

SR 417/SR 429 Interchange with I-4 to Orange Boulevard



VE Study Recommendations

Conducted May 12 – May 15, 2014



SR 417/SR 429 Interchange with I-4 to Orange Boulevard

Team Members:

- Mark Robinson, PE, Roadway Design**
- Steven Buck, EI, Roadway Design**
- Michael Dollery, Right of Way**
- Jack Crahan, MAI, Right of Way**
- Nick Truncone, MAI, Right of Way**
- Stan Mann, Maintenance**
- Karen Snyder, PE, Drainage**



SR 417/SR 429 Interchange with I-4 to Orange Boulevard

Team Members:

- Chris Dabson, PE, Structures**
- Matthew Hodges, EI, PE Trainee**
- Randall James, PE, Construction**
- Zach Sullivan, PE, Geotechnical**
- Leston Ellis, FHWA**
- Mahmud Yousef, FHWA**
- Rick Johnson, PE, CVS, Team Leader**
- Ty Garner, VE Coordinator**

SAVE International and FDOT Job Plan

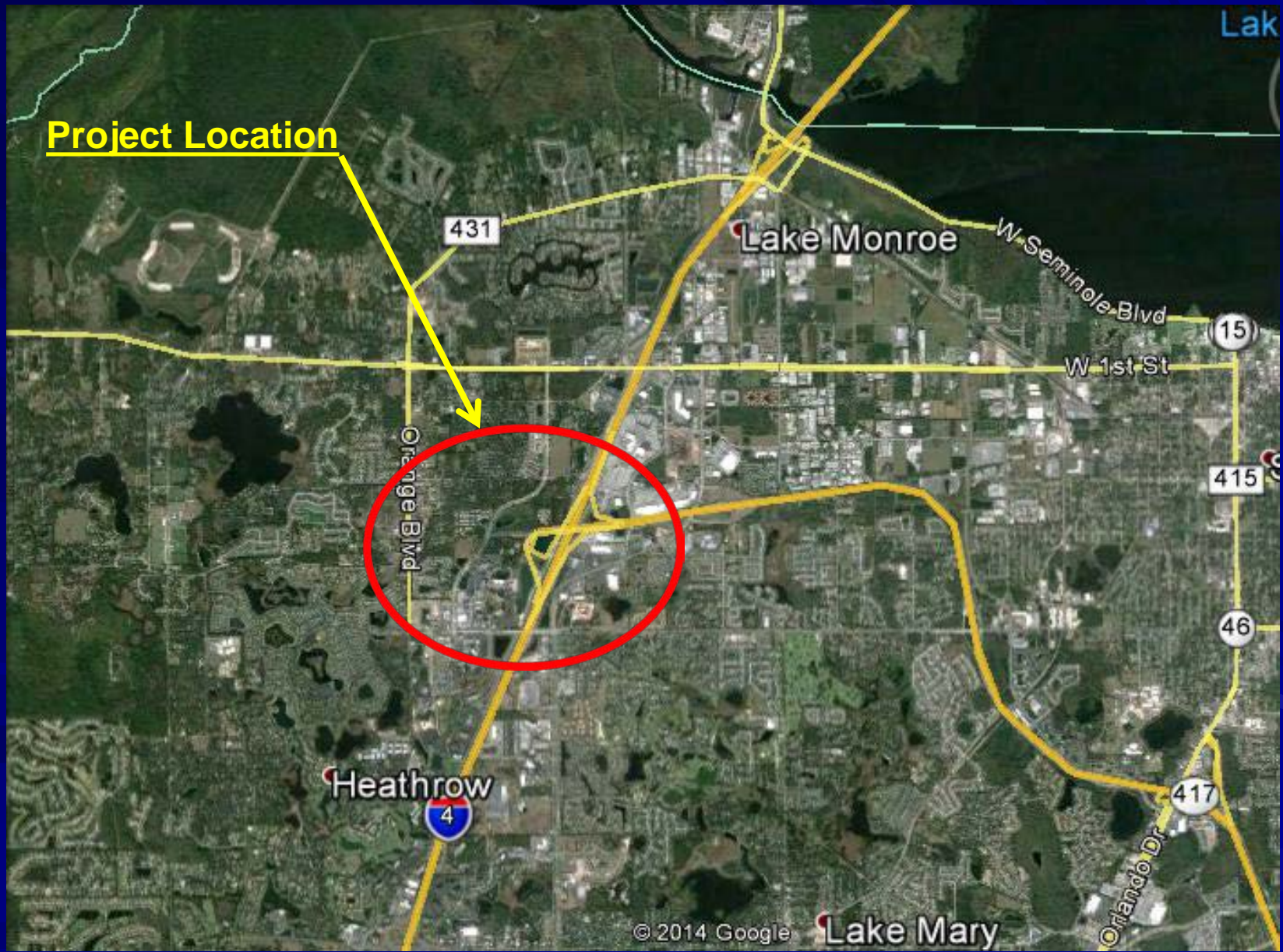


- Information
- Function
- Creative Brainstorming
- Evaluation/Development
- Recommendation/Presentation/
- Report

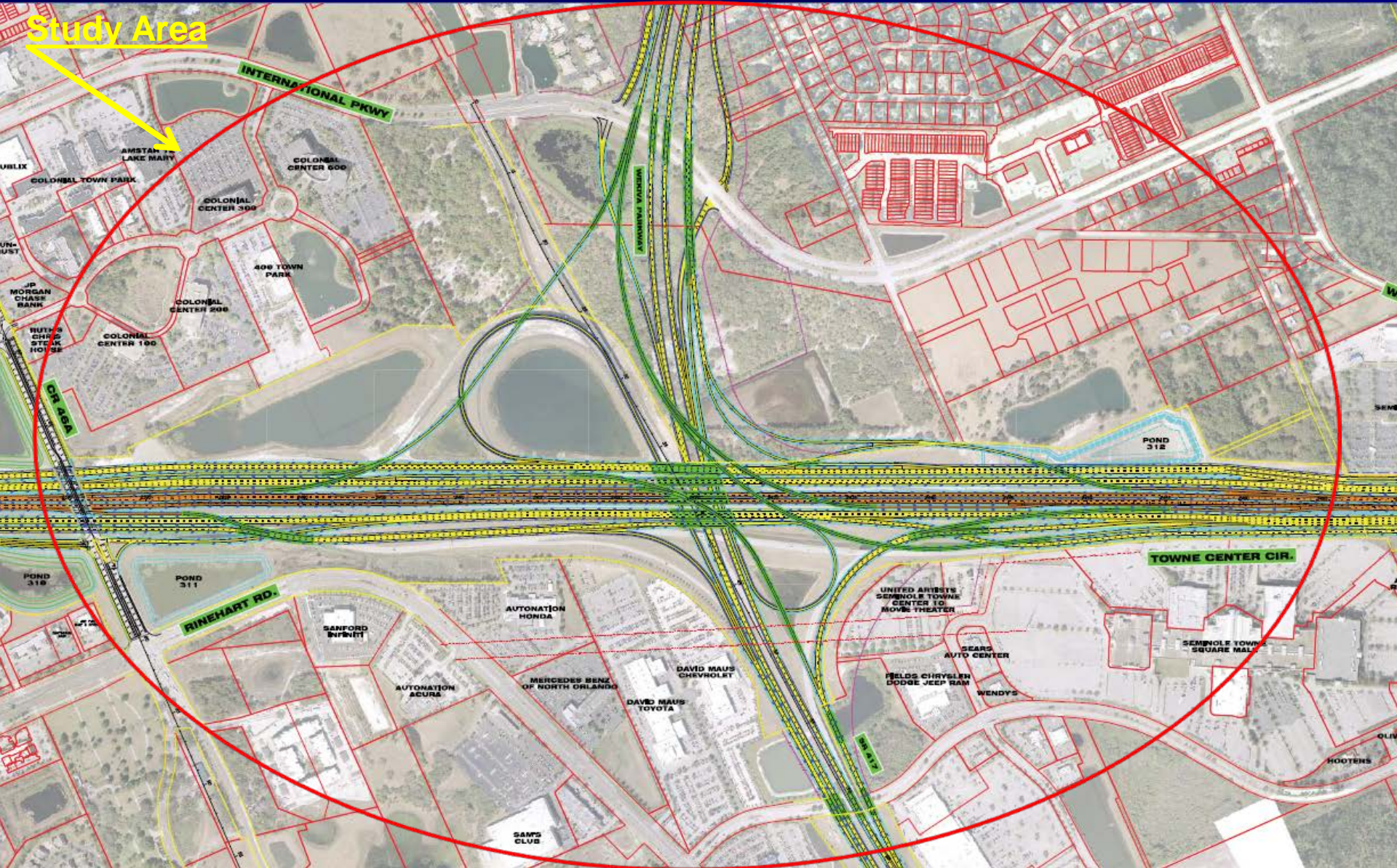
Information

- **Information Gathering**
- **Reviewed Project Information**
- **Site Visit**
- **Verified Constraints**
- **Identified Functions**

Project Location



Project Limits



Project Scope



Widening I-4 to a ten-lane divided highway. The typical section is proposed to be the same throughout Segment 3. The I-4 interchange with SR 417 will be improved to add connection to SR 429 (Wekiva Parkway). System to system direct connections are proposed for both general use lanes and express lanes.

Construction: \$255.0 M

Right of Way: \$ 91.7 M

Constraints

- **Duke Energy high voltage transmission lines and towers**

Function Analysis

- Add Connectivity
- Improve Interchange
- Connect Systems
- Build Project
- Acquire Right of Way
- Permit Project
- Design Project
- Recommend Alternatives
- Evaluate Alternatives
- Determine Needs

FAST Diagram

HOW



WHY



“Design Objectives”

- Accommodate Users-Industry/Residents
- Treat Stormwater
- Accommodate Utilities
- Satisfy Community
- Mimimize Environmental Impacts
- Manage Access

“All The Time Functions”

- Anticipate
- Incorporate Future Growth
- Accommodate Traffic
- Minimize Costs
- Ease Maintenance

“Higher Order”

“Basic”

“Critical Path”

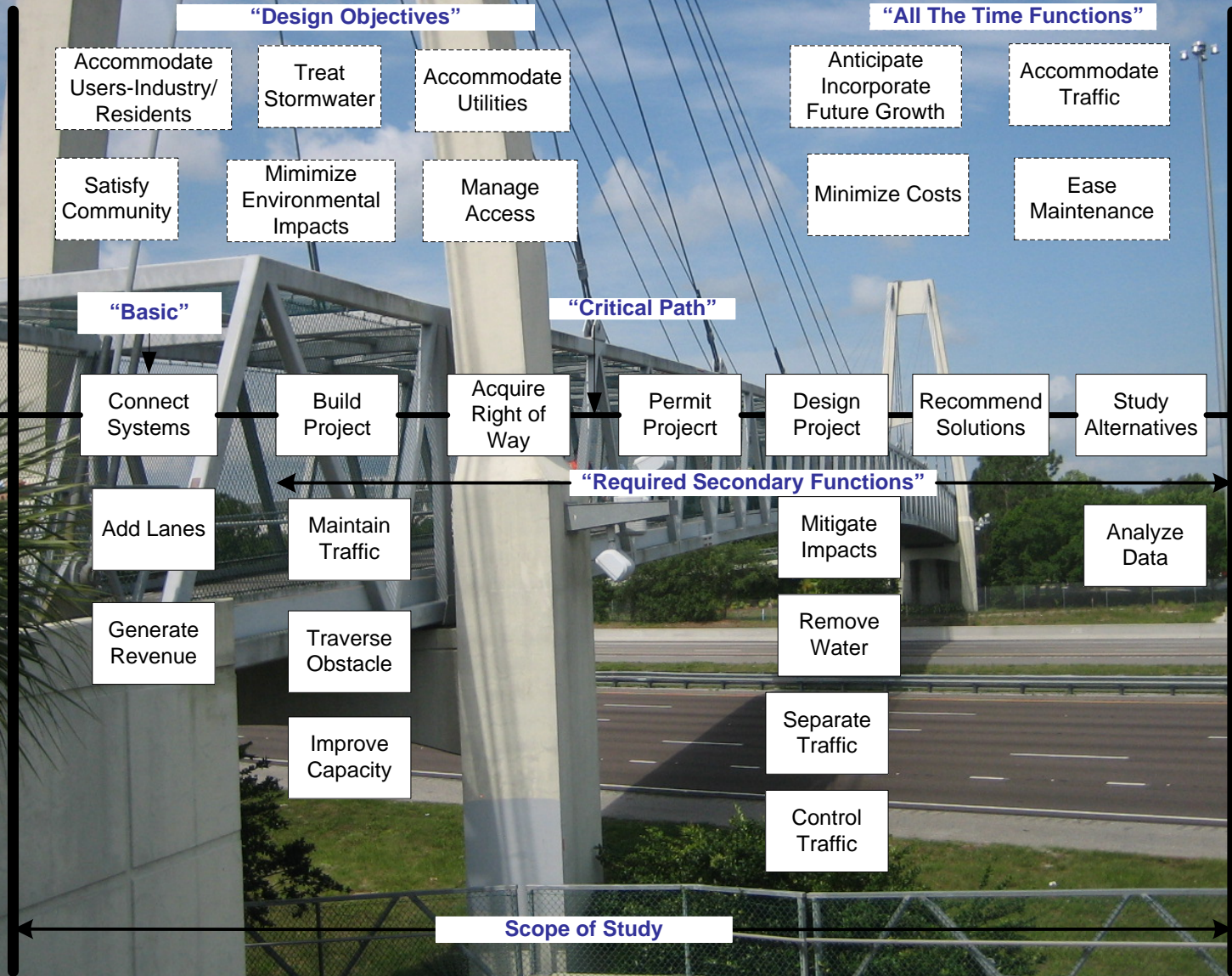
“Lower Order”

- Add Connectivity
- Connect Systems
- Build Project
- Acquire Right of Way
- Permit Project
- Design Project
- Recommend Solutions
- Study Alternatives
- Determine Needs

“Required Secondary Functions”

- Improve Interchange
- Add Lanes
- Maintain Traffic
- Mitigate Impacts
- Generate Revenue
- Traverse Obstacle
- Remove Water
- Improve Capacity
- Separate Traffic
- Control Traffic
- Analyze Data

Scope of Study



Creative Brainstorming

- **Generated Ideas in Major Disciplines and for Each Function**
- **Ideas Were Consolidated by the VE Team for Further Development**

Evaluation/Development

- **Generated 34 Ideas and Identified Weighted Criteria**
- **Ideas That Improved the Base Alternative Were Developed**
- **Compare the Base Alternative to the VE Alternative**
- **List Advantages and Disadvantages**

Eliminate the R/W take on International Parkway



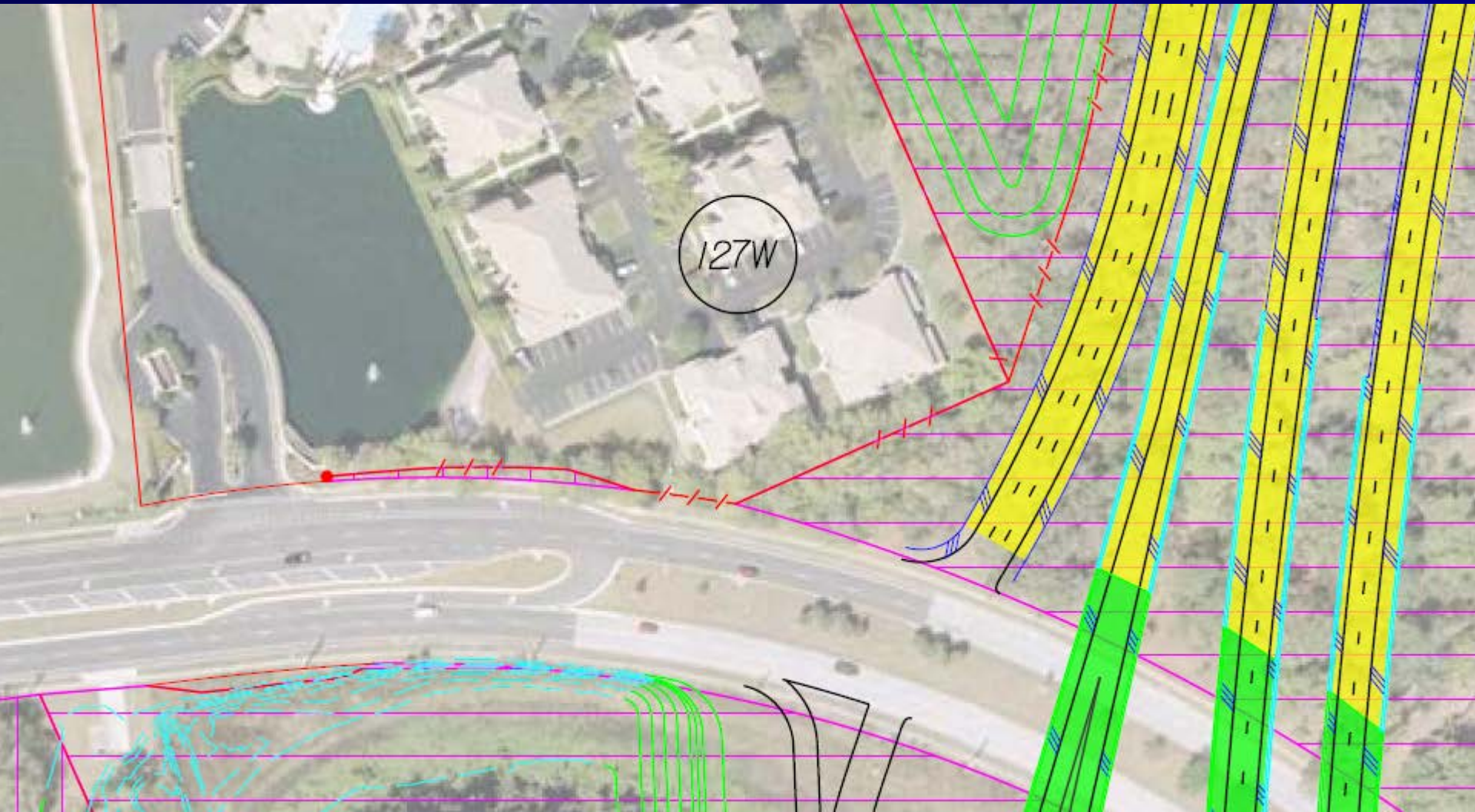
- **PD&E Concept:** The PD&E Documents show a fee taking and a proposed limited access line in front of a parent tract improved with an apartment complex (Project Parcel # 127W).

Eliminate the R/W take on International Parkway



- **VE Idea No. 9:** The VE team recommends the elimination of this fee taking, as well as, limited access taking. These takings are proposed to meet design standards regarding controlled access from a ramp. The team believes a variation to the standard may be possible, if needed.

Eliminate the R/W take on International Parkway



Eliminate the R/W take on International Parkway



■ Advantages:

- Less cost
- Less right of way

■ Disadvantages:

- Requires a design variation

■ Potential Cost Savings: **\$110,000**

Wilson Road and Wekiva Parkway at grade



- **PD&E Concept:** The PD&E Documents show two eastbound and two westbound bridges on SR 429 to span Wilson Road. Each bridge is approximately 160 feet in length.

Wilson Road and Wekiva Parkway at grade

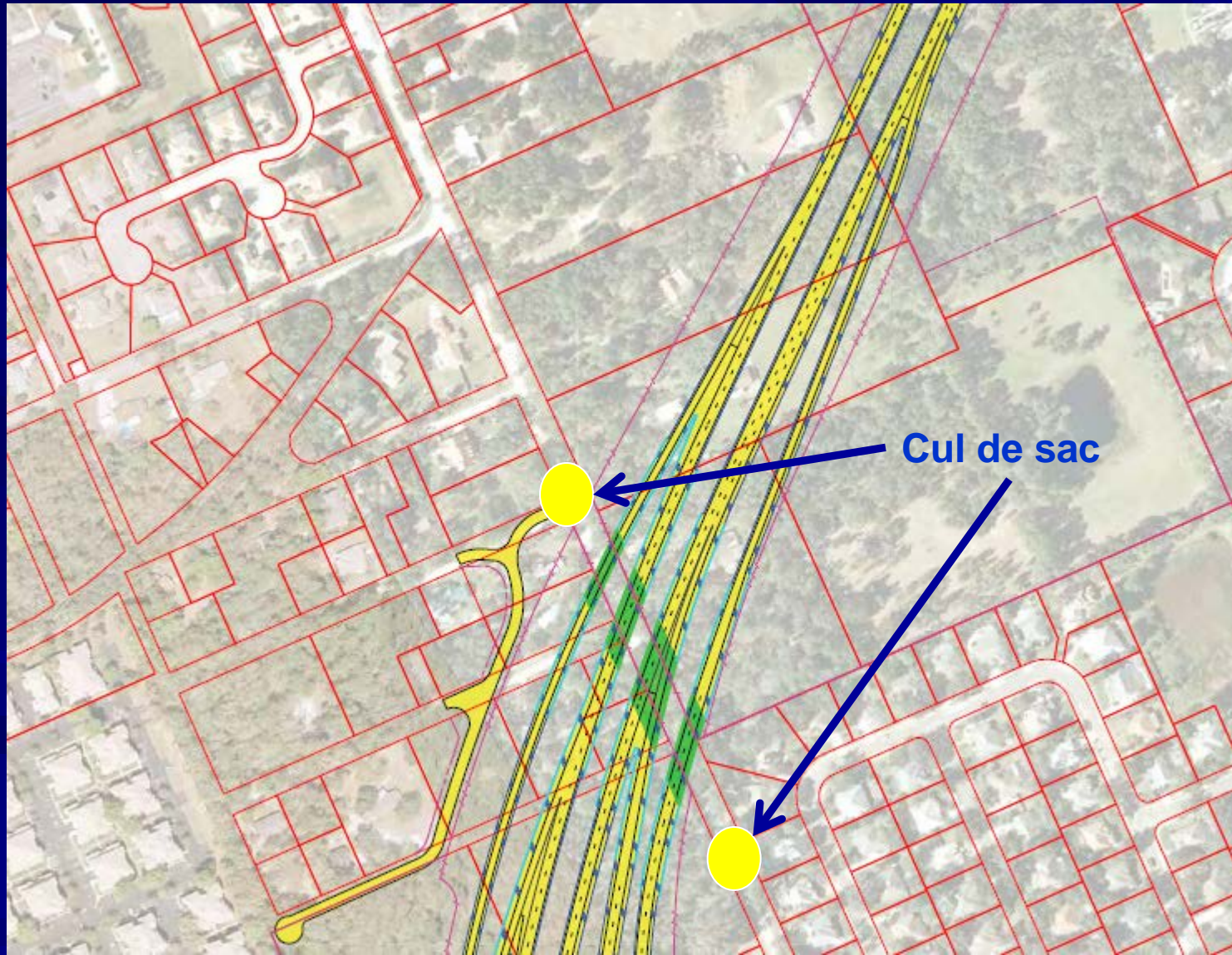


- **VE Idea No. 33: Eliminate proposed bridges and construct SR 429 at-grade through Wilson Rd. Construct cul-de-sacs at ends of Wilson Rd. at northern and southern right-of-way limits of SR 429. Construct pedestrian bridge to span SR 429 at Wilson Rd if warranted.**

Wilson Road and Wekiva Parkway at grade



Wilson Road and Wekiva Parkway at grade



Wilson Road and Wekiva Parkway at grade



■ Advantages:

- Less cost
- Easier construction
- Less noise impacts

■ Disadvantages:

- Decrease in connectivity

■ Potential Cost Savings: **\$1,034,000**

Adopt the I-4 Ultimate typical section



- **PD&E Concept:** The PD&E Documents show a typical cross section of six general use lanes and four express lanes with 12-ft. inside and outside shoulders on the general use lanes and 10-ft. outside and 6-ft. inside shoulders on the express lanes.

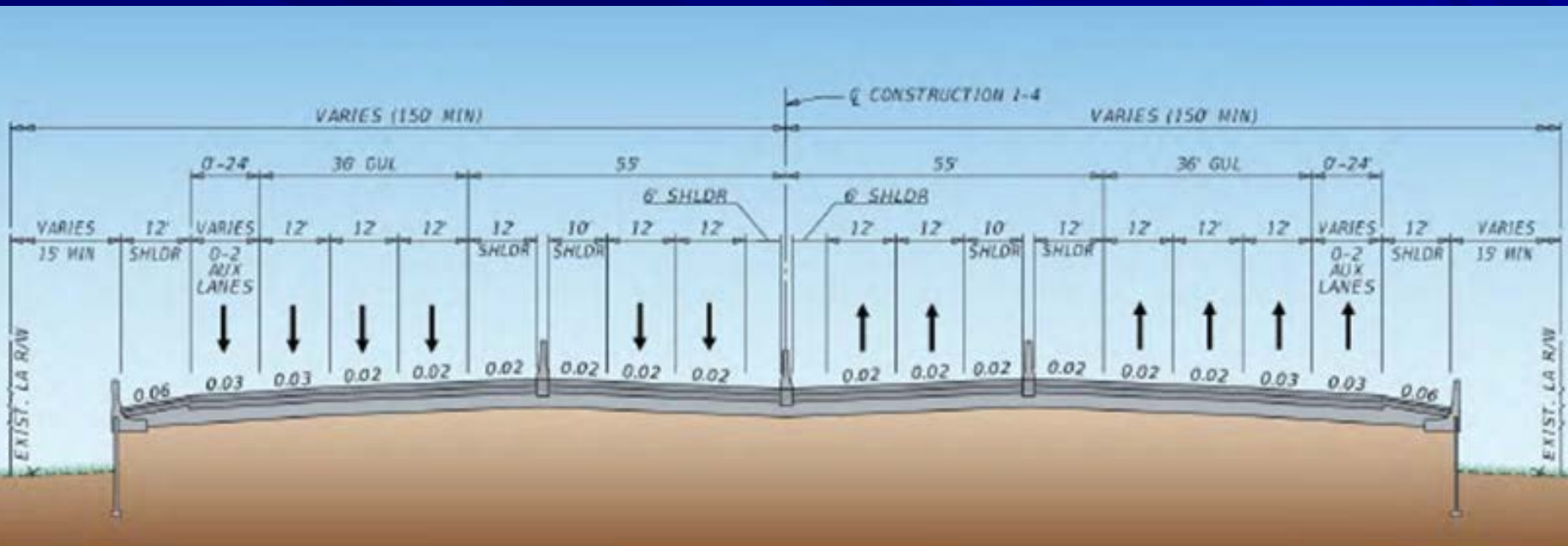
Adopt the I-4 Ultimate typical section



- **VE Idea No. 2: Adopt the I-4 Ultimate typical used through downtown Orlando and proposed for use on the remainder of Segment 3 to the north and south of this project. This will keep consistency through the corridor and reduce the roadway footprint.**

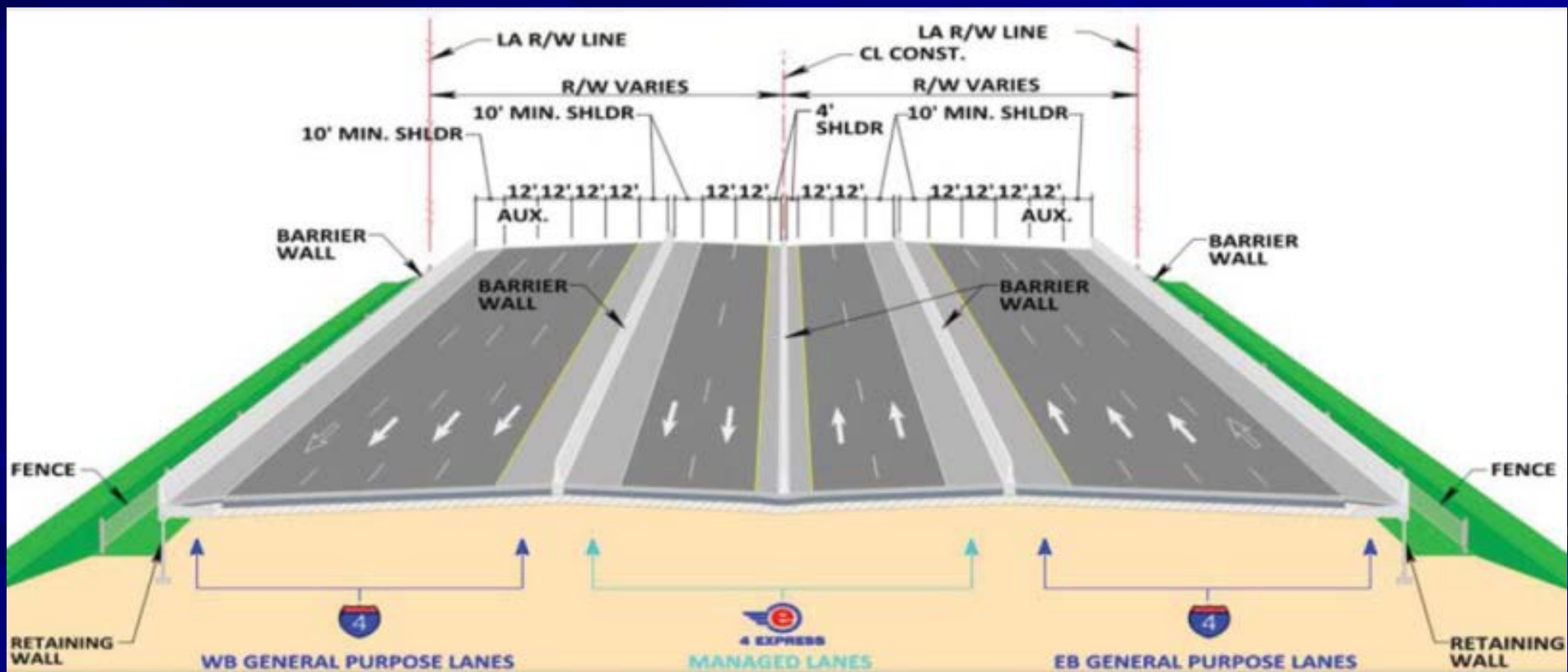
Adopt the I-4 Ultimate typical section

Proposed Typical Section



Adopt the I-4 Ultimate typical section

VE Recommendation



Adopt the I-4 Ultimate typical section

■ Advantages:

- Less Cost
- Less right of way
- Less impervious area

■ Disadvantages:

- Narrower shoulders
- Requires a design variation

■ Potential Cost Savings: **\$1,770,000**

SR 429 westbound off ramp reconfigure to two lanes



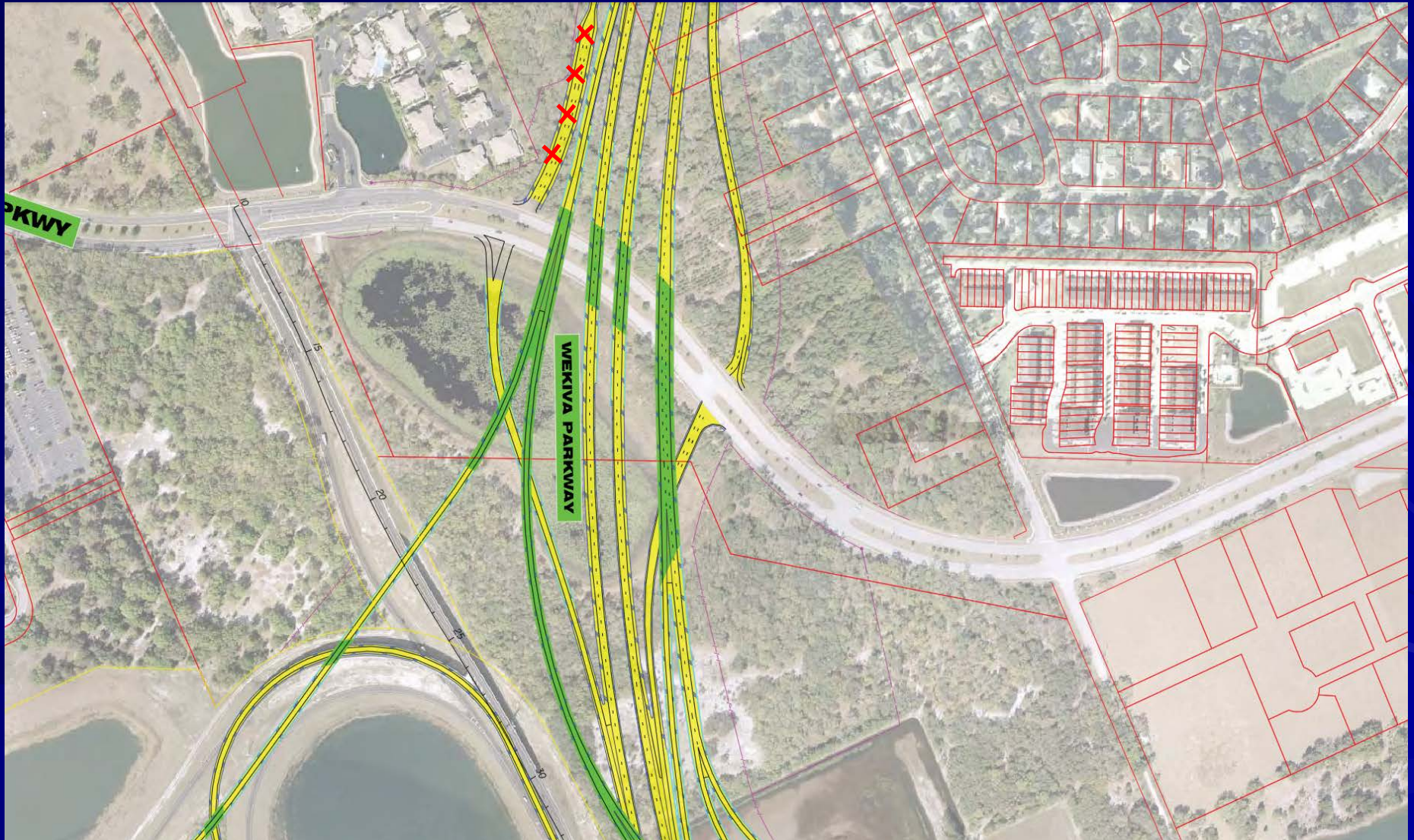
- **PD&E Concept:** The PD&E Documents show the SR 429 westbound off ramp to International Parkway with three lanes, two left-turn lanes and one right-turn lane.

SR 429 westbound off ramp reconfigure to two lanes



- **VE Idea No. 25:** Design year traffic demand does not warrant a 3-lane off ramp with a peak demand of only 236 vph. Instead, a 2-lane off ramp is suggested that still accommodates all proposed movements while reducing costs, maintenance, impervious area, and right-of-way. Additionally, reduce the queue length from 500 ft. to 300 ft.

SR 429 westbound off ramp reconfigure to two lanes



SR 429 westbound off ramp reconfigure to two lanes



SR 429 westbound off ramp reconfigure to two lanes



■ Advantages:

- Less cost
- Less maintenance

■ Disadvantages:

- Decrease storage queue length

■ Potential Cost Savings: **\$92,000**

SR 429 westbound on ramp reconfigure to one lane



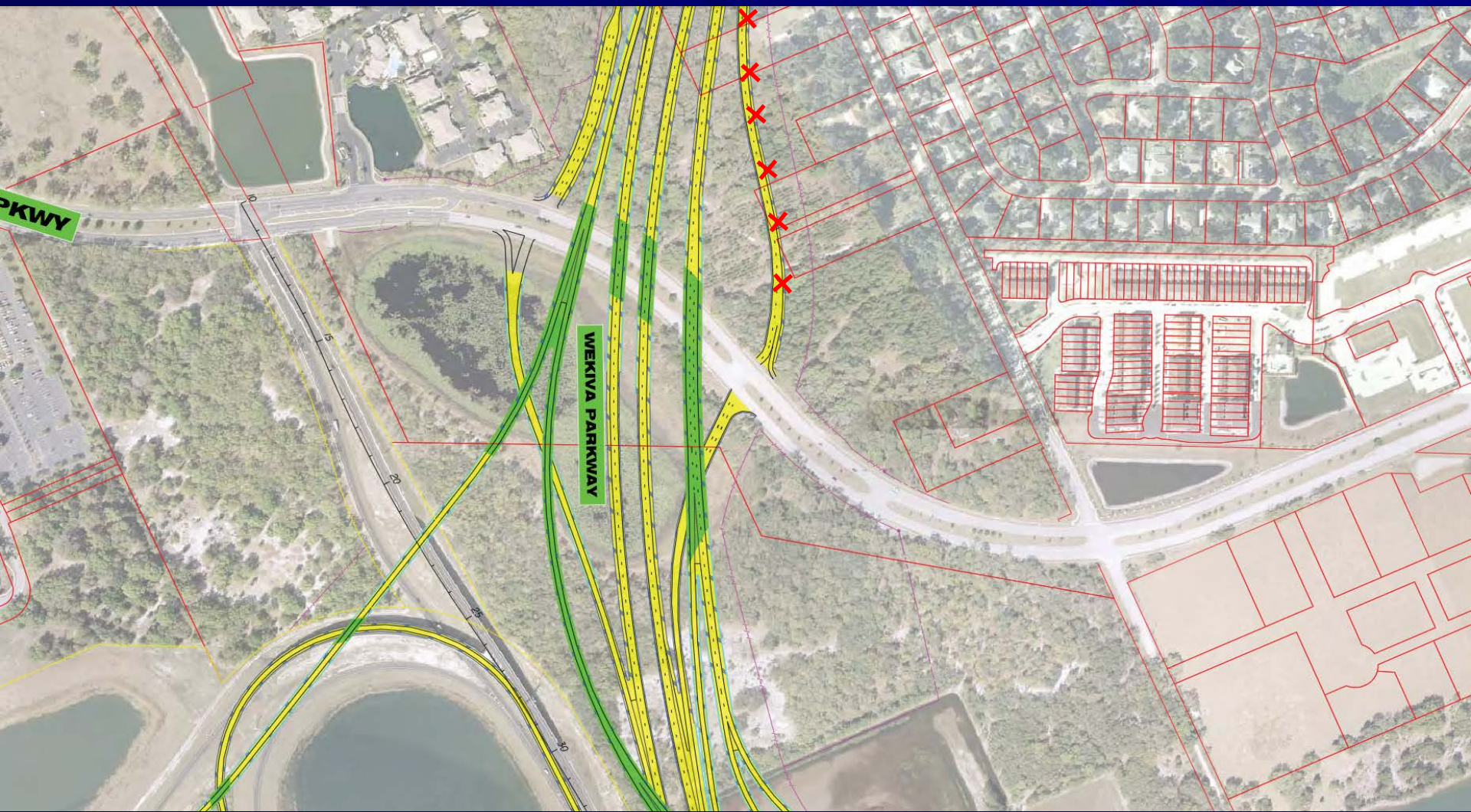
- **PD&E Concept:** The PD&E Documents show a 2-lane SR 429 westbound on ramp at the proposed interchange at International Parkway.

SR 429 westbound on ramp reconfigure to one lane



- **VE Idea No. 24: Design and construct a one lane ramp for SR 429 westbound from International Parkway.**

SR 429 westbound on ramp reconfigure to one lane



SR 429 westbound on ramp reconfigure to one lane



SR 429 westbound on ramp reconfigure to one lane



■ Advantages:

- Less cost
- Less right of way
- Improves constructability
- Less environmental impacts

■ Disadvantages:

- None apparent

■ Potential Cost Savings: **\$1,721,000**

Shrink the median width to 50 ft.



- **PD&E Concept:** The PD&E Documents show a 64-ft. median width on SR 417 that is carried through the I-4 interchange in is maintained on SR 429 to Orange Boulevard.

Shrink the median width to 50 ft.



- **VE Idea No. 23:** The VE team recommends constructing a 50-foot median width to connect to the Wekiva Parkway (Section 7A) that is designed for the same 50 feet median.

Shrink the median width to 50 ft.



■ Advantages:

- Less cost
- Less right of way
- Less maintenance
- Less environmental impacts

■ Disadvantages:

- None apparent

■ Potential Cost Savings: **\$11,512,000**

Eliminate the direct connects from SR 429 to I-4

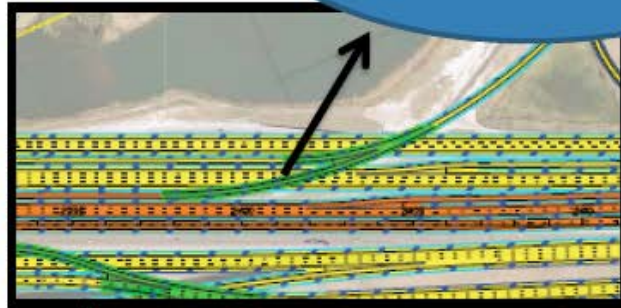
- **PD&E Concept:** The PD&E Documents show direct connections to I-4 express lanes going from SR 429 eastbound to I-4 eastbound and westbound.

Eliminate the direct connects from SR 429 to I-4

- **VE Idea No. 16: Eliminate direct connections to I-4 express lanes, going from SR 429 eastbound to I-4 westbound and from SR 429 eastbound to I-4 eastbound. An additional slip ramp could be constructed further north on I-4 to provide access to the express lanes going eastbound. There is already an existing slip ramp to I-4 express lanes proposed going westbound.**

Eliminate the direct connects from SR 429 to I-4

Eliminate Direct Connection to I-4 Express lanes going westbound. Traffic analysis show traffic demand less the



Eliminate Direct Connection to I-4 Express lanes going eastbound. Traffic analysis show traffic demand less the



Eliminate the direct connects from SR 429 to I-4

■ Advantages:

- Less cost
- Improves constructability
- Less future maintenance

■ Disadvantages:

- Eliminates low volume direct connects

■ Potential Cost Savings: **\$21,419,000**

Eliminate the C-D road in the southeast corner of SR 417

- **PD&E Concept:** The PD&E Documents show the use of a C-D road starting at the Cross Seminole Trail connecting the main line of I-4 at the interchange of SR 417. The proposed alternative is to eliminate the C-D road and utilize the system connection as is.

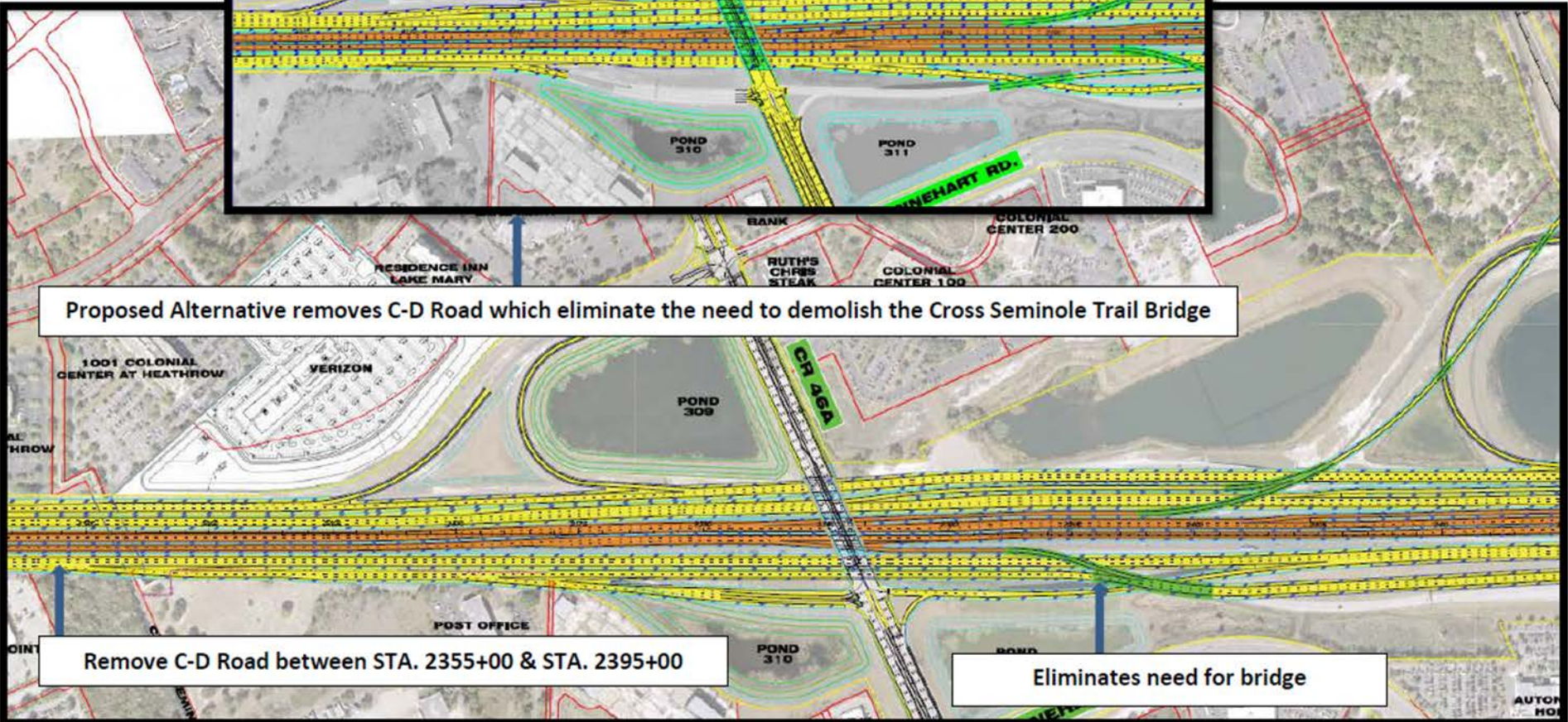
Eliminate the C-D road in the southeast corner of SR 417

- **VE Idea No. 31: Eliminate the C-D road from the southeast corner of the interchange in the most recent concept. Therefore the system would resemble it's present day appearance.**

Eliminate the C-D road in the southeast corner of SR 417



Proposed Alternative removes C-D Road which eliminate the need to demolish the Cross Seminole Trail Bridge



Remove C-D Road between STA. 2355+00 & STA. 2395+00

Eliminates need for bridge

Eliminate the C-D road in the southeast corner of SR 417

■ Advantages:

- Less cost
- Less right of way
- Saves the Cross Seminole Trail Bridge

■ Disadvantages:

- None apparent

■ Potential Cost Savings: **\$13,592,000**

Increase the ramp profile to save the CR 46A Bridge



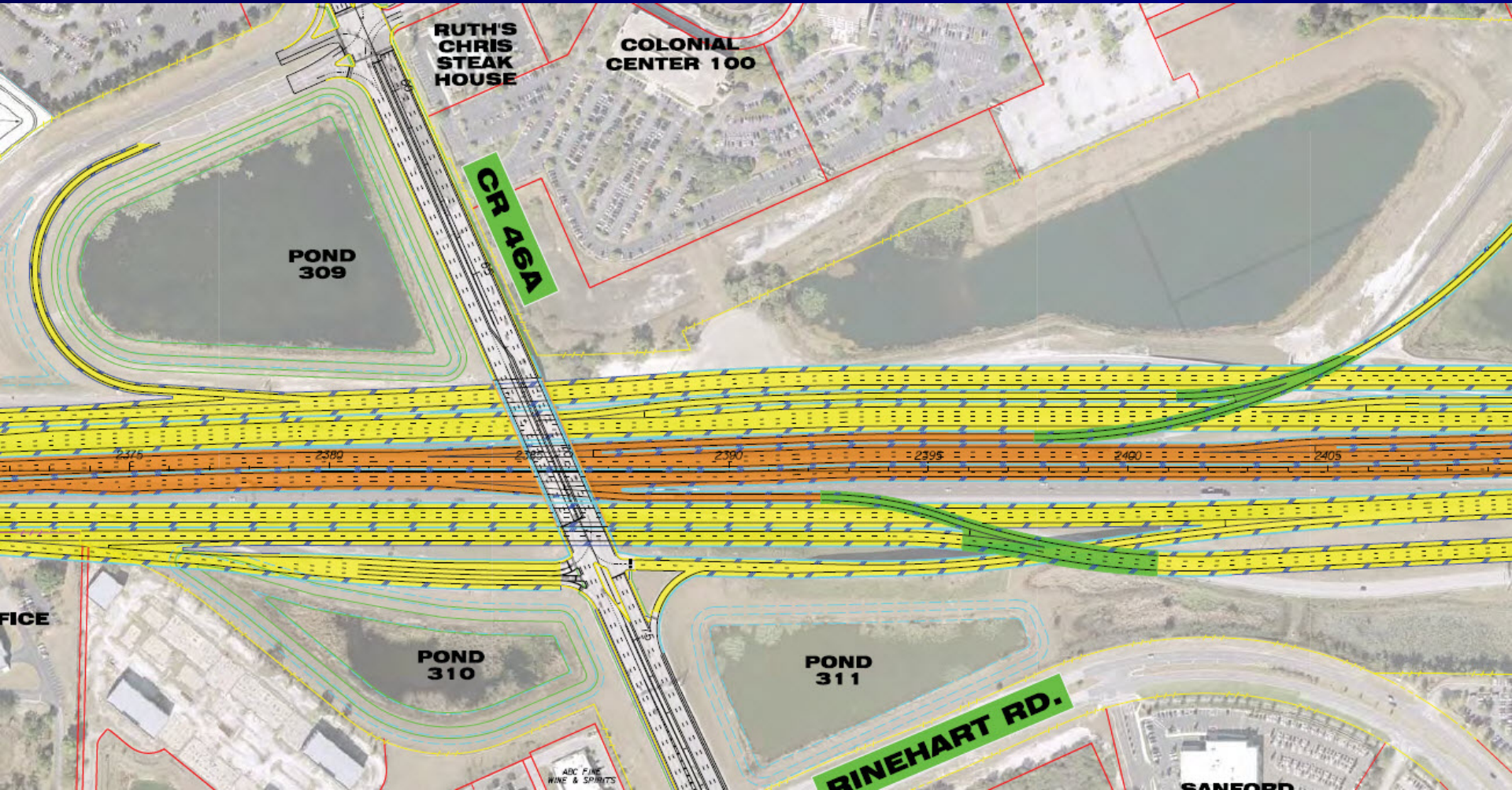
- **PD&E Concept:** The PD&E Documents show long ramp profiles near the CR 46A bridge including the ramp from I-4 eastbound to SR 417/SR 429 and the ramps from SR 429 to I-4 westbound.

Increase the ramp profile to save the CR 46A Bridge

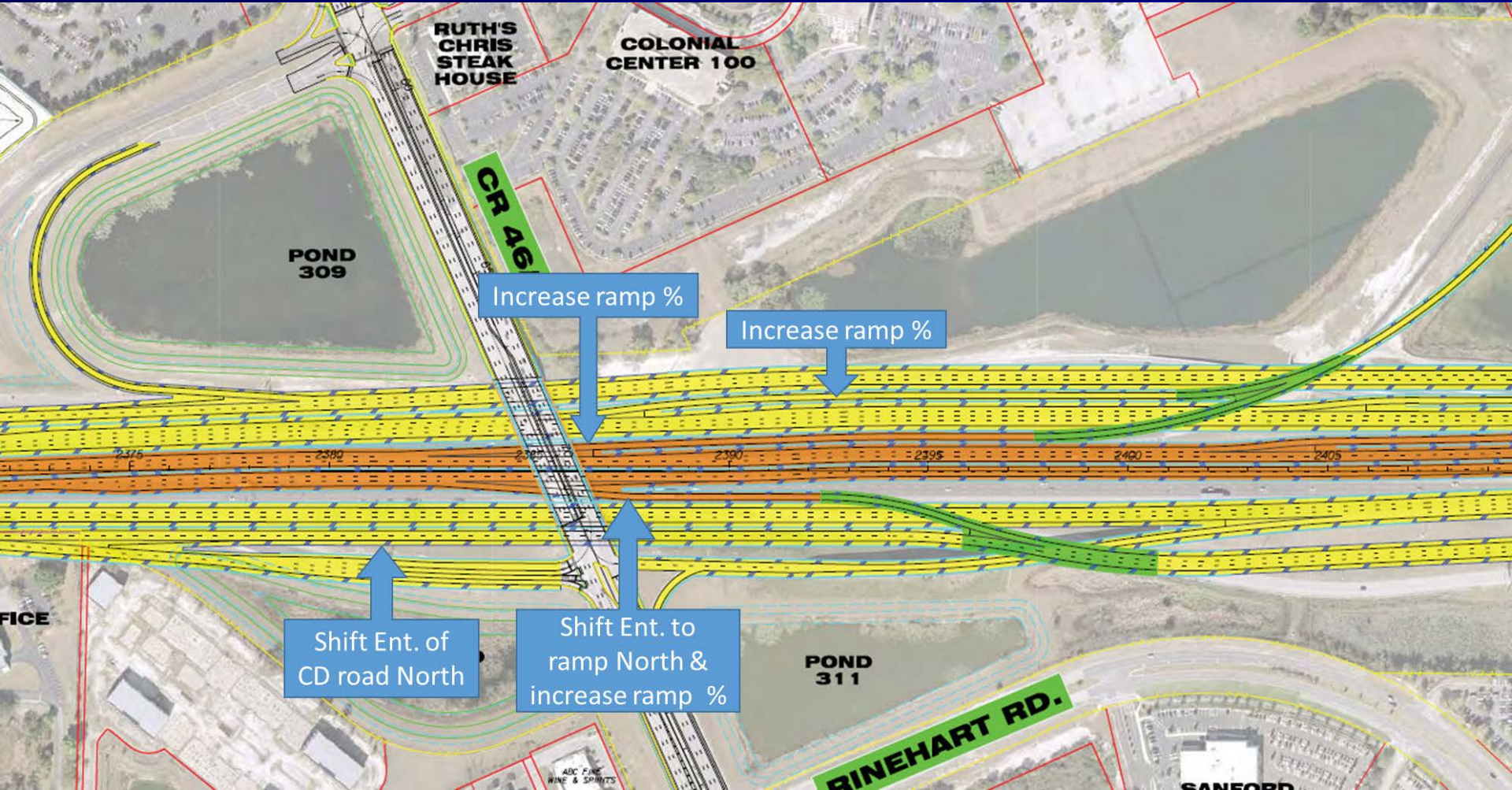


- **VE Idea No. 32:** The VE Team recommends that ramp profile grades are increased to bring traffic to at-grade quicker (less distance), allowing traffic to merge into the mainline quicker, resulting in a narrower footprint of I-4. By reducing the overall width of I-4 the CR 46A bridge should not need to be replaced as proposed.

Increase the ramp profile to save the CR 46A Bridge



Increase the ramp profile to save the CR 46A Bridge



Increase the ramp profile to save the CR 46A Bridge



■ Advantages:

- Less cost
- Less MOT

■ Disadvantages:

- More maintenance on older CR 46A newly-widened bridge

■ Potential Cost Savings: **\$1,400,000**

Don't replace the bridge and reroute the Seminole Trail



- **PD&E Concept:** The I-4 Re-Evaluation Segment 3 PD&E proposes to impact and replace the existing Cross Seminole Trail Pedestrian Bridge with the I-4 Beyond the Ultimate Improvements from SR 434 to East of US 17/92.

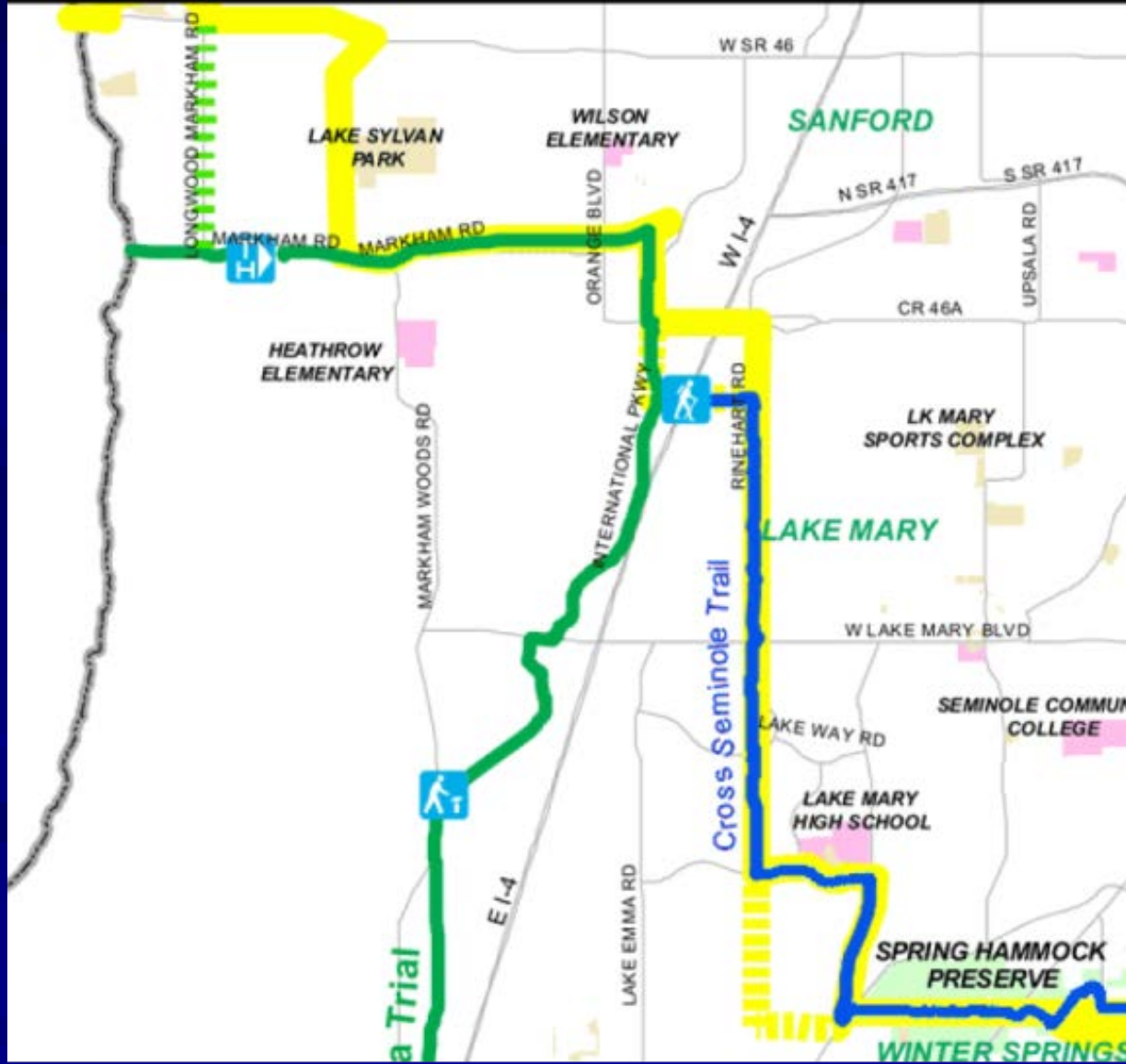
Don't replace the bridge and reroute the Seminole Trail



■ VE Idea No. 29: The VE

Alternative/Option consists of rerouting the Cross Seminole Trail to the CR 46A Interchange. This would include providing enhanced pedestrian improvements on the Ultimate CR 46A Interchange Bridge configuration to accommodate a multi-use trail in addition to the standard pedestrian pathway.

Don't replace the bridge and reroute the Seminole Trail



Don't replace the bridge and reroute the Seminole Trail



■ Advantages:

- Less cost
- Provides similar connectivity

■ Disadvantages:

- Needs local approval
- Lessens the trail experience

■ Potential Cost Savings: **\$6,700,000**

Reconfigure International Parkway to TUDI



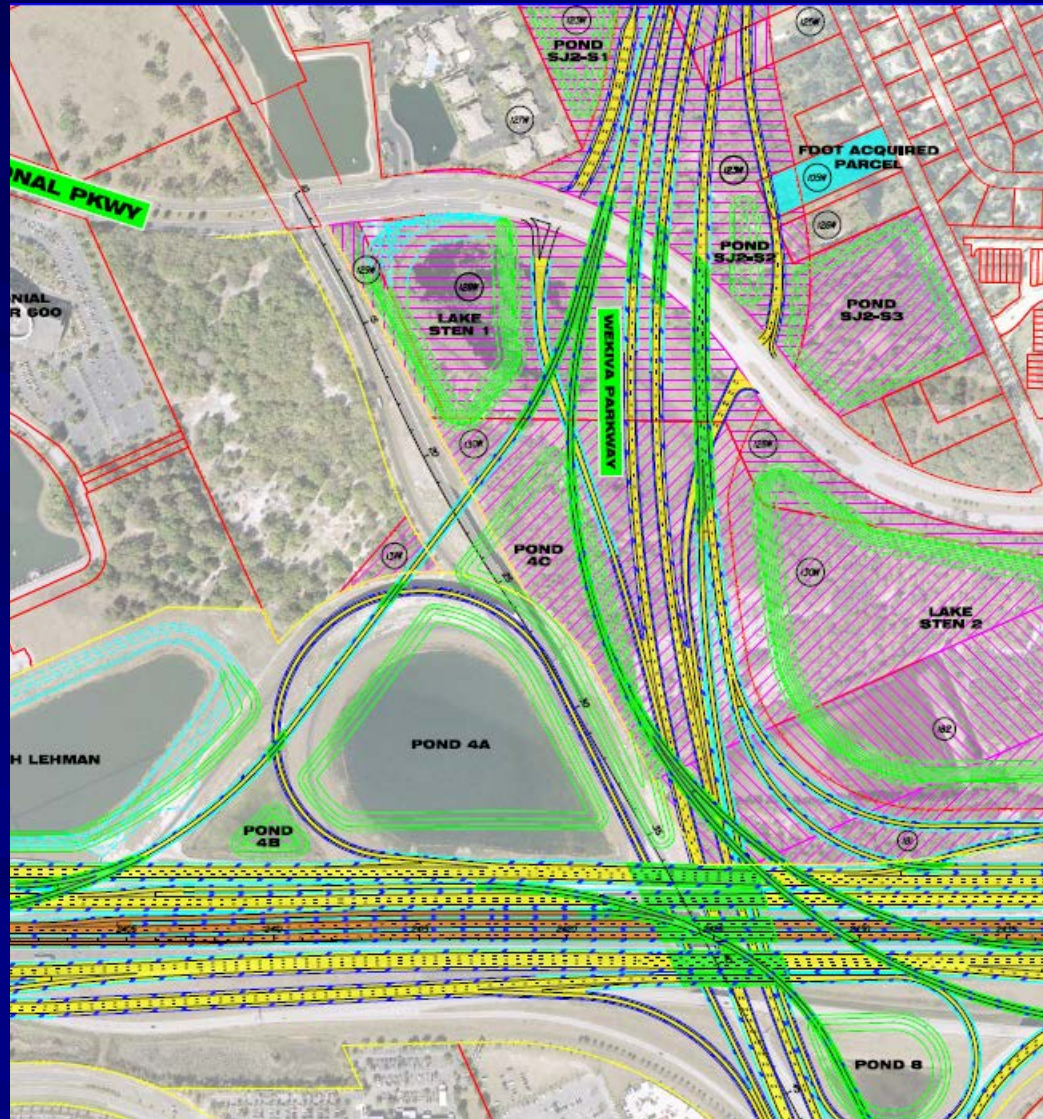
- **PD&E Concept:** The PD&E Documents show the bridge ramps that intersect with International Parkway as being spread out over the general area impacting the wetlands and requiring additional right-of-way near International Parkway.

Reconfigure International Parkway to TUDI

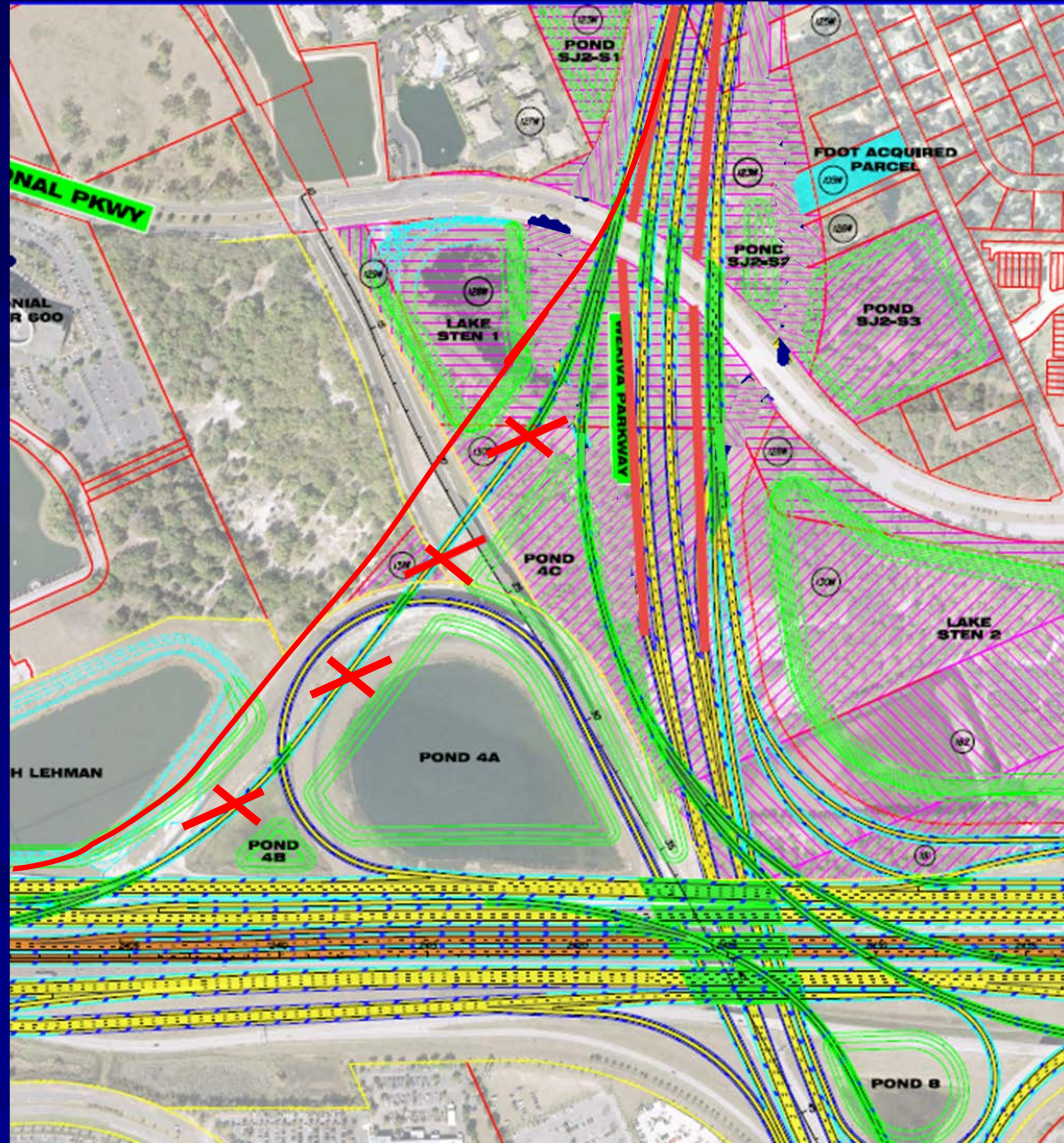


- **VE Idea No. 21: Construct International Parkway and Wekiva Parkway as a tight diamond interchange, thereby reducing the footprint of the roadway and bridge ramps right-of-way required, and wetland impacts. The outside off and on ramps are to be shifted to the inside of the eastbound and westbound I-4 on and off ramps at the International Parkway interchange.**

Reconfigure International Parkway to TUDI



Reconfigure International Parkway to TUDI



Reconfigure International Parkway to TUDI



■ Advantages:

- Less cost
- Less structures
- Smaller footprint
- More area for ponds/compensation

■ Disadvantages:

- None apparent

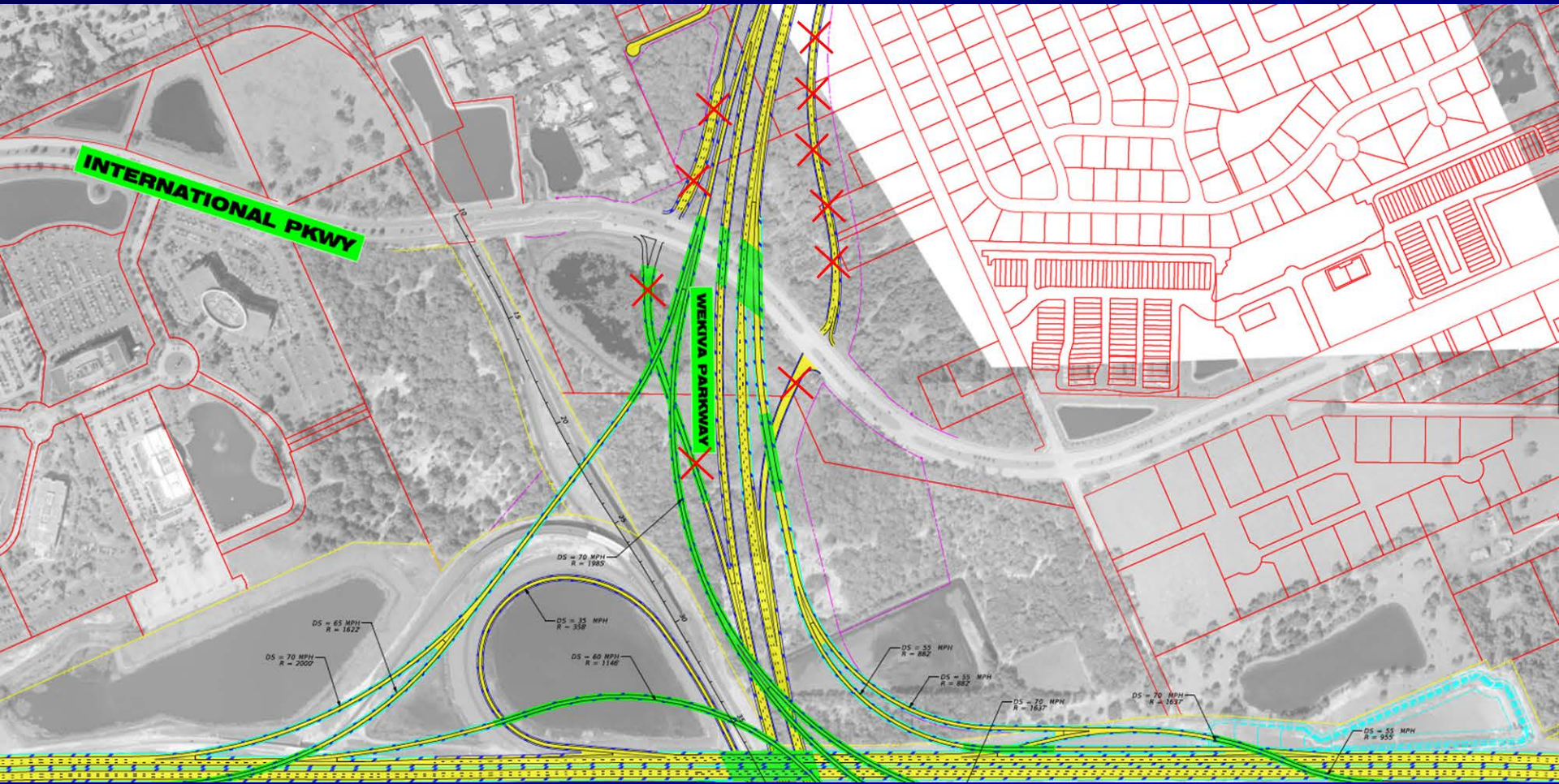
■ Potential Cost Savings: **\$10,651,000**

Don't construct International Pkwy Interchange



- **PD&E Concept:** The PD&E Documents show a full Interchange at International Parkway and SR 429.
- **VE Idea No. 34:** Do not construct a full Interchange at International Parkway and SR 429.

Don't construct International Pkwy Interchange



Don't construct International Pkwy Interchange



■ Advantages:

- Less cost
- Less wetland impacts
- Less right of way
- Easier construction

■ Disadvantages:

- Less connectivity

■ Potential Cost Savings: **\$16,239,000**

Salvage the International Pkwy connection



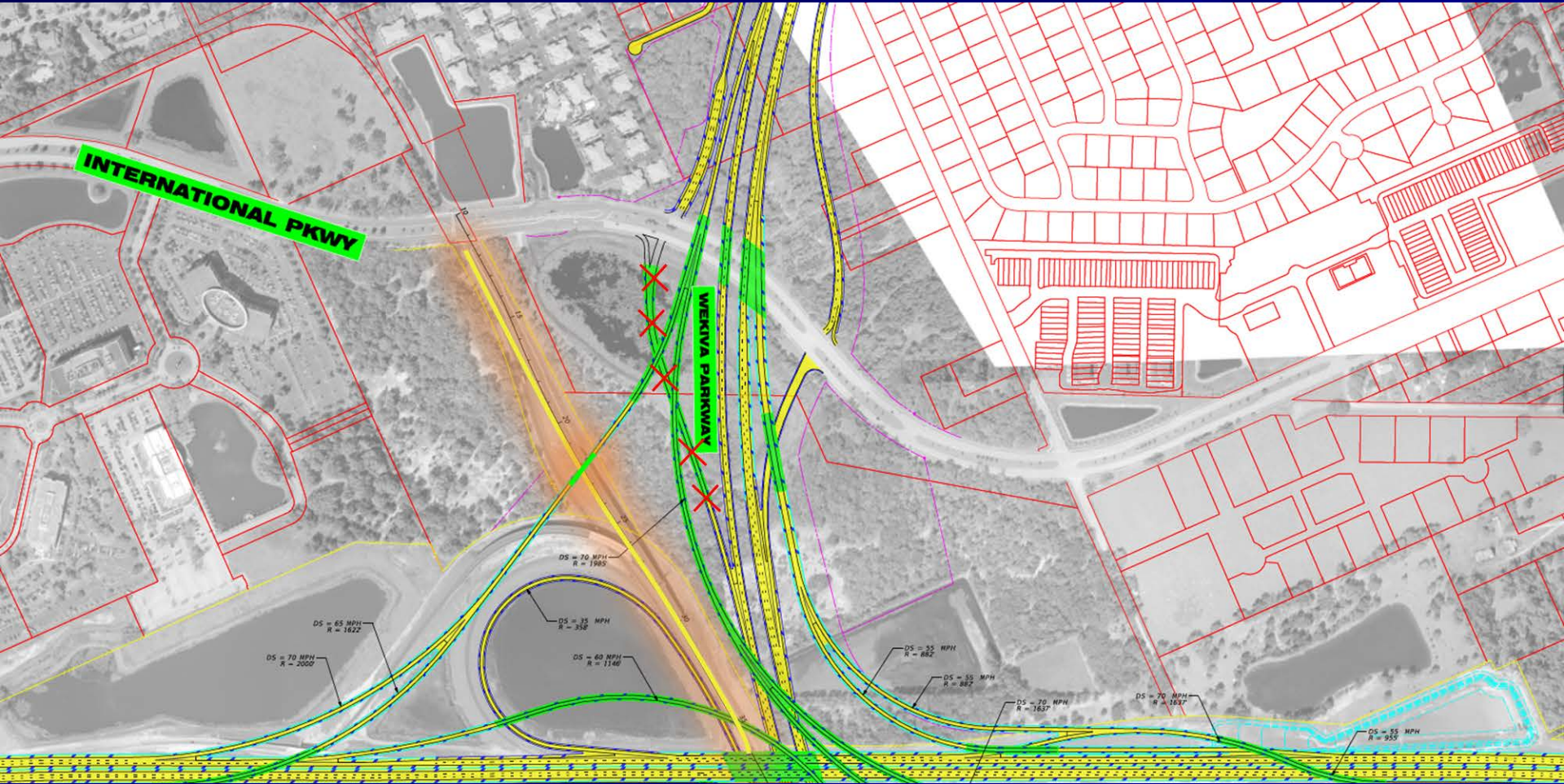
- **PD&E Concept:** The PD&E Documents show constructing a new ramp on International Parkway for traffic to take SR 417 southbound. This ramp aligns with the SR 429 southbound off ramp.

Salvage the International Pkwy connection



- **VE Idea No. 18: Salvage the existing connection from SR 417 northbound to International Parkway. Convert this connection from an off-ramp to an on-ramp for International Parkway to SR 417 southbound.**

Salvage the International Pkwy connection



Salvage the International Pkwy connection



■ Advantages:

- Salvages existing alignment
- Easier construction
- Less environmental impacts

■ Disadvantages:

- Adds cost
- Adds a third signal

■ Potential Value Added: **(\$142,000)**

Tighten up the separation between I-4 GULs and ELs



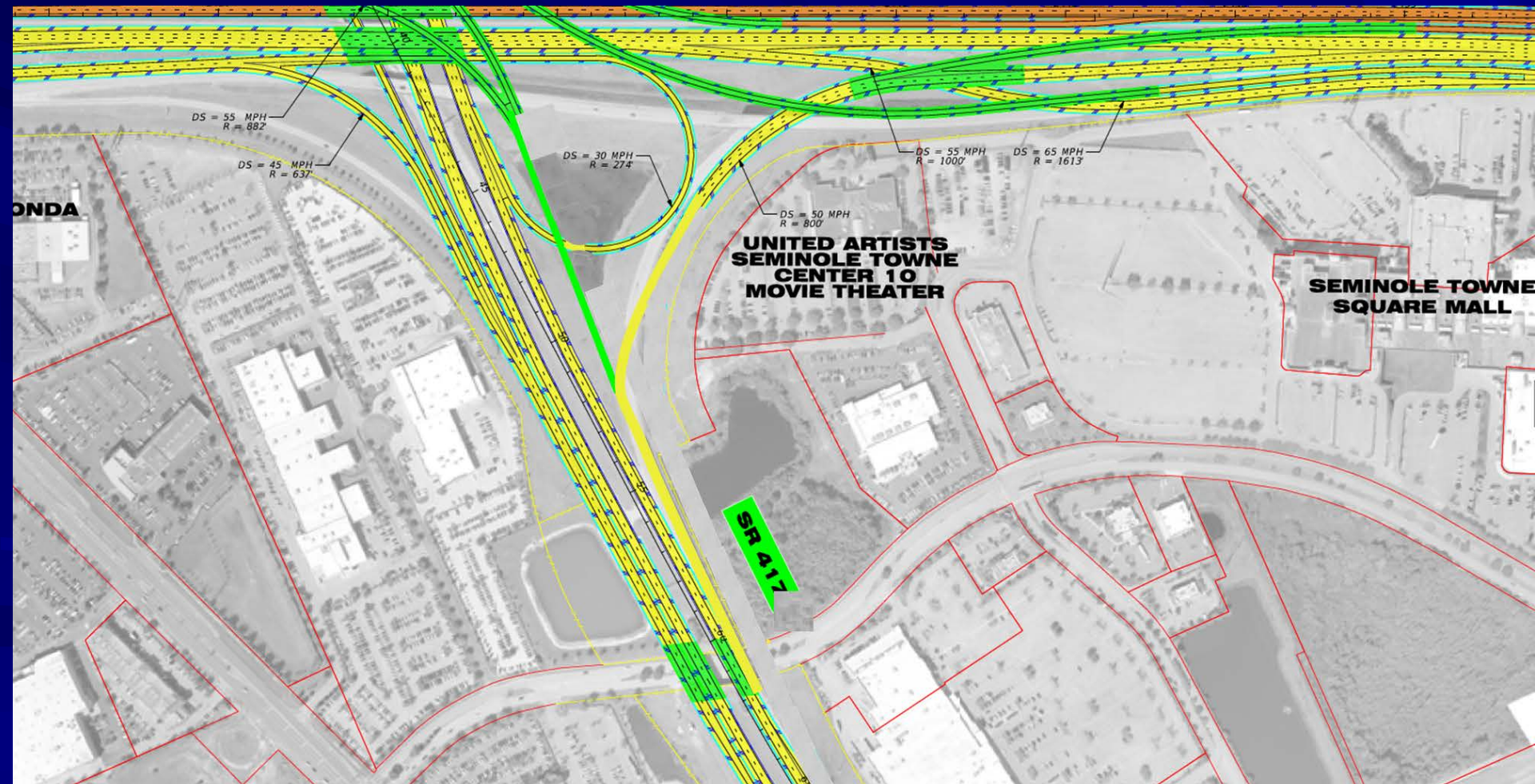
- **PD&E Concept:** The PD&E Documents show the entrance to the SR 417 northbound to I-4 ramp beginning approximately at Station 69+00. The alignment of the ramp then trends northward before breaking off to I-4 eastbound and westbound.

Tighten up the separation between I-4 GULs and ELs



- **VE Idea No. 19:** Begin the entrance to the SR 417 northbound to I-4 ramp approximately at Station 62+00 where the bridge over Town Center Blvd begins. The alignment of the ramp will trend northward before breaking off to I-4 east and westbound.

Tighten up the separation between I-4 GULs and ELs



Tighten up the separation between I-4 GULs and ELs

■ Advantages:

- Less cost
- Less bridge
- Less right of way
- Easier construction

■ Disadvantages:

- None apparent

■ Potential Cost Savings: **\$411,000**

Modify SR 429 EB to I-4 WB ramps under I-4 and the C-D



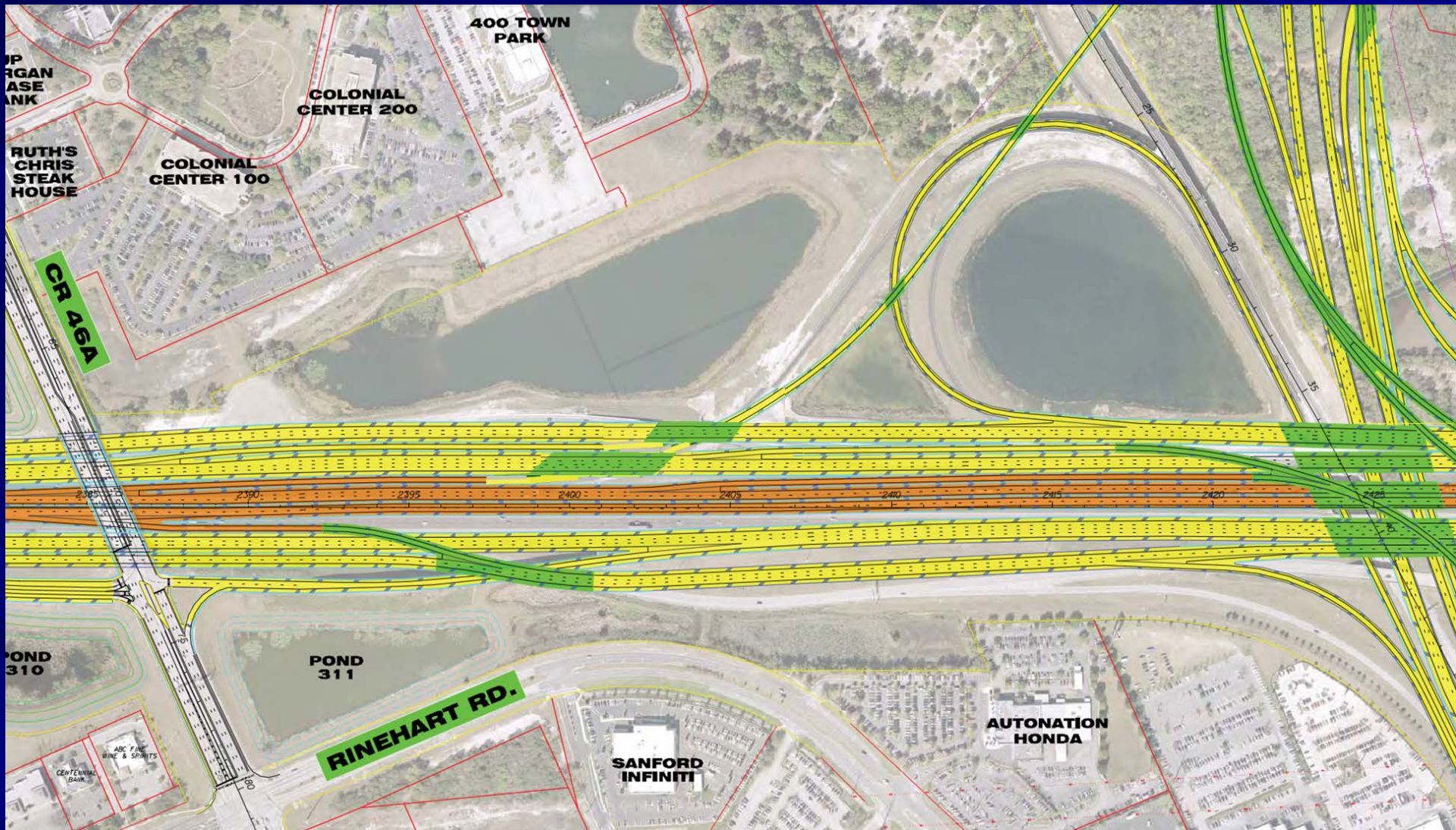
- **PD&E Concept:** The PD&E Documents propose the ramps from SR-429 Wekiva Parkway eastbound to I-4 westbound (both to the general use lanes and the express lanes) passing over I-4 using flyover bridges. These flyover bridges are anticipated to be steel box girders and require the use of cantilever beams which would be costly.

Modify SR 429 EB to I-4 WB ramps under I-4 and the C-D



- **VE Idea No. 28:** As this section of I-4 profile will already be raised to get over SR-417 and SR-429, the VE team suggests that the SR-429 eastbound to I-4 westbound ramps pass under I-4 and connect in a similar manner as proposed. This concept maintains the SR 429 ramps at grade instead of requiring steel structures and the I-4 bridges could be simple span concrete bridges.

Modify SR 429 EB to I-4 WB ramps under I-4 and the C-D



Modify SR 429 EB to I-4 WB ramps under I-4 and the C-D



■ Advantages:

- Less cost
- Less maintenance

■ Disadvantages:

- More MOT phases

■ Potential Cost Savings: **\$9,723,000**

Modify the entrance to the WB C-D to Station 2515+00



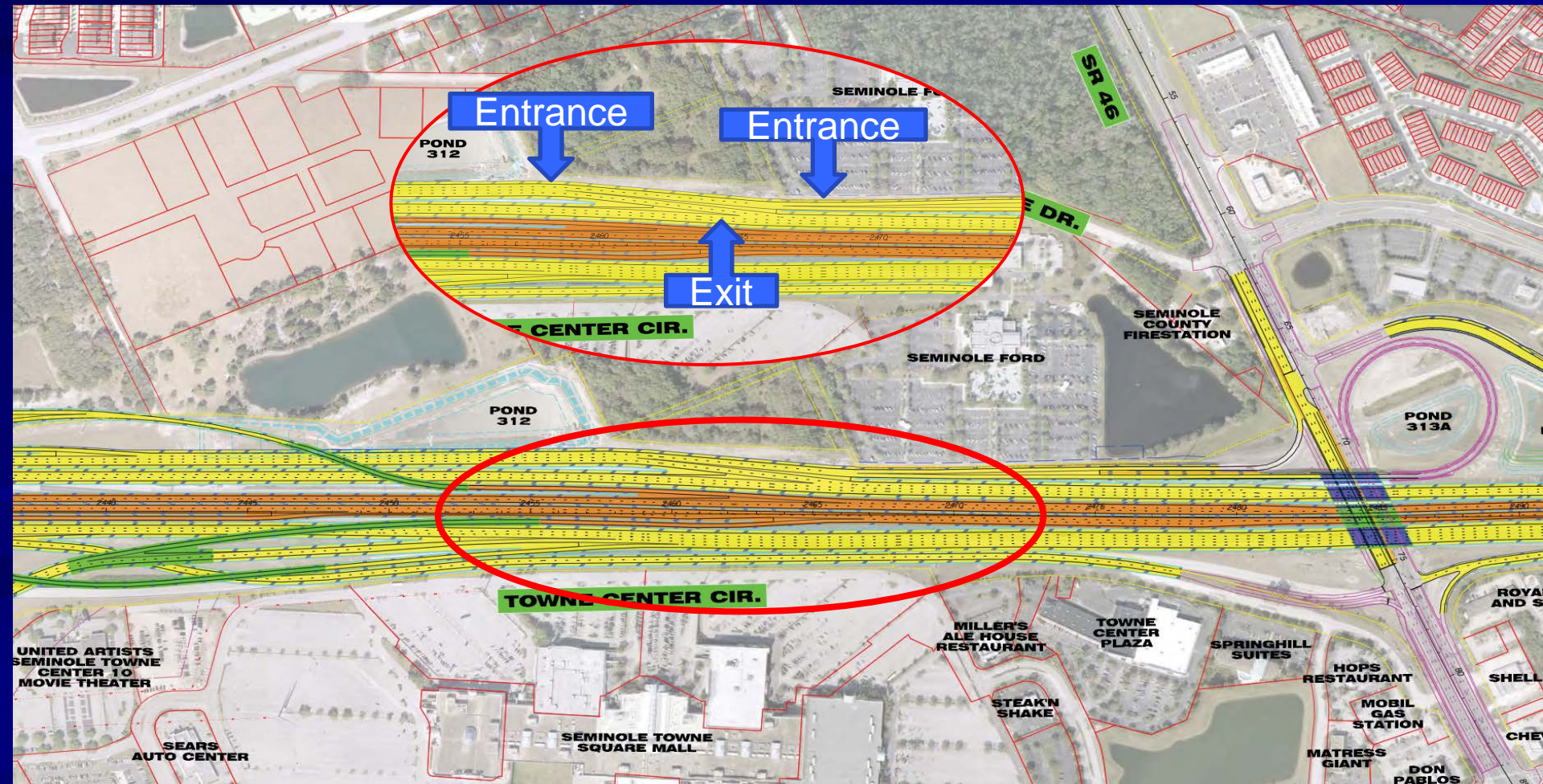
- **PD&E Concept:** The PD&E Documents show the ramp entrance from the westbound general use lanes to the C-D road beginning approximately at station 2465+00. The C-D system continues under CR 46A and ties back into the westbound general use lanes.

Modify the entrance to the WB C-D to Station 2515+00

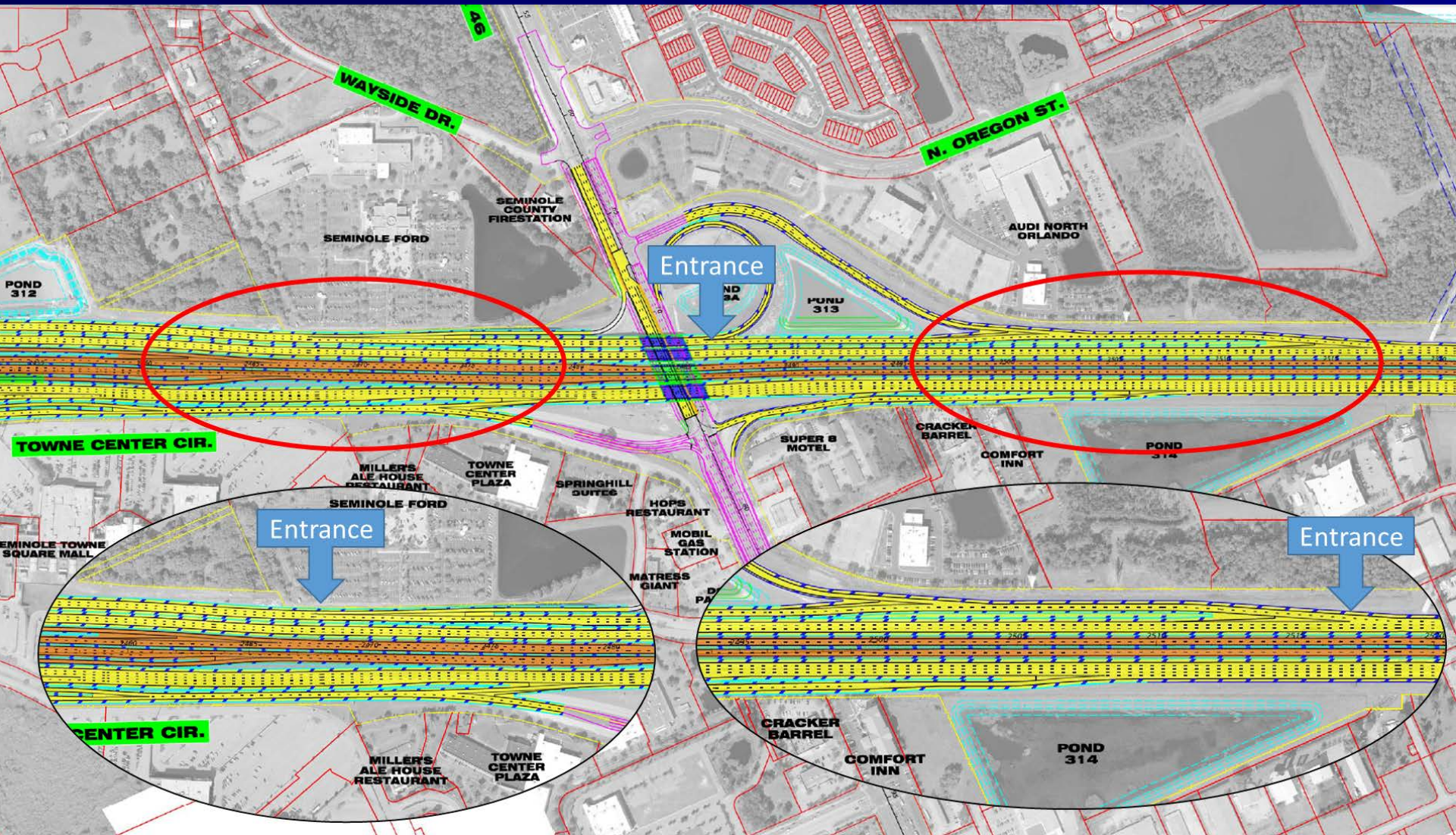


- **VE Idea No. 6:** Shift the entrance to the C-D road north to begin approximately at station 2517+00. The C-D system continues over SR 46 where the bridge required was recently built for this condition. From SR 46 the C-D road continues under CR 46A and ties back into the westbound general use lanes.

Modify the entrance to the WB C-D to Station 2515+00



Modify the entrance to the WB C-D to Station 2515+00



Modify the entrance to the WB C-D to Station 2515+00

■ Advantages:

- Less cost
- Preserves the existing C-D bridge
- Lengthens the weave

■ Disadvantages:

- None apparent

■ Potential Cost Savings: **\$103,000**

Create a grade separated DDI



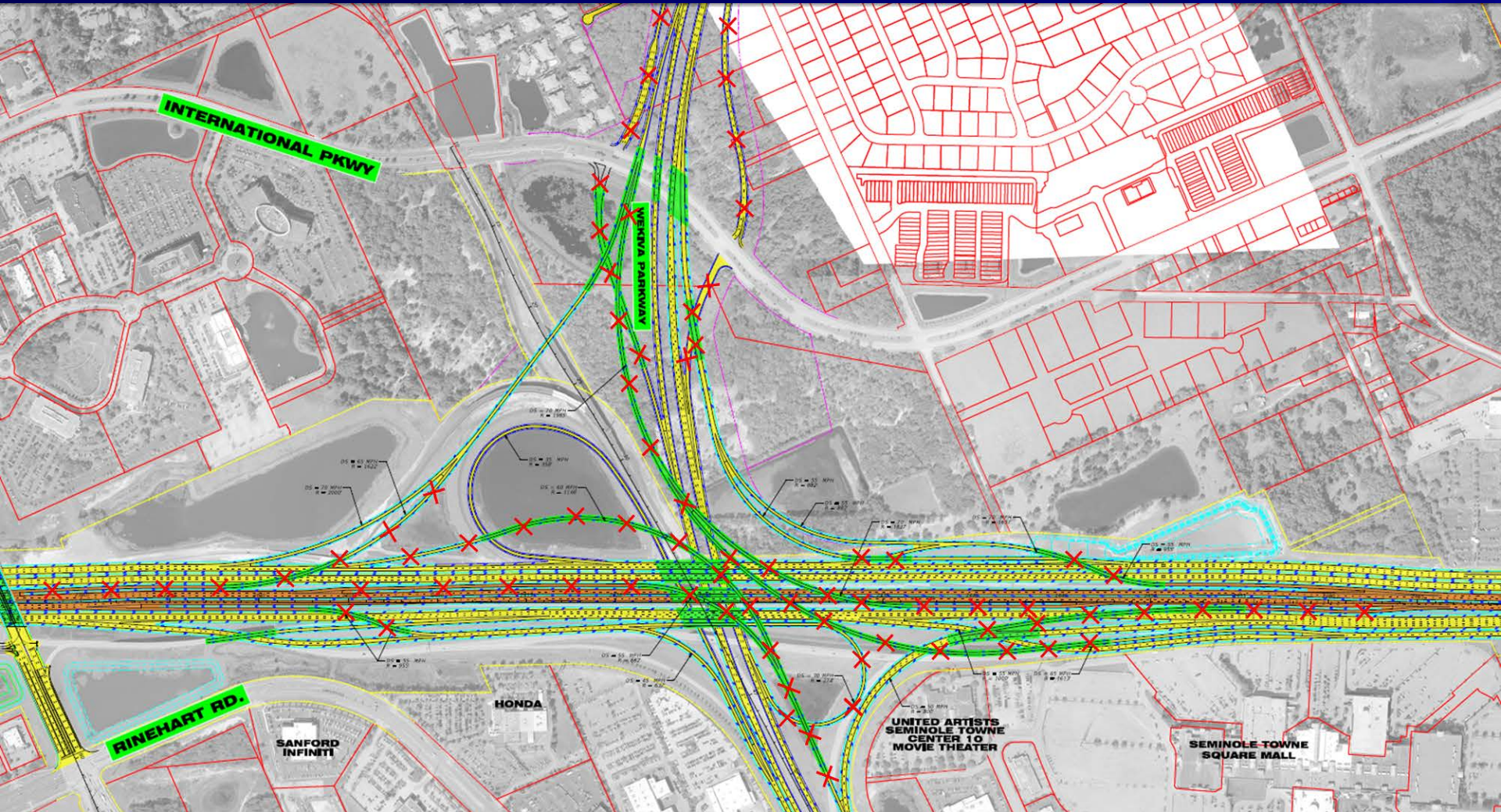
- **PD&E Concept:** The PD&E Documents show a system to system multi-level direct connect interchange providing direct connect with complete connectivity including major 3rd level flyover structures eastbound Wekiva Parkway to eastbound I-4 and westbound SR 417 to westbound I-4.

Create a grade separated DDI

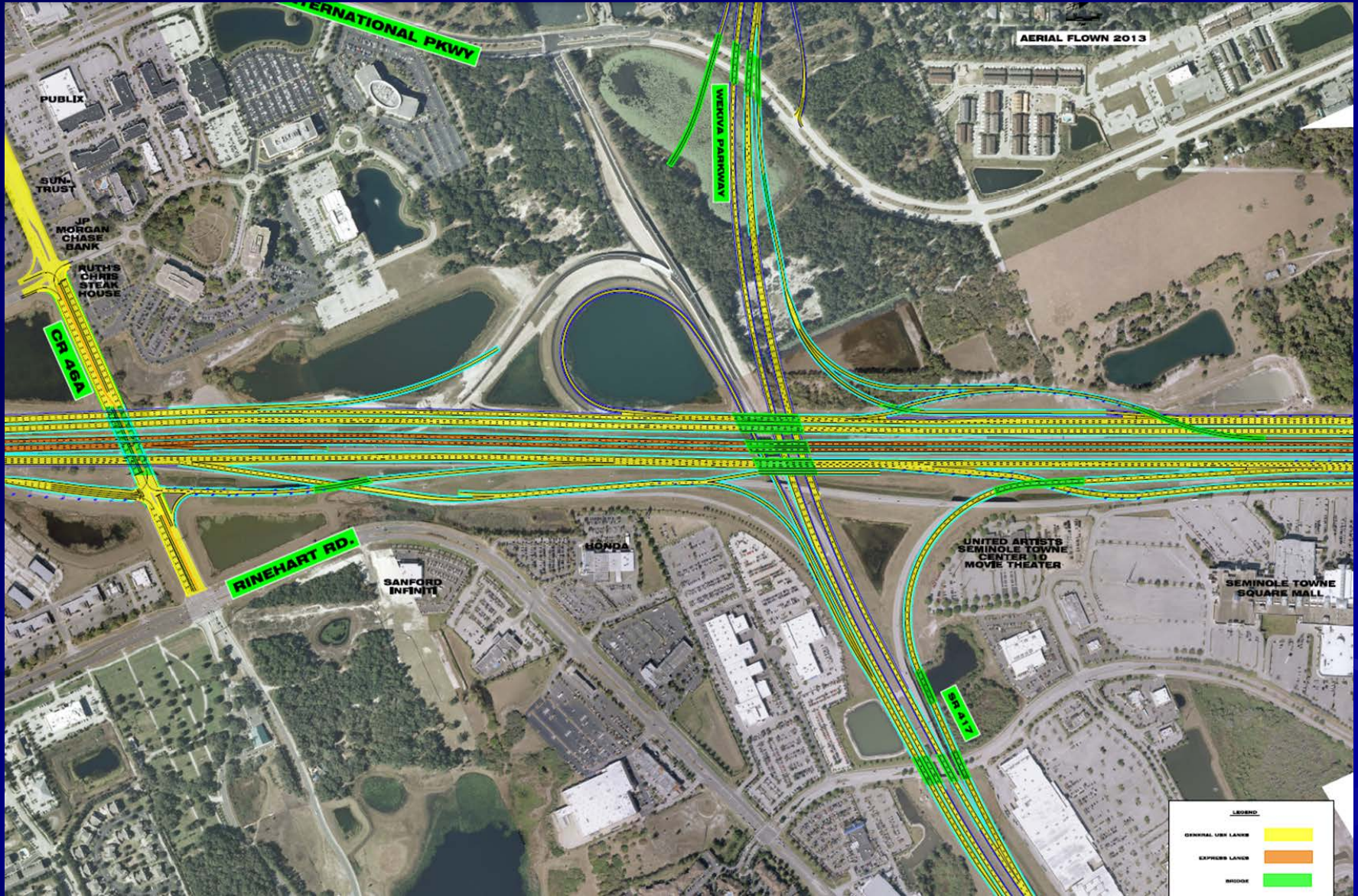


- **VE Idea No. 20: Construct a grade separated diverging diamond interchange (DDI) between Town Center Blvd. and International Parkway which allows us to salvage the existing ramps and connections in SW quadrant to I-4 and to and from International Parkway.**

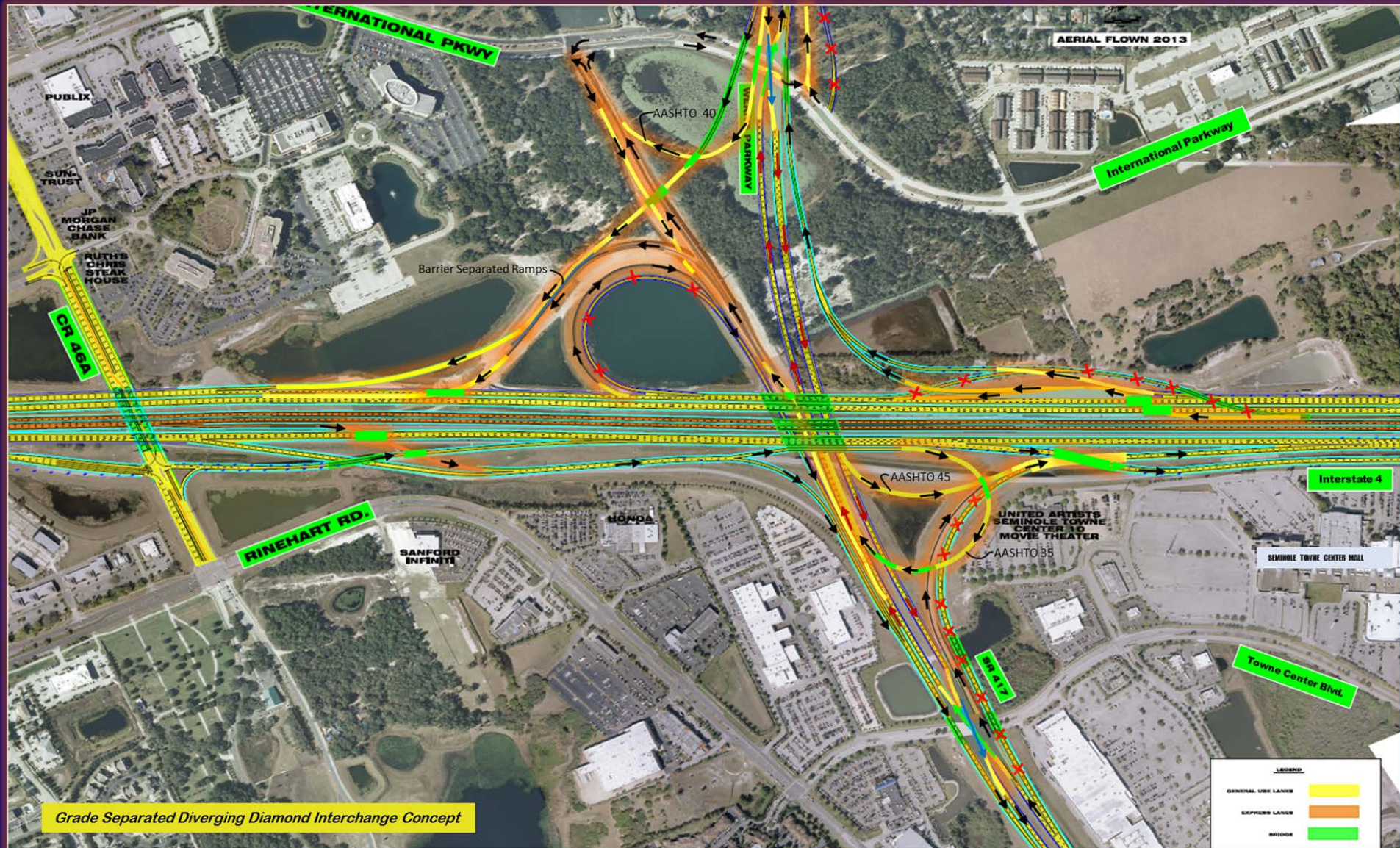
Create a grade separated DDI



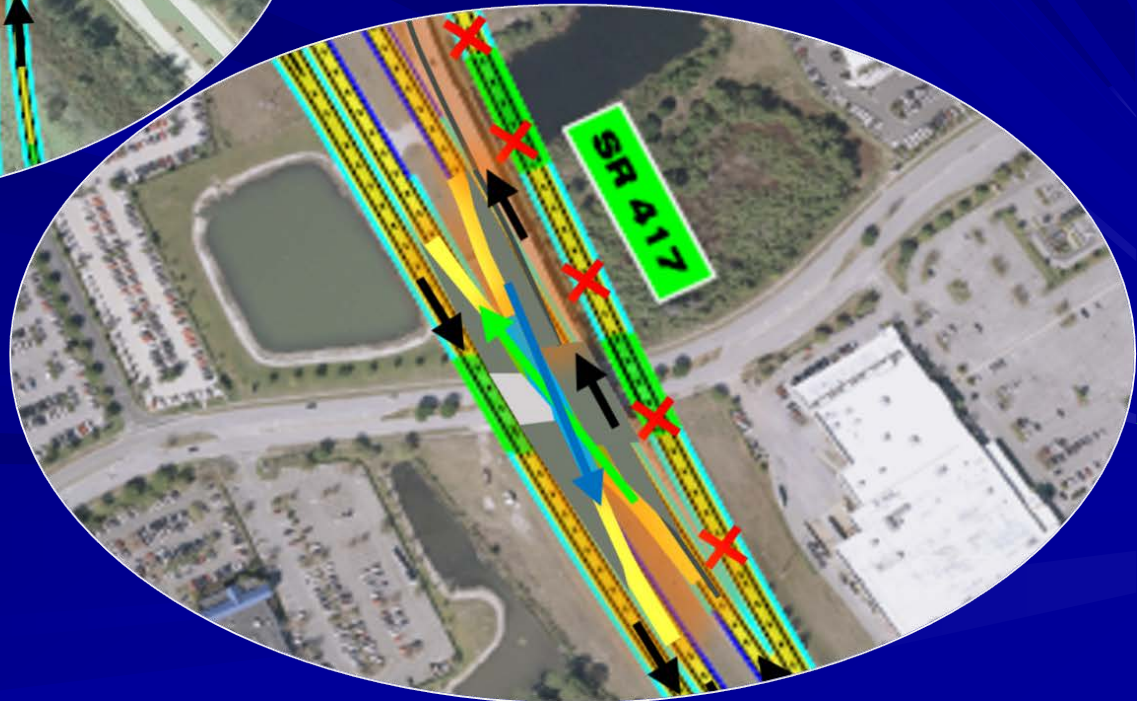
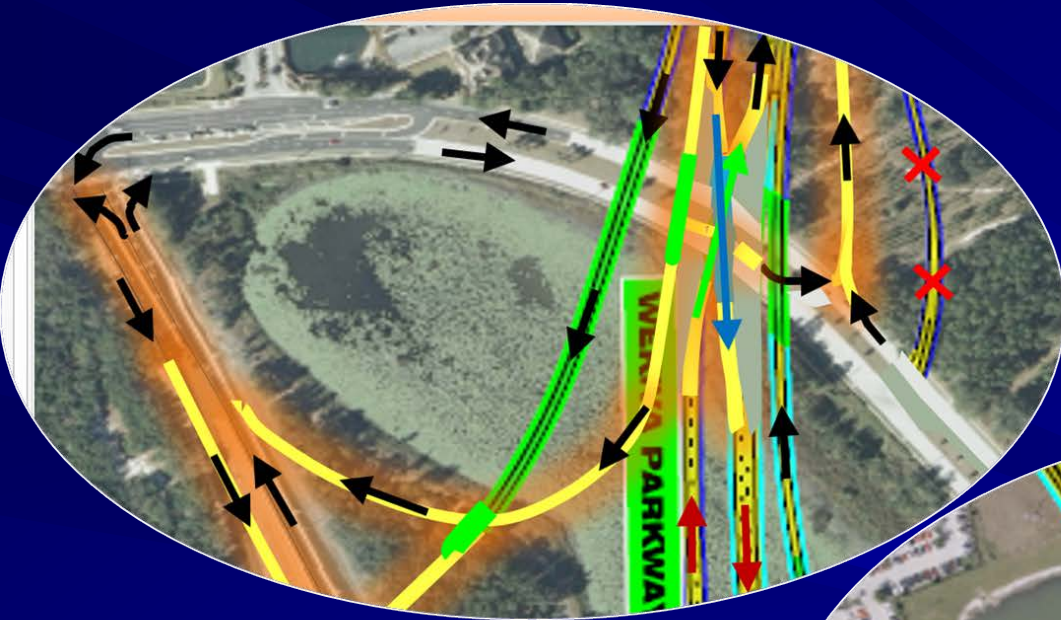
Create a grade separated DDI



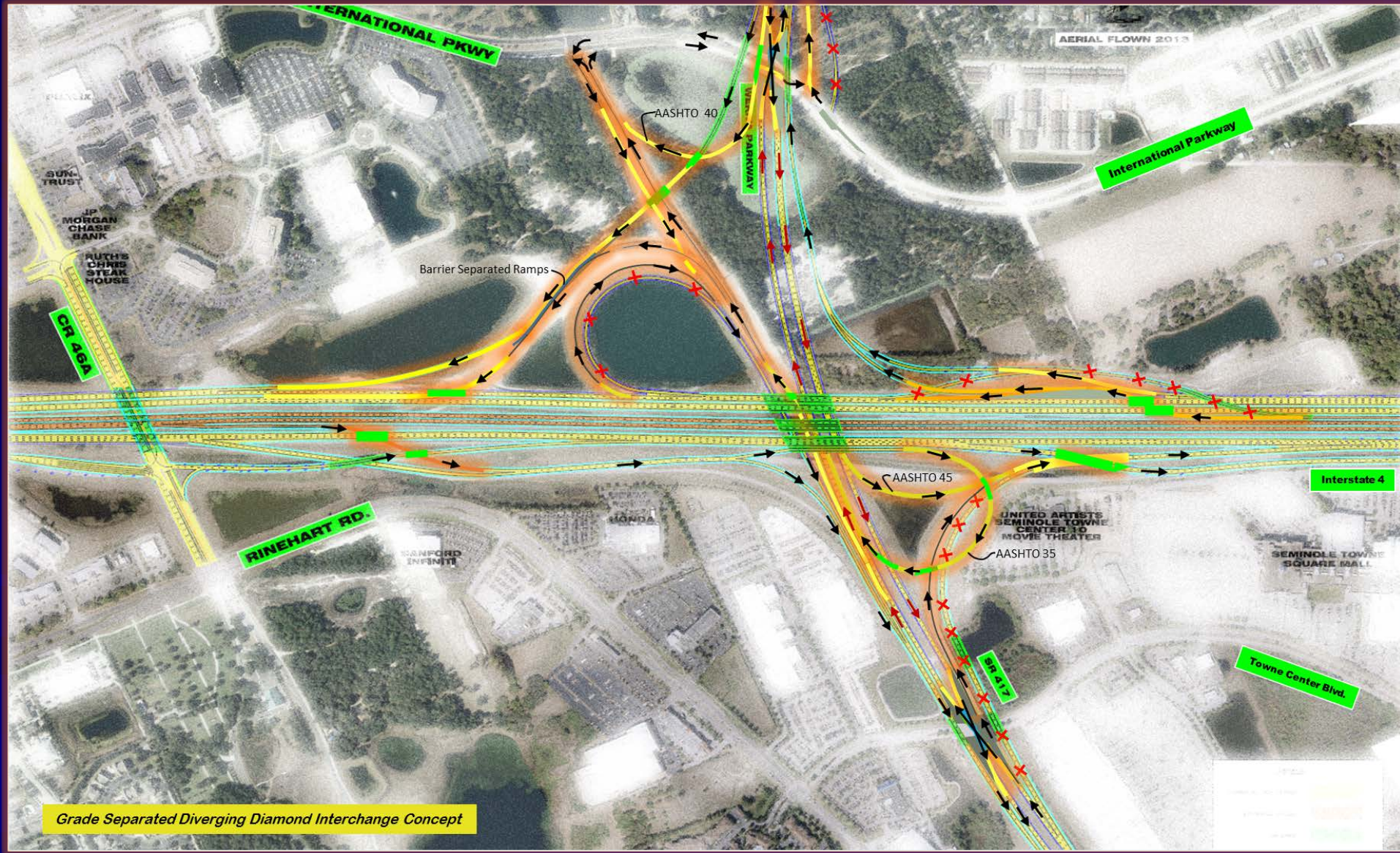
Create a grade separated DDI



Create a grade separated DDI



Create a grade separated DDI



Create a grade separated DDI



■ Advantages:

- Improves LOS
- Less cost
- Less construction
- Less environmental impacts

■ Disadvantages:

- One system to system, system to service connection is mixed

■ Potential Cost Savings: **\$162,542,000**

Savings Summary

Recommendation	Savings	Maximum Savings
Adopt the I-4 Ultimate typical section	\$1,770,000	\$1,770,000
Modify the entrance to the WB C-D to Station 2515+00	\$103,000	\$103,000
Eliminate the R/W take on International Parkway	\$110,000	
Eliminate the direct connects from SR 429 to I-4	\$21,419,000	
Salvage the International Pkwy connection	(\$142,000)	
Tighten up the separation between I-4 GULs and EIs	\$1,911,000	
Create a grade separated DDI	\$162,542,000	\$162,542,000
Reconfigure the International Parkway to TDI	\$10,831,000	
Shrink the median width to 50 ft.	\$3,227,000	\$3,227,000
SR 429 westbound on ramp reconfigure to one lane	\$1,214,000	
SR 429 westbound off ramp reconfigure to one lane	\$92,000	
Modify SR 429 EB to I-4 WB ramps under I-4 and the C-D	\$1,472,000	
Demolish the bridge and reroute the Seminole Trail	\$6,700,000	
Eliminate the C-D road in the southeast corner of SR 417	\$22,826,000	\$22,826,000
Increase the ramp profile to save the SR 46A Bridge	\$11,583,000	
Wilson Road and Wekiva Parkway at grade	\$7,938,000	\$7,938,000
Don't construct International Pkwy Interchange	\$16,239,000	\$16,239,000
		\$214,645,000

Action Plan

- **Receive Draft VE Report 5/30/14**
- **Draft Report Routed for Comments**
- **Receive and Incorporate D5
Comments and Revisions 6/20/14**
- **Resolution Meeting**
- **Issue Final VE Report 7/3/14**

Questions

