PIK-23-13.72 (SR 104)

PIK-32 & SR 104 Safety Study

August 31, 2025

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I. Executive Summary

A. Purpose and Need

The purpose of this study is to analyze existing conditions and identify potential countermeasures to reduce crash frequency and severity at the intersection of SR 32 and SR 104. The study limits include the intersection of SR 32, SR 104, and approximately 1000 feet on each intersection approach.

ODOT District 9 Safety maintains a list of 4-lane highway, at-grade intersections and ranks each location based on crash criteria and intersection characteristics. As of August 2025, this intersection is currently ranked second on the list of locations without a project constructed or in design. Increased attention has been given to this intersection due to public complaints due to crashes and the severity of the crashes.

B. Overview of Safety Issues

Crash data was pulled from 2019 through 2023 from ODOT's crash database inside TIMS. There were 18 crashes within that 5-year period.

Of the 18 crashes, 10 crashes (55.6%) resulted in injuries. 1 crash resulted in a fatality and 2 crashes resulted in serious injuries. 12 of the 18 crashes (66.7%) were left turn/angle crashes. Crashes are proportionately distributed throughout the days of the week, along with time of day, with a small spike at 6PM. The intersection is signalized with protected turn phases. Regardless, this has not prevented left turn/angle crashes from occurring. Potential sight distance issues involving westbound traffic on SR 32, caused by the bridge east of the intersection may be causing SR 104 drivers false confidence to turn on red turn arrows.

C. Recommended Countermeasures

Based on the crash report investigation resulting in an angle/left turn crash pattern involving southbound SR 104 traffic being identified, an RCUT is being proposed at this intersection. The RCUT is expected to mitigate the primary crash pattern identified at the intersection. The estimated cost of the roundabout is $2,743,950. ECAT analysis shows a benefit-cost ratio of 0.11. It is believed that the ECAT Tool is underrepresenting the benefits of the RCUT alternative.

II. Purpose and Need

The purpose of this study is to analyze existing conditions and identify potential countermeasures to reduce crash frequency and severity at the intersection of SR 32 and SR 104. The study limits include the intersection of SR 32, SR 104, and approximately 1000 feet on each intersection approach.

ODOT District 9 Safety maintains a list of 4-lane highway, at-grade intersections and ranks each location based on crash criteria and intersection characteristics. As of August 2025, this intersection is currently ranked second on the list of locations without a project constructed or in design. Increased attention has been given to this intersection due to public complaints due to crashes and the severity of the crashes. A project location map is provided in **Figure 1.** A study area aerial is provided in **Figure 2**.

Figure 1: Project Location Map (Pike County outlined in red)

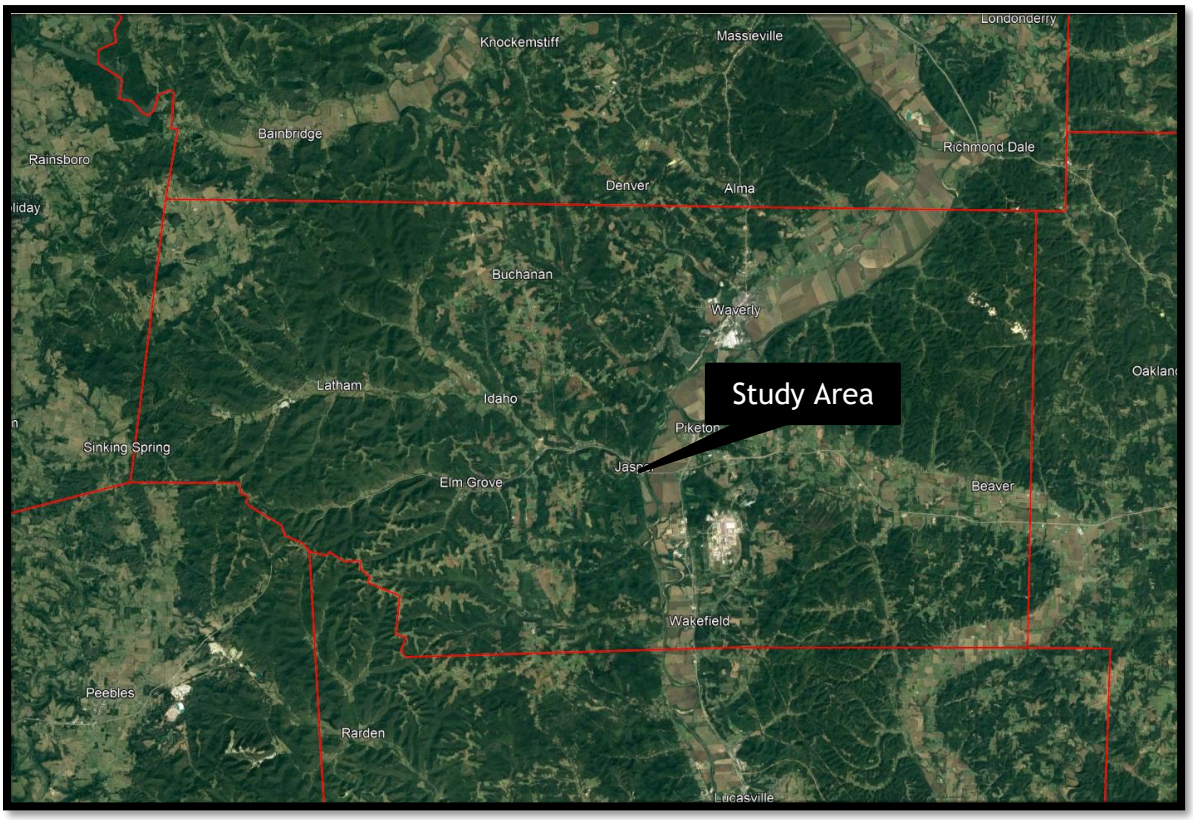
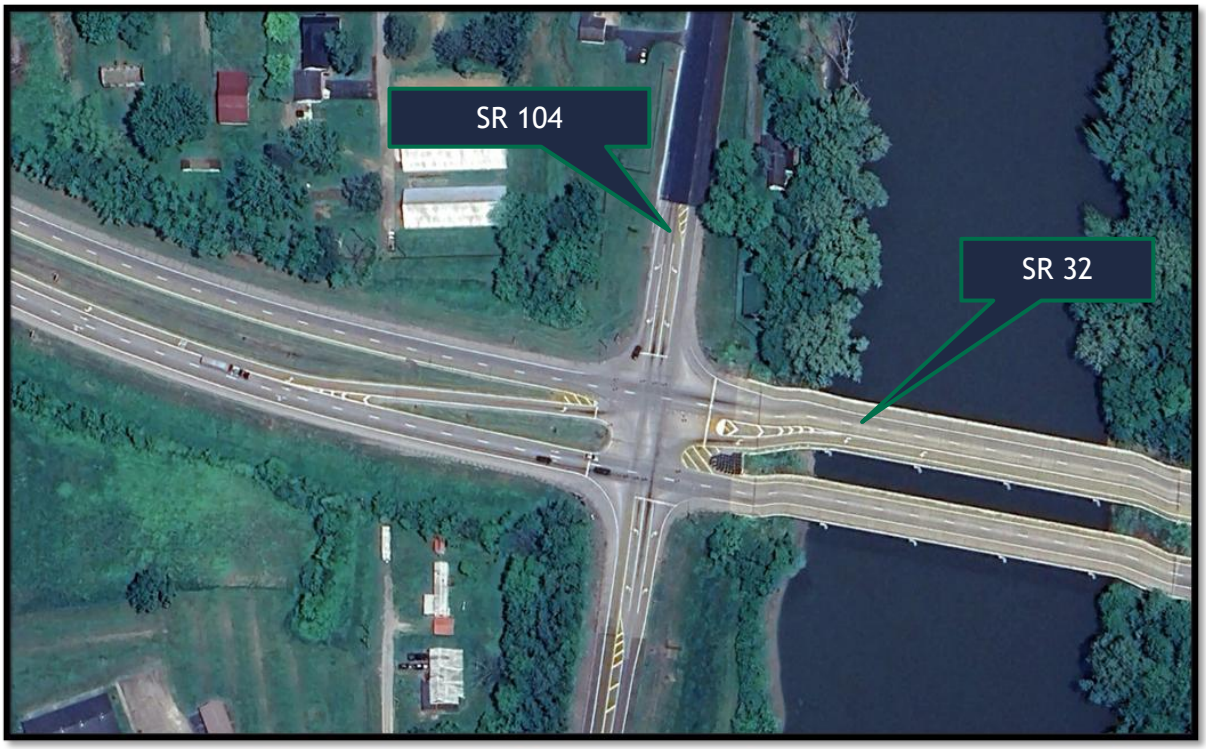


Figure 2: Study Area Aerial



III. Existing Conditions

A. Land Use

The study area is approximately 1.5 miles west of the village of Piketon on SR 32. The surrounding area of the study area includes undeveloped wooded and grassy space and residential housing, with the Scioto River just east of the intersection. Two culverts exist in the study area. Culvert ID 1975720 is a 229' long, 54" span culvert with a current appraisal rating of 7. The second culvert, Culvert ID 1810262 is a 98', 15" span culvert with a current appraisal rating of 7.

B. Roadway Conditions

SR 32 acts as an east-west connector throughout Ohio with an AADT of as high as 10,324 in locations along this corridor. SR 32 is classified as a Principle Arterial Other and has a posted speed limit of 60 MPH. This segment of SR 32 is a four-lane, divided, rural highway with 12-foot shoulders. Rumble strips are present at the outside edge lines in both directions.

SR 104 is classified as a Major Collector. The roadway is a two-lane rural roadway with a 4-foot paved shoulder along much of the corridor. Centerline and edge lines exist on the roadway. SR 104 serves a connector between Waverly and SR 32 and passes through the Lake White region.

C. Intersection Conditions

The intersection of SR 32 and SR 104 is a 4-leg, divided highway, rural intersection that is controlled by a signal. SR 104's southbound approach is a 3-lane approach with dedicated right, through, and left turn lanes. SR 104's northbound approach exhibits the same characteristics as SR 104's southbound approach. SR 32 has dedicated left turn lanes in both directions. The intersection connects just west to what appears to be a vertical curve that reaches its apex on the bridge structure east of the intersection. There is a horizontal curve west of the intersection. However, it is not believed that the curve is causing sight distance issues.

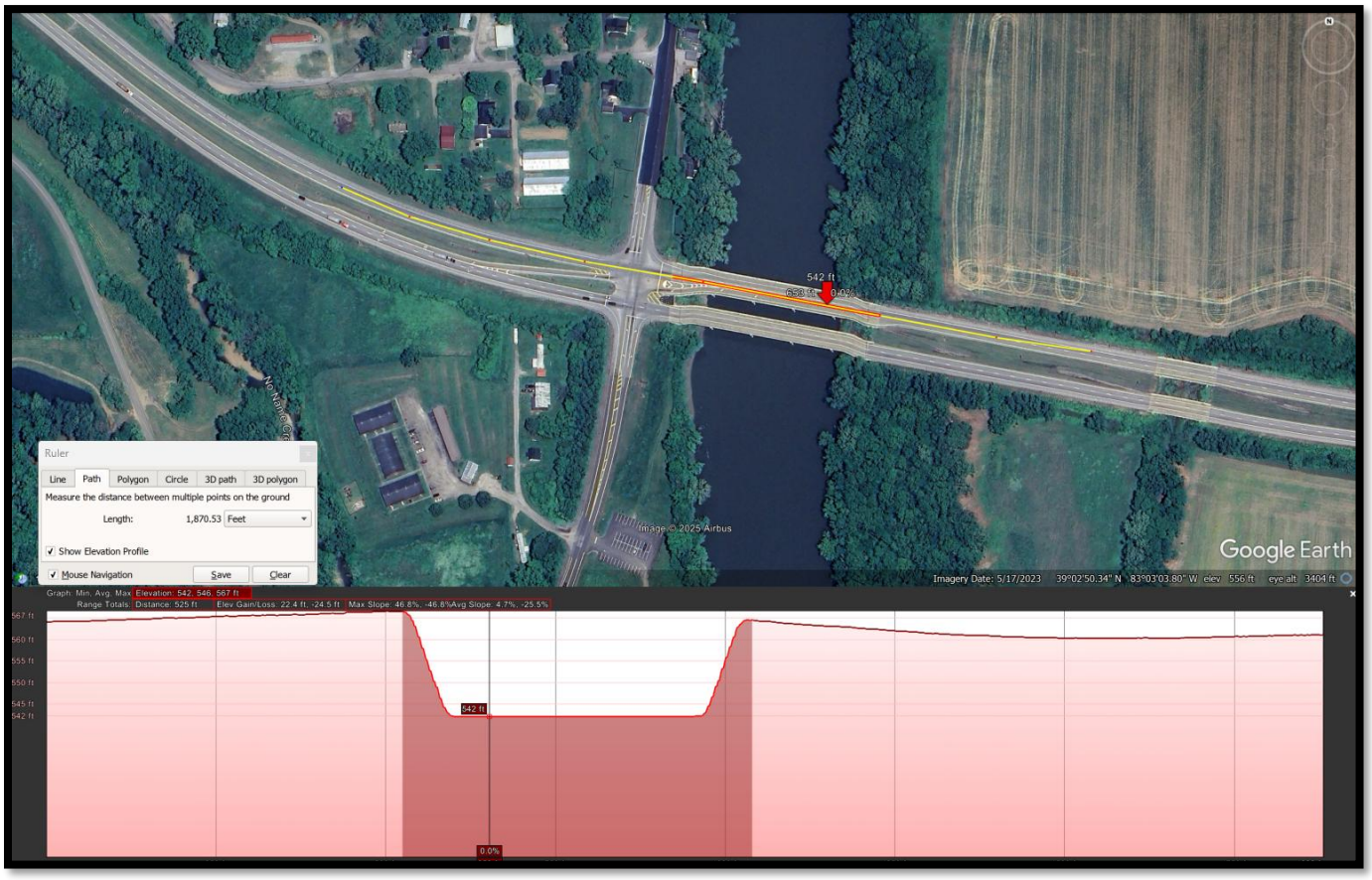
D. Data Collection

Existing data for the routes and the intersection was obtained through TIMS.

IV. Existing Conditions Analysis

Brief studies have been conducted at the intersection for nearly 20 years. This study was conducted as a result of a new public complaint regarding severe crashes at the intersection. Crash data shows a trend of left turn/angle crashes involving traffic on SR 104 and SR 32, even with the existence of the signal with protected-only turn phases. It is believed that the generally low off-peak traffic volumes on SR 32 and vertical curves in the roadway are causing a sense of false confidence in drivers to attempt left turning movements on SR 32 on phases with a red turn arrow. The presence of 3-lane approaches on SR 104 in both directions appears to be causing confusion for drivers on SR 104 regarding right-of-way when turning. **Figure 3** the elevation profile of SR 32 along the study area. While Google Earth does not capture the elevation of bridge structure, the apex of the vertical curve can be approximated looking at the rest of the elevation profile.

Figure 3: SR 32 Elevation Profile



V. Crash Data

Crash data was pulled from 2019 through 2023 from ODOT's crash database inside TIMS. There were 18 crashes within that 5-year period.

Of the 18 crashes, 10 crashes (55.6%) resulted in injuries. 1 crash resulted in a fatality and 2 crashes resulted in serious injuries. 12 of the 18 crashes (66.7%) were left turn/angle crashes. Crashes are proportionately distributed throughout the days of the week, along with time of day, with a small spike at 6PM. The intersection is signalized with protected turn phases. Regardless, this has not prevented left turn/angle crashes from occurring. Potential sight distance issues involving westbound traffic on SR 32, caused by the bridge east of the intersection may be causing SR 104 drivers false confidence to turn on red turn arrows.

Table 1: Crash Statistics

Year	Crashes	%
2019	4	22.22%
2020	2	11.11%
2021	4	22.22%
2022	3	16.67%
2023	5	27.78%
Grand Total	18	100.00%

Crash Type	Crashes	%
Left Turn	7	38.89%
Angle	5	27.78%
Fixed Object	3	16.67%
Rear End	2	11.11%
Sideswipe - Passing	1	5.56%
Grand Total	18	100.00%

Crash Severity	Crashes	%
(1) Fatal	1	5.56%
(2) Serious Injury Suspected	2	11.11%
(3) Minor Injury Suspected	7	38.89%
(5) PDO/No Injury	8	44.44%
Grand Total	18	100.00%

Hour of Day	Crashes	%
6	1	5.56%
7	1	5.56%
10	1	5.56%
11	1	5.56%
12	1	5.56%
13	2	11.11%
14	1	5.56%
16	1	5.56%
17	1	5.56%
18	3	16.67%
19	1	5.56%
20	1	5.56%
21	1	5.56%
22	1	5.56%
23	1	5.56%
Grand Total	18	100.00%

Unit 1 Contributing Factor	Crashes	%
Failure to Yield	9	50.00%
Ran Red Light	3	16.67%
Following Too Closely/ACDA	2	11.11%
Drove off Road	2	11.11%
Swerving to Avoid	1	5.56%
Not Discernible	1	5.56%
Grand Total	18	100.00%

VI. Recommended Countermeasures

A. Recommended Alternative

Based on the crash report investigation resulting in an 66.7% left turn/angle crash pattern being identified, an RCUT proposed at this intersection. RCUTs have been shown to reduce the serious crash types involving median crossing movements for side street traffic. Given the serious crash types observed at the intersection, it is believed that an RCUT is the best solution to the crash pattern observed.

A traditional 4-lane, divided highway intersection has 42 total conflict points, including 24 crossing points, 10 merge points, and 8 diverge points. The RCUT configuration proposed reduces those conflict points down to 20. Those 20 conflict points include 2 crossing points, 9 merge points, and 9 diverge points. **Figure 4** shows the proposed layout of the RCUT configuration. **Figure 5** shows the conflict points of a traditional 4-lane, divided highway intersection. **Figure 6** shows the conflict points of an RCUT configuration.

Figure 4: Proposed RCUT Layout

Figure 5: Traditional 4-Lane, Divided Highway Conflict Points

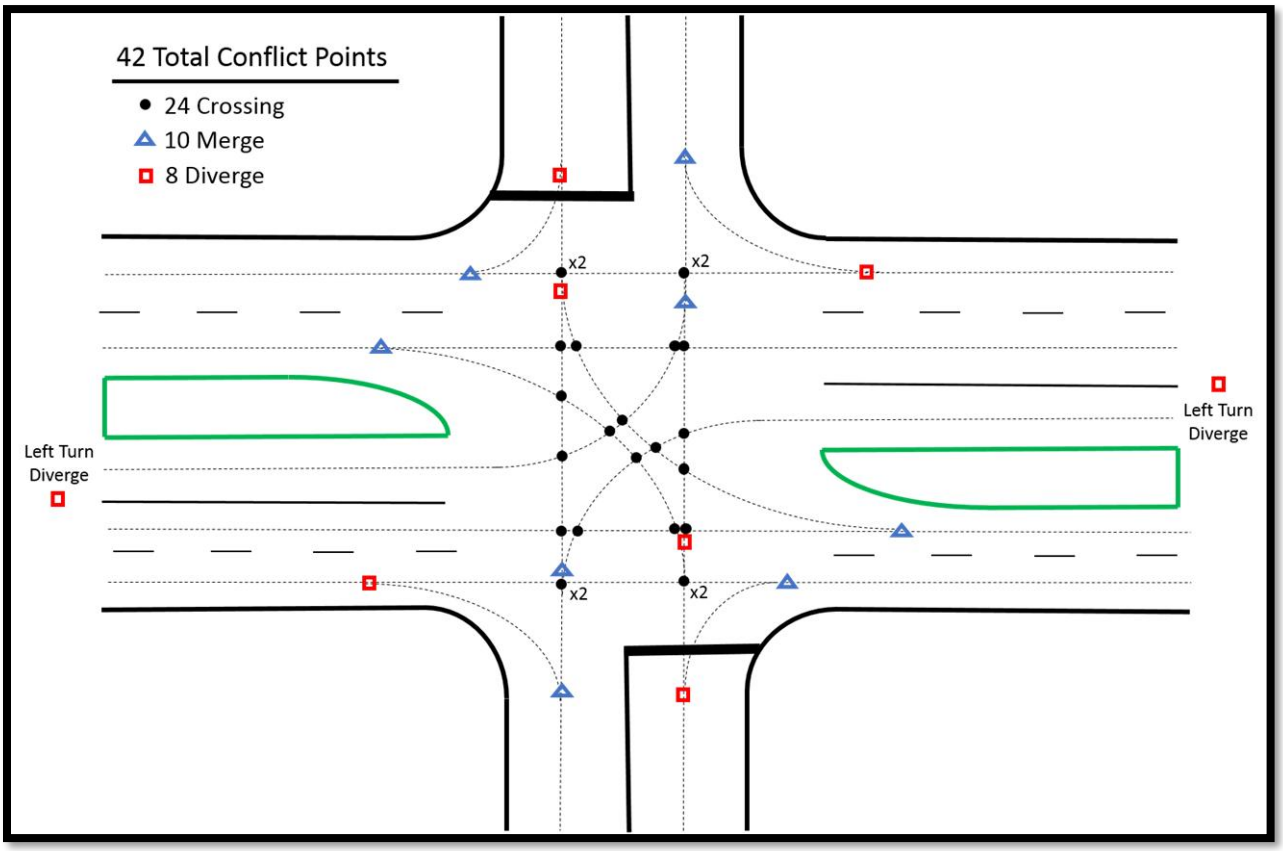
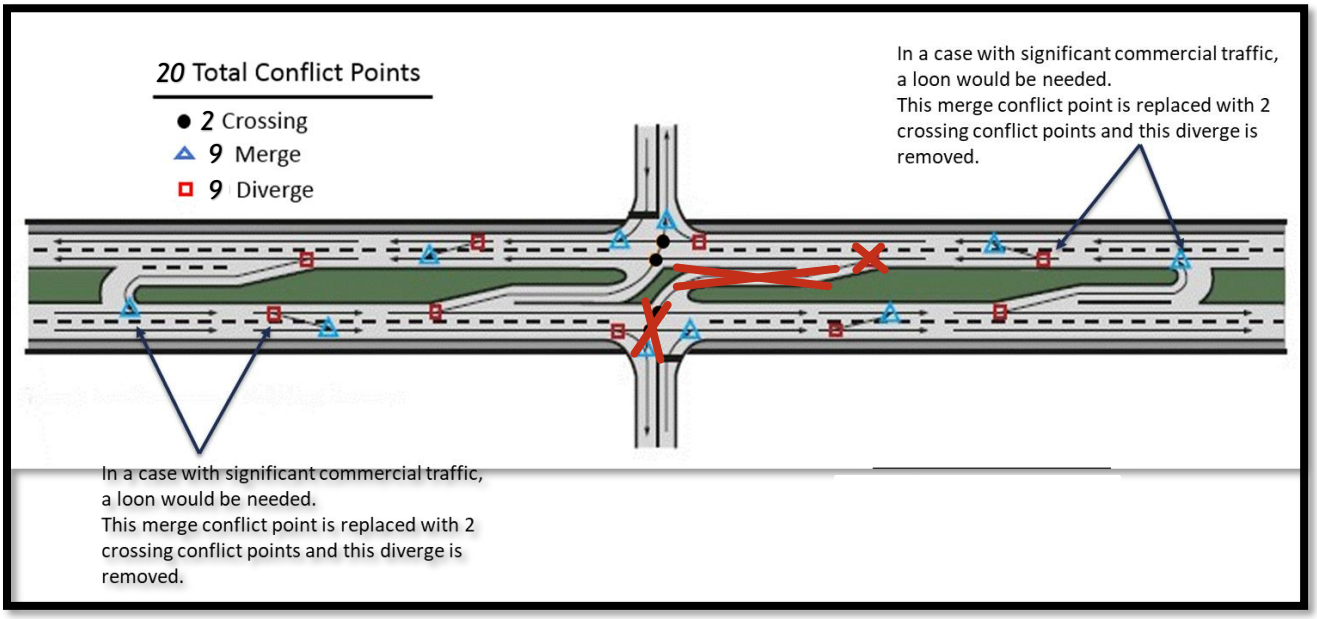


Figure 6: RCUT Conflict Points



The estimated cost of the RCUT is $2,743,950. ECAT analysis shows a benefit-cost ratio of 0.11. It is believed that ECAT analysis is underrepresenting the safety benefits of the RCUT. Although the benefit-cost ratio from ECAT is 0.11, it is still believed the RCUT is the best alternative to address the crash types observed.

B. Alternatives Considered

Given the crash trends and sight distance issues involving eastbound SR 32 traffic, a Turbo Lane was also considered. It is believed that the RCUT and Turbo Lane configurations would both address the crash trends observed at the intersection. Both RCUT and Turbo Lane configurations exist on this corridor of SR 32 within 7 miles of the intersection, providing two alternatives that drivers in the area would already be familiar with. However, after investigating traffic shifts for the Turbo Lane configuration, it was discovered that traffic on SR 104 northbound, that would have their access restricted, would be detoured up to 3 miles. For this reason, the Turbo Lane was ruled out.

Two additional RCUT layouts were investigated but required widening of the bridge structures to the east. Widening these structures would drastically increase the scope of an RCUT project. The widening of these bridge structures also came with a significantly higher cost for the overall RCUT project. For these reasons, RCUT layouts involving bridge widening were ruled out.