

Loudoun County Parkway and Route 50 Conceptual Interchange Design

Marc Dreyfuss, Transportation Planner

Department of Transportation and Capital Infrastructure

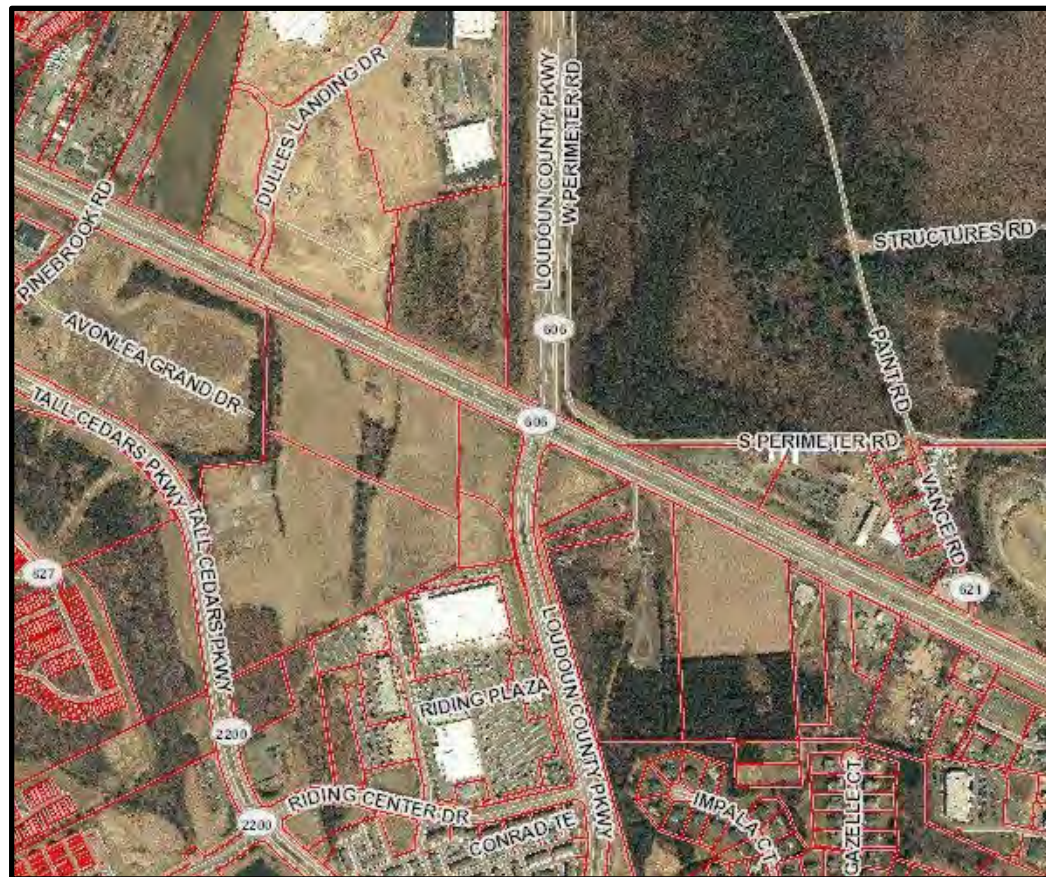
August 30, 2016

Liberty Elementary School



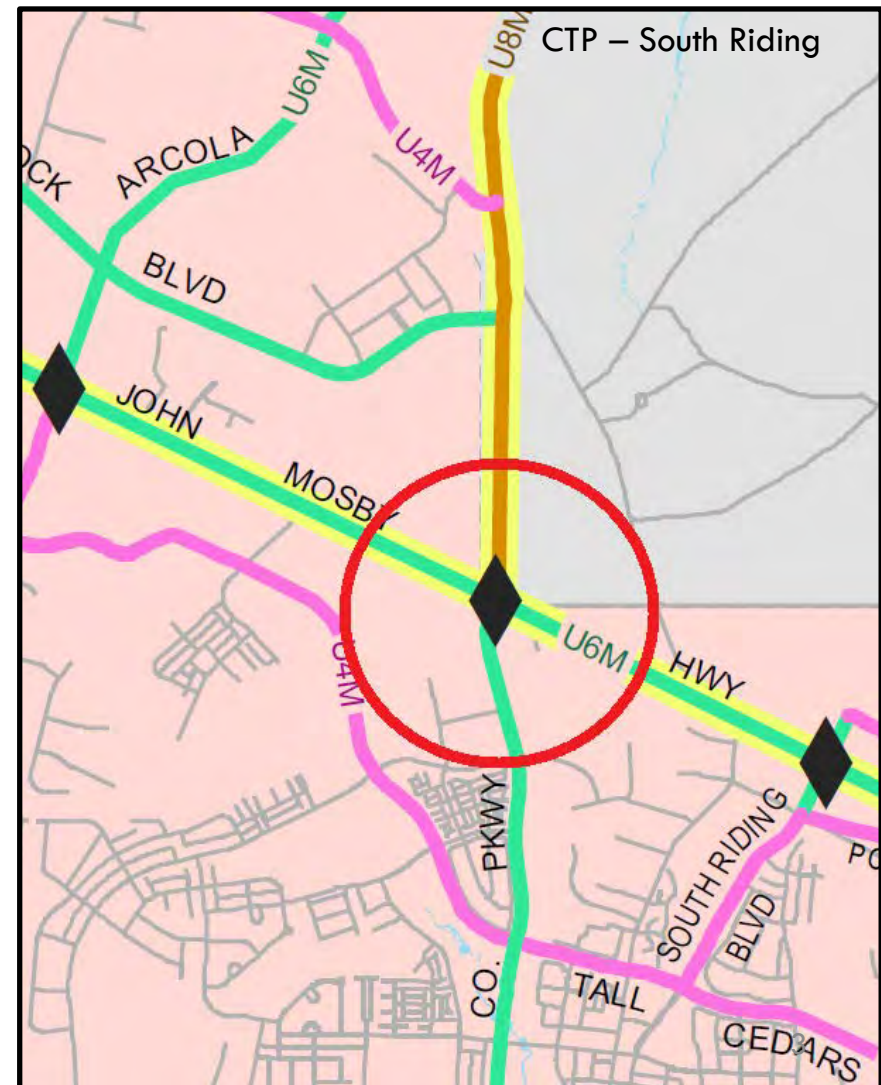
Overview

- Background
 - CTP Road Network
- Analysis
 - Interim Conditions
- Alternatives
 - Partial Cloverleaf
 - Full Cloverleaf
- Pros and Cons
- Next Steps

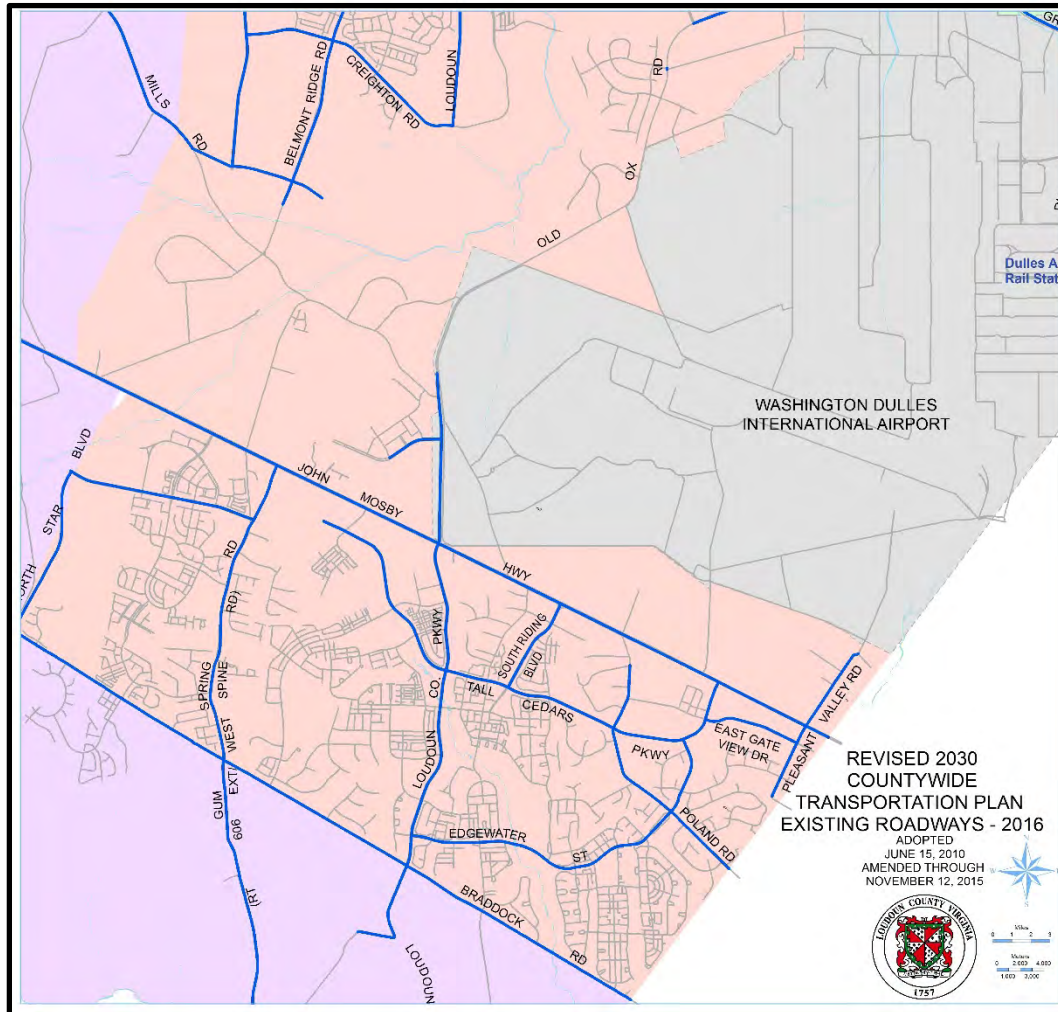


Background

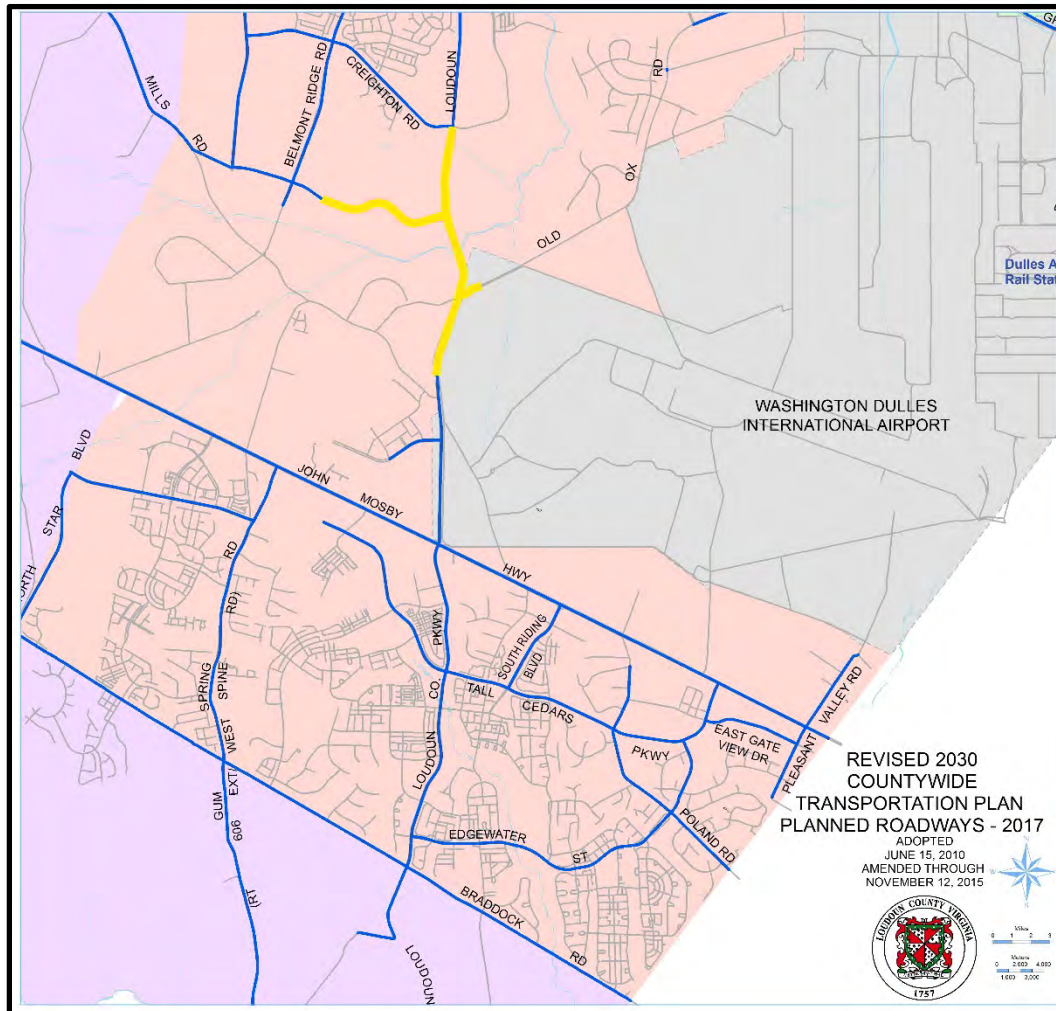
- Interchange shown on the 2010 Countywide Transportation Plan; on County plans since 1995
- Initial (2006) designs brought to the TLUC in 2013; rejected due to cost, scale, and property impacts
- Western Dulles Access Study (2015) confirmed the need for an interchange
- At July 21, 2016 BOS directed staff to carry forward ParClo and Full Cloverleaf for public input



Existing (2016) CTP Roadways built to the Interim/Ultimate Condition



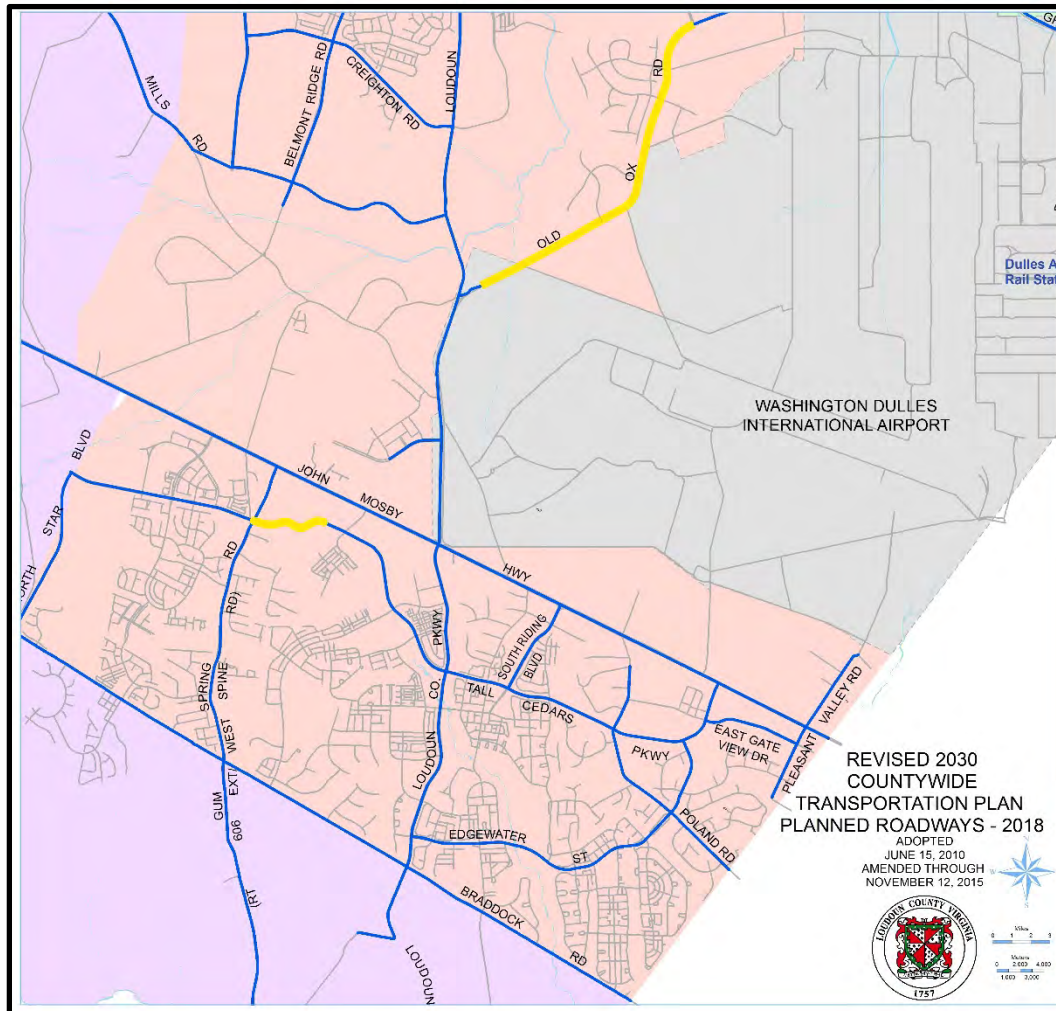
Planned (2017) CTP Roadway Network (Interim/Ultimate Condition)



* Based upon anticipated completion date of under-construction County road projects

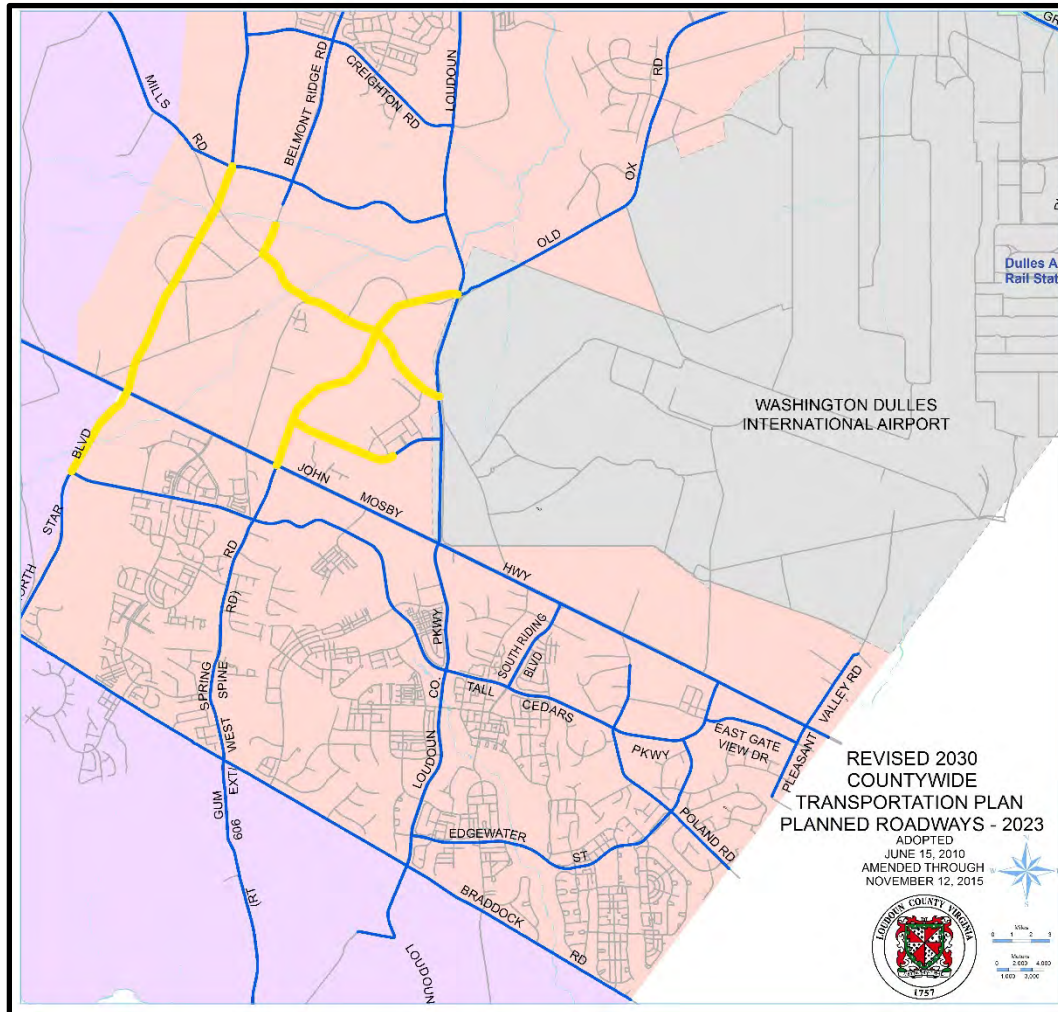


Planned (2018) CTP Roadway Network (Interim/Ultimate Condition)



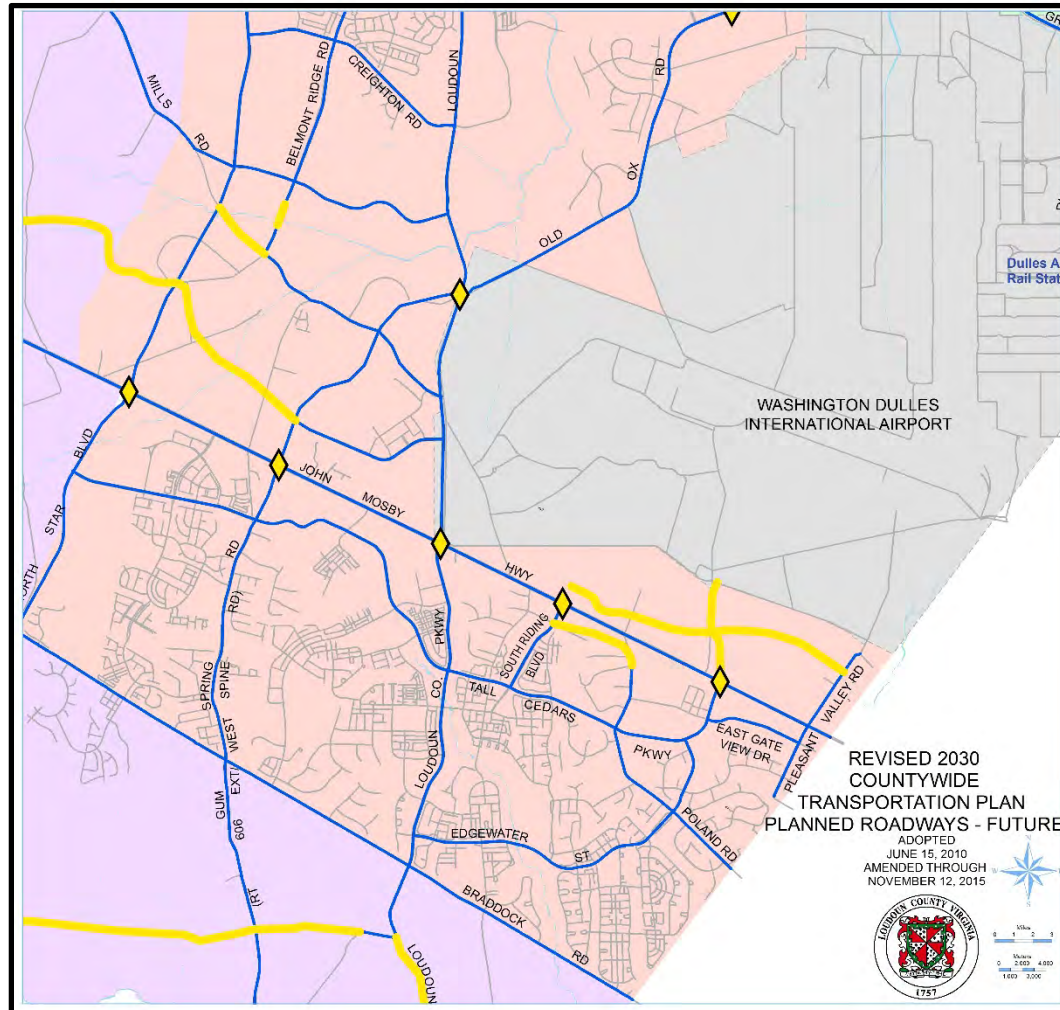
* Based upon anticipated completion date of under-construction County road projects

Planned (2023) CTP Roadway Network (Interim/Ultimate Condition)



* Based upon current
(FY2017-FY2022
Capital Improvement
Program)

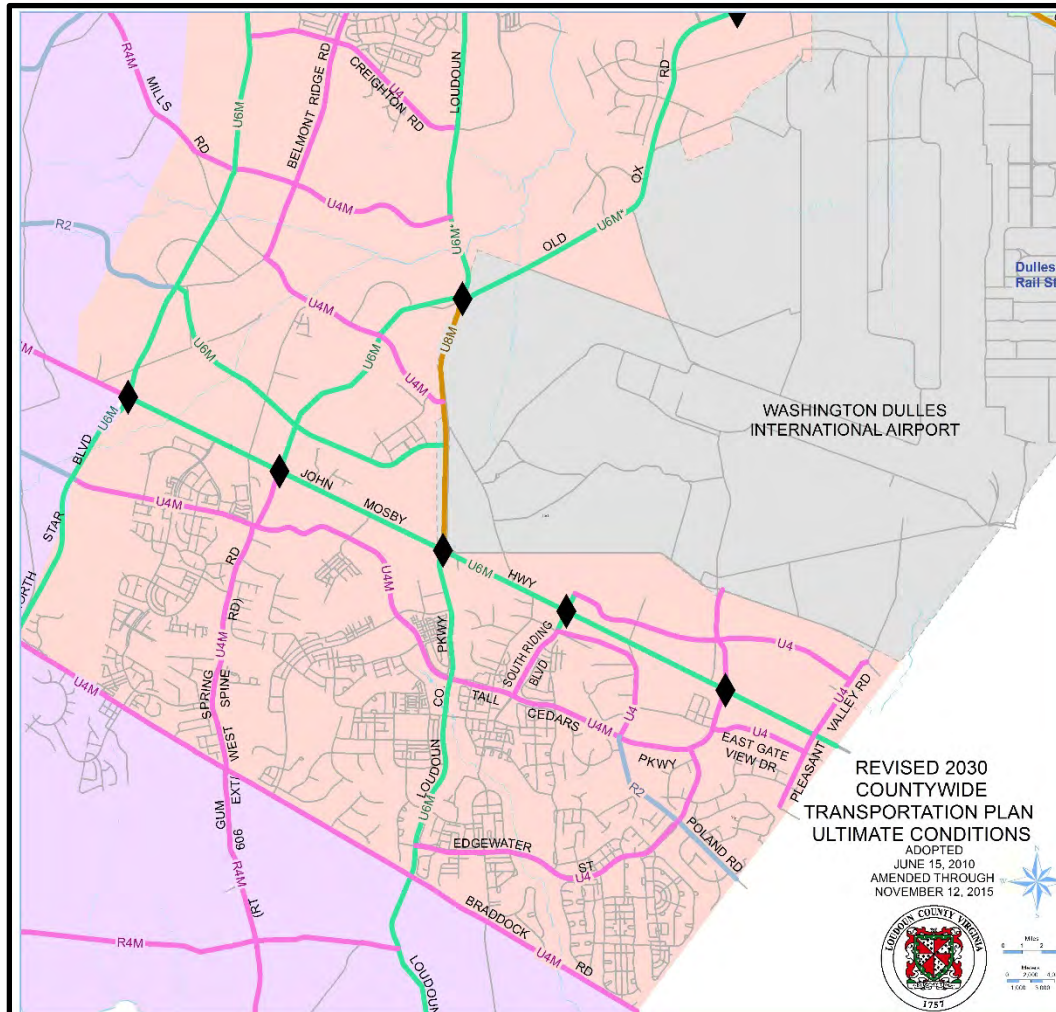
Planned (Future) CTP Roadway Network (Interim/Ultimate Condition)



* Based upon 2010
Countywide
Transportation Plan



Ultimate 2030 CTP Roadway Network



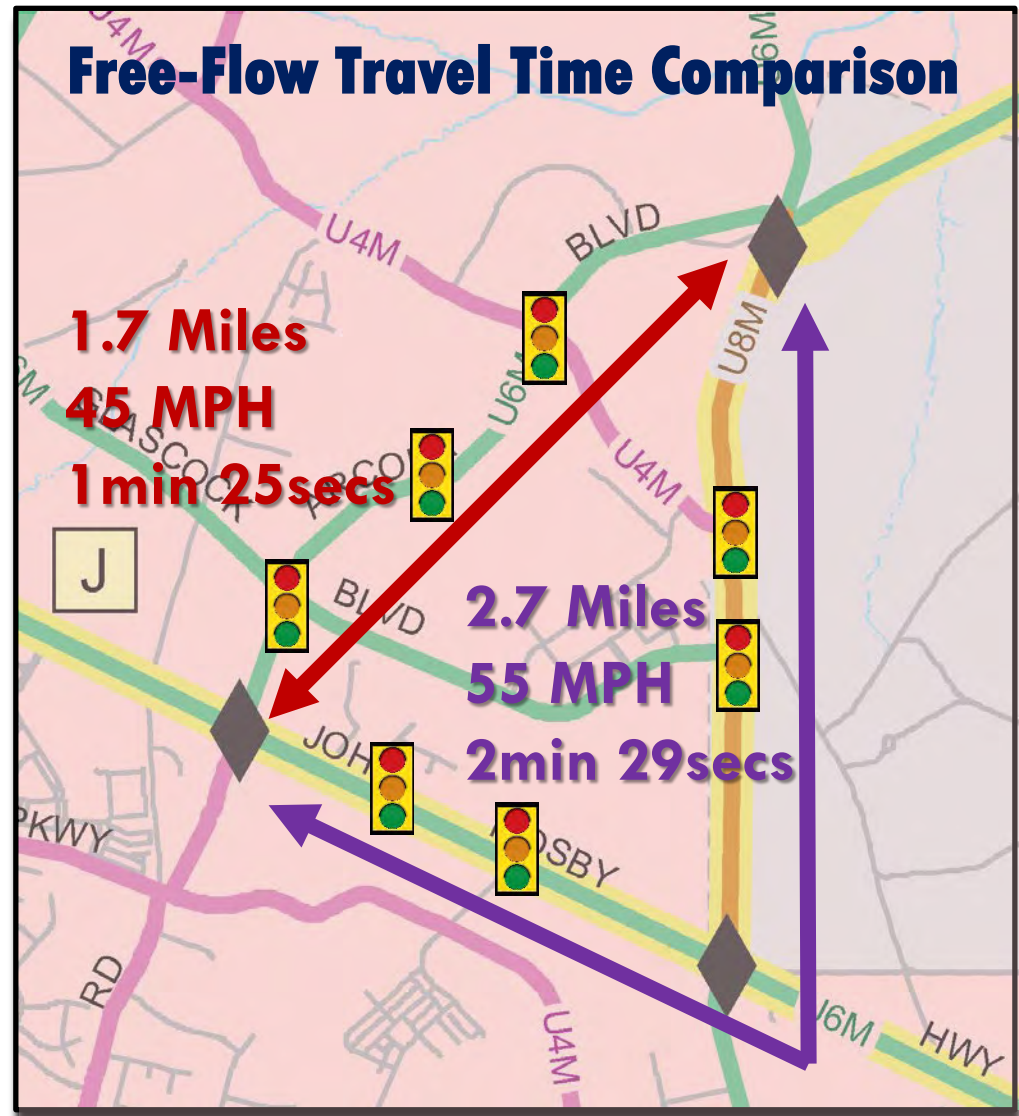
* Based upon 2010
Countywide
Transportation Plan

Arcola Boulevard

- Provides a more direct route from Stone Ridge and Gum Spring Road corridor to Old Ox Road and Ashburn
- Shorter distance than current route (1.7 miles vs 2.7 miles)
- Saves more than a minute (1:04) in free-flow
- Fewer traffic signals than the current route



* Based upon 2010
Countywide
Transportation Plan



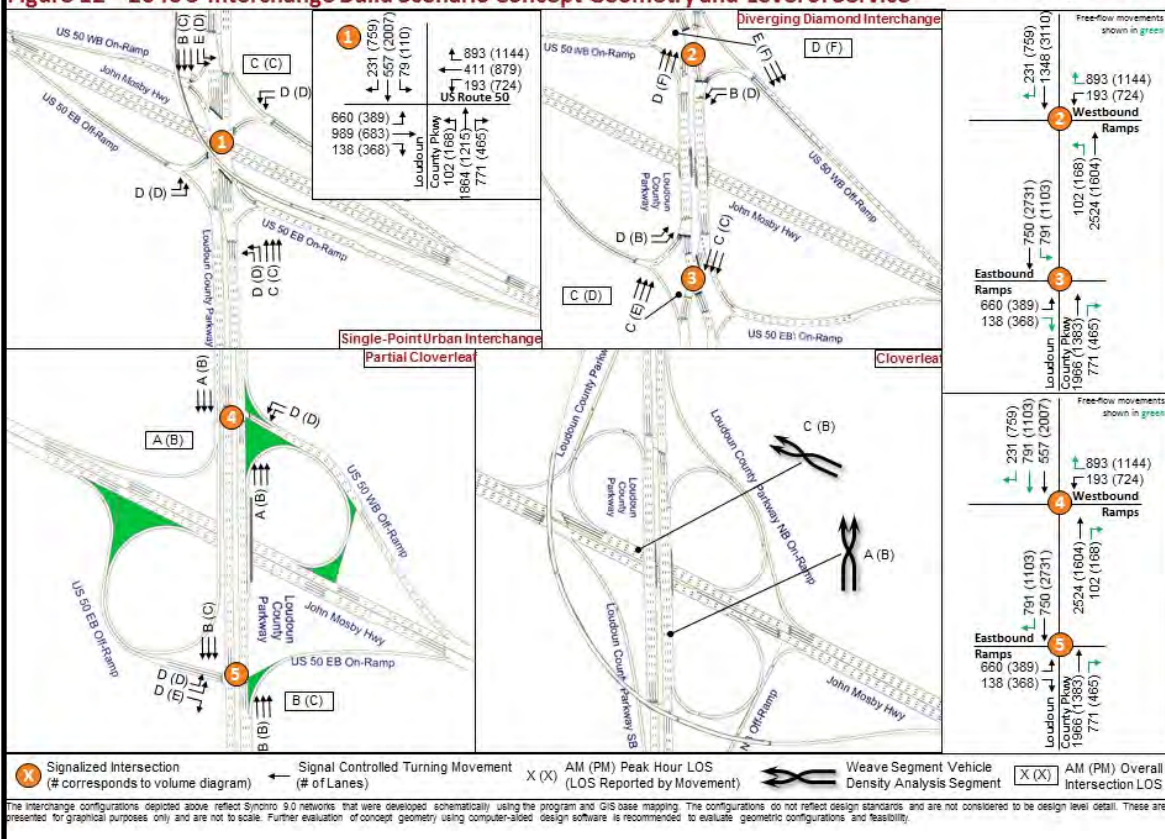
Study Challenges

- Provide a long term solution to the congestion and delays at this intersection ★
- Provide access to properties currently accessed from Route 50 ★
- Minimize costs and impacts to property contributing to the tax base ★



US Route 50 and Loudoun County Parkway Interchange – Planning Level Concept Evaluation
Figure 12 – 2040 5-Interchange Build Scenario Concept Geometry and Level of Service

Kimley»Horn



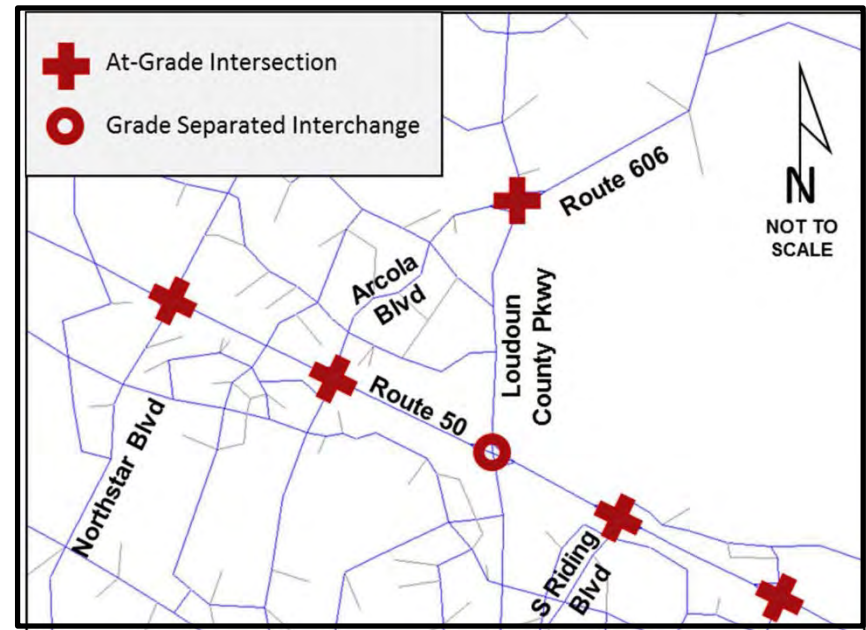
Initial Analysis

- Four interchange concepts were considered:
 - Modified Single-Point Urban Interchange (SPUI)
 - Diverging Diamond Interchange (DDI)
 - Partial Cloverleaf (ParClo)
 - Modified Full Cloverleaf
- ParClo** was the only alternative that met all of the objectives: lower costs, reduced impacts, and meets CTP policies.



Feedback and Supplemental Analysis

- Two Additional Concepts Considered:
 - Traditional Full Cloverleaf
 - Three-Level Partial Cloverleaf
- Evaluated interim conditions without other interchanges along Route 50
- No significant change in traffic volumes on Route 50 or other roadways
- Without these other interchanges, there is greater dispersion of traffic throughout the network
- The **ParClo** still functions acceptably under an interim condition

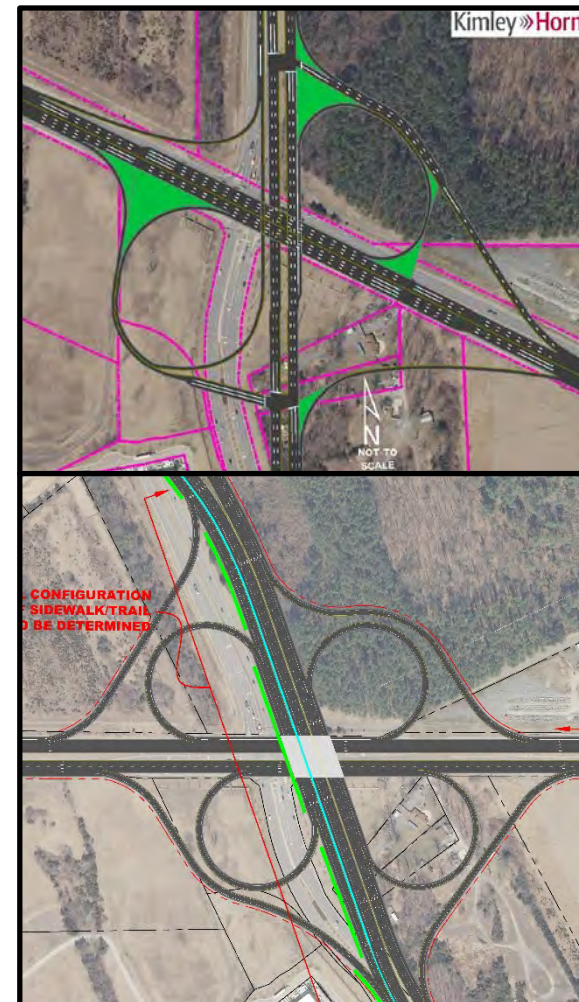


The Board directed staff to move forward with the following options:

- ❖ Partial Cloverleaf (ParClo)
- ❖ Full Cloverleaf

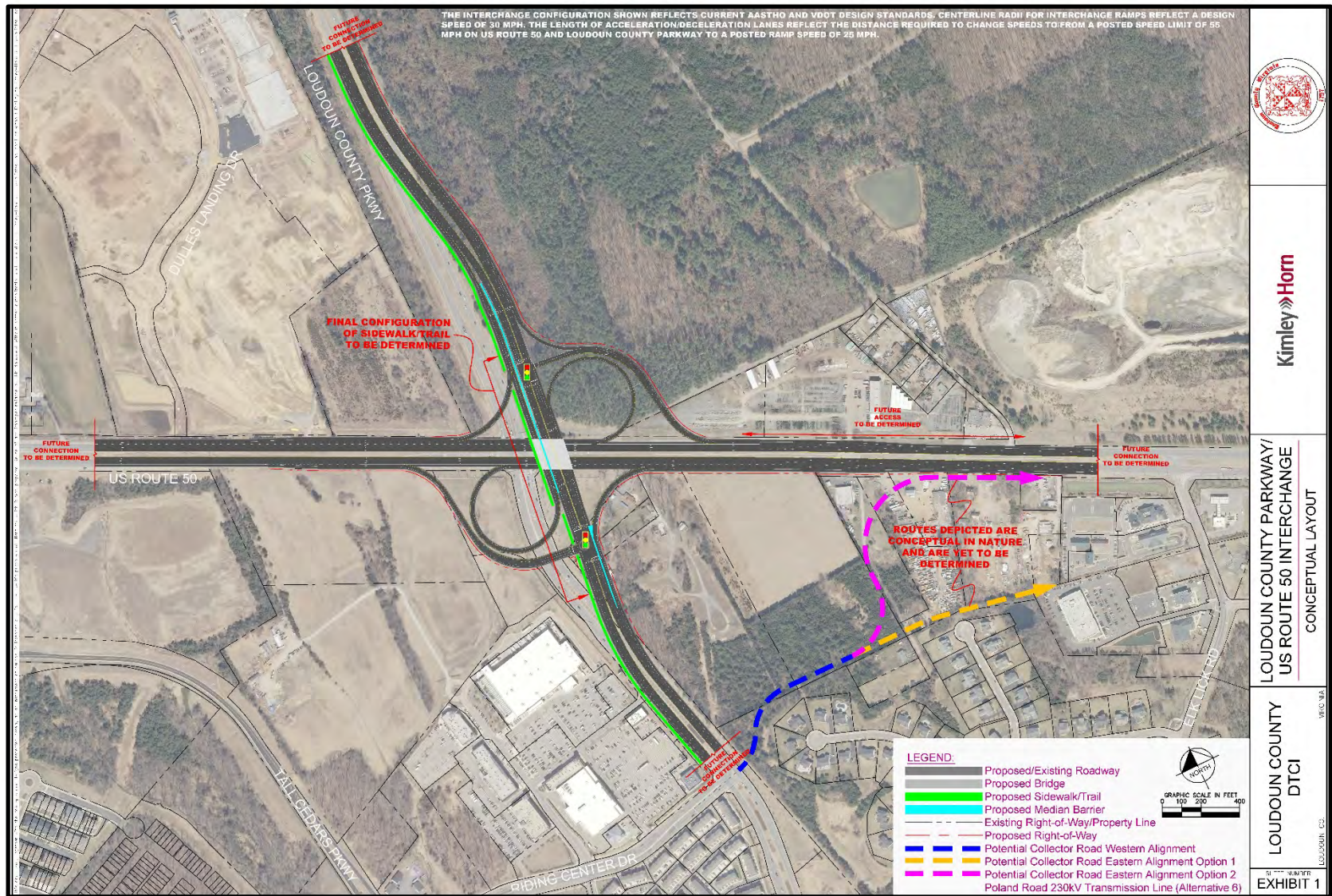
Why These Alternatives?

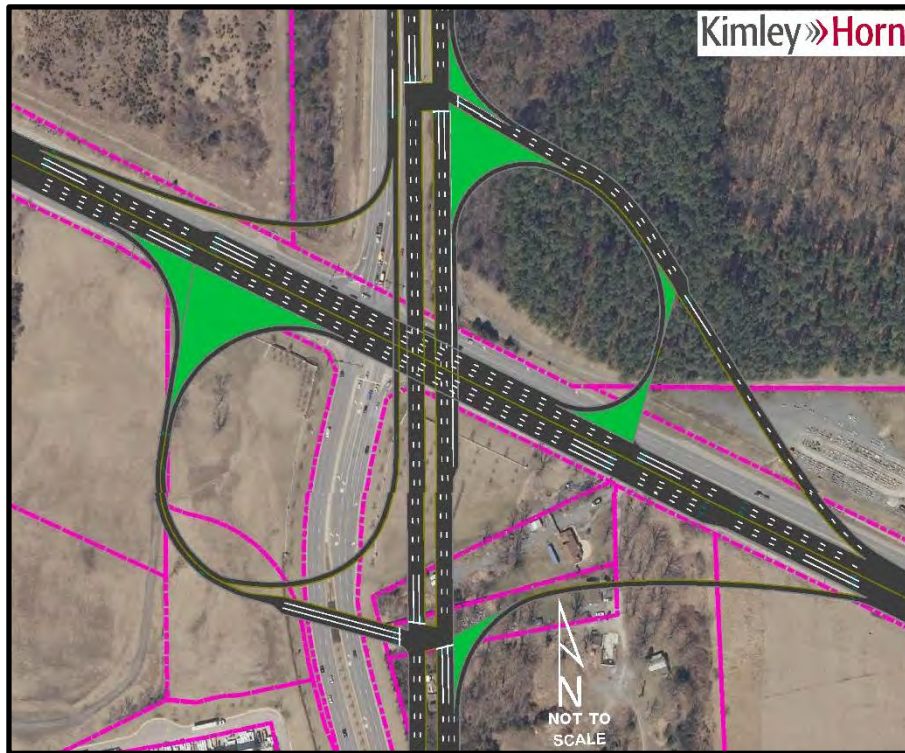
- Both require only a single bridge span - lower construction costs
- Both have a low profile design and would have fewer visual impacts
- Both would operate acceptably and improve mobility
- Both are less costly than an interchange with flyover ramps, which traffic analysis indicated was not needed



Loudoun County

VIRGINIA
WHERE TRADITION MEETS INNOVATION

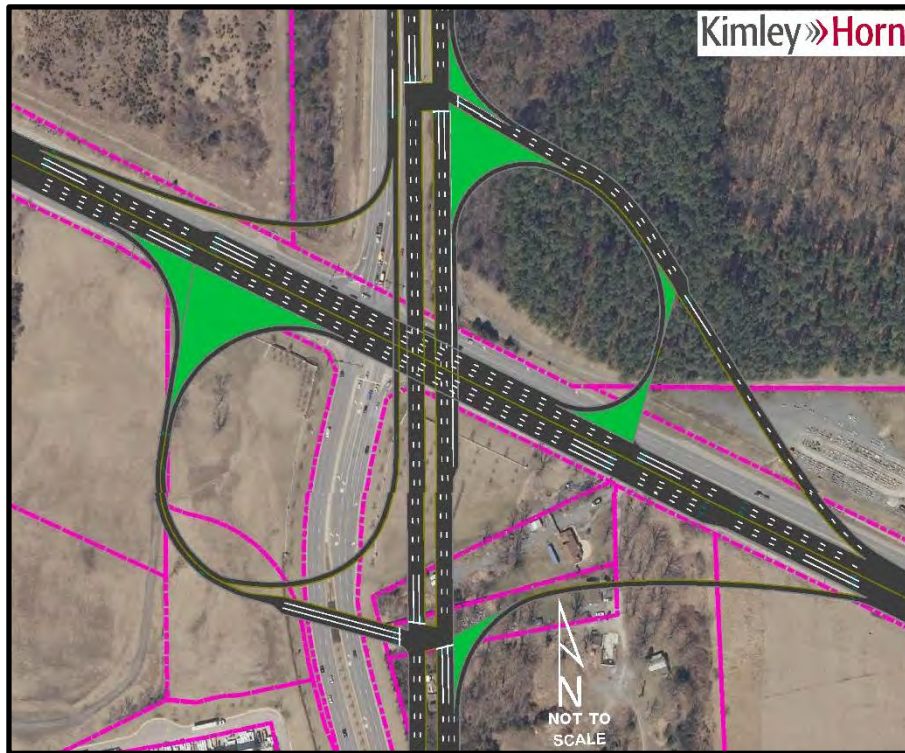




ParClo Design

- Provides an opportunity for coordinated traffic flow to minimize delays
- Allows shorter traffic signal cycles than a traditional intersection
- Limited land impacts lower costs and provide more opportunities for development
- No weave/merge conflicts



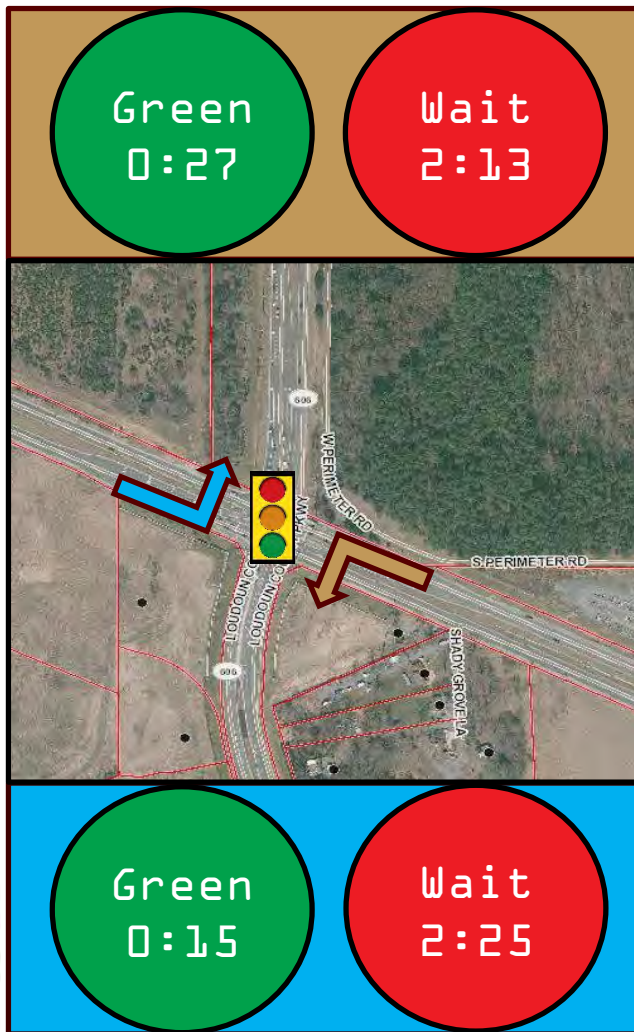


ParClo at Loudoun County Parkway and Route 50

- Southbound Loudoun County Parkway traffic could free-flow onto both directions of Route 50
- Primary land impacts are to property already reserved for the interchange (SW corner) and to MWAA land (NE corner)
- Synchronized traffic signals on Loudoun County Parkway
- Two uncontrolled crossing points for bicyclists and pedestrians

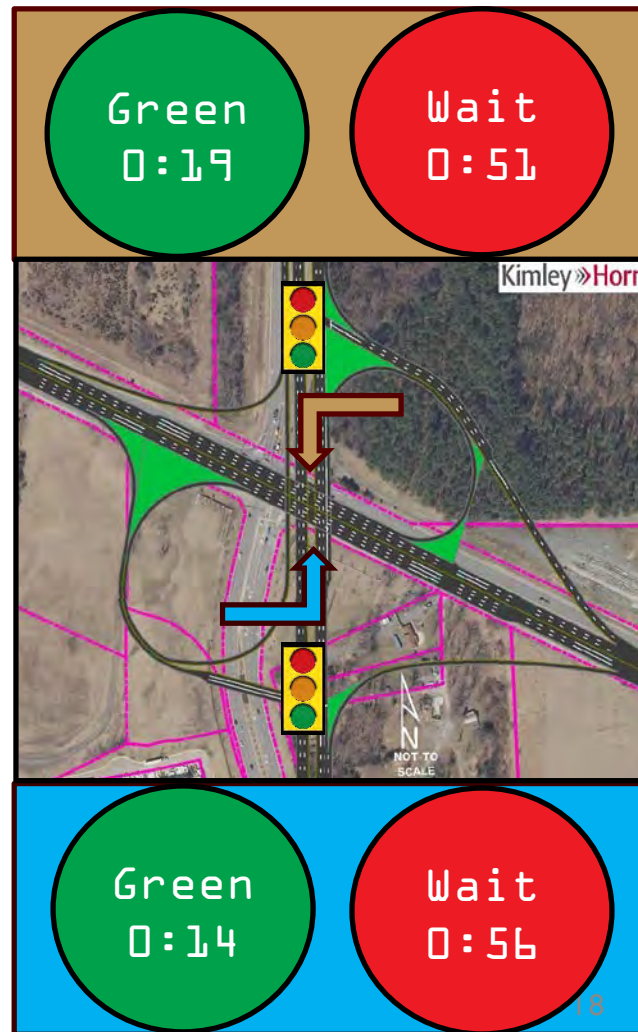


Existing (2016)



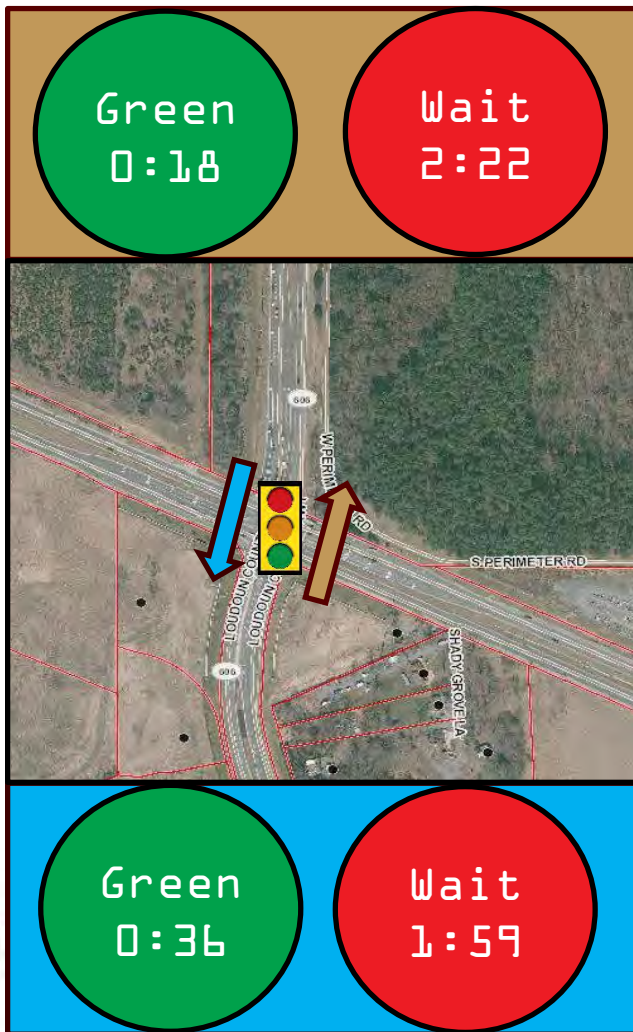
**WB to SB
Left Turn**

Future ParClo



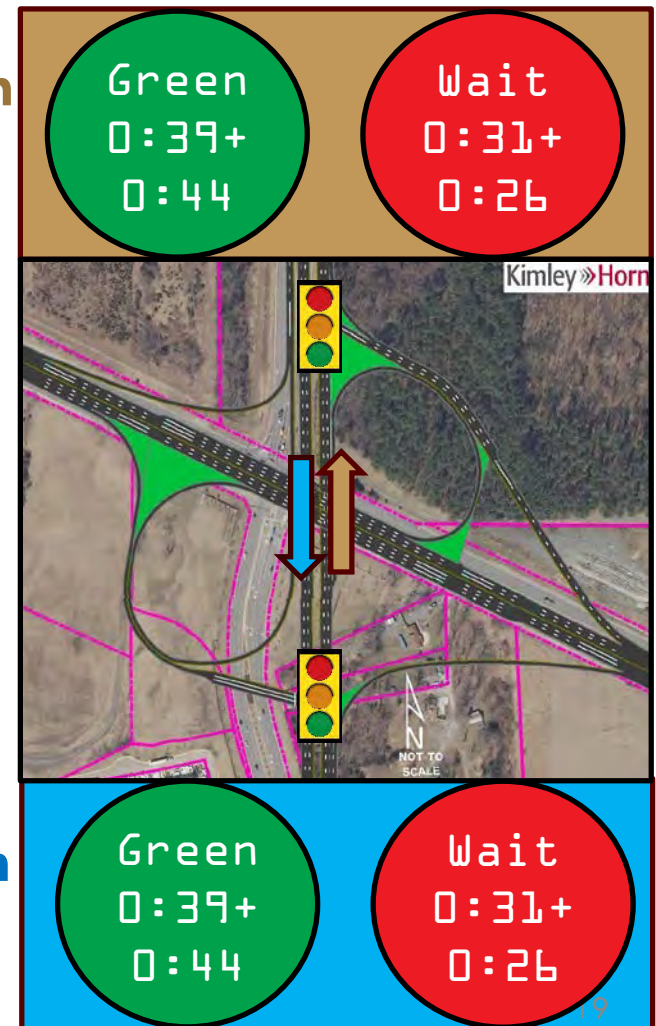
**EB to NB
Left Turn**

Existing (2016)



NB Through Movement

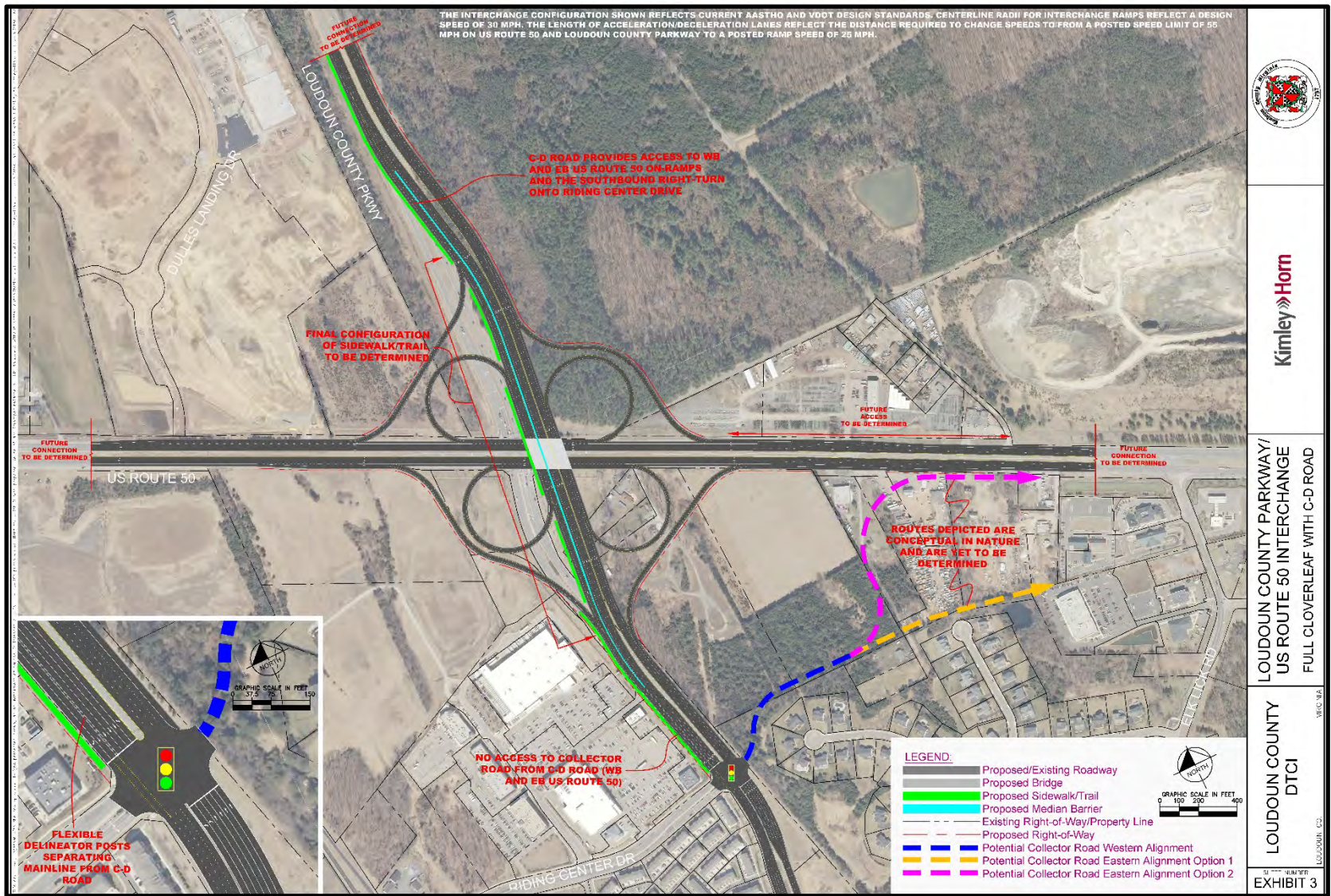
Future ParClo



SB Through Movement

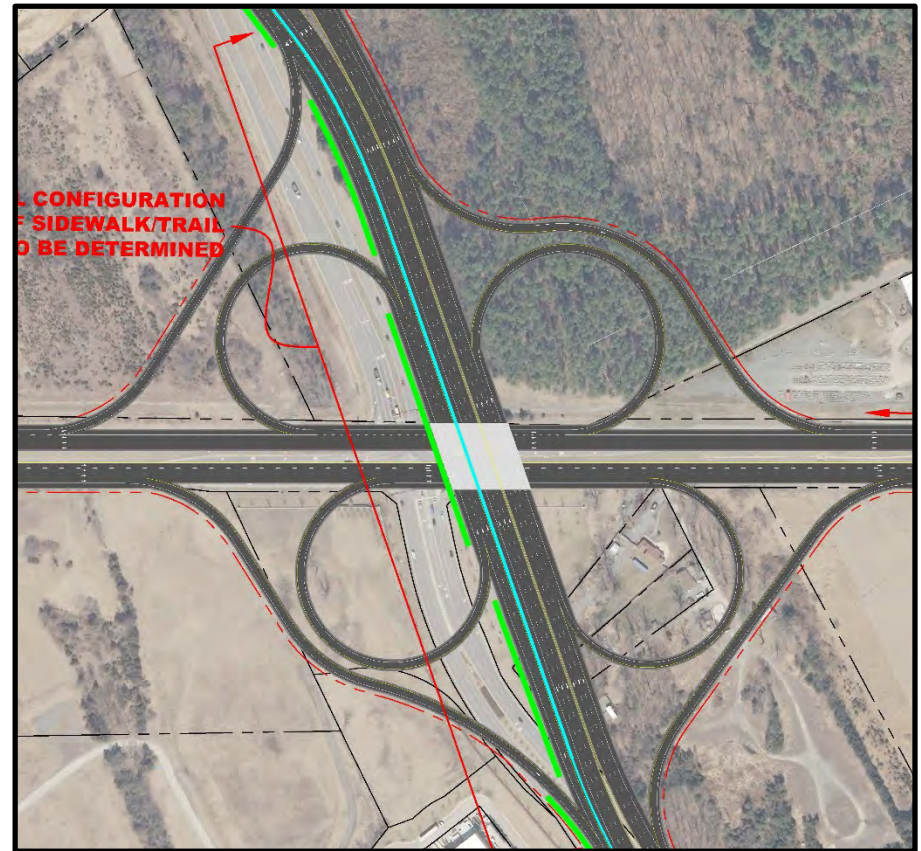


Loudoun County VIRGINIA
WHERE TRADITION MEETS INNOVATION



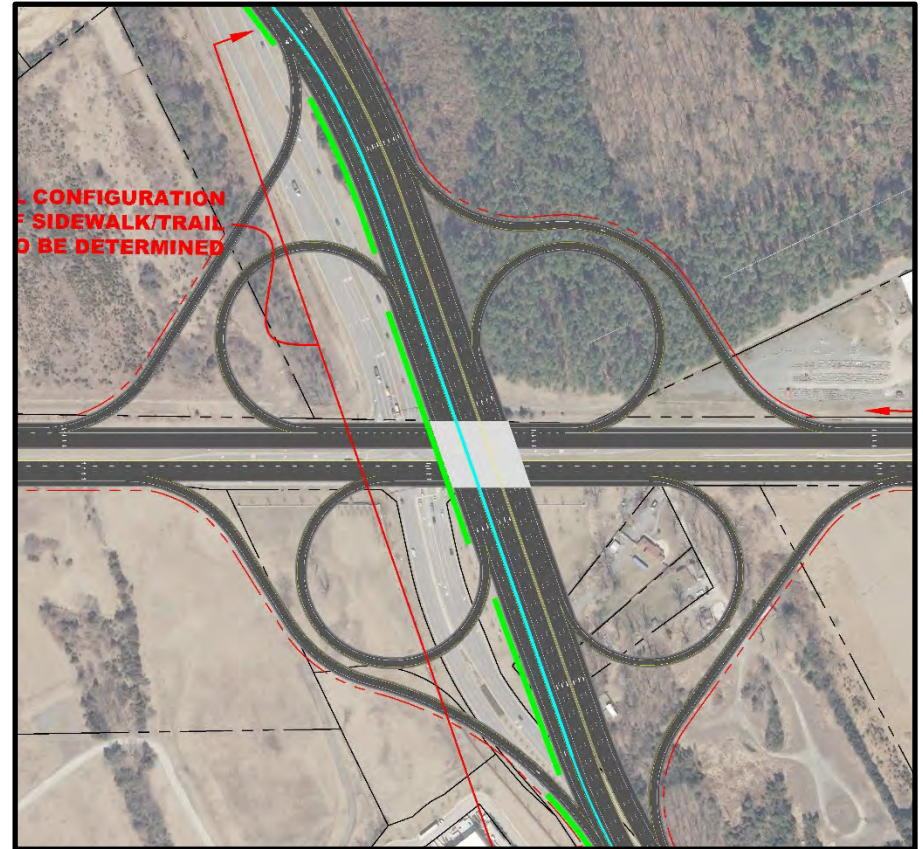
Full Cloverleaf Design

- Free flow traffic in all directions
- No traffic signals
- Large land area
- Traffic on cloverleaf ramps must weave and merge with other traffic, causing delays and increasing the potential for conflicts



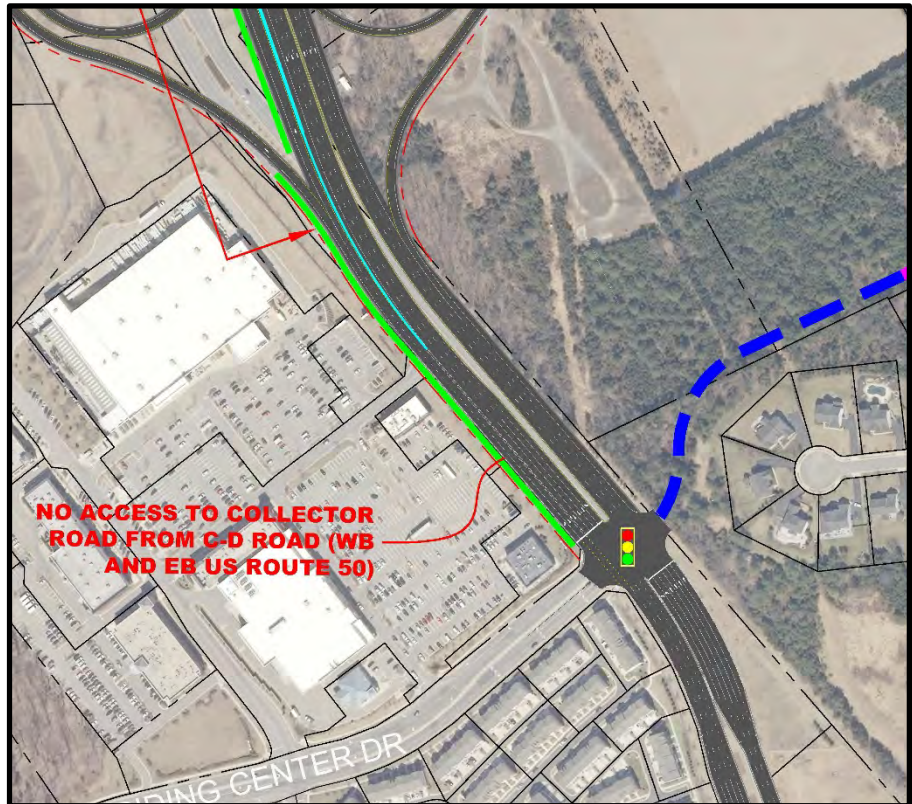
Full Cloverleaf at Loudoun County Parkway and Route 50

- Collector-Distributor (C-D) local lanes needed on southbound Loudoun County Parkway due to high traffic volumes
- Primary land impacts are to all four quadrants, restricting potential development
- Four uncontrolled crossing points for bicyclists and pedestrians
- Higher costs for land, design, and construction



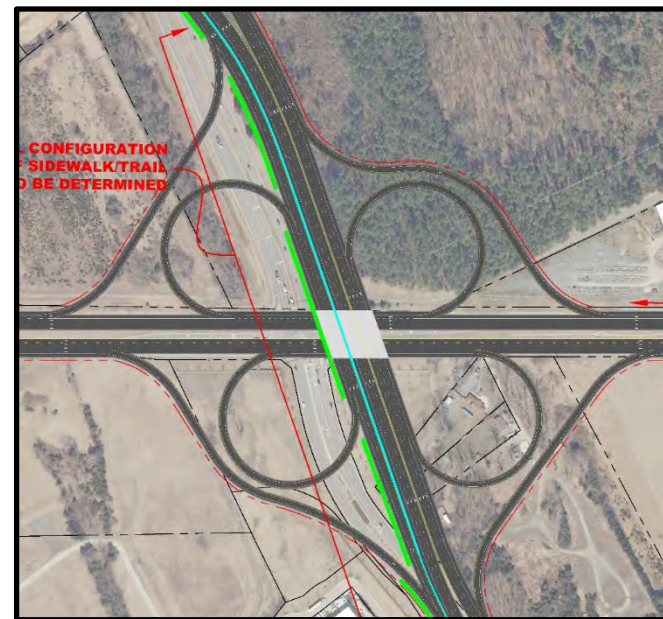
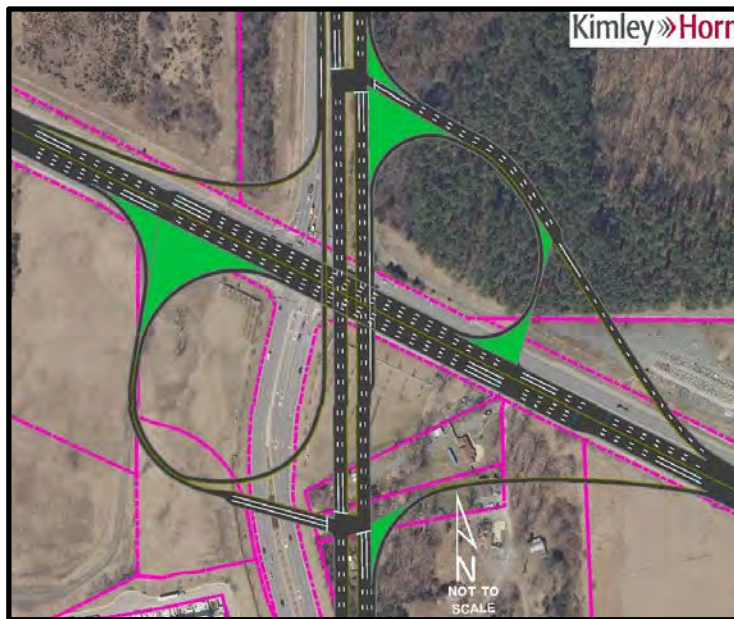
Full Cloverleaf Design: Riding Center Drive

- Free-flow ramp is too close to Riding Center Drive; does not meet VDOT standards
- Collector-Distributor (C-D) lane continues through the intersection
- SB Loudoun County Parkway traffic uses C-D lanes to access WB Riding Center Drive
- EB Riding Center Drive would not be accessible to traffic from Route 50



Similarities of the ParClo and Full Cloverleaf Designs

- Only a single bridge span - lower construction costs than a flyover design
 - Low profile design would have fewer visual impacts
- Shown to operate acceptably and improve mobility through the area



Pros and Cons of the ParClo and Full Cloverleaf Designs

ParClo

- No weave/merge movements
- Traffic signals needed
- Southbound Loudoun County Parkway traffic could free-flow onto both directions of Route 50
- Less total land impact
- Lower cost than the Full Cloverleaf alternative
- Full access to Riding Center Drive

Full Cloverleaf

- Weave/merge movements
- All traffic free-flow
- Collector-distributor (C-D) local lanes required along Loudoun County Parkway
- Greater total land impact
- Higher cost than the ParClo alternative
- Restricts some access from US 50 to Riding Center Drive



Next Steps

- Board Endorsement of Interchange Concept
- Interchange Justification Report
 - Reviewed by VDOT
 - Includes Public Outreach
- Interchange Design
 - Will determine exact layout of the interchange
 - Includes Public Outreach
- Engineering and Construction



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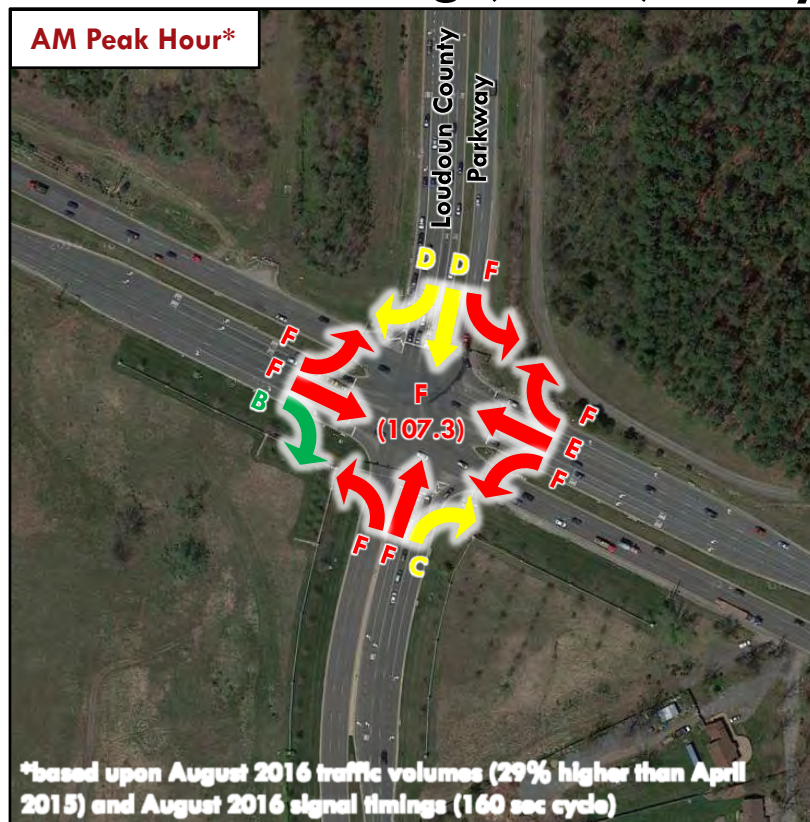
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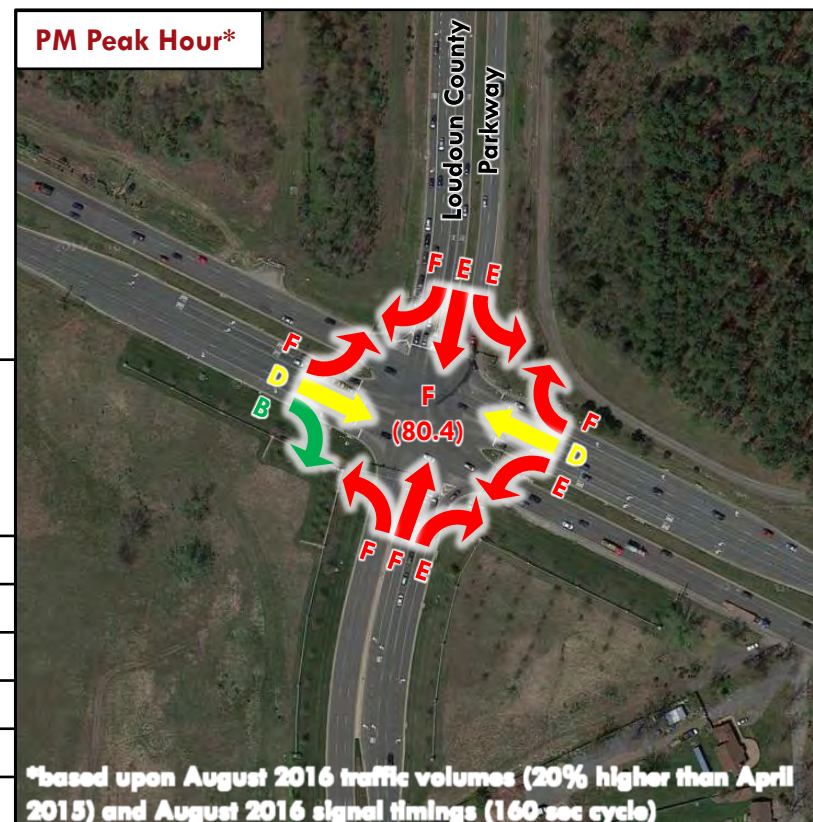


Existing (2016) Study Intersection Levels of Service

AM Peak Hour*



PM Peak Hour*



A → LOS by movement
A Overall Intersection
(9.9) LOS (Delay)

