THE CITY OF COLUMBUS
ANDREW J. GINTHER, MAYOR

CARPENTER MARTY transportation

Renner-Trabue-McKinley (RTMC) Mobility Study

Final Report
December 22, 2023

6612 Singletree Drive
Columbus, OH 43229
614.656.2424
www.cmtran.com

THE CITY OF COLUMBUS
ANDREW J. GINTHER, MAYOR

CARPENTER MARTY transportation

Table of Contents

List of Tables

List of Figures

List of Appendices

I. Background - Project History

Carpenter Marty Transportation (CM) was retained by the City of Columbus to complete the Renner Road/Trabue Road/McKinley Avenue Corridor (RTMC) Mobility Study. The RTMC forms a route from the west side of Columbus to Franklinton/Downtown. It services many communities including Rush Creek, Marble Cliff Crossing, San Margherita, Scioto Woods, Golfview Woods, Brookhollow, and Trabue Woods. These areas have a wide range of land uses such as residential, light and heavy industrial, recreational, warehousing, retail, and heavy railroad use. The RTMC is critical to these areas due to the connectivity it provides to US-33, IR-70, and IR-670 which sequentially provide access to the remaining local, state, and national vehicular transportation system in the area.

A project location map is provided in **Figure 1.** A study area map is provided in **Figure 2**.

Figure 1 - Project Location Map (Franklin County outlined)

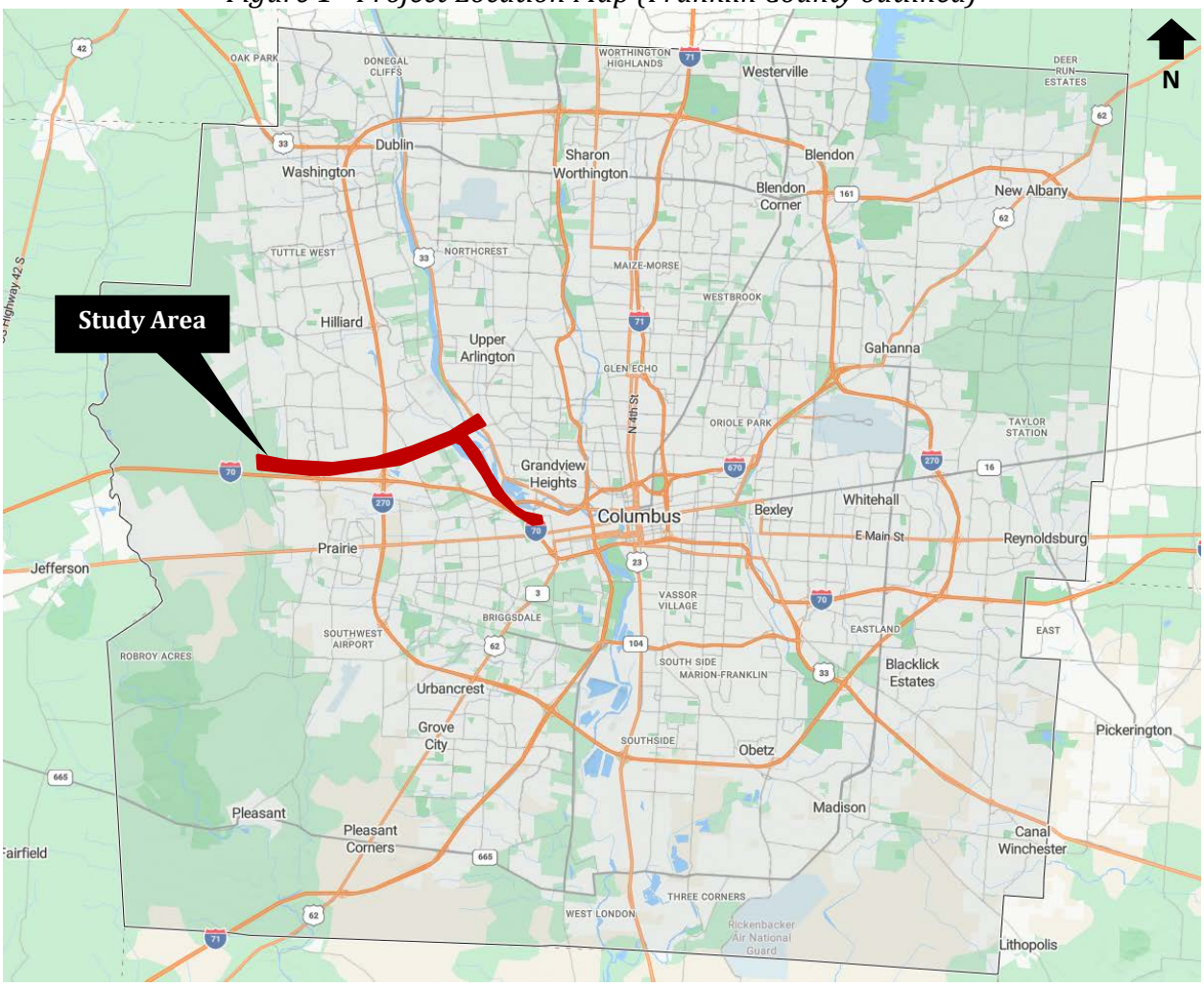
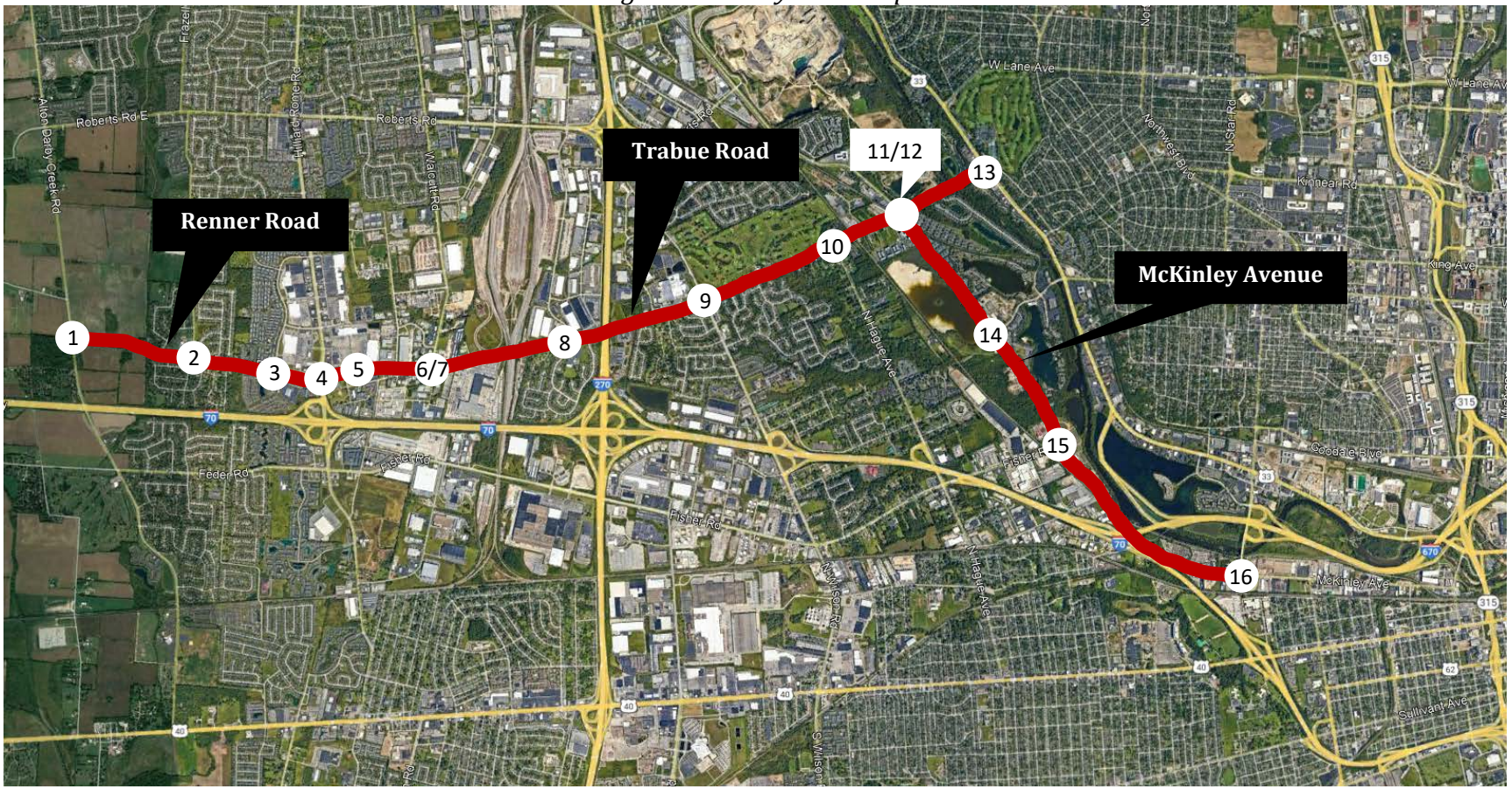


Figure 2 – Study Area Map



Red line = RTMC
White dots = study intersections with numbers corresponding to Table 6

II. Purpose and Need

The RTMC is under significant development pressure, bringing additional traffic to the corridor. People who use and live along the RTMC have expressed concerns. The Sugar Farms development, near Renner Road on the west side of the City, and the Cover My Meds development in Franklinton bookend the RTMC. Along the corridor, there are several developments in various stages of planning, zoning, and (re)development. Several mixed-use developments of significant size are occurring near the center of the RTMC. Over the years, other significant corridor developments have occurred, such as the UPS facility.

Due to residents' mobility concerns sparked by development pressures in the corridor (the need), the City of Columbus undertook a mobility study of the RTMC. This study analyzed past planning efforts, current/future mobility conditions, and public input to identify areas lacking satisfactory mobility, and developed solutions to improve mobility (the purpose).

III. Goals and Objectives

The first step of the mobility study process was to establish goals and objectives for the project. Through coordination with the City of Columbus and stakeholder group (described later), the following goals and objectives were developed for the project:

- Improve mobility in the RTMC
- Maximize economic vitality
- Improve health and safety
- Improve access to employment

These goals and objectives were developed to aid the project team through the study process. The results from the study will bring forward short and long-term, implementable solutions, for the corridor.

IV. Previous and Planned Efforts

CM was provided a comprehensive list of planned developments/projects within the corridor ranging as far back as 2016. The planned developments and improvement projects have been summarized in a separate document found in **Appendix A**.

Figure 2 shows a map of the corridor. An exhibit showing the locations and development types of all planned developments in the area is also provided in **Appendix A**. Developments range from multifamily residential to industrial/warehousing. Improvement projects not related to private development have been focused on bridge rehabilitation of Trabue Road over the Norfolk Southern Railroad. A shared-use path project was also proposed for the south side of Trabue Road, which was only partially implemented. The development summary describes the types of developments proposed and/or constructed in the RTMC and any roadway improvements associated with them.

The following planned infrastructure improvements are assumed to be in place by the 2045 design year:

- Bloomington Boulevard/Tanglewood Park Boulevard & Renner Road
  - Add westbound drop right turn lane
- Hilliard-Rome Road & Renner Road
  - Add second eastbound through lane
  - Add second eastbound right turn lane
  - Add westbound through lane
  - Add second northbound left turn lane
- Rentra Drive/Westpoint Plaza Drive & Renner Road
  - Add eastbound right turn lane
- Riverside Drive & Trabue Road/Cambridge Boulevard
  - Extend eastbound left turn lane length from 630' to 1000'

V. Demographics

A thorough study of area demographics was conducted. Understanding factors affecting the health, safety, and welfare of the RTMC communities is important when conducting a mobility study. Demographic data was obtained via a public survey (described later), census data, and StreetLight data. A summary of the demographics review is described below. The full demographics data can be found in **Appendix B**.

StreetLight software was used to obtain demographic data for the corridor. This software uses cellphone location data to determine the number of vehicles that pass through or stop in user-defined zones. Zones were set on signalized intersection approaches within the RTMC. To obtain demographic information, StreetLight infers a general home location for each device based on travel patterns. This location is then attributed to a census block, from which the demographic information is gathered from US Census data.

Streetlight demographic data is broken into four segmentations:

1. Residents within the zone identified (the census blocks)
2. Workers within the zone
3. Visitors to the zone
4. Combination of all three (resident, worker, or visitor – anyone driving through the corridor)

Traveler attributes including level of education, family status, household income, and race are produced by StreetLight for each segmentation. Results for these attributes are output as percentages. **Tables 1-4** summarize the results of the traveler attributes for the combined segmentation (residents, workers, or visitors). Outputs for all attributes and segmentations are provided in **Appendix B**.

Table 1 – Education of Head of Household

Education Level	No HS Diploma	HS Diploma	Some College	Bachelor's Degree	Graduate Degree
Percent of Population	10.31%	27.17%	26.60%	23.55%	12.38%

Table 2– Family Status

Family Status	With Kids	With No Kids	With Kids under 6 years old	With Kids between 6-17 years old
Percent of Population	36.99%	63.01%	17.39%	27.56%

Table 3 – Income Range

Income Range	<$20k	$20-35k	$35-50k	$50-75k	$75-100k	$100-125k	$125-150k	$150-200k	>$200k
Percent of Population	15.41%	14.16%	13.95%	20.86%	13.48%	8.94%	5.30%	4.27%	3.63%

Table 4 - Race

Race	White	Black	Indian	Asian	Islander	Other Race	Multiple Races	Hispanic
Percent of Population	82.32%	8.26%	0.21%	4.21%	0.08%	2.40%	2.52%	4.73%

In addition to the traveler attributes seen above, StreetLight also provided a breakdown of the 'home' location of travelers and the 'work' location of travelers used in the analysis. These visualizations can be seen in **Figure 3 and Figure 4**. The yellow dots shown in each figure represent the zones set along the RTMC to gather the data.

Figure 3 - Home (Green) Location Visualizations

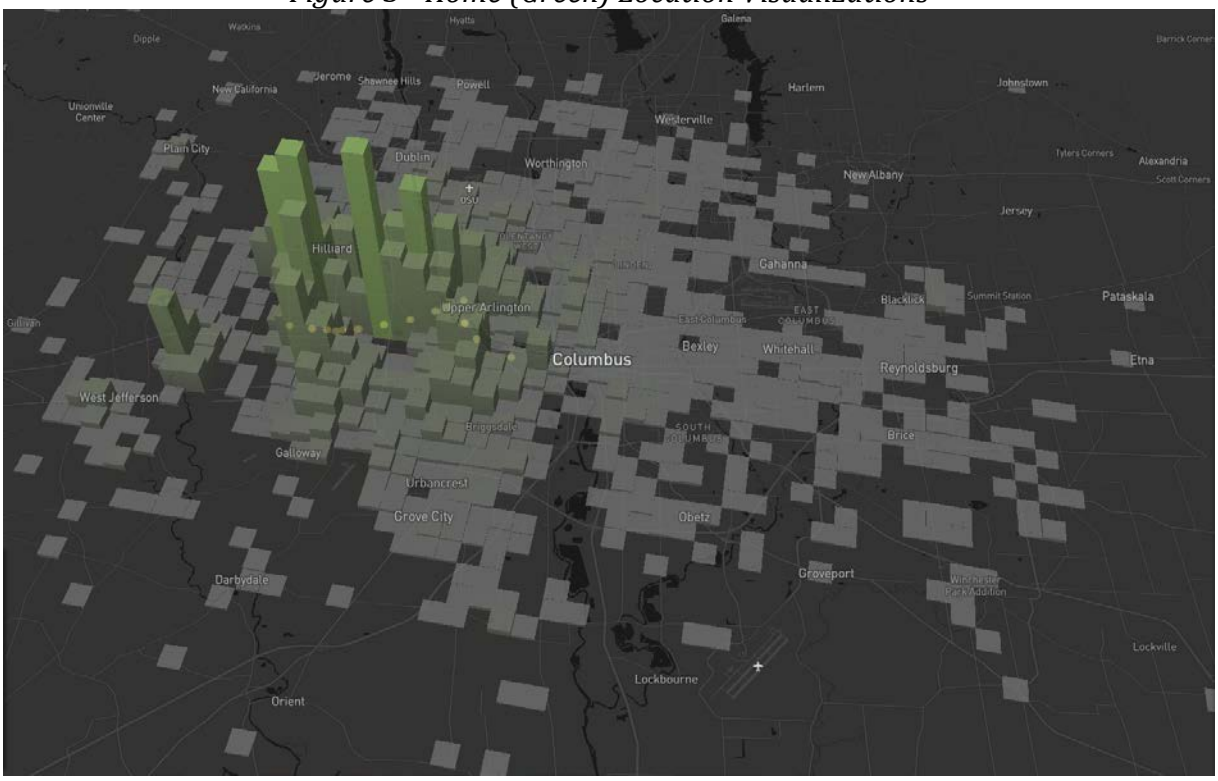
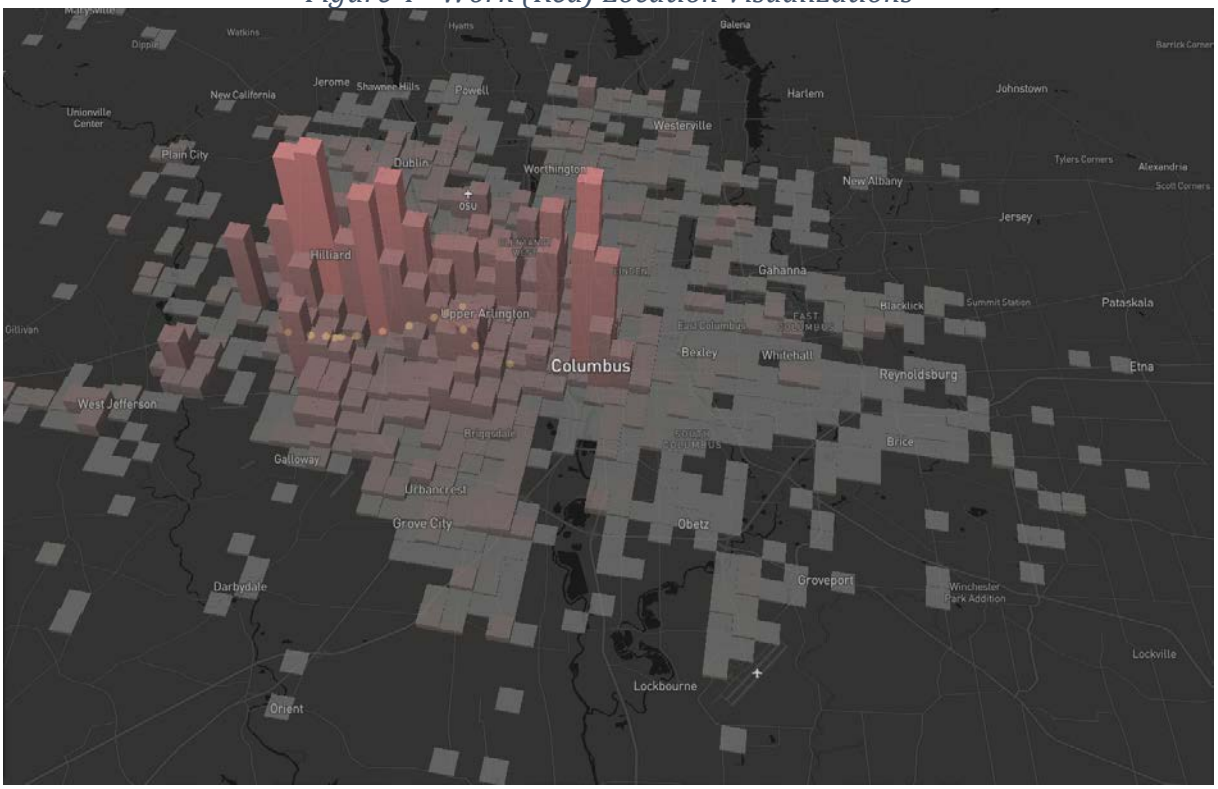


Figure 4 - Work (Red) Location Visualizations



VI. Existing Conditions Assessment

A. Existing Conditions Inventory

An initial assessment of the existing conditions of the area was developed to determine what mobility infrastructure is currently available in the RTMC. Map exhibits were developed for the entire corridor to show existing roadway classifications, intersections, sidewalks, pedestrian crossings, shared-use paths, bike lanes, and transit routes. The existing conditions exhibits can be found in **Appendix C**.

CM employees conducted a field inventory of base pavement conditions for the entirety of the study area in the summer of 2022. Overall, at the time of field review, the majority of the study area had fair pavement conditions. The most common pavement distress types (as identified in the ODOT Pavement Condition Rating System Manual) found in the study area are noted below with a brief description of the distress type. Example photos from the study area for each distress type can be seen in **Appendix C**.

- Patching – Replacing a small section of pavement or placing asphalt on top of existing pavement to repair small sections.
- Rutting – Depression of the wheel track as compared to the surrounding roadway.
- Potholes – Voids or depressions in the pavement surface at localized locations.

- Transverse Cracking – Cracking that occurs approximately perpendicular to the centerline of the roadway.
- Longitudinal Cracking – Cracking that forms parallel to the centerline of the roadway.
- Edge Cracking – Cracking found within 1 foot of the pavement edge line.

Additionally, it was noted that turn radii issues were present at several intersections and access points where high truck traffic was noted.

Figure 5 – Renner Road & W. St. James Lutheran Lane Southwest Corner (Eastbound to Southbound Turn)

Figure 6 – Renner Road & Walcutt Road Northwest Corner (Southbound to Westbound Turn)

Figure 7 – Renner Road & Walcutt Court Southeast Corner (Northbound to Eastbound Turn)

Figure 8 – Renner Road & UPS Western Access Northeast Corner (Northbound to Eastbound Turn)

B. Roadways

A summary of all roadways within the study area, as well as their classification and posted speed limit, can be seen in **Table 5**.

Table 5 - Summary of Roadways

Roadway	From	To	Classification	Posted Speed Limit (MPH)
Renner Rd	Alton Darby Rd	Spindler Rd	Urban Minor Arterial (4)	45
	Spindler Rd	Below Falls Pl	Urban Minor Arterial (4)	35
	Below Falls Pl	Hilliard Rome Rd	Urban Minor Arterial (4)	45
	Hilliard Rome Rd	Rentra Dr/ Westpointe Plaza Dr	Urban Minor Arterial (4)	45
	Rentra Dr/ Westpointe Plaza Dr	Walcutt Rd	Urban Minor Arterial (4)	45
	Walcutt Rd	Walcutt Ct	Urban Minor Arterial (4)	45
Trabue Rd	Walcutt Ct	Westbelt Dr/ Trabue Woods Blvd	Urban Minor Arterial (4)	45
	Westbelt Dr/ Trabue Woods Blvd	N. Wilson Rd	Urban Minor Arterial (4)	45
	N. Wilson Rd	Mapleway Dr/ N. Hague Rd	Urban Minor Arterial (4)	45
	Mapleway Dr/ N. Hague Rd	McKinley Ave	Urban Minor Arterial (4)	35
	McKinley Ave	Dublin Rd/ Marblevista Blvd	Urban Minor Arterial (4)	35
	Dublin Rd/ Marblevista Blvd	Riverside Dr	Urban Minor Arterial (4)	45
McKinley Ave	Trabue Rd	Quarry Lake Dr	Urban Minor Arterial (4)	40
	Quarry Lake Dr	W. 5th Ave	Urban Minor Arterial (4)	50
	W. 5th Ave	Fisher Rd	Urban Minor Arterial (4)	50
	Fisher Rd	Harrison Rd	Urban Minor Arterial (4)	45
	Harrison Rd	Grandview Ave	Urban Minor Arterial (4)	35
Alton Darby Rd	500' s/o Renner Rd	500' North of Renner Rd	Urban Minor Arterial (4)	45
Spindler Rd	500' s/o Renner Rd	Renner Rd	Urban Local (7)	25
	Renner Rd	500' n/o Renner Rd	Urban Major Collector (5)	35
Bloomington Blvd	500' s/o Renner Rd	Renner Rd	Urban Local (7)	25
Tanglewood Park Blvd	Renner Rd	500' n/o Renner Rd	Urban Local (7)	25
Hilliard Rome Rd	500' s/o Renner Rd	500' n/o Renner Road	NB: Urban Principal Arterial Other (3) SB: Urban Minor Arterial (4)	45
Rentra Dr	500' s/o Renner Rd	Renner Rd	Urban Local (7)	25
Westpointe Plaza Dr	Renner Rd	500' n/o Renner Rd	Urban Local (7)	25
Walcutt Rd	Renner Rd	500' n/o Renner Rd	Urban Major Collector (5)	45
Walcutt Court	Renner Rd	500' s/o Renner Rd	Urban Local (7)	25
Trabue Woods Blvd	500' s/o Trabue Rd	Trabue Rd	Urban Local (7)	25
Westbelt Dr	Trabue Rd	500' n/o Trabue Rd	Urban Local (7)	35
N. Wilson Rd	500' s/o Trabue Rd	Trabue Rd	Urban Minor Arterial (4)	45
	Trabue Rd	500' n/o Trabue Rd	Urban Minor Arterial (4)	35
N. Hauge Rd	500' s/o Trabue Rd	Trabue Rd	Urban Major Collector (5)	45
Mapleway Dr	Trabue Rd	500' n/o Trabue Rd	Urban Local (7)	25
Marblevista Blvd	500' s/o Trabue Rd	Trabue Rd	Urban Local (7)	25
Dublin Rd	500' n/o Trabue Rd	Trabue Rd	Urban Minor Arterial (4)	45
Riverside Dr	500' s/o Trabue Rd/ Cambridge Rd	500' n/o Trabue Rd/ Cambridge Rd	Urban Principal Arterial Other (3)	45
Cambridge Rd	Riverside Dr	500' e/o Riverside Dr	Urban Major Collector (5)	25
W. 5th Ave	McKinley Ave	500' e/o McKinley Ave	Urban Minor Arterial (4)	25
Fisher Rd	500' w/o McKinley Ave	McKinley Ave	Urban Minor Arterial (4)	45
Grandview Ave	McKinley Ave	500' s/o McKinley Ave	Urban Minor Arterial (4)	35

C. Intersections

Table 6 below shows the study intersections analyzed in the corridor. **Figure 2** shows where these intersections are located throughout the study area.

Table 6 – Summary of Study Intersections

Intersection Number	East/West Roadway	North/South Roadway
1	Renner Road	Alton Darby Creek Road
2		Spindler Road
3		Tanglewood Park/Bloomington Boulevard
4		Hilliard Rome Road
5		Westpoint Plaza Drive/Rentra Drive
6	Trabue Road	Walcutt Road
7		Walcutt Court
8		Westbelt Drive/Trabue Woods Boulevard
9		N. Wilson Road
10		Mapleway Drive/N. Hague Avenue
11		McKinley Avenue
12		Dublin Road/Marblevista Boulevard
13		Riverside Drive
14	W. 5th Avenue	McKinley Avenue
15	Fisher Road	
16	McKinley Avenue	Grandview Avenue

D. Sidewalks & Pedestrian Infrastructure

A summary of sidewalk availability and pedestrian and transit infrastructure throughout the study area is provided in this section. For a graphical representation of these existing conditions, please see **Appendix C**.

Along Renner Road, there is currently a shared use path on the north side of Renner Road from Alton Darby Creek Road to the east edge of the VC Meadows site. There is then a gap in pedestrian infrastructure until a sidewalk begins along the north side of Renner Road from Valley Crest Drive to Whispering Willow Lane. Marked crossings at Spindler Road provide crossing access, but the crosswalks do not connect into any pedestrian infrastructure on the south side of Renner Road.

An unmarked crossing at Whispering Willow Lane connects to a sidewalk south of Renner Road that runs along Gadston Way, which continues until just east of Bloomington Boulevard. The Bloomington Boulevard intersection provides marked crosswalks that access a sidewalk on the north side of Renner Road which terminates just west of Hilliard Rome Road, at the McDonald's access. Some sidewalk also exists on the south side of Renner between the two legs of Keim Circle.

The Hilliard Rome Road intersection provides marked crossings on all but the south leg, providing access to the bus stops on the north and east legs of the intersections, but no

pavement for pedestrians to travel on. The same is true for the bus stops just east of Rentra Drive, where no pavement or marked crossing locations are provided for pedestrians.

East of Hilliard Rome Road, sidewalks are only sporadically included along site frontages, with no continuous routes available to pedestrians. Marked crossings are available at Walcutt Road and Walcutt Court, but do not connect into any continuous pedestrian routes along Trabue Road.

There is a long stretch of shared use path that begins along the site frontage of the UPS site, along the south side of Trabue Road. This shared use path terminates at Bolingbrook Drive. Bus stops are provided along the UPS frontage as well, but there is no marked crossing to access the bus stop on the north side of Trabue Road.

A gap in pedestrian infrastructure stretches from Bolingbrook Road to N. Wilson Road. This means there is no pavement or marked crossings provided to access the bus stops just east and west of Westbelt Drive. The same is true for the bus stops just east of Arlingate Lane and the one just west of Raspberry Run Drive. At the N. Wilson Road intersection, there are marked crossings on all four legs, and a small stretch of sidewalk along the site frontage of the development in the southeast corner of the intersection. That sidewalk provides access to the bus stop just east of the intersection. No pavement is available for the bus stop on the northwest corner of the intersection.

No sidewalk is provided from N. Wilson Road until the intersection with Mapleway Drive/N. Hague Avenue, where sidewalk along both the north and south sides of Trabue Road begins. This sidewalk provides access to the bus stops on the east leg of the intersection, however there are no marked crossings at the intersection to provide access to the other side of Trabue Road.

The sidewalk along the north and south side of Trabue Road provides access to the bus stops on the west leg of the McKinley Avenue intersection, and a marked crossing also allows for pedestrian crossings across the west leg of the intersection. The sidewalk on the north side of Trabue terminates at McKinley Avenue. The sidewalk on the south side of Trabue Road continues slightly east of McKinley Road until Marblevista Boulevard.

From Marblevista Boulevard until Riverside Drive, the termination point for Trabue Road, no sidewalks are present. However, the intersection of Lake Shore Drive provides a marked crossing of Trabue Road that provides access to shared use paths leading into the Quarry site.

McKinley Avenue provides some sidewalk on the west side of the road from Trabue Road to Angelo Joseph Lane. A bus stop is provided on the east side of McKinley Avenue, across from Angelo Joseph Lane, but there is no marked crossing provided to access it.

On the east side of McKinley Avenue, sidewalk begins just north of Angelo Joseph Lane and terminates at Quarry Lake Drive. Two bus stops are provided on either side of McKinley Avenue at Quarry Lake Drive, but no marked crossings are provided near this location.

There is then a gap in sidewalk until W. 5th Avenue, where sidewalk is present along the northeast corner of the intersection, however the sidewalk does not continue along

McKinley Avenue. A shared use path on the south side of W. 5th Avenue begins at this intersection as well. The W. 5th Avenue intersection provides marked crossings on the north and south legs of the intersection, but no pedestrian infrastructure is present on the west side of McKinley Avenue.

A marked crossing is present along the north leg of the McKinley Avenue & Harper Road intersection. The east side of the crossing connects to the Hilltop Connector shared use path, but the west side of the crossing does not connect into any pedestrian infrastructure.

From W. 5th Avenue to Grandview Avenue (the termination point of the study area), there is no sidewalk provided along McKinley Avenue. Marked crossings are present at the McKinley Avenue & Grandview Avenue intersection, but these crossings do not connect into any pedestrian infrastructure.

No dedicated bike lanes currently exist along Renner Road/Trabue Road or McKinley Road through the study area.

E. Transit Routing

The RTMC corridor is serviced by four total Central Ohio Transit Authority (COTA) lines. COTA Route 5 travels along Renner Road and Trabue Road with the western limit at Tanglewood Park Boulevard and an eastern limit of McKinley Avenue. COTA Route 73 travels along Riverside Drive on the east end of the study area. COTA Routes 21 and 71 travel along Hilliard-Rome Road. There are several stops along all major roadways. A summary of ridership data for each stop is provided in **Appendix D**.

There is one stop which provides shelter for riders, and it is located at the Renner Road Park and Ride. Based on the data provided by COTA, this stop has the highest utilization in the corridor. Bus stop accommodations are determined based on ridership and are handled by COTA.

F. Crash History

Crash data for the study area was obtained from ODOT Transportation Information Mapping System (TIMS) for three complete years of available data (2017-2019). A total of 579 crashes were obtained. OH-1 reports for the crashes were not reviewed and crash data was not cleaned. The data was plotted graphically in heat maps to be used to identify areas of concern. Heat maps were produced for several sub-sets of the crash data: all crashes, injury and fatal crashes, and pedestrian and bike crashes. These maps can be seen in **Appendix E**.

Based on the crash data pulled from TIMS, the intersections of Renner Road & Hilliard Rome Road and Trabue Road & N. Wilson Road were identified as areas of concern due to crash frequency and severity. There are no specific areas of concern that experience a high frequency of crashes involving pedestrians and cyclists. McKinley Avenue from just north of Lake Shore Drive to Fisher Road experienced two such crashes in the three-year period. All other such crashes were single-incident locations that are spaced away from other similar crashes.

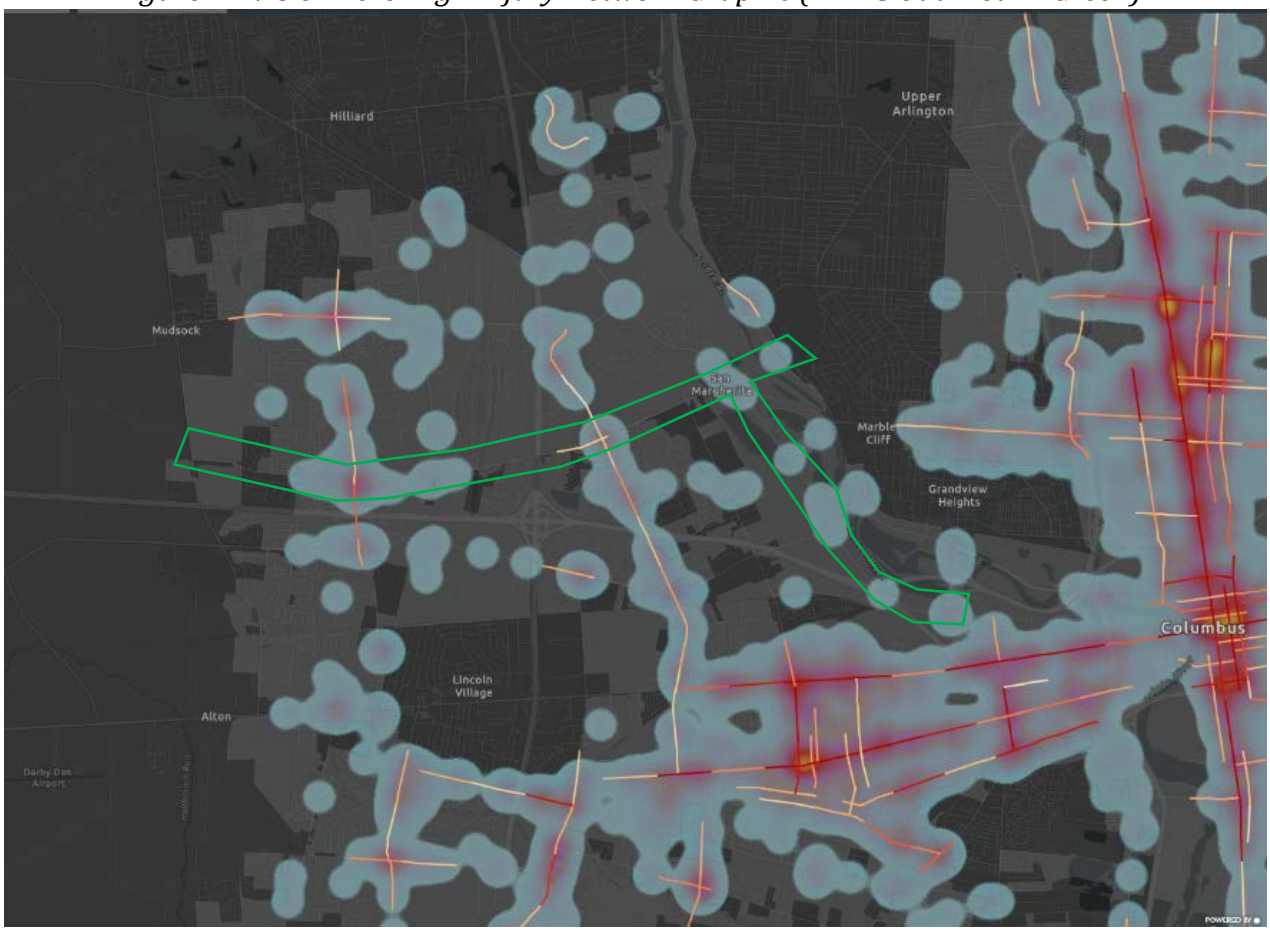
Roadway segments and intersections within the study area identified on ODOT and MORPC high-crash location lists are summarized as follows:

- ODOT State Fiscal Year (SFY) 2015 Safety Integrated Projects (SIP) Map for Franklin County Local Systems
  - Renner Road & Hilliard-Rome Road was identified as a high priority intersection
  - Trabue Road & Wilson Road identified as a high priority intersection
  - Almost the entire Renner Road/Trabue Road corridor from Alton & Darby Creek Road to Hague Avenue was identified as high priority segments
  - The McKinley Avenue corridor also had many segments identified as high priority segments from just south of Trabue Road to north of Fisher Road
- MORPC Top 100 Regional High-Crash Intersections (2015-2017)
  - Hilliard Rome Road & Renner Road intersection was identified as the fifth highest crash incident intersection on the list

Details regarding the high-crash locations can be found in **Appendix E**.

Columbus' Vision Zero initiative was also considered when reviewing crash history and areas for safety improvements. The Vision Zero Crash Data for High Injury Network is shown in **Figure 9**. This shows the RTMC has several locations with moderate crash density. The segment of Trabue Road from Trabue Frontage Road to Gilmore Park Avenue is also identified on the High Injury Network. This data further supports the crash data summarized above and the need for the RTMC and intersections of Renner Road & Hilliard Rome Road and Trabue Road & N. Wilson Road to be further studied.

Figure 9 - Vision Zero High Injury Network Graphic (RTMC Outlined in Green)



VII. Traffic Volumes

A. Origin-Destination (OD) Data

StreetLight software was utilized to conduct several OD analyses of the RTMC. OD data utilizes the relative amount of traffic that passes through a user-defined zone (the origin) and exits or passes through a separate zone (the destination) to map the top routes for the corridor. The data obtained includes the average daily traffic (ADT) from the entire year of 2019 for all vehicle classes as well as for trucks only. Zones were set on signalized intersection approaches within the RTMC. Separate output visuals were produced for top routes to and from the selected zone(s). Top routes for all vehicles to the entire RTMC are shown in **Figure 10** and from the RTMC are shown in **Figure 11**.

Note, the zones were set up as "pass-through" zones. So, this does not show vehicles that started or ended in the corridor. This shows vehicles where vehicles traveling through or in the corridor come from before they enter the corridor and where they go to after they leave the corridor. The figures show the majority of vehicles traveling to/from the RTMC travel to/from Alton & Darby Creek Road, Dublin Road, Riverside Drive, or I-70 east. Separate top route outputs for vehicles and trucks for each signalized intersection approach can be found in **Appendix F**.

Figure 10 – Top Routes to RTMC (yellow, lowest, to red, highest)

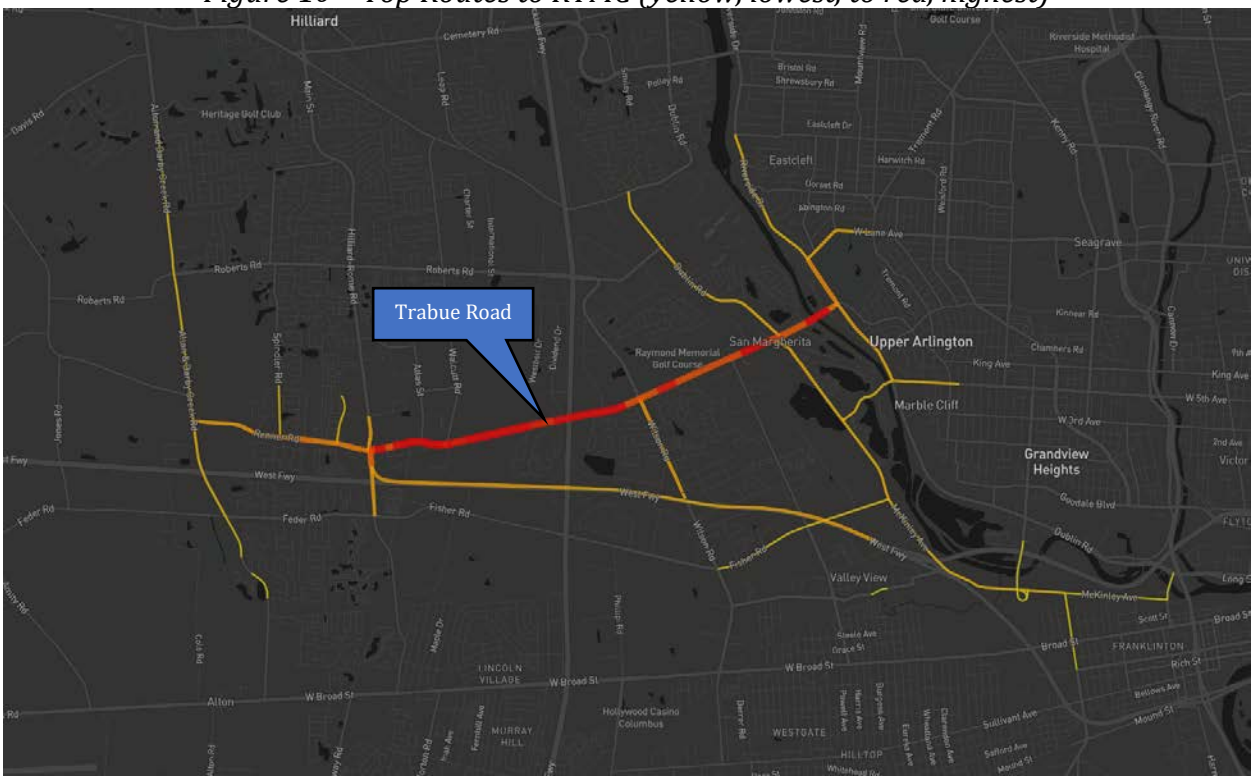
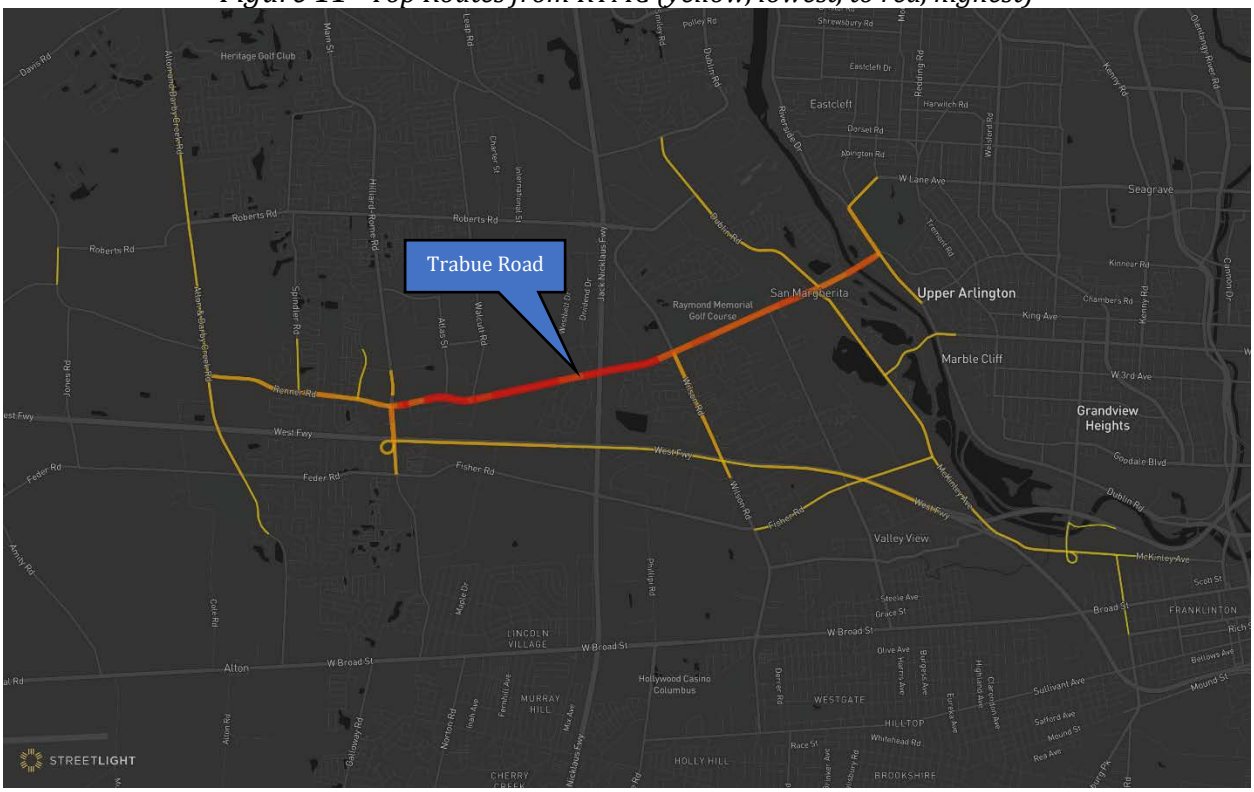


Figure 11– Top Routes from RTMC (yellow, lowest, to red, highest)



Top routes analysis for trucks shows a different distribution of origins and destinations compared to all vehicles. Trucks traveling to the RTMC originate from I-70 east and west, Riverside Drive, and to a lesser extent Alton & Darby Creek Road and Dublin Road. Trucks traveling from the RTMC utilize all of the same routes as those traveling to the RTMC, with the addition of a large amount traveling to I-270 south. Top routes analysis for trucks at individual intersections also displays more differences between top routes compared to other intersections, whereas the data with all vehicles generally shows common top routes for each intersection.

Top routes data was also obtained for the combination of all census blocks touching the RTMC. Results for the census block top routes shows a similar to/from distribution primarily utilizing I-270, I-70, I-670, Roberts Road, and Hilliard Rome Road. Outputs for the census block top routes can be found in **Appendix F**.

B. Data Collection

Turning movement count data was collected from 7-11 AM and 2-6 PM on a typical weekday (Tuesday-Thursday) in April 2022 while school was in session at the following study intersections. Note that the numbers refer to those seen in **Figure 2.**

1. Alton Darby Creek Road & Renner Road
2. Spindler Road & Renner Road
3. Tanglewood Park Boulevard/Bloomington Boulevard & Renner Road
4. Hilliard Rome Road & Renner Road

5. Rentra Drive & Renner Road
6. Walcutt Road/Walcutt Court & Trabue Road
7. Westbelt Drive/Trabue Woods Boulevard & Trabue Road
8. Wilson Road & Trabue Road
9. Hague Avenue/Mapleway Drive & Trabue Road
10. McKinley Avenue & Trabue Road
11. Dublin Road/Marblevista Boulevard & Trabue Road
12. Riverside Drive & Trabue Road
13. W. 5th Avenue & McKinley Avenue
14. Fisher Road & McKinley Avenue
15. Grandview Avenue & McKinley Avenue

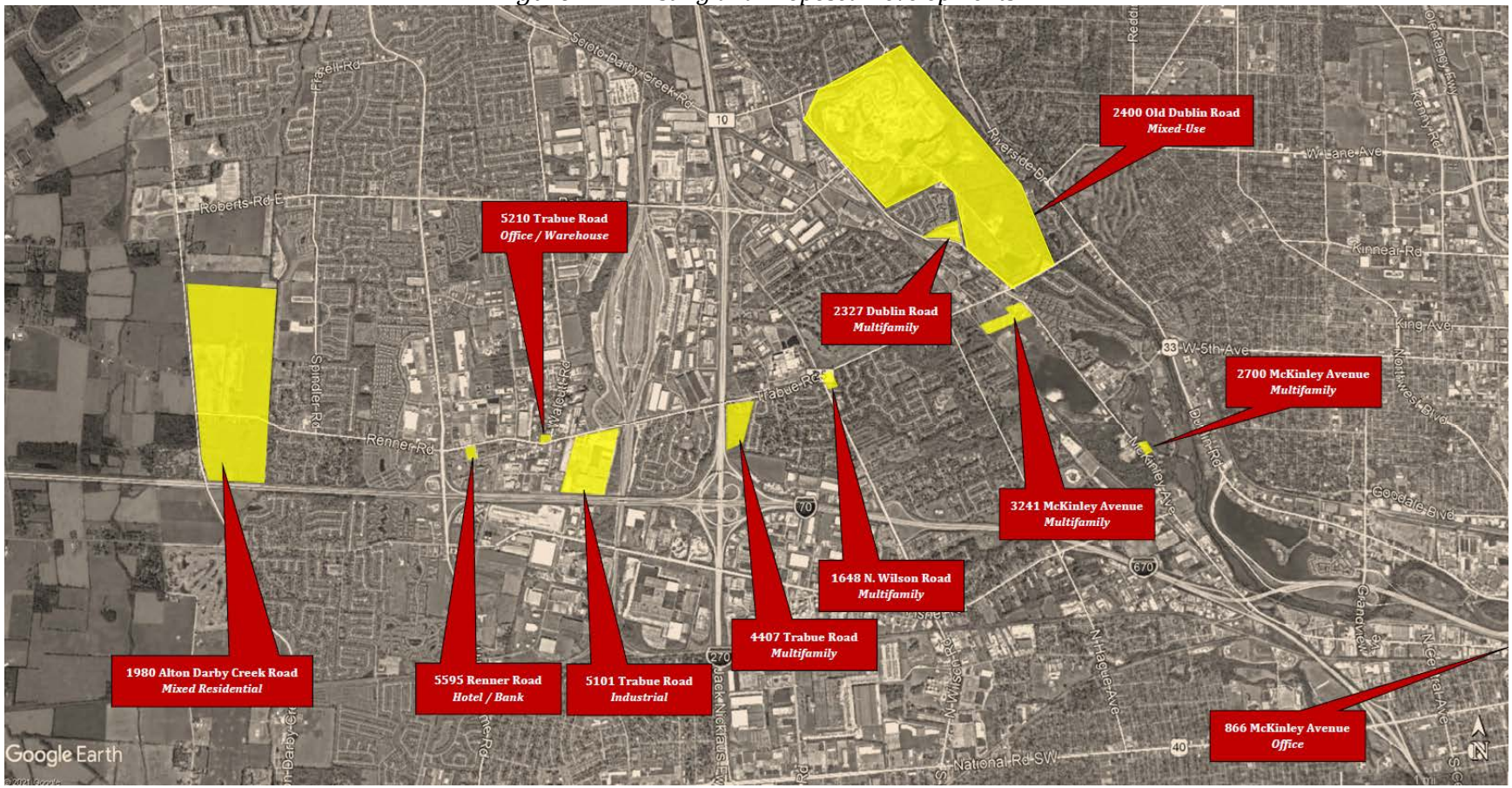
Note, the Quarry was partially open when count data was collected. All count data can be found in **Appendix G**.

C. Existing and Proposed Developments

Throughout the study area there are multiple planned and proposed developments that will impact the study corridor both through an increase in vehicular traffic and in roadway improvements resulting from Traffic Impact Studies (TIS). Each planned development considered in this study is shown in **Figure 12.**

A summary of each development and their respective TIS can be found in **Appendix A**.

Figure 12– Existing and Proposed Developments



D. Background Growth Rates

Traffic volumes were developed using a combination of count data, growth rates, City input, and engineering judgement.

Background growth rates for the study area were provided by MORPC, based on MORPC modeling of the study area. The City provided MORPC with details of all known developments planned in the area and new count data collected for this study. MORPC comprehensively reviewed land use codes and updated their model accordingly to provide the City with the most up-to-date and accurate growth rates for this study. MORPC provided linear, annual growth rates to be utilized in the volume development. MORPC growth rates and correspondence can be seen in **Appendix H**.

Note, the growth rates provided by MORPC may be different than what was used for other TISs in the area for the following reasons:

- Older models were used to develop previous growth rates
- The Quarry development was partially open when new data was collected
- Different analysis years utilized
- ITE trip generation was previously used for development traffic versus model trip generation
- The model could show different routing assumptions for development traffic

All these factors result in different growth rates being utilized to develop the calculated traffic volumes. These volumes were then utilized for analysis, leading to different improvements being determined necessary in other TISs compared to this study.

E. Volume Development

Growth rates were then applied to the base count data. Note that, per the City, a common peak hour for the study area was utilized rather than the individual peak hours for each intersection. This was done to normalize the count data and allow for corridor improvements in addition to intersection improvements. Based on the count data, an AM peak hour of 7:30-8:30 and a PM peak hour of 4:30-5:30 were utilized. Peak hour data was grown to the design year of 2045.

Base 2022 data and grown 2045 data was then rounded to the nearest 10, with a minimum count of 10 being assumed for all permissible movements. Rounded count data was then balanced to negate any discrepancies between intersections where there were no access points to allow for vehicles to enter or leave the roadway or smoothed where peak hour volumes were not expected to see differences to the degree that were present between intersections. Such segments are listed below.

- Between Hilliard Rome Road and Westpointe Plaza Drive/ Rentra Drive
- Between Walcutt Road and Walcutt Court
- Between McKinley Avenue and Dublin Road/Marblevista Boulevard

The resulting smoothed data was then utilized in all analysis calculations. Volume development can be found in **Appendix I.**

F. Annual Average Daily Traffic (AADT) Volumes

ODOT partial count forms were utilized to project the hours of collected data for each study intersection to AADT volumes. The resulting 2022 AADT volumes were then grown to 2045 using the growth rates previously described. Entry or exit volumes for each leg of each study intersection were then averaged with the relevant entry or exit volume at the adjacent study intersection (when one exists) and rounded to create directional segment AADT volumes. Partial count forms, 2020 Hourly Percent by Vehicle Type outputs, 2019 Seasonal Adjustment Factors, and AADT volume development can be found in **Appendix I**.

VIII. Public Engagement

A. Steering Committee

With the assistance of CM, the City of Columbus developed a Steering Committee inclusive of government agencies, MORPC, COTA, area commissions, and land owners. The full list of Steering Committee members can be found in **Appendix J**.

The purpose of this diverse group was to solicit feedback as the study progressed and to assist with public engagement. Initial meetings were held to discuss the study team, study process, public engagement, project evaluation criteria, goals, and objectives. CM and the City of Columbus developed a presentation for the initial Steering Committee meeting held on February 18, 2021.

Many additional steering committee meetings took place throughout 2022 and 2023. Once analysis was completed and initial recommendations were developed, a stakeholder meeting took place in September of 2023 to overview the recommendations and prepare for an in-person public meeting in October 2023, which is described further in the report. Stakeholder meeting minutes can be found in **Appendix J**.

B. Broad Public Engagement

In a subsequent meeting held on March 17, 2021, the Steering Committee and Advisory Panel provided CM and the City of Columbus with strengths, weaknesses, opportunities, and recommendations for the corridor. Discussions with the Steering Committee and Advisory Panel led to the development of an 18-question online public survey to further engage the community and determine the priorities of the general public. The survey was distributed to the public through the City of Columbus social media and information platforms, as well as through the Steering Committee and Advisory Panel members. The survey was posted on May 17, 2021 and concluded on June 17, 2021. A total of 1,093 responses were received. A detailed summary of the survey results is provided in **Appendix K**.

C. Specific Public Engagement

An in-person public involvement meeting took place on October 9th, 2023 at the Franklin County Engineer Maintenance Facility. CM and the City of Columbus provided staff and display boards for the public to review and comment. Comment cards and post-it notes were provided to allow the public to offer their thoughts, concerns, and overall feedback on the recommended improvements for the corridor. A database of all public comments generated from the Public Open house can be found in **Appendix L**. Responses to main comments and topics from the Open House can be found in **Appendix L**. These responses are not in any particular order.

IX. Future Conditions Assessment

A. Planning-Level AADT Estimate Analysis

The AADT volumes previously described were used to develop a planning-level evaluation of the number of through lanes needed for the corridor segments in the study area. The results of the planning-level evaluation of the number of lanes can be found in **Appendix M.** It should be noted that these recommendations are based on high-level volume to capacity ratios. The analysis in the following sub-sections looks at micro-analyses of what is needed at individual intersections to account for various turning movements and the capacity needed for each movement.

B. Capacity Analysis

The smoothed 2022 and 2045 volumes previously described were utilized in the analysis of the Existing Conditions (using 2022 and 2045 volumes) and Conditions with Improvements (using 2045 volumes). Synchro version 11 was used for signalized capacity analysis, HCS for roundabout analysis, and Sidra for atypical roundabouts when necessary.

The 2022 Existing Conditions analysis assumes existing signal timings, as provided by the maintaining agencies. All 2045 analyses assume signal timings (cycle lengths and splits) are optimized. The planned infrastructure improvements listed in Section IV were assumed to be in place for all 2045 analyses. Improvements (e.g., lanes, signal phasing, etc.) were added to each intersection so that acceptable LOS/delay was achieved and all movements had a volume to capacity ratio (V/C) of less than 0.9 in 2045. A minimum LOS of D for the overall intersection/ approaches and LOS E for each individual movement during peak traffic hours were considered acceptable.

Recommended intersection improvements needed to obtain acceptable capacity in 2045 are listed in **Table 7**. Detailed capacity analysis outputs can be found in **Appendix N**.

*Table 7 – 2045 Physical Improvements Summary**

Intersection	Improvements to 2045 Planned Roadway Network
Alton Darby Road & Renner Road	Add a 435' northbound right turn lane
Walcutt Road & Trabue Road	Realign Walcutt Road to create a single signalized intersection as follows: Eastbound: L (320'), T/R Westbound: L (225'), T, R (295') Northbound: L (150'), T/R Southbound: L (395'), T/R OR Realign Walcutt Road to create a roundabout as follows: Eastbound: L/T/R Westbound: L/T/R Northbound: L/T/R Southbound: L/T, R
Riverside Drive & Trabue Road/ Cambridge Boulevard	Add a second eastbound left turn lane Add a second northbound left turn lane Revise westbound approach to: 100' L, T, and 225' R
Fisher Road & McKinley Avenue	Add a 540' southbound right turn lane

*It is assumed that all intersections will have signal timings (cycle lengths/splits) optimized by 2045.
L/T/R indicates an approach with a shared left, through, right lane
L, T/R indicates an approach with a dedicated left turn lane and a shared through/right lane

Capacity analysis results are summarized in **Table 8**.

Table 8 - Capacity Analysis Summary

Intersection Name	Approach	2022 Existing Conditions AM	2022 Existing Conditions PM	2045 Existing Conditions AM	2045 Existing Conditions PM	2045 Conditions w/ Improvements* AM	2045 Conditions w/ Improvements* PM
Alton Darby Creek Road & Renner Road	Westbound	B/15.3	C/20.1	C/21.7	D/39.7	B/14.8	B/17.2
	Northbound	B/13.8	B/17.8	C/22.2	D/48.2	B/13.1	B/19.1
	Southbound	A/6.2	A/8.6	B/13.0	C/25.3	A/7.8	B/11.8
	Total	**B/10.8**	**B/15.4**	**B/18.2**	**D/37.4**	**B/11.1**	**B/15.9**
Spindler Road & Renner Road	Eastbound	A/5.2	A/5.6	A/6.8	A/6.7	---	---
	Westbound	A/4.2	A/5.8	A/5.2	A/7.4	---	---
	Northbound	B/12.4	B/12.6	B/12.0	B/13.7	---	---
	Southbound	B/13.5	B/13.5	B/13.6	B/15.3	---	---
	Total	**A/6.8**	**A/6.9**	**A/8.1**	**A/8.6**	**---**	**---**
Tanglewood Park Boulevard/ Bloomington Boulevard & Renner Road	Eastbound	A/6.5	B/11.1	A/7.4	B/12.7	A/7.5	B/12.5
	Westbound	B/11.1	C/23.7	B/10.8	C/25.9	B/10.8	C/20.8
	Northbound	B/18.2	C/22.1	B/18.4	C/20.3	B/18.4	C/21.4
	Southbound	C/20.2	C/30.6	C/20.7	D/37.9	C/20.7	D/36.3
	Total	**B/10.6**	**C/21.2**	**B/10.9**	**C/24.0**	**B/10.9**	**C/21.6**
Hilliard Rome Road & Renner Road**	Eastbound	D/51.0	D/40.8	C/27.5	D/41.3	---	D/40.6
	Westbound	D/51.0	E/71.3	D/35.9	D/54.2	---	D/51.7
	Northbound	B/17.0	C/31.6	C/34.1	C/34.3	---	C/33.9
	Southbound	D/36.2	E/58.7	C/30.0	D/41.6	---	D/42.8
	Total	**C/33.8**	**D/45.0**	**C/31.7**	**D/40.1**	**---**	**D/39.6**
Westpointe Plaza Drive/ Rentra Drive & Renner Road	Eastbound	A/6.2	A/7.8	A/6.5	A/9.0	A/6.5	A/9.1
	Westbound	B/12.0	B/19.6	B/13.0	D/36.0	B/13.0	C/24.2
	Northbound	B/17.7	C/26.5	B/18.0	C/27.2	B/18.2	C/29.1
	Southbound	B/17.8	C/26.2	B/18.0	C/27.8	B/18.0	C/29.0
	Total	**A/9.4**	**B/16.7**	**A/10.0**	**C/23.3**	**A/10.0**	**B/19.5**
Walcutt Road & Trabue Road**	Eastbound	C/33.5	C/27.6	D/36.3	C/29.2		
	Westbound	A/1.4	A/2.4	A/2.4	A/2.4		
	Southbound	D/38.4	D/50.9	D/53.7	E/75.0		
	Total	**C/24.0**	**C/21.8**	**C/29.8**	**C/28.8**		
Walcutt Court & Trabue Road***	Eastbound	A/2.0	A/1.4	A/5.8	A/6.0		
	Westbound	D/37.2	D/46.6	D/42.1	E/64.0		
	Northbound	D/40.1	D/53.1	C/33.3	D/42.4		
	Total	**B/16.6**	**C/25.9**	**C/20.4**	**C/34.8**		
Walcutt Road/Walcutt Court & Trabue Road *Signalized*	Eastbound					C/30.3	B/18.3
	Westbound					C/20.4	C/25.7
	Northbound					B/14.8	C/25.6
	Southbound					B/16.0	C/27.2
	Total					**C/22.9**	**C/23.6**
Walcutt Road/Walcutt Court & Trabue Road *Roundabout*	Eastbound					B/14.7	C/20.5
	Westbound					A/8.3	C/20.6
	Northbound					B/11.0	B/14.3
	Southbound					A/7.1	B/10.8
	Total					**B/10.6**	**C/17.9**
Westbelt Drive/ Trabue Woods Boulevard & Trabue Road	Eastbound	A/7.8	B/13.3	A/10.0	C/21.2	---	B/10.8
	Westbound	A/9.8	B/15.0	B/12.1	C/24.4	---	C/23.0
	Northbound	B/17.1	B/19.1	B/17.1	C/23.0	---	C/23.7
	Southbound	B/16.0	C/20.5	B/16.3	C/26.4	---	C/26.8
	Total	**A/10.0**	**B/15.1**	**B/12.0**	**C/23.3**	**---**	**B/18.6**
N Wilson Road & Trabue Road	Eastbound	E/62.3	E/71.4	C/30.6	D/48.7	---	---
	Westbound	E/59.7	E/56.2	C/29.6	D/36.4	---	---
	Northbound	C/23.6	C/27.1	D/35.6	C/30.7	---	---
	Southbound	C/33.1	D/39.4	C/29.8	C/34.1	---	---
	Total	**D/42.3**	**D/50.8**	**C/32.3**	**D/38.5**	**---**	**---**
Mapleway Drive/ N Hague Avenue & Trabue Road	Eastbound	B/16.0	B/31.1	C/25.6	C/21.6	---	---
	Westbound	A/8.0	A/7.2	A/9.4	A/9.3	---	---
	Northbound	B/19.2	B/18.9	C/25.6	C/21.6	---	---
	Southbound	B/14.3	B/15.6	B/15.3	B/16.6	---	---
	Total	**B/14.3**	**B/11.2**	**C/20.0**	**B/15.2**	**---**	**---**
Trabue Road & McKinley Avenue***	Eastbound	C/29.7	C/21.2	C/33.5	C/21.2	---	---
	Westbound	B/15.8	A/8.2	C/24.8	B/14.0	---	---
	Northbound	B/15.0	B/16.8	B/13.7	B/15.9	---	---
	Total	**C/21.9**	**B/14.2**	**C/26.6**	**B/16.6**	**---**	**---**
Dublin Road/ Marblevista Boulevard & Trabue Road***	Eastbound	B/10.2	B/12.4	B/17.5	B/19.4	---	---
	Westbound	B/18.8	B/17.3	B/18.7	C/20.3	---	---
	Northbound	D/43.9	D/37.3	D/39.4	C/32.1	---	---
	Southbound	C/33.7	C/25.8	D/39.4	C/30.3	---	---
	Total	**C/21.7**	**B/17.8**	**C/26.5**	**C/22.2**	**---**	**---**
Riverside Drive & Trabue Road/ Cambridge Boulevard	Eastbound	D/38.1	D/42.0	D/47.1	D/53.9	D/41.0	D/40.8
	Westbound	E/65.5	E/73.9	F/113.6	F/99.3	D/44.0	D/51.9
	Northbound	C/25.0	D/39.3	D/36.4	E/62.4	C/29.7	D/51.5
	Southbound	C/27.5	C/33.0	D/40.3	D/53.0	C/28.0	D/38.5
	Total	**C/32.1**	**D/40.2**	**D/47.6**	**E/61.7**	**C/34.3**	**D/45.1**
W 5th Avenue & McKinley Avenue	Westbound	C/20.1	C/20.9	C/21.6	C/25.2	A/9.3	B/11.9
	Northbound	B/15.5	B/17.8	C/22.7	D/39.5	C/22.7	C/31.9
	Southbound	A/7.5	A/8.6	A/9.3	B/11.2	C/21.6	C/21.9
	Total	**B/13.2**	**B/16.9**	**B/16.6**	**C/26.3**	**B/16.6**	**C/22.6**
Fisher Road & McKinley Avenue	Eastbound	C/22.8	C/23.2	C/26.5	C/32.9	C/23.4	C/24.9
	Northbound	A/6.5	A/6.7	A/7.9	A/9.6	A/7.1	A/6.7
	Southbound	B/13.7	B/15.0	C/27.1	D/35.1	B/14.2	B/14.7
	Total	**B/15.9**	**B/14.3**	**C/22.9**	**C/26.3**	**B/16.0**	**B/14.2**
Grandview Avenue & McKinley Avenue	Eastbound	A/8.1	A/8.9	B/14.7	B/16.2	---	---
	Westbound	A/4.7	A/5.4	A/9.1	A/9.9	---	---
	Northbound	D/45.8	D/48.8	C/23.2	C/27.1	---	---
	Total	**B/18.2**	**C/23.0**	**B/14.9**	**B/18.0**	**---**	**---**

*Capacity outputs matching 'Existing Conditions' scenarios were not represented in the improvements columns in order to simplify the summary of results.
**Hilliard Rome Road & Renner Road does not have standard NEMA phasing in the 2022 analysis. By 2045, improvements planned for the intersection are assumed to be implemented. These improvements will result in standard NEMA phasing. Therefore, HCM 2000 outputs are used for 2022 analysis and HCM 6th Edition outputs are used for both 2045 analysis scenarios.
***Intersections do not have standard NEMA phasing. Synchro HCM 2000 was utilized for outputs rather than the HCM 6th Edition which was used at other intersections. Due to the limitations of Synchro, it is expected that the provided results do not accurately reflect the present issues at this intersection(s).
Note: red text denotes unacceptable LOS for an approach and/or movement. In instances where an approach achieves acceptable LOS but has a movement with unacceptable LOS, the approach is notated in red for having a failing LOS.

C. Queuing Analysis

The SimTraffic module of the Synchro version 11 software was used for queuing analysis. V/C ratio and queuing analysis results are summarized in **Tables 9-11.**

Note, some movements still experience unacceptable queue lengths after improvements are implemented. Since most of the average queue lengths are within acceptable standards and all movements have acceptable V/C ratios and LOS/delay, these queues were considered acceptable. The full queuing analysis outputs can be found in **Appendix O.**

Table 9 - 2022 Existing Conditions V/C Ratio and Queuing Analysis Summary

Intersection Name	Approach	Movement	Existing Storage Space	AM		PM	
				V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
Alton Darby Creek Road & Renner Road	Westbound	Left	2,860’	0.34	40’/88’	0.69	130’/206’
		Right	365’	0.40	35’/72’	0.60	71’/142’
	Northbound	Thru/Right	1,010	0.75	110’/187’	0.79	176’/287’
	Southbound	Left	350’	0.54	70’/124’	0.56	87’/144’
		Thru	1,070’	0.26	28’/68’	0.37	70’/135’
Spindler Road & Renner Road	Eastbound	Left	140’	0.05	10’/31’	0.10	19’/43’
		Thru/Right	730’	0.45	47’/98’	0.45	48’/97’
	Westbound	Left	115’	0.02	5’/22’	0.04	9’/29’
		Thru	710’	0.24	30’/77’	0.59	64’/125’
		Right	250’	0.06	10’/34’	0.20	19’/40’
	Northbound	Left/Thru/Right	460’	0.10	21’/48’	0.10	23’/54’
	Southbound	Left	145’	0.34	60’/99’	0.30	61’/106’
		Thru/Right	850’	0.15	18’/47’	0.27	34’/69’
Tanglewood Park Boulevard/ Bloomington Boulevard & Renner Road	Eastbound	Left	180’	0.19	39’/72’	0.60	83’/146’
		Thru/Right	915’	0.55	98’/177’	0.43	97’/171’
	Westbound	Left	220’	0.02	6’/26’	0.11	46’/154’
		Thru/Right	480’	0.39	66’/136’	0.89	239’/414’
	Northbound	Left	95’	0.04	8’/31’	0.07	10’/36’
		Thru/Right	250’	0.18	28’/58’	0.14	38’/75’
	Southbound	Left	100’	0.38	57’/100’	0.33	80’/138’
		Thru/Right	550’	0.34	34’/62’	0.83	143’/262’
Hilliard Rome Road & Renner Road	Eastbound	Left	75’	0.20	33’/90’	0.59	73’/126’
		Thru	800’	0.64	103’/178’	0.67	138’/248’
		Right	445’	0.88	116’/225’	0.60	130’/234’
	Westbound	Left	470’	0.58	105’/160’	0.93	396’/588’
		Thru/Right	600’	0.64	119’/218’	0.82	576’/1,090’
	Northbound	Left	575’	0.60	127’/219’	0.94	366’/549’
		Thru	590’	0.29	170’/176’	0.62	226’/400’
		Right	425’	0.29	58’/122’	0.35	73’/146’
	Southbound	Left	140’	0.26	74’/164’	0.53	118’/214’
		Thru	735’	0.55	204’/293’	0.88	311’/427’
		Thru/Right	615’		91’/190’		215’/338’
Westpointe Plaza Drive/ Rentra Drive & Renner Road	Eastbound	Left	85’	0.11	27’/73’	0.41	78’/126’
		Thru/Right	270’	0.58	87’/179’	0.49	148’/296’
	Westbound	Left	50’	0.02	8’/34’	0.02	8’/33’
		Thru/Right	1,225’	0.59	86’/196’	0.86	292’/629’
	Northbound	Left	75’	0.07	15’/43’	0.25	37’/76’
		Thru	370’	0.04	7’/29’	0.03	10’/47’
		Thru/Right	110’	0.05	10’/39’	0.07	13’/39’
	Southbound	Left	230’	0.12	26’/60’	0.45	94’/156’
		Thru/Right	230’	0.16	28’/63’	0.65	90’/168’
Walcutt Road & Trabue Road*	Eastbound	Left	130’	0.22	54’/126’	0.40	99’/173’
		Thru	535’	0.76	198’/369’	0.66	266’/451’
	Westbound	Thru	70’	0.40	9’/35’	0.58	12’/44’
		Right	70’	0.08	9’/38’	0.11	23’/53’
	Southbound	Left	310’	0.62	103’/198’	0.66	148’/259’
		Right	565’	0.07	26’/54’	0.11	65’/171’
Walcutt Court & Trabue Road	Eastbound	Thru/Right	70’	0.66	14’/53’	0.61	17’/58’
	Westbound	Left	135’	0.16	37’/112’	0.04	6’/25’
		Thru	3575’	0.75	168’/302’	0.88	340’/602’
	Northbound	Left	80’	0.13	24’/62’	0.36	61’/105’
		Right	1,035’	0.01	11’/45’	0.04	39’/119’
Westbelt Drive/ Trabue Woods Boulevard & Trabue Road	Eastbound	Left	185’	0.15	31’/70’	0.20	37’/101’
		Thru/Right	515’	0.60	60’/141’	0.83	133’/340’
	Westbound	Left	115’	0.02	7’/28’	0.10	26’/85’
		Thru/Right	365’	0.61	74’/155’	0.84	155’/310’
	Northbound	Left	45’	0.10	19’/49’	0.12	26’/57’
		Thru/Right	705’	0.24	32’/68’	0.13	26’/63’
	Southbound	Left	180’	0.15	29’/73’	0.48	80’/129’
		Thru	1,175’	0.05	9’/38’	0.10	45’/157’
		Right	95’	0.14	30’/68’	0.12	23’/54’
N Wilson Road & Trabue Road	Eastbound	Left	380’	0.16	60’/198’	0.19	110’/328’
		Thru	615’	0.39	259’/426’	0.45	289’/496’
		Right	325’	0.67	110’/284’	0.89	107’/281’
	Westbound	Left	500’	0.46	98’/187’	0.61	177’/310’
		Thru	770’	0.22	115’/198’	0.35	267’/380’
		Right	220’	0.23	26’/57’	0.24	51’/170’
	Northbound	Left	555’	0.59	141’/294’	0.63	172’/338’
		Thru	720’	0.33	110’/234’	0.23	87’/204’
		Right	720’	0.19	15’/38’	0.17	17’/42’
	Southbound	Left	290’	0.23	45’/101’	0.22	65’/151’
		Thru	970’	0.18	74’/148’	0.29	155’/266’
		Thru/Right	285’	0.18	67’/145’	0.29	151’/265’
Mapleway Drive/ N Hague Avenue & Trabue Road	Eastbound	Left	140’	0.02	9’/47’	0.02	14’/66’
		Thru/Right	2,625’	0.75	125’/298’	0.73	133’/313’
	Westbound	Left	600’	0.32	47’/90’	0.46	81’/165’
		Thru/Right	600’	0.32	64’/158’	0.57	96’/213’
	Northbound	Left/Thru/Right	470’	0.72	127’/240’	0.61	101’/197’
	Southbound	Left/Thru/Right	130’	0.06	18’/47’	0.07	17’/44’

Table 9 Cont. - 2022 Existing Conditions V/C Ratio and Queuing Analysis Summary

Intersection Name	Approach	Movement	Existing Storage Space	AM		PM	
				V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
Trabue Road & McKinley Avenue	Eastbound	Thru	810’	0.64	136’/243’	0.45	107’/208’
		Thru/Right	810’		119’/220’		85’/177’
	Westbound	Left	205’	0.47	78’/144’	0.32	63’/122’
		Thru	205’	0.35	61’/115’	0.55	74’/126’
	Northbound	Left	335’	0.11	24’/62’	0.30	81’/153’
		Right	335’	0.09	30’/66’	0.09	36’/79’
Dublin Road/ Marblevista Boulevard & Trabue Road	Eastbound	Left	120’	0.38	54’/112’	0.49	98’/160’
		Thru	205’	0.52	30’/84’	0.37	63’/178’
		Thru/Right	205’		15’/49’		20’/67’
	Westbound	Left	290’	0.03	3’/16’	0.08	13’/38’
		Thru	1,170’	0.31	66’/155’	0.52	172’/291’
		Right	525’	0.14	7’/29’	039	71’/159’
	Northbound	Left	90’	0.17	7’/29’	0.11	4’/17’
		Thru	345’	0.12	8’/34’	0.11	10’/36’
		Right	40’	0.03	26’/60’	0.02	21’/48’
	Southbound	Left	250’	0.67	115’/193’	0.42	62/119’
		Left/Thru	2,000’	0.67	122’/208’	0.43	67’/123’
		Right	500’	0.13	38’/68’	0.10	41’/80’
Riverside Drive & Trabue Road/ Cambridge Boulevard	Eastbound	Left	630’	0.88	314’/478’	0.90	302’/489’
		Thru	1,550’	0.22	73’/137’	0.18	70’/177’
		Right	1,550’	0.56	152’/256’	0.33	103’/200’
	Westbound	Left/Thru	145’	0.57	46’/92’	0.71	95’/169’
		Thru/Right	1,135’	0.71	62’/128’	0.82	139’/233’
	Northbound	Left	340’	0.72	105’/182’	0.95	327’/430’
		Thru	1,645’	0.31	118’/186’	0.61	544’/1051’
		Thru/Right	1,645’	0.31	99’/174’	0.61	985’/1443’
	Southbound	Left	210’	0.16	70’/203’	0.35	95’/233’
		Thru	2,255’	0.69	324’/486’	0.57	284’/460’
		Right	200’	0.26	126’/281’	0.59	181’/286’
W 5th Avenue & McKinley Avenue	Westbound	Left	150’	0.53	81’/146’	0.73	114’/174’
		Right	315’	0.20	35’/82’	0.47	68’/163’
	Northbound	Thru/Right	1,560’	0.60	84’/161’	0.68	103’/191’
	Southbound	Left	190’	0.37	60’/110’	0.30	43’/86’
		Thru	2,165’	0.23	43’/104’	0.16	30’/72’
Fisher Road & McKinley Avenue	Eastbound	Left	90’	0.73	81’/121’	0.65	73’/119’
		Right	360’	0.32	57’/155’	0.20	26’/84’
	Northbound	Left	120’	0.13	26’/57’	0.27	42’/76’
		Thru	2,005’	0.11	33’/79’	0.18	40’/84’
	Southbound	Thru/Right	2,395’	0.63	106’/205’	0.69	113’/229’
Grandview Avenue & McKinley Avenue	Eastbound	Thru	80’	0.09	34’/80’	0.09	42’/95’
		Thru/Right	3,925’		13’/49’		17’/62’
	Westbound	Left	800’	0.29	54’/103’	0.22	44’/92’
		Thru	1,540’	0.12	26’/80’	0.18	38’/100’
	Northbound	Left	2,315’	0.51	88’/149’	0.80	145’/233’
		Right	2,315’	0.55	45’/72’	0.58	44’/71’

Note: red text denotes unacceptable V/C ratio or queue which exceeds available storage.

Table 10 - 2045 Existing Conditions V/C Ratio and Queuing Analysis Summary

Intersection Name	Approach	Movement	Existing Storage Space	AM		PM	
				V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
Alton Darby Creek Road & Renner Road	Westbound	Left	2,860’	0.41	62’/123’	0.84	219’/340’
		Right	365’	0.46	52’/109’	0.65	119’/220’
	Northbound	Thru/Right	1,010	0.87	301’/575’	0.97	966’/1,744’
	Southbound	Left	350’	0.87	127’/197’	0.91	172’/261’
		Thru	1,070’	0.32	39’/96’	0.44	108’/200’
Spindler Road & Renner Road	Eastbound	Left	140’	0.07	16’/42’	0.16	26’/55’
		Thru/Right	730’	0.55	70’/138’	0.53	68’/141’
	Westbound	Left	115’	0.02	6’/24’	0.06	17’/43’
		Thru	710’	0.31	42’/97’	0.71	92’/155’
		Right	250’	0.10	11’/33’	0.23	25’/49’
	Northbound	Left/Thru/Right	460’	0.14	27’/60’	0.13	24’/51’
	Southbound	Left	145’	0.46	78’/126’	0.44	77’/128’
		Thru/Right	850’	0.19	25’/53’	0.32	35’/72’
Tanglewood Park Boulevard/ Bloomington Boulevard & Renner Road	Eastbound	Left	180’	0.22	43’/94’	0.70	81’/139’
		Thru/Right	915’	0.65	110’/187’	0.53	104’/172’
	Westbound	Left	220’	0.03	7’/31’	0.15	46’/112’
		Thru	480’	0.35	67’/142’	0.90	170’/216’
		Right	480’	0.11	17’/48’	0.22	35’/74’
	Northbound	Left	95’	0.04	10’/33’	0.08	11’/36’
		Thru/Right	250’	0.18	30’/61’	0.17	37’/69’
	Southbound	Left	100’	0.42	58’/105’	0.36	68’/131’
		Thru/Right	550’	0.38	30’/58’	0.90	115’/198’
Hilliard Rome Road & Renner Road	Eastbound	Left	445’	0.13	24’/54’	0.44	61’/117’
		Thru	800’	0.37	65’/124’	0.73	98’/167’
		Thru/Right	800’		52’/100’		93’/164’
		Right	575’	0.66	71’/117’	0.55	90’/154’
	Westbound	Left	470’	0.76	102’/161’	0.91	223’/313’
		Thru	600’	0.19	45’/92’	0.34	85’/161’
		Thru/Right	600’		46’/96’		75’/139’
	Northbound	Left	575’	0.90	94’/165’	0.91	264’/385’
		Thru	590’	0.43	105’/177’	0.71	242’/342’
		Right	425’	0.71	47’/91’	0.52	47’/88’
	Southbound	Left	140’	0.33	49’/92’	0.56	79’/166’
		Thru	735’	0.60	193’/264’	0.67	240’/313’
		Thru/Right	615’	0.60	95’/176’	0.67	175’/254’
Westpointe Plaza Drive/ Rentra Drive & Renner Road	Eastbound	Left	85’	0.13	29’/73’	0.50	82’/139’
		Thru/Right	270’	0.62	82’/160’	0.55	126’/240’
	Westbound	Left	50’	0.03	9’/41’	0.02	8’/44’
		Thru/Right	1,225’	0.64	88’/191’	0.93	251’/415’
	Northbound	Left	75’	0.10	20’/50’	0.31	41’/82’
		Thru	370’	0.04	7’/29’	0.03	7’/42’
		Thru/Right	110’	0.04	8’/33’	0.09	17’/49’
	Southbound	Left	230’	0.12	28’/65’	0.47	90’/154’
		Thru/Right	230’	0.16	25’/53’	0.67	74’/126’
Walcutt Road & Trabue Road	Eastbound	Left	130’	0.29	64’/147’	0.54	112’/197’
		Thru	535’	0.86	196’/361’	0.74	244’/414’
	Westbound	Thru	70’	0.45	19’/57’	0.63	38’/78’
		Right	70’	0.09	15’/49’	0.12	29’/65’
	Southbound	Left	310’	0.91	136’/242’	1.00	245’/385’
		Right	565’	0.10	30’/64’	0.15	123’/344’
Walcutt Court & Trabue Road	Eastbound	Thru/Right	70’	0.78	43’/102’	0.73	77’/128’
	Westbound	Left	135’	0.26	24’/80’	0.05	10’/58’
		Thru	3575’	0.87	188’/345’	0.99	486’/851’
	Northbound	Left	80’	0.17	31’/76’	0.35	64’/117’
		Right	1,035’	0.21	9’/35’	0.05	41’/111’
Westbelt Drive/ Trabue Woods Boulevard & Trabue Road	Eastbound	Left	185’	0.17	34’/86’	0.26	40’/110’
		Thru/Right	515’	0.68	79’/178’	0.87	181’/346’
	Westbound	Left	115’	0.03	7’/27’	0.16	31’/93’
		Thru/Right	365’	0.73	105’/190’	0.90	187’/334’
	Northbound	Left	45’	0.10	20’/52’	0.12	26’/85’
		Thru/Right	705’	0.27	32’/68’	0.11	25’/61’
	Southbound	Left	180’	0.23	38’/77’	0.64	107’/161’
		Thru	1,175’	0.05	11’/41’	0.11	81’/223’
		Right	95’	0.21	34’/71’	0.18	40’/94’
N Wilson Road & Trabue Road	Eastbound	Left	380’	0.17	30’/65’	0.23	72’/250’
		Thru	615’	0.44	170’/278’	0.56	340’/481’
		Right	325’	0.70	69’/157’	0.98	192’/373’
	Westbound	Left	500’	0.51	72’/133’	0.80	109’/204’
		Thru	770’	0.27	83’/145’	0.52	181’/283’
		Right	220’	0.27	29’/61’	0.33	31’/75’
	Northbound	Left	555’	0.92	239’/454’	0.88	238’/419’
		Thru	720’	0.61	179’/473’	0.39	110’/222’
		Right	720’	0.33	36’/176’	0.27	29’/58’
	Southbound	Left	290’	0.41	60’/114’	0.31	62’/123’
		Thru	970’	0.35	89’/137’	0.54	132’/198’
		Thru/Right	285’	0.35	75’/136’	0.55	130’/211’

Table 10 Cont. - 2045 Existing Conditions V/C Ratio and Queuing Analysis Summary

Intersection Name	Approach	Movement	Existing Storage Space	AM		PM	
				V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
Mapleway Drive/ N Hague Avenue & Trabue Road	Eastbound	Left	140’	0.02	7’/39’	0.03	16’/84’
		Thru/Right	2,625’	0.88	151’/285’	0.87	196’/330’
	Westbound	Left	600’	0.47	57’/108’	0.65	83’/138’
		Thru/Right	600’	0.39	72’/161’	0.69	114’/221’
	Northbound	Left/Thru/Right	470’	0.77	108’/186’	0.66	92’/162’
	Southbound	Left/Thru/Right	130’	0.06	17’/47’	0.07	20’/50’
Trabue Road & McKinley Avenue	Eastbound	Thru	810’	0.83	169’/261’	0.59	130’/208’
		Thru/Right	810’		148’/236’		102’/174’
	Westbound	Left	205’	0.83	104’/172’	0.51	88’/147’
		Thru	205’	0.51	77’/129’	0.74	105’/151’
	Northbound	Left	335’	0.14	34’/76’	0.41	87’/145’
		Right	335’	0.18	40’/85’	0.19	87’/216’
Dublin Road/ Marblevista Boulevard & Trabue Road	Eastbound	Left	120’	0.58	87’/156’	0.78	140’/196’
		Thru	205’	0.69	63’/146’	0.49	132’/270’
		Thru/Right	205’		40’/103’		57’/151’
	Westbound	Left	290’	0.03	4’/16’	0.13	18’/43’
		Thru	1,170’	0.43	85’/161’	0.70	316’/648’
		Right	525’	0.18	19’/54’	0.69	170’/393’
	Northbound	Left	90’	0.15	4’/18’	0.10	5’/17’
		Thru	345’	0.15	8’/28’	0.10	7’/24’
		Right	40’	0.03	25’/54’	0.02	19’/45’
	Southbound	Left	250’	0.88	152’/249’	0.72	81’/150’
		Left/Thru	2,000’	0.87	156’/254’	0.71	87’/151’
		Right	500’	0.21	50’/103’	0.16	49’/95’
Riverside Drive & Trabue Road/ Cambridge Boulevard	Eastbound	Left	1,000’	1.03	508’/899’	1.07	667’/1,178’
		Thru	1,550’	0.24	176’/591’	0.19	593’/1,777’
		Right	1,550’	0.61	179’/364’	0.34	200’/837’
	Westbound	Left/Thru	145’	0.87	162’/264’	0.92	195’/269’
		Thru/Right	1,135’	1.04	194’/289’	1.03	235’/282’
	Northbound	Left	340’	0.88	120’/204’	1.06	340’/447’
		Thru	1,645’	0.41	133’/204’	0.87	509’/1,010’
		Thru/Right	1,645’	0.41	110’/185’	0.88	466’/920’
	Southbound	Left	210’	0.20	103’/273’	0.49	150’/320’
		Thru	2,255’	0.91	420’/771’	0.96	777’/1,332’
		Right	200’	0.29	159’/328’	0.78	245’/283’
W 5th Avenue & McKinley Avenue	Westbound	Left	150’	0.67	86’/146’	0.83	127’/197’
		Right	315’	0.25	35’/65’	0.55	83’/214’
	Northbound	Thru/Right	1,560’	0.78	115’/200’	0.92	60’/106’
	Southbound	Left	190’	0.59	82’/143’	0.53	47’/96’
		Thru	2,165’	0.32	60’/125’	0.22	176’/385’
Fisher Road & McKinley Avenue	Eastbound	Left	90’	0.81	102’/147’	0.81	94’/141’
		Right	360’	0.36	63’/160’	0.25	39’/121’
	Northbound	Left	120’	0.23	35’/71’	0.60	66’/111’
		Thru	2,005’	0.18	42’/90’	0.24	47’/96’
	Southbound	Thru/Right	2,395’	0.87	144’/270’	0.94	227’/414’
Grandview Avenue & McKinley Avenue	Eastbound	Thru	80’	0.25	73’/127’	0.26	71’/116’
		Thru/Right	3,925’		55’/116’		54’/109’
	Westbound	Left	800’	0.59	100’/172’	0.49	85’/147’
		Thru	1,540’	0.23	55’/122’	0.36	78’/145’
	Northbound	Left	2,315’	0.55	93’/160’	0.82	141’/233’
		Right	2,315’	0.54	55’/96’	0.56	60’/105’

Note: red text denotes unacceptable V/C ratio or queue which exceeds available storage.

Table 11– 2045 Proposed Conditions V/C Ratio and Queuing Analysis Summary

Intersection Name	Approach	Movement	Existing Storage Space	AM		PM	
				V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
Alton Darby Creek Road & Renner Road	Westbound	Left	2,860’	0.39	49’/94’	0.73	128’/198’
		Right	365’	0.41	51’/109’	0.60	87’/154’
	Northbound	Thru	1,010’	0.77	144’/250’	0.85	201’/329’
		Right	435’	0.27	42’/76’	0.30	47’/84’
	Southbound	Left	350’	0.71	100’/172’	0.75	110’/185’
		Thru	1,070’	0.35	44’/95’	0.53	102’/173’
Spindler Road & Renner Road	Eastbound	Left	140’	0.07	18’/43’	0.16	22’/47’
		Thru/Right	730’	0.55	64’/124’	0.53	63’/121’
	Westbound	Left	115’	0.02	7’/36’	0.06	15’/39’
		Thru	710’	0.31	42’/97’	0.71	97’/179’
		Right	250’	0.10	11’/36’	0.23	26’/70’
	Northbound	Left/Thru/Right	460’	0.14	26’/55’	0.13	25’/53’
	Southbound	Left	145’	0.46	82’/132’	0.44	80’/136’
		Thru/Right	850’	0.19	25’/53’	0.32	39’/83’
Tanglewood Park Boulevard/ Bloomington Boulevard & Renner Road	Eastbound	Left	180’	0.22	47’/102’	0.70	92’/157’
		Thru/Right	915’	0.65	113’/197’	0.52	104’/177’
	Westbound	Left	220’	0.03	6’/29’	0.15	35’/94’
		Thru	480’	0.35	63’/132’	0.87	149’/228’
		Right	480’	0.11	19’/49’	0.21	31’/68’
	Northbound	Left	95’	0.04	7’/29’	0.08	13’/43
		Thru/Right	250’	0.18	28’/58’	0.17	37’/73’
	Southbound	Left	100’	0.42	58’/104’	0.36	85’/146’
		Thru/Right	550’	0.37	29’/64’	0.88	146’/271’
Hilliard Rome Road & Renner Road	Eastbound	Left	445’	0.13	23’/55’	0.39	68’/128’
		Thru	800’	0.18	76’/135’	0.38	84’/147’
		Thru/Right	800’		18’/69'		33’/92’
		Right	575’	0.72	43’/79’	0.62	62’/111’
		Right	575’		64’/103’		75’/128’
	Westbound	Left	470’	0.79	89’/158’	0.89	199’/289’
		Left	470’		100’/167’		205’/291’
		Thru	600’	0.18	50’/93’	0.37	86’/161’
		Thru/Right	600’		54’/110’		76’/141’
	Northbound	Left	575’	0.90	83’/147’	0.89	222’/318’
		Left	575’		73’/135’		197’/291’
		Thru	590’	0.45	92’/165’	0.72	24’/343’
		Thru	590’		71’/145’		240’/329’
		Thru	590’		23’/75’		198’/294’
		Right	425’	0.74	31’/69’	0.52	38’/68’
	Southbound	Left	140’	0.34	42’/79’	0.55	80’/184’
		Thru	735’	0.64	192’/266’	0.69	252’/328’
		Thru	735’		158’/235’		228’/303’
		Thru/Right	615’	0.64	89’/164’	0.69	184’/261’
Westpointe Plaza Drive/ Rentra Drive & Renner Road	Eastbound	Left	85’	0.13	24’/62’	0.49	82’/132’
		Thru	270’	0.61	86’/’163’	0.48	124’/236’
		Right	270’	0.01	2’/11’	0.05	11’/36’
	Westbound	Left	50’	0.03	7’/27’	0.02	6’/32’
		Thru/Right	1,225’	0.64	81’/172’	0.89	208’/365’
	Northbound	Left	75’	0.10	17’/51’	0.32	39’/75’
		Thru	370’	0.04	8’/34’	0.03	7’/26’
		Thru/Right	110’	0.04	8’/29’	0.09	17’/41’
	Southbound	Left	230’	0.12	28’/62’	0.48	98’/180’
		Thru/Right	230’	0.16	25’/61’	0.67	92’/172’
Walcutt Road/Walcutt Court & Trabue Road *Signalized*	Eastbound	Left	320’	0.30	54’/143’	0.57	78’/154’
		Thru/Right	735’	0.89	168’/328’	0.72	173’/332’
	Westbound	Left	225’	0.15	19’/54’	0.04	10’/65’
		Thru	3,575’	0.73	122’/211’	0.88	243’/410’
		Right	295’	0.18	24’/57’	0.20	56’/191’
	Northbound	Left	150’	0.07	19’/63’	0.32	45’/86’
		Thru/Right	1,035’	0.06	15’/53’	0.23	39’/80’
	Southbound	Left	395’	0.44	95’/162’	0.65	117’/202’
		Thru/Right	~565’	0.30	39’/80’	0.60	76’/143’
Walcutt Road/Walcutt Court & Trabue Road *Roundabout*	Eastbound	Left/Thru/Right	735’	0.66	---/102’	0.79	---/170’
	Westbound	Left/Thru/Right	3,575’	0.45	---/48’	0.81	---/194’
	Northbound	Left/Thru/Right	1,035’	0.11	---/8’	0.38	---/34’
	Southbound	Left/Thru	565’	0.31	---/26’	0.41	---/40’
		Right	395’	0.16	---/118’	0.36	---/32’
Westbelt Drive/ Trabue Woods Boulevard & Trabue Road	Eastbound	Left	185’	0.17	30’/78’	0.26	38’/104’
		Thru/Right	515’	0.68	80’/183’	0.72	149’/290’
	Westbound	Left	115’	0.03	7’/33’	0.14	34’/98’
		Thru/Right	365’	0.73	90’/168’	0.89	209’/369’
	Northbound	Left	45’	0.10	17’/47’	0.12	26’/55’
		Thru/Right	705’	0.27	35’/68’	0.11	24’/56’
	Southbound	Left	180’	0.23	37’/83’	0.64	110’/160’
		Thru	1,175’	0.05	7’/31’	0.11	84’/235’
		Right	95’	0.21	30’/68’	0.18	37’/87’

Table 11 Cont. - 2045 Proposed Conditions V/C Ratio and Queuing Analysis Summary

Intersection Name	Approach	Movement	Existing Storage Space	AM		PM	
				V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
N Wilson Road & Trabue Road	Eastbound	Left	420’	0.17	37’/80’	0.22	60’/212’
		Thru	615’	0.44	202’/313’	0.51	319’/520’
		Thru	615’		38’/171’		143’/484’
		Right	410’	0.70	72’/127’	0.97*	175’/341’
	Westbound	Left	500’	0.51	69’/126’	0.75	99’/179’
		Thru	770’	0.27	69’/120’	0.48	138’/219’
		Thru	770’		37’/83’		80’/169’
		Right	220’	0.27	32’/70’	0.31	31’/66’
	Northbound	Left	555’	0.92	235’/466’	0.95	263’/487’
		Thru	720’	0.61	195’/529’	0.42	132’/352’
		Right	720’	0.33	53’/327’	0.29	24’/49’
	Southbound	Left	290’	0.41	59’/99’	0.33	62’/120’
		Thru	970’	0.35	80’/129’	0.55	126’/192’
		Thru/Right	285’	0.35	66’/124’	0.55	117’/191’
Mapleway Drive/ N Hague Avenue & Trabue Road	Eastbound	Left	140’	0.02	8’/32’	0.03	8’/29’
		Thru/Right	2,625’	0.88	143’/251’	0.87	174’/296’
	Westbound	Left	600’	0.47	55’/98’	0.65	81’/136’
		Thru/Right	600’	0.39	75’/162’	0.69	121’/227’
	Northbound	Left/Thru/Right	470’	0.77	112’/197’	0.66	91’/161’
	Southbound	Left/Thru/Right	130’	0.06	19’/48’	0.07	20’/50’
Trabue Road & McKinley Avenue	Eastbound	Thru	810’	0.81	165’/259’	0.59	132’/207’
		Thru/Right	810’		144’/235’		101’/168’
	Westbound	Left	205’	0382	109’/187’	0.50	85’/140’
		Thru	205’	0.50	59’/121’	0.72	91’/142’
		Thru	205’		78’/134’		113’/161’
	Northbound	Left	335’	0.15	26’/65’	0.45	82’/158’
		Right	335’	0.18	37’/82’	0.21	60’/137’
		Right	335’		28’/65’		31’/64’
Dublin Road/ Marblevista Boulevard & Trabue Road	Eastbound	Left	120’	0.56	80’/146’	0.76	133’/188’
		Thru	205’	0.67	61’/137’	0.48	107’/243’
		Thru/Right	205’		40’/100’		37’/113’
	Westbound	Left	290’	0.03	3’/11’	0.13	29’/131’
		Thru	1,170’	0.42	42’/101’	0.68	458’/1417’
		Thru	1,170’		80’/158’		367’/1603’**
		Right	525’	0.26	17’/54’	0.69	291’/633’
	Northbound	Left	90’	0.08	160’/265’	0.05	94’/168’
		Thru	345’	0.08	173’/290’	0.05	99’/167’
		Right	40’	0.16	50’/99’	0.05	48’/85’
	Southbound	Left	250’	0.86	6’/21’	0.70	5’/21’
		Left/Thru	2,000’	0.85	9’/38’	0.69	8’/27’
		Right	500’	0.33	27’/60’	0.29	20’/43’
Riverside Drive & Trabue Road/ Cambridge Boulevard	Eastbound	Left	1,000’	0.89	154’/232’	0.89	169’/254’
		Left	1,000’		171’/246’		179’/262’
		Thru	1,550’	0.37	73’/147’	0.24	59’/114’
		Right	1,550’	0.88	169’/294’	0.45	108’/197’
	Westbound	Left	100’	0.09	17’/61’	0.07	28’/108’
		Thru	1,135’	0.81	107’/182’	0.89	240’/397’
		Right	225’	0.32	30’/59’	0.35	106’/267’
	Northbound	Left	465’	0.73	48’/116’	0.89	219’/383’
		Left	465’		103’/158’		255’/426’
		Thru	1,645’	0.42	107’/164’	0.87	308’/455’
		Thru/Right	1,645’	0.42	87’/152’	0.87	305’/443’
	Southbound	Left	210’	0.18	65’/195’	0.47	84’/217’
		Thru	2,255’	0.88	265’/384’	0.75	236’/332’
		Thru	2,255’		238’/359’		230’/348’
		Right	200’	0.34	111’/259’	0.80	190’/294'
W 5th Avenue & McKinley Avenue	Westbound	Left	150’	0.67	94’/157’	0.78	140’/204’
		Right	315’	0.25	37’/88’	0.53	95’/223’
	Northbound	Thru/Right	1,560’	0.78	124’/217’	0.89	170’/328’
	Southbound	Left	190’	0.59	76’/131’	0.54	63’/113’
		Thru	2,165’	0.32	57’/117’	0.22	52’/107’
Fisher Road & McKinley Avenue	Eastbound	Left	90’	0.77	97’/146’	0.75	86’/141’
		Right	360’	0.34	52’/159’	0.23	38’/139’
	Northbound	Left	120’	0.15	40’/86’	0.37	63’/109’
		Thru	2,005’	0.19	47’/100’	0.26	52’/105’
	Southbound	Thru	2,395’	0.29	66’/129’	0.39	78’/143’
		Right	490’	0.59	64’/109’	0.71	72’/124’
Grandview Avenue & McKinley Avenue	Eastbound	Thru	80’	0.25	81’/136’	0.26	40’/113’
		Thru/Right	3,925’		62’/119’		51’/104’
	Westbound	Left	800’	0.59	97’/183’	0.49	83’/141’
		Thru	1,540’	0.23	53’/107’	0.36	83’/149’
	Northbound	Left	2,315’	0.55	92’/155’	0.82	150’/244’
		Right	2,315’	0.54	58’/99’	0.56	59’/98’

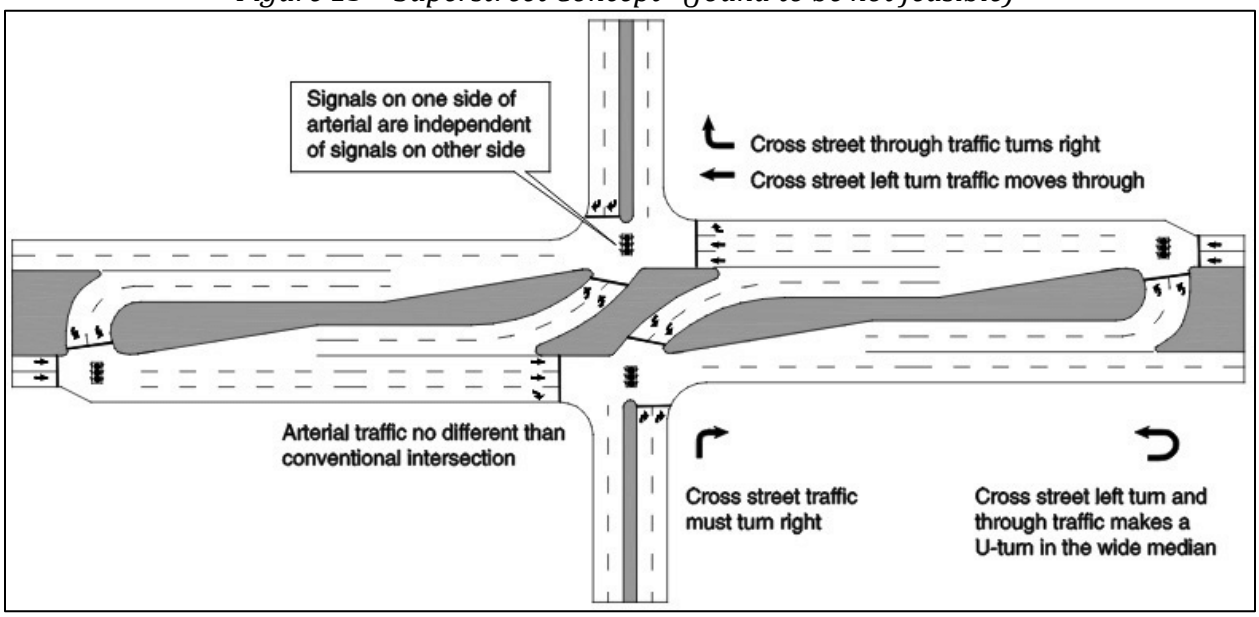
Note: red text denotes unacceptable V/C ratio or queue which exceeds available storage.
**Per City request, an additional eastbound right turn lane was not analyzed at this location, due to pedestrian safety concerns. Note, the eastbound approach, and specifically the eastbound right turn movement may experience capacity and queuing issues in the future. An additional analysis was conducted to determine if an alternate eastbound approach configuration would improve capacity and queuing conditions, described on the next page.*
***The increase in queue length from the Existing Conditions analysis was likely due to improvements and split adjustments at other intersections. It is likely that traffic was hitting this intersection at more inopportune times than before. However, this is considered acceptable as the increases are caused by changes made to achieve acceptable capacity delays and V/C ratios throughout the corridor. Additionally, the queuing analysis was conducted using SimTraffic, which is a high-level simulation tool.*

D. Alternatives Evaluation

Additional analysis was conducted at the intersections of Trabue Road with McKinley Avenue and Dublin Road/Marblevista Boulevard for two alternatives which would change the existing operation of the intersections. These alternatives included:

1. Superstreet concept – see **Figure 13**
    - A superstreet is a roadway concept with left turn restrictions which force vehicles to utilize U-turns to make a movement.
    - After initial analysis, this concept was found to be not feasible due to the limitations of this section of the corridor.

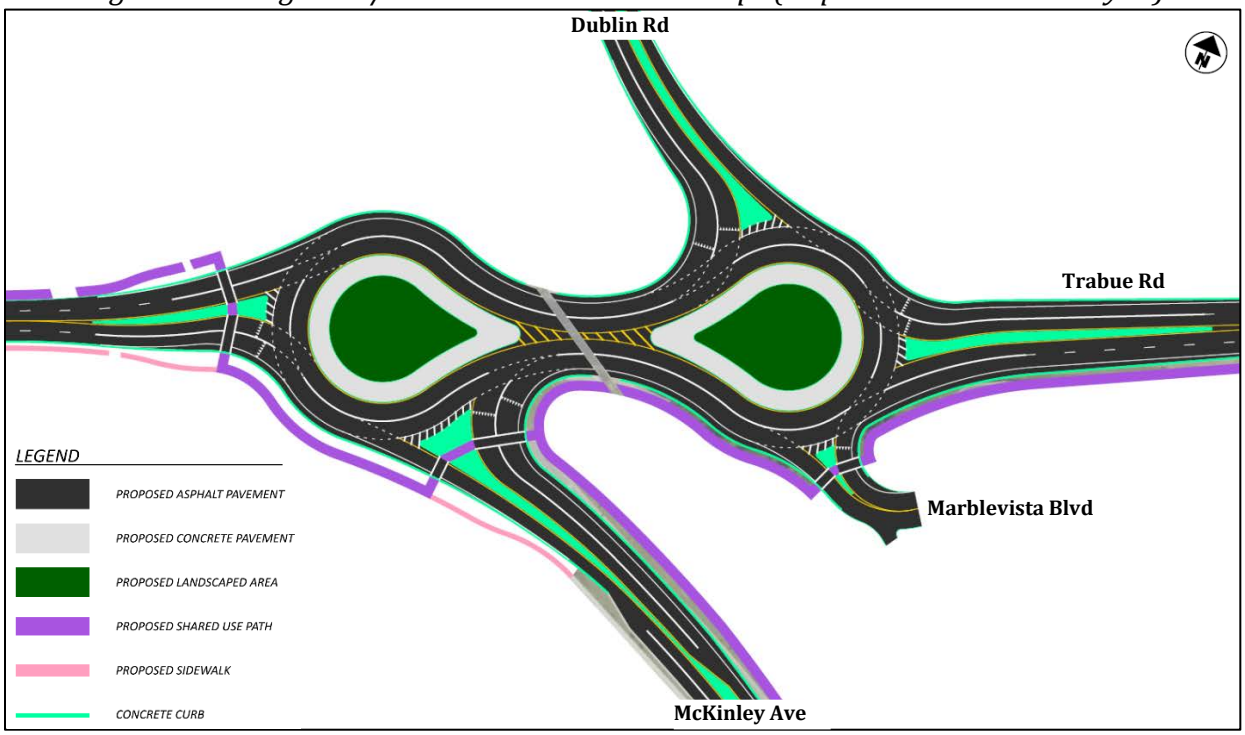
Figure 13 – Superstreet Concept (found to be not feasible)*



*Not representative of the RTMC

2. Dog-bone/peanut roundabout concept – see **Figure 14**
    - This concept would require additional analysis to further determine feasibility.

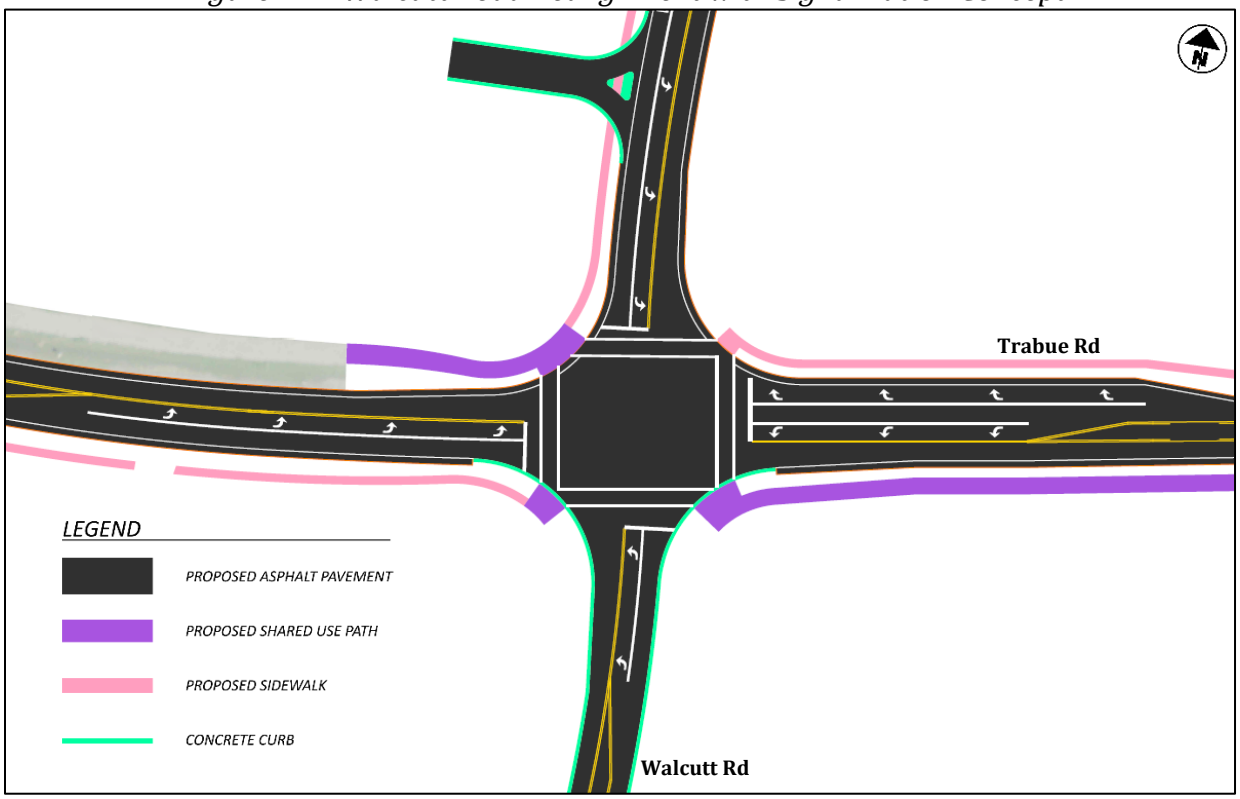
Figure 14 – Dog-bone/Peanut Roundabout Concept (requires additional analysis)



Analysis was also completed for two concepts that would include the realignment of Walcutt Road. These alternatives included:

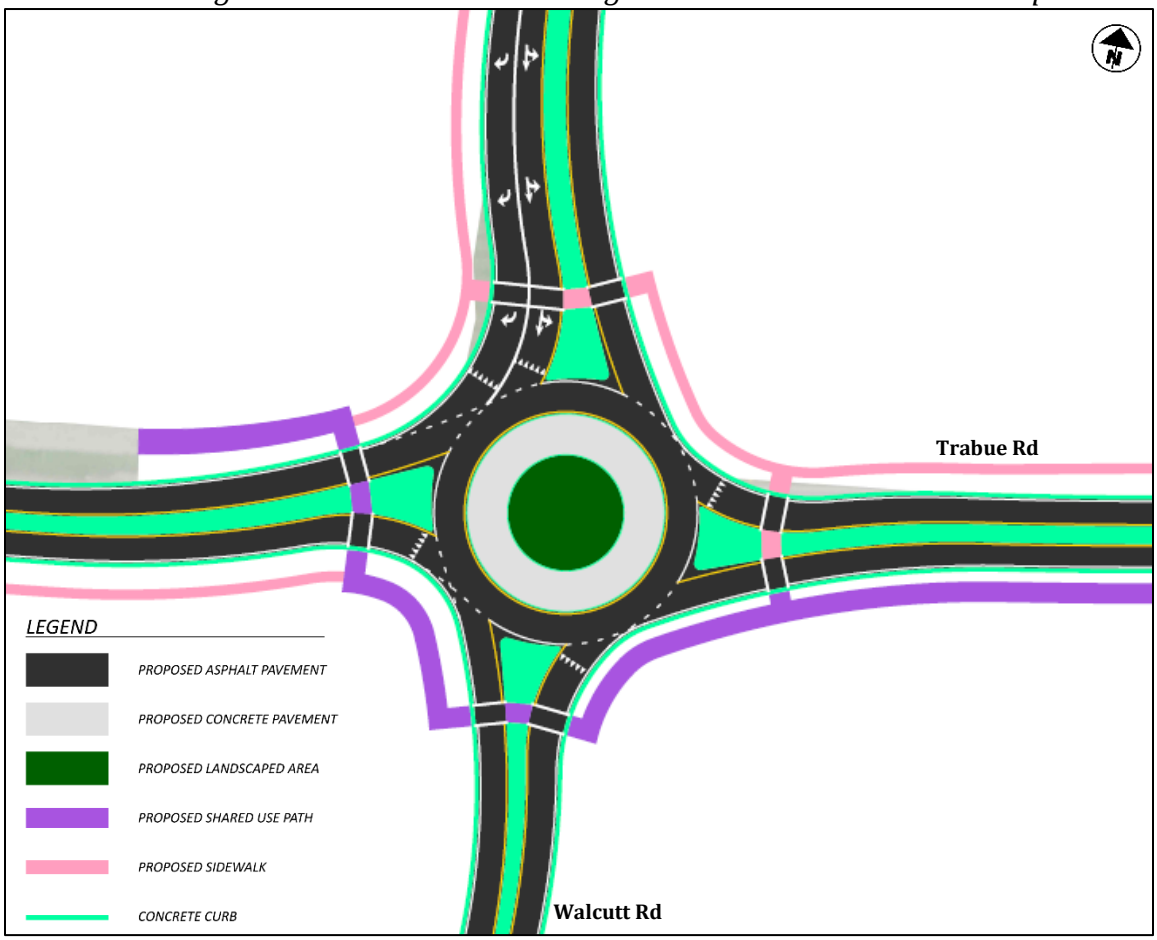
1. Realignment with signalization – see **Figure 15**

Figure 15 – Walcutt Road Realignment with Signalization Concept



2. Realignment with roundabout – see **Figure 16**

Figure 16 – Walcutt Road Realignment with Roundabout Concept



Capacity analysis for the Trabue Road with McKinley Avenue and Dublin Road/Marblevista Boulevard alternative configurations can be seen in **Table 12** while V/C and queuing analysis results can be seen in **Table 13**. Analysis of the dog bone roundabout was conducted using Sidra software. All alternatives analysis files can be found in **Appendix P.**

Per City of Columbus request, an additional analysis was conducted at the Trabue Road & Wilson Road intersection to determine if an alternate eastbound approach configuration of converting one of two through lanes to be a shared through-right lane would improve capacity and queuing conditions. The capacity and queuing results from this analysis can be seen in **Table 14** and **Table 15**, respectively. Ultimately, this configuration is not recommended as it does not mitigate the capacity issues on the eastbound approach, and also causes the northbound left movement to exhibit a V/C ratio of 0.988. Alternate phasing schema, similar to N. High Street at Henderson Road, could be considered. Phasing with a lagging left northbound, so the right-turn overlap will run mid-cycle instead of immediately after the green ball was attempted. This phasing did not improve operations.

Table 12 - Alternative Intersection Capacity Analysis Summary

Intersection Name	Approach	2045			
		Superstreet		Dog Bone Roundabout	
		AM	PM	AM	PM
Trabue Road & McKinley Avenue	Eastbound	B/19.2	B/12.1	B/10.5	A/6.9
	Westbound	B/11.4	A/6.9	A/9.0	A/6.7
	Northbound	B/16.9	C/26.8	A/8.5	A/7.0
	Total	**B/16.1**	**B/12.9**	**A/9.4**	**A/6.8**
Dublin Road/ Marblevista Boulevard & Trabue Road	Eastbound	B/13.9	A/8.9	A/4.6	A/5.9
	Westbound	A/5.6	A/7.9	A/4.6	A/9.8
	Northbound	A/6.2	A/1.7	A/8.9	A/8.3
	Southbound	C/25.3	C/26.6	A/5.4	A/9.3
	Total	**B/14.8**	**B/11.3**	**A/4.9**	**A/8.1**
Trabue Road & West U-Turn	Eastbound	A/0.3	A/0.3		
	Westbound	A/0.1	A/0.2		
	Total	**A/0.2**	**A/0.3**		
Trabue Road & Lake Shore Drive/ East U-Turn	Eastbound	C/21.7	B/17.5		
	Westbound	B/16.5	B/19.4		
	Northbound	C/31.2	D/36.1		
	Southbound	C/34.6	D/53.6		
	Total	**C/22.6**	**C/22.6**		

Table 13 – Alternative Intersection V/C Ratio and Queuing Analysis Summary

Alternative	Intersection Name	Approach	Movement	Storage Space	2045			
					AM		PM	
					V/C	Queue (Avg/95th %)*	V/C	Queue (Avg/95th %)*
Superstreet	Trabue Road & McKinley Avenue	Eastbound	Thru	810’	0.69	140’/268’	0.45	126’/223’
			Thru/Right	810’		165’/311’		147’/256’
		Westbound	Thru	205’	0.48	94’/160’	0.50	84’/138’
		Northbound	Left	335’	0.13	34’/77’	0.51	101’/179’
			Right	335’	0.46	56’/111’	0.68	74’/127’
	Dublin Road/ Marblevista Boulevard & Trabue Road	Eastbound	Thru	205’	0.60	61’/127’	0.43	132’/192’
			Thru/Right	205’		42’/111’		91’/192’
		Westbound	Thru	1,170’	0.28	32’/79’	0.38	74’/135’
			Right	525’	0.36	0’/0’	0.66	0’/0’
		Northbound	Right	40’	0.31	37’/73’	0.20	29’/61’
		Southbound	Left	2000’	0.74	145’/223’	0.60	103’/170’
			Right	500’	0.45	55’/104’	0.50	59’/109’
	Trabue Road & West U-Turn	Eastbound	Thru	~1307’	0.24	79’/151’	0.21	63’/120’
		Westbound	U-Turn	390’	0.00	129’/217’	0.00	142’/238’
			Thru	~740’	0.16	0’/0’	0.32	0’/0’
	Trabue Road & Lake Shore Drive/ East U-Turn	Eastbound	U-Turn	440’	0.25	127’/206’	0.72	180’/279’
			Left	440’	0.25	50’/100’	0.72	101’/184’
			Thru/Right	1,170’	0.51	116’/200’	0.32	71’/141’
		Westbound	Left	165’	0.04	7’/26’	0.05	24’/113’
			Thru/Right	1,550’	0.37	86’/173’	0.78	899’/1503’
		Northbound	Left	100’	0.06	8’/29’	0.10	9’/32’
			Thru/Right	200’	0.06	11’/31’	0.18	21’/48’
		Southbound	Left	225’	0.44	85’/144’	0.49	71’/136’
			Thru/Right	200’	0.67	65’/121’	0.85	74’/135’
Dog Bone Roundabout	Trabue Road & McKinley Avenue	Eastbound	Thru	~760’	0.432	---/83.6’	0.320	---/50.2’
			Thru/Right	~760’	0.432	---/89.8’	0.320	---/56.5’
		Westbound	U-Turn/Left/Thru	~150’	0.497	---/0.0’	0.505	---/0.0’
			Thru	~150’	0.353	---/0.0’	0.505	---/0.0’
		Northbound	Right	~285’	0.250	---/37.1’	0.339	---/47.5’
	Dublin Road/ Marblevista Boulevard & Trabue Road	Eastbound	U-Turn/Left/Thru	~155’	0.486	---/0.0’	0.467	---/0.0’
			Thru/Right	~155’	0.486	---/0.0’	0.467	---/0.0’
		Westbound	Thru	~1,120’	0.251	---/1.4’	0.696	---/206.8’
			Thru/Right	~1,120’	0.251	---/1.4’	0.696	---/220.3’
		Northbound	Left/Thru/Right	~295’	0.089	---/0.3’	0.070	---/6.4’
		Southbound	Right	~1,950’	0.443	---/2.4’	0.473	---/88.6’

Note: red text denotes unacceptable V/C ratio or queue which exceeds available storage.
**Sidra roundabout analysis outputs provide 95th percentile queues only. Average queue lengths are not provided for the roundabout analysis.*

Table 14 – Wilson Road Alternative Intersection Capacity Analysis Summary

Intersection Name	Approach	2045 Eastbound Approach Alternative	
		AM	PM
Trabue Road & Wilson Road	Eastbound	D/39.1	D/45.1
	Westbound	C/34.1	D/37.4
	Northbound	C/31.7	D/46.3
	Southbound	C/28.3	C/34.2
	Total	**C/33.6**	**D/41.6**

Table 15 – Wilson Road Alternative Intersection V/C Ratio and Queuing Analysis Summary

Alternative	Intersection Name	Approach	Movement	Storage Space	2045			
					AM		PM	
					V/C	Queue (Avg/95th %)	V/C	Queue (Avg/95th %)
Eastbound Approach	Trabue Road & Wilson Road	Eastbound	Left	420’	0.18	36’/75’	0.21	118’/388’
			Thru/Right	615’	0.91	177’/283’	0.99	380’/643’
			Right	410’	0.36	51’/94’	0.51	218’/488’
		Westbound	Left	500’	0.71	73’/133’	0.89	95’/163’
			Thru	770’	0.29	69’/126’	0.46	134’/215’
			Right	220’	0.28	33’/74’	0.30	32’/66’
		Northbound	Left	555’	0.89	239’/437’	0.99	323’/572’
			Thru	720’	0.58	166’/417’	0.43	156’/419’
			Right	720’	0.31	39’/236’	0.29	30’/140’
		Southbound	Left	290’	0.39	57’/116’	0.34	66’/118’
			Thru/Right	285’	0.33	89’/137’	0.55	126’/193’

Note: red text denotes unacceptable V/C ratio or queue which exceeds available storage.

X. Proposed Improvements and Evaluation

A. Conceptual Plan Development

A concept plan was developed for the previously described intersection improvements and alternatives. Planned improvements, being implemented by others, and proposed improvements recommended by this study are included. The superstreet alternative was dismissed from further evaluation because it was determined to be infeasible due to physical constraints of the roadway and surrounding area. Pedestrian and bicycle infrastructure was recommended, assuming a shared-use path on one side of the roadway and sidewalk on the other in various locations. Crossing infrastructure was recommended where appropriate based on existing/proposed infrastructure and complimentary land uses. See concept plans in **Appendix Q**.

B. Cost Estimates

The concept plan previously described was parsed into projects sections based on logical termini and separation points. See **Appendix Q** for each section. Note, these sections can be grouped or further parsed as determined necessary as funding and improvement opportunities arise. Planning-level cost estimates were developed for each section. The construction cost estimate assumes the following:

- 30% contingency
- 15% engineering design
- 10% environmental, geotechnical, federal requirements
- 20% inflation rate for an estimated 2026 construction year
- Right-of-way impacts (includes 30% contingency)
- Utility relocation costs are not included

The total estimated cost for each section is summarized in **Table 16**. Detailed cost estimates are provided in **Appendix Q**.

C. Evaluation Matrix

In order to further assess, compare, and prioritize the recommended improvements, an evaluation matrix was developed. The criteria utilized were developed based on the previously described goals and objectives, paired with the engineering/planning efforts developed in this study.

Table 16 shows the ratings of each section for each of the evaluation criteria. A legend identifying the color code for high negative impact, some negative impact, minimal impact/no change, moderate benefit, and high benefit is provided below the table. Each criteria is listed below, with information accounted for when rating described, as needed:

- Environmental impacts
  - Stream and land impacts identified from concept plans and cost estimates showing varying levels of negative impact
  - Otherwise shown as minimal impact
- Vehicle delay and travel time impacts

  - High benefit if improvements included
  - Some negative impact when adding pedestrian crossings
- Public perception
  - From discussions and comments received during public meeting
- Interconnectivity between developed areas
  - Moderate benefit if presence of areas to be connected
  - Minimal impact if no areas present to be connected
- Estimated construction and right-of-way costs
  - Per cost estimates in **Appendix Q**
- Right-of-way property and railroad impacts
  - Number of acres/parcels per cost estimates in **Appendix Q**
- Safety impacts - vehicular
  - Minimal impact if no new road improvements included
  - Moderate benefit if new/improved intersections/lanes included
- Safety impacts – non-vehicular
  - Moderate benefit if new shared use path and sidewalk included
  - High benefit if new/improved crossings included
- Mobility impacts - bicyclists
  - High benefit if new shared use path included
  - Moderate benefit if a mixture of new shared use path and/or sidewalk included
  - Minimal benefit if mostly just sidewalk included
- Mobility impacts – pedestrians
  - Each section includes the addition of at least sidewalk and shows a high benefit
  - The dog bone alternative is the only section that only shows a moderate benefit because routes may be more circuitous compared to the signalized alternative
- Mobility impacts – transit
  - A benefit is shown if access to bus stops via sidewalk or marked crosswalk is included that was previously "inaccessible"
- Economic vitality
  - Moderate benefit shown if improvements connect people to commercial establishments
  - Otherwise shown as minimal impact
- Access to employment
  - Moderate benefit shown if improvements connect people to places they work/buses they can take to work
  - Otherwise shown as minimal impact

Table 16 – Evaluation Matrix

	Section 1	Section 2	Section 3	Section 4	Section 4A	Section 5	Section 6	Section 7	Section 8	Section 9	Section 9A	Section 10	Section 11	Section 12	Section 13	Section 14	Section 15	Section 16
	Renner	Renner	Renner	Trabue	Trabue	Trabue	Trabue	Trabue	Trabue	Trabue	Trabue	Trabue	McKinley	McKinley	McKinley	McKinley	McKinley	McKinley
	Spindler to Tanglewood	Keim to Rentra	Rentra to Trabue	Walcutt Signal	Walcutt RAB	Walcutt to RR	Bolingbrook to Tenagra	Frontage to Wilson	Wilson to Hague	RR to Quarry	Dog Bone	Quarry to Riverside	Trabue to W. 5th	W. 5th to Fisher	Fisher	Fisher to Harrison	Harrison to Harper	Harper to Grandview
Environmental Impacts	○	●	○	●	●	●	○	○	○	●	●	●	○	○	●	○	○	○
Vehicle Delay and Travel Time Impacts	○	○	○	●	●	●	○	●	●	○	●	●	●	○	○	●	○	○
Public Perception	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	●
Interconnectivity Between Developed Areas	●	●	●	●	●	○	●	●	●	●	●	●	●	●	○	●	●	●
Estimated Construction Costs	$0.80M	$0.29M	$0.63M	$2.45M	$3.24M	$0.26M	$0.86M	$0.87M	$2.68M	$1.40M	$8.65M	$3.11M	$1.05M	$1.03M	$0.31M	$0.61M	$0.88M	$0.99M
Estimated Right-of-Way Costs	$0.59M	$0.32M	$0.32M	$0.23M	$0.21M	$0.10M	$0.28M	$0.39M	$1.50M	$0.34M	$0.92M	$0.87M	$0.82M	$0.29M	$0	$0.40M	$0.25M	$0.44M
Right-of-Way Property Impacts (Number of Acres/Parcels)	*1.23 acres 21 parcels*	*0.73 acres 11 parcels*	*0.60 acres 12 parcels*	*0.77 acres 3 parcels*	*0.68 acres 4 parcels*	*0.40 acres 2 parcels*	*0.95 acres 7 parcels*	*0.59 acres 16 parcels*	*5.70 acres 34 parcels*	*0.71 acres 12 parcels*	*3.86 acres 17 parcels*	*3.33 acres 16 parcels*	*4.44 acres 7 parcels*	*1.63 acres 2 parcels*	*0 acres 0 parcels*	*1.84 acres 6 parcels*	*0.74 acres 4 parcels*	*1.12 acres 14 parcels*
Right-of-Way Railroad Impacts	No	No	No	No	No	No	No	No	No	*Yes*	*Yes*	No	No	No	No	*Yes*	*Yes*	No
Safety Impacts – Vehicular	○	○	○	○	●	○	○	○	○	○	●	●	○	○	○	○	○	○
Safety Impacts – Non-Vehicular	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Mobility Impacts – Bicyclists	●	○	●	●	●	○	●	●	●	●	●	○	●	●	○	●	●	●
Mobility Impacts – Pedestrians	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Mobility Impacts – Transit	○	●	●	○	○	●	●	●	●	○	○	○	●	○	○	○	○	●
Economic Vitality	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
Access to Employment	○	●	●	●	●	●	●	○	○	○	○	○	○	○	○	○	○	●

● **High Negative Impact** ● **Some Negative Impact** ○ **Minimal Impact** ● **Moderate Benefit** ● **High Benefit**

D. Constraints of the Corridor

The RTMC Corridor provides many challenges, including but not limited to diverse topography, limited right-of-way, railroad crossings, and multiple bridges. All future improvements will require additional feasibility analysis and potential alterations to the concepts brought forward in this study.

XI. Recommendations

Based on the analysis and improvement options herein, it is recommended that this document be used as a planning tool to inform future infrastructure decisions. As developments and infrastructure projects arise, incorporate improvements according to this study where feasible. The overall objective of this study is to provide multimodal connectivity to all users of this corridor, and ensure equitable access is provided to the entire community of residents, workers, and visitors.

This study provides conceptual recommendations for the corridor, addressing the core objectives determined during the inauguration of the project; improve mobility in the RTMC, maximize economic vitality, improve health and safety, and improve access to employment. Multimodal improvements should be prioritized along the corridor as they align with community sentiment, as well as multiple City plans including Vision Zero 2.0 and the Climate Action Plan.

There are several funding sources which can be sought to begin implementing recommended solutions, including but not limited to:

- MORPC attributable funding
- ODOT systemic safety funding
- ODOT transportation alternatives program (TAP) funding

This study will be utilized as a planning tool to inform future infrastructure decisions where feasible and to seek funding for proposed improvements.