WELCOME

U.S. 202 (Buckingham Rd) and York Rd Roundabout Intersection Improvement Project

Public Meeting

MAY 21, 2024

pennsylvania
DEPARTMENT OF TRANSPORTATION

INTRODUCTIONS

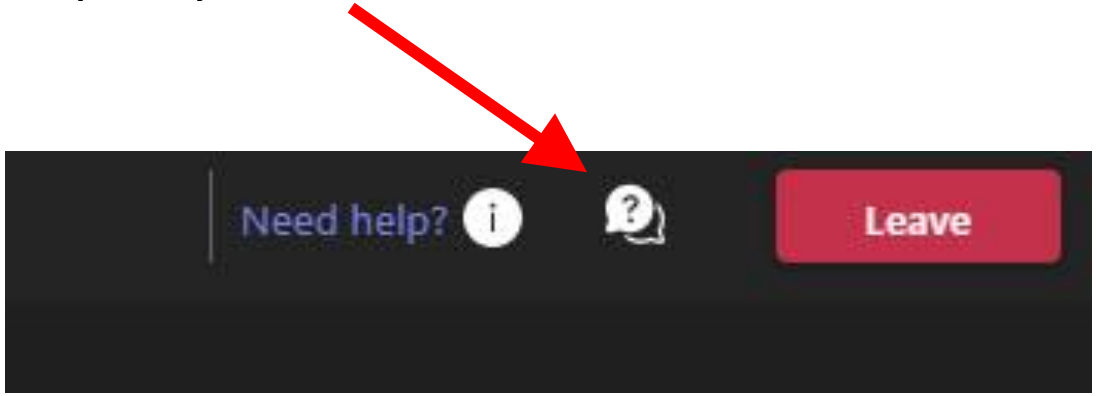
- Nathan Parrish, P.E., Consultant Project Manager

- Michael P. Mastaglio, P.E., PTOE, Project Manager

- Andrew Gould, P.E., Project Engineer

QUESTIONS?

Questions can be submitted by clicking on the Q&A feature located at the top of your screen

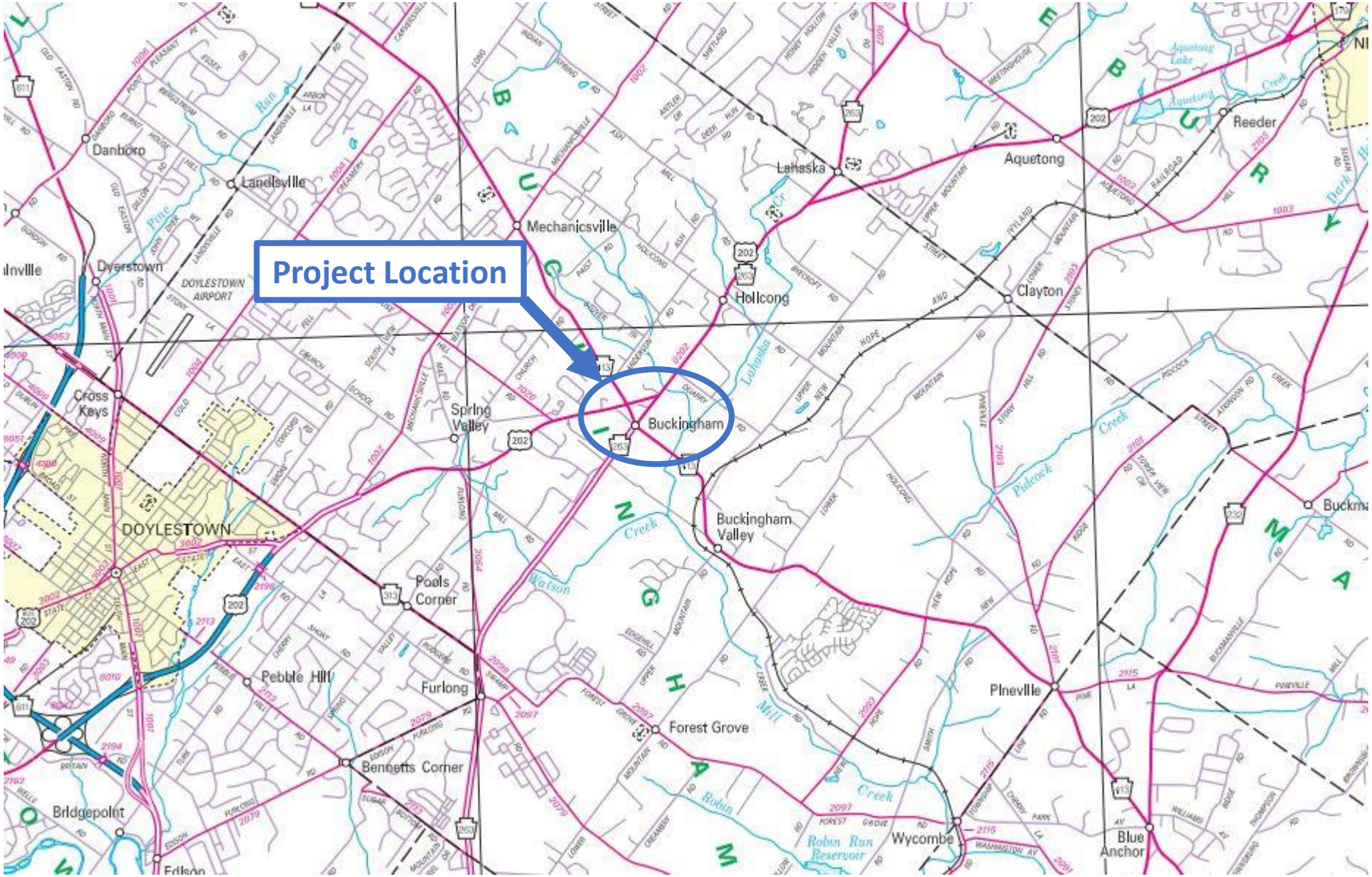


Please note the slide number in your question

WELCOME & PURPOSE

- Project Overview
- Purpose & Project Selection
- Highway Safety Manual (HSM) Analysis
- Roundabout Education
- Proposed Design
- Operations and Safety Considerations
- Construction Staging & Next steps
- Questions and Answers

PROJECT OVERVIEW



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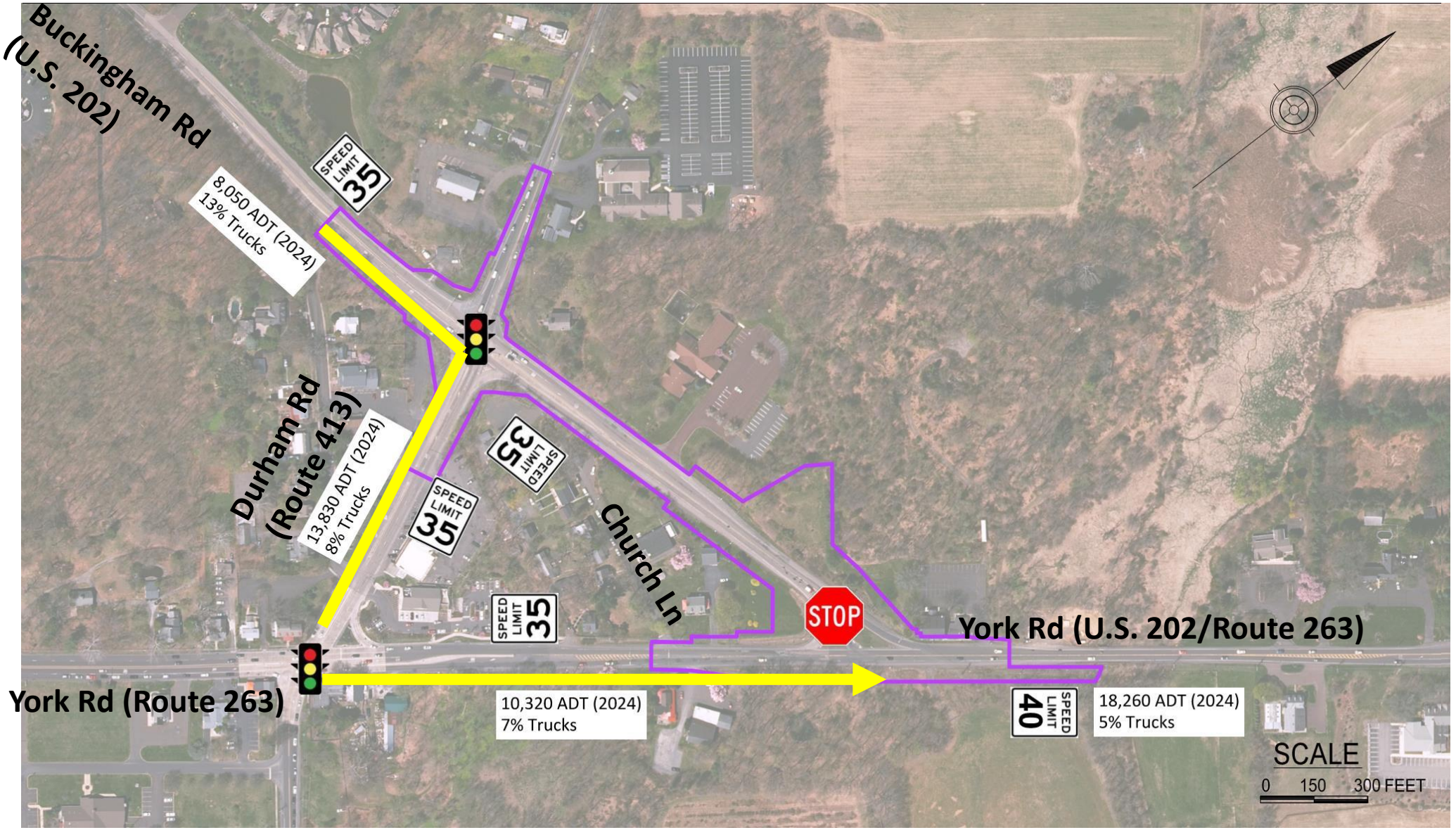

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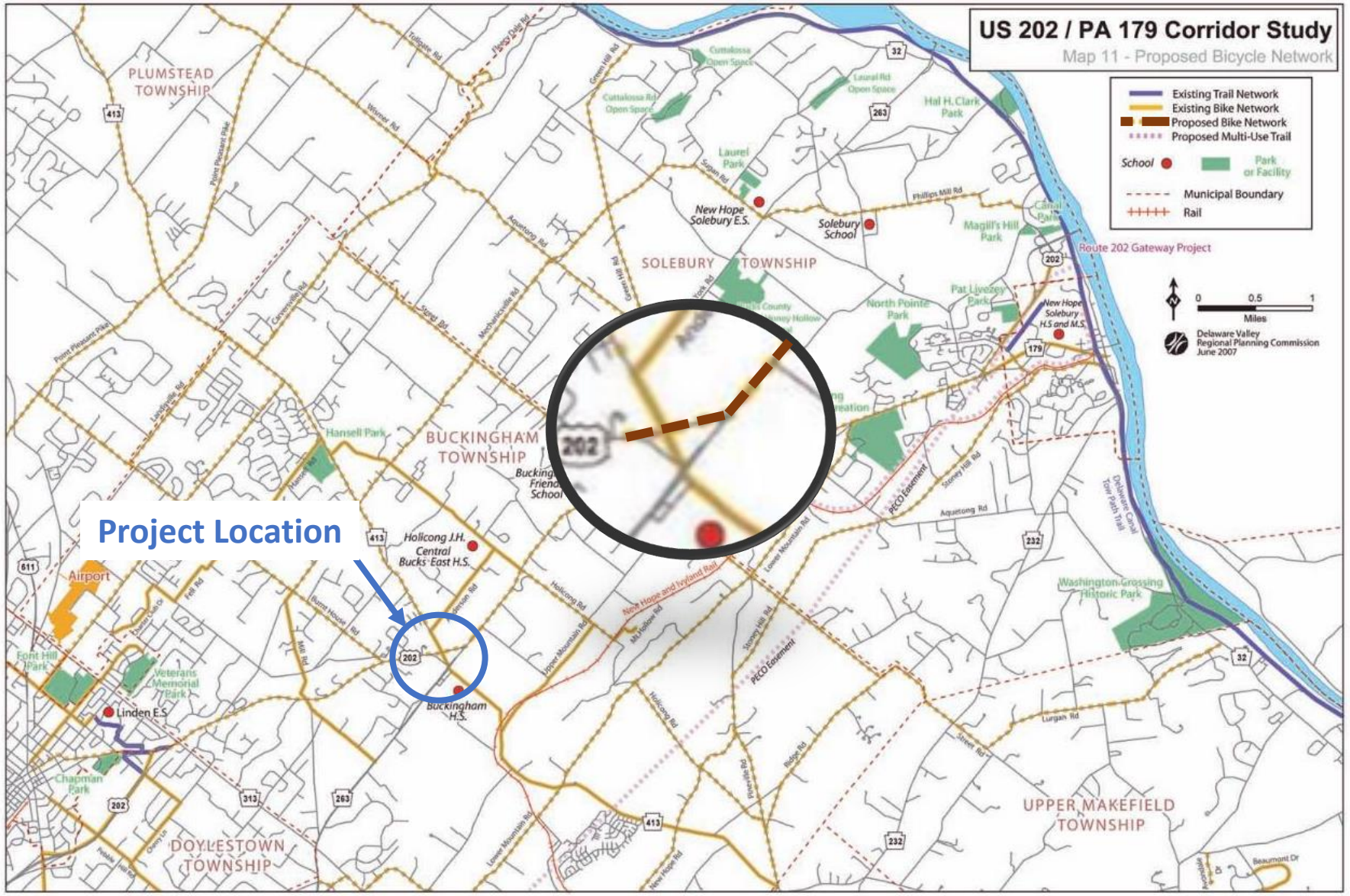
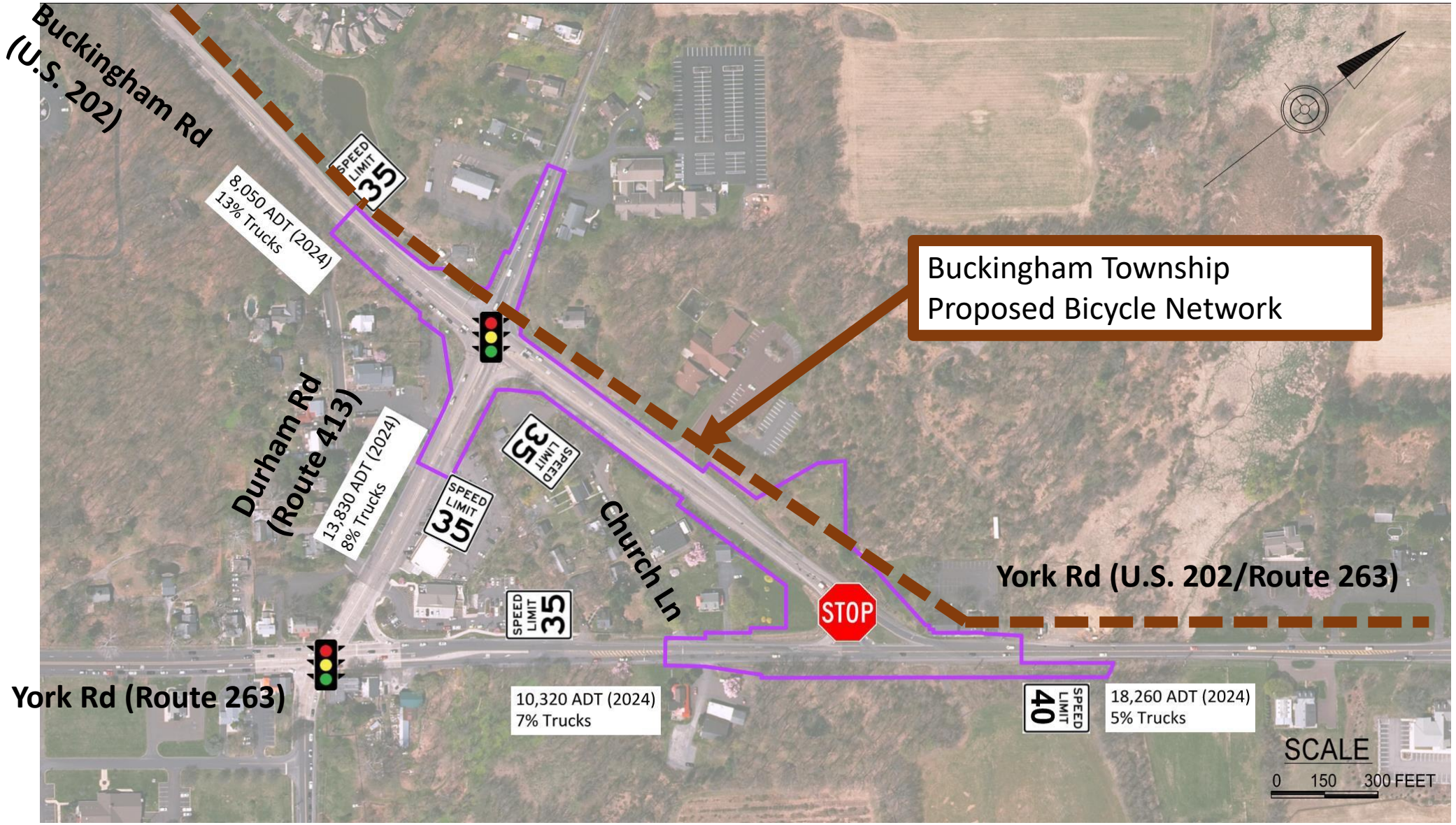
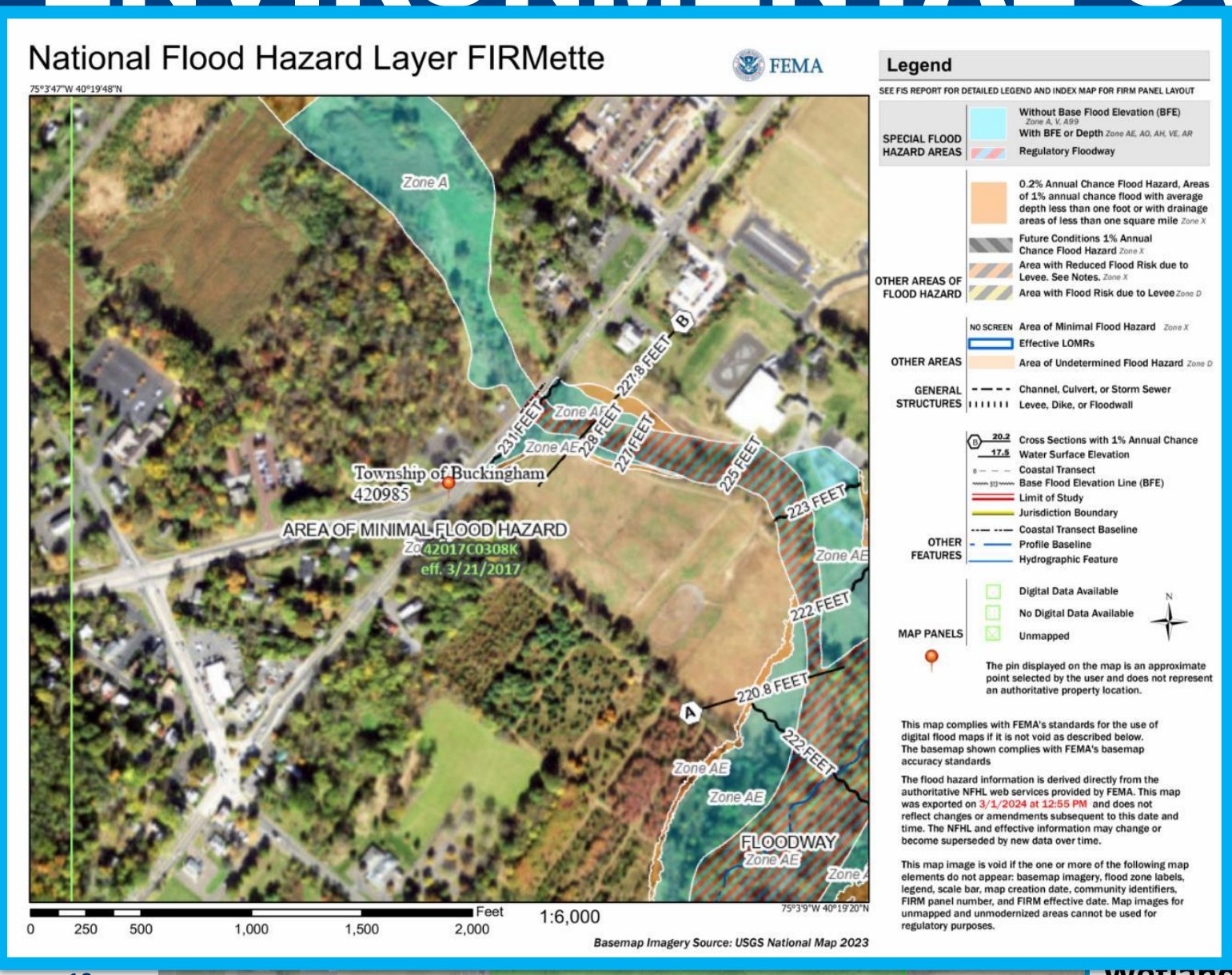


PROJECT OVERVIEW



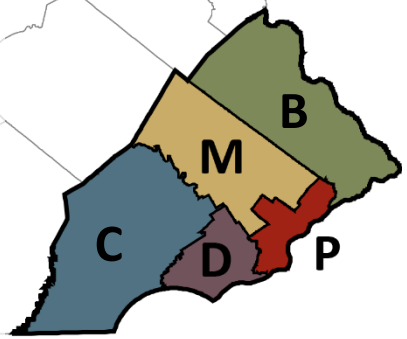
ENVIRONMENTAL OVERVIEW



PROJECT SELECTION

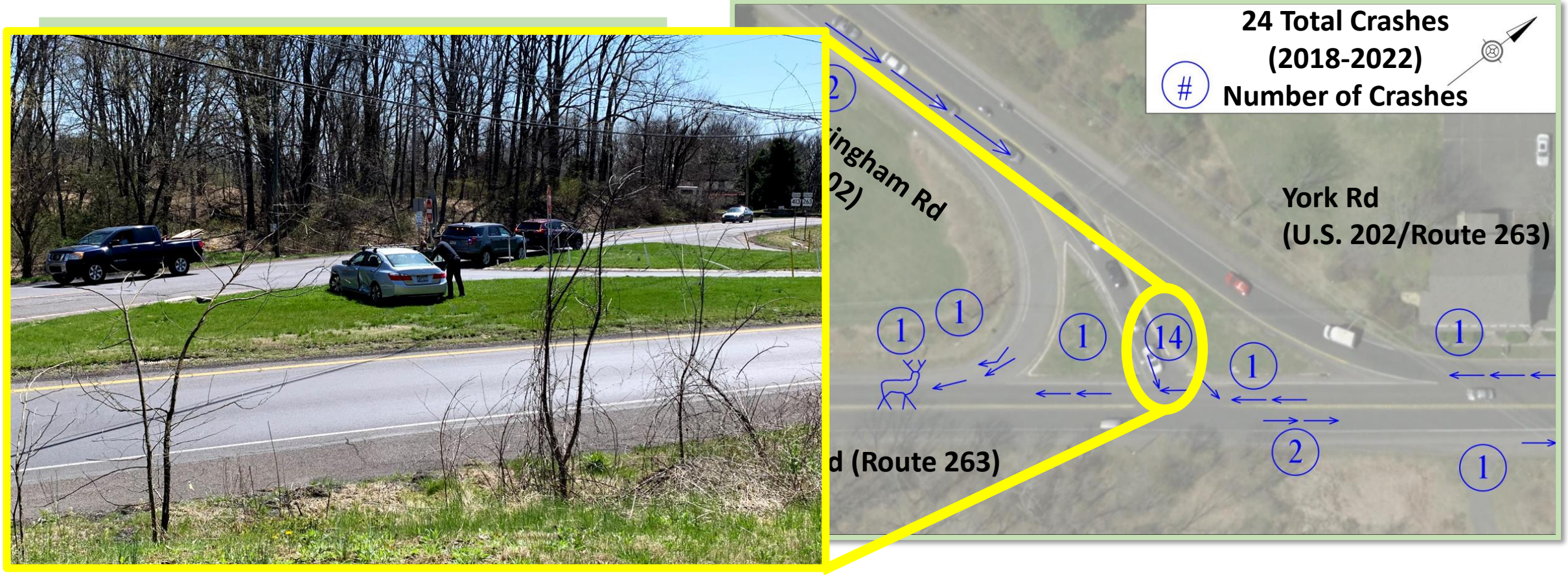
District-Wide Roundabout Program

- Urban Engineers worked with PennDOT District 6-0 to establish a data driven Roundabout Program
- The goal of the program is to address safety needs at intersections by identifying locations where a roundabout would be a suitable safety countermeasure
- Highway Safety Improvement Program (HSIP) Applications submitted in 2019
- Prioritized Benefit/Cost Ratio



DISTRICT 6-0

PURPOSE

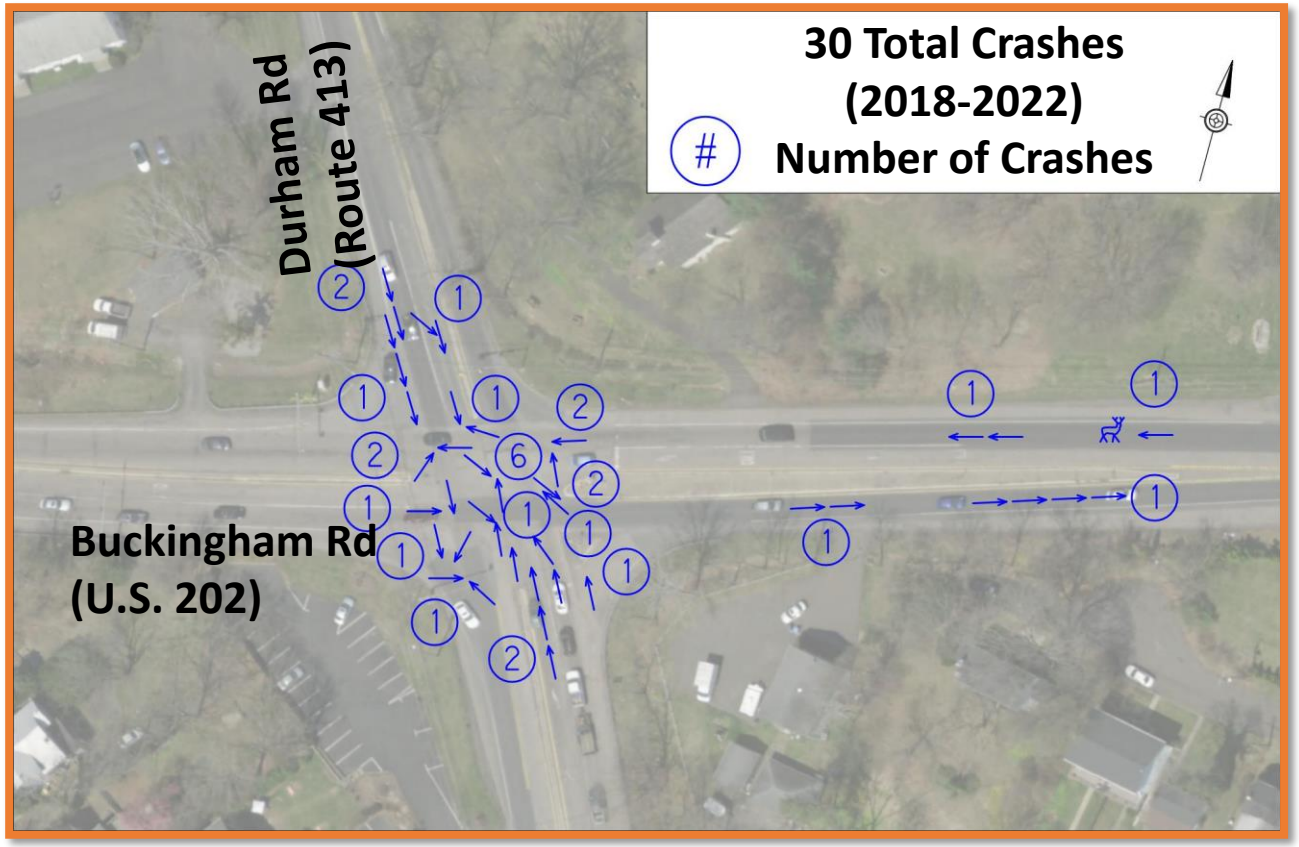


Source: Urban – Site visit on April 5, 2021

PURPOSE

U.S. 202 & Route 413
Buckingham Rd & Durham Rd

- SR 0202/0413 intersection has a history of severe crashes.
  - 53% of reported crashes had suspected serious, minor or possible injury.
- The intersection has a history of angle crashes.
  - 63% of reported crashes were angle crashes.
  - 90% of reported crashes had no weather or enviornmental factors.



PURPOSE

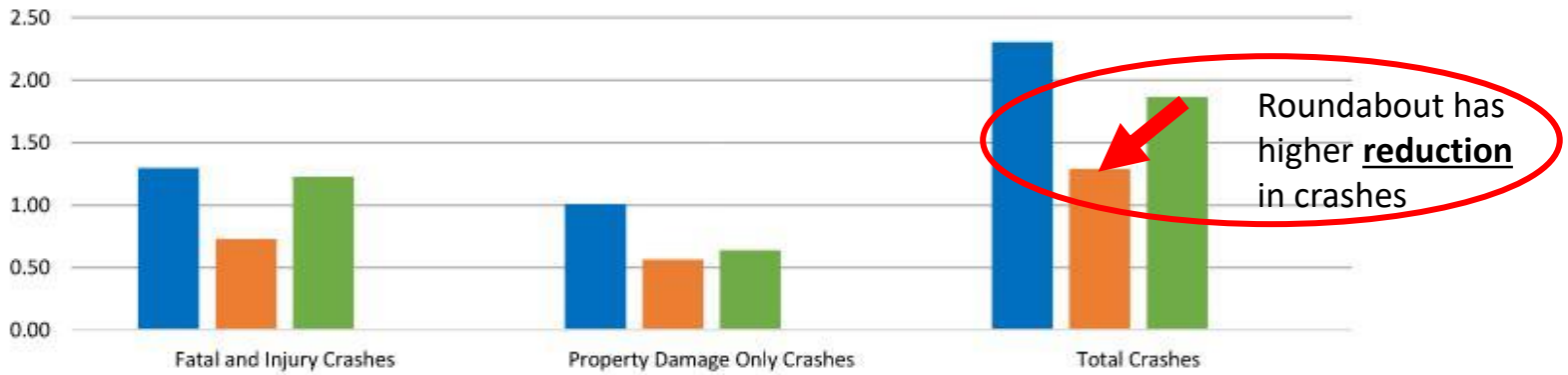
- Reduce the amount and severity of crashes at the intersections.
- Relieve congestion
- Improve accessibility

Source: PennDOT website

INTERSECTION CONTROL EVALUATION (ICE)

- Federal HSIP funding requires benefit/cost analysis to secure construction funding.
- Roundabout shows a **higher reduction** in crashes
- Roundabouts are generally safer and more efficient than traffic signals
- Traffic signal would require realignment and create more impacts to the local properties/businesses

Summary of Predicted Crash Performance - Alternative Analysis



Safety Performance Summary

Project Totals	Total Crashes			
	Existing	Roundabout	Traffic Signal	
Predicted Average Annual Crash Frequency	2.31	1.29	1.87	--
Expected Average Annual Crash Frequency	--	--	--	--
Change from Existing Conditions	--	-1.02	-0.44	--

WHY A ROUNDABOUT?

- Address PennDOT's Strategic Highway Safety Plan (SHSP).
- Roundabouts are an FHWA Proven Safety Countermeasure.

Safety Statistics

In September 2023, PennDOT released data for 42 roundabouts on state routes at intersections that were previously stop- or signal-controlled. These roundabouts were reviewed based on having at least three years of data available before and after the roundabout's installation. These 42 comprise all the roundabouts on state routes that met the review parameters. Department data based on police-submitted crash reports spanning the years 2003 through 2022 shows:

- Crashes involving suspected serious injuries were reduced by 24 percent;
- Crashes involving suspected non-serious injuries were reduced by 51 percent; and
- The total number of crashes dropped three percent.

In addition to the 42 roundabouts meeting the review criteria, 36 other roundabouts have been installed on state routes.

Source: PennDOT Roundabout Website

WHY A ROUNDABOUT?

Roundabout Operation Characteristics

Roundabouts		Traffic Circles
Yield-at-Entry Rule: • Entering traffic yields to circulating traffic, which always keeps moving. • Very efficient with heavy traffic. • No weaving distance is needed, so roundabouts are small and fit in compact spaces.		**Entering traffic may interfere with circulating traffic:** • Circulating traffic can not clear when entering traffic fills circle. • Heavy traffic causes gridlock. • Circles must be large to provide long weaving distances.
Entering traffic is deflected slowly around the central island: • Deflection controls speed without enforcement, thereby reducing accidents. • Deflection forms gaps in traffic so other vehicles can enter. • Entry flare adds lanes		**Inconsistent entry design may allow traffic to enter at high speed:** • Serious accidents can result on high speed streets. • Fast entries impede gap acceptance and defeat the yielding process.
Flare increases capacity at the intersection, where capacity is needed most: • Flare promotes narrow streets between roundabouts, saving cost and neighborhood impacts.		**Poor entry conditions may not benefit from flare:** • Poor intersection capacity even with large traffic circles. • Higher capacity requires wide streets between circles, wasting money and land

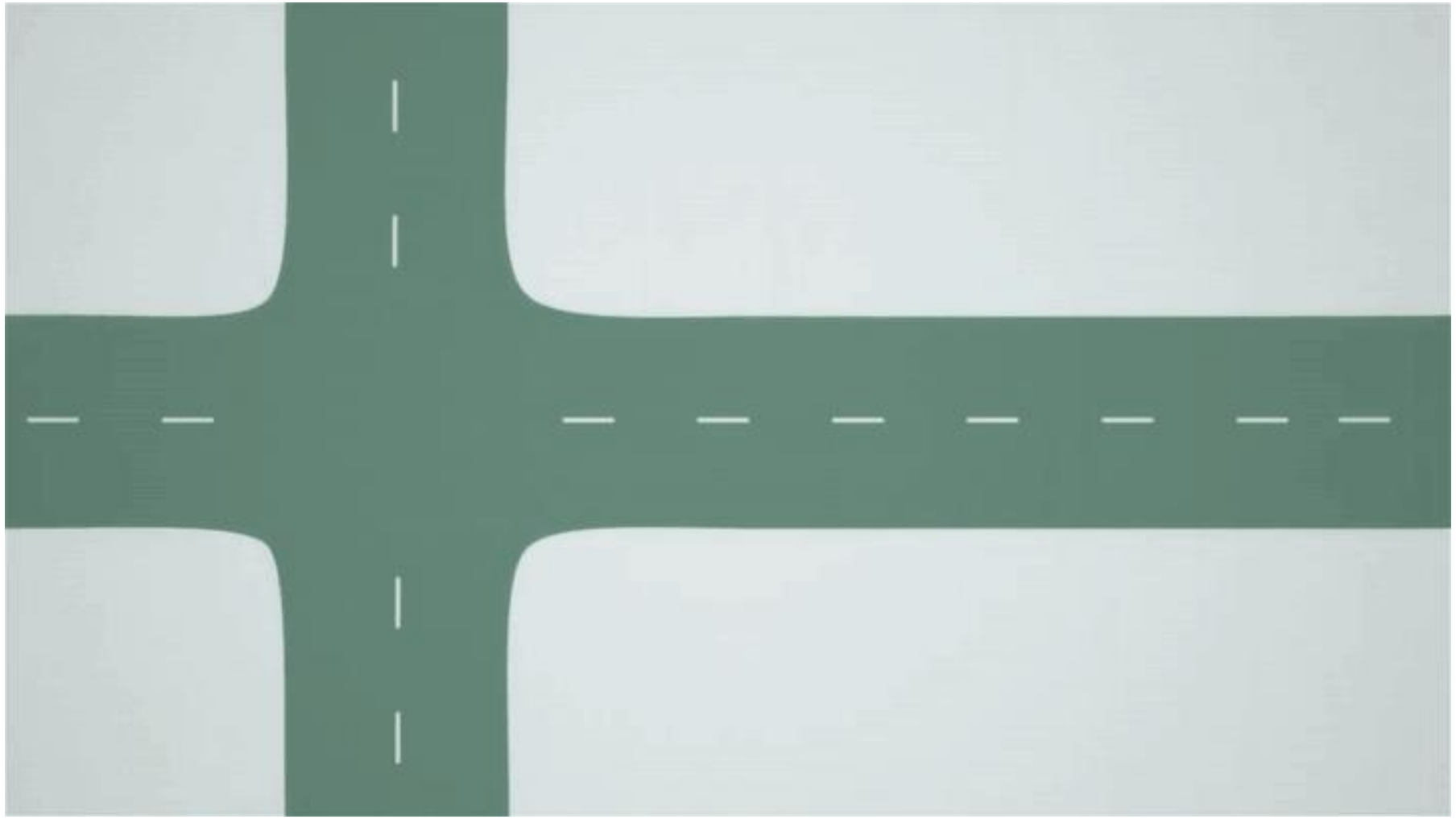
ROUNDABOUT BENEFITS

Benefits of Roundabouts

- Improve safety
- Slower vehicle speeds
- Efficient traffic flow
- Reduces pollution and fuel use
- Traffic calming
- Gateway opportunity

Source: Vision ZERO

Vehicular Conflicts at Intersections



Source: Utah Department of Transportation

Vehicular Conflicts at Intersections

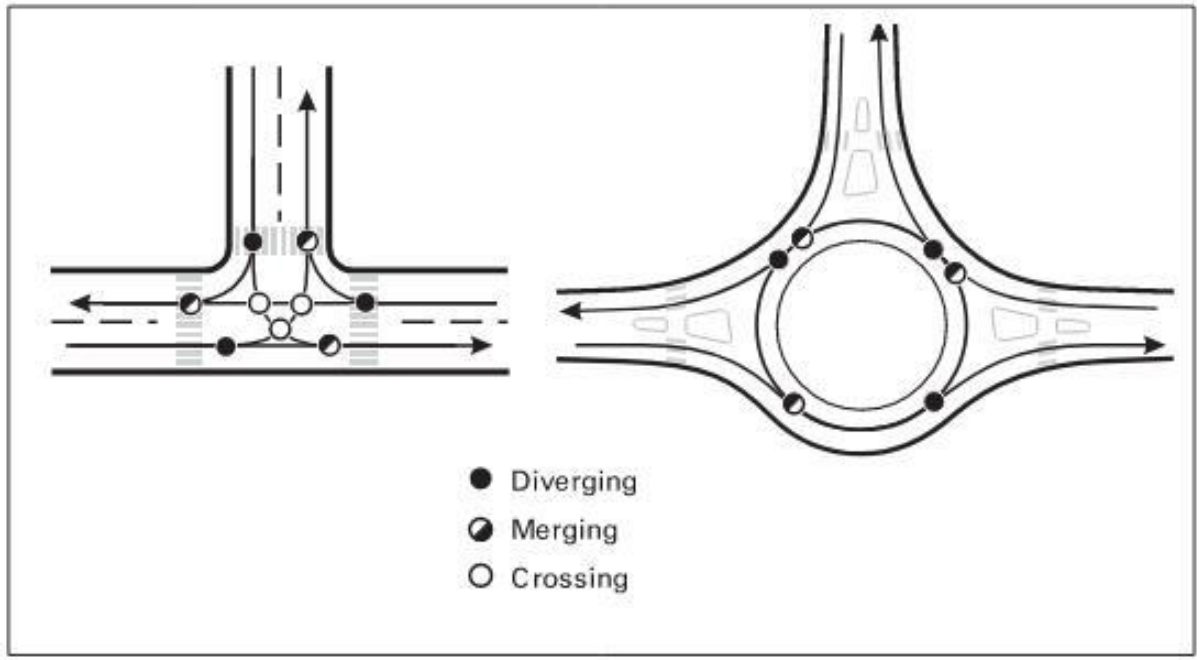


Exhibit 5-1. Vehicle conflict points for "T" Intersections with single-lane approaches.

Source: FHWA – Roundabouts: An Information Guide – Chapter 5

Traditional 3-leg Intersection

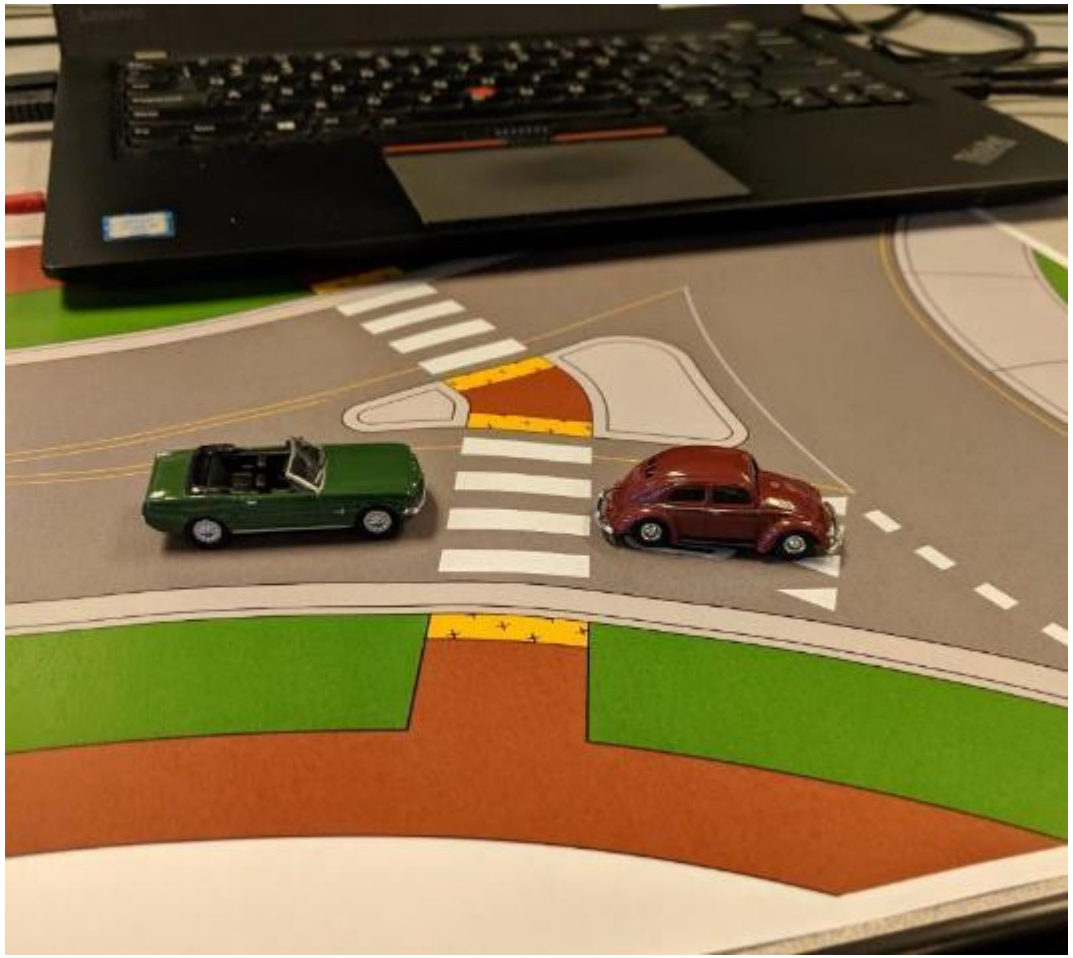
9 Conflict Points

Roundabout (3-leg)

6 Conflict Points

Pedestrian Crossings at Roundabouts

- Crosswalks set back one car length
- Separates conflicts between cars and pedestrians
- Allows pedestrians to cross when cars are queued



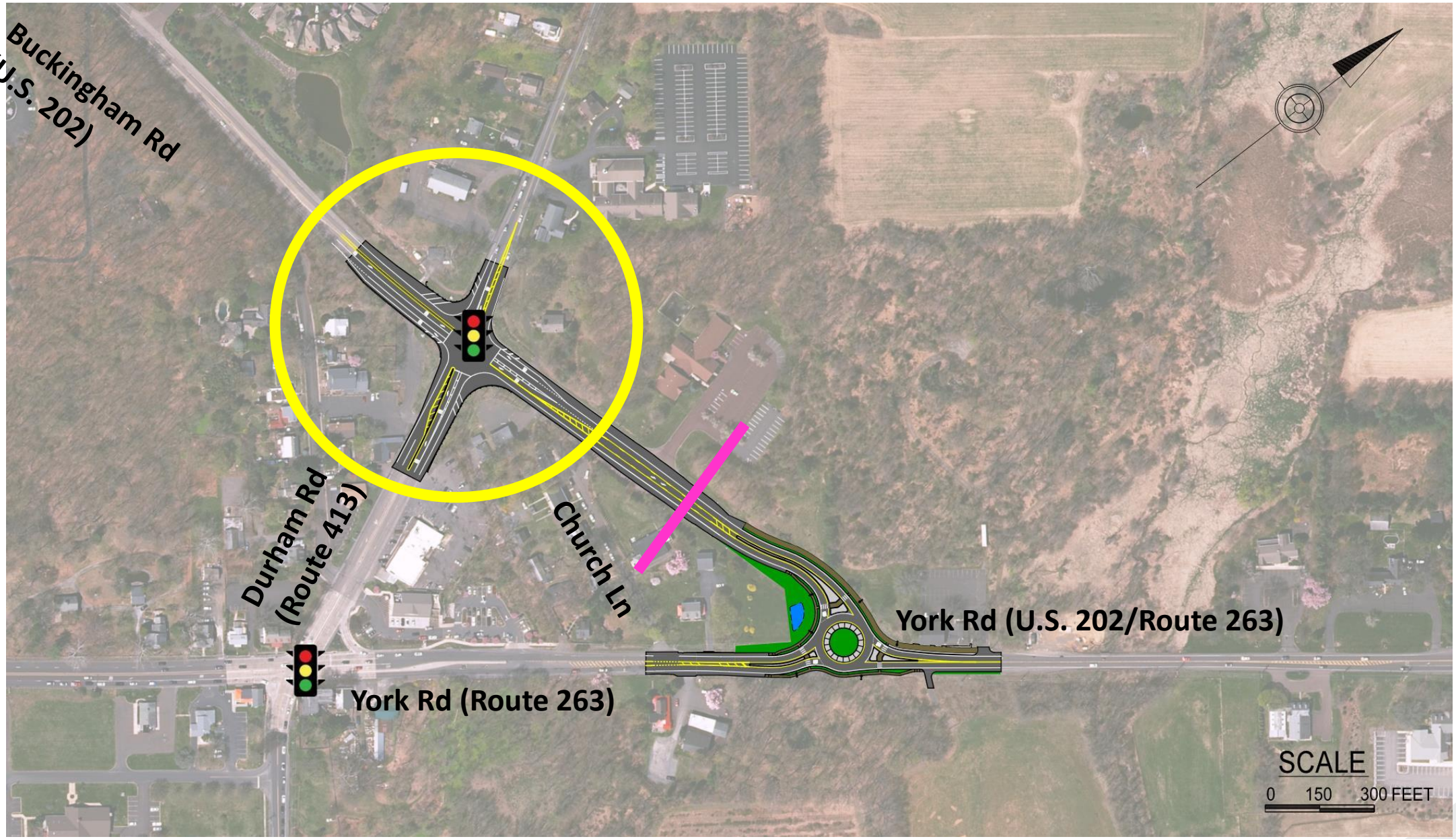
Source: *Urban Engineers*

SAFETY CONSIDERATIONS

Roundabout Intersection Lighting

PROPOSED DESIGN

PROPOSED DESIGN



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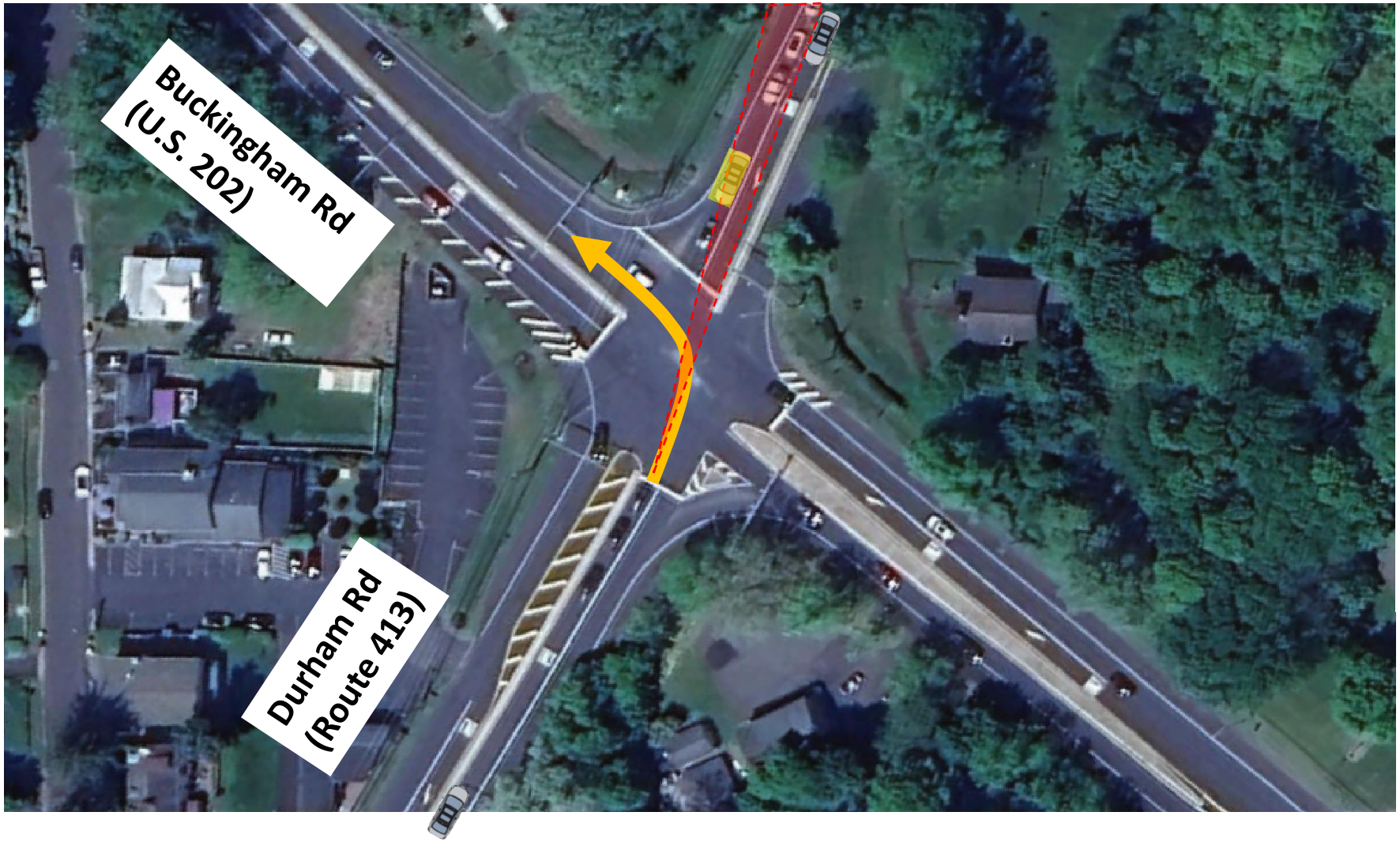
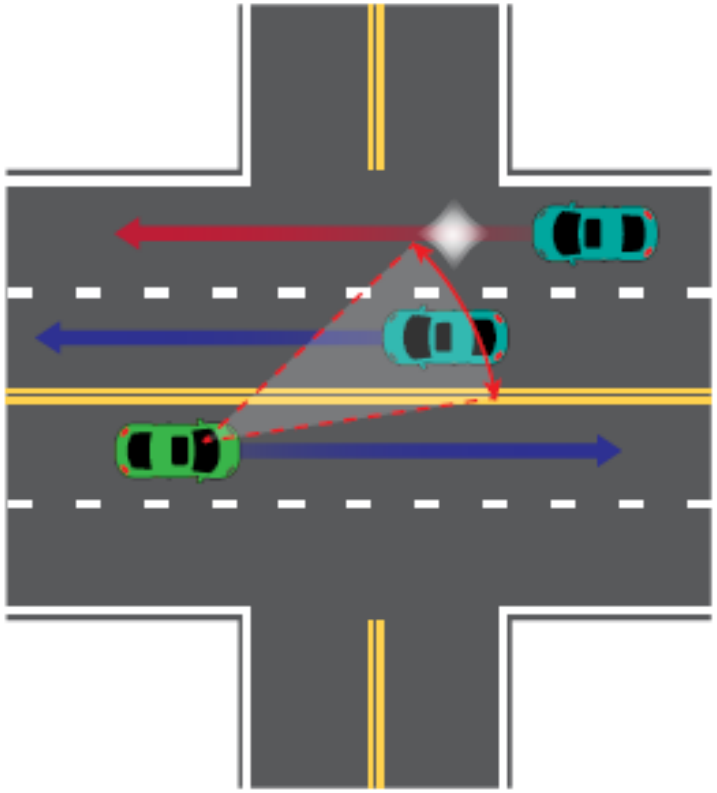
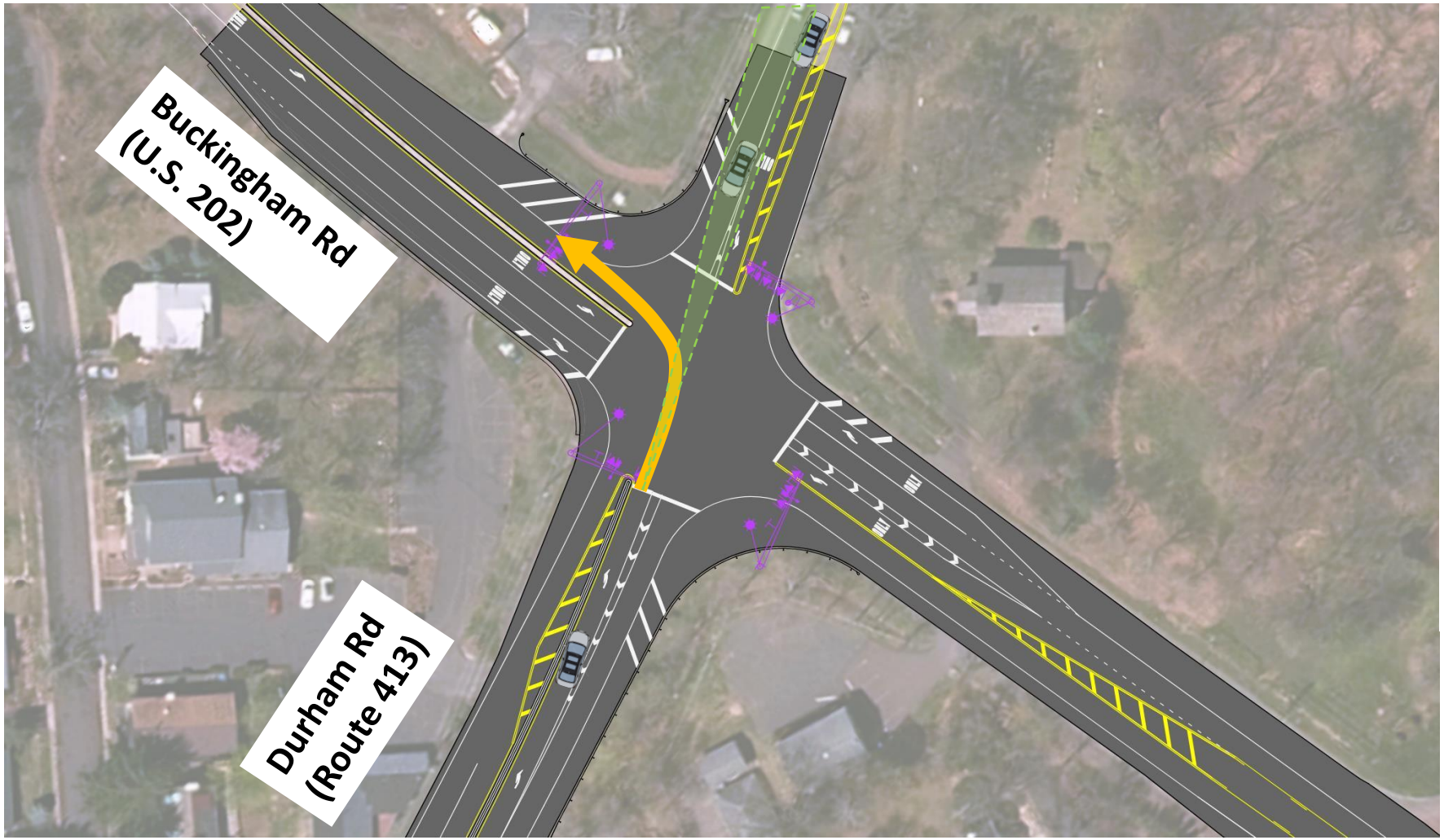
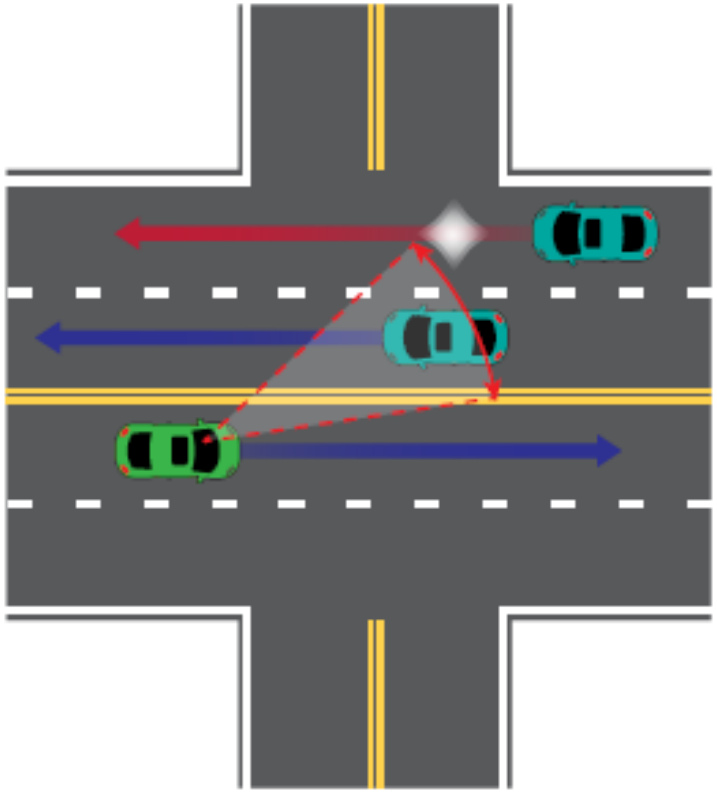




Shadow Vehicle restricts sight line of opposing thru traffic

PROPOSED DESIGN





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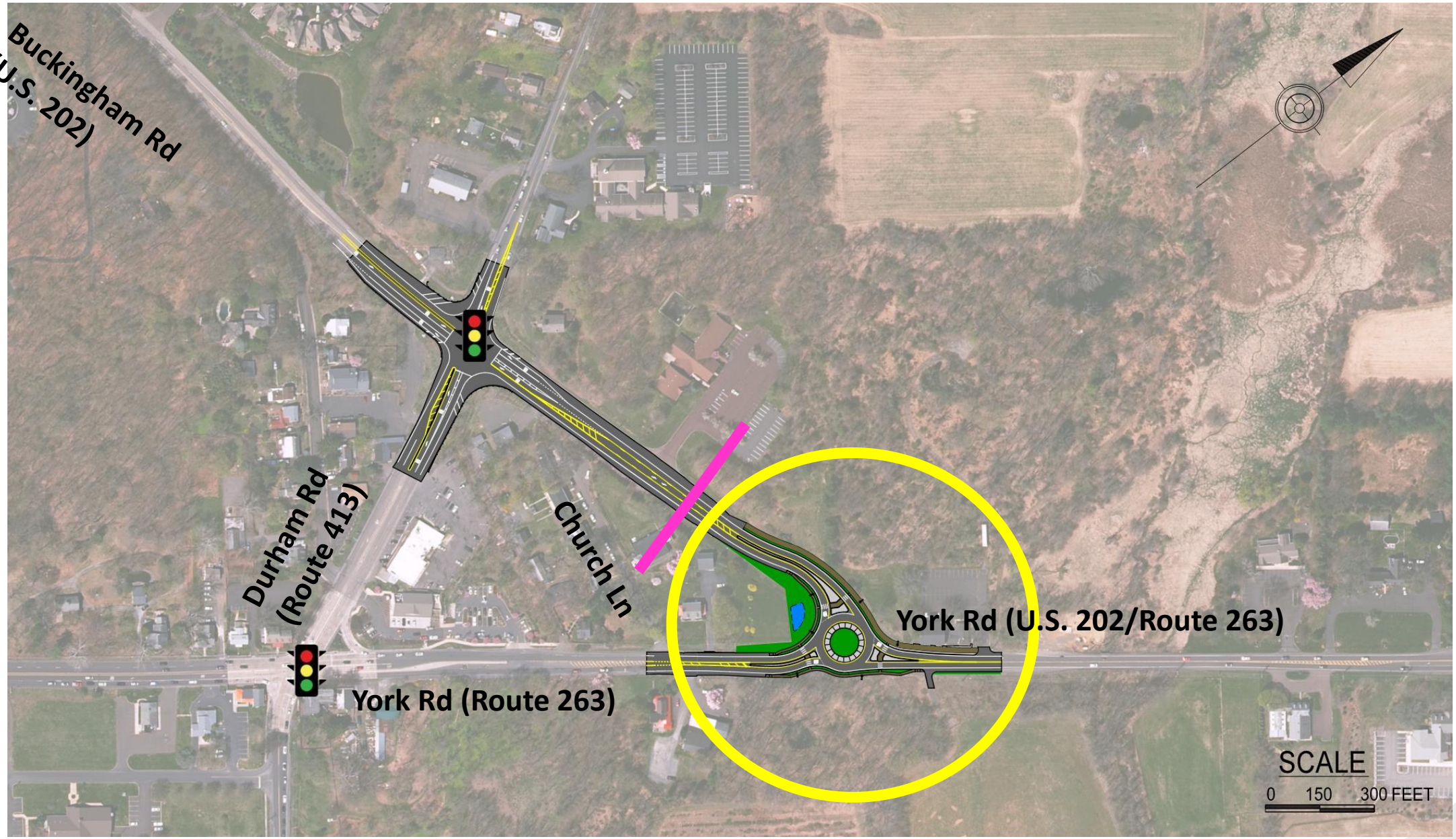

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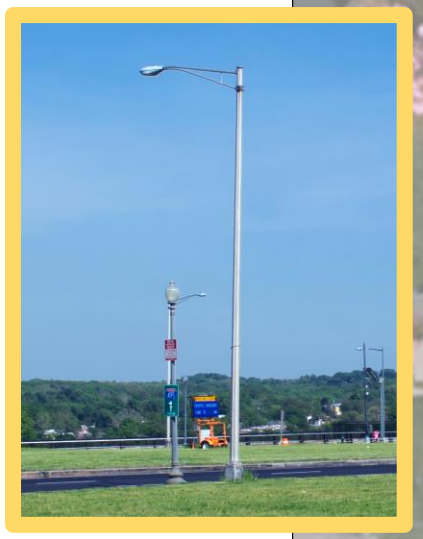
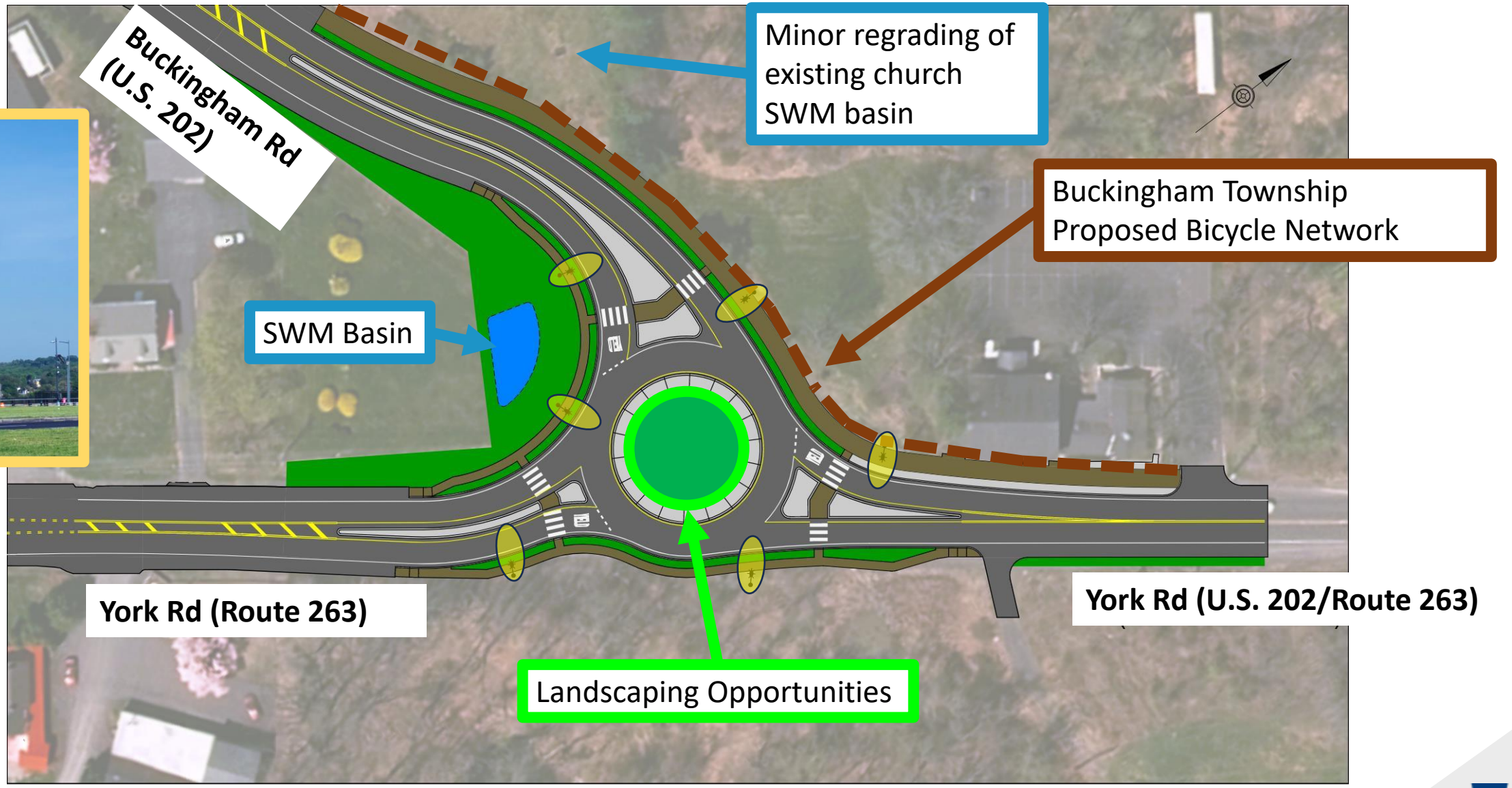
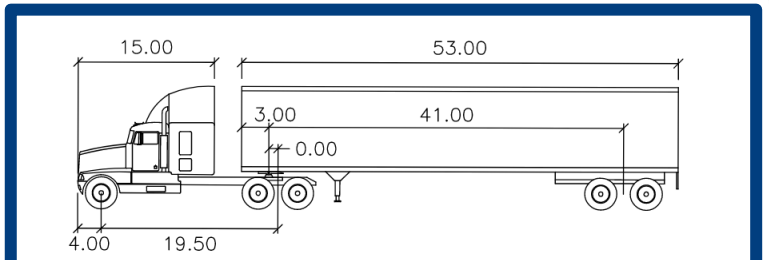




OPERATIONS

Large Vehicles Accommodations



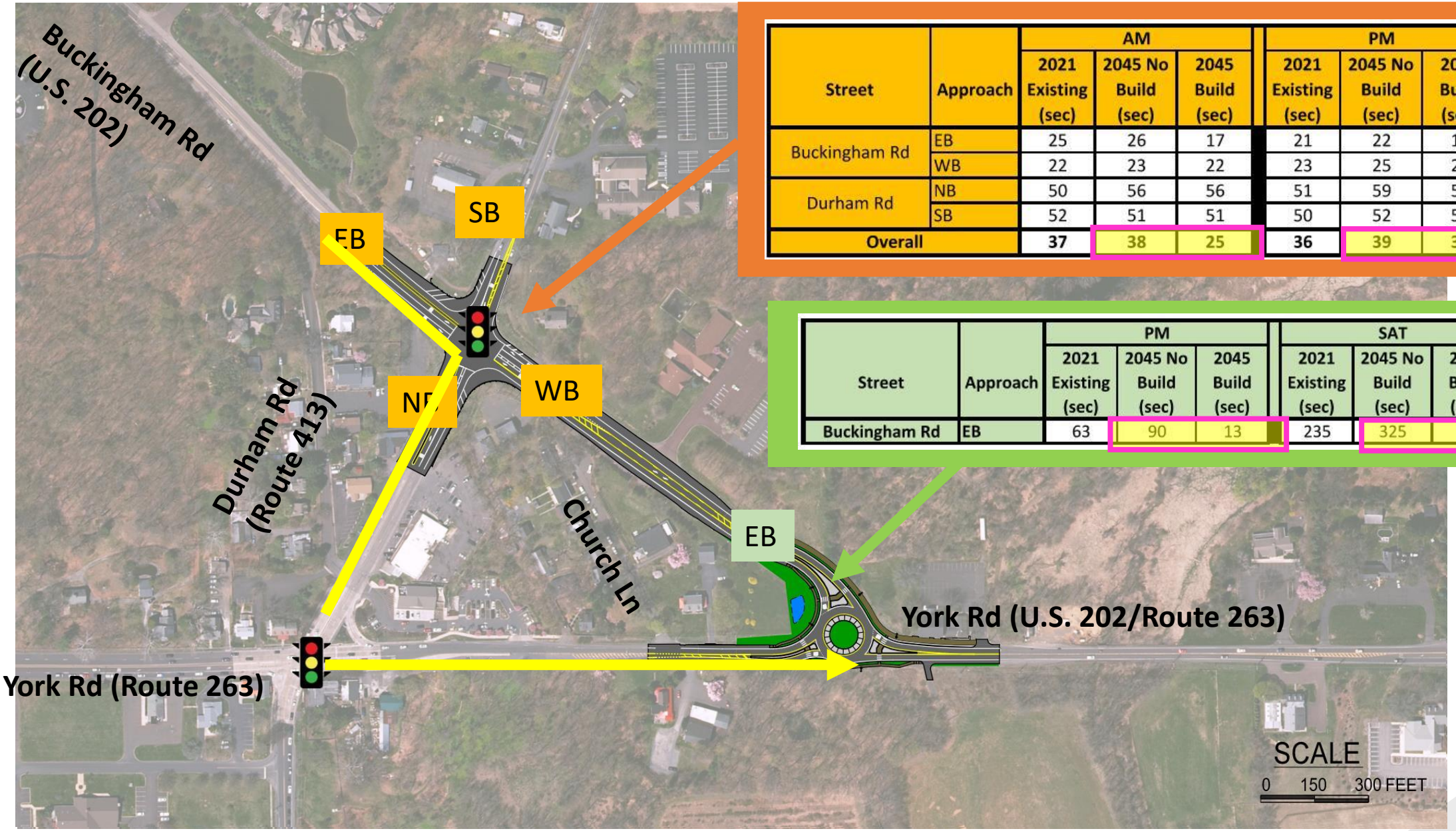
WB-62 with 53' Trailer

feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

Tractor Trailer navigating a roundabout in Milford Township, PA

OPERATIONS



Street	Approach	AM			PM		
		2021 Existing (sec)	2045 No Build (sec)	2045 Build (sec)	2021 Existing (sec)	2045 No Build (sec)	2045 Build (sec)
Buckingham Rd	EB	25	26	17	21	22	13
	WB	22	23	22	23	25	22
Durham Rd	NB	50	56	56	51	59	59
	SB	52	51	51	50	52	52
Overall		37	38	25	36	39	36

Street	Approach	PM			SAT		
		2021 Existing (sec)	2045 No Build (sec)	2045 Build (sec)	2021 Existing (sec)	2045 No Build (sec)	2045 Build (sec)
Buckingham Rd	EB	63	90	13	235	325	21

TRAFFIC SIMULATION

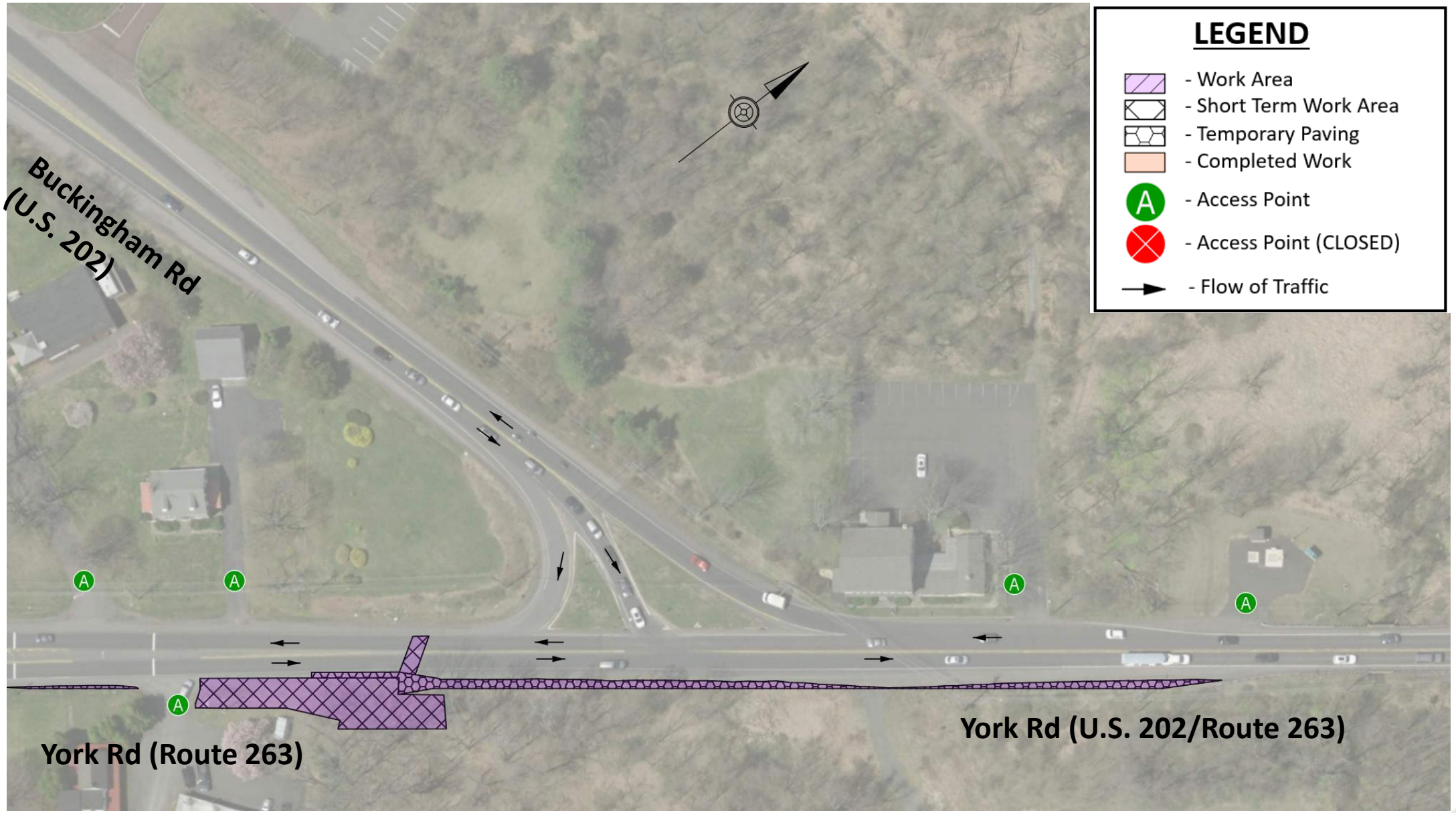
ROUNDABOUT EXAMPLES

LEGEND

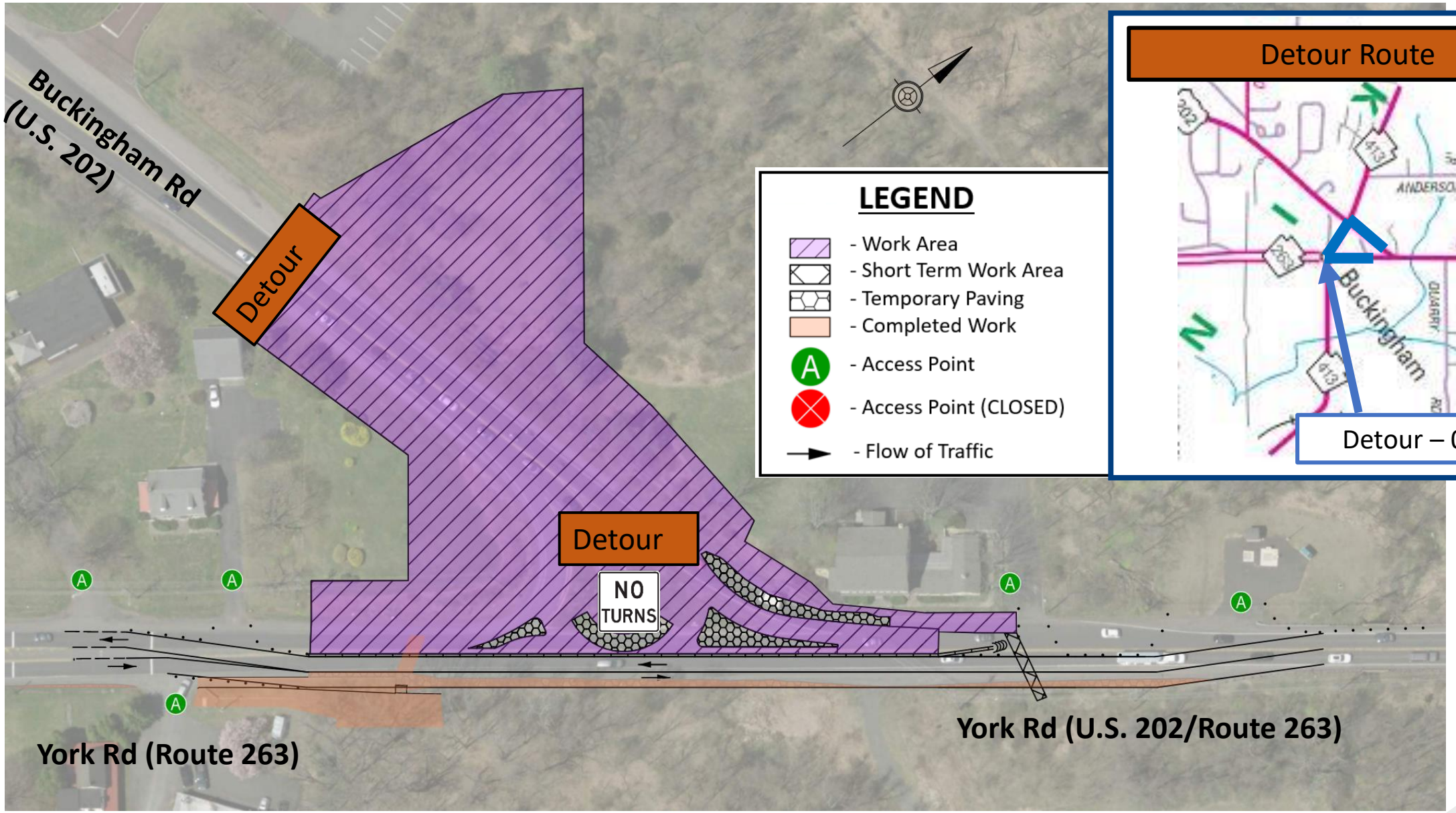
- IN CONSTRUCTION
- IN DESIGN
- COMPLETED

Source: Google

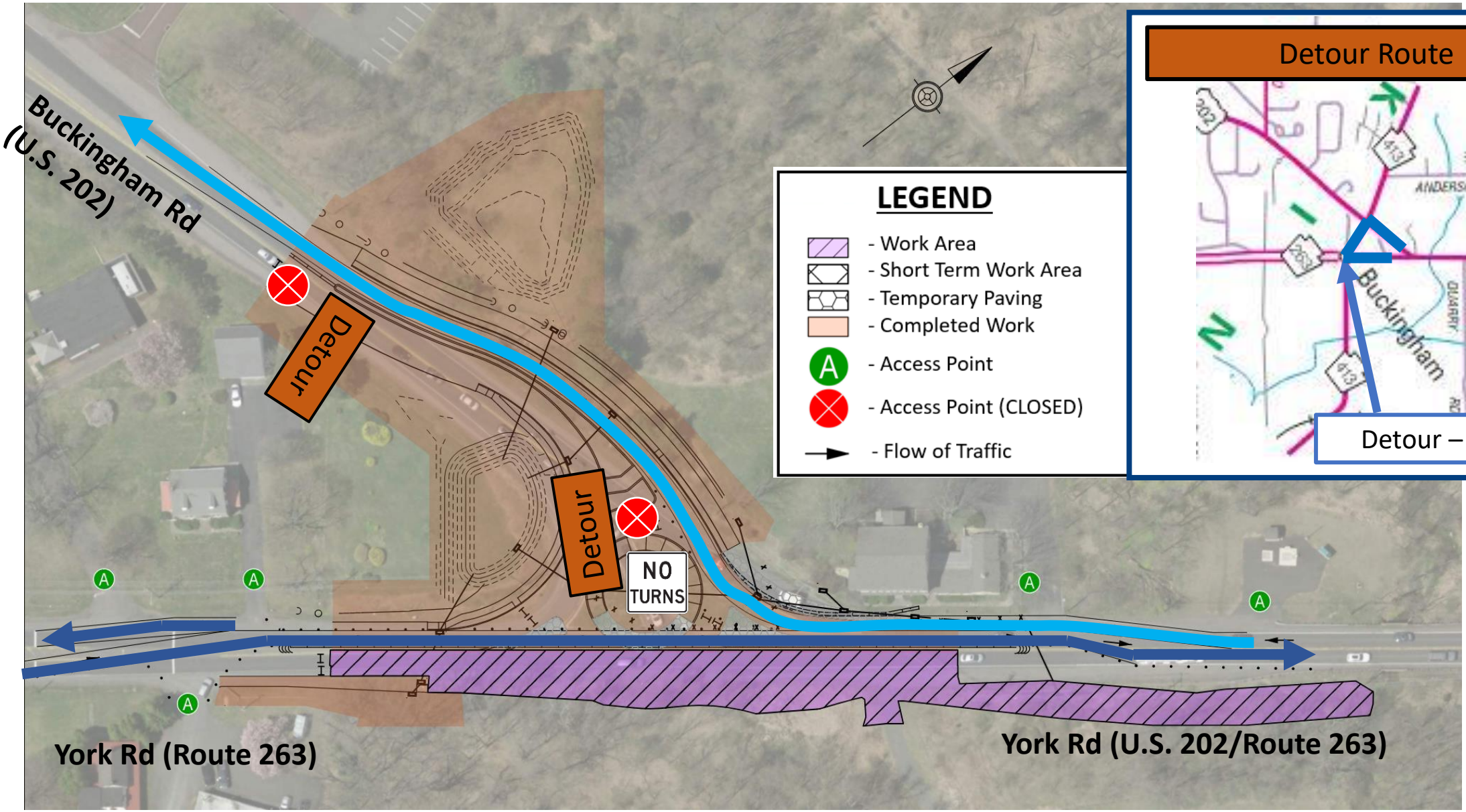
CONSTRUCTION - STAGE 1



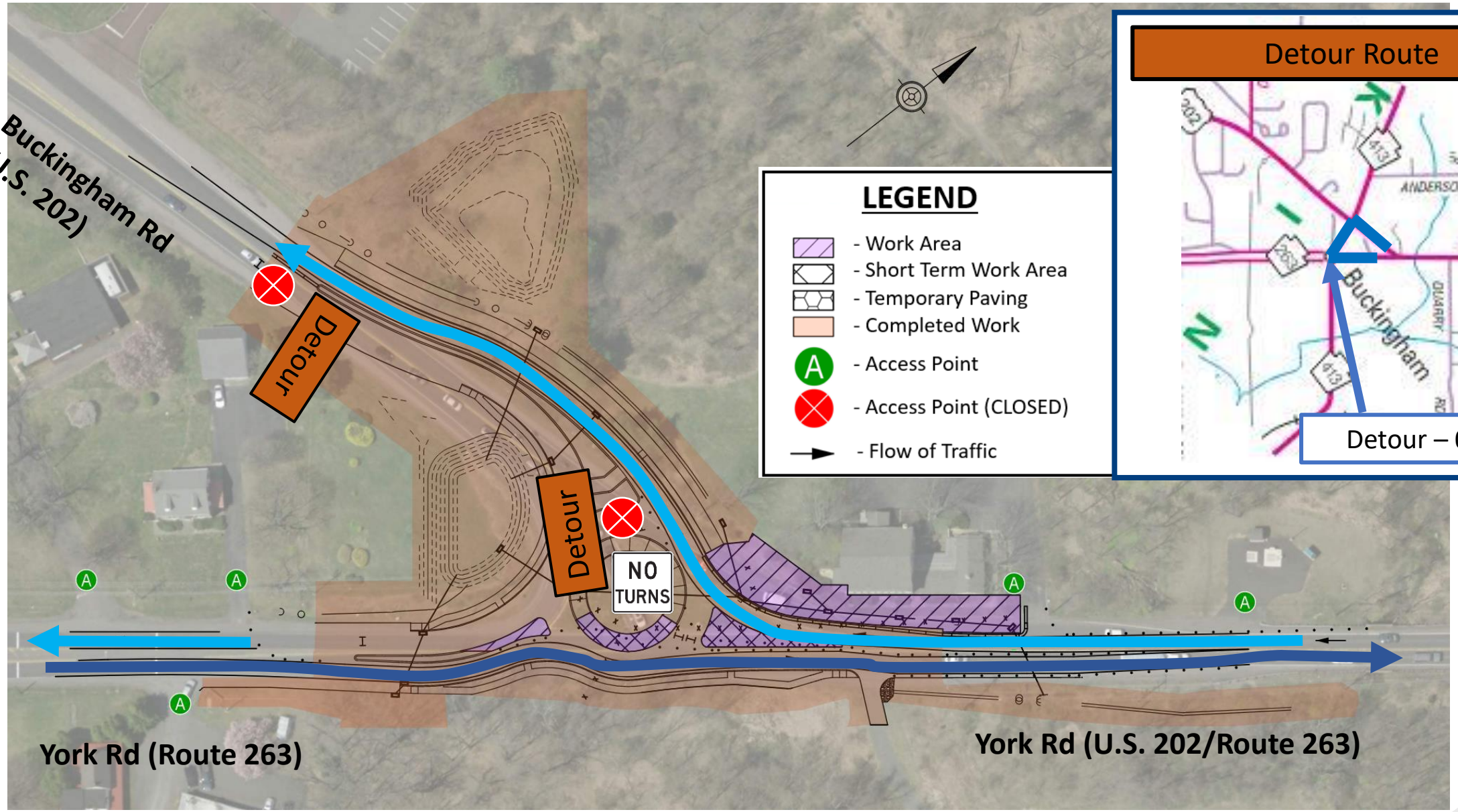
CONSTRUCTION - STAGE 2



CONSTRUCTION - STAGE 3

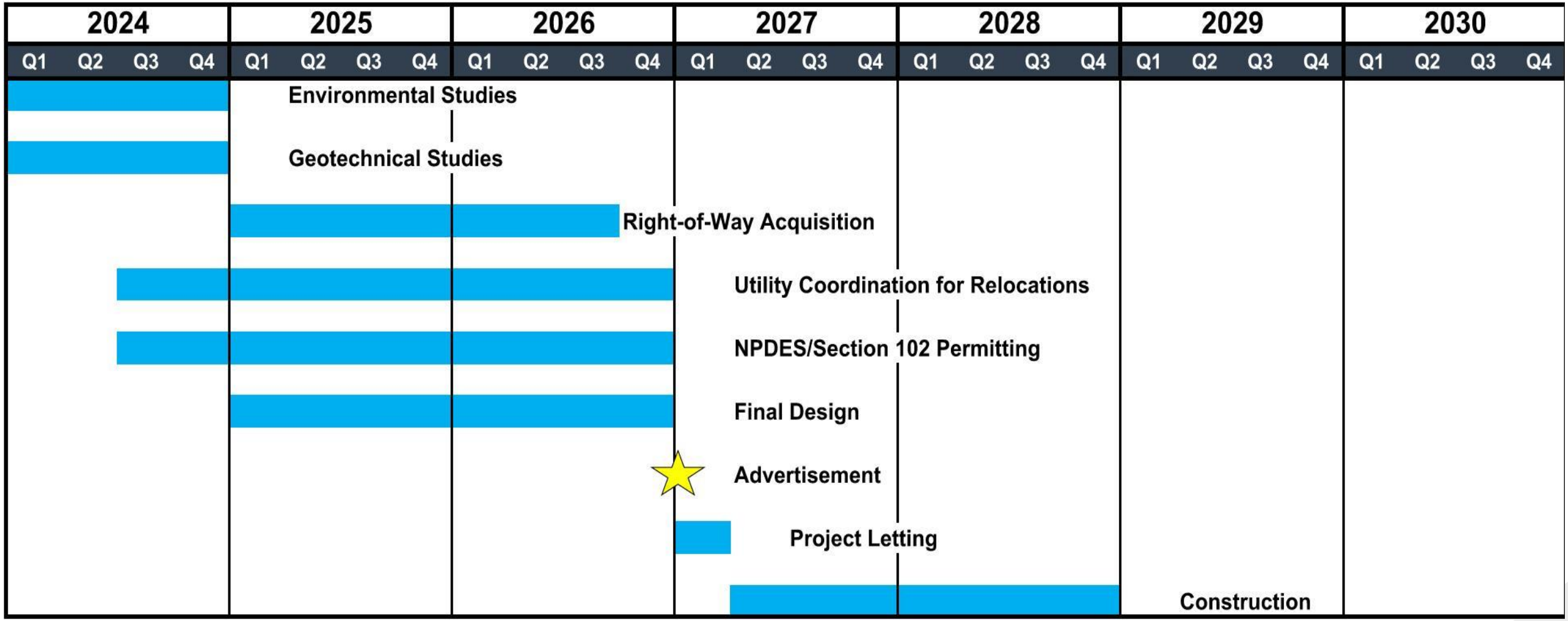


CONSTRUCTION - STAGE 4



PROJECT TIMELINE OVERVIEW

Upcoming Activities



QUESTIONS?

THANK YOU

Contact Information

Consultant Project Manager, Nathan Parrish, P.E.
c-nparrish@pa.gov

For more information about roundabouts:

https://www.penndot.pa.gov/ProjectAndPrograms/RoadDesignEnvironment/RoadDesign/Pages/Roundabouts.aspx

To comment, visit:

https://www.penndot.pa.gov/RegionalOffices/district-6/ConstructionsProjectsAndRoadwork/BucksCounty/Pages/U.S.-202-and-York-Road-Roundabout-Construction.aspx

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