVICE RD

CONDITION DIAGRAM

FIGURE NO.

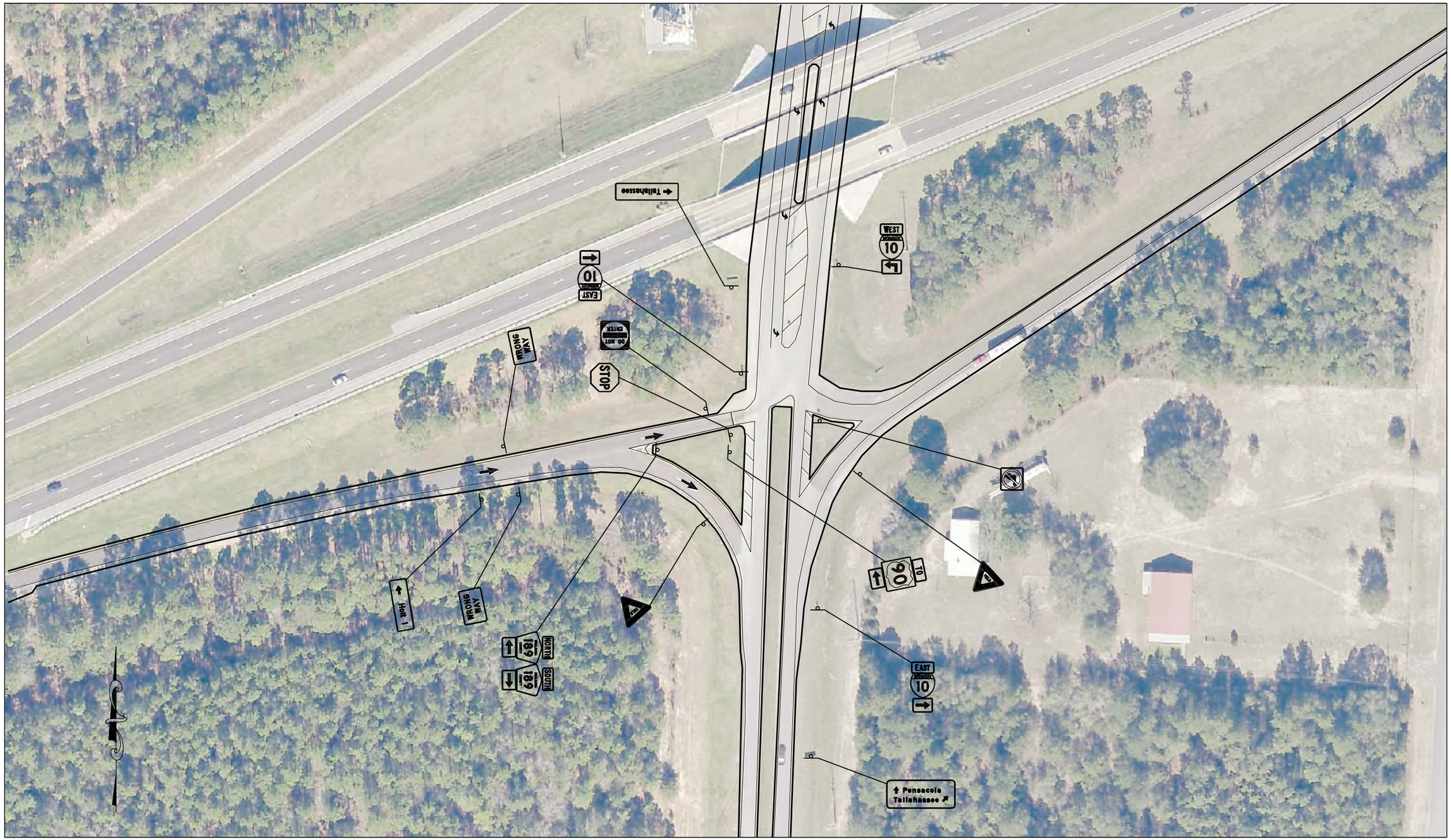
District 3

I-10 AT LOG LAKE ROAD

The interchange of I-10 and Log Lake Rd, Exit 45, is located in the City of Holt, Okaloosa County, FL. The interchange is in a Diamond configuration. I-10 runs in an east-west direction through the interchange and Log Lake Rd, a 2-lane highway, runs east-west.

Interchange Details

Speed Limits:	• I-10: 70 mph • Log Lake Rd: 45 mph
No. of Lanes:	• I-10: 4 DIV • Log Lake Rd: 2
Maintaining Agency:	• I-10: FDOT District 3 • Log Lake Rd: FDOT District 3
Traffic Control at Ramp Terminals	• I-10 Eastbound On Ramp: Yield • I-10 Eastbound Off Ramp: Stop/Yield • I-10 Westbound On Ramp: Yield • I-10 Westbound Off Ramp: Stop/Yield
Left-Turn to On-Ramp Traffic Control	• Log Lake Rd NB Left: Yield • Log Lake Rd SB Left: Yield
Lighting Level	• NW Quadrant: No Lighting • NE Quadrant: No Lighting • SE Quadrant: No Lighting • SW Quadrant: No Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Destination Sign • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane
WB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-10 LOG LAKE RD EB EXIT

CONDITION DIAGRAM

FIGURE NO.
1

SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-10 LOG LAKE RD WB EXIT

CONDITION DIAGRAM

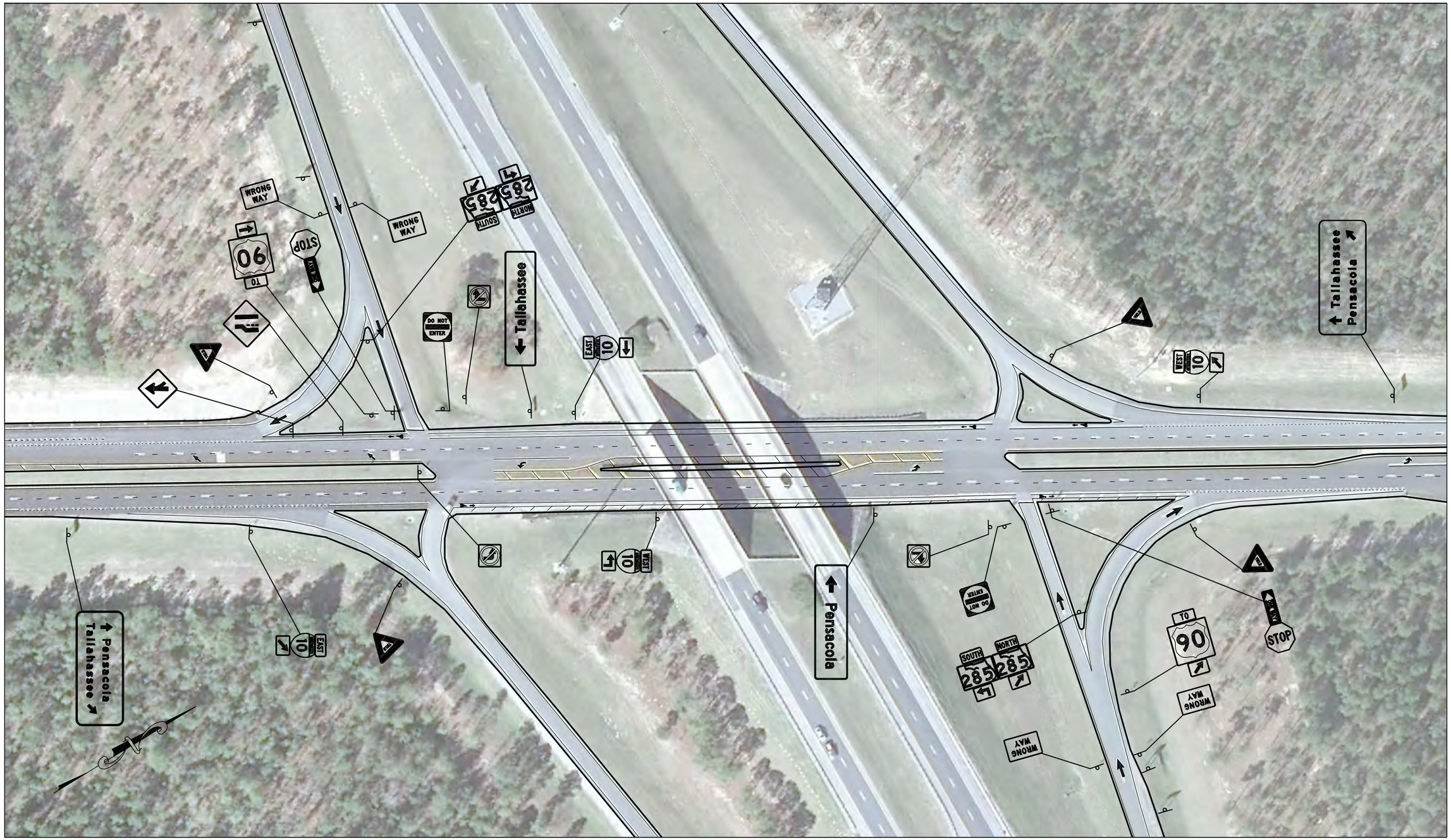
FIGURE NO.
2

I-10 AT SR 285

The interchange of I-10 and SR 285, Exit 70, is located in the City of Defuniak Springs, Walton County, FL. The interchange is in a Diamond configuration. I-10 runs in an east-west direction through the interchange and SR 285, a 2-lane highway, runs north-south.

Interchange Details

Speed Limits:	• I-10: 70 mph • SR 285: 45 mph
No. of Lanes:	• I-10: 4 DIV • SR 285: 2
Maintaining Agency:	• I-10: FDOT District 3 • SR 285: FDOT District 3
Traffic Control at Ramp Terminals	• I-10 Eastbound On Ramp: Yield • I-10 Eastbound Off Ramp: Stop/Yield • I-10 Westbound On Ramp: Yield • I-10 Westbound Off Ramp: Stop/Yield
Left-Turn to On-Ramp Traffic Control	• SR 285 NB Left: Yield • SR 285 SB Left: Yield
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign (WB only) • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Destination Sign • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn Lane
WB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn Lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-10 SR 285 EB/WB EXITS

CONDITION DIAGRAM

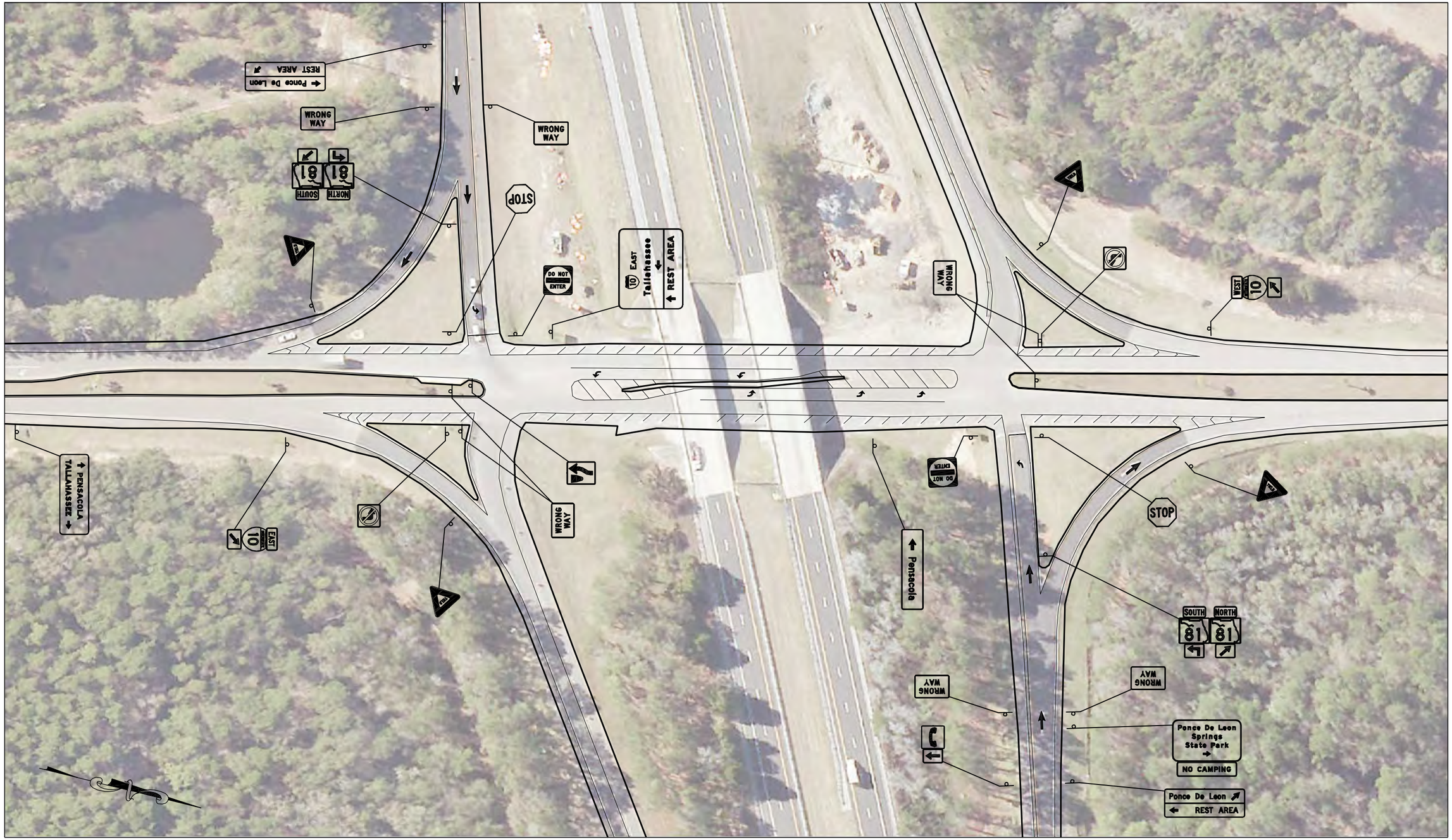
FIGURE NO.

I-10 AT SR 81 (SAMSON HWY)

The interchange of I-10 and SR 81, Exit 96, is located in the City of Ponce de Leon, Holmes County, FL. The interchange is in a Diamond configuration. I-10 runs in an east-west direction through the interchange and SR 81, a 2-lane highway, runs north-south.

Interchange Details

Speed Limits:	• I-10: 70 mph • SR 81: 45 mph
No. of Lanes:	• I-10: 4 DIV • SR 81: 2
Maintaining Agency:	• I-10: FDOT District 3 • SR 81: FDOT District 3
Traffic Control at Ramp Terminals	• I-10 Eastbound On Ramp: Yield • I-10 Eastbound Off Ramp: Stop/Yield • I-10 Westbound On Ramp: Yield • I-10 Westbound Off Ramp: Stop/Yield
Left-Turn to On-Ramp Traffic Control	• SR 81 NB Left: Yield • SR 81 SB Left: Yield
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Destination Sign • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane
WB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-10 SR 81 EB EXIT

CONDITION DIAGRAM

FIGURE NO.

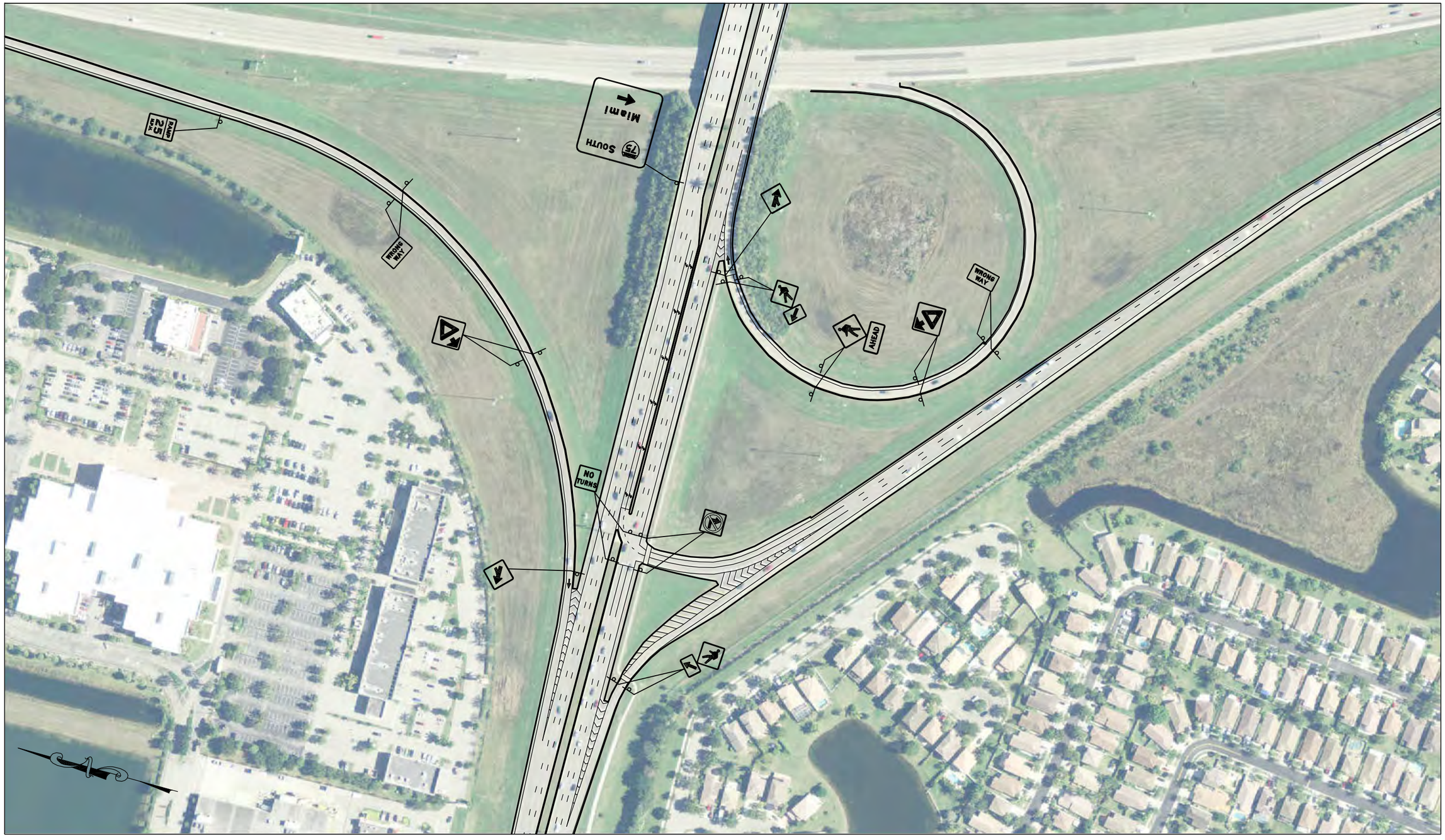
District 4

I-75 AT SR 822 (SHERIDAN ST)

The interchange of I-75 and SR 822, Exit 11, is located in the City of Davie, Broward County, FL. The interchange is in a Partial Cloverleaf configuration, with loop ramps serving the I-75 North to SR 822 West movement and the I-75 South to SR 822 East movement. I-75 runs in a north-south direction through the interchange and SR 822, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • SR 822: 35 mph
No. of Lanes:	• I-75: 8 DIV • SR 822: 6 DIV
Maintaining Agency:	• I-75: FDOT District 4 • SR 822: FDOT District 4
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Yield • I-75 Northbound Off Ramp: Yield • I-75 Southbound On Ramp: Yield • I-75 Southbound Off Ramp: Yield
Left-Turn to On-Ramp Traffic Control	• SR 822 EB Left: Signal – Protected Only • SR 822 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit
SB Off-Ramp Lane Configurations:	• Single Lane Exit



SCALE

0 200 400

SYMBOLS

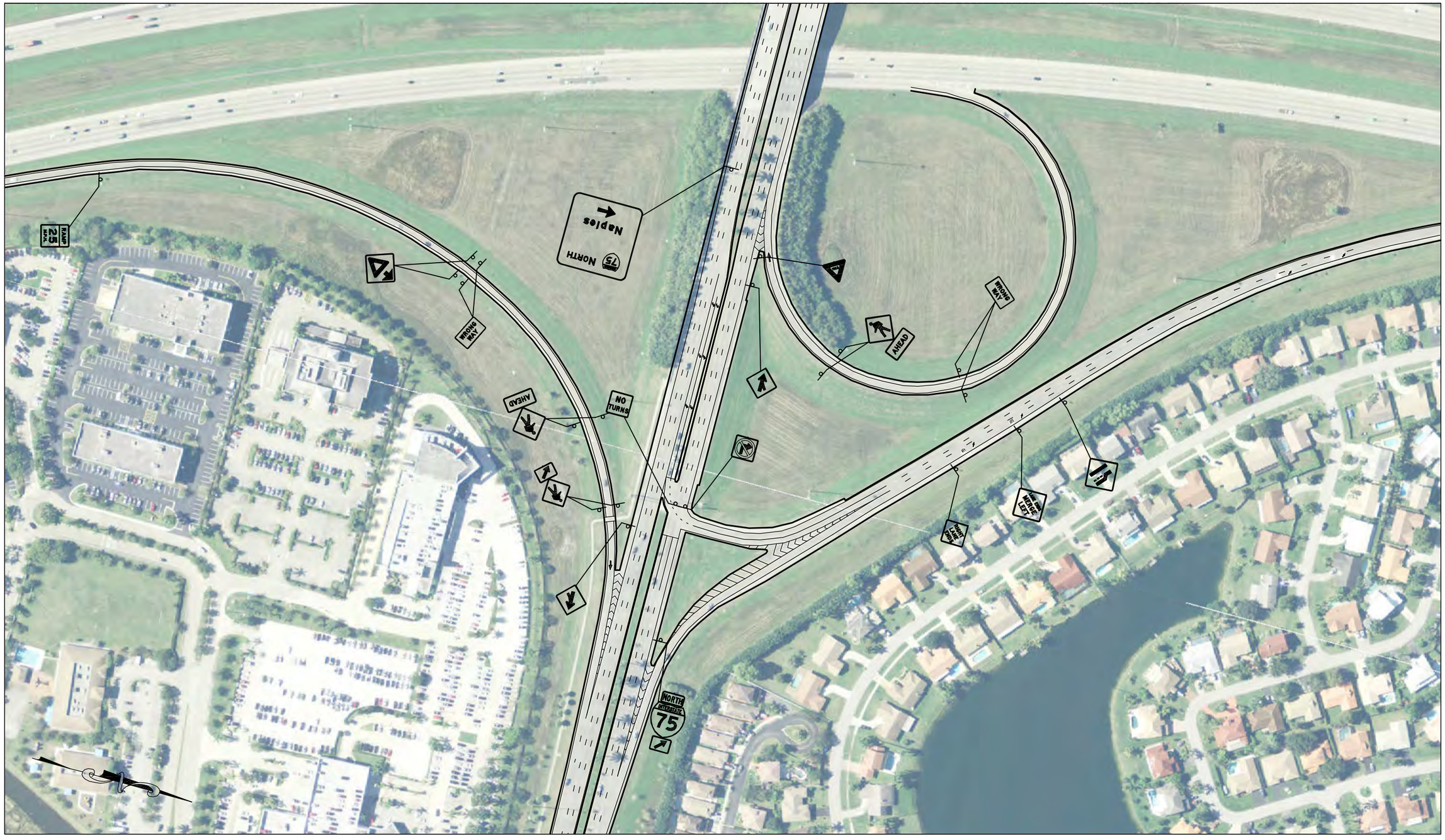
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-75 SR-822 SB RAMPS

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 200 400

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I–75 SR–822 NB RAMPS

CONDITION DIAGRAM

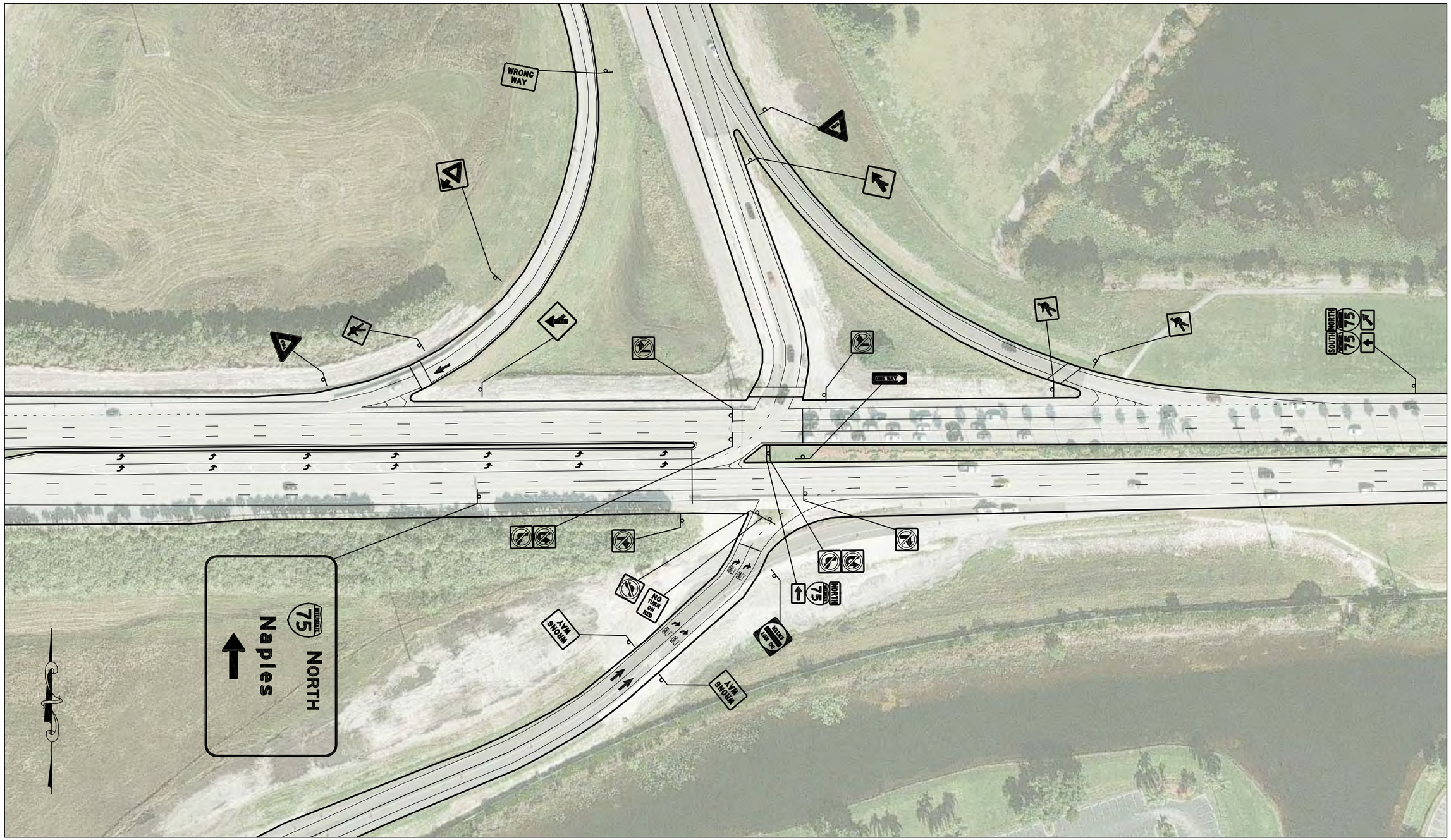
FIGURE NO.
2

I-75 AT MIRAMAR PARKWAY (S 33RD ST)

The interchange of I-75 and Miramar Pkwy, Exit 7, is located in the City of Miramar, Broward County, FL. The interchange is in a 2 Quadrant Cloverleaf configuration, with loop ramps serving the I-75 North to Miramar Pkwy West movement and the I-75 South to Miramar Pkwy East movement. I-75 runs in a north-south direction through the interchange and Miramar Pkwy, a 6-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • Miramar Pkwy: 45 mph
No. of Lanes:	• I-75: 8 DIV • Miramar Pkwy: 6 DIV
Maintaining Agency:	• I-75: FDOT District 6 • Miramar Pkwy: FDOT District 6
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Yield • I-75 Northbound Off Ramp EB: Signal • I-75 Northbound Off Ramp WB: Yield • I-75 Southbound On Ramp: Yield • I-75 Southbound Off Ramp EB: Yield • I-75 Southbound Off Ramp WB: Signal
Left-Turn to On-Ramp Traffic Control	• Miramar Pkwy EB Left: Signal – Protected Only • Miramar Pkwy WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Destination Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• NB to EB – Single Lane Exit – 2 Right Turn Lanes (Directional/Signal Controlled) • NB to WB – Single Lane Exit – 1 Right Turn Lane (Directional Loop/Yield Controlled)
SB Off-Ramp Lane Configurations:	• SB to WB – Single Lane Exit – 2 Right Turn Lanes (Directional/Signal Controlled) • SB to EB – Single Lane Exit – 1 Right Turn Lane (Directional Loop/Yield Controlled)



SCALE

0 100 200

SYMBOLS

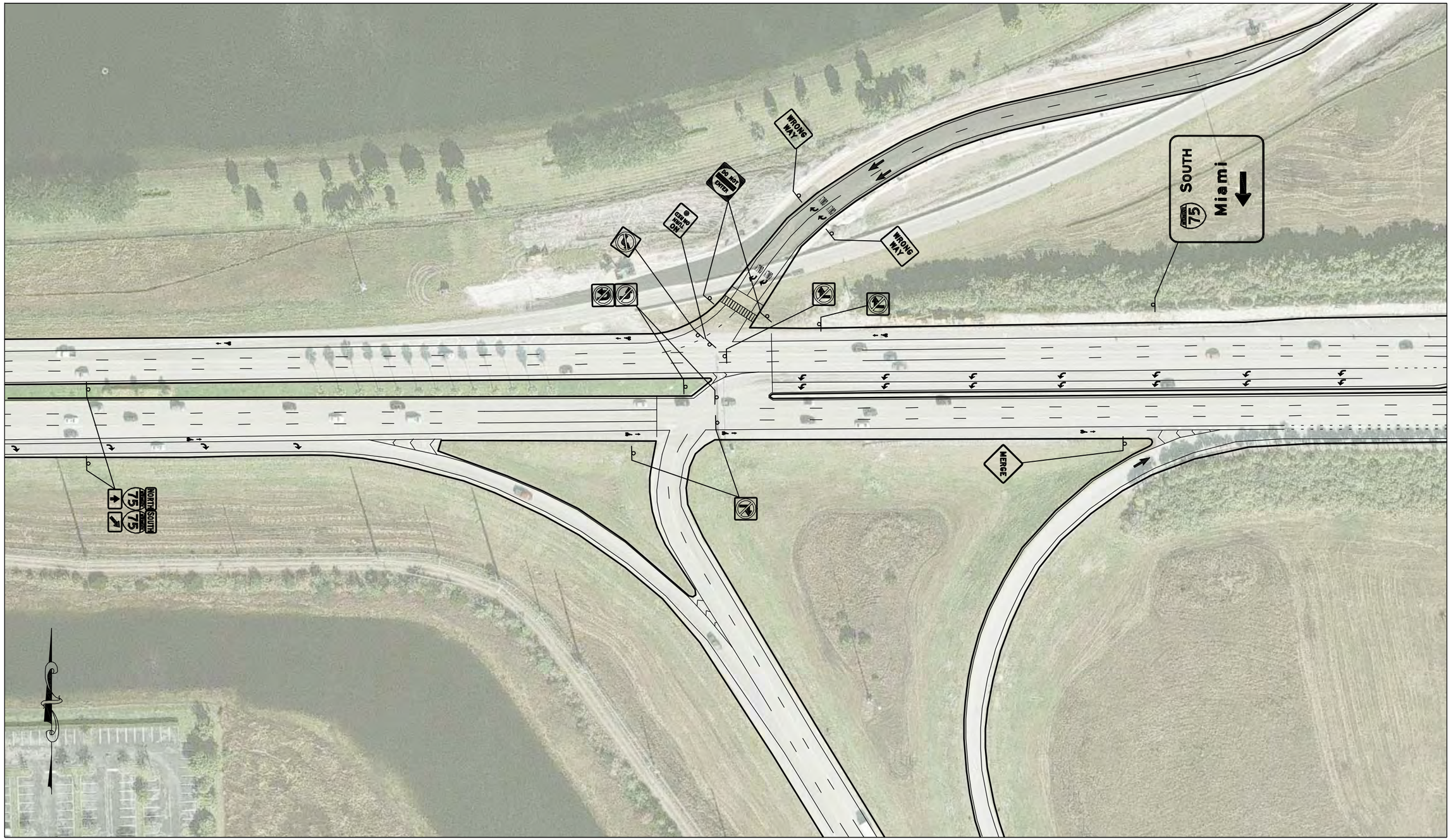
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I-75 MIRAMAR PKWY (S 33RD ST) NB EXIT

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

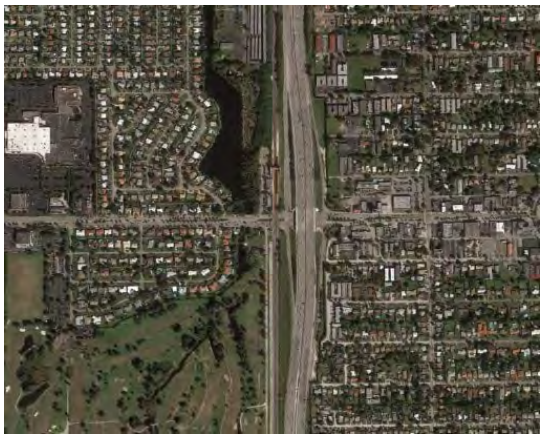
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-75 MIRAMAR PKWY (S 33RD ST) SB EXIT

CONDITION DIAGRAM

FIGURE NO.
2

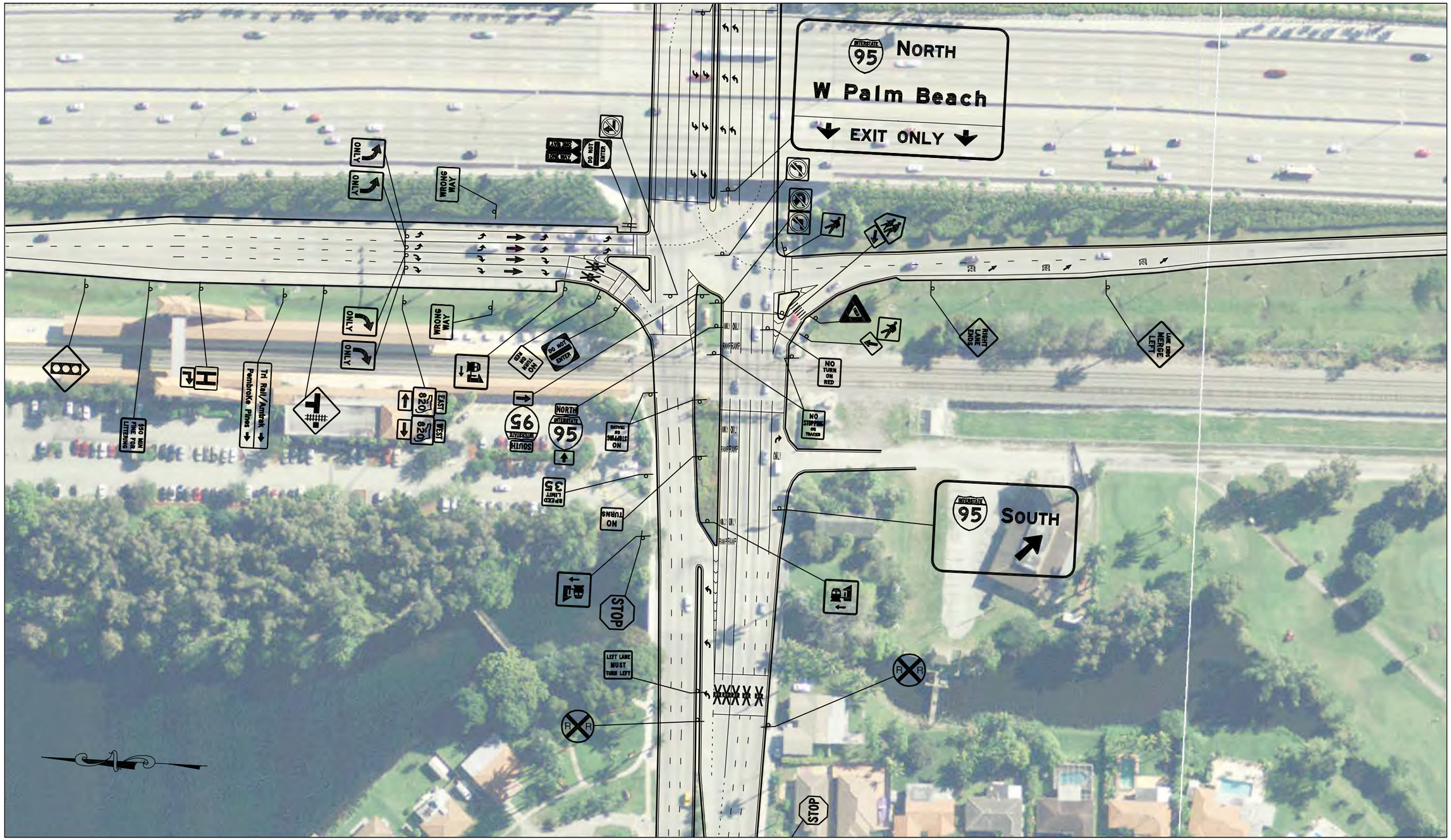
I-95 AT SR 820 (HOLLYWOOD BLVD)



The interchange of I-95 and SR 820, Exit 20, is located in the City of Hollywood, Broward County, FL. The interchange is in a Diamond configuration. I-95 runs in a north-south direction through the interchange and SR 820, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• I-95: 65 mph • SR 820: 35 mph
No. of Lanes:	• I-95: 10 DIV • SR 820: 6 DIV
Maintaining Agency:	• I-95: FDOT District 4 • SR 820: FDOT District 4
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Yield • I-95 Northbound Off Ramp: Signal/Yield • I-95 Southbound On Ramp: Yield • I-95 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• SR 820 EB Left: Signal – Protected Only • SR 820 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lanes • 2 Right Turn Lanes



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I–95 SR–820 SB RAMPS

CONDITION DIAGRAM

FIGURE NO.
1

SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

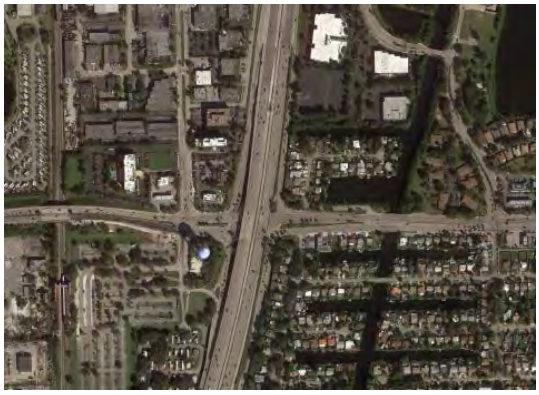
WRONG-WAY
CRASH ANALYSIS
I-95 SR-820 NB RAMPS

CONDITION DIAGRAM

FIGURE NO.
2

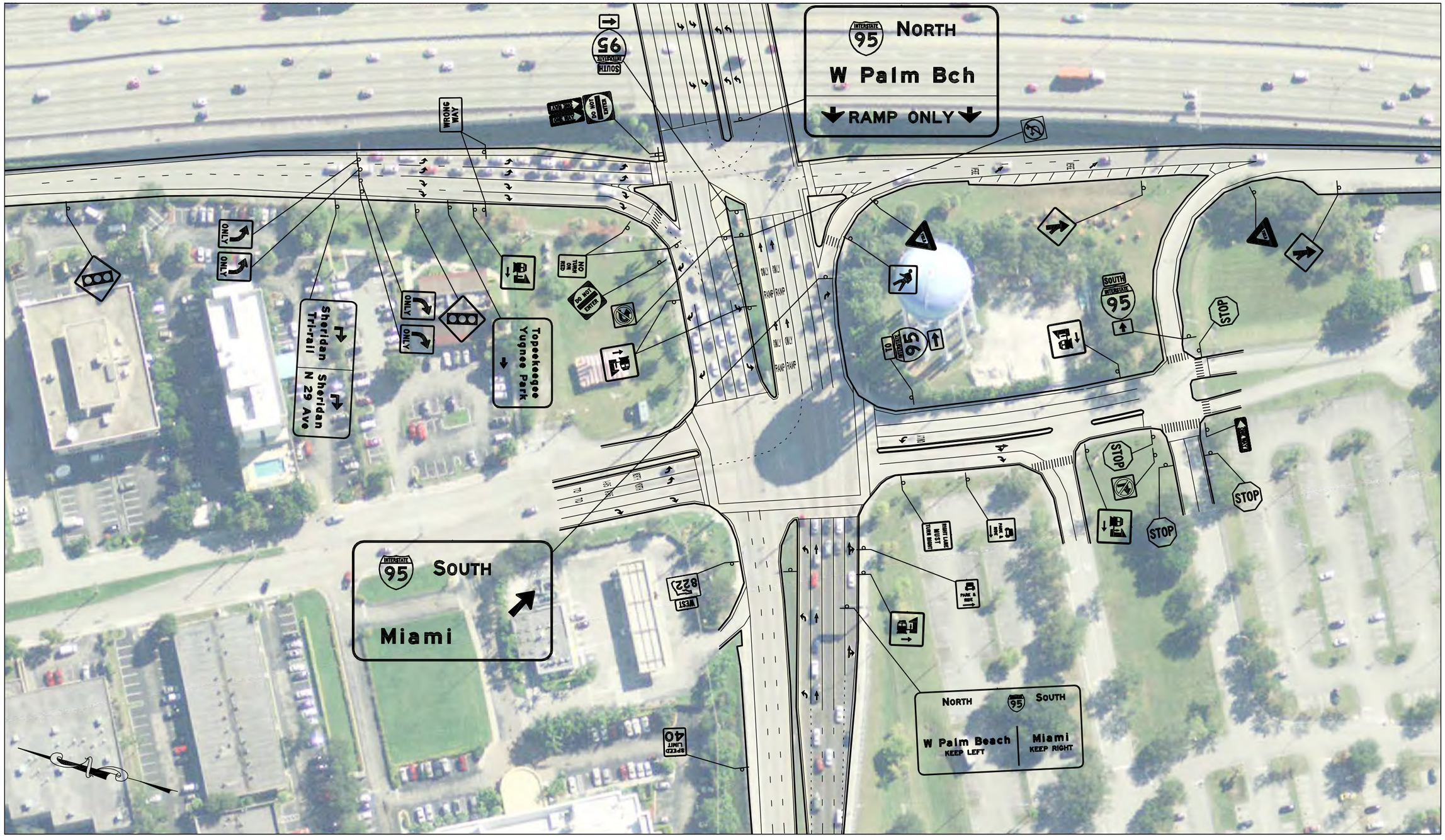
I-95 AT SR 822 (SHERIDAN ST)

The interchange of I-95 and SR 822, Exit 21, is located in the City of Hollywood, Broward County, FL. The interchange is in a Diamond configuration. I-95 runs in a north-south direction through the interchange and SR 822, a 6-lane divided arterial, runs east-west.



Interchange Details

Speed Limits:	• I-95: 65 mph • SR 822: 40 mph
No. of Lanes:	• I-95: 10 DIV • SR 822: 6 DIV
Maintaining Agency:	• I-95: FDOT District 4 • SR 822: FDOT District 4
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Yield • I-95 Northbound Off Ramp: Signal/Yield • I-95 Southbound On Ramp: Yield • I-95 Southbound Off Ramp: Signal
rLeft-Turn to On-Ramp Traffic Control	• SR 822 EB Left: Signal – Protected Only • SR 822 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 1 Right Turn Lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lanes • 2 Right Turn Lanes



SCALE

0 100 200

SYMBOLS

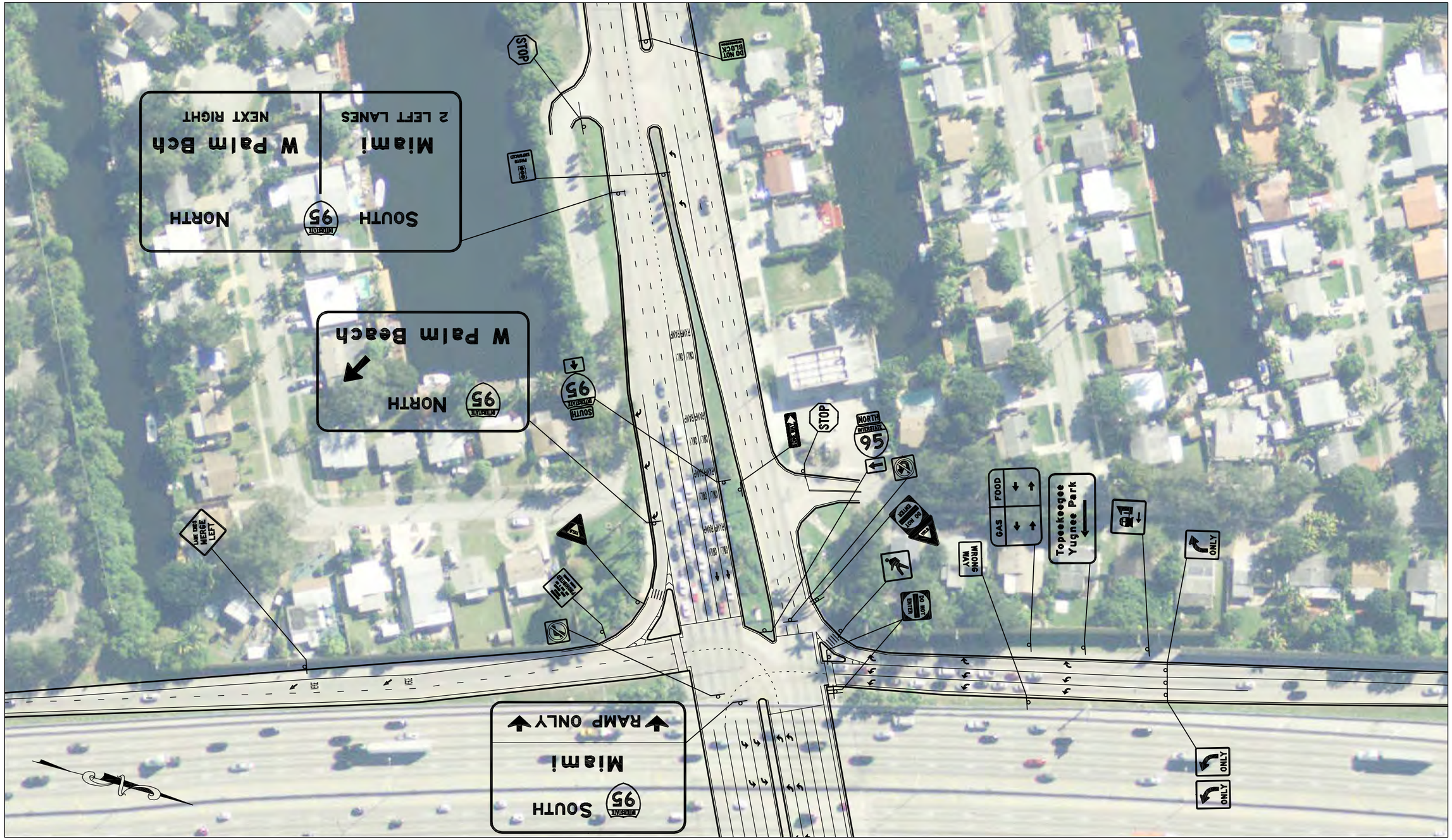
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR-822 SB RAMPS

CONDITION DIAGRAM

FIGURE NO.
1



SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR-822 NB RAMPS

CONDITION DIAGRAM

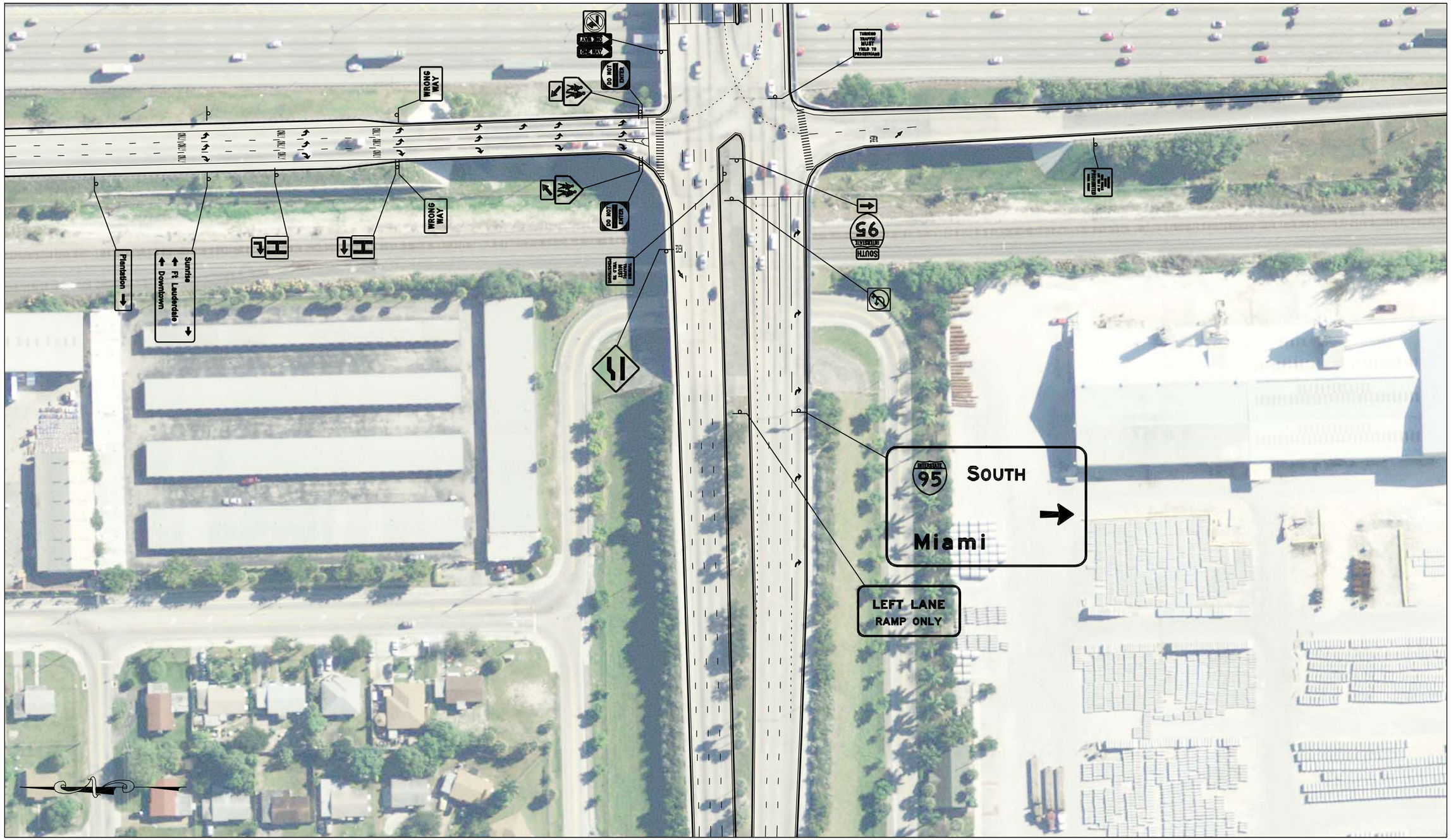
FIGURE NO.
2

I-95 AT SR 838 (SUNRISE BLVD)

The interchange of I-95 and SR 838, Exit 29, is located in the City of Fort Lauderdale, Broward County, FL. The interchange is in a Partial Cloverleaf configuration, with a loop ramp serving the I-95 North to SR 838 West movement. I-95 runs in a north-south direction through the interchange and SR 838, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• I-95: 65 mph • SR 838: 40 mph
No. of Lanes:	• I-95: 10 DIV • SR 838: 6 DIV
Maintaining Agency:	• I-95: FDOT District 4 • SR 838: FDOT District 4
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Yield • I-95 Northbound Off Ramp: Yield • I-95 Southbound On Ramp: Signal • I-95 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• SR 838 EB Left: Signal – Protected Only • SR 838 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lanes • 1 Right Turn Lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

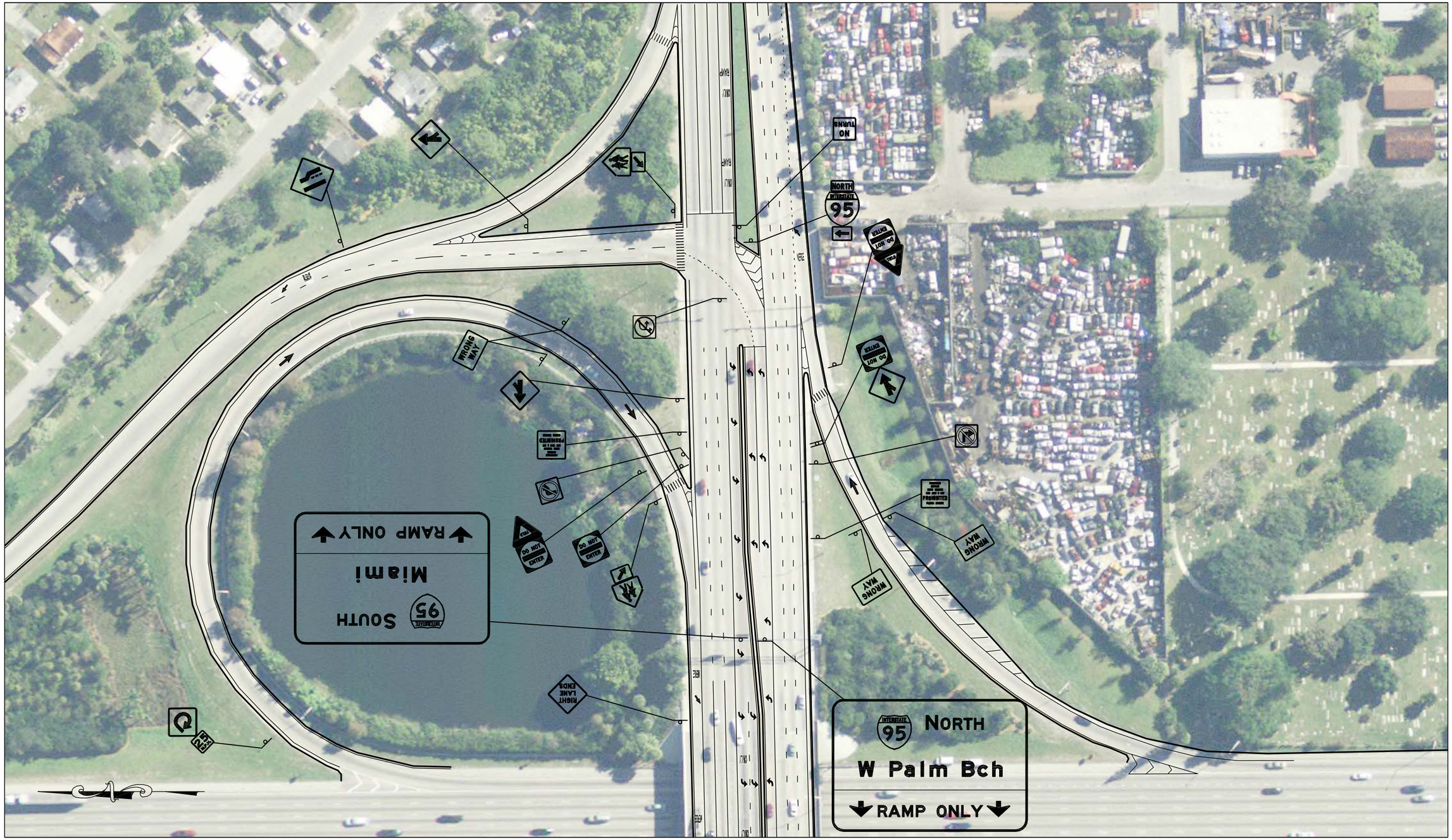
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR-838 SB RAMPS

CONDITION DIAGRAM

FIGURE NO.

1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR-838 NB RAMPS

CONDITION DIAGRAM

FIGURE NO.
2

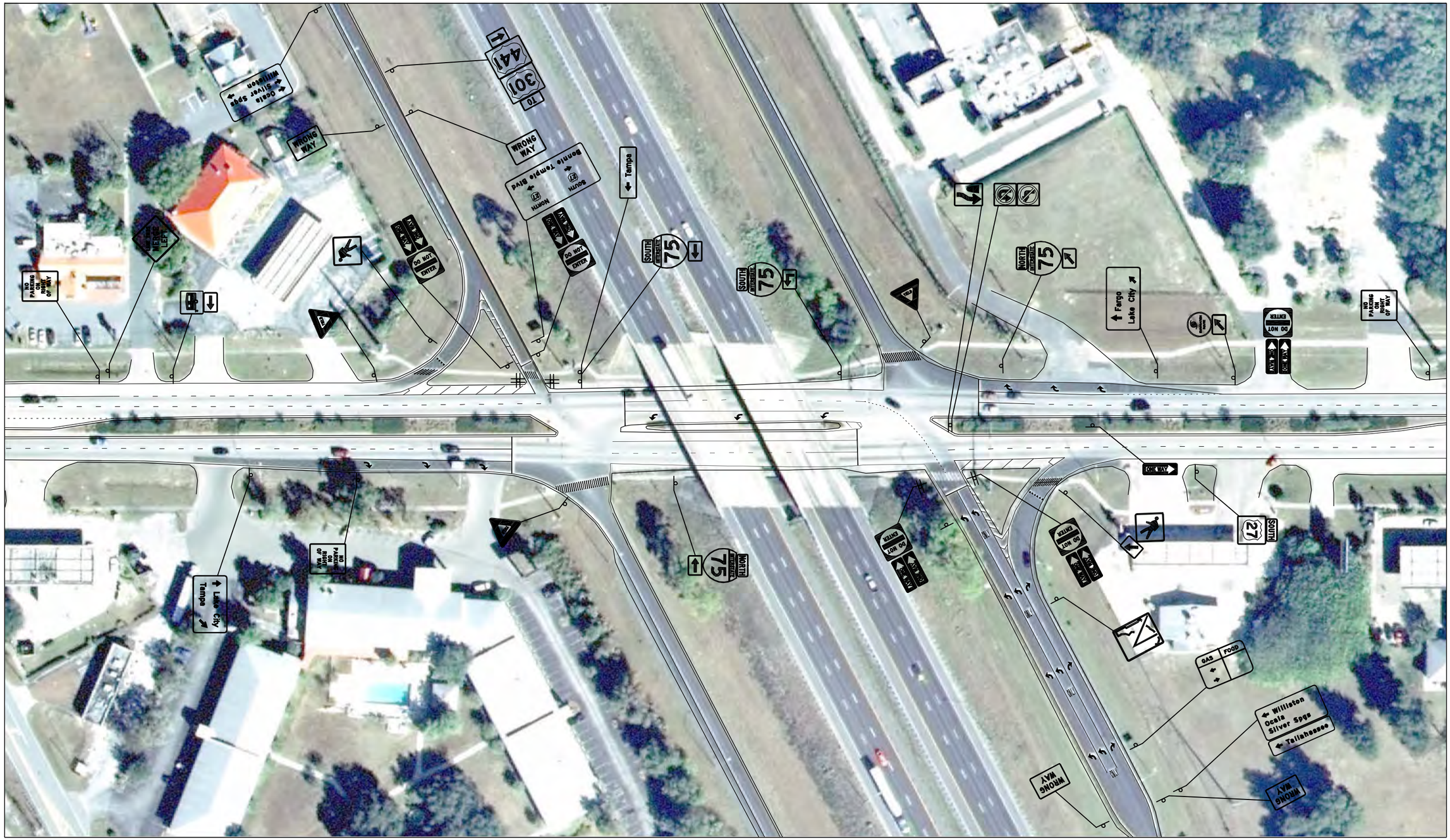
District 5

I-75 AT SR 500/US 27

The interchange of I-75 and SR 500/US 27, Exit 354, is located in the City of Ocala, Marion County, FL. The interchange is in a Diamond configuration. I-75 runs in a north-south direction through the interchange and SR 500/US 27, a 4-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • SR 500/US 27: 45 mph
No. of Lanes:	• I-75: 6 DIV • SR 500/US 27: 4 DIV
Maintaining Agency:	• I-75: FDOT District 5 • SR 500/US 27: FDOT District 5
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Yield • I-75 Northbound Off Ramp: Signal/Yield • I-75 Southbound On Ramp: Yield • I-75 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• SR 500/US 27 EB Left: Signal – Permitted Only • SR 500/US 27 WB Left: Signal – Permitted Only
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Destination Sign • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 2 Right Turn Lanes
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn Lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-75 SR 500/US 27 SB EXIT

CONDITION DIAGRAM

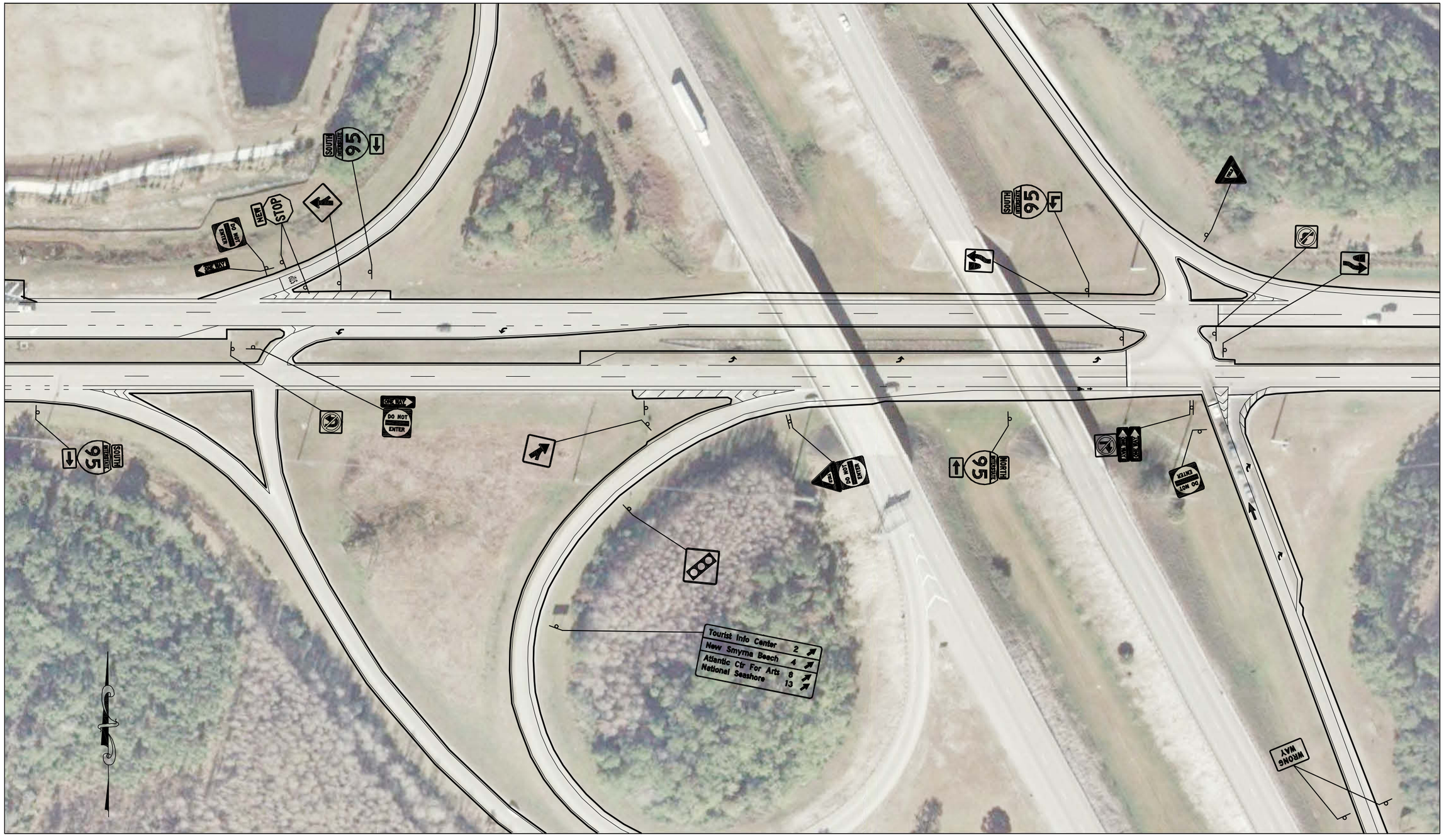
FIGURE NO.

I-95 AT SR 44

The interchange of I-95 and SR 44, Exit 249, is located in the City of New Smyrna Beach, Volusia County, FL. The interchange is in a Diamond configuration, with a loop ramp serving the I-95 South to SR 44 East movement. I-95 runs in a north-south direction through the interchange and SR 44, a 4-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• I-95: 70 mph • SR 44: 55 mph
No. of Lanes:	• I-95: 4 DIV (construction widening to 6 DIV) • SR 44: 4 DIV
Maintaining Agency:	• I-95: FDOT District 5 • SR 44: FDOT District 5
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Signal • I-95 Northbound Off Ramp: Signal • I-95 Southbound On Ramp: Yield • I-95 Southbound Off Ramp: Stop/Yield
Left-Turn to On-Ramp Traffic Control	• SR 44 EB Left: Signal – Permitted Only • SR 44 WB Left: Yield
Lighting Level	• NW Quadrant: No Lighting • NE Quadrant: No Lighting • SE Quadrant: No Lighting • SW Quadrant: No Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign (WB only) • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• SB to WB – Single Lane Exit – 1 Right Turn lane (Directional/Stop Controlled) • SB to EB – Single Lane Exit – 1 Right Turn lane (Directional Loop/Yield Controlled)



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR-44 NB/SB EXITS

CONDITION DIAGRAM

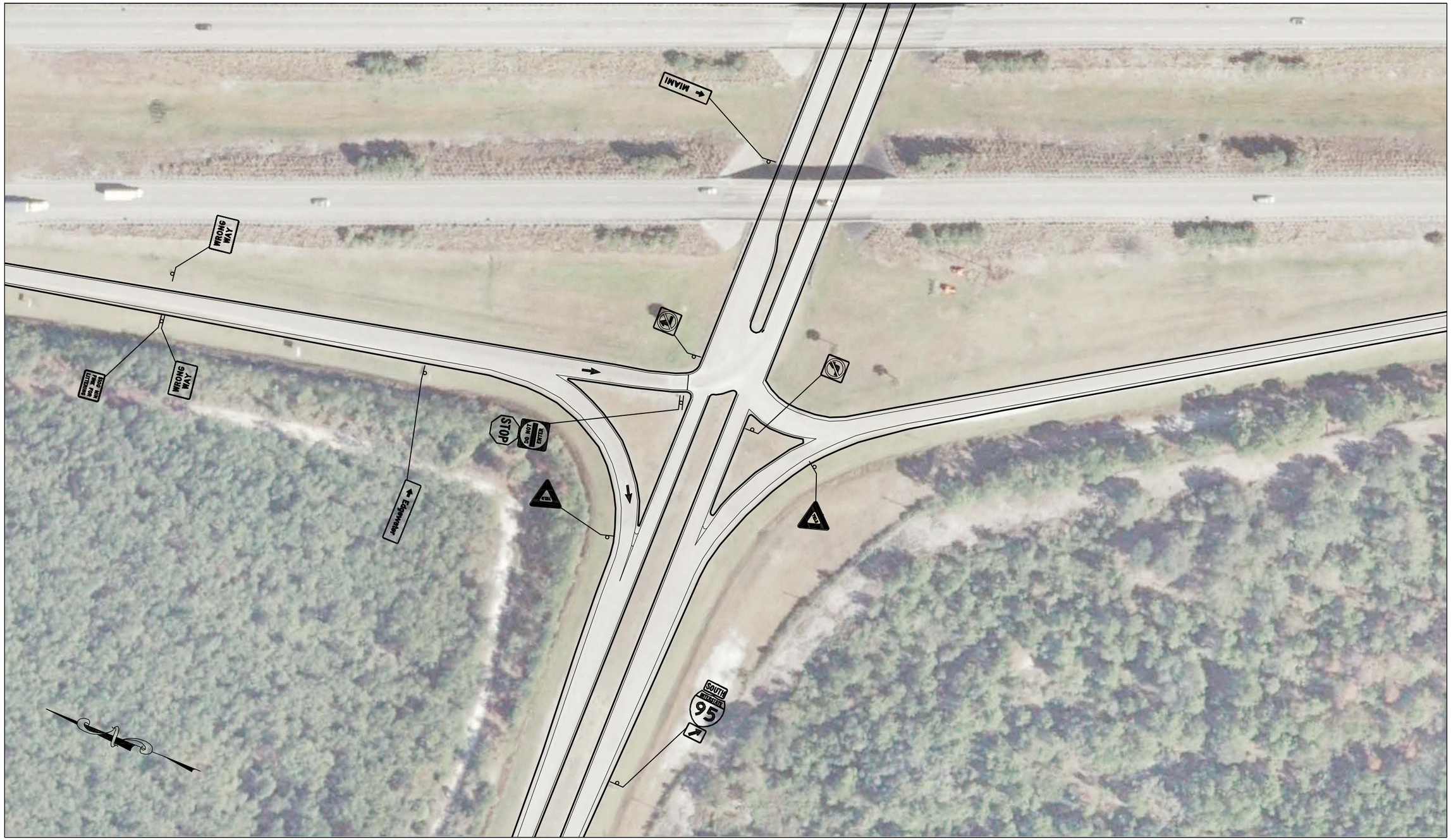
FIGURE NO.
1

I-95 AT SR 442 (ELKCAM BLVD)

The interchange of I-95 and SR 442 (Elkcam Blvd), Exit 244, is located near the City of Edgewater in Volusia County, FL. The interchange is in a Diamond configuration as seen in the image to the right. I-95 runs in a north-south direction through the interchange and SR 442, a 2-lane highway, runs east-west.

Interchange Details

Speed Limits:	• I-95: 70 mph • SR 442: 45 mph
No. of Lanes:	• I-95: 4 DIV (construction widening to 6 DIV) • SR 442: 4 DIV
Maintaining Agency:	• I-95: FDOT District 5 • SR 442: FDOT District 5
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Yield • I-95 Southbound On Ramp: Yield • I-95 Northbound Off Ramp: Stop • I-95 Southbound Off Ramp: Stop
Left-Turn to On-Ramp Traffic Control	• SR 442 EB Left: Yield • SR 442 WB Left: Yield
Lighting Level	• NW Quadrant: No Lighting • NE Quadrant: No Lighting • SE Quadrant: No Lighting • SW Quadrant: No Lighting
Guide Signage Along Crossroad (both directions)	• Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane (Directional/Yield Controlled)
SB Off-Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane (Directional/Free Flow)



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR442 (ELKHAM BLVD)

CONDITION DIAGRAM

FIGURE NO.
1

SCALE

0 100 200

SYMBOLS

Traffic Sign

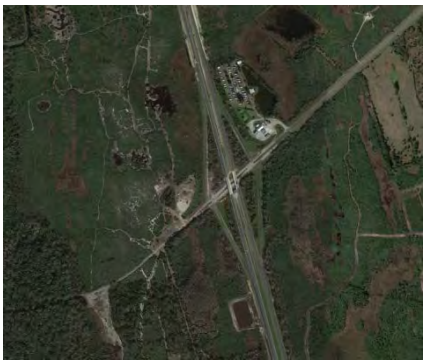
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 SR442 (ELKHAM BLVD)

CONDITION DIAGRAM

FIGURE NO.
2

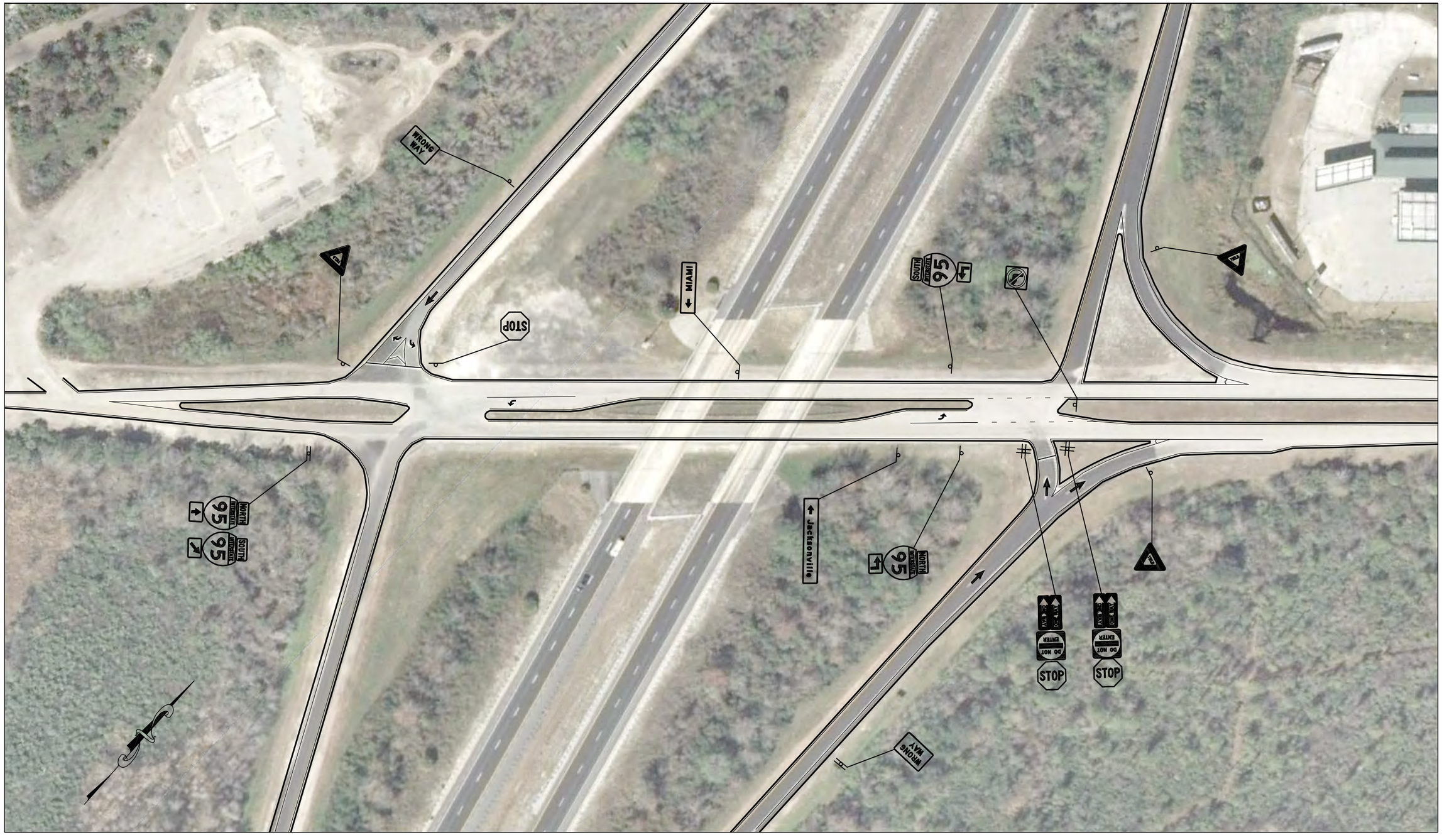
I-95 AT STUCKWAY ROAD



The interchange of I-95 and Stuckway Road, Exit 231, is located in Brevard County, FL. The interchange is in a Diamond configuration as seen in the image to the right. I-95 runs in a north-south direction through the interchange and Stuckway Road, a 2-lane arterial, runs east-west.

Interchange Details

Speed Limits:	• I-95: 70 mph • Stuckway Road : 45 mph
No. of Lanes:	• I-95: 4 • Stuckway Road: 2
Maintaining Agency:	• I-95: FDOT District 5 • Stuckway Road: FDOT District 5
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Unsignalized • I-95 Southbound On Ramp: Unsignalized • I-95 Northbound Off Ramp: Unsignalized • I-95 Southbound Off Ramp: Unsignalized
Left-Turn to On-Ramp Traffic Control	• Stuckway Road EB Left: Unsignalized • Stuckway Road WB Left: Unsignalized
Lighting Level	• NW Quadrant: None • NE Quadrant: None • SE Quadrant: None • SW Quadrant: None
Guide Signage Along Crossroad (both directions)	• WB Junction assembly • WB Directional Assembly for the first ramp • WB Directional Assembly for the second ramp • No guide signage for EB crossroad
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane (Stop Controlled) • 1 Right Turn Lane (Free-Flow and Channelized)
SB Off-Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane (Stop Controlled) • 1 Right Turn lane (Yield Controlled)



SCALE

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SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-95 STUCKWAY RD

CONDITION DIAGRAM

FIGURE NO.

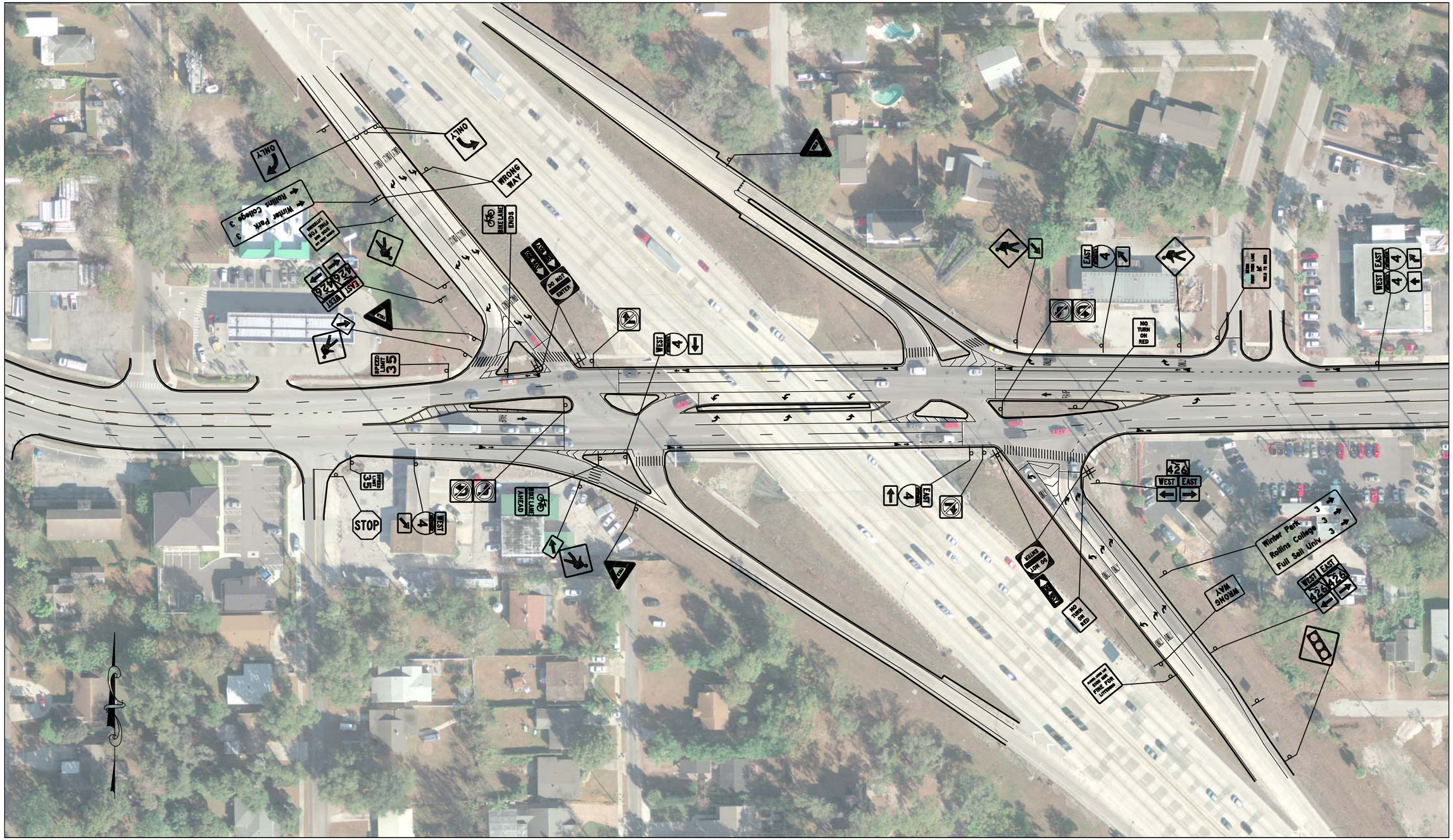
1

I-4 AT FAIRBANKS AVENUE

The interchange of I-4 and Fairbanks Avenue, Exit 87, is located in Winter Park, FL, a suburb of Orlando. The interchange is in a Diamond configuration as seen in the image to the right. I-4 runs in a northwest-southeast direction through the interchange and Fairbanks Avenue, a 4-lane arterial, runs east-west.

Interchange Details

Speed Limits:	• I-4: Variable (50 mph max.) • Fairbanks Ave: 35 mph
No. of Lanes:	• I-4: 8 • Fairbanks Ave: 4 + TWLTL
Maintaining Agency:	• I-4: FDOT District 5 • Fairbanks Ave: FDOT District 5
Traffic Control at Ramp Terminals	• I-4 Eastbound On Ramp: Traffic signals • I-4 Westbound On Ramp: Traffic signals • I-4 Eastbound Off Ramp: Traffic signals • I-4 Westbound Off Ramp: Traffic signals
Left-Turn to On-Ramp Traffic Control	• Fairbanks Ave EB Left: Protected • Fairbanks Ave WB Left: Protected
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Directional Assembly for the first ramp • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 2 Right Turn lanes (No RTOR)
WB Off-Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 1 Right Turn lanes (Yield Controlled)



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-4 AT FAIRBANKS AVE

CONDITION DIAGRAM

FIGURE NO.

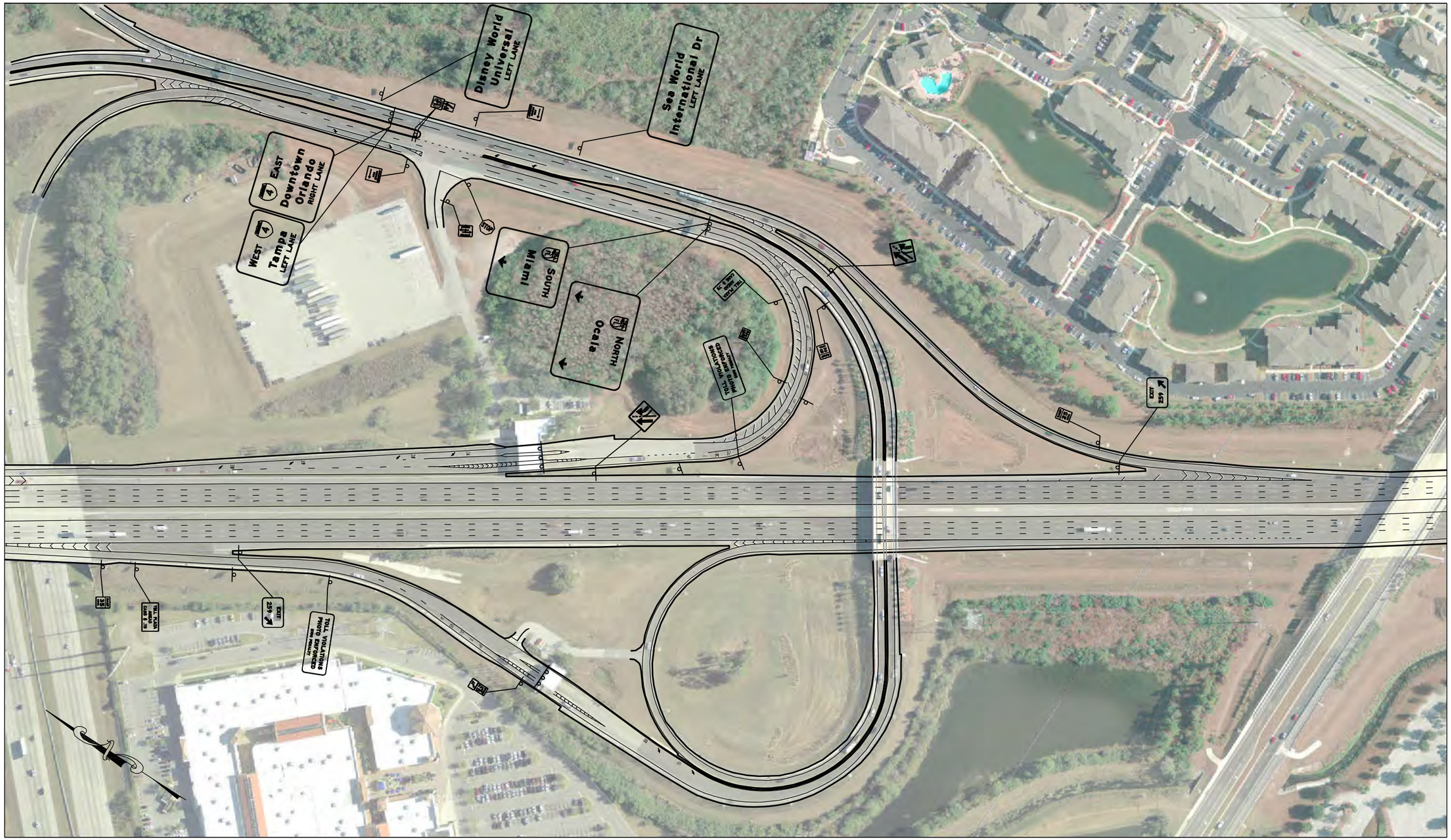
1

I-4 AT SR 91 (TURNPIKE)

The interchange of I-4 and SR 91, Exit 259, is located in the City of Orlando, Orange County, FL. The system interchange is in a trumpet configuration, with loop ramps serving the SR 91 South to I-4 West movement and the I-4 (both East and West) to SR 91 South movement. I-4 runs in a northeast-southwest direction through the interchange and SR 91 runs northwest-southeast.

Interchange Details

Speed Limits:	• I-4: 55 mph • SR 91: 70 mph
No. of Lanes:	• I-4: 6 DIV • SR 91: 8 DIV
Maintaining Agency:	• I-4: FDOT District 5 • SR 91: FDOT District 5
Traffic Control at Ramp Terminals	• SR 91 Northbound On Ramp: Yield • SR 91 Northbound Off Ramp: Yield • SR 91 Southbound On Ramp: Yield • SR 91 Southbound Off Ramp: Yield
Left-Turn to On-Ramp Traffic Control	• I-4 EB: Loop • I-4 WB: Loop
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Interchange Exit Direction Sign • Exit Only Sign • Exit Gore Sign
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 EB Ramp Entrance Lane • 1 WB Ramp Entrance Lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 EB Ramp Entrance Lane • 1 WB Ramp Entrance Lane



SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-4 AND SR91 AT EXIT 259

CONDITION DIAGRAM

FIGURE NO.
1

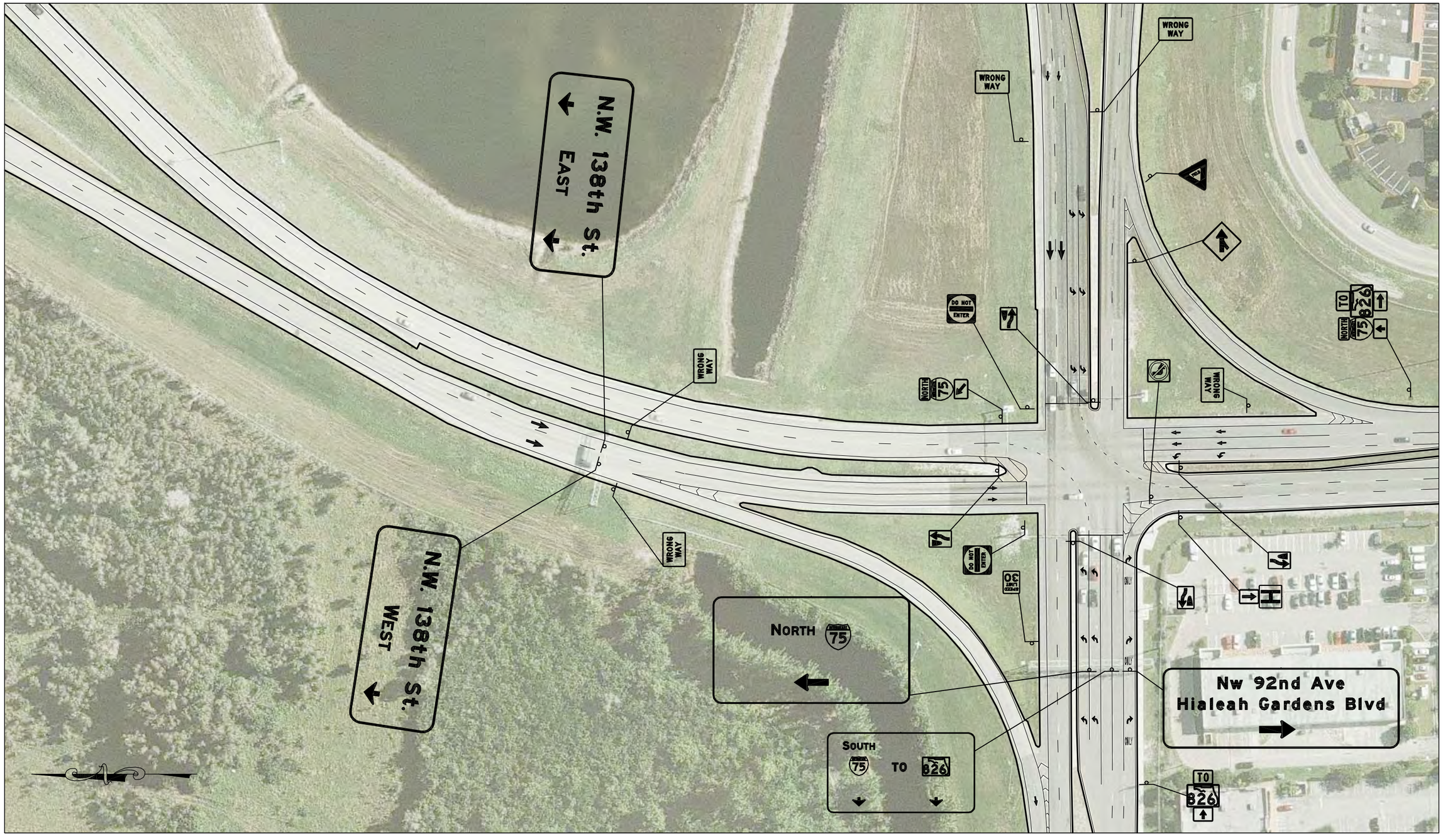
District 6

I-75 AT 138TH ST (HIALEAH GARDENS BLVD)

The interchange of I-75 and 138th St, Exit 2, is located in the City of Hialeah, Miami-Dade, FL. The interchange is in a Trumpet configuration. I-75 runs in a north-south direction, however it runs in a north-east direction through this interchange. 138th St, a 4-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • 138th St: 40 mph
No. of Lanes:	• I-75: 8 DIV • 138th St: 4 DIV
Maintaining Agency:	• I-75: FDOT District 6 • 138th St: FDOT District 6
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Signal • I-75 Northbound Off Ramp: Signal • I-75 Eastbound On Ramp: Signal • I-75 Eastbound Off Ramp: Signal/Stop
Left-Turn to On-Ramp Traffic Control	• 138th St EB Left: Signal
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (EB Only)	• Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Double Lane Exit • 2 Left Turn Lanes • 2 Thru lanes
EB Off-Ramp Lane Configurations:	• Double Lane Exit • 2 Thru Lanes • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-75 138TH ST(HIALEAH GARDENS BLVD) SB EXIT

CONDITION DIAGRAM

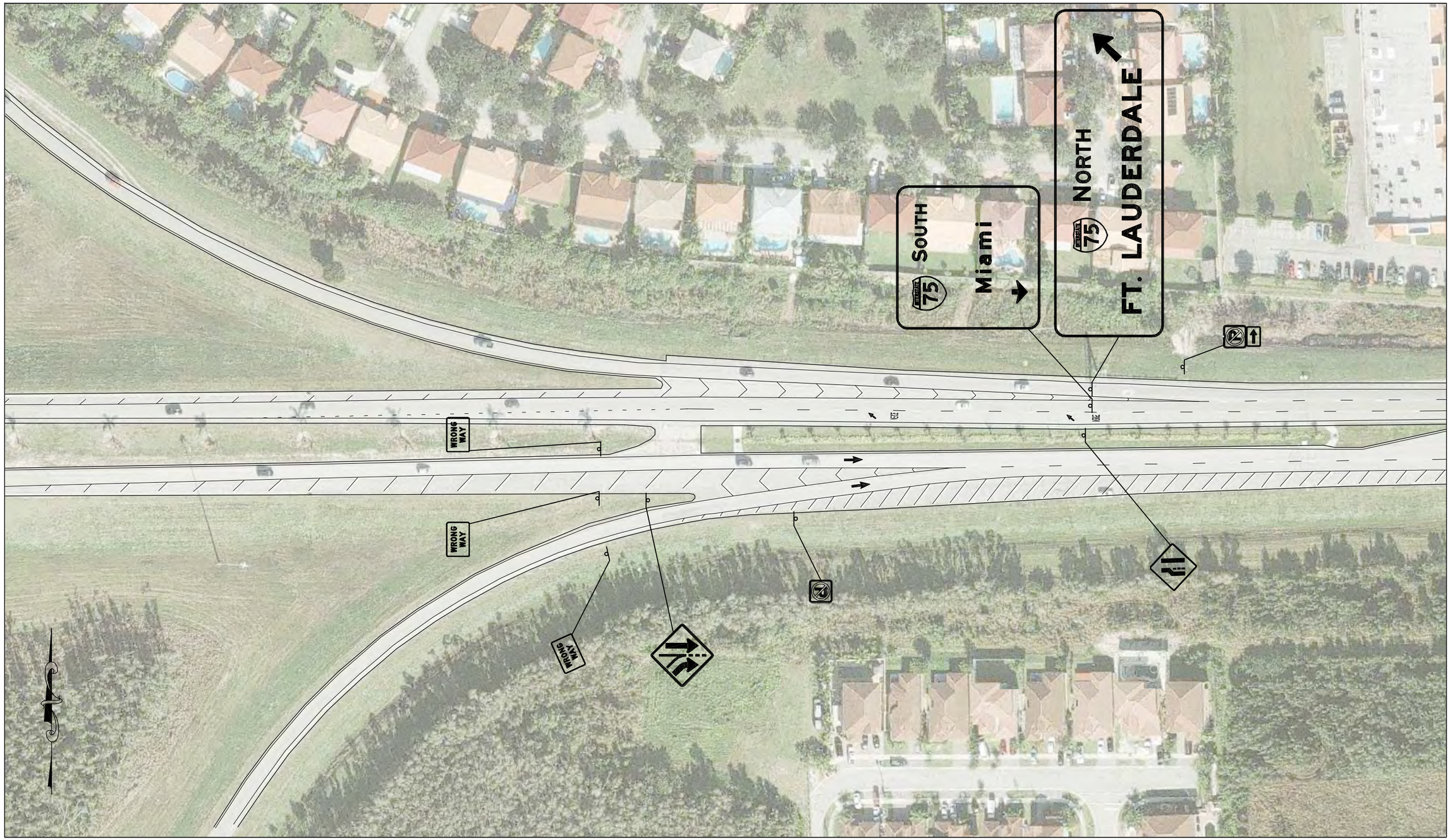
FIGURE NO.

I-75 AT SR 860 (NW 186TH ST)

The interchange of I-75 and SR 860, Exit 4, is located in the City of Hialeah, Miami-Dade County, FL. The interchange is in a Partial Cloverleaf configuration, with a loop ramp serving the SR 860 East to I-75 South movement. I-75 runs in a north-south direction through the interchange and SR 860, a 4-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• I-75: 70 mph • SR 860: 35 mph
No. of Lanes:	• I-75: 8 DIV • SR 860: 4 DIV
Maintaining Agency:	• I-75: FDOT District 6 • SR 860: FDOT District 6
Traffic Control at Ramp Terminals	• I-75 Northbound On Ramp: Yield • I-75 Northbound Off Ramp: Yield • I-75 Southbound On Ramp: Yield • I-75 Southbound Off Ramp: Yield
Left-Turn to On-Ramp Traffic Control	• SR 860 WB Left: Loop
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (WB Only)	• Junction Sign • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 2 Thru Lanes • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lanes • 2 Thru Lanes • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I–75 SR 860 NB EXIT

CONDITION DIAGRAM

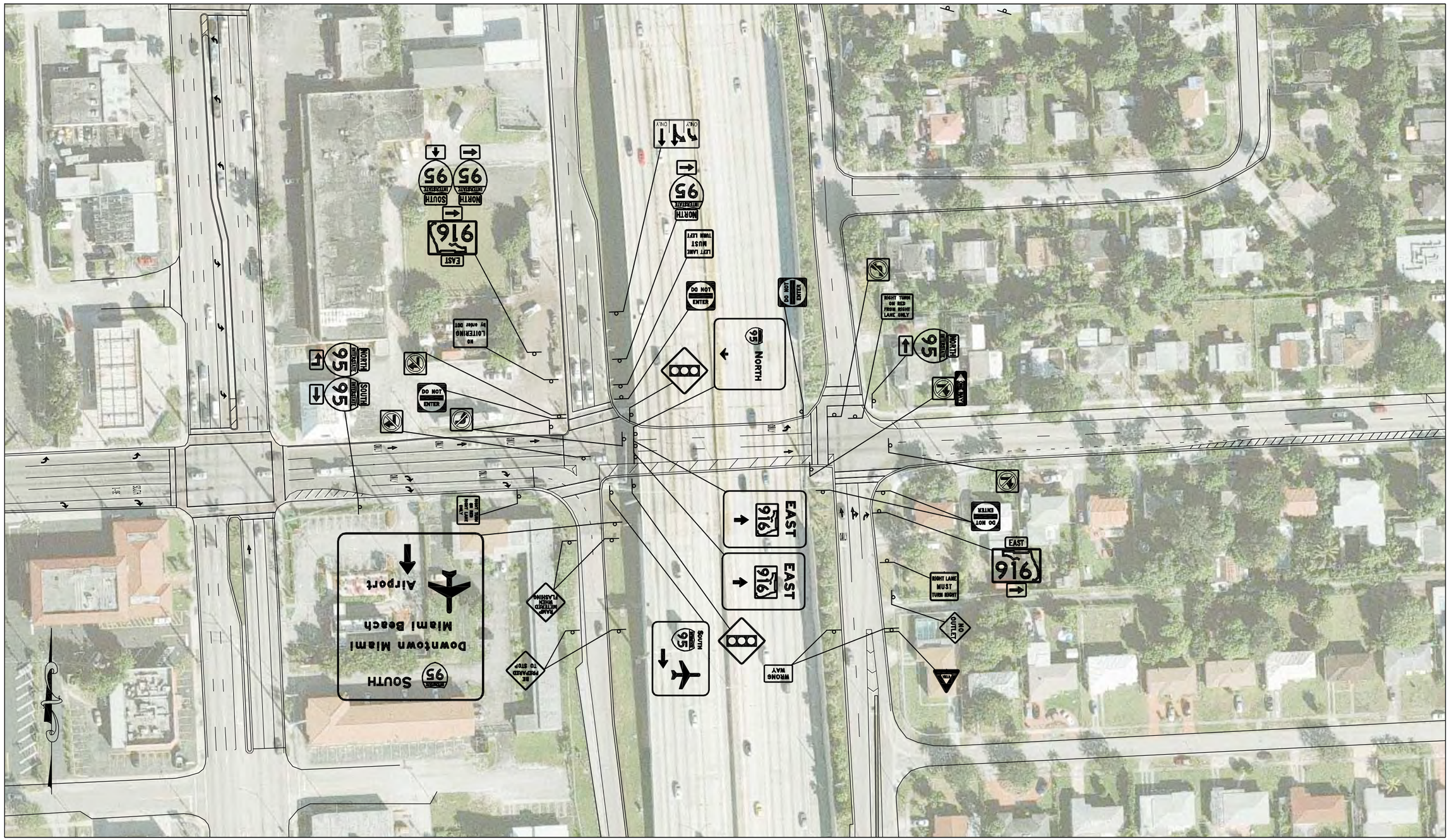
FIGURE NO.

I-95 AT SR 916 (NE 135TH ST)

The interchange of I-95 and SR 916, Exit 10B, is located in the City of North Miami, Miami-Dade County, FL. The interchange is in a Diamond configuration. I-95 runs in a north-south direction through the interchange and SR 916, a 3-lane one-way arterial, runs eastbound only.

Interchange Details

Speed Limits:	• I-95: 55 mph • SR 916: 40 mph
No. of Lanes:	• I-95: 8 DIV • SR 916: 3
Maintaining Agency:	• I-95: FDOT District 6 • SR 916: FDOT District 6
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Signal • I-95 Northbound Off Ramp: Signal • I-95 Southbound On Ramp: Signal • I-95 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• SR 916 EB Left: Signal
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (EB only)	• Junction Sign • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Thru Lane • 1 Thru or Right Turn Lane • 1 Right Turn Lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Thru Lane • 1 Thru or Right Turn Lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I-95 SR 916 (NE 135th) SB EXIT

CONDITION DIAGRAM

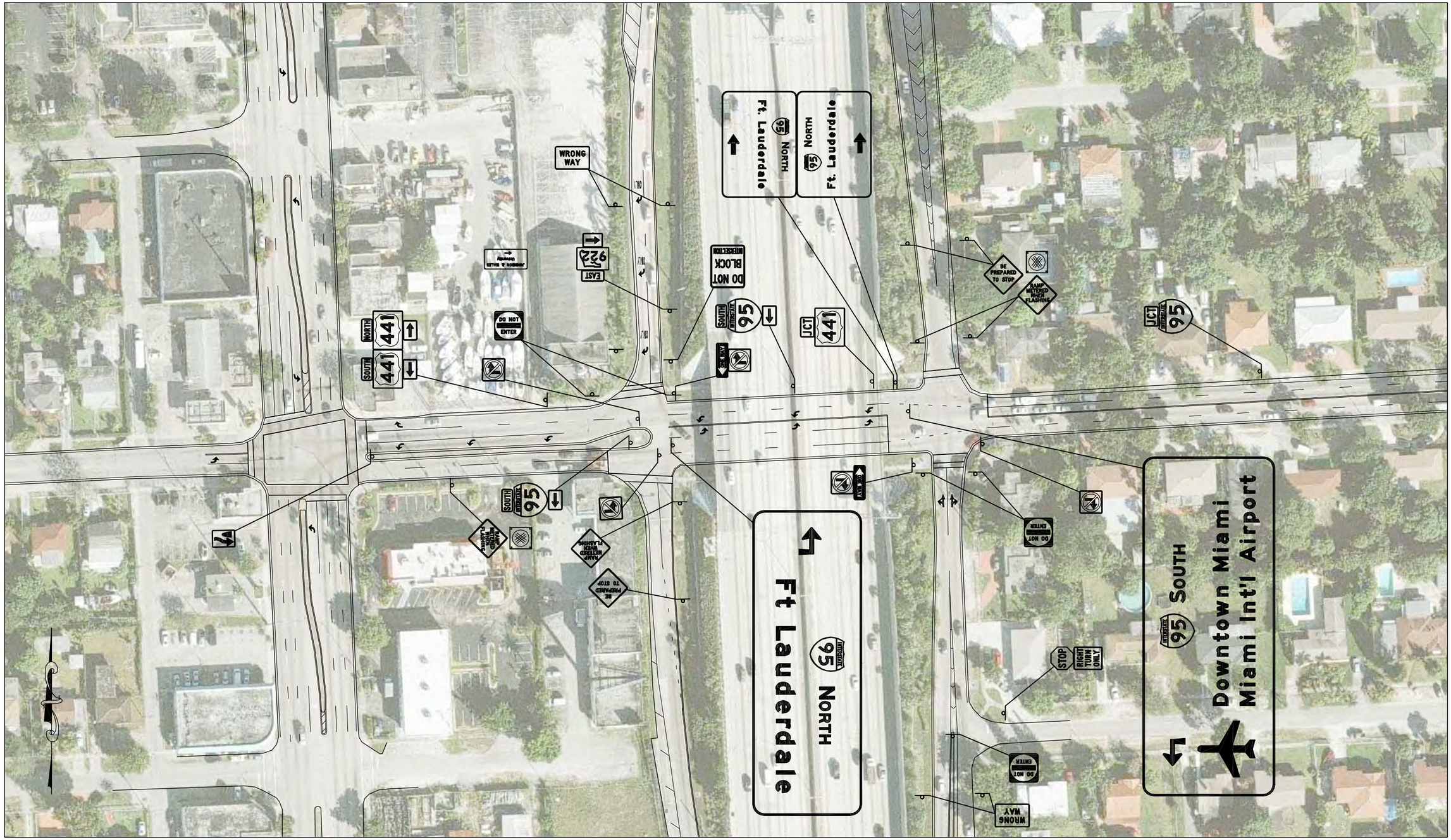
FIGURE NO.

I-95 AT SR 922 (NW 125TH ST)

The interchange of I-95 and SR 922, Exit 10A, is located in the City of North Miami, Miami-Dade County, FL. The interchange is in a Diamond configuration. I-95 runs in a north-south direction through the interchange and SR 922, a 4-lane highway, runs east-west.

Interchange Details

Speed Limits:	• I-95: 55 mph • SR 922: 35 mph
No. of Lanes:	• I-95: 12 DIV • SR 922: 4
Maintaining Agency:	• I-95: FDOT District 6 • SR 922: FDOT District 6
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Signal • I-95 Northbound Off Ramp: Signal • I-95 Southbound On Ramp: Signal • I-95 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• SR 922 EB Left: Signal • SR 922 WB Left: Signal
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn or Thru Lane • 1 Right Turn or Thru Lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Right Turn lane • 1 Thru Lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I-95 SR 922 (NE 125th) SB EXIT

CONDITION DIAGRAM

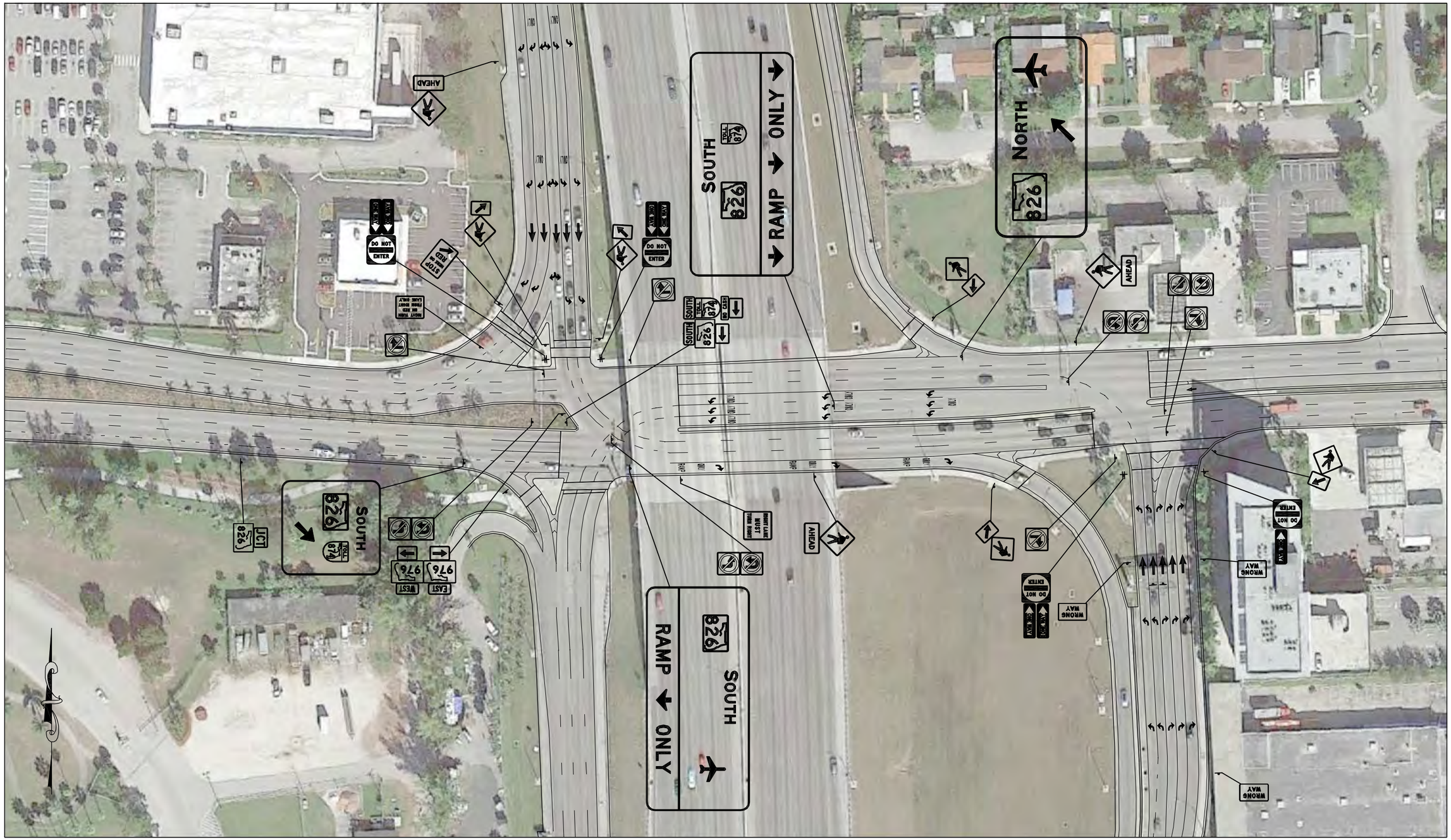
FIGURE NO.

SR 826 (PALMETTO EXPY) AT SR 976 (SW 40TH ST)

The interchange of SR 826 and SR 976 is located in the City of Miami, Miami-Dade County, FL. The interchange is in a Diamond configuration, with a loop ramp serving the SR 976 East to SR 826 North movement. SR 826 runs in a north-south direction through the interchange and SR 976, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• SR 826: 55 mph • SR 976: 40 mph
No. of Lanes:	• SR 826: 12 DIV • SR 976: 6 DIV
Maintaining Agency:	• SR 826: FDOT District 6 • SR 976: FDOT District 6
Traffic Control at Ramp Terminals	• SR 826 Northbound On Ramp: Yield • SR 826 Northbound Off Ramp: Signal/Yield • SR 826 Southbound On Ramp: Yield • SR 826 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• SR 976 EB Left: Loop • SR 976 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Double Lane Exit • 2 Left Turn Lane • 3 Right Turn lane
SB Off-Ramp Lane Configurations:	• Double Lane Exit • 3 Left Turn Lane • 3 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
SR-826 AND SR 976 NB/SB EXITS

CONDITION DIAGRAM

FIGURE NO.

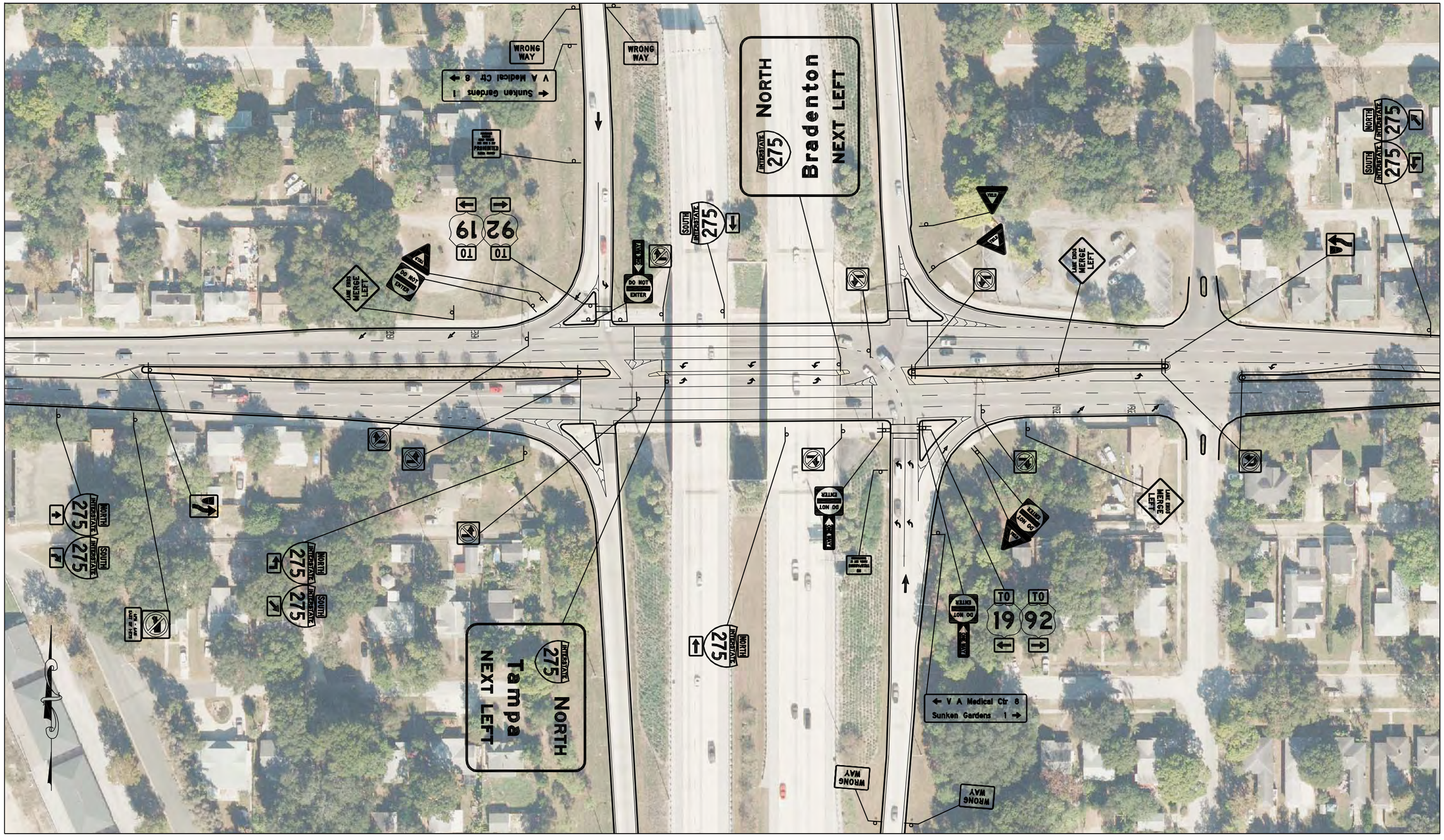
District 7

I-275 AT 22ND AVE

The interchange of I-275 and 22nd Ave, Exit 24, is located in the City of St. Petersburg, Pinellas County, FL. The interchange is in a Diamond configuration. I-275 runs in a north-south direction through the interchange and 22nd Ave, a 4-lane highway, runs east-west.

Interchange Details

Speed Limits:	• I-275: 65 mph • 22nd Ave: 40 mph
No. of Lanes:	• I-275: 6 DIV • 22nd Ave: 4
Maintaining Agency:	• I-275: FDOT District 7 • 22nd Ave: FDOT District 7
Traffic Control at Ramp Terminals	• I-275 Northbound On Ramp: Yield • I-275 Northbound Off Ramp: Signal/Yield • I-275 Southbound On Ramp: Yield • I-275 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• 22nd Ave EB Left: Signal • 22nd Ave WB Left: Signal
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lane • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 22nd AVE SB EXIT

CONDITION DIAGRAM

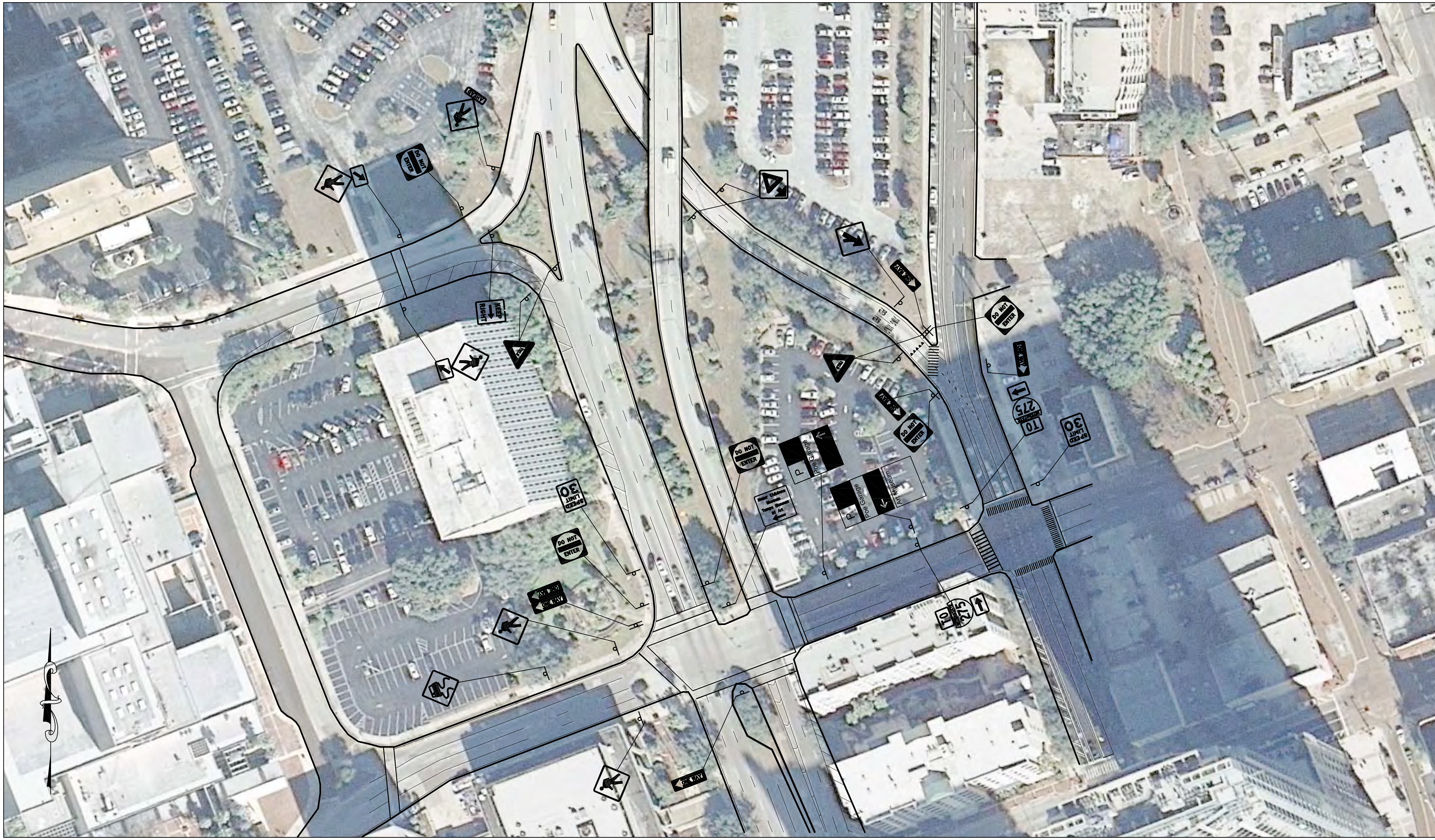
FIGURE NO.

I-275 AT ASHLEY DR

The interchange of I-275 and Ashley Dr, Exit 44, is located in the City of Tampa, Hillsborough County, FL. The interchange is in a Trumpet configuration, with a loop ramp serving the Ashley Dr North to I-275 South movement. I-275 runs in a north-south direction, however it runs in a north-east direction through this interchange. Ashley Dr, a 6-lane divided arterial, runs north-south.

Interchange Details

Speed Limits:	• I-275: 50 mph • Ashley Dr: 35 mph
No. of Lanes:	• I-275: 8 DIV • Ashley Dr: 6 DIV
Maintaining Agency:	• I-275: FDOT District 7 • Ashley Dr: FDOT District 7
Traffic Control at Ramp Terminals	• I-275 Eastbound On Ramp: Signal • I-275 Eastbound Off Ramp: Signal/Yield • I-275 Westbound On Ramp: Signal • I-275 Westbound Off Ramp: Stop/Signal
Left-Turn to On-Ramp Traffic Control	• Ashley Dr NB Left: Loop
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign (NB only) • Directional Assembly for the first ramp • Directional Assembly for the second ramp
EB Off- Ramp Lane Configuration:	• Single Lane Exit to Multiple Lane Direct Connection
WB Off-Ramp Lane Configurations:	• Double Lane Exit to Freeway-Distributor Road



SCALE

0 100 200

SYMBOLS

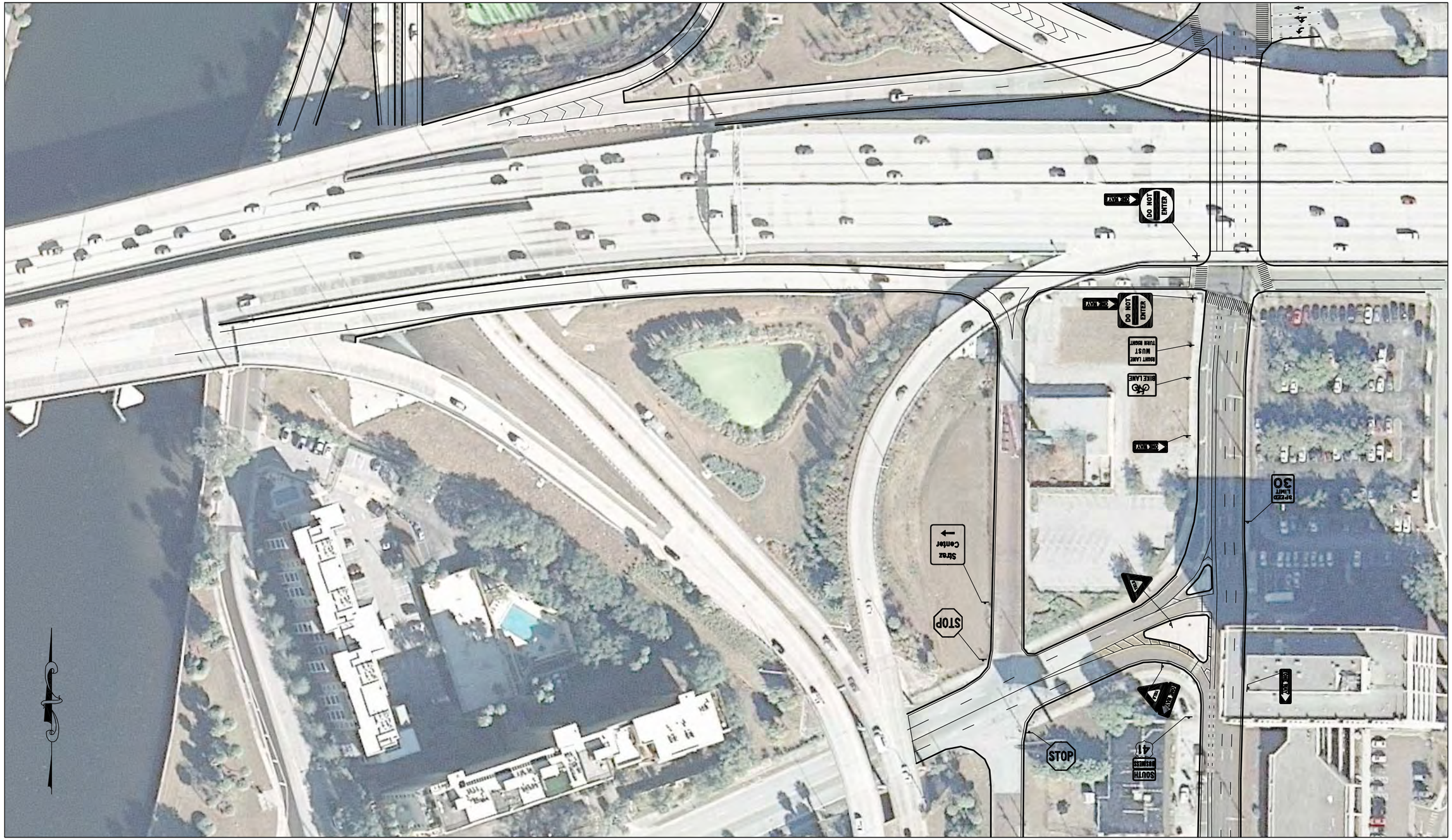
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 ASHLEY AVE NB/SB EXITS

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

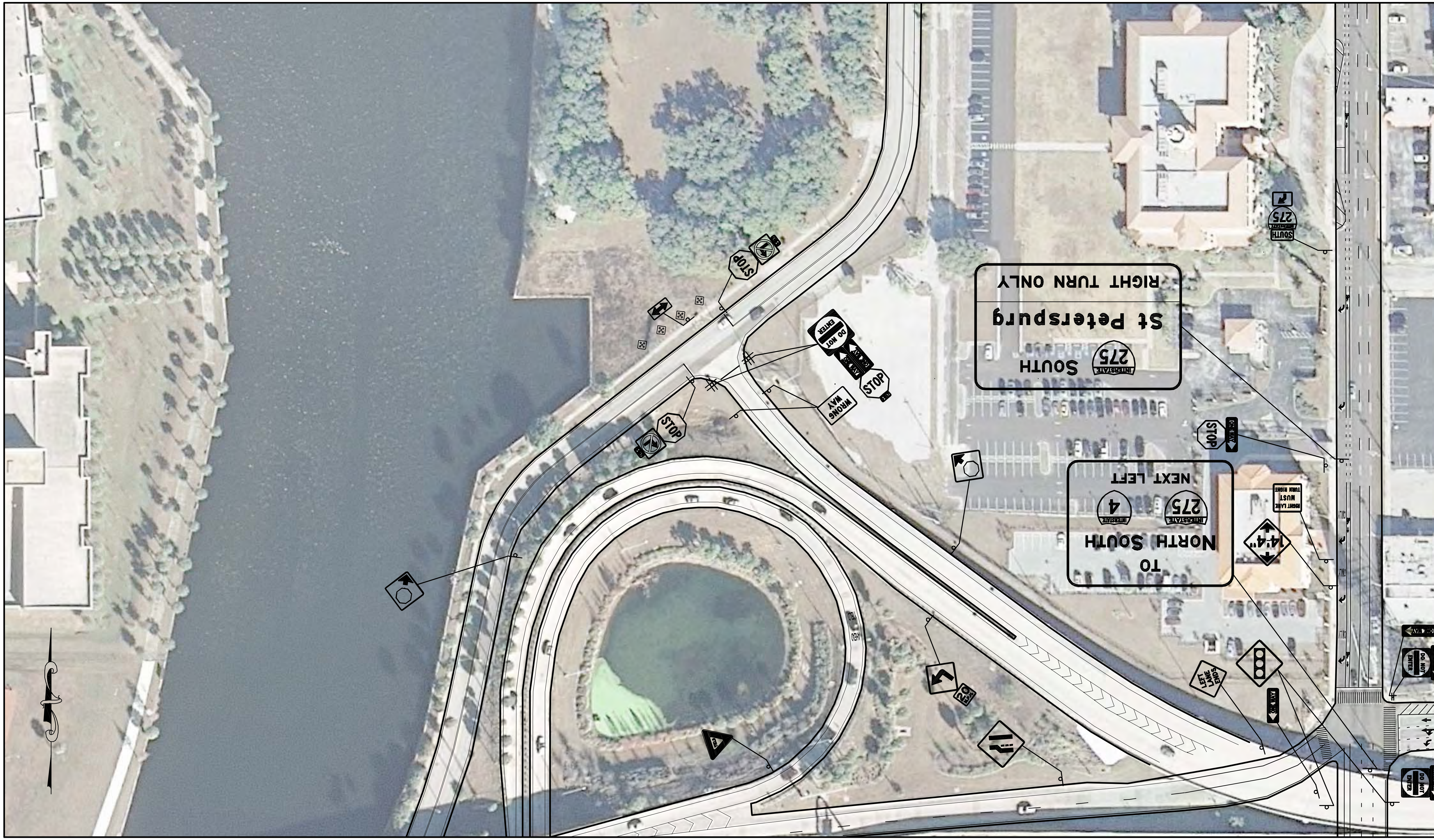
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 ASHLEY AVE NB/SB EXITS

CONDITION DIAGRAM

FIGURE NO.
2



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I-275 ASHLEY AVE NB/SB EXITS

CONDITION DIAGRAM

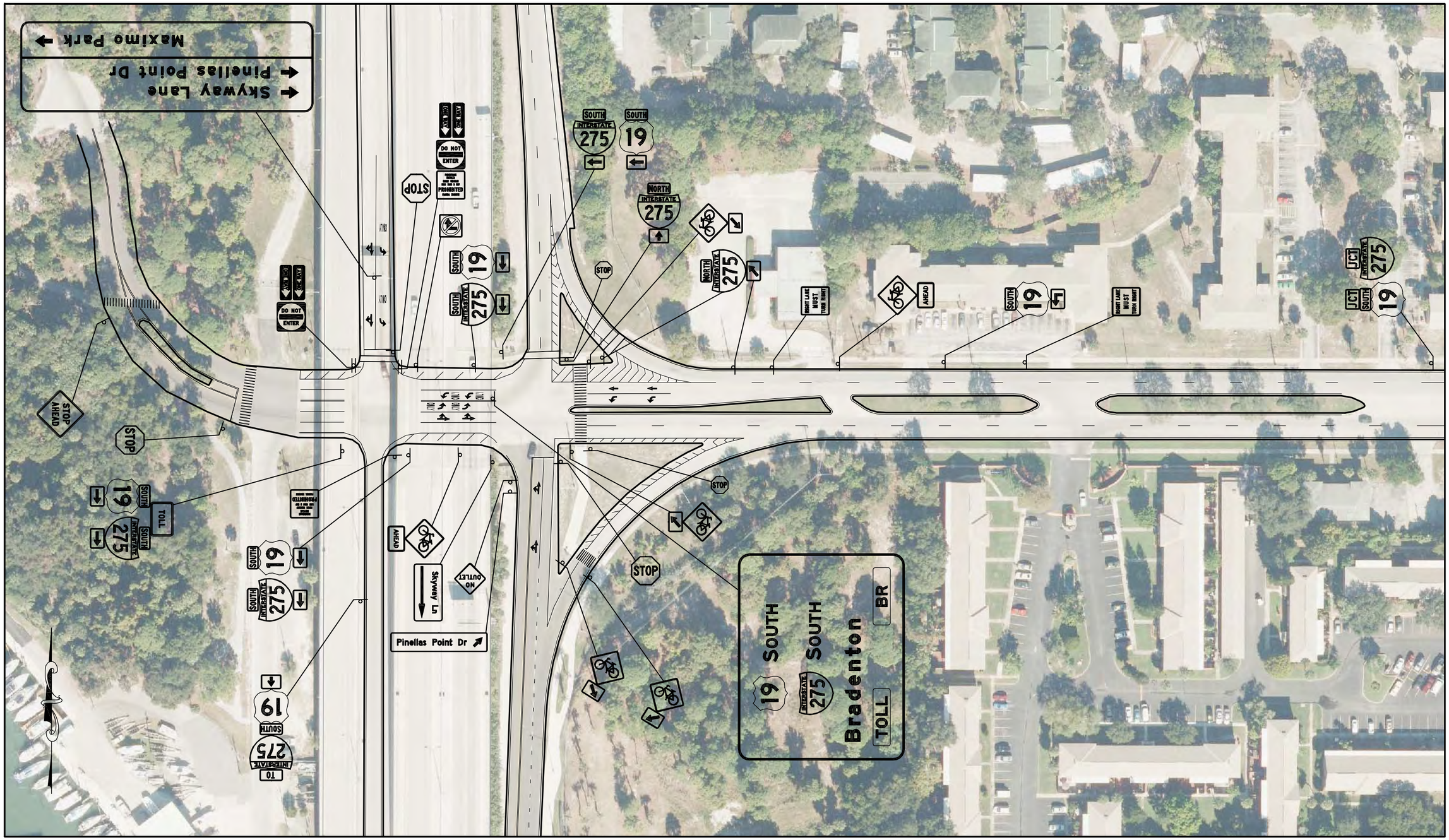
FIGURE NO.
3

I-275 AT PINELLAS POINT DR

The interchange of I-275 and Pinellas Point Dr, Exit 16, is located in the City of St. Petersburg, Pinellas County, FL. The interchange is in a Partial Diamond configuration. I-275 runs in a north-south direction through the interchange and Pinellas Point Dr, a 4-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• I-275: 65 mph • Pinellas Point Dr: 35 mph
No. of Lanes:	• I-275: 4 DIV • Pinellas Point Dr: 4 DIV
Maintaining Agency:	• I-275: FDOT District 7 • Pinellas Point Dr: FDOT District 7
Traffic Control at Ramp Terminals	• I-275 Northbound On Ramp: Yield • I-275 Northbound Off Ramp: Stop/Yield • I-275 Southbound On Ramp: Yield • I-275 Southbound Off Ramp: Stop
Left-Turn to On-Ramp Traffic Control	• Pinellas Point Dr EB Left: Yield • Pinellas Point Dr WB Left: Yield
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign (WB only) • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit (to Sunshine Skyway Ln)
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Thru/Right Turn Lane



SCALE

0 100 200

SYMBOLS

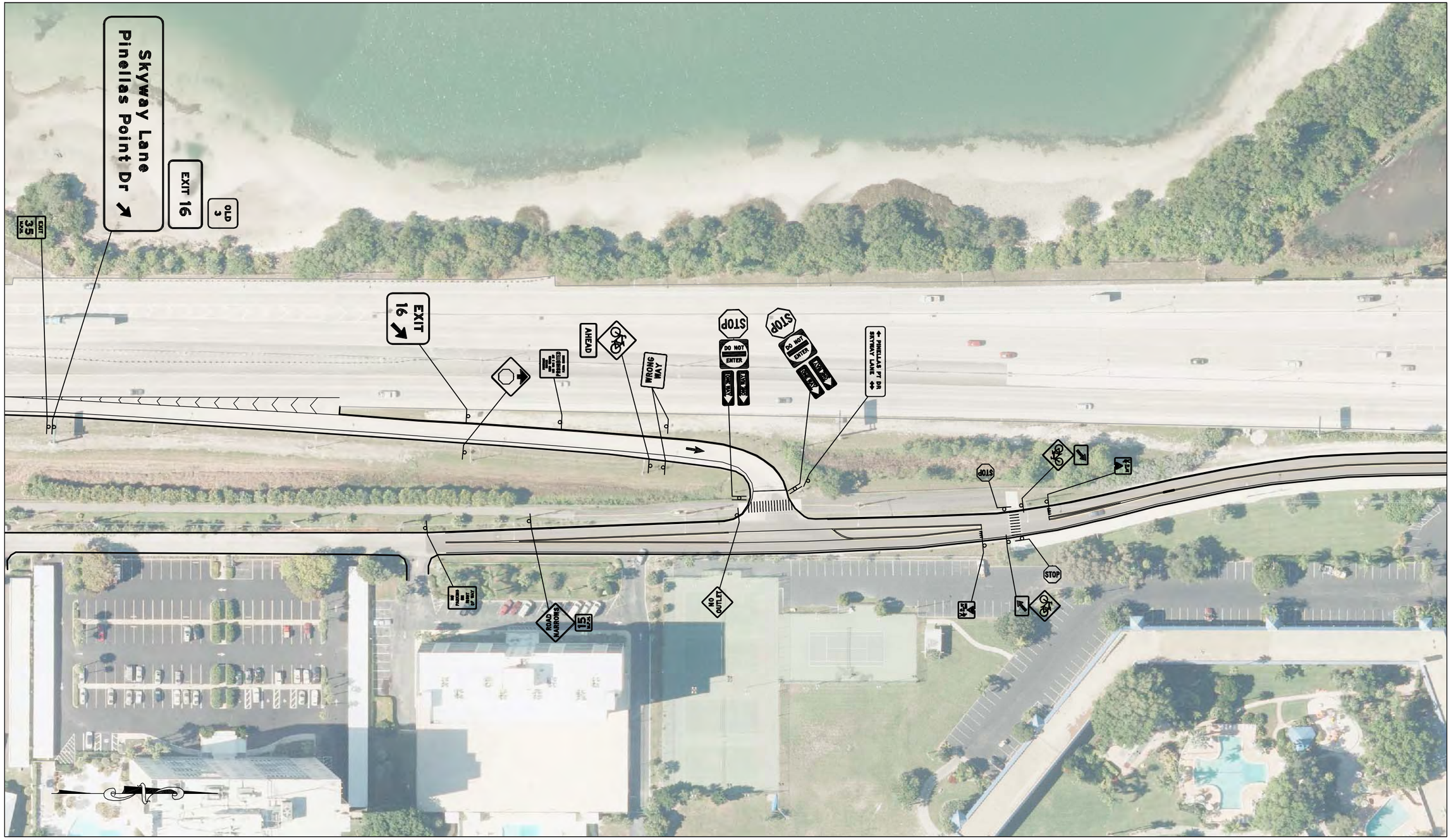
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 PINELLAS POINT DRIVE

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
I–275 PINELLAS POINT DRIVE

CONDITION DIAGRAM

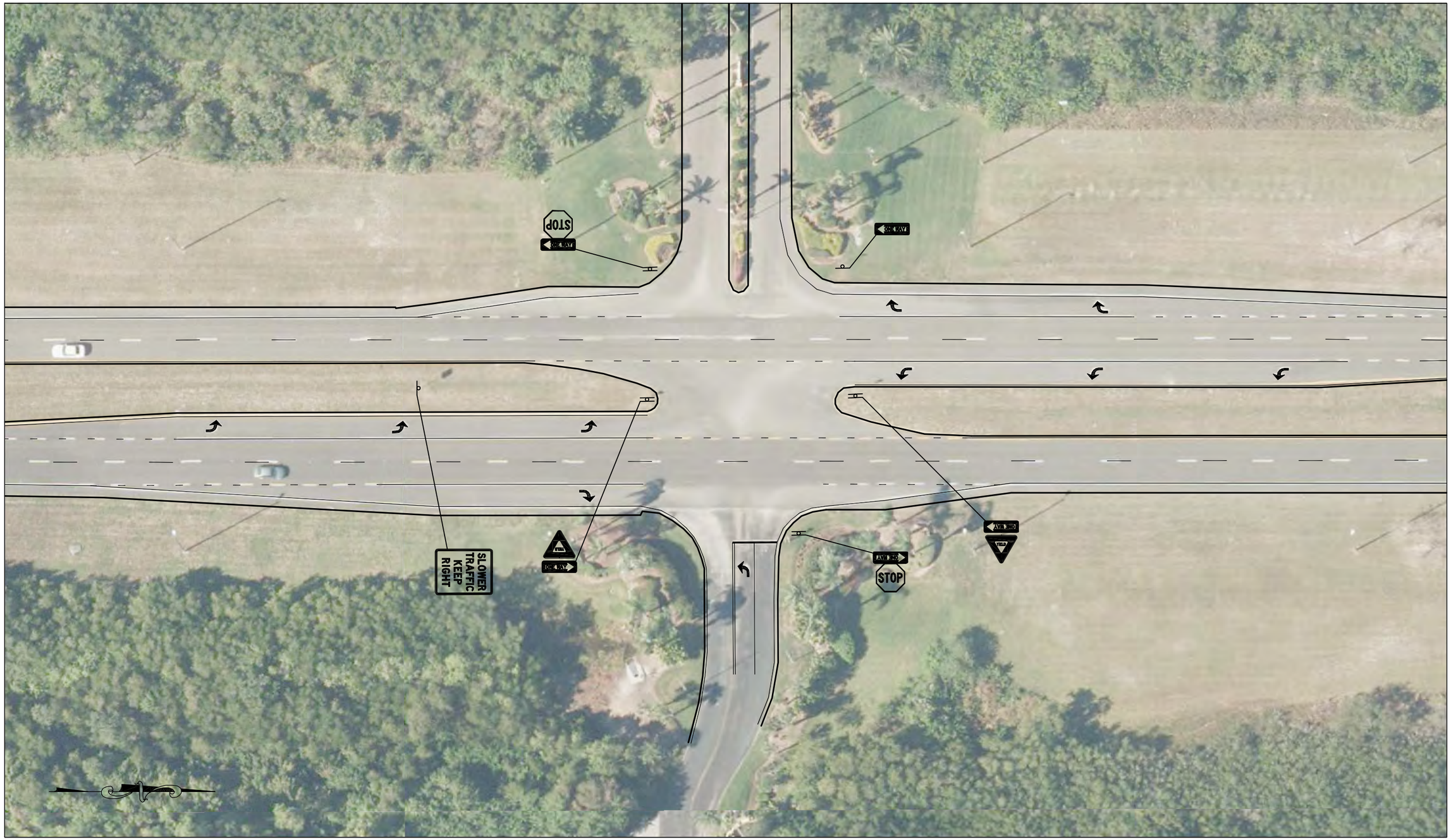
FIGURE NO.
2

I-275 AT SR 687 (4TH ST)

The interchange of I-275 and SR 687, Exit 32, is located in the City of St. Petersburg, Pinellas County, FL. The interchange is in a Direct Connection configuration, with SR 687 North entering I-275 North and SR 687 South exiting I-275 South. I-275 runs in a north-south direction through the interchange and SR 287, a 4-lane divided highway, runs north-south.

Interchange Details

Speed Limits:	• I-275: 65 mph • SR 687: 55 mph
No. of Lanes:	• I-275: 8 DIV • SR 687: 4 DIV
Maintaining Agency:	• I-95: FDOT District 7 • SR 44: FDOT District 7
Traffic Control at Ramp Terminals	• I-275 Northbound On Ramp: Yield • I-275 Southbound Off Ramp: Yield
Left-Turn to On-Ramp Traffic Control	• SR 687 EB Left: Direct Connection • SR 687 WB Left: Direct Connection
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• None
NB Off- Ramp Lane Configuration:	• N/A
SB Off-Ramp Lane Configurations:	• Single Lane Exit



SCALE

0 50 100

SYMBOLS

Traffic Sign

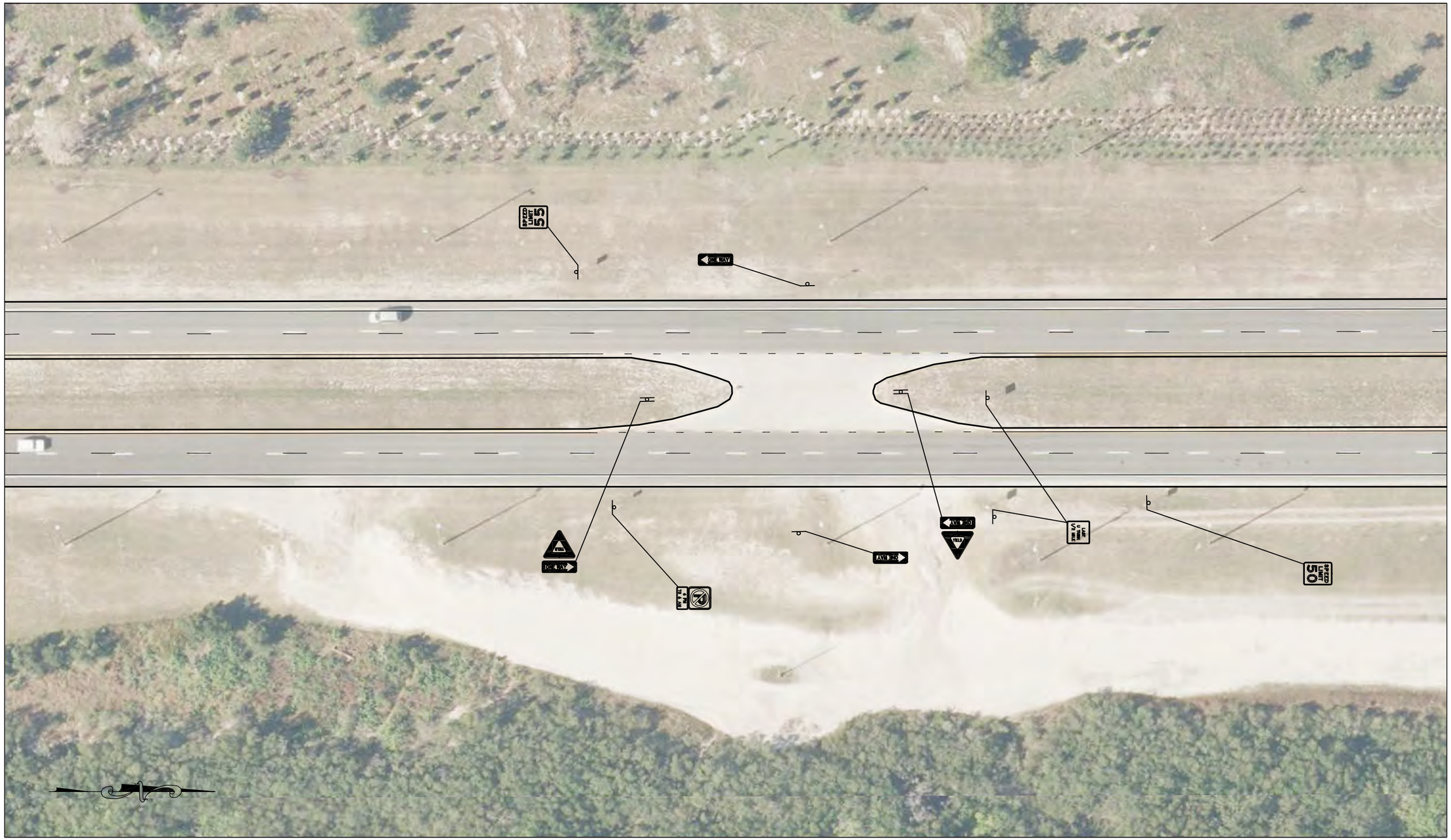
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 SR-687 (4th STREET)

CONDITION DIAGRAM

FIGURE NO.

1



SCALE

0 50 100

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 SR-687 (4th STREET)

CONDITION DIAGRAM

FIGURE NO.

2

SCALE

0 50 100

SYMBOLS

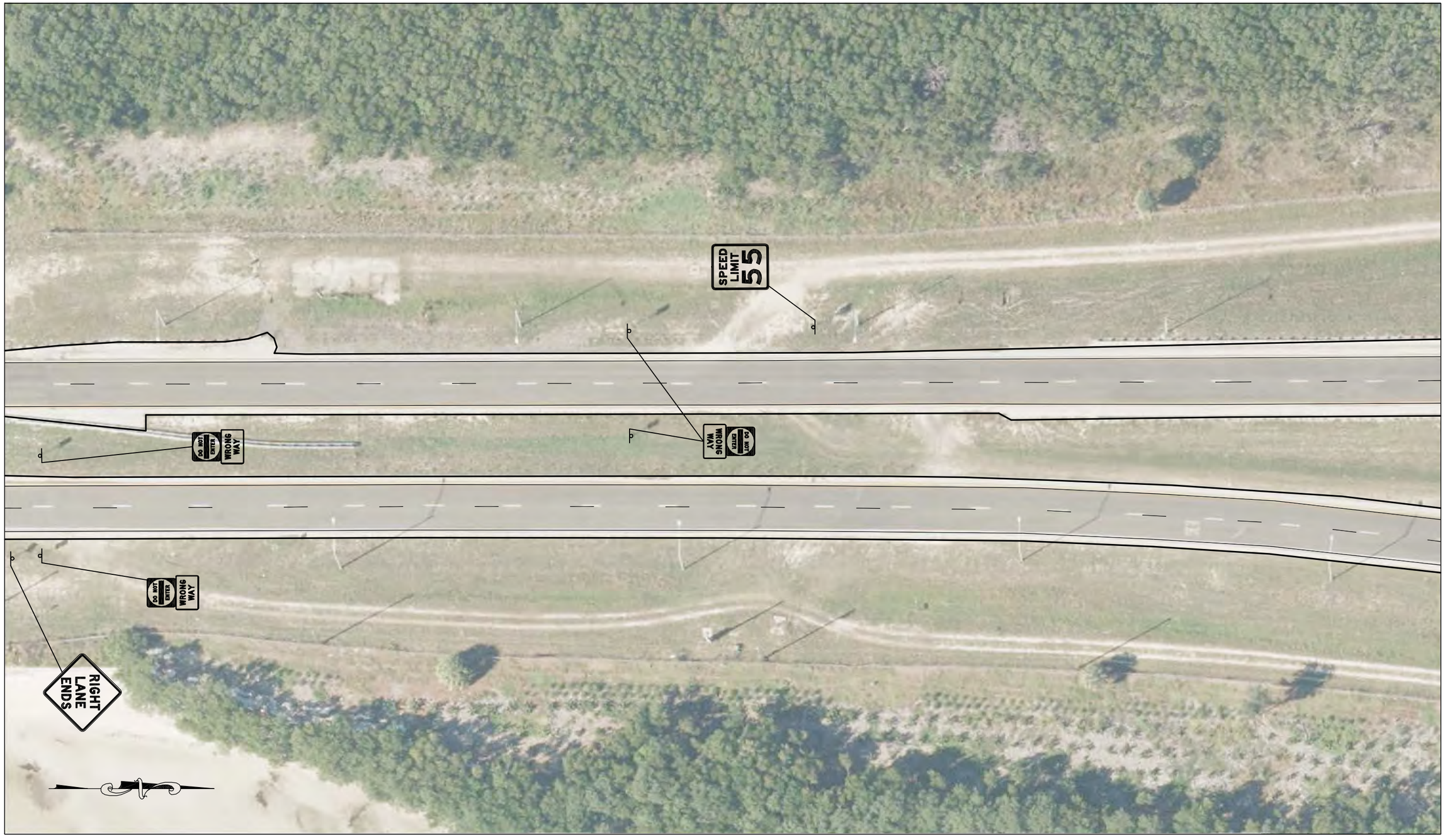
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 SR-687 (4th STREET)

CONDITION DIAGRAM

FIGURE NO.
3



SCALE

0 50 100

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
I-275 SR-687 (4th STREET)

CONDITION DIAGRAM

FIGURE NO.

4

Turnpike

SR 417 AT RED BUG LAKE RD

The interchange of SR 417 and Red Bug Lake Rd, Exit 41, is located in the City of Oviedo, Seminole County, FL. The interchange is in a Partial Cloverleaf configuration, with a loop ramp serving the Red Bug Lake Rd West to SR 417 South movement. SR 417 runs in a north-south direction through the interchange and Red Bug Lake Rd, a 6-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• SR 417: 65 mph • Red Bug Lake Rd: 45 mph
No. of Lanes:	• SR 417: 4 DIV • Red Bug Lake Rd: 6 DIV
Maintaining Agency:	• SR 417: FDOT District 8 • Red Bug Lake Rd: FDOT District 8
Traffic Control at Ramp Terminals	• SR 417 Northbound On Ramp: Yield • SR 417 Northbound Off Ramp: Signal/Yield • SR 417 Southbound On Ramp: Yield • SR 417 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• Red Bug Lake Rd EB Left: Signal – Protected Only • Red Bug Lake Rd WB Left: Loop
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Destination Sign • Directional Assembly for the first ramp • Advance Entrance Direction Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lanes • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 2 Left Turn Lanes • 1 Right Turn lane

SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR417 RED BUG LAKE SB RAMPS

CONDITION DIAGRAM

FIGURE NO.
1

SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR417 RED BUG LAKE NB RAMPS

CONDITION DIAGRAM

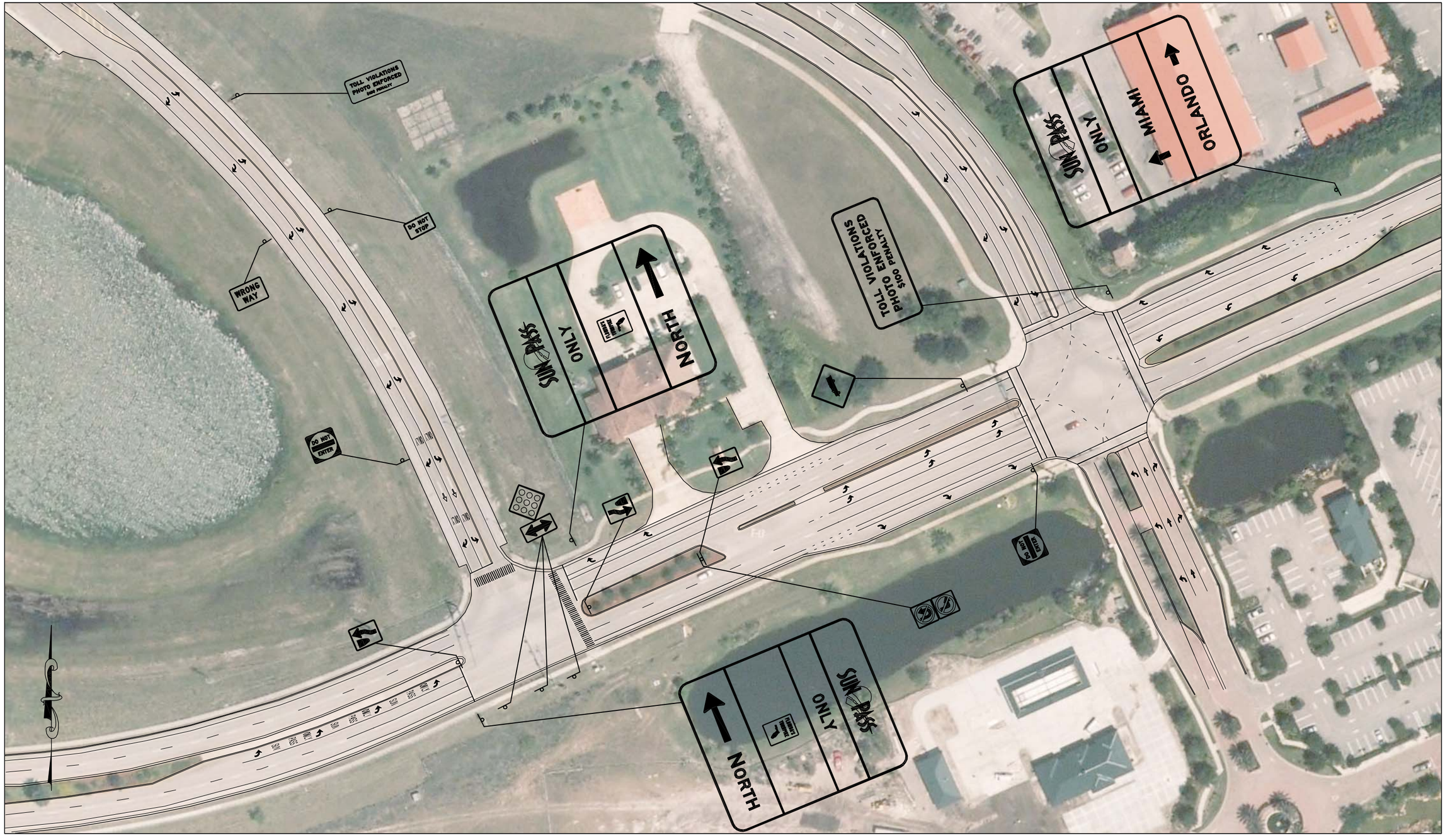
FIGURE NO.
2

SR 91 (TURNPIKE) AT BECKER RD

The interchange of SR 91 and Becker Rd, Exit 138, is located in the City of Port St Lucie, St. Lucie County, FL. The interchange is in a Partial Diamond configuration. SR 91 runs in a north-south direction through the interchange and Becker Rd, a 4-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• SR 91: 70 mph • Becker Rd: 45 mph
No. of Lanes:	• SR 91: 4 DIV • Becker Rd: 4 DIV
Maintaining Agency:	• SR 91: FDOT District 8 • Becker Rd: FDOT District 8
Traffic Control at Ramp Terminals	• SR 91 Northbound On Ramp: Signal • SR 91 Northbound Off Ramp: Signal • SR 91 Southbound On Ramp: Yield • SR 91 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• Becker Rd EB Left: Signal • Becker Rd WB Left: Signal
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign (EB only) • Destination Sign • Directional Assembly for the first ramp • Advance Turn Assembly for the second ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

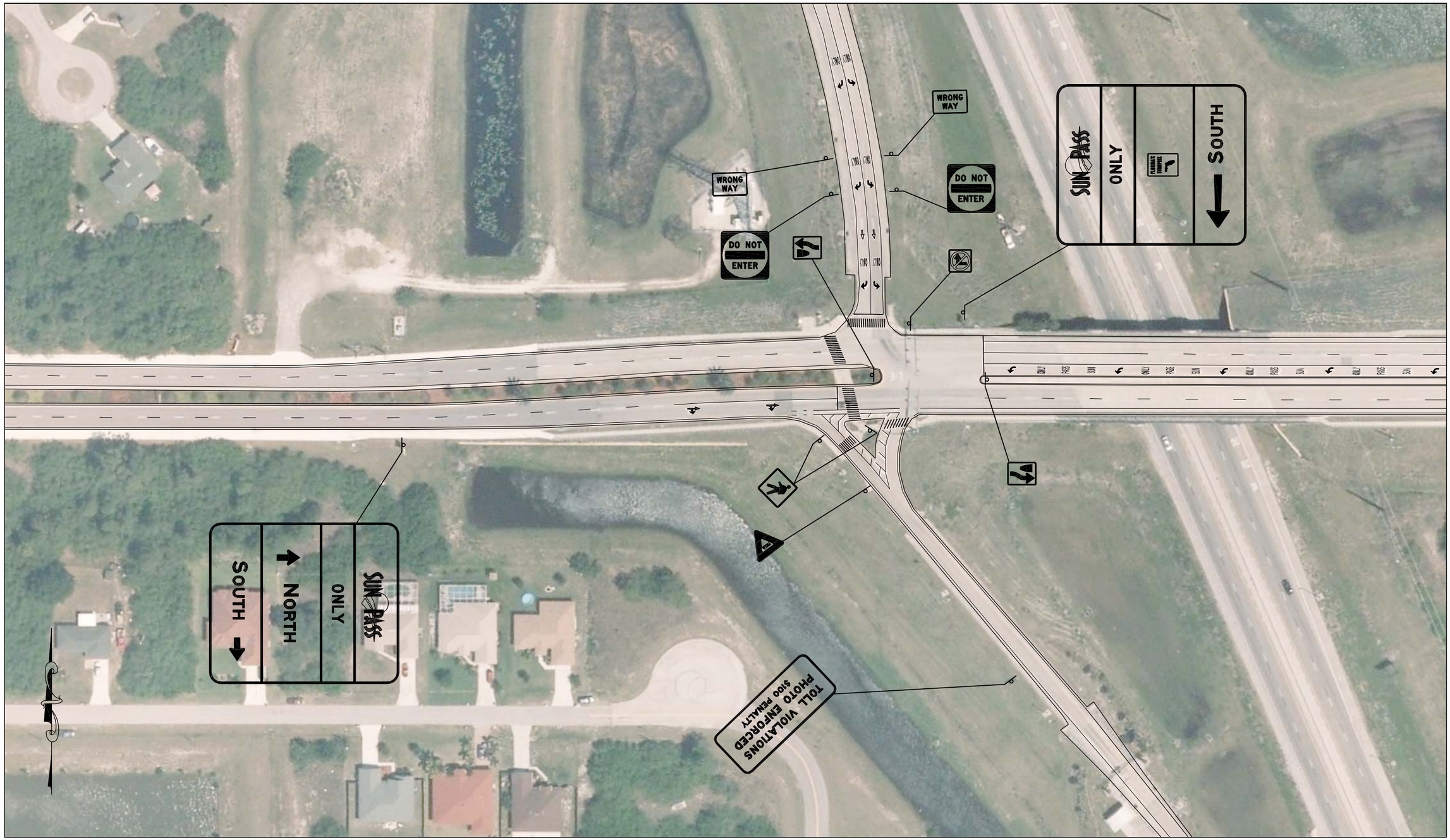
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR-91 Becker RD NB EXIT

CONDITION DIAGRAM

FIGURE NO.

1



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR-91 Becker RD SB EXIT

CONDITION DIAGRAM

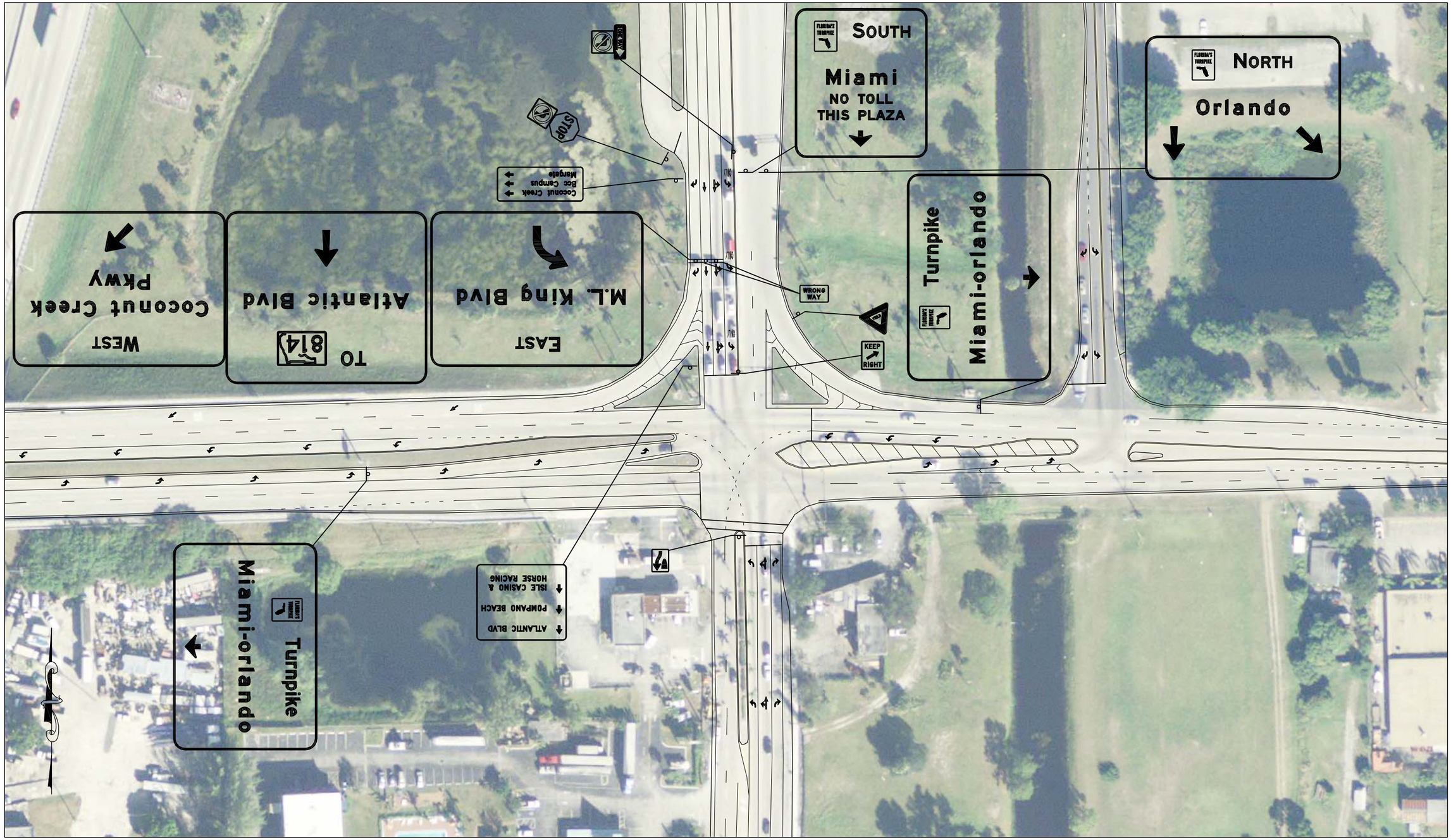
FIGURE NO.
2

SR 91 (TURNPIKE) AT COCONUT CREEK PKWY

The interchange of I-95 and Coconut Creek Pkwy, Exit 67, is located in the City of Pompano Beach, Broward County, FL. The interchange is in a Trumpet configuration, with a loop ramp serving the Coconut Creek Pkwy to SR 91 South movement. SR 91 runs in a north-south direction through the interchange and Coconut Creek Pkwy, a 4-lane arterial, runs east-west.

Interchange Details

Speed Limits:	• SR 91: 65 mph • Coconut Creek Pkwy: 35 mph
No. of Lanes:	• SR 91: 6 DIV • Coconut Creek Pkwy: 4
Maintaining Agency:	• SR 91: FDOT District 8 • Coconut Creek Pkwy: FDOT District 8
Traffic Control at Ramp Terminals	• SR 91 Northbound On Ramp: Yield • SR 91 Northbound Off Ramp: Signal/Yield • SR 91 Southbound On Ramp: Yield • SR 91 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• Coconut Creek Pkwy EB Left: Signal – Protected Only • Coconut Creek Pkwy WB Left: Loop
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Directional Assembly for ramp • Destination Sign
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 1 Shared Left -Thru Lane • 1 Thru Lane • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 1 Shared Left -Thru Lane • 1 Thru Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
SR–91 COCONUT CREEK PKWY NB/SB EXITS

CONDITION DIAGRAM

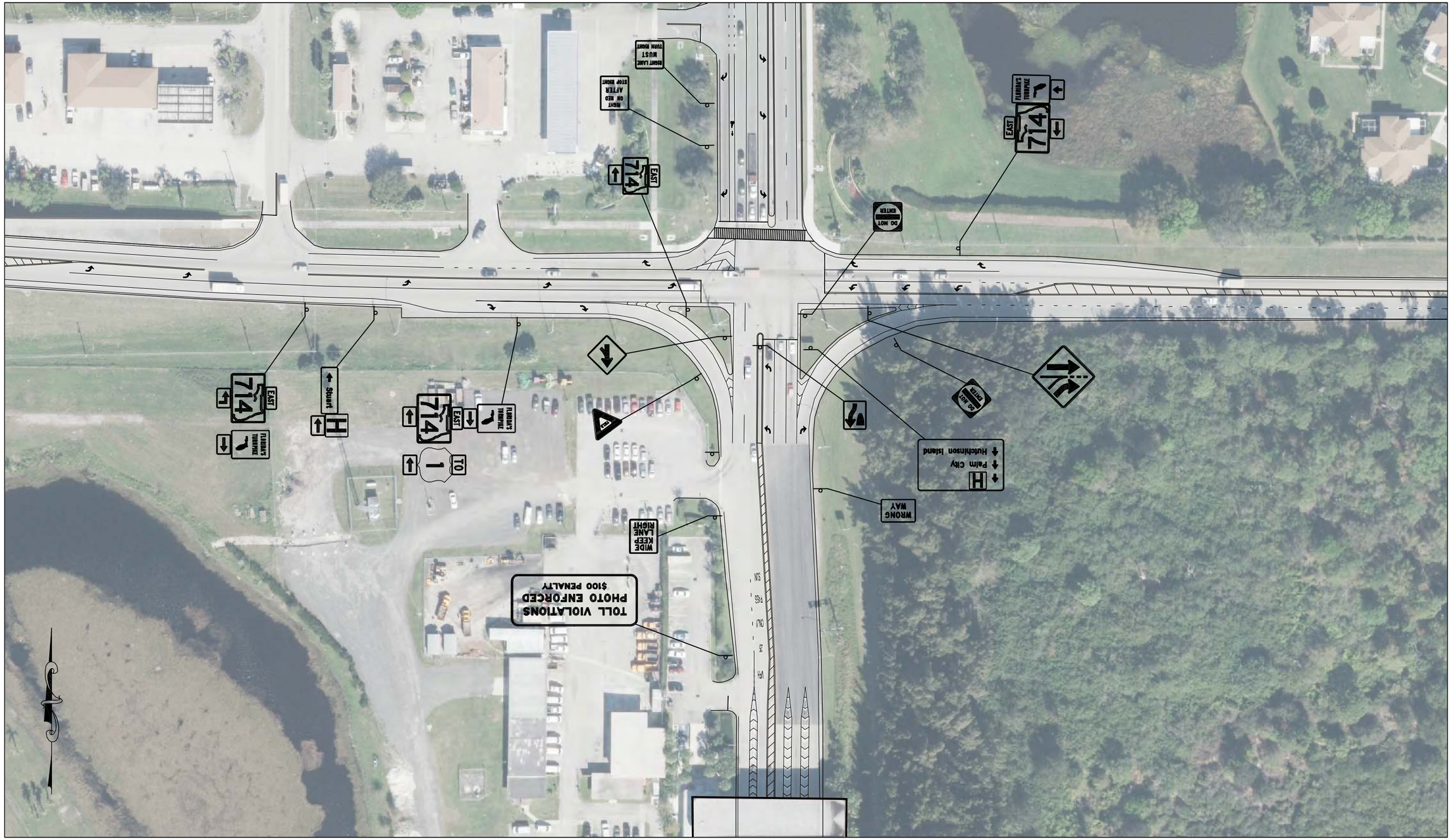
FIGURE NO.

SR 91 (TURNPIKE) AT SR 714 (MARTIN HWY)

The interchange of SR 91 and SR 714, Exit 133, is located in the City of Palm City, Martin County, FL. The interchange is in a Trumpet configuration, with a loop ramp serving the SR 714 to SR 91 South movement. SR 91 runs in a north-south direction through the interchange and SR 714, a 2-lane arterial, runs east-west.

Interchange Details

Speed Limits:	• SR 91: 70 mph • SR 714: 45 mph
No. of Lanes:	• SR 91: 4 DIV • SR 714: 2
Maintaining Agency:	• SR 91: FDOT District 8 • SR 714: FDOT District 8
Traffic Control at Ramp Terminals	• SR 91 Northbound On Ramp: Yield • SR 91 Northbound Off Ramp: Signal/Yield • SR 91 Southbound On Ramp: Yield • SR 91 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• SR 714 EB Left: Loop • SR 714 WB Left: Signal
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the entrance ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 2 Thru Lanes • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 2 Thru Lanes • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR-91 SR-714 (MARTIN HWY) EXITS

CONDITION DIAGRAM

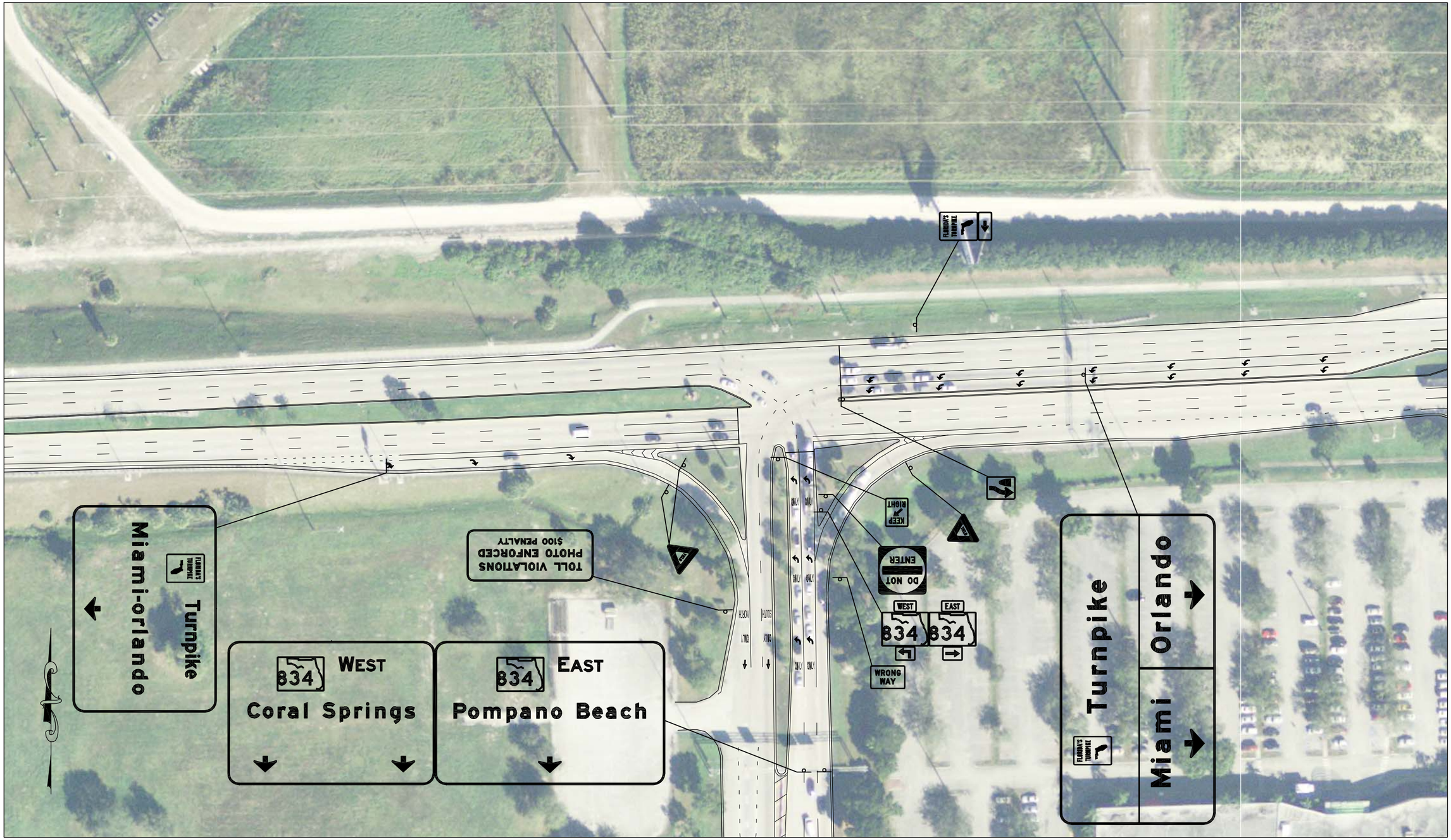
FIGURE NO.

SR 91 (TURNPIKE) AT SR 834 (SAMPLE RD)

The interchange of SR 91 and SR 834, Exit 69, is located in the City of Coconut Creek, Broward County, FL. The interchange is in a Trumpet configuration, with a loop ramp serving the SR 834 to SR 91 South movement. SR 91 runs in a north-south direction through the interchange and SR 834, a 6-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• SR 91: 65 mph • SR 834: 45 mph
No. of Lanes:	• SR 91: 6 DIV • SR 834: 6 DIV
Maintaining Agency:	• SR 91: FDOT District 8 • SR 834: FDOT District 8
Traffic Control at Ramp Terminals	• SR 91 Northbound On Ramp: Yield • SR 91 Northbound Off Ramp: Signal/Yield • SR 91 Southbound On Ramp: Yield • SR 91 Southbound Off Ramp: Signal/Yield
Left-Turn to On-Ramp Traffic Control	• SR 834 EB Left: Loop • SR 834 WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Interchange Lighting • NE Quadrant: Interchange Lighting • SE Quadrant: Interchange Lighting • SW Quadrant: Interchange Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Destination Signs
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 1 Left Turn Lane • 2 Right Turn lanes
SB Off-Ramp Lane Configurations:	• Single Lane Exit • 1 Left Turn Lane • 2 Right Turn lanes



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR-91 SR-834 (SAMPLE RD) SB EXIT

CONDITION DIAGRAM

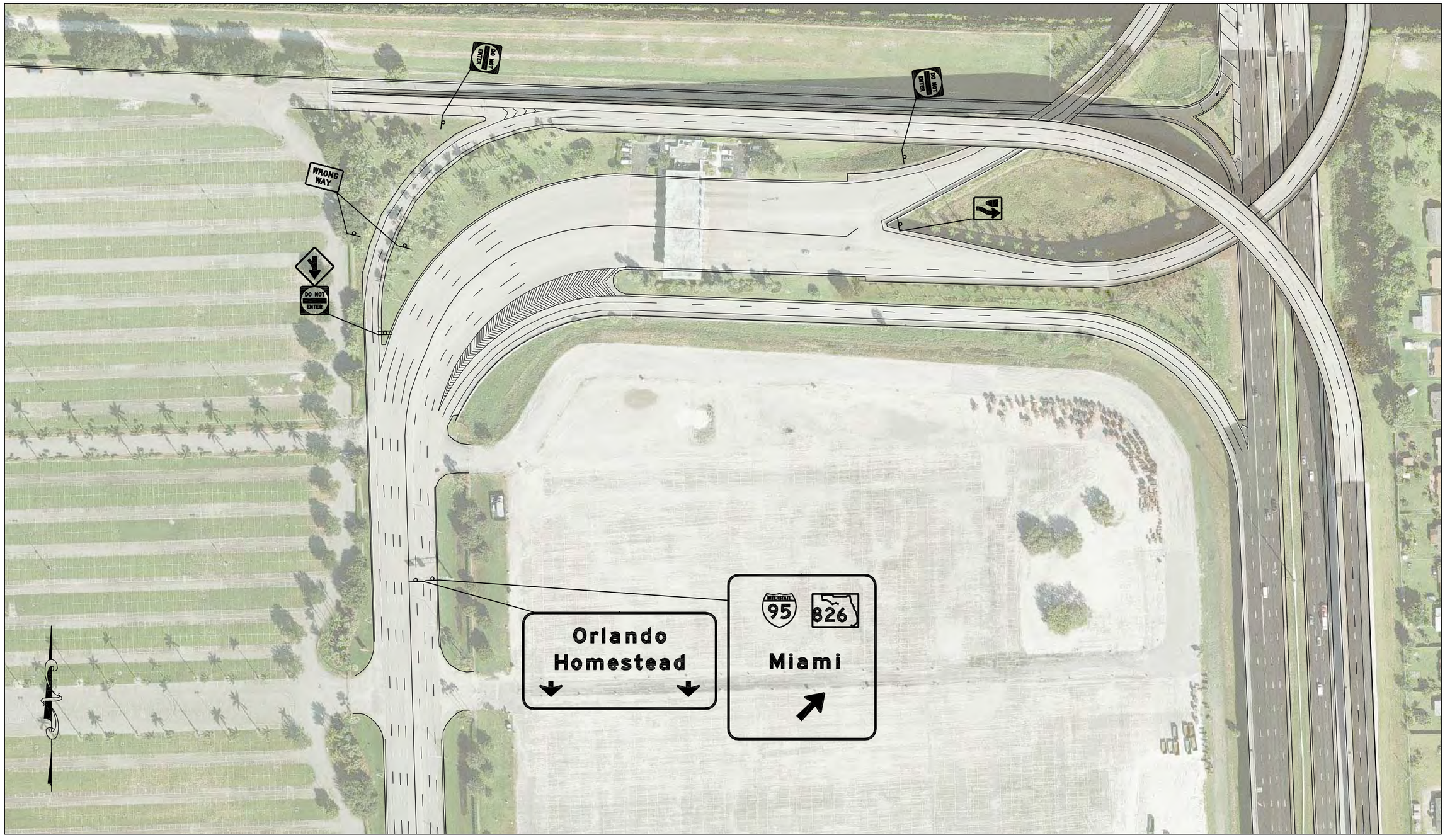
FIGURE NO.

SR 91 (TURNPIKE) AT NW 199TH ST

The interchange of SR 91 and NW 199th St, Exit 249, is located in the City of Miami, Miami-Dade County, FL. The interchange is in a Y-intersection configuration. SR 91 runs in a north-south direction through the interchange and NW 199th St, an 8-lane divided highway, runs east-west.

Interchange Details

Speed Limits:	• SR 91: 65 mph • NW 199th St: 35 mph
No. of Lanes:	• SR 91: 8 DIV • NW 199th St: 8 DIV
Maintaining Agency:	• SR 91: FDOT District 8 • NW 199th St: FDOT District 8
Traffic Control at Ramp Terminals	• I-95 Northbound On Ramp: Yield • I-95 Northbound Off Ramp: Stop • I-95 Southbound On Ramp: Yield • I-95 Southbound Off Ramp: Stop
Left-Turn to On-Ramp Traffic Control	• NW 199th St EB Left: Yield • NW 199th St WB Left: Y-intersection
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• None
NB Off- Ramp Lane Configuration:	• Double Lane Exit • 1 Left Turn Lane • 1 Left or Right Turn Lane • 1 Right Turn lane
SB Off-Ramp Lane Configurations:	• Double Lane Exit • 1 Left Turn Lane • 1 Left or Right Turn Lane • 1 Right Turn lane



SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
SR 91 NW 199th St NB EXIT

CONDITION DIAGRAM

FIGURE NO.
1

SCALE

0 100 200

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG–WAY
CRASH ANALYSIS
SR 91 NW 199th St NB EXIT

CONDITION DIAGRAM

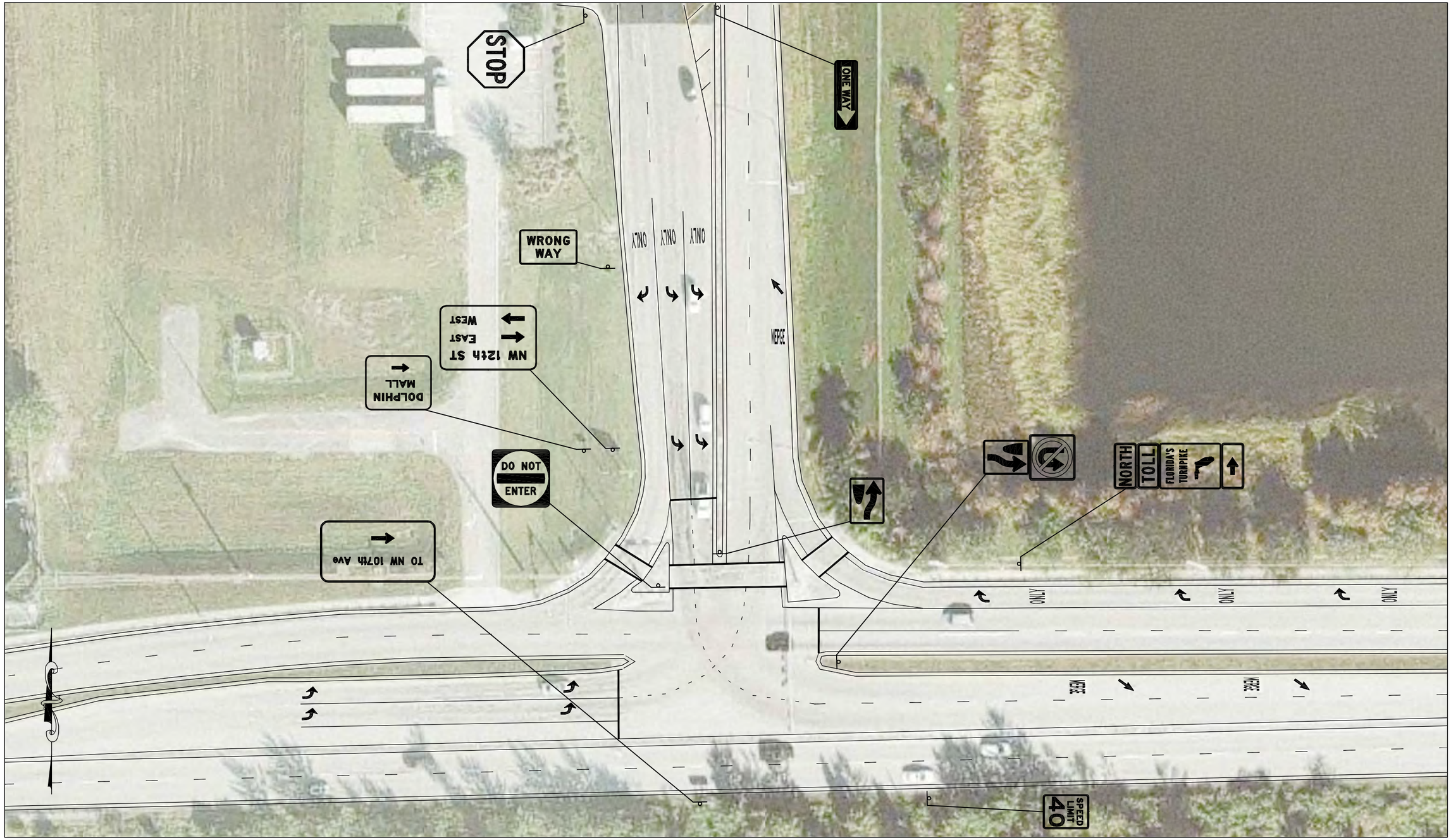
FIGURE NO.
2

SR 821 (HEFT) AT NW 12TH ST

The interchange of SR 821 and NW 12th St, Exit 27, is located in the City of Miami, Miami-Dade County, FL. The interchange is in a Partial Cloverleaf configuration, with loop ramps serving the SR 821 North to NW 12th St movement and the NW 12th St to SR 821 South movement. SR 821 runs in a north-south direction through the interchange and NW 12th St, a 4-lane divided arterial, runs east-west.

Interchange Details

Speed Limits:	• SR 821: 60 mph • NW 12th St: 40 mph
No. of Lanes:	• SR 821: 6 DIV • NW 12th St: 4 DIV
Maintaining Agency:	• SR 821: FDOT District 8 • NW 12th St: FDOT District 8
Traffic Control at Ramp Terminals	• SR 821 Northbound On Ramp: Yield • SR 821 Northbound Off Ramp: Signal/Yield • SR 821 Southbound On Ramp: Yield • SR 821 Southbound Off Ramp: Signal
Left-Turn to On-Ramp Traffic Control	• NW 12th St EB Left: Loop • NW 12th St WB Left: Signal – Protected Only
Lighting Level	• NW Quadrant: Street Lighting • NE Quadrant: Street Lighting • SE Quadrant: Street Lighting • SW Quadrant: Street Lighting
Guide Signage Along Crossroad (both directions)	• Junction Sign • Directional Assembly for the first ramp • Directional Assembly for the second ramp
NB Off- Ramp Lane Configuration:	• Single Lane Exit • 2 Left Turn Lane • 2 Right Turn lane
SB Off-Ramp Lane Configurations:	• Double Lane Exit • 2 Left Turn Lane • 1 Right Turn lane



SCALE

0 50 100

SYMBOLS

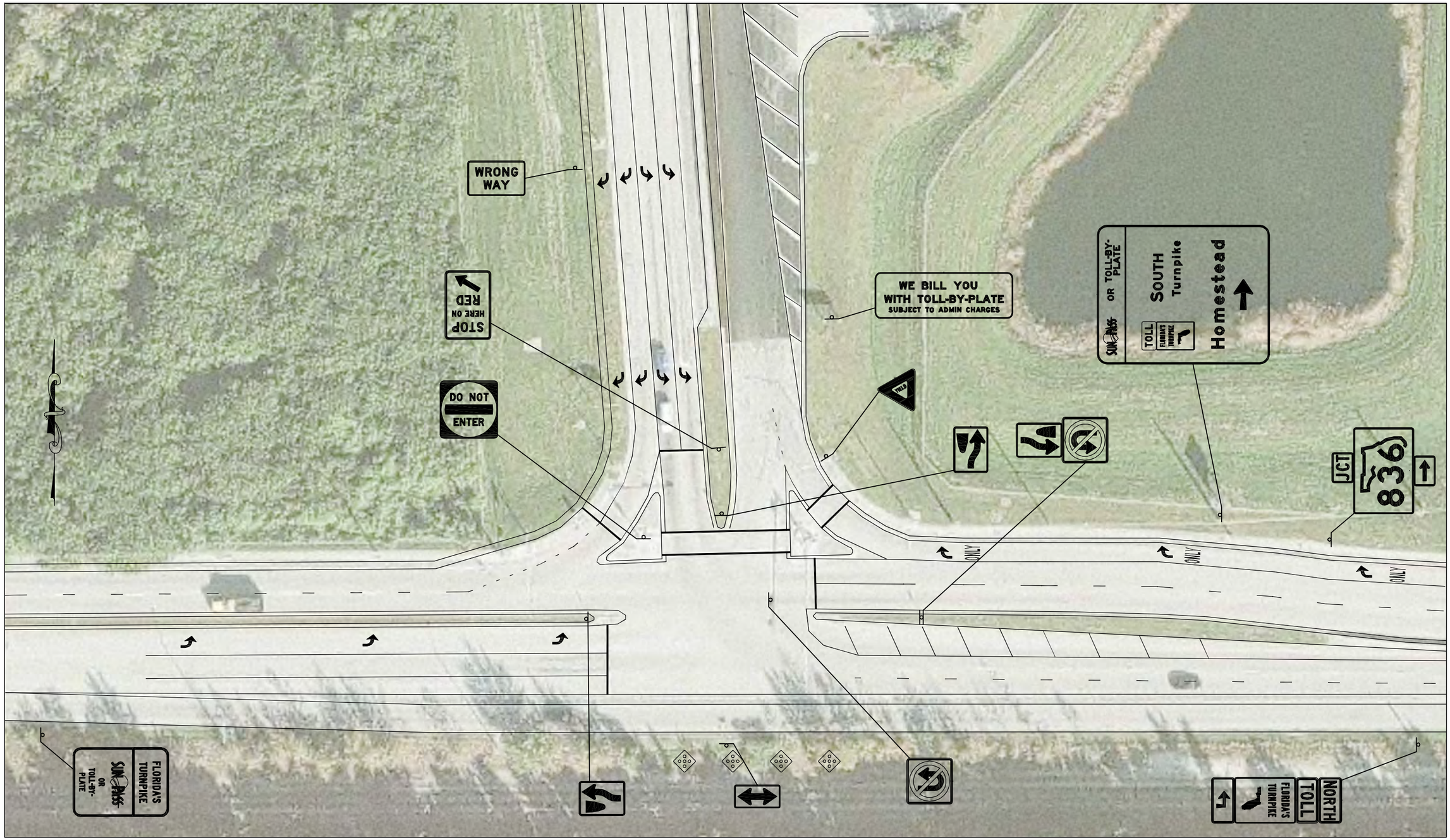
Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR-821 (HEFT) NW 12TH ST NB EXIT

CONDITION DIAGRAM

FIGURE NO.
1



SCALE

0 50 100

SYMBOLS

Traffic Sign

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

WRONG-WAY
CRASH ANALYSIS
SR-821 (HEFT) NW 12TH ST SB EXIT

CONDITION DIAGRAM

FIGURE NO.
2