Renaissance Infrastructure Consulting

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# TRAFFIC IMPACT STUDY

## Heartland Market

### Lee's Summit, MO


Prepared For:

Great American Dream LLC

Prepared By:

Renaissance Infrastructure Consulting

October 2022

October 14, 2022

Great American Dream LLC
Jack Hopkins
PO BOX 200
Raymore, MO 64083

**RE: NE Colbern Road & NE Rice Road C-Store - Traffic Impact Study**
**Lee's Summit, MO**

Dear Jack Hopkins,

In response to your request, RIC has completed a traffic impact study for a proposed Convenience Store to be located northeast of NE Colbern Road & Rice Road in Lee's Summit, MO. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system. The following report documents our analysis and recommendations.

Please do not hesitate to contact us should you have any questions.

Sincerely,

**Renaissance Infrastructure Consulting**

Grant Niehus, PE, PTOE
Traffic Engineer

# Contents

# 1 Introduction

In response to your request, Renaissance Infrastructure Consulting (RIC) has completed the following Traffic Impact Study (TIS) for a proposed development in Lee's Summit, MO. The purpose of this study was to assess the impact of the proposed development on the existing roadway network. To evaluate the increase of traffic on adjacent streets, the number of trips in the AM and PM peak periods were estimated. Existing traffic counts were collected to conduct a capacity analysis at the study intersections. The study also includes analysis on access management and provides recommendations for proposed geometric and traffic control improvements that may be necessary for the proposed development.

*Figure 1 – Project Location*

# 2 Study Scope

Guidance provided by the City of Lee's Summit Access Management Code and MoDOT's Engineering Policy Guide were used in the development of this study and its associated scope.

## *2.1 Study Area*

Based on discussions with the city and MoDOT, the study area for this TIS includes the following intersections:

- *Missouri Route 291 Northbound Ramp & NE Colbern Road*
- *NE Colbern Road & NE Rice Road*
- *NE Colbern Road & NE Todd George Parkway*
- *NE Colbern Road & Lucky Road*
- *NE Rice Road & Ikerd Road*

## *2.2 Analysis Scenarios*

For this traffic study, analysis was completed for the following scenarios:

- *Existing Conditions*
- *Existing Plus Proposed Conditions*

## *2.3 Analysis Methodology*

For all study intersections, trip generation estimates were developed for both the AM and PM peak hours using ITE's Trip Generation Manual, 11$^{th}$ Edition. Intersection Capacity Analysis was performed using PTV VISTRO 2022 which uses Highway Capacity Manual (HCM) methodology for the analysis.

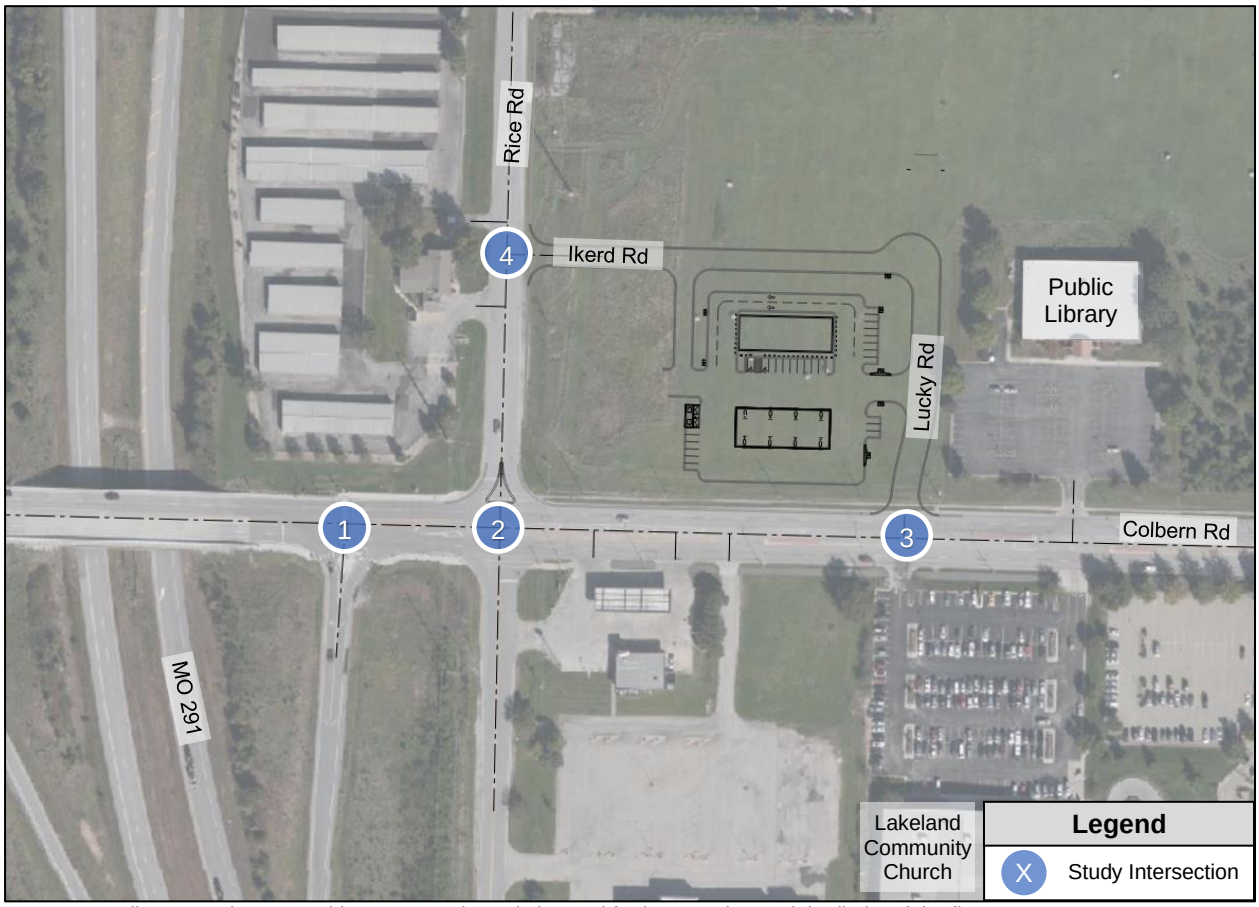
# 3 Project Description

The proposed development is located northeast of Colbern Road and Rice Road in Lee's Summit, MO. It will include a gas station with 16 fueling stations and an associated convenience store on an approximately 1.70 acre lot. The site plan for the proposed development is included in **Appendix A**.

The proposed development will be accessed through two driveways, one on a yet to be built public road that extends east from Rice Road, north of Colbern Road. The other driveway is located on another yet to be built public road that extends north from Colbern Road. Both public roads are proposed to be constructed by the master developer of the larger property. Lucky Road will

intersect Colbern Road approximately 511 feet east of Rice Road measured center-to-center, aligning with the existing driveway of Lakeland Community Church, located south of Colbern Road. The other proposed public road, Ikerd Road is located approximately 352 feet north of Colbern Road, measured center-to-center.

*Figure 3 – Study Intersections*




**Note:** NE Colbern Road & NE Todd George Parkway is located further east beyond the limits of the figure

## *3.1 Existing Street Network and Land Uses*

Missouri Route 291 runs north/south and is located to the west of the proposed development. It is 4-lane divided roadway with a posted speed limit of 55 mph. It is classified as 'Other Principal Arterial' by MoDOT's Functional Classification Map and merges with Interstate 470 north of Colbern Road.

Northeast Colbern Road is located to the south of the proposed development. It is a 4-lane divided roadway supporting eastbound and westbound traffic with median openings and exclusive left turn lanes at each intersection. It is classified as 'Major Arterial' in Lee's Summit's Roadway Classification Map and has a posted speed limit of 40 mph.

Northeast Rice Road is located to the west of the proposed development. It is a 2-lane roadway supporting northbound and southbound traffic. It is classified as 'Commercial/ Industrial Collector' in Lee's Summit's Roadway Classification Map and has a posted speed limit of 45 mph to the north and 25 mph to the south of Colbern Road.

**Table 3.1 – Roadway Characteristics**

| Roadway | Functional Classification | Posted Speed | Travel Lanes | Sidewalks |
|---|---|---|---|---|
| MO Route 291 | Other Principal Arterial | 55 | 4 | No |
| NE Colbern Road | Major Arterial | 40 | 4 | Both Sides |
| NE Rice Road | Commercial/ Industrial Collector | 45(1) | 2 | No |

(1) 25 mph south of Colbern Road

The lot for the proposed development is currently vacant and is zoned as 'Planned Community Commercial (CP-2)' according to Lee's Summit's zoning map.

### *3.2 Existing Traffic Volumes*

Traffic Counts were collected on August 9th, 2022, between 7:00 - 9:00 AM and 4:00 - 6:00 PM. The collected traffic data revealed that all the intersections had a peak hour window of 7:15 – 8:15 AM and 4:30 – 5:30 PM. A summary of existing traffic counts is included in **Appendix B.**

Traffic counts were also collected at the Public Library driveway on Colbern Road on October 4th and 6th between 7:00 – 9:00 AM and 4:00 – 6:00 PM.

### *3.3 Planned Colbern Road Improvements*

Improvements to Colbern Road have been proposed by the master developer of the property that the Convenience Store/Gas Station is proposed to be located on. Those improvements include constructing a raised median on Colbern Road that restricts north and south Rice Road to right only movements. The median is planned to extend from Rice Road to Paradise Park Drive, with a break at the planned intersection of Lucky Road to provide a full-access intersection with eastbound and westbound left turn lanes.

# 4 Proposed Conditions

### *4.1 Trip Generation*

Trip generation estimates developed for this study are based on the 11th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE). The Manual is the most widely used industry resource for this type of data. The trip generation data are organized by land use types, with more than 170 different categories of land uses. For each category, the manual provides a data set for use in estimating the number of vehicle and person trips generated

by a site based on its characteristics such as physical size or intensity. Trips may be estimated by direction (entering or exiting the site) and for time periods typically pertaining to a full day (weekday or weekend), peak hours of the adjacent roadway, and peak hours of the particular land use. Used properly, the Trip Generation Manual provides an objective basis for estimating trips generated by a proposed development.

The ITE category Convenience Store/Gas Station was used to project traffic volumes for the proposed development using the listed intensity for the development. Both the AM and PM Peak hour trips were estimated based on projections from various studies included in ITE's Trip Generation Manual for the hours of 7-9 am & 4-6 pm, respectively. An average of 6,930 vehicles per day are expected to access the development for the Existing plus Proposed scenario.

**Table 4a – Trip Generation**

| Land Use | Intensity | ITE Code | Weekday Trips | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In | Out | Total | In | Out | Total |
| C-Store/Gas Station | 5,400 S.F.<br>16 Fueling Positions | 945 | 6,930 | 246 | 247 | 493 | 213 | 213 | 426 |

Convenience Store/Gas Station's typically generate significant pass-by vehicle trips, which represent trips which have other final destinations that are interrupted to visit the proposed development. Hence, pass-by trips do not add new traffic to the adjoining street system. The ITE Trip Generation Manual recommends an average pass-by rate of 76% for the AM Peak Hours and 75% for the PM Peak Hours for ITE Land Use 945, Convenience Store/Gas Station. For simplicity, an average pass-by rate of 75% for both the AM and PM peak periods was applied in this study.

As a general guideline, the number of pass-by trips assumed for a site should not exceed 10% of the adjacent street traffic. To check this, the calculated number of pass-by trips were compared to two-way volume on Colbern Road adjacent to the project site for each analysis hour. No more than 136 pass-by trips should be assumed for the AM peak hour analysis (10% of 1359), and 174 for the PM peak hour analysis (10% of 1733).

It is expected that diverted trips from MO-291 and I-470 will also contribute to the total trips for the development. A diverted trip represents a vehicle trip made as an intermediate stop while traveling from an origin to a primary destination with a route diversion from a primary route to another roadway to gain access to the site. A diverted trip reduction was calculated by subtracting the pass-by trips after the 10 percent check was applied, from the average pass-by rate of 75% provided by ITE, resulting in approximately 48% and 34% of the total trips for AM and PM peak hours, respectively. The results of the pass-by reduction and diverted trips are included in **Table 3**.

| Table 4b – Trip Generation w/ Pass-By and Diverted Trips Reduction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Land Use** | **Intensity** | **ITE Code** | **AM Peak Hour** | | | **PM Peak Hour** | | |
| | | | **In** | **Out** | **Total** | **In** | **Out** | **Total** |
| C-Store/Gas Station | 5,400 S.F. | 945 | 246 | 247 | 493 | 213 | 213 | 426 |
| **Pass-by Trips** (1) | | | -68 | -68 | -136 | -87 | -87 | -174 |
| **Diverted Trips** (2) | | | -117 | -117 | -234 | -73 | -73 | -146 |
| **Total New Development Trips** | | | **61** | **62** | **123** | **53** | **53** | **106** |

(1) Pass-by Trips are reported as 10% of the adjacent, two-way, traffic on Colbern Road.

(2) Diverted Trips are reported as 48% and 34% for the AM and PM peak hours, respectively, of the total trips

## *4.2 Trip Distribution*

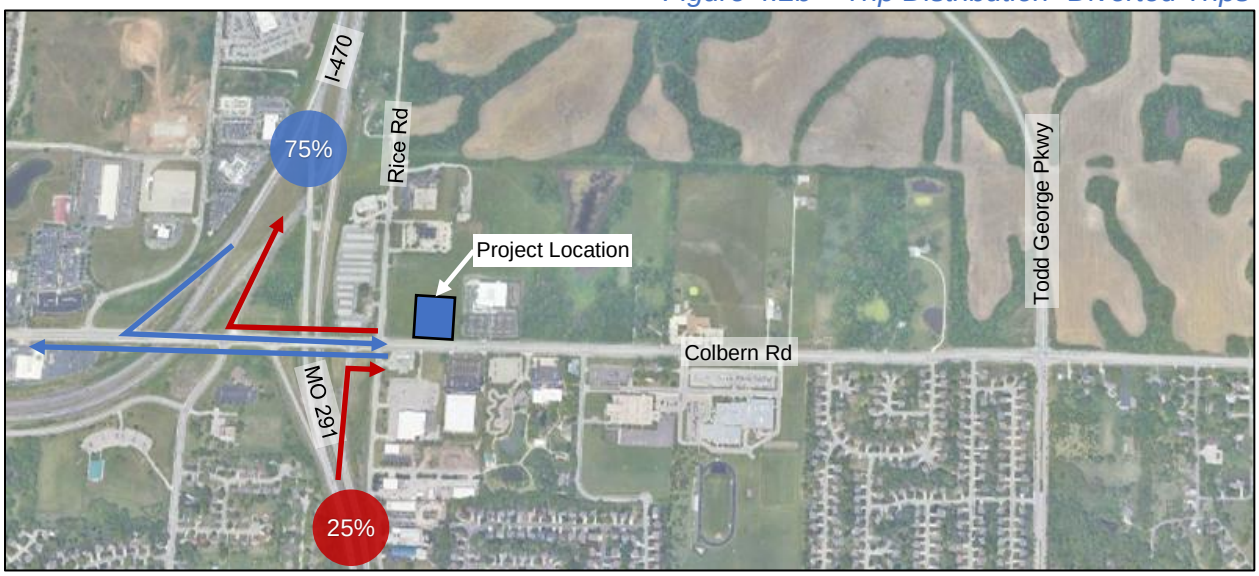
The traffic generated by the proposed development was distributed to the adjacent roadway system based on engineering judgement. It is anticipated that a significant portion of the primary trips (trips navigating to a destination and returning back to their original departure location) will be arriving on Colbern Road from the east (50%) and west (30%) directions. Remaining traffic will be arriving from the north (10%) and south (10%) directions using Rice Road as shown in **Figure 4.2a**.

*Figure 4.2a – Trip Distribution – Primary Trips*


The trips arriving from the west and south directions will be required to use Lucky Road to access the development due to the right-in/right-out restriction at Rice Road. The trips from the north will access the development via Ikerd Road.

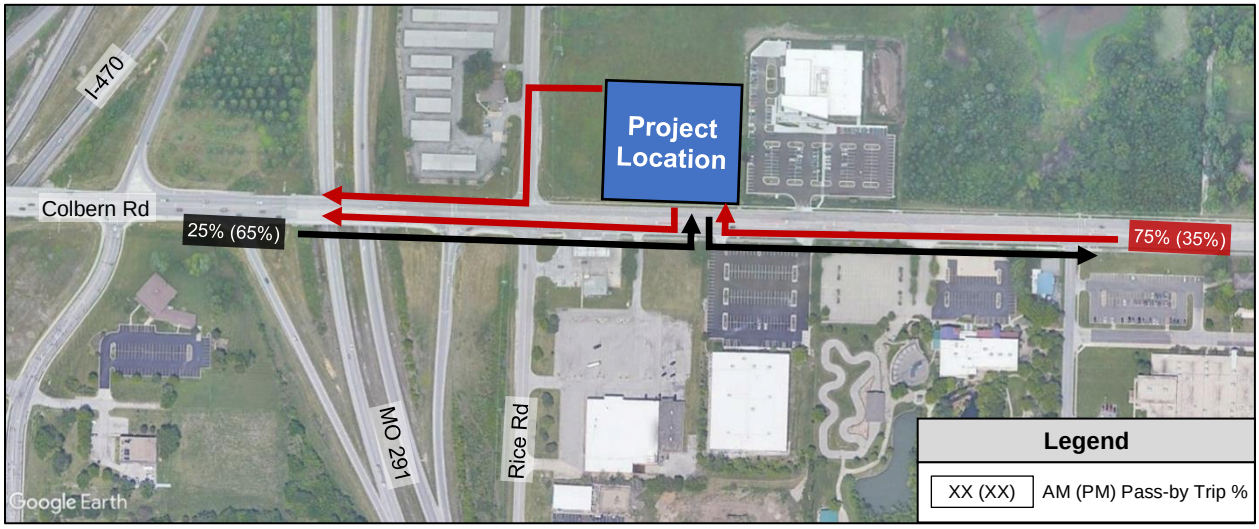
A 75/25 split was applied for the diverted trips arriving from I-470 and MO-291 based on the directional peak hour data for the past five years obtained from MoDOT's traffic volume map as shown in **Figure 4.2b**. All diverted trips will enter the proposed development using the proposed Lucky Road and a 50/50 split was applied between Lucky Road and Rice Road for the exiting diverted trips.

*Figure 4.2b – Trip Distribution- Diverted Trips*




The pass-by trip percentage distribution for both AM and PM peak hours was based on adjacent street traffic volume on Colbern Road as shown in **Figure 4.2c**. All pass-by trips are expected to enter via Lucky Road. Traffic exiting and going east will be required to use Lucky Road and traffic exiting to go west is expected to have a 50/50 split between Lucky Road and Rice Road.

*Figure 4.2c – Trip Distribution - Pass-by Trips*



### *4.3 Access Management*

The curb radius requirements for the two proposed private driveways, one on Lucky Road and the other on Ikerd Road were analyzed against the Lee's Summit's design criteria. A minimum curb radius of 35 feet measured at the back of the curb is required for a driveway on a Commercial Collector, while both driveways are proposed with a curb radius of 20 feet. It is recommended that both driveway curb radii are increased to 35 feet to meet Lee's Summit's minimum requirements.

Minimum throat length for each driveway was analyzed against Lee's Summit Access Management Code. The driveway on Ikerd Road should have a minimum throat length of 75 feet and the driveway on Lucky Road should have a minimum throat length of 100 feet based on the projected peak hour trips accessing each driveway and using an adjacent Roadway Classification of Local. The throat length of the driveway on Ikerd Road, measured at 120 feet, exceeds the minimum requirement. However, the proposed driveway on Lucky Road, measured at 60 feet, does not meet the minimum requirement of 100 feet. It is recommended that the throat length be increased to meet city requirements.

Lee's Summit requires a 28 ft. driveway width for a Low Volume approach and 42 ft. for a Medium Volume approach based on their Access Management Code. The proposed driveway on Ikerd Road has a width of 21 feet, whereas the driveway on Lucky Road has a width of 32 feet. The driveway on Ikerd is expected to fall under the Low Volume approach classification so it is recommended that the approach be widened to 28 feet. The driveway on Lucky Road is expected to fall under the Medium Volume driveway classification so it is recommended that the approach be widened to 42 feet.

The access spacing criteria for both proposed driveways were analyzed based on guidelines in Lee's Summit Access Management Code. The proposed driveway on Ikerd Road should be located at least 125 feet from Rice Road to meet city requirements for spacing on Commercial Local roads. The driveway on Ikerd Road, measured at approximately 225 feet from Rice Road, measured center-to-center, exceeds the minimum required spacing.

The proposed driveway on Lucky Road should be located at least 300 feet from Colbern Road, measured center-to-center, to meet Lee's Summit's connection spacing requirements on a Commercial Collector. However, capacity analysis in section 5.3 shows that the 95$^{th}$ percentile queue length on the southbound approach to Colbern Road on Lucky Drive is not expected to exceed 50 feet. The current spacing of approximately 180 feet would provide enough stacking distance for vehicles on the southbound approach of Colbern Road & Lucky Road.

The proposed improvements to Colbern Road call for constructing a raised median at the current driveway entrance to the Public Library. This will require an entrance on Lucky Road to provide access to traffic traveling eastbound on Colbern Road. Similar to the proposed gas station

driveway, city guidelines for Commercial Collectors require driveway spacing of 300 feet. However, the queue lengths on the southbound approach are not expected to exceed 50 feet in the Existing Plus Proposed with Improvements scenario.

# 5 Intersection Capacity Analysis

To analyze the existing traffic, operating conditions were analyzed using PTV Vistro, a macroscopic analysis and optimization software. PTV Vistro is based on study procedures outlined in the Highway Capacity Manual, 7th edition. The analysis determines the "Level of Service" of the intersections and is based on factors such as the number and types of lanes, signal timing, traffic volumes, pedestrian activity, etc. This manual, which is used universally by traffic engineers to measure roadway capacity, establishes six levels of traffic service: Level A ("Free Flow") to Level F ("Fully Saturated").

**Table 5 – Level of Service Criteria**

| Level of Service | Signalized Intersection (sec/veh) | Unsignalized Intersection (sec/veh) |
|---|---|---|
| A | < 10 seconds | < 10 seconds |
| B | < 20 seconds | < 15 seconds |
| C | < 35 seconds | < 25 seconds |
| D | < 55 seconds | < 35 seconds |
| E | < 80 seconds | < 50 seconds |
| F | ≥ 80 seconds | ≥ 50 seconds |

Level of Service "D" is typically considered the minimum acceptable LOS, however in some cases Level of Service "E" is acceptable in peak times. The above table shows the thresholds for Levels of Service A through F for unsignalized intersections.

Intersection capacity analysis was performed for Existing Conditions and Existing + Proposed Conditions scenarios. Detailed capacity analysis can be found in **Appendix C**.

## *5.1 MO-291 Northbound Ramp & NE Colbern Road*

**Table 5.1** summarizes the LOS, control delay, and 95th percentile queue lengths at the existing ramp off MO-291.

**Table 5.1 – MO-291 Northbound Ramp & NE Colbern Road**

| Condition | Measure | NB | | EB | WB | Intersection |
|---|---|---|---|---|---|---|
| | | NBL | NBR | EBT | WBT | LOS (Delay) |
| **AM Peak Hour** | | | | | | |
| Existing Conditions | LOS (Delay) | D (46.6) | | A (3.1) | A (4.7) | A (8.3) |
| | 95% Queue | 173' | 173' | 28' | 124' | |
| Existing plus Proposed Conditions | LOS (Delay) | D (46.6) | | A (3.2) | A (5.1) | A (8.1) |
| | 95% Queue | 173' | 173' | 36' | 149' | |
| **PM Peak Hour** | | | | | | |
| Existing Conditions | LOS (Delay) | B (15.5) | | A (6.4) | A (5.7) | A (6.8) |
| | 95% Queue | 38' | 38' | 38' | 25' | |
| Existing plus Proposed Conditions | LOS (Delay) | B (16.9) | | A (6.3) | A (5.7) | A (6.8) |
| | 95% Queue | 43' | 43' | 44' | 31' | |

As shown in **Table 5.1**, the intersection is expected to operate with acceptable conditions in both the Existing conditions and Existing and Proposed conditions scenarios.

## *5.2 NE Colbern Road & NE Rice Road*

**Table 5.2** summarizes the LOS, control delay, and 95$^{th}$ percentile queue lengths at the intersection of Colbern Road and Rice Road.

**Table 5.2 – NE Colbern Road & NE Rice Road**

| Condition | Measure | NB | SB | EB | | | WB | | |
|---|---|---|---|---|---|---|---|---|---|
| | | NBLTR | SBLTR | EBL | EBT | EBTR | WBL | WBT | WBTR |
| **AM Peak Hour** | | | | | | | | | |
| Existing Conditions | LOS (Delay) | D (31.4) | C (17.1) | A (0.8) | | | A (0.1) | | |
| | 95% Queue | 25' | 25' | 25' | 25' | 25' | 25' | 25' | 25' |
| Existing plus Proposed Conditions | LOS (Delay) | B (10.1)* | C (16.1)* | - | A (0.0) | | A (0.3) | | |
| | 95% Queue | 25'* | 27'* | - | 25' | 25' | 25' | 25' | 25' |
| **PM Peak Hour** | | | | | | | | | |
| Existing Conditions | LOS (Delay) | F (108.7) | D (33.7) | A (0.5) | | | A (0.2) | | |
| | 95% Queue | 70' | 53' | 25' | 25' | 25' | 25' | 25' | 25' |
| Existing plus Proposed Conditions | LOS (Delay) | C (15.6)* | B (12.6)* | - | A (0.0) | | A (0.7) | | |
| | 95% Queue | 25'* | 25'* | - | 25' | 25' | 25' | 25' | 25' |

* Restricted to right-in/right-out access.

As shown in **Table 5.2**, the northbound approach operates with a LOS D and F in the Existing Condition scenario for the AM and PM peak period, respectively.

In the Existing plus Proposed Conditions, the southbound and northbound approach is planned to operate as a right-in/right-out approach due to the proposed raised median and is expected to

operate with an acceptable LOS.

### *5.3 NE Colbern Road & NE Lucky Road*

**Table 5.3** summarizes the LOS, control delay, and 95th percentile queue lengths at the intersection of Colbern Road and Lucky Road.

**Table 5.3 – NE Colbern Road & Lucky Road**

| Condition | Measure | NB | SB | | EB | | | WB | | Intersection |
|---|---|---|---|---|---|---|---|---|---|---|
| | | NBLTR | SBLT | SBR | EBL | EBT | EBR | WBL | WBTR | LOS (Delay) |
| **AM Peak Hour** | | | | | | | | | | |
| Existing plus Proposed Conditions (Stop Controlled) | LOS (Delay) | F (68.4) | F (565.5) | | A (10.8) | | | A (0.0) | | |
| | 95% Queue | 25' | 260' | 25' | 87' | 25' | 25' | 25' | 25' | |
| Existing plus Proposed Conditions (Signalized) | LOS (Delay) | A (0.0) | B (19.6) | | A (9.0) | | | B (18.7) | | B (16.0) |
| | 95% Queue | 25' | 42' | 25' | 26' | 41' | 41' | 25' | 242' | |
| **PM Peak Hour** | | | | | | | | | | |
| Existing plus Proposed Conditions (Stop Controlled) | LOS (Delay) | F (455.2) | F (1006.5) | | A (2.5) | | | A (0.0) | | |
| | 95% Queue | 58' | 380' | 25' | 46' | 25' | 25' | 25' | 25' | |
| Existing plus Proposed Conditions (Signalized) | LOS (Delay) | C (23.9) | B (13.0) | | B (13.2) | | | B (18.4) | | B (14.3) |
| | 95% Queue | 25' | 43' | 25' | 49' | 185' | 184' | 25' | 128' | |

As shown in **Table 5.4**, both northbound and southbound approaches are expected to have a LOS F, with the southbound approach having an average delay per vehicle of over 10 minutes.

A second scenario was developed that modeled the intersection as a signal. (See Section 6 for Signal Warrant Analysis) The intersection is expected to operate with an acceptable LOS in this scenario.

### *5.4 NE Rice Road & NE Ikerd Road*

**Table 5.4** summarizes the LOS, control delay, and 95th percentile queue lengths at the intersection of Rice Road and Ikerd Road.

**Table 5.4 – NE Rice Road & Ikerd Road**

| Condition | Measure | NB | SB | WB |
|---|---|---|---|---|
| | | NBLTR | SBLTR | WBLTR |
| **AM Peak Hour** | | | | |
| Existing plus Proposed Conditions | LOS (Delay) | A (0.0) | A (2.3) | A (9.4) |
| | 95% Queue | 25' | 25' | 25' |
| **PM Peak Hour** | | | | |
| Existing plus Proposed Conditions | LOS (Delay) | A (0.0) | A (2.4) | A (9.7) |
| | 95% Queue | 25' | 25' | 25' |

As shown in **Table 5.4**, the intersection is expected to operate with acceptable conditions for the Existing Conditions and Existing Conditions plus Proposed scenario.

### *5.5 NE Colbern Road & NE Todd George Parkway*

**Table 5.5** summarizes the LOS, control delay, and 95th percentile queue lengths at the intersection of Colbern Road and Todd George Parkway.

**Table 5.5 – NE Colbern Rd & NE Todd George Parkway**

| Condition | Measure | NB | | | SB | | | EB | | | WB | | | Intersection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NBL | NBT | NBR | SBL | SBT | SBTR | EBL | EBT | EBR | WBL | WBT | WBTR | LOS (Delay) |
| **AM Peak Hour** | | | | | | | | | | | | | | |
| Existing Conditions | LOS (Delay) | B (13.8) | | | B (13.0) | | | B (13.5) | | | B (15.4) | | | B (14.5) |
| | 95% Queue | 87' | 129' | 25' | 25' | 25' | 25' | 25' | 35' | 25' | 25' | 183' | 175' | |
| Existing plus Proposed Conditions | LOS (Delay) | B (14.3) | | | B (13.5) | | | B (13.6) | | | B (15.7) | | | B (14.8) |
| | 95% Queue | 91' | 135' | 25' | 25' | 25' | 25' | 25' | 47' | 25' | 25' | 199' | 192' | |
| **PM Peak Hour** | | | | | | | | | | | | | | |
| Existing Conditions | LOS (Delay) | B (15.0) | | | B (14.1) | | | B (16.6) | | | B (14.6) | | | B (15.3) |
| | 95% Queue | 41' | 118' | 25' | 79' | 79' | 78' | 25' | 170' | 46' | 25' | 96' | 92' | |
| Existing plus Proposed Conditions | LOS (Delay) | B (15.2) | | | B (14.3) | | | B (16.7) | | | B (14.7) | | | B (15.4) |
| | 95% Queue | 42' | 120' | 25' | 81' | 80' | 79' | 25' | 176' | 46' | 25' | 102' | 97' | |

As shown in **Table 5.3**, the intersection is expected to operate with acceptable conditions in both the Existing Conditions and Existing plus Proposed Conditions scenarios.

# 6 Signal Warrant Analysis

Traffic signal warrants were evaluated for the intersection of Colbern Road & Lucky Road for the Existing + Proposed scenario. To warrant traffic signalization, an intersection must satisfy one or more of the nine warrants presented in the MUTCD. However, the satisfaction of a signal warrant shall not in itself require the installation of a traffic signal.

The nine warrants outlined in the MUTCD are as follows:

- *Warrant 1, Eight-Hour Vehicular Volume*
- *Warrant 2, Four-Hour Vehicular Volume*
- *Warrant 3, Peak Hour*
- *Warrant 4, Pedestrian Volume*
- *Warrant 5, School Crossing*

- *Warrant 6, Coordinated Signal System*
- *Warrant 7, Crash Experience*
- *Warrant 8, Roadway Network*
- *Warrant 9, Intersection Near a Grade Crossing*

For the purpose of this study process, the traffic signal warrant evaluation was limited to Signal Warrant 3 for the existing plus proposed condition. Warrant 1 and 2 were not evaluated since the intersections were analyzed for a future proposed scenario. A brief description of the warrant, based on traffic volumes, as presented in the MUTCD is provided as follows:

## *6.1 Signal Warrant 3 - Peak-hour volume*

The Peak Hour Signal Warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This warrant is intended to apply for unusual cases where a facility generates or attracts an unusual amount of traffic over a short time.

Colbern Road & Lucky Road was analyzed against this warrant, and it was observed that a signal was warranted for the Existing + Proposed scenario. The signal warrant analysis was conducted in accordance with the methodology presented in Chapter 4C of the MUTCD. A detailed summary of the Signal Warrant Analysis is included in **Appendix D**.

*Figure 6.1 – Peak Hour Warrant*

**Warrant 3: Peak Hour Volume** **100%**

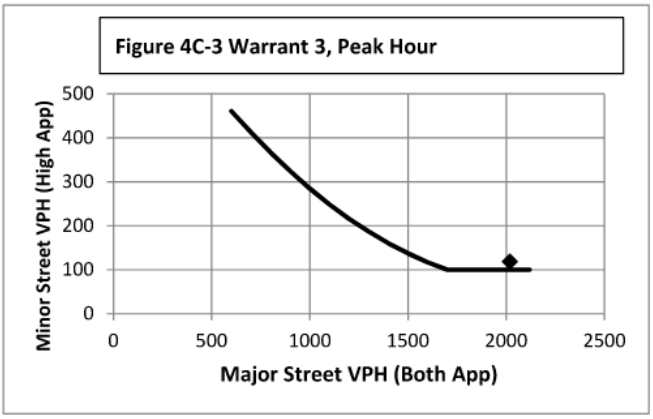
**Warrant Evaluated? Yes** **Warrant Satisfied? Yes** **Manually Set To:**

Condition justifying use of warrant:

| Criteria | | Met? |
|---|---|---|
| Delay on Minor Approach | 4 | |
| Volume on Minor Approach | 100 | Yes |
| Total Entering Volume (veh/h) | 800 | |

**Manually Set Peak Hour?**

| Peak Hour | Major Road Vol. (Both App.) | Minor Road Vol. (High App.) |
|---|---|---|
| 16:00 | 2019 | 118 |



# 7 Summary

RIC completed the preceding analysis to study the traffic impacts associated with a proposed development located northeast of NE Colbern Road & Rice Road in Lee's Summit, MO.

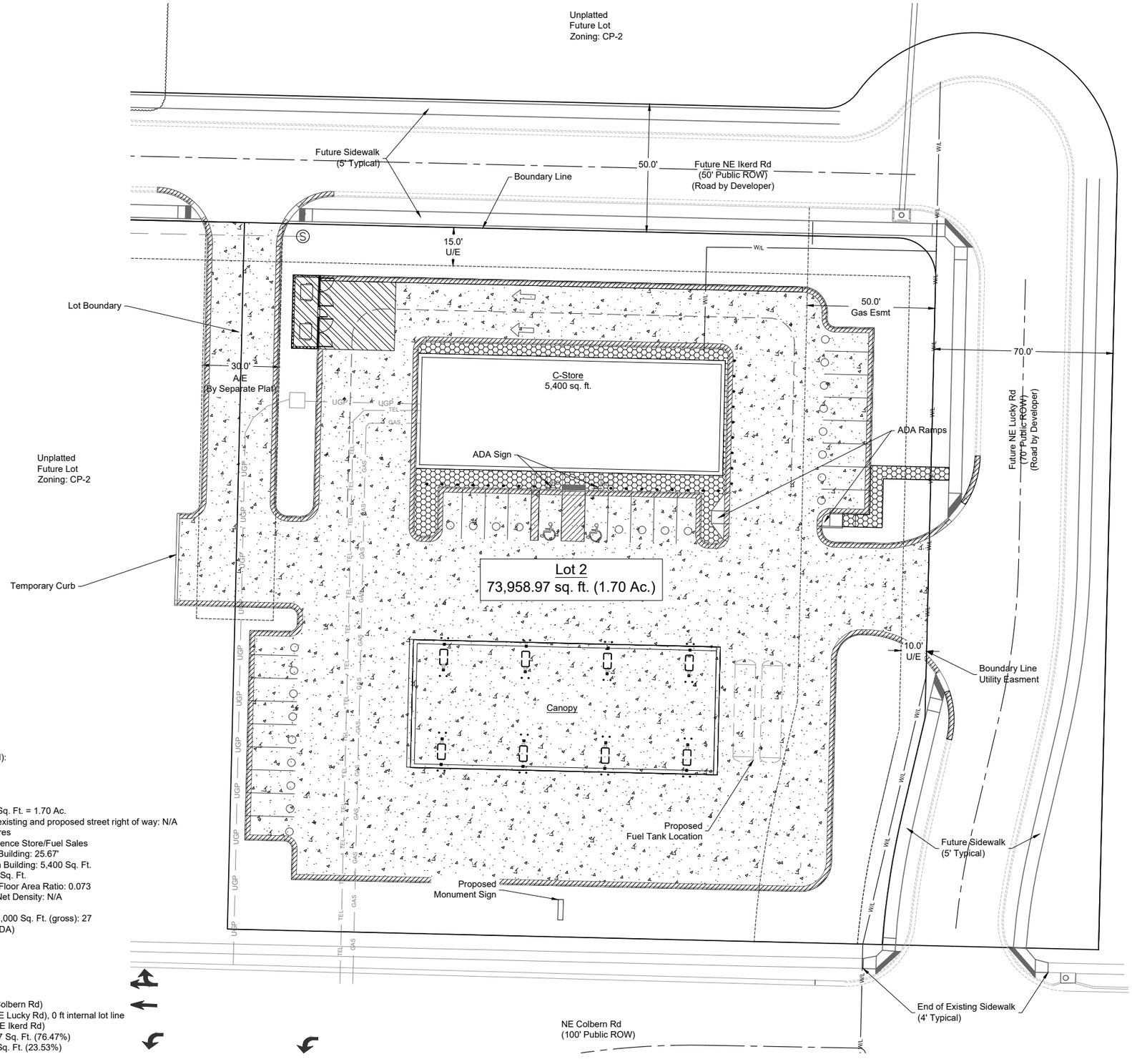
Based on the traffic analysis completed for the Existing Conditions scenario, the following summary is provided:

- All study intersections currently operate with an acceptable LOS except for the northbound approach at Colbern Road and Rice Road, with a LOS F for the PM Peak Hour.

Based on the traffic analysis completed for the Existing plus Proposed Conditions scenario, the following summary is provided.

- It is recommended that both driveway curb radii are increased to 35 feet to meet Lee's Summit's minimum requirements.
- The throat length of the proposed driveway on Lucky Road does not meet the minimum requirement of 100 feet. It is recommended that the throat length be increased to meet city requirements.
- The driveway width for both intersections do not meet city requirements. The driveway on Ikerd should be widened to 28 feet and the driveway on Lucky Road should be widened to 42 feet.
- The proposed location of the gas station driveway on Lucky Road does not meet the city requirement of 300 feet spacing for driveways on Commercial Collectors. However, the intersection capacity analysis for the Existing Plus Proposed Scenario with Improvements (Signal) showed a 95$^{th}$ percentile queue length of 50 feet. The current spacing of approximately 180 feet would provide enough stacking distance for vehicles on the southbound approach of Colbern Road & Lucky Road.
- The proposed intersection of Colbern Road & Lucky Road meets peak hour signal warrants and is recommended to be designed as a signalized intersection.
- All study intersections are expected to operate with acceptable conditions for the Existing plus Proposed conditions with recommended improvements.

# Appendix A - Site Plan




SITE DATA TABLE (Proposed):

LOT 2:

A. Zoning: CP-2
B. Total Lot Area: 73,959 Sq. Ft. = 1.70 Ac.
C. Land Area or acres for existing and proposed street right of way: N/A
D. Net Land Area: 1.70 Acres
E. Proposed Use: Convenience Store/Fuel Sales
F. Height above Grade at Building: 25.67'
G. Gross Floor Area - Main Building: 5,400 Sq. Ft.
H. Total Floor Area: 5,400 Sq. Ft.
I. Building Coverage and Floor Area Ratio: 0.073
J. Residential Gross and Net Density: N/A
K. Commercial Parking
   Required - 5 stalls per 1,000 Sq. Ft. (gross): 27
   Provided: 27 Stalls (2 ADA)

L. Parking Set Back:
   20 ft from Colbern Rd
   15 ft from other roads
   0 ft internal
M. Building Set Back
   Front yard: 15 ft (from Colbern Rd)
   Side yard: 15 ft (from NE Lucky Rd), 0 ft internal lot line
   Rear yard: 15 ft (from NE Ikerd Rd)
N. Impervious Area: 56,557 Sq. Ft. (76.47%)
   Pervious Area: 17,402 Sq. Ft. (23.53%)

PAVEMENT SECTION DETAILS

PC Concrete Pavement

6" PC Concrete Pavement (4K KCMMB Mix)
4" - 3/4" Clean Aggregate base
12" - 95% Standard Compacted Soils

Heavy Duty Concrete Pavement

¾" Bars, 12' O.C., Ea.Dir

7" PC Concrete Pavement (4K KCMMB Mix)
4" - 3/4" Clean Aggregate base
12" - 95% Standard Compacted Soils

Sidewalk Pavement

4" PC Concrete Pavement
Compacted Low Plasticity Subgrade

CG-1 Curb

NORTH
1"=20'
0 10' 20'

Preliminary Development Plans

22-0133
Heartland Market - Lee's Summit
Lee's Summit, Jackson County, Missouri

General Layout

| NO. | DATE | REVISION |
|---|---|---|
| 2 | 10/11/2022 | Revised Per City Comment |
| 1 | 09/09/2022 | PDP Submittal |

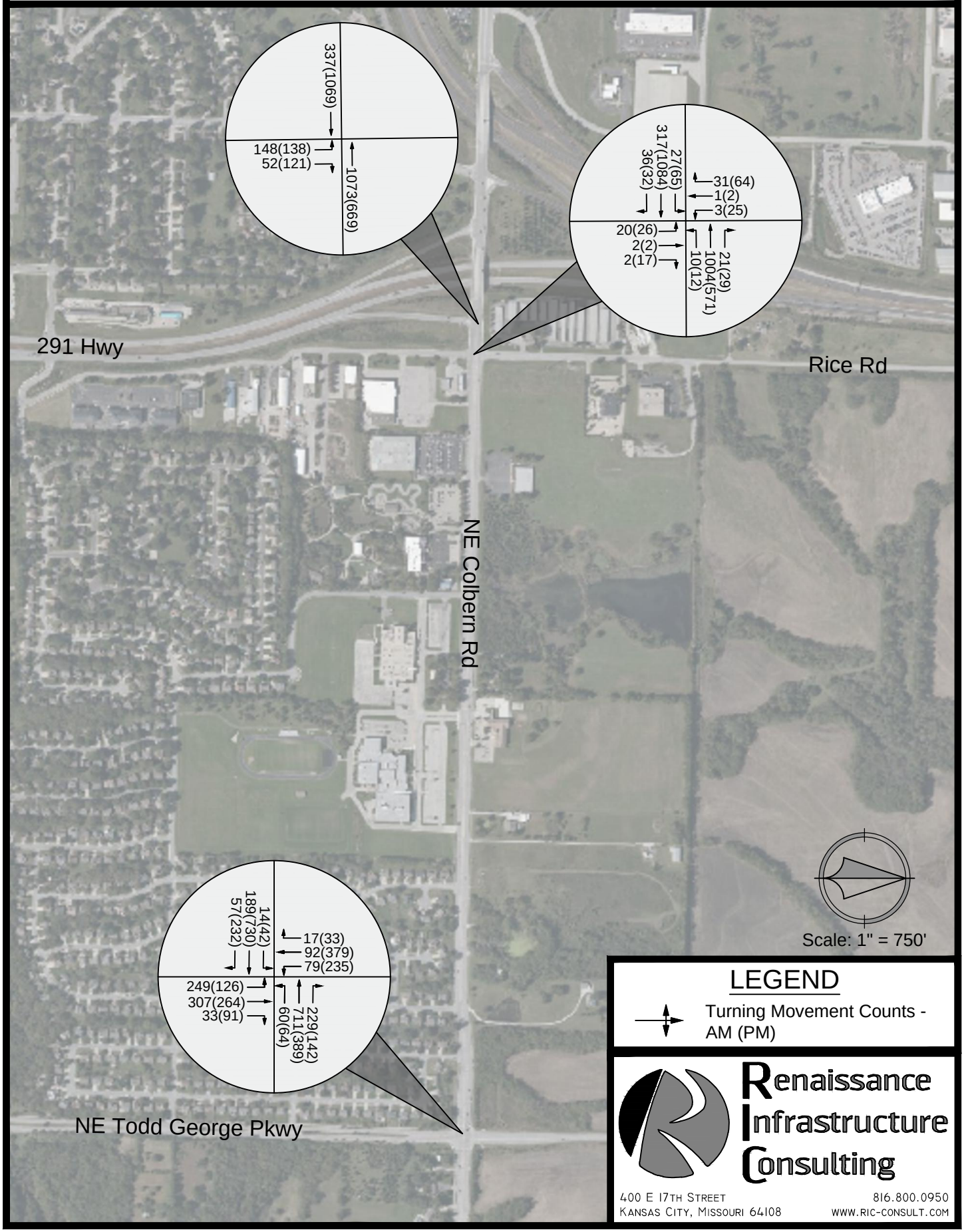
DRAWN BY ZM | CHECKED BY DB


Renaissance Infrastructure Consulting
400 E 17TH STREET KANSAS CITY, MISSOURI 64108
816.800.0950 WWW.RIC-CONSULT.COM
MO Certificate of Authority: E-2010033830


Sheet
C02

# Appendix B - Traffic Volumes

# Volume - Existing Conditions




## LEGEND

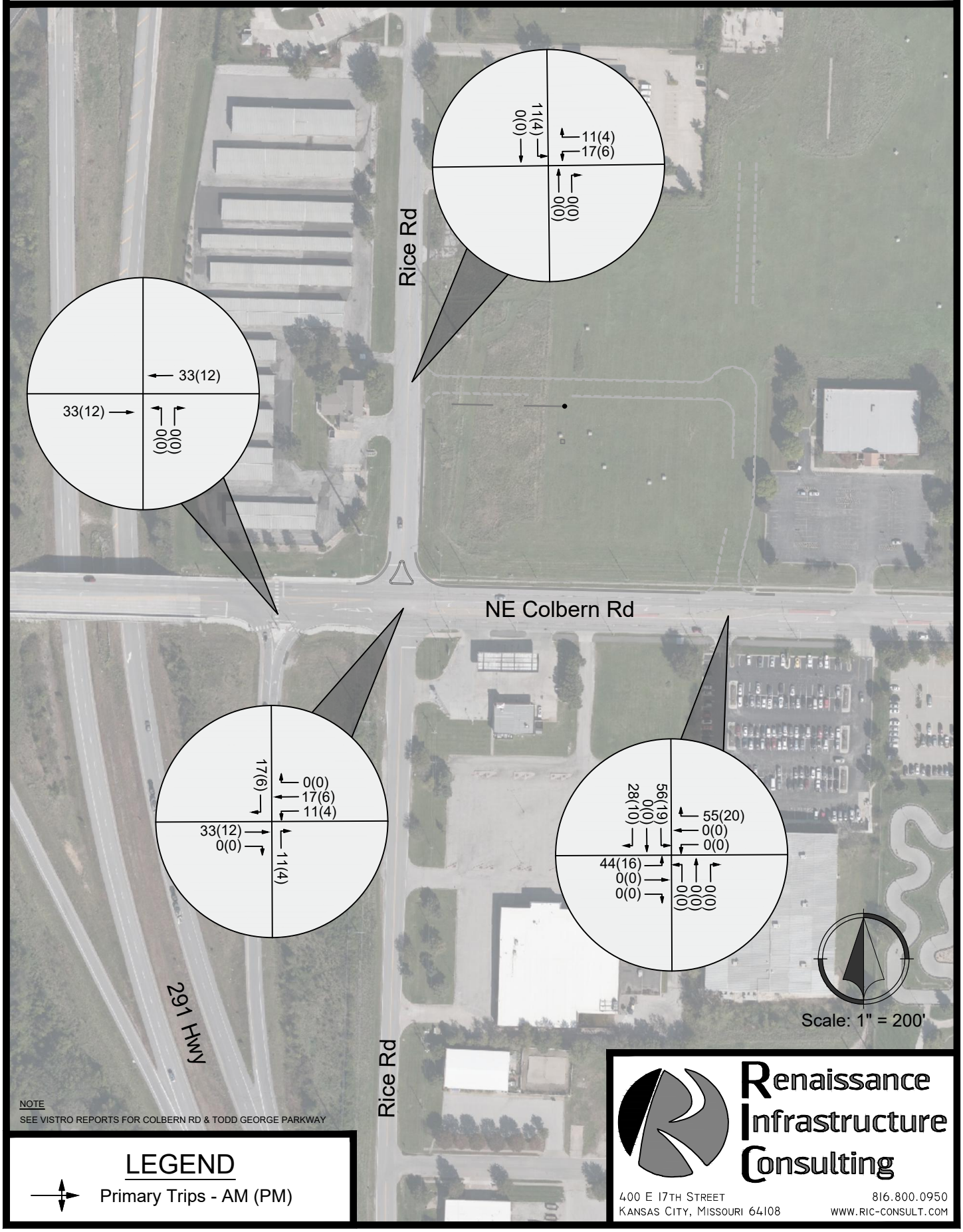
Turning Movement Counts - AM (PM)


Renaissance Infrastructure Consulting

400 E 17th Street
Kansas City, Missouri 64108

816.800.0950
www.ric-consult.com

# Primary Trips - Existing Plus Proposed Conditions




NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

Primary Trips - AM (PM)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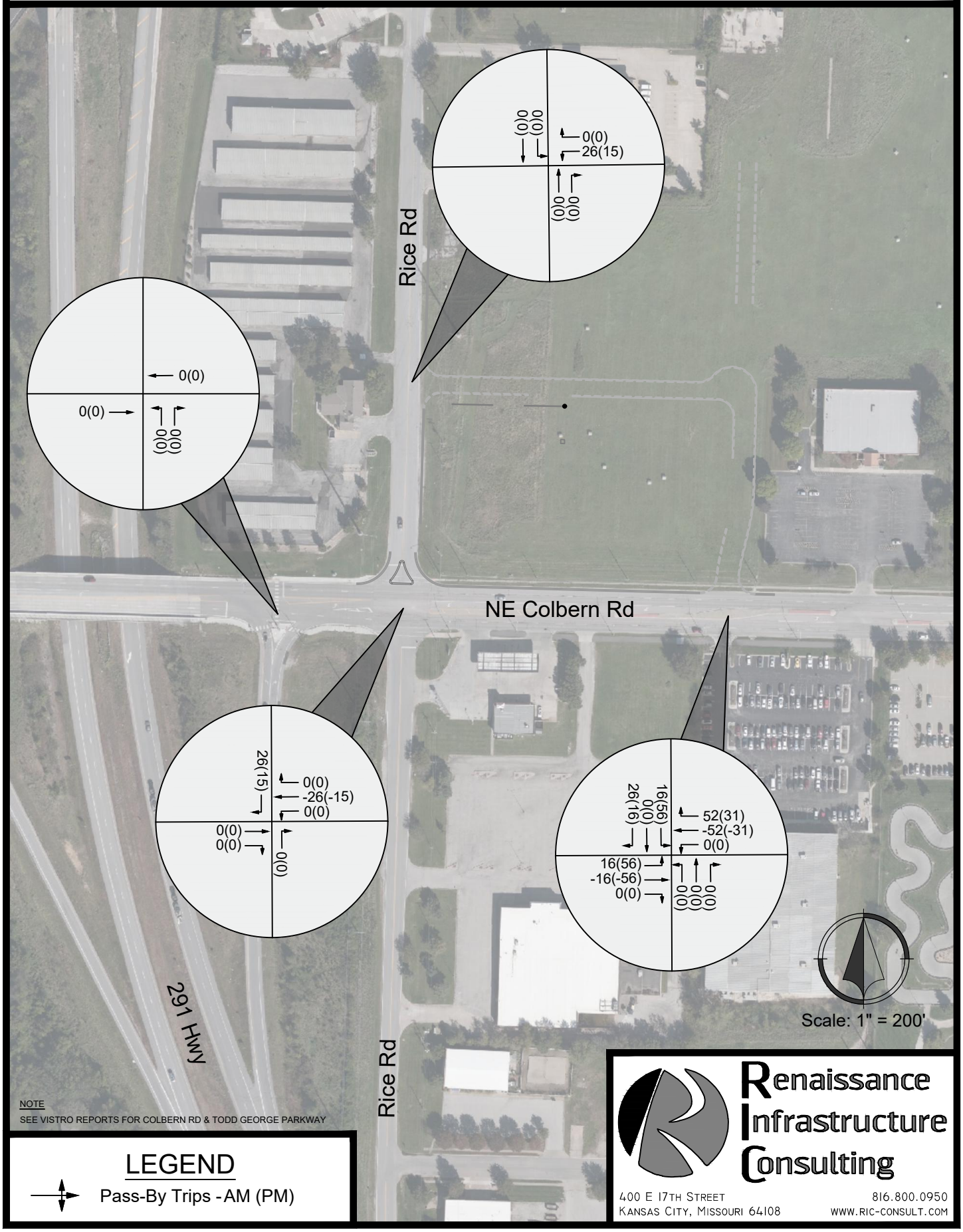
400 E 17th Street
Kansas City, Missouri 64108
816.800.0950
www.ric-consult.com

# Pass-By Trips - Existing Plus Proposed Conditions




NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

Pass-By Trips - AM (PM)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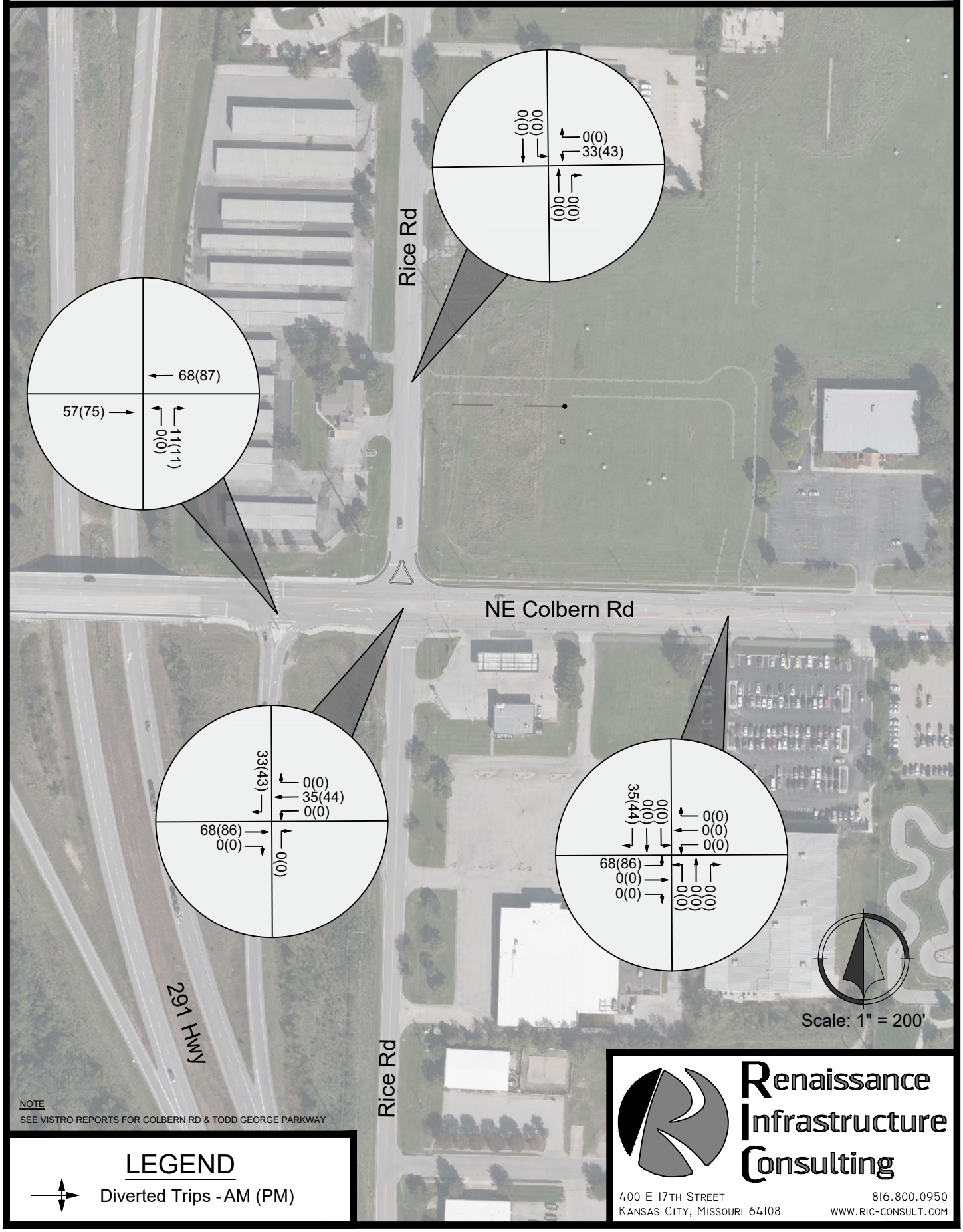
400 E 17th Street
Kansas City, Missouri 64108
816.800.0950
www.ric-consult.com

# Diverted Trips - Existing Plus Proposed Conditions



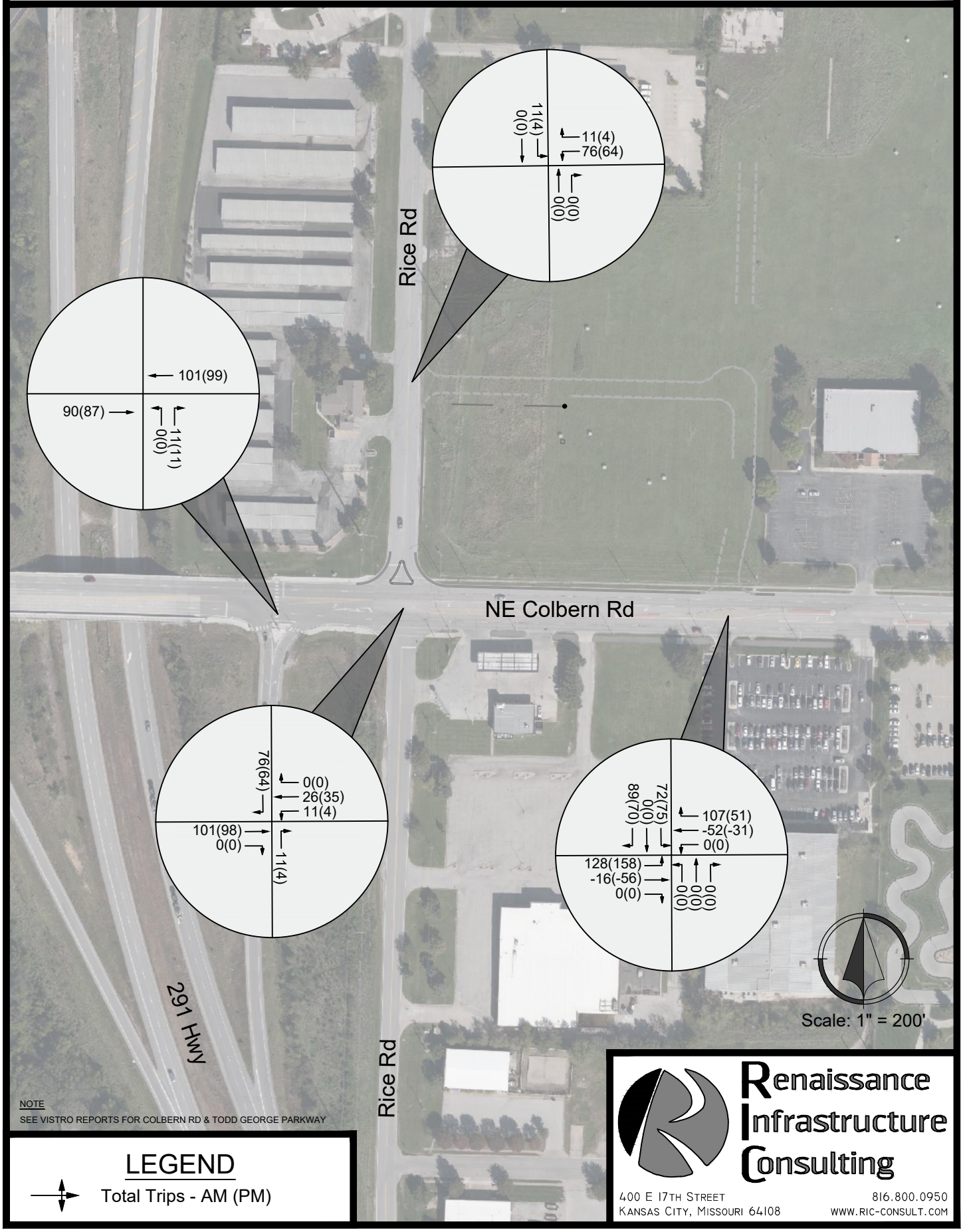

NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

Diverted Trips - AM (PM)


Renaissance Infrastructure Consulting
400 E 17th Street
Kansas City, Missouri 64108
816.800.0950
www.ric-consult.com

# Total Trips - Existing Plus Proposed Conditions



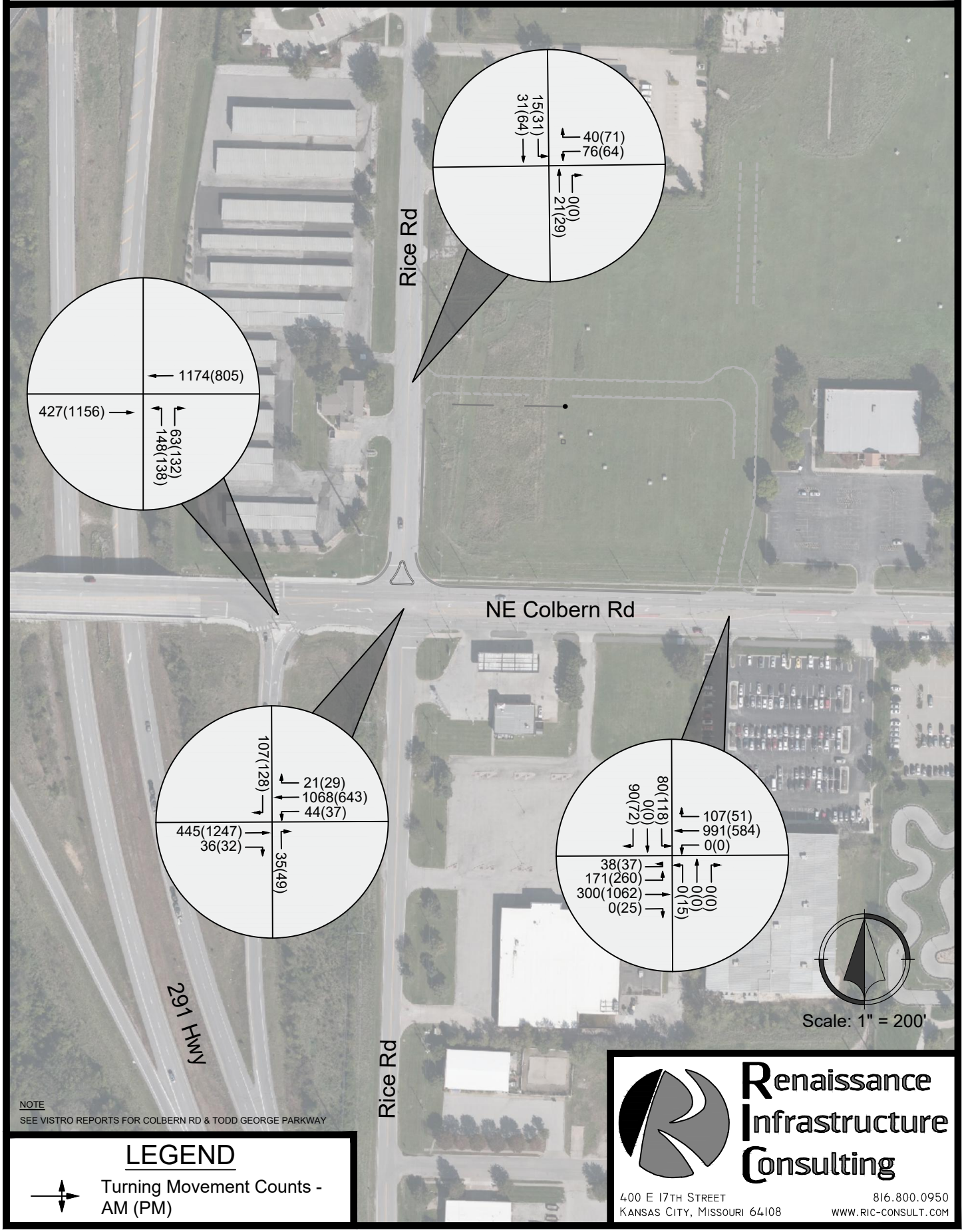

NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

Total Trips - AM (PM)


Renaissance Infrastructure Consulting
400 E 17th Street
Kansas City, Missouri 64108
816.800.0950
www.ric-consult.com

# Turning Movement Counts - Existing Plus Proposed Conditions w/ Improvements




NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

Turning Movement Counts - AM (PM)


Renaissance Infrastructure Consulting
400 E 17th Street
Kansas City, Missouri 64108
816.800.0950
www.ric-consult.com

## Trip Generation Data for Adjacent Properties

Peak Hour

**Date: 10/04/2022**

| | Colbern Road & Library Driveway | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NB | | SB | | EB | | WB | |
| | L | R | L | R | L | R | L | R |
| 4:00 PM | 0 | 0 | 3 | 9 | 8 | 0 | 0 | 7 |
| 4:15 PM | 0 | 0 | 4 | 14 | 3 | 0 | 0 | 2 |
| 4:30 PM | 0 | 1 | 2 | 8 | 10 | 0 | 0 | 2 |
| 4:45 PM | 0 | 1 | 4 | 10 | 15 | 0 | 2 | 10 |
| 5:00 PM | 7 | 1 | 6 | 14 | 6 | 0 | 2 | 3 |
| 5:15 PM | 8 | 3 | 6 | 12 | 4 | 3 | 8 | 5 |
| 5:30 PM | 6 | 5 | 4 | 6 | 13 | 2 | 6 | 1 |
| 5:45 PM | 0 | 2 | 4 | 5 | 10 | 2 | 0 | 2 |

| | Colbern Road & Lakeland Church West Driveway | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NB | | SB | | EB | | WB | |
| | L | R | L | R | L | R | L | R |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

**Date: 10/06/2022**

| | Colbern Road & Library Driveway | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NB | | SB | | EB | | WB | |
| | L | R | L | R | L | R | L | R |
| 7:00 AM | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 3 |
| 8:00 AM | 0 | 0 | 2 | 3 | 6 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 1 |
| 8:30 AM | 0 | 0 | 0 | 6 | 5 | 0 | 1 | 3 |
| 8:45 AM | 0 | 0 | 0 | 3 | 8 | 0 | 0 | 2 |

| | Colbern Road & Lakeland Church West Driveway | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NB | | SB | | EB | | WB | |
| | L | R | L | R | L | R | L | R |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Colbern Rd & Rice Rd - TMC

Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976528, Location: 38.946176, -94.359562

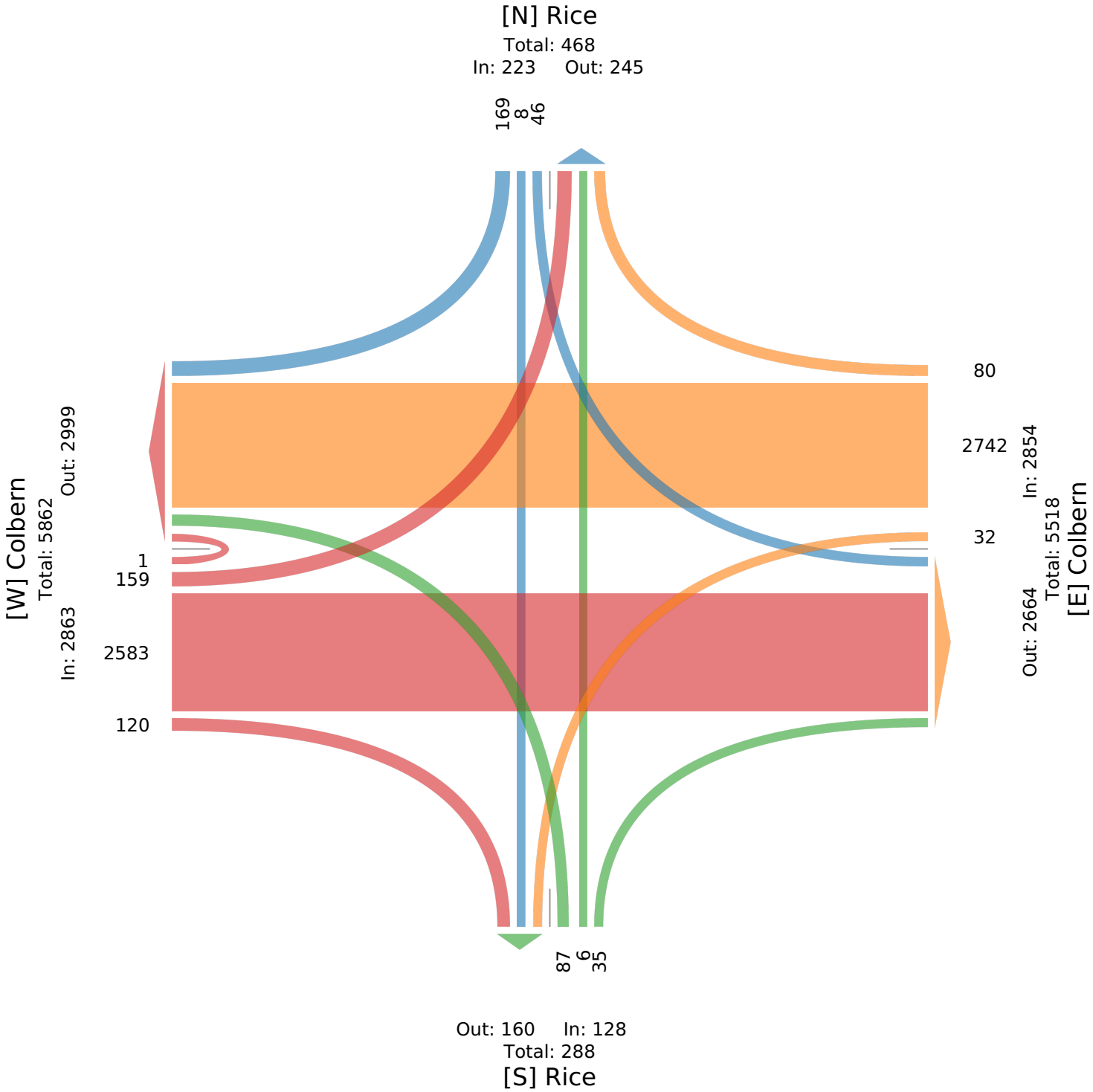
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | Rice | | | | | Rice | | | | | Colbern | | | | | Colbern | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| 2022-08-09 7:00AM | 1 | 1 | 1 | 0 | **3** | 2 | 0 | 4 | 0 | **6** | 2 | 41 | 1 | 0 | **44** | 1 | 211 | 6 | 0 | **218** | **271** |
| 7:15AM | 8 | 0 | 0 | 0 | **8** | 1 | 0 | 8 | 0 | **9** | 10 | 70 | 5 | 0 | **85** | 2 | 257 | 7 | 0 | **266** | **368** |
| 7:30AM | 6 | 0 | 2 | 0 | **8** | 0 | 0 | 8 | 0 | **8** | 10 | 86 | 11 | 0 | **107** | 5 | 269 | 8 | 0 | **282** | **405** |
| 7:45AM | 4 | 1 | 0 | 0 | **5** | 2 | 0 | 9 | 0 | **11** | 6 | 77 | 15 | 1 | **99** | 2 | 280 | 5 | 0 | **287** | **402** |
| Hourly Total | 19 | 2 | 3 | 0 | **24** | 5 | 0 | 29 | 0 | **34** | 28 | 274 | 32 | 1 | **335** | 10 | 1017 | 26 | 0 | **1053** | **1446** |
| 8:00AM | 2 | 1 | 0 | 0 | **3** | 0 | 1 | 6 | 0 | **7** | 1 | 84 | 5 | 0 | **90** | 1 | 198 | 1 | 0 | **200** | **300** |
| 8:15AM | 10 | 1 | 3 | 0 | **14** | 1 | 2 | 6 | 0 | **9** | 6 | 82 | 5 | 0 | **93** | 1 | 171 | 2 | 0 | **174** | **290** |
| 8:30AM | 1 | 0 | 0 | 0 | **1** | 3 | 1 | 8 | 0 | **12** | 9 | 82 | 7 | 0 | **98** | 0 | 135 | 2 | 0 | **137** | **248** |
| 8:45AM | 4 | 0 | 1 | 0 | **5** | 3 | 0 | 15 | 0 | **18** | 11 | 82 | 9 | 0 | **102** | 1 | 150 | 6 | 0 | **157** | **282** |
| Hourly Total | 17 | 2 | 4 | 0 | **23** | 7 | 4 | 35 | 0 | **46** | 27 | 330 | 26 | 0 | **383** | 3 | 654 | 11 | 0 | **668** | **1120** |
| 4:00PM | 7 | 0 | 3 | 0 | **10** | 3 | 1 | 15 | 0 | **19** | 19 | 210 | 9 | 0 | **238** | 2 | 128 | 7 | 0 | **137** | **404** |
| 4:15PM | 5 | 0 | 1 | 0 | **6** | 2 | 1 | 15 | 0 | **18** | 9 | 198 | 5 | 0 | **212** | 2 | 124 | 5 | 0 | **131** | **367** |
| 4:30PM | 7 | 0 | 5 | 0 | **12** | 10 | 1 | 20 | 0 | **31** | 23 | 250 | 5 | 0 | **278** | 1 | 132 | 7 | 0 | **140** | **461** |
| 4:45PM | 6 | 1 | 3 | 0 | **10** | 6 | 0 | 12 | 0 | **18** | 18 | 266 | 11 | 0 | **295** | 3 | 147 | 8 | 0 | **158** | **481** |
| Hourly Total | 25 | 1 | 12 | 0 | **38** | 21 | 3 | 62 | 0 | **86** | 69 | 924 | 30 | 0 | **1023** | 8 | 531 | 27 | 0 | **566** | **1713** |
| 5:00PM | 8 | 1 | 4 | 0 | **13** | 5 | 1 | 19 | 0 | **25** | 14 | 268 | 6 | 0 | **288** | 3 | 130 | 9 | 0 | **142** | **468** |
| 5:15PM | 5 | 0 | 5 | 0 | **10** | 4 | 0 | 13 | 0 | **17** | 10 | 300 | 10 | 0 | **320** | 5 | 162 | 5 | 0 | **172** | **519** |
| 5:30PM | 8 | 0 | 6 | 0 | **14** | 2 | 0 | 6 | 0 | **8** | 4 | 257 | 10 | 0 | **271** | 3 | 116 | 2 | 0 | **121** | **414** |
| 5:45PM | 5 | 0 | 1 | 0 | **6** | 2 | 0 | 5 | 0 | **7** | 7 | 230 | 6 | 0 | **243** | 0 | 132 | 0 | 0 | **132** | **388** |
| Hourly Total | 26 | 1 | 16 | 0 | **43** | 13 | 1 | 43 | 0 | **57** | 35 | 1055 | 32 | 0 | **1122** | 11 | 540 | 16 | 0 | **567** | **1789** |
| **Total** | 87 | 6 | 35 | 0 | **128** | 46 | 8 | 169 | 0 | **223** | 159 | 2583 | 120 | 1 | **2863** | 32 | 2742 | 80 | 0 | **2854** | **6068** |
| **% Approach** | 68.0% | 4.7% | 27.3% | 0% | **-** | 20.6% | 3.6% | 75.8% | 0% | **-** | 5.6% | 90.2% | 4.2% | 0% | **-** | 1.1% | 96.1% | 2.8% | 0% | **-** | - |
| **% Total** | 1.4% | 0.1% | 0.6% | 0% | **2.1%** | 0.8% | 0.1% | 2.8% | 0% | **3.7%** | 2.6% | 42.6% | 2.0% | 0% | **47.2%** | 0.5% | 45.2% | 1.3% | 0% | **47.0%** | - |
| **Lights** | 87 | 3 | 34 | 0 | **124** | 46 | 8 | 164 | 0 | **218** | 157 | 2542 | 108 | 1 | **2808** | 30 | 2698 | 80 | 0 | **2808** | 5958 |
| **% Lights** | 100% | 50.0% | 97.1% | 0% | **96.9%** | 100% | 100% | 97.0% | 0% | **97.8%** | 98.7% | 98.4% | 90.0% | 100% | **98.1%** | 93.8% | 98.4% | 100% | 0% | **98.4%** | 98.2% |
| **Articulated Trucks** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 0 | **1** | 0 | 6 | 0 | 0 | **6** | 0 | 9 | 0 | 0 | **9** | 16 |
| **% Articulated Trucks** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0.6% | 0% | **0.4%** | 0% | 0.2% | 0% | 0% | **0.2%** | 0% | 0.3% | 0% | 0% | **0.3%** | 0.3% |
| **Buses and Single-Unit Trucks** | 0 | 3 | 1 | 0 | **4** | 0 | 0 | 4 | 0 | **4** | 2 | 35 | 12 | 0 | **49** | 2 | 35 | 0 | 0 | **37** | 94 |
| **% Buses and Single-Unit Trucks** | 0% | 50.0% | 2.9% | 0% | **3.1%** | 0% | 0% | 2.4% | 0% | **1.8%** | 1.3% | 1.4% | 10.0% | 0% | **1.7%** | 6.3% | 1.3% | 0% | 0% | **1.3%** | 1.5% |

*L: Left, R: Right, T: Thru, U: U-Turn

**Colbern Rd & Rice Rd - TMC**
Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976528, Location: 38.946176, -94.359562

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Colbern Rd & Rice Rd - TMC

Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976528, Location: 38.946176, -94.359562

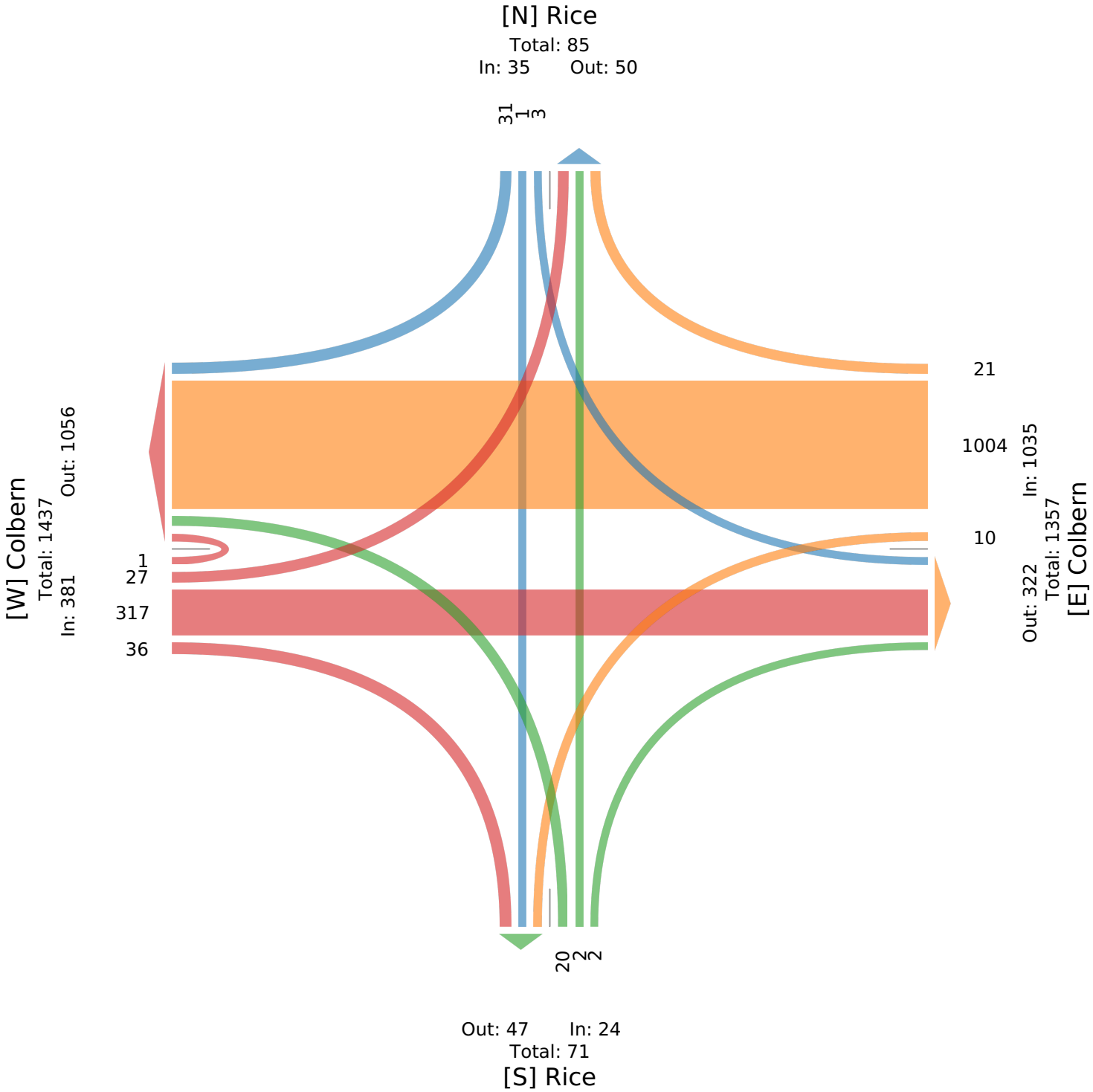
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | Rice | | | | | Rice | | | | | Colbern | | | | | Colbern | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| 2022-08-09 7:15AM | 8 | 0 | 0 | 0 | **8** | 1 | 0 | 8 | 0 | **9** | 10 | 70 | 5 | 0 | **85** | 2 | 257 | 7 | 0 | **266** | **368** |
| 7:30AM | 6 | 0 | 2 | 0 | **8** | 0 | 0 | 8 | 0 | **8** | 10 | 86 | 11 | 0 | **107** | 5 | 269 | 8 | 0 | **282** | **405** |
| 7:45AM | 4 | 1 | 0 | 0 | **5** | 2 | 0 | 9 | 0 | **11** | 6 | 77 | 15 | 1 | **99** | 2 | 280 | 5 | 0 | **287** | **402** |
| 8:00AM | 2 | 1 | 0 | 0 | **3** | 0 | 1 | 6 | 0 | **7** | 1 | 84 | 5 | 0 | **90** | 1 | 198 | 1 | 0 | **200** | **300** |
| **Total** | 20 | 2 | 2 | 0 | **24** | 3 | 1 | 31 | 0 | **35** | 27 | 317 | 36 | 1 | **381** | 10 | 1004 | 21 | 0 | **1035** | **1475** |
| **% Approach** | 83.3% | 8.3% | 8.3% | 0% | **-** | 8.6% | 2.9% | 88.6% | 0% | **-** | 7.1% | 83.2% | 9.4% | 0.3% | **-** | 1.0% | 97.0% | 2.0% | 0% | **-** | **-** |
| **% Total** | 1.4% | 0.1% | 0.1% | 0% | **1.6%** | 0.2% | 0.1% | 2.1% | 0% | **2.4%** | 1.8% | 21.5% | 2.4% | 0.1% | **25.8%** | 0.7% | 68.1% | 1.4% | 0% | **70.2%** | **-** |
| **PHF** | 0.625 | 0.500 | 0.250 | - | **0.750** | 0.375 | 0.250 | 0.861 | - | **0.795** | 0.675 | 0.922 | 0.600 | 0.250 | **0.890** | 0.500 | 0.896 | 0.656 | - | **0.902** | 0.910 |
| **Lights** | 20 | 1 | 2 | 0 | **23** | 3 | 1 | 30 | 0 | **34** | 27 | 299 | 33 | 1 | **360** | 9 | 993 | 21 | 0 | **1023** | 1440 |
| **% Lights** | 100% | 50.0% | 100% | 0% | **95.8%** | 100% | 100% | 96.8% | 0% | **97.1%** | 100% | 94.3% | 91.7% | 100% | **94.5%** | 90.0% | 98.9% | 100% | 0% | **98.8%** | 97.6% |
| **Articulated Trucks** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 1 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | **1** | 2 |
| **% Articulated Trucks** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0% | 0% | **0%** | 0% | 0.3% | 0% | 0% | **0.3%** | 0% | 0.1% | 0% | 0% | **0.1%** | 0.1% |
| **Buses and Single-Unit Trucks** | 0 | 1 | 0 | 0 | **1** | 0 | 0 | 1 | 0 | **1** | 0 | 17 | 3 | 0 | **20** | 1 | 10 | 0 | 0 | **11** | 33 |
| **% Buses and Single-Unit Trucks** | 0% | 50.0% | 0% | 0% | **4.2%** | 0% | 0% | 3.2% | 0% | **2.9%** | 0% | 5.4% | 8.3% | 0% | **5.2%** | 10.0% | 1.0% | 0% | 0% | **1.1%** | 2.2% |

*L: Left, R: Right, T: Thru, U: U-Turn

**Colbern Rd & Rice Rd - TMC**
Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976528, Location: 38.946176, -94.359562

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Colbern Rd & Rice Rd - TMC

Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976528, Location: 38.946176, -94.359562

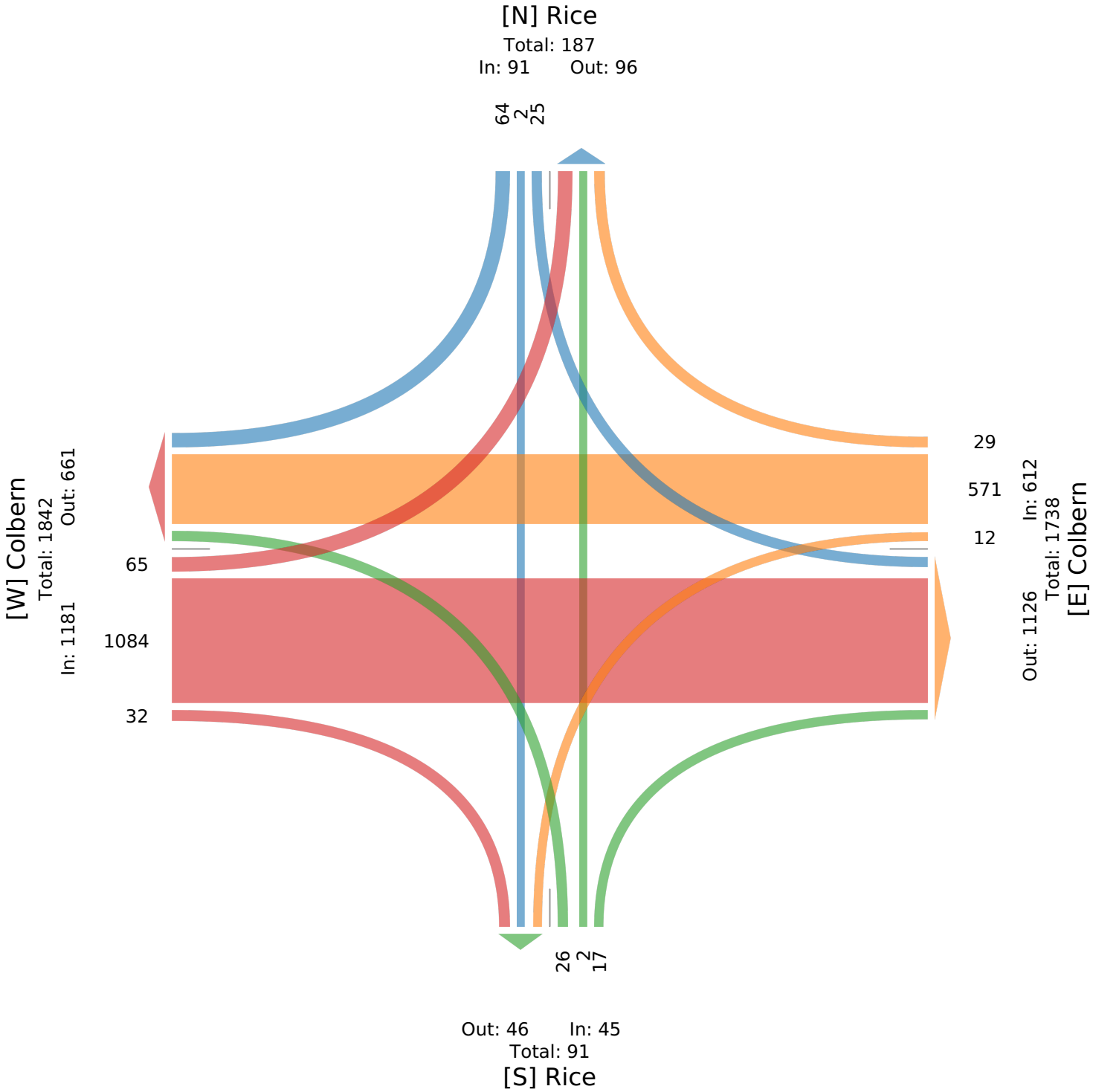
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | Rice | | | | | Rice | | | | | Colbern | | | | | Colbern | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| 2022-08-09 4:30PM | 7 | 0 | 5 | 0 | **12** | 10 | 1 | 20 | 0 | **31** | 23 | 250 | 5 | 0 | **278** | 1 | 132 | 7 | 0 | **140** | **461** |
| 4:45PM | 6 | 1 | 3 | 0 | **10** | 6 | 0 | 12 | 0 | **18** | 18 | 266 | 11 | 0 | **295** | 3 | 147 | 8 | 0 | **158** | **481** |
| 5:00PM | 8 | 1 | 4 | 0 | **13** | 5 | 1 | 19 | 0 | **25** | 14 | 268 | 6 | 0 | **288** | 3 | 130 | 9 | 0 | **142** | **468** |
| 5:15PM | 5 | 0 | 5 | 0 | **10** | 4 | 0 | 13 | 0 | **17** | 10 | 300 | 10 | 0 | **320** | 5 | 162 | 5 | 0 | **172** | **519** |
| **Total** | 26 | 2 | 17 | 0 | **45** | 25 | 2 | 64 | 0 | **91** | 65 | 1084 | 32 | 0 | **1181** | 12 | 571 | 29 | 0 | **612** | **1929** |
| **% Approach** | 57.8% | 4.4% | 37.8% | 0% | **-** | 27.5% | 2.2% | 70.3% | 0% | **-** | 5.5% | 91.8% | 2.7% | 0% | **-** | 2.0% | 93.3% | 4.7% | 0% | **-** | - |
| **% Total** | 1.3% | 0.1% | 0.9% | 0% | **2.3%** | 1.3% | 0.1% | 3.3% | 0% | **4.7%** | 3.4% | 56.2% | 1.7% | 0% | **61.2%** | 0.6% | 29.6% | 1.5% | 0% | **31.7%** | - |
| **PHF** | 0.813 | 0.500 | 0.850 | - | **0.865** | 0.625 | 0.500 | 0.800 | - | **0.734** | 0.707 | 0.903 | 0.727 | - | **0.923** | 0.600 | 0.881 | 0.806 | - | **0.890** | 0.929 |
| **Lights** | 26 | 2 | 17 | 0 | **45** | 25 | 2 | 63 | 0 | **90** | 64 | 1076 | 31 | 0 | **1171** | 12 | 561 | 29 | 0 | **602** | 1908 |
| **% Lights** | 100% | 100% | 100% | 0% | **100%** | 100% | 100% | 98.4% | 0% | **98.9%** | 98.5% | 99.3% | 96.9% | 0% | **99.2%** | 100% | 98.2% | 100% | 0% | **98.4%** | 98.9% |
| **Articulated Trucks** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 1 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | **1** | 2 |
| **% Articulated Trucks** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0% | 0% | **0%** | 0% | 0.1% | 0% | 0% | **0.1%** | 0% | 0.2% | 0% | 0% | **0.2%** | 0.1% |
| **Buses and Single-Unit Trucks** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 1 | 0 | **1** | 1 | 7 | 1 | 0 | **9** | 0 | 9 | 0 | 0 | **9** | 19 |
| **% Buses and Single-Unit Trucks** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 1.6% | 0% | **1.1%** | 1.5% | 0.6% | 3.1% | 0% | **0.8%** | 0% | 1.6% | 0% | 0% | **1.5%** | 1.0% |

*L: Left, R: Right, T: Thru, U: U-Turn

**Colbern Rd & Rice Rd - TMC**
Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976528, Location: 38.946176, -94.359562

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## 291 Hwy & Northbound Ramp - TMC

Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976529, Location: 38.946164, -94.360232

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

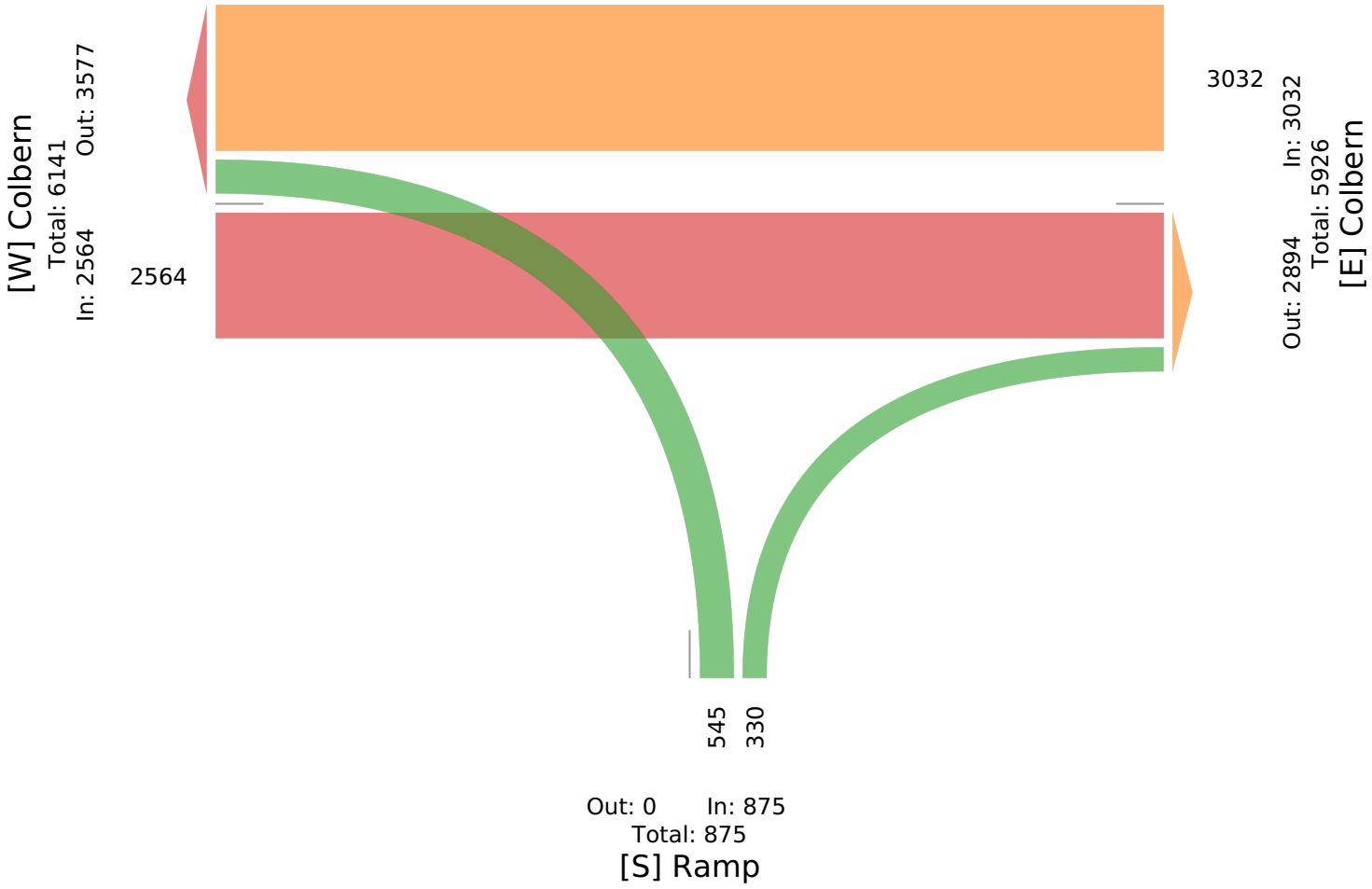
| Leg | Ramp | | | | Colbern | | | | Colbern | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | Eastbound | | | | Westbound | | | | |
| Time | L | R | U | **App** | T | R | U | **App** | L | T | U | **App** | **Int** |
| 2022-08-09 7:00AM | 40 | 7 | 0 | **47** | 43 | 0 | 0 | **43** | 0 | 214 | 0 | **214** | **304** |
| 7:15AM | 48 | 12 | 0 | **60** | 73 | 0 | 0 | **73** | 0 | 280 | 0 | **280** | **413** |
| 7:30AM | 34 | 19 | 0 | **53** | 90 | 0 | 0 | **90** | 0 | 285 | 0 | **285** | **428** |
| 7:45AM | 41 | 8 | 0 | **49** | 92 | 0 | 0 | **92** | 0 | 300 | 0 | **300** | **441** |
| Hourly Total | 163 | 46 | 0 | **209** | 298 | 0 | 0 | **298** | 0 | 1079 | 0 | **1079** | **1586** |
| 8:00AM | 25 | 13 | 0 | **38** | 82 | 0 | 0 | **82** | 0 | 208 | 0 | **208** | **328** |
| 8:15AM | 36 | 19 | 0 | **55** | 76 | 0 | 0 | **76** | 0 | 188 | 0 | **188** | **319** |
| 8:30AM | 30 | 16 | 0 | **46** | 85 | 0 | 0 | **85** | 0 | 141 | 0 | **141** | **272** |
| 8:45AM | 33 | 15 | 0 | **48** | 84 | 0 | 0 | **84** | 0 | 173 | 0 | **173** | **305** |
| Hourly Total | 124 | 63 | 0 | **187** | 327 | 0 | 0 | **327** | 0 | 710 | 0 | **710** | **1224** |
| 4:00PM | 32 | 23 | 0 | **55** | 214 | 0 | 0 | **214** | 0 | 153 | 0 | **153** | **422** |
| 4:15PM | 24 | 16 | 0 | **40** | 199 | 0 | 0 | **199** | 0 | 146 | 0 | **146** | **385** |
| 4:30PM | 34 | 23 | 0 | **57** | 255 | 0 | 0 | **255** | 0 | 159 | 0 | **159** | **471** |
| 4:45PM | 30 | 35 | 0 | **65** | 262 | 0 | 0 | **262** | 0 | 169 | 0 | **169** | **496** |
| Hourly Total | 120 | 97 | 0 | **217** | 930 | 0 | 0 | **930** | 0 | 627 | 0 | **627** | **1774** |
| 5:00PM | 45 | 29 | 0 | **74** | 263 | 0 | 0 | **263** | 0 | 157 | 0 | **157** | **494** |
| 5:15PM | 29 | 34 | 0 | **63** | 289 | 0 | 0 | **289** | 0 | 184 | 0 | **184** | **536** |
| 5:30PM | 38 | 25 | 0 | **63** | 245 | 0 | 0 | **245** | 0 | 134 | 0 | **134** | **442** |
| 5:45PM | 26 | 36 | 0 | **62** | 212 | 0 | 0 | **212** | 0 | 141 | 0 | **141** | **415** |
| Hourly Total | 138 | 124 | 0 | **262** | 1009 | 0 | 0 | **1009** | 0 | 616 | 0 | **616** | **1887** |
| **Total** | 545 | 330 | 0 | **875** | 2564 | 0 | 0 | **2564** | 0 | 3032 | 0 | **3032** | **6471** |
| **% Approach** | 62.3% | 37.7% | 0% | **-** | 100% | 0% | 0% | **-** | 0% | 100% | 0% | **-** | - |
| **% Total** | 8.4% | 5.1% | 0% | **13.5%** | 39.6% | 0% | 0% | **39.6%** | 0% | 46.9% | 0% | **46.9%** | - |
| **Lights** | 526 | 322 | 0 | **848** | 2503 | 0 | 0 | **2503** | 0 | 2983 | 0 | **2983** | 6334 |
| **% Lights** | 96.5% | 97.6% | 0% | **96.9%** | 97.6% | 0% | 0% | **97.6%** | 0% | 98.4% | 0% | **98.4%** | 97.9% |
| **Articulated Trucks** | 2 | 1 | 0 | **3** | 4 | 0 | 0 | **4** | 0 | 9 | 0 | **9** | 16 |
| **% Articulated Trucks** | 0.4% | 0.3% | 0% | **0.3%** | 0.2% | 0% | 0% | **0.2%** | 0% | 0.3% | 0% | **0.3%** | 0.2% |
| **Buses and Single-Unit Trucks** | 17 | 7 | 0 | **24** | 57 | 0 | 0 | **57** | 0 | 40 | 0 | **40** | 121 |
| **% Buses and Single-Unit Trucks** | 3.1% | 2.1% | 0% | **2.7%** | 2.2% | 0% | 0% | **2.2%** | 0% | 1.3% | 0% | **1.3%** | 1.9% |

*L: Left, R: Right, T: Thru, U: U-Turn

## 291 Hwy & Northbound Ramp - TMC

Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976529, Location: 38.946164, -94.360232

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## 291 Hwy & Northbound Ramp - TMC

Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976529, Location: 38.946164, -94.360232

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

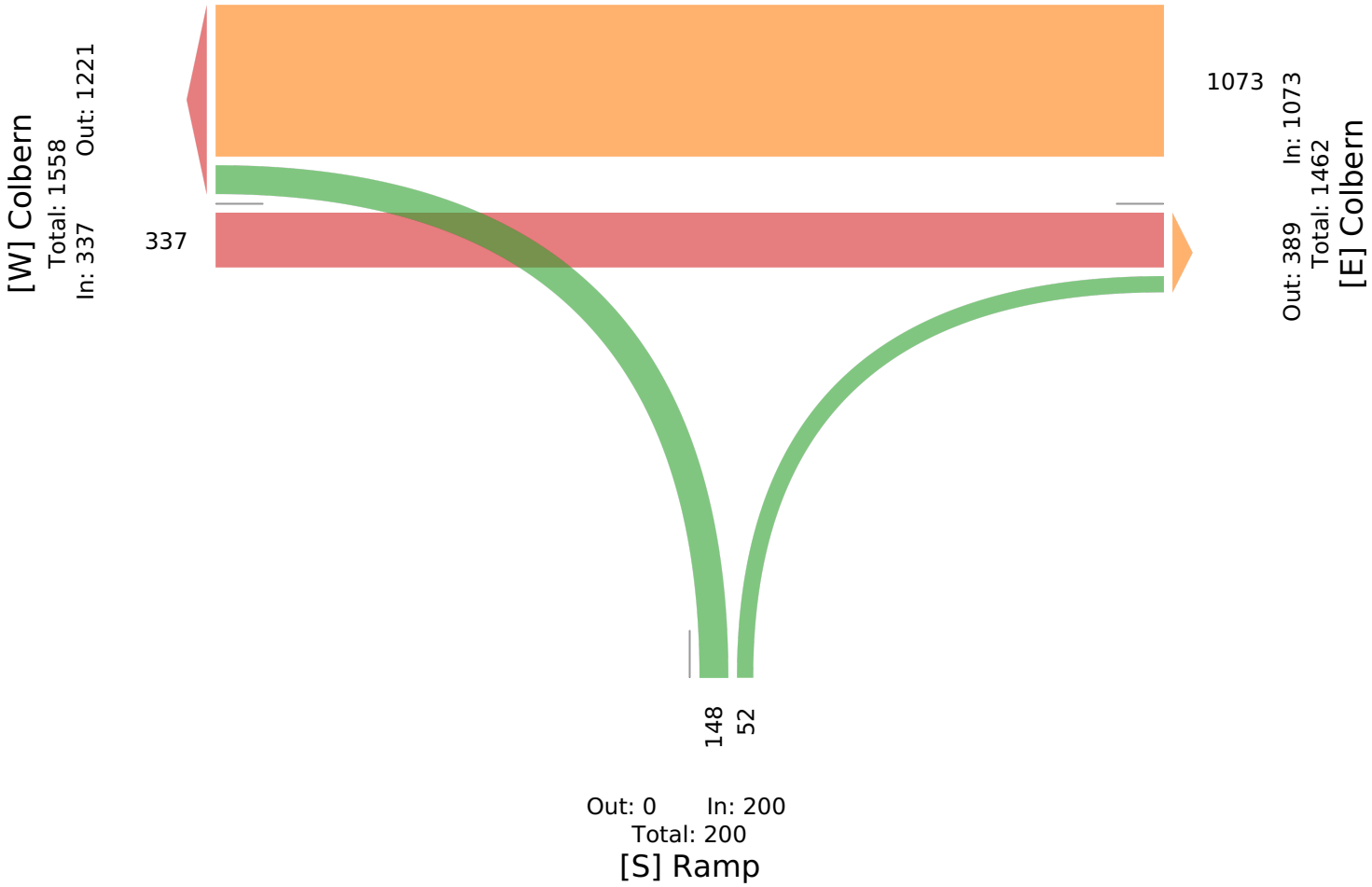
| Leg<br>Direction | Ramp<br>Northbound | | | | Colbern<br>Eastbound | | | | Colbern<br>Westbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | L | R | U | **App** | T | R | U | **App** | L | T | U | **App** | **Int** |
| 2022-08-09 7:15AM | 48 | 12 | 0 | **60** | 73 | 0 | 0 | **73** | 0 | 280 | 0 | **280** | **413** |
| 7:30AM | 34 | 19 | 0 | **53** | 90 | 0 | 0 | **90** | 0 | 285 | 0 | **285** | **428** |
| 7:45AM | 41 | 8 | 0 | **49** | 92 | 0 | 0 | **92** | 0 | 300 | 0 | **300** | **441** |
| 8:00AM | 25 | 13 | 0 | **38** | 82 | 0 | 0 | **82** | 0 | 208 | 0 | **208** | **328** |
| **Total** | 148 | 52 | 0 | **200** | 337 | 0 | 0 | **337** | 0 | 1073 | 0 | **1073** | **1610** |
| **% Approach** | 74.0% | 26.0% | 0% | **-** | 100% | 0% | 0% | **-** | 0% | 100% | 0% | **-** | - |
| **% Total** | 9.2% | 3.2% | 0% | **12.4%** | 20.9% | 0% | 0% | **20.9%** | 0% | 66.6% | 0% | **66.6%** | - |
| **PHF** | 0.771 | 0.684 | - | **0.833** | 0.916 | - | - | **0.916** | - | 0.894 | - | **0.894** | 0.913 |
| **Lights** | 143 | 51 | 0 | **194** | 313 | 0 | 0 | **313** | 0 | 1060 | 0 | **1060** | 1567 |
| **% Lights** | 96.6% | 98.1% | 0% | **97.0%** | 92.9% | 0% | 0% | **92.9%** | 0% | 98.8% | 0% | **98.8%** | 97.3% |
| **Articulated Trucks** | 0 | 0 | 0 | **0** | 2 | 0 | 0 | **2** | 0 | 4 | 0 | **4** | 6 |
| **% Articulated Trucks** | 0% | 0% | 0% | **0%** | 0.6% | 0% | 0% | **0.6%** | 0% | 0.4% | 0% | **0.4%** | 0.4% |
| **Buses and Single-Unit Trucks** | 5 | 1 | 0 | **6** | 22 | 0 | 0 | **22** | 0 | 9 | 0 | **9** | 37 |
| **% Buses and Single-Unit Trucks** | 3.4% | 1.9% | 0% | **3.0%** | 6.5% | 0% | 0% | **6.5%** | 0% | 0.8% | 0% | **0.8%** | 2.3% |

*L: Left, R: Right, T: Thru, U: U-Turn

## 291 Hwy & Northbound Ramp - TMC

Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976529, Location: 38.946164, -94.360232

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## 291 Hwy & Northbound Ramp - TMC

Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976529, Location: 38.946164, -94.360232

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

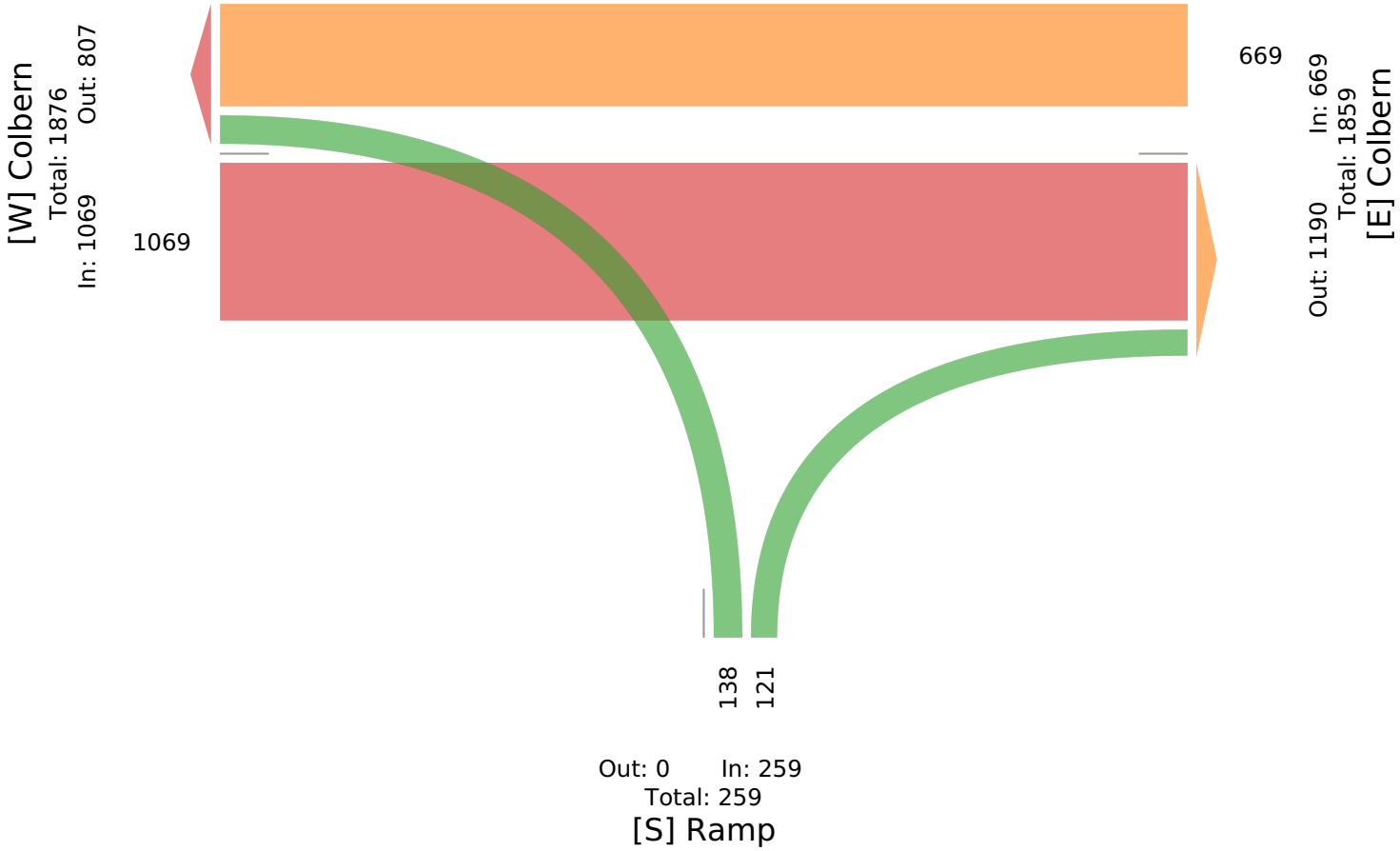
| Leg | Ramp | | | | Colbern | | | | Colbern | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | Eastbound | | | | Westbound | | | | |
| Time | L | R | U | **App** | T | R | U | **App** | L | T | U | **App** | **Int** |
| 2022-08-09 4:30PM | 34 | 23 | 0 | **57** | 255 | 0 | 0 | **255** | 0 | 159 | 0 | **159** | **471** |
| 4:45PM | 30 | 35 | 0 | **65** | 262 | 0 | 0 | **262** | 0 | 169 | 0 | **169** | **496** |
| 5:00PM | 45 | 29 | 0 | **74** | 263 | 0 | 0 | **263** | 0 | 157 | 0 | **157** | **494** |
| 5:15PM | 29 | 34 | 0 | **63** | 289 | 0 | 0 | **289** | 0 | 184 | 0 | **184** | **536** |
| **Total** | 138 | 121 | 0 | **259** | 1069 | 0 | 0 | **1069** | 0 | 669 | 0 | **669** | **1997** |
| **% Approach** | 53.3% | 46.7% | 0% | **-** | 100% | 0% | 0% | **-** | 0% | 100% | 0% | **-** | - |
| **% Total** | 6.9% | 6.1% | 0% | **13.0%** | 53.5% | 0% | 0% | **53.5%** | 0% | 33.5% | 0% | **33.5%** | - |
| **PHF** | 0.767 | 0.864 | - | **0.875** | 0.925 | - | - | **0.925** | - | 0.909 | - | **0.909** | 0.931 |
| **Lights** | 136 | 120 | 0 | **256** | 1055 | 0 | 0 | **1055** | 0 | 658 | 0 | **658** | 1969 |
| **% Lights** | 98.6% | 99.2% | 0% | **98.8%** | 98.7% | 0% | 0% | **98.7%** | 0% | 98.4% | 0% | **98.4%** | 98.6% |
| **Articulated Trucks** | 0 | 0 | 0 | **0** | 1 | 0 | 0 | **1** | 0 | 1 | 0 | **1** | 2 |
| **% Articulated Trucks** | 0% | 0% | 0% | **0%** | 0.1% | 0% | 0% | **0.1%** | 0% | 0.1% | 0% | **0.1%** | 0.1% |
| **Buses and Single-Unit Trucks** | 2 | 1 | 0 | **3** | 13 | 0 | 0 | **13** | 0 | 10 | 0 | **10** | 26 |
| **% Buses and Single-Unit Trucks** | 1.4% | 0.8% | 0% | **1.2%** | 1.2% | 0% | 0% | **1.2%** | 0% | 1.5% | 0% | **1.5%** | 1.3% |

*L: Left, R: Right, T: Thru, U: U-Turn

## 291 Hwy & Northbound Ramp - TMC

Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976529, Location: 38.946164, -94.360232

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Colbern Rd & Phillips 66 Driveway - TMC

Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976527, Location: 38.946122, -94.358941

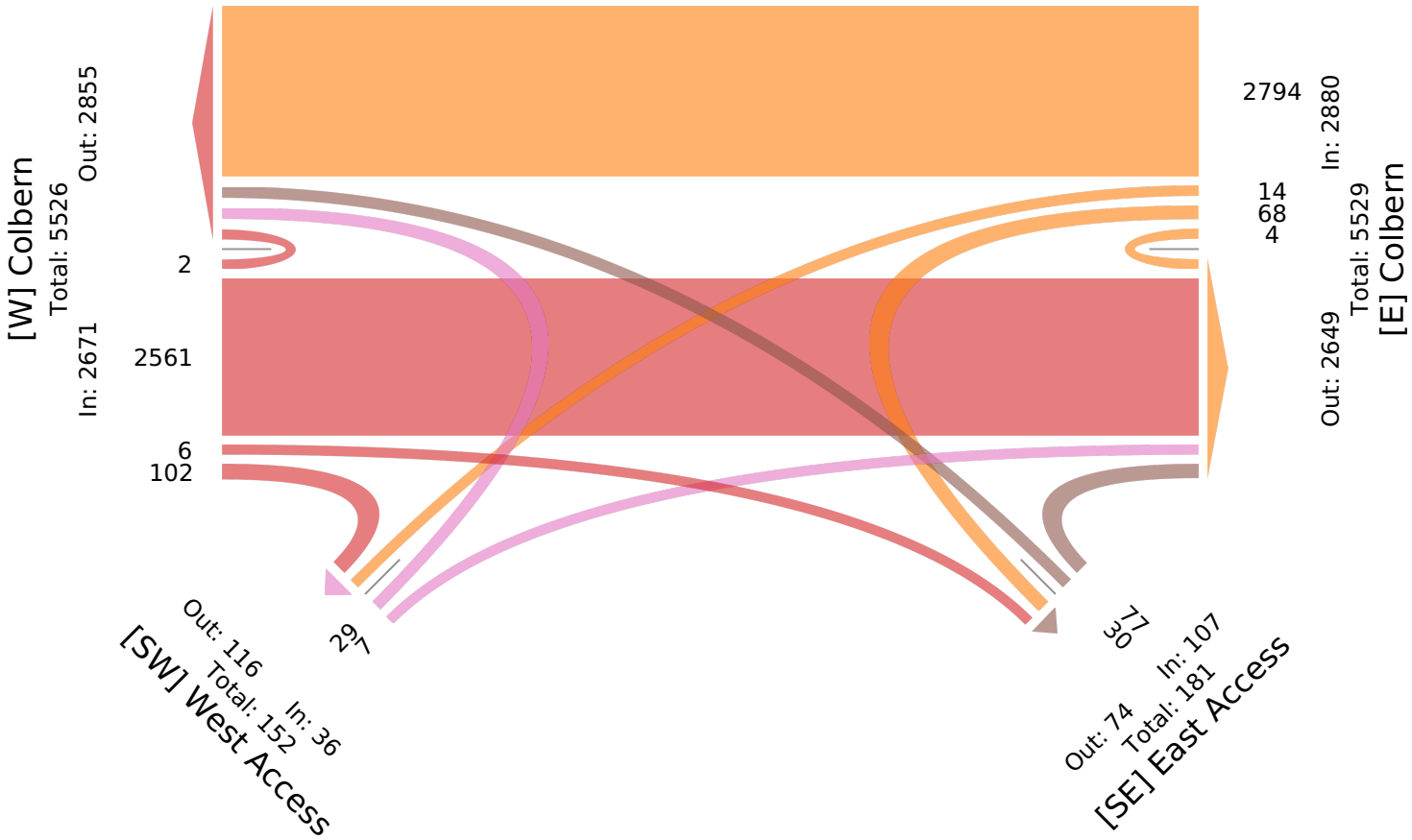
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | Colbern | | | | | Colbern | | | | | West Access | | | | | East Access | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Eastbound | | | | | Westbound | | | | | Northeastbound | | | | | Northwestbound | | | | | |
| Time | T | BR | HR | U | App | HL | BL | T | U | App | HL | BR | R | U | App | L | BL | HR | U | App | Int |
| 2022-08-09 7:00AM | 41 | 0 | 3 | 0 | **44** | 8 | 2 | 213 | 0 | **223** | 5 | 0 | 0 | 0 | **5** | 0 | 2 | 4 | 0 | **6** | **278** |
| 7:15AM | 68 | 0 | 4 | 0 | **72** | 5 | 0 | 266 | 0 | **271** | 2 | 0 | 0 | 0 | **2** | 0 | 3 | 0 | 0 | **3** | **348** |
| 7:30AM | 85 | 0 | 2 | 0 | **87** | 10 | 1 | 279 | 0 | **290** | 2 | 2 | 0 | 0 | **4** | 0 | 2 | 2 | 0 | **4** | **385** |
| 7:45AM | 75 | 0 | 5 | 0 | **80** | 5 | 0 | 277 | 0 | **282** | 0 | 0 | 0 | 0 | **0** | 0 | 4 | 3 | 0 | **7** | **369** |
| Hourly Total | 269 | 0 | 14 | 0 | **283** | 28 | 3 | 1035 | 0 | **1066** | 9 | 2 | 0 | 0 | **11** | 0 | 11 | 9 | 0 | **20** | **1380** |
| 8:00AM | 81 | 0 | 5 | 0 | **86** | 2 | 0 | 198 | 0 | **200** | 2 | 0 | 0 | 0 | **2** | 0 | 3 | 0 | 0 | **3** | **291** |
| 8:15AM | 81 | 2 | 5 | 0 | **88** | 2 | 0 | 170 | 0 | **172** | 3 | 0 | 0 | 0 | **3** | 0 | 2 | 2 | 0 | **4** | **267** |
| 8:30AM | 83 | 2 | 2 | 0 | **87** | 5 | 0 | 140 | 0 | **145** | 0 | 1 | 0 | 0 | **1** | 0 | 1 | 4 | 0 | **5** | **238** |
| 8:45AM | 77 | 0 | 5 | 0 | **82** | 4 | 4 | 150 | 0 | **158** | 2 | 0 | 0 | 0 | **2** | 0 | 2 | 5 | 0 | **7** | **249** |
| Hourly Total | 322 | 4 | 17 | 0 | **343** | 13 | 4 | 658 | 0 | **675** | 7 | 1 | 0 | 0 | **8** | 0 | 8 | 11 | 0 | **19** | **1045** |
| 4:00PM | 207 | 0 | 9 | 0 | **216** | 4 | 0 | 131 | 0 | **135** | 1 | 0 | 0 | 0 | **1** | 0 | 3 | 5 | 0 | **8** | **360** |
| 4:15PM | 197 | 0 | 4 | 0 | **201** | 2 | 0 | 127 | 0 | **129** | 3 | 0 | 0 | 0 | **3** | 0 | 1 | 6 | 0 | **7** | **340** |
| 4:30PM | 258 | 0 | 9 | 0 | **267** | 3 | 1 | 142 | 0 | **146** | 0 | 0 | 0 | 0 | **0** | 0 | 1 | 7 | 0 | **8** | **421** |
| 4:45PM | 264 | 0 | 9 | 0 | **273** | 5 | 3 | 150 | 0 | **158** | 2 | 0 | 0 | 0 | **2** | 0 | 2 | 10 | 0 | **12** | **445** |
| Hourly Total | 926 | 0 | 31 | 0 | **957** | 14 | 4 | 550 | 0 | **568** | 6 | 0 | 0 | 0 | **6** | 0 | 7 | 28 | 0 | **35** | **1566** |
| 5:00PM | 268 | 0 | 7 | 0 | **275** | 3 | 0 | 138 | 1 | **142** | 2 | 0 | 0 | 0 | **2** | 0 | 1 | 8 | 0 | **9** | **428** |
| 5:15PM | 297 | 1 | 13 | 1 | **312** | 2 | 1 | 166 | 0 | **169** | 1 | 1 | 0 | 0 | **2** | 0 | 2 | 4 | 0 | **6** | **489** |
| 5:30PM | 250 | 0 | 9 | 0 | **259** | 3 | 1 | 119 | 0 | **123** | 1 | 3 | 0 | 0 | **4** | 0 | 1 | 10 | 0 | **11** | **397** |
| 5:45PM | 229 | 1 | 11 | 1 | **242** | 5 | 1 | 128 | 3 | **137** | 3 | 0 | 0 | 0 | **3** | 0 | 0 | 7 | 0 | **7** | **389** |
| Hourly Total | 1044 | 2 | 40 | 2 | **1088** | 13 | 3 | 551 | 4 | **571** | 7 | 4 | 0 | 0 | **11** | 0 | 4 | 29 | 0 | **33** | **1703** |
| **Total** | 2561 | 6 | 102 | 2 | **2671** | 68 | 14 | 2794 | 4 | **2880** | 29 | 7 | 0 | 0 | **36** | 0 | 30 | 77 | 0 | **107** | **5694** |
| **% Approach** | 95.9% | 0.2% | 3.8% | 0.1% | **-** | 2.4% | 0.5% | 97.0% | 0.1% | **-** | 80.6% | 19.4% | 0% | 0% | **-** | 0% | 28.0% | 72.0% | 0% | **-** | - |
| **% Total** | 45.0% | 0.1% | 1.8% | 0% | **46.9%** | 1.2% | 0.2% | 49.1% | 0.1% | **50.6%** | 0.5% | 0.1% | 0% | 0% | **0.6%** | 0% | 0.5% | 1.4% | 0% | **1.9%** | - |
| **Lights** | 2522 | 5 | 100 | 2 | **2629** | 68 | 14 | 2759 | 4 | **2845** | 28 | 4 | 0 | 0 | **32** | 0 | 30 | 77 | 0 | **107** | 5613 |
| **% Lights** | 98.5% | 83.3% | 98.0% | 100% | **98.4%** | 100% | 100% | 98.7% | 100% | **98.8%** | 96.6% | 57.1% | 0% | 0% | **88.9%** | 0% | 100% | 100% | 0% | **100%** | 98.6% |
| **Articulated Trucks** | 10 | 0 | 0 | 0 | **10** | 0 | 0 | 8 | 0 | **8** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 18 |
| **% Articulated Trucks** | 0.4% | 0% | 0% | 0% | **0.4%** | 0% | 0% | 0.3% | 0% | **0.3%** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0% | 0% | **0%** | 0.3% |
| **Buses and Single-Unit Trucks** | 29 | 1 | 2 | 0 | **32** | 0 | 0 | 27 | 0 | **27** | 1 | 3 | 0 | 0 | **4** | 0 | 0 | 0 | 0 | **0** | 63 |
| **% Buses and Single-Unit Trucks** | 1.1% | 16.7% | 2.0% | 0% | **1.2%** | 0% | 0% | 1.0% | 0% | **0.9%** | 3.4% | 42.9% | 0% | 0% | **11.1%** | 0% | 0% | 0% | 0% | **0%** | 1.1% |

*BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

**Colbern Rd & Phillips 66 Driveway - TMC**
Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976527, Location: 38.946122, -94.358941

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Colbern Rd & Phillips 66 Driveway - TMC

Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976527, Location: 38.946122, -94.358941

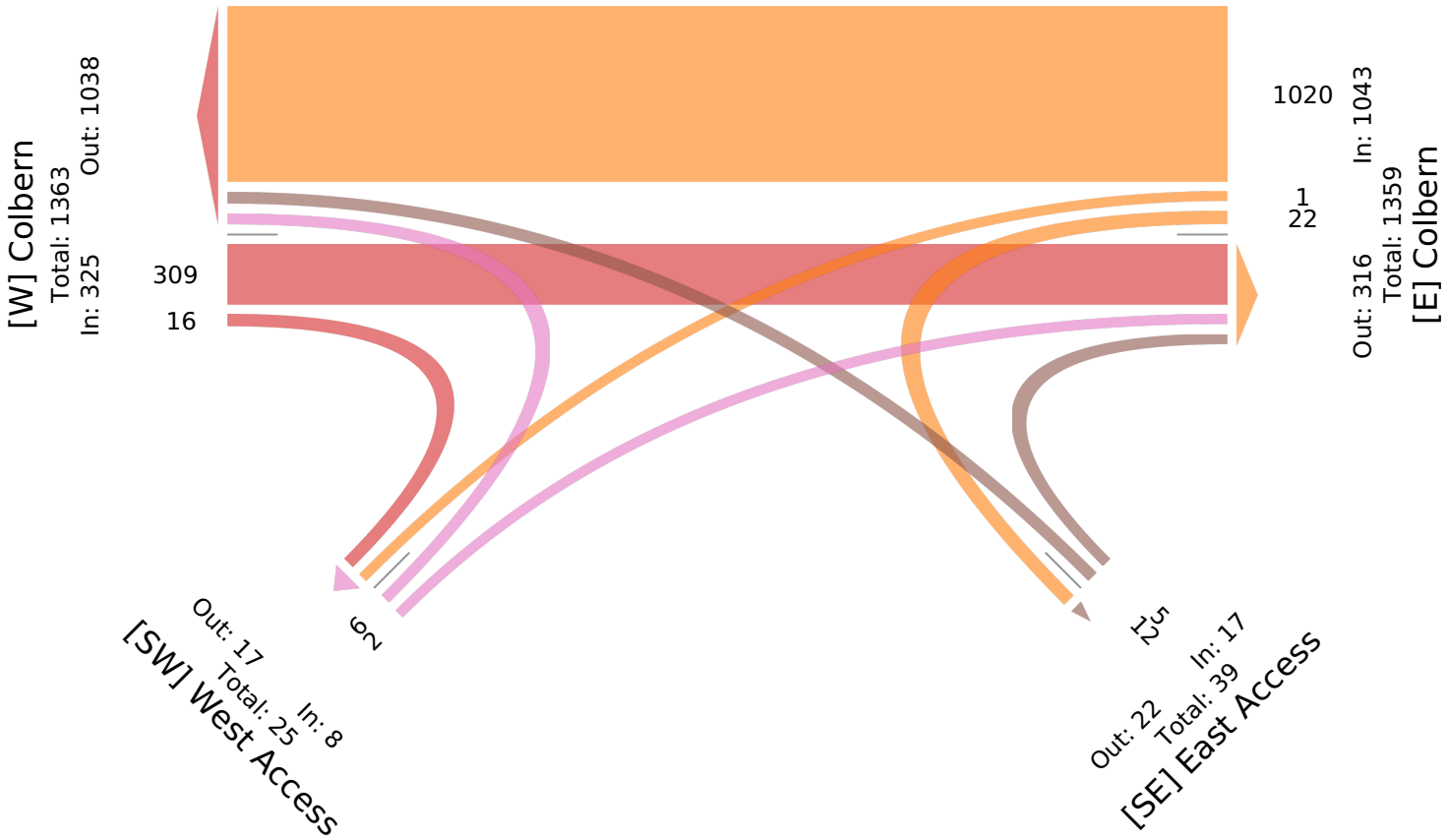
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | Colbern | | | | | Colbern | | | | | West Access | | | | | East Access | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Eastbound | | | | | Westbound | | | | | Northeastbound | | | | | Northwestbound | | | | | |
| Time | T | BR | HR | U | **App** | HL | BL | T | U | **App** | HL | BR | R | U | **App** | L | BL | HR | U | **App** | **Int** |
| 2022-08-09 7:15AM | 68 | 0 | 4 | 0 | **72** | 5 | 0 | 266 | 0 | **271** | 2 | 0 | 0 | 0 | **2** | 0 | 3 | 0 | 0 | **3** | **348** |
| 7:30AM | 85 | 0 | 2 | 0 | **87** | 10 | 1 | 279 | 0 | **290** | 2 | 2 | 0 | 0 | **4** | 0 | 2 | 2 | 0 | **4** | **385** |
| 7:45AM | 75 | 0 | 5 | 0 | **80** | 5 | 0 | 277 | 0 | **282** | 0 | 0 | 0 | 0 | **0** | 0 | 4 | 3 | 0 | **7** | **369** |
| 8:00AM | 81 | 0 | 5 | 0 | **86** | 2 | 0 | 198 | 0 | **200** | 2 | 0 | 0 | 0 | **2** | 0 | 3 | 0 | 0 | **3** | **291** |
| **Total** | 309 | 0 | 16 | 0 | **325** | 22 | 1 | 1020 | 0 | **1043** | 6 | 2 | 0 | 0 | **8** | 0 | 12 | 5 | 0 | **17** | **1393** |
| **% Approach** | 95.1% | 0% | 4.9% | 0% | **-** | 2.1% | 0.1% | 97.8% | 0% | **-** | 75.0% | 25.0% | 0% | 0% | **-** | 0% | 70.6% | 29.4% | 0% | **-** | **-** |
| **% Total** | 22.2% | 0% | 1.1% | 0% | **23.3%** | 1.6% | 0.1% | 73.2% | 0% | **74.9%** | 0.4% | 0.1% | 0% | 0% | **0.6%** | 0% | 0.9% | 0.4% | 0% | **1.2%** | **-** |
| **PHF** | 0.909 | - | 0.800 | - | **0.934** | 0.550 | 0.250 | 0.914 | - | **0.899** | 0.750 | 0.250 | - | - | **0.500** | - | 0.750 | 0.417 | - | **0.607** | 0.905 |
| **Lights** | 291 | 0 | 15 | 0 | **306** | 22 | 1 | 1010 | 0 | **1033** | 6 | 0 | 0 | 0 | **6** | 0 | 12 | 5 | 0 | **17** | 1362 |
| **% Lights** | 94.2% | 0% | 93.8% | 0% | **94.2%** | 100% | 100% | 99.0% | 0% | **99.0%** | 100% | 0% | 0% | 0% | **75.0%** | 0% | 100% | 100% | 0% | **100%** | 97.8% |
| **Articulated Trucks** | 6 | 0 | 0 | 0 | **6** | 0 | 0 | 2 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 8 |
| **% Articulated Trucks** | 1.9% | 0% | 0% | 0% | **1.8%** | 0% | 0% | 0.2% | 0% | **0.2%** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0% | 0% | **0%** | 0.6% |
| **Buses and Single-Unit Trucks** | 12 | 0 | 1 | 0 | **13** | 0 | 0 | 8 | 0 | **8** | 0 | 2 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | **0** | 23 |
| **% Buses and Single-Unit Trucks** | 3.9% | 0% | 6.3% | 0% | **4.0%** | 0% | 0% | 0.8% | 0% | **0.8%** | 0% | 100% | 0% | 0% | **25.0%** | 0% | 0% | 0% | 0% | **0%** | 1.7% |

*BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

**Colbern Rd & Phillips 66 Driveway - TMC**
Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976527, Location: 38.946122, -94.358941

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Colbern Rd & Phillips 66 Driveway - TMC

Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976527, Location: 38.946122, -94.358941

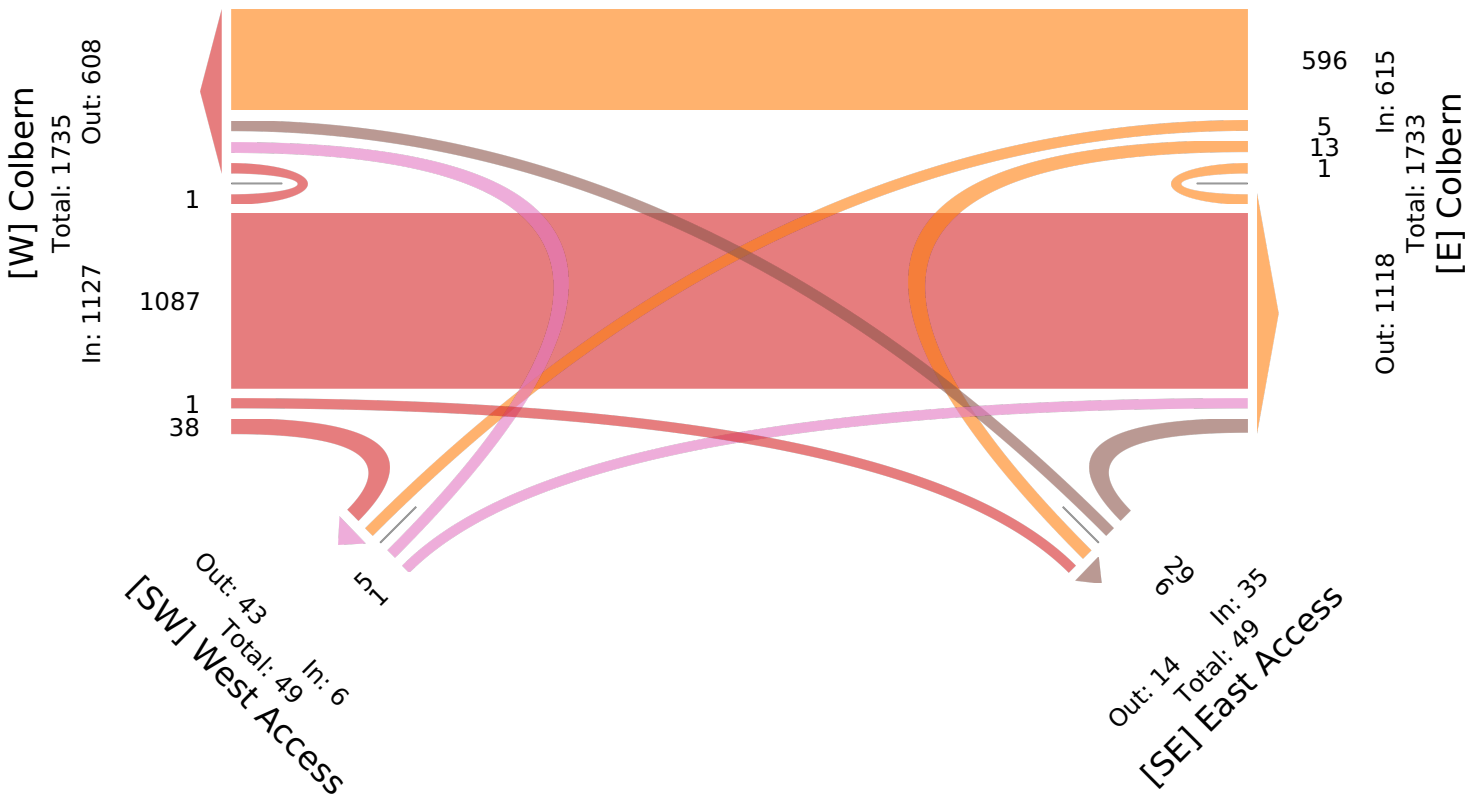
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | Colbern | | | | | Colbern | | | | | West Access | | | | | East Access | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Eastbound | | | | | Westbound | | | | | Northeastbound | | | | | Northwestbound | | | | | |
| Time | T | BR | HR | U | App | HL | BL | T | U | App | HL | BR | R | U | App | L | BL | HR | U | App | Int |
| 2022-08-09 4:30PM | 258 | 0 | 9 | 0 | **267** | 3 | 1 | 142 | 0 | **146** | 0 | 0 | 0 | 0 | **0** | 0 | 1 | 7 | 0 | **8** | **421** |
| 4:45PM | 264 | 0 | 9 | 0 | **273** | 5 | 3 | 150 | 0 | **158** | 2 | 0 | 0 | 0 | **2** | 0 | 2 | 10 | 0 | **12** | **445** |
| 5:00PM | 268 | 0 | 7 | 0 | **275** | 3 | 0 | 138 | 1 | **142** | 2 | 0 | 0 | 0 | **2** | 0 | 1 | 8 | 0 | **9** | **428** |
| 5:15PM | 297 | 1 | 13 | 1 | **312** | 2 | 1 | 166 | 0 | **169** | 1 | 1 | 0 | 0 | **2** | 0 | 2 | 4 | 0 | **6** | **489** |
| **Total** | 1087 | 1 | 38 | 1 | **1127** | 13 | 5 | 596 | 1 | **615** | 5 | 1 | 0 | 0 | **6** | 0 | 6 | 29 | 0 | **35** | **1783** |
| **% Approach** | 96.5% | 0.1% | 3.4% | 0.1% | **-** | 2.1% | 0.8% | 96.9% | 0.2% | **-** | 83.3% | 16.7% | 0% | 0% | **-** | 0% | 17.1% | 82.9% | 0% | **-** | - |
| **% Total** | 61.0% | 0.1% | 2.1% | 0.1% | **63.2%** | 0.7% | 0.3% | 33.4% | 0.1% | **34.5%** | 0.3% | 0.1% | 0% | 0% | **0.3%** | 0% | 0.3% | 1.6% | 0% | **2.0%** | - |
| **PHF** | 0.915 | 0.250 | 0.731 | 0.250 | **0.903** | 0.650 | 0.417 | 0.898 | 0.250 | **0.910** | 0.625 | 0.250 | - | - | **0.750** | - | 0.750 | 0.725 | - | **0.729** | 0.912 |
| **Lights** | 1080 | 1 | 38 | 1 | **1120** | 13 | 5 | 588 | 1 | **607** | 5 | 1 | 0 | 0 | **6** | 0 | 6 | 29 | 0 | **35** | 1768 |
| **% Lights** | 99.4% | 100% | 100% | 100% | **99.4%** | 100% | 100% | 98.7% | 100% | **98.7%** | 100% | 100% | 0% | 0% | **100%** | 0% | 100% | 100% | 0% | **100%** | 99.2% |
| **Articulated Trucks** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 1 | 0 | **1** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 2 |
| **% Articulated Trucks** | 0.1% | 0% | 0% | 0% | **0.1%** | 0% | 0% | 0.2% | 0% | **0.2%** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0% | 0% | **0%** | 0.1% |
| **Buses and Single-Unit Trucks** | 6 | 0 | 0 | 0 | **6** | 0 | 0 | 7 | 0 | **7** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | 13 |
| **% Buses and Single-Unit Trucks** | 0.6% | 0% | 0% | 0% | **0.5%** | 0% | 0% | 1.2% | 0% | **1.1%** | 0% | 0% | 0% | 0% | **0%** | 0% | 0% | 0% | 0% | **0%** | 0.7% |

*BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

**Colbern Rd & Phillips 66 Driveway - TMC**
Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976527, Location: 38.946122, -94.358941

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Northeast Colbern Road & Northeast Todd Geor... - TMC

Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976526, Location: 38.945912, -94.343388

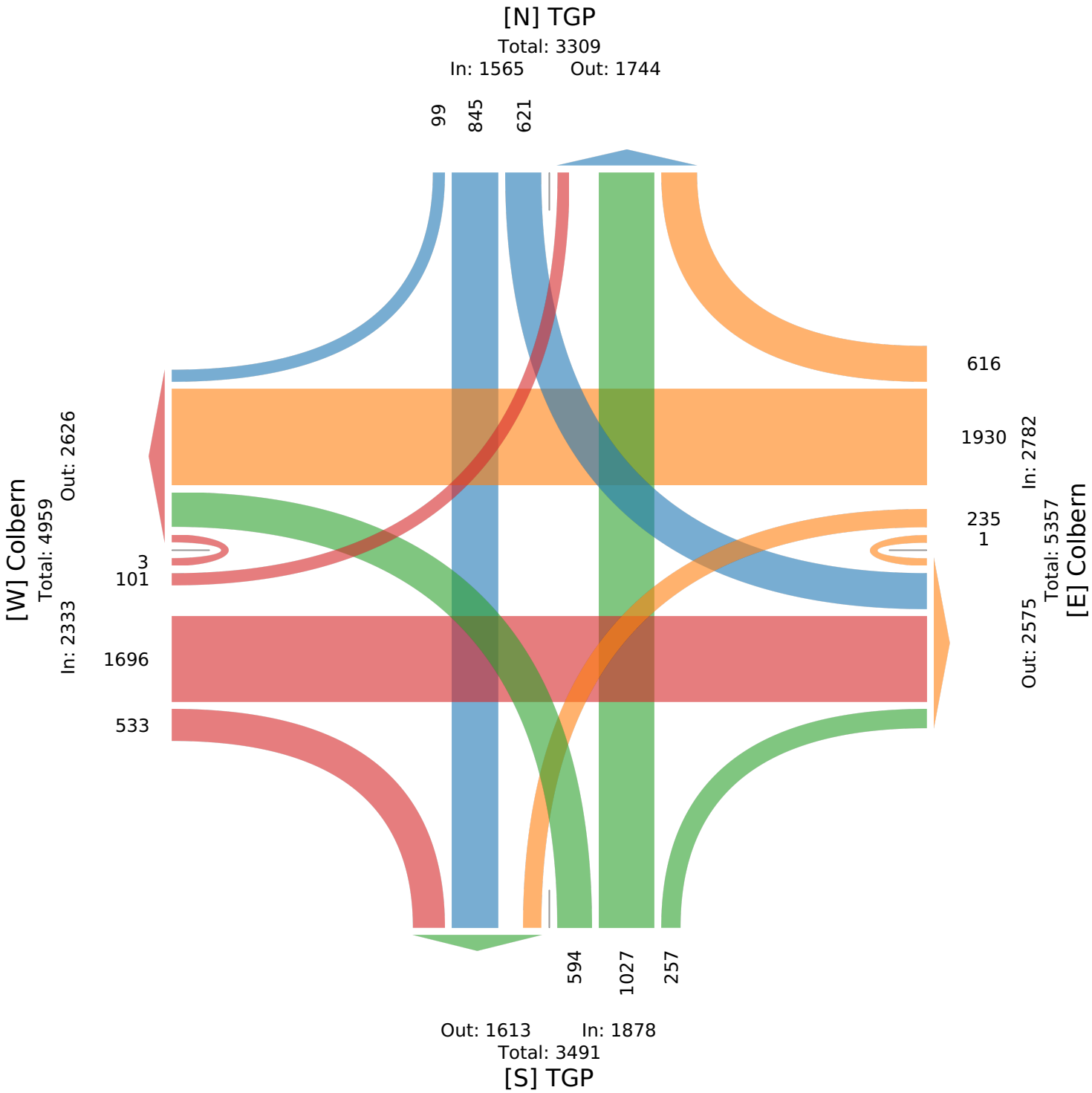
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | TGP | | | | | TGP | | | | | Colbern | | | | | Colbern | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| 2022-08-09 7:00AM | 48 | 64 | 4 | 0 | **116** | 12 | 16 | 8 | 0 | **36** | 2 | 27 | 7 | 0 | **36** | 10 | 140 | 40 | 0 | **190** | **378** |
| 7:15AM | 66 | 79 | 6 | 0 | **151** | 12 | 19 | 6 | 0 | **37** | 3 | 45 | 12 | 0 | **60** | 20 | 184 | 57 | 0 | **261** | **509** |
| 7:30AM | 68 | 89 | 11 | 0 | **168** | 21 | 26 | 6 | 0 | **53** | 4 | 49 | 12 | 1 | **66** | 11 | 192 | 45 | 0 | **248** | **535** |
| 7:45AM | 65 | 76 | 7 | 0 | **148** | 18 | 25 | 3 | 0 | **46** | 4 | 41 | 16 | 1 | **62** | 19 | 218 | 76 | 0 | **313** | **569** |
| Hourly Total | 247 | 308 | 28 | 0 | **583** | 63 | 86 | 23 | 0 | **172** | 13 | 162 | 47 | 2 | **224** | 60 | 734 | 218 | 0 | **1012** | **1991** |
| 8:00AM | 50 | 63 | 9 | 0 | **122** | 28 | 22 | 2 | 0 | **52** | 3 | 54 | 17 | 0 | **74** | 10 | 117 | 51 | 0 | **178** | **426** |
| 8:15AM | 30 | 62 | 10 | 0 | **102** | 24 | 28 | 3 | 0 | **55** | 2 | 53 | 16 | 0 | **71** | 14 | 128 | 29 | 0 | **171** | **399** |
| 8:30AM | 29 | 61 | 19 | 0 | **109** | 33 | 25 | 4 | 0 | **62** | 5 | 51 | 12 | 0 | **68** | 13 | 101 | 42 | 0 | **156** | **395** |
| 8:45AM | 31 | 57 | 12 | 0 | **100** | 30 | 32 | 7 | 0 | **69** | 1 | 64 | 18 | 0 | **83** | 14 | 113 | 36 | 0 | **163** | **415** |
| Hourly Total | 140 | 243 | 50 | 0 | **433** | 115 | 107 | 16 | 0 | **238** | 11 | 222 | 63 | 0 | **296** | 51 | 459 | 158 | 0 | **668** | **1635** |
| 4:00PM | 22 | 50 | 26 | 0 | **98** | 44 | 64 | 6 | 0 | **114** | 9 | 144 | 43 | 0 | **196** | 13 | 95 | 28 | 1 | **137** | **545** |
| 4:15PM | 9 | 55 | 29 | 0 | **93** | 58 | 77 | 6 | 0 | **141** | 10 | 126 | 45 | 1 | **182** | 18 | 81 | 17 | 0 | **116** | **532** |
| 4:30PM | 33 | 58 | 25 | 0 | **116** | 52 | 107 | 8 | 0 | **167** | 5 | 175 | 46 | 0 | **226** | 15 | 91 | 26 | 0 | **132** | **641** |
| 4:45PM | 34 | 70 | 21 | 0 | **125** | 60 | 93 | 5 | 0 | **158** | 8 | 170 | 63 | 0 | **241** | 17 | 93 | 37 | 0 | **147** | **671** |
| Hourly Total | 98 | 233 | 101 | 0 | **432** | 214 | 341 | 25 | 0 | **580** | 32 | 615 | 197 | 1 | **845** | 63 | 360 | 108 | 1 | **532** | **2389** |
| 5:00PM | 33 | 74 | 20 | 0 | **127** | 55 | 90 | 5 | 0 | **150** | 10 | 183 | 54 | 0 | **247** | 15 | 97 | 39 | 0 | **151** | **675** |
| 5:15PM | 26 | 62 | 25 | 0 | **113** | 68 | 89 | 15 | 0 | **172** | 19 | 202 | 69 | 0 | **290** | 17 | 108 | 40 | 0 | **165** | **740** |
| 5:30PM | 19 | 53 | 16 | 0 | **88** | 54 | 75 | 9 | 0 | **138** | 11 | 165 | 50 | 0 | **226** | 16 | 81 | 26 | 0 | **123** | **575** |
| 5:45PM | 31 | 54 | 17 | 0 | **102** | 52 | 57 | 6 | 0 | **115** | 5 | 147 | 53 | 0 | **205** | 13 | 91 | 27 | 0 | **131** | **553** |
| Hourly Total | 109 | 243 | 78 | 0 | **430** | 229 | 311 | 35 | 0 | **575** | 45 | 697 | 226 | 0 | **968** | 61 | 377 | 132 | 0 | **570** | **2543** |
| **Total** | 594 | 1027 | 257 | 0 | **1878** | 621 | 845 | 99 | 0 | **1565** | 101 | 1696 | 533 | 3 | **2333** | 235 | 1930 | 616 | 1 | **2782** | **8558** |
| **% Approach** | 31.6% | 54.7% | 13.7% | 0% | **-** | 39.7% | 54.0% | 6.3% | 0% | **-** | 4.3% | 72.7% | 22.8% | 0.1% | **-** | 8.4% | 69.4% | 22.1% | 0% | **-** | - |
| **% Total** | 6.9% | 12.0% | 3.0% | 0% | **21.9%** | 7.3% | 9.9% | 1.2% | 0% | **18.3%** | 1.2% | 19.8% | 6.2% | 0% | **27.3%** | 2.7% | 22.6% | 7.2% | 0% | **32.5%** | - |
| **Lights** | 590 | 1015 | 252 | 0 | **1857** | 603 | 838 | 98 | 0 | **1539** | 100 | 1666 | 523 | 3 | **2292** | 233 | 1891 | 593 | 1 | **2718** | 8406 |
| **% Lights** | 99.3% | 98.8% | 98.1% | 0% | **98.9%** | 97.1% | 99.2% | 99.0% | 0% | **98.3%** | 99.0% | 98.2% | 98.1% | 100% | **98.2%** | 99.1% | 98.0% | 96.3% | 100% | **97.7%** | 98.2% |
| **Articulated Trucks** | 0 | 3 | 1 | 0 | **4** | 8 | 0 | 1 | 0 | **9** | 0 | 5 | 2 | 0 | **7** | 1 | 8 | 7 | 0 | **16** | 36 |
| **% Articulated Trucks** | 0% | 0.3% | 0.4% | 0% | **0.2%** | 1.3% | 0% | 1.0% | 0% | **0.6%** | 0% | 0.3% | 0.4% | 0% | **0.3%** | 0.4% | 0.4% | 1.1% | 0% | **0.6%** | 0.4% |
| **Buses and Single-Unit Trucks** | 4 | 9 | 4 | 0 | **17** | 10 | 7 | 0 | 0 | **17** | 1 | 25 | 8 | 0 | **34** | 1 | 31 | 16 | 0 | **48** | 116 |
| **% Buses and Single-Unit Trucks** | 0.7% | 0.9% | 1.6% | 0% | **0.9%** | 1.6% | 0.8% | 0% | 0% | **1.1%** | 1.0% | 1.5% | 1.5% | 0% | **1.5%** | 0.4% | 1.6% | 2.6% | 0% | **1.7%** | 1.4% |

*L: Left, R: Right, T: Thru, U: U-Turn

**Northeast Colbern Road & Northeast Todd Geor... - TMC**
Tue Aug 9, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976526, Location: 38.945912, -94.343388

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Northeast Colbern Road & Northeast Todd Geor... - TMC

Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976526, Location: 38.945912, -94.343388

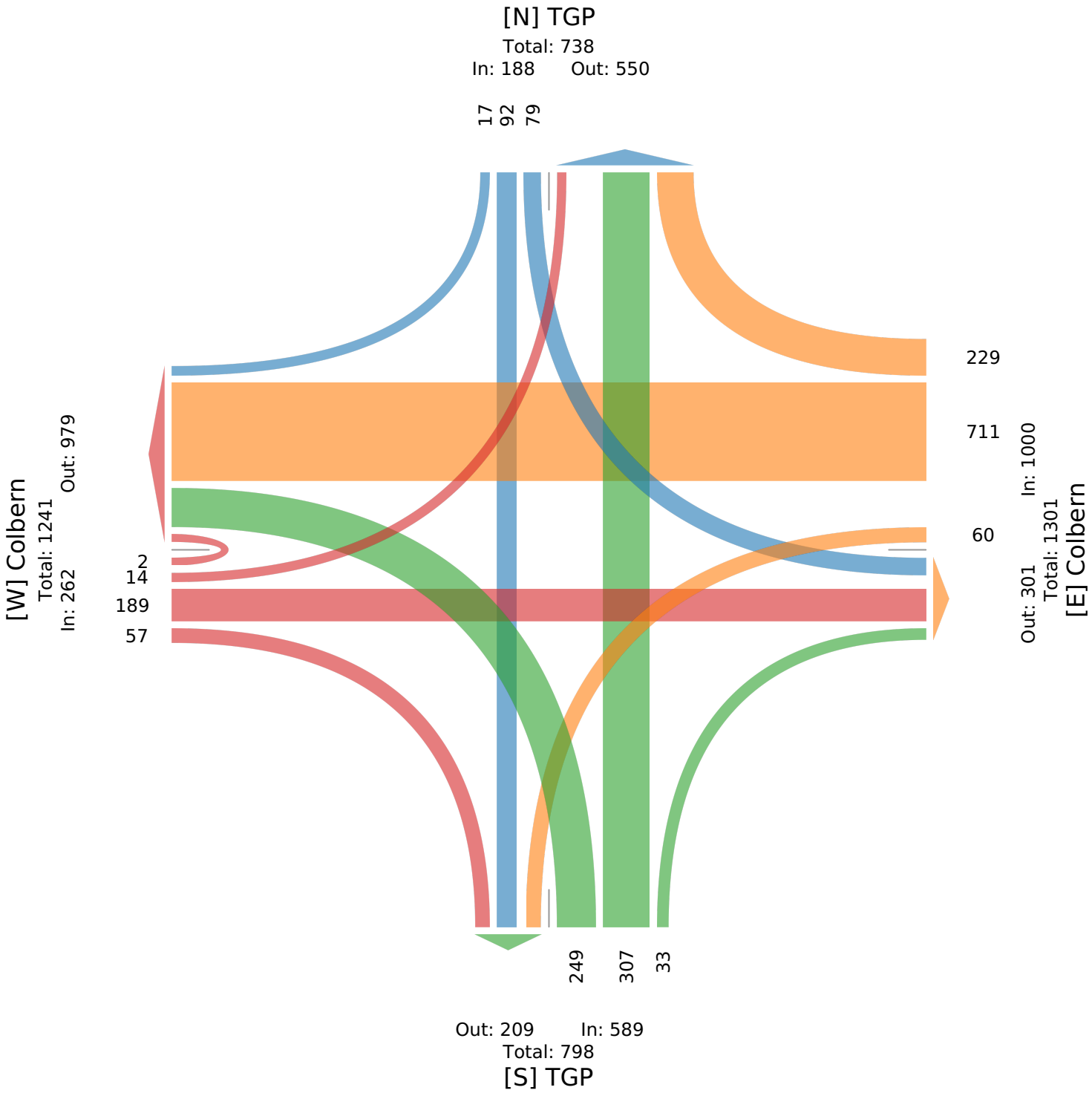
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | TGP | | | | | TGP | | | | | Colbern | | | | | Colbern | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| 2022-08-09 7:15AM | 66 | 79 | 6 | 0 | **151** | 12 | 19 | 6 | 0 | **37** | 3 | 45 | 12 | 0 | **60** | 20 | 184 | 57 | 0 | **261** | **509** |
| 7:30AM | 68 | 89 | 11 | 0 | **168** | 21 | 26 | 6 | 0 | **53** | 4 | 49 | 12 | 1 | **66** | 11 | 192 | 45 | 0 | **248** | **535** |
| 7:45AM | 65 | 76 | 7 | 0 | **148** | 18 | 25 | 3 | 0 | **46** | 4 | 41 | 16 | 1 | **62** | 19 | 218 | 76 | 0 | **313** | **569** |
| 8:00AM | 50 | 63 | 9 | 0 | **122** | 28 | 22 | 2 | 0 | **52** | 3 | 54 | 17 | 0 | **74** | 10 | 117 | 51 | 0 | **178** | **426** |
| **Total** | 249 | 307 | 33 | 0 | **589** | 79 | 92 | 17 | 0 | **188** | 14 | 189 | 57 | 2 | **262** | 60 | 711 | 229 | 0 | **1000** | **2039** |
| **% Approach** | 42.3% | 52.1% | 5.6% | 0% | - | 42.0% | 48.9% | 9.0% | 0% | - | 5.3% | 72.1% | 21.8% | 0.8% | - | 6.0% | 71.1% | 22.9% | 0% | - | - |
| **% Total** | 12.2% | 15.1% | 1.6% | 0% | **28.9%** | 3.9% | 4.5% | 0.8% | 0% | **9.2%** | 0.7% | 9.3% | 2.8% | 0.1% | **12.8%** | 2.9% | 34.9% | 11.2% | 0% | **49.0%** | - |
| **PHF** | 0.915 | 0.862 | 0.750 | - | **0.876** | 0.705 | 0.885 | 0.708 | - | **0.887** | 0.875 | 0.875 | 0.838 | 0.500 | **0.885** | 0.750 | 0.815 | 0.753 | - | **0.799** | 0.896 |
| **Lights** | 248 | 303 | 32 | 0 | **583** | 73 | 90 | 16 | 0 | **179** | 14 | 179 | 52 | 2 | **247** | 59 | 701 | 221 | 0 | **981** | 1990 |
| **% Lights** | 99.6% | 98.7% | 97.0% | 0% | **99.0%** | 92.4% | 97.8% | 94.1% | 0% | **95.2%** | 100% | 94.7% | 91.2% | 100% | **94.3%** | 98.3% | 98.6% | 96.5% | 0% | **98.1%** | 97.6% |
| **Articulated Trucks** | 0 | 2 | 0 | 0 | **2** | 3 | 0 | 1 | 0 | **4** | 0 | 2 | 2 | 0 | **4** | 1 | 2 | 3 | 0 | **6** | 16 |
| **% Articulated Trucks** | 0% | 0.7% | 0% | 0% | **0.3%** | 3.8% | 0% | 5.9% | 0% | **2.1%** | 0% | 1.1% | 3.5% | 0% | **1.5%** | 1.7% | 0.3% | 1.3% | 0% | **0.6%** | 0.8% |
| **Buses and Single-Unit Trucks** | 1 | 2 | 1 | 0 | **4** | 3 | 2 | 0 | 0 | **5** | 0 | 8 | 3 | 0 | **11** | 0 | 8 | 5 | 0 | **13** | 33 |
| **% Buses and Single-Unit Trucks** | 0.4% | 0.7% | 3.0% | 0% | **0.7%** | 3.8% | 2.2% | 0% | 0% | **2.7%** | 0% | 4.2% | 5.3% | 0% | **4.2%** | 0% | 1.1% | 2.2% | 0% | **1.3%** | 1.6% |

*L: Left, R: Right, T: Thru, U: U-Turn

**Northeast Colbern Road & Northeast Todd Geor... - TMC**
Tue Aug 9, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976526, Location: 38.945912, -94.343388

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



## Northeast Colbern Road & Northeast Todd Geor... - TMC

Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976526, Location: 38.945912, -94.343388

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

| Leg | TGP | | | | | TGP | | | | | Colbern | | | | | Colbern | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
| Time | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | L | T | R | U | App | Int |
| 2022-08-09 4:30PM | 33 | 58 | 25 | 0 | **116** | 52 | 107 | 8 | 0 | **167** | 5 | 175 | 46 | 0 | **226** | 15 | 91 | 26 | 0 | **132** | **641** |
| 4:45PM | 34 | 70 | 21 | 0 | **125** | 60 | 93 | 5 | 0 | **158** | 8 | 170 | 63 | 0 | **241** | 17 | 93 | 37 | 0 | **147** | **671** |
| 5:00PM | 33 | 74 | 20 | 0 | **127** | 55 | 90 | 5 | 0 | **150** | 10 | 183 | 54 | 0 | **247** | 15 | 97 | 39 | 0 | **151** | **675** |
| 5:15PM | 26 | 62 | 25 | 0 | **113** | 68 | 89 | 15 | 0 | **172** | 19 | 202 | 69 | 0 | **290** | 17 | 108 | 40 | 0 | **165** | **740** |
| **Total** | 126 | 264 | 91 | 0 | **481** | 235 | 379 | 33 | 0 | **647** | 42 | 730 | 232 | 0 | **1004** | 64 | 389 | 142 | 0 | **595** | **2727** |
| **% Approach** | 26.2% | 54.9% | 18.9% | 0% | - | 36.3% | 58.6% | 5.1% | 0% | - | 4.2% | 72.7% | 23.1% | 0% | - | 10.8% | 65.4% | 23.9% | 0% | - | - |
| **% Total** | 4.6% | 9.7% | 3.3% | 0% | **17.6%** | 8.6% | 13.9% | 1.2% | 0% | **23.7%** | 1.5% | 26.8% | 8.5% | 0% | **36.8%** | 2.3% | 14.3% | 5.2% | 0% | **21.8%** | - |
| **PHF** | 0.926 | 0.892 | 0.910 | - | **0.947** | 0.864 | 0.886 | 0.550 | - | **0.940** | 0.553 | 0.903 | 0.841 | - | **0.866** | 0.941 | 0.900 | 0.888 | - | **0.902** | 0.921 |
| **Lights** | 126 | 262 | 89 | 0 | **477** | 232 | 379 | 33 | 0 | **644** | 42 | 723 | 231 | 0 | **996** | 64 | 381 | 139 | 0 | **584** | 2701 |
| **% Lights** | 100% | 99.2% | 97.8% | 0% | **99.2%** | 98.7% | 100% | 100% | 0% | **99.5%** | 100% | 99.0% | 99.6% | 0% | **99.2%** | 100% | 97.9% | 97.9% | 0% | **98.2%** | 99.0% |
| **Articulated Trucks** | 0 | 0 | 0 | 0 | **0** | 1 | 0 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | **1** | 0 | 1 | 1 | 0 | **2** | 4 |
| **% Articulated Trucks** | 0% | 0% | 0% | 0% | **0%** | 0.4% | 0% | 0% | 0% | **0.2%** | 0% | 0.1% | 0% | 0% | **0.1%** | 0% | 0.3% | 0.7% | 0% | **0.3%** | 0.1% |
| **Buses and Single-Unit Trucks** | 0 | 2 | 2 | 0 | **4** | 2 | 0 | 0 | 0 | **2** | 0 | 6 | 1 | 0 | **7** | 0 | 7 | 2 | 0 | **9** | 22 |
| **% Buses and Single-Unit Trucks** | 0% | 0.8% | 2.2% | 0% | **0.8%** | 0.9% | 0% | 0% | 0% | **0.3%** | 0% | 0.8% | 0.4% | 0% | **0.7%** | 0% | 1.8% | 1.4% | 0% | **1.5%** | 0.8% |

*L: Left, R: Right, T: Thru, U: U-Turn

**Northeast Colbern Road & Northeast Todd Geor... - TMC**
Tue Aug 9, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 976526, Location: 38.945912, -94.343388

GEWALT HAMILTON ASSOCIATES, INC.
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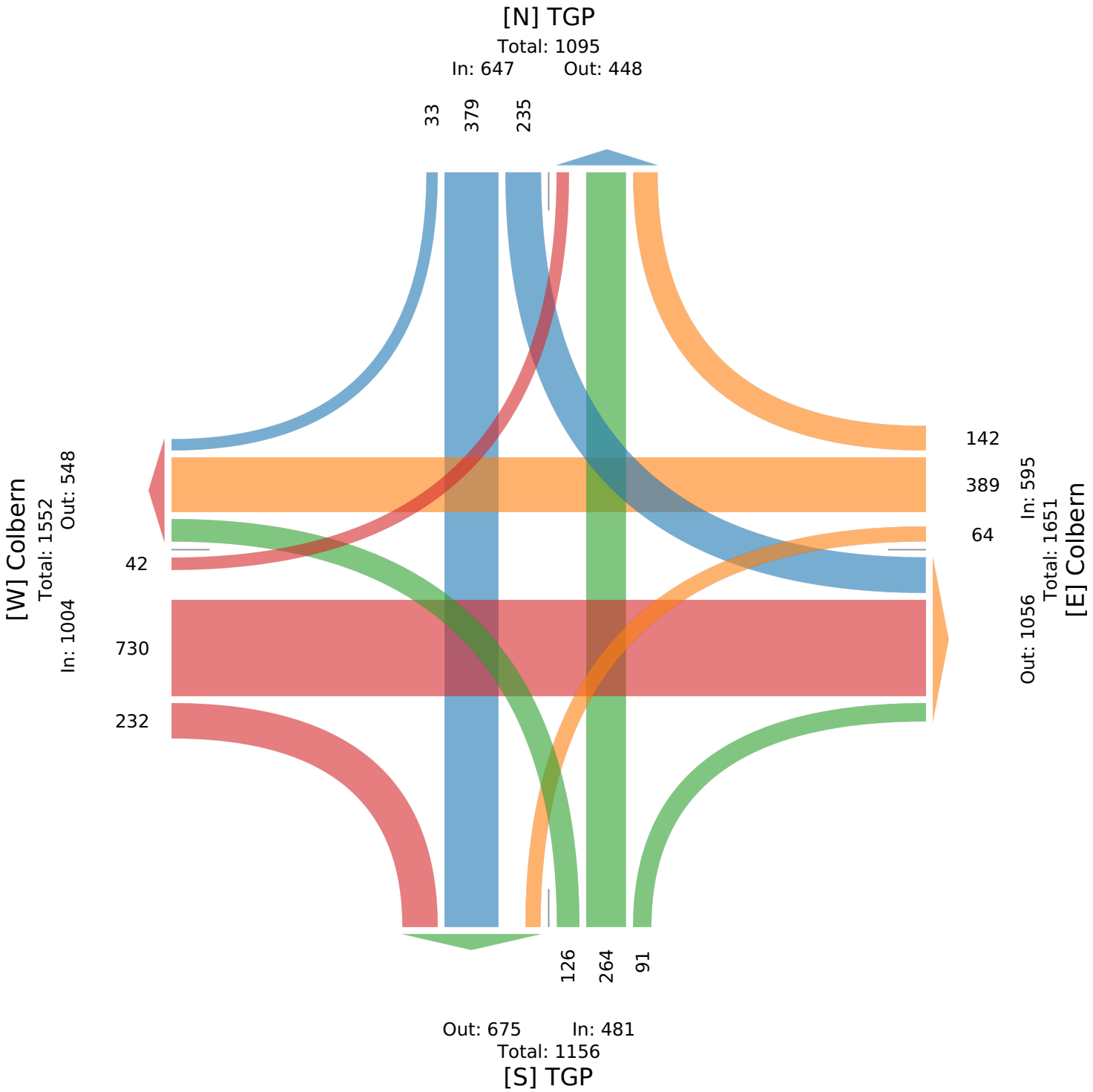
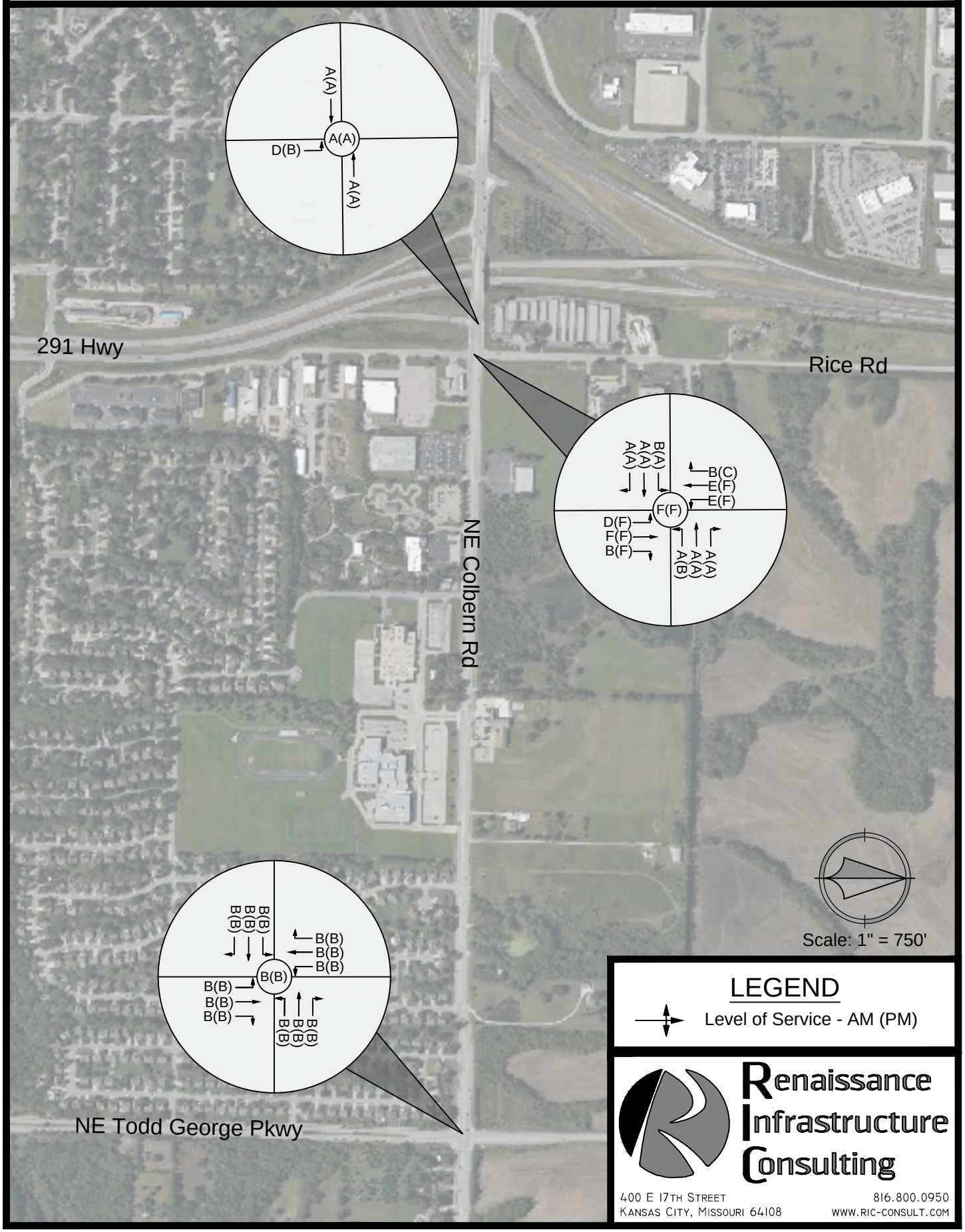
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



# Appendix C - Operational Analysis

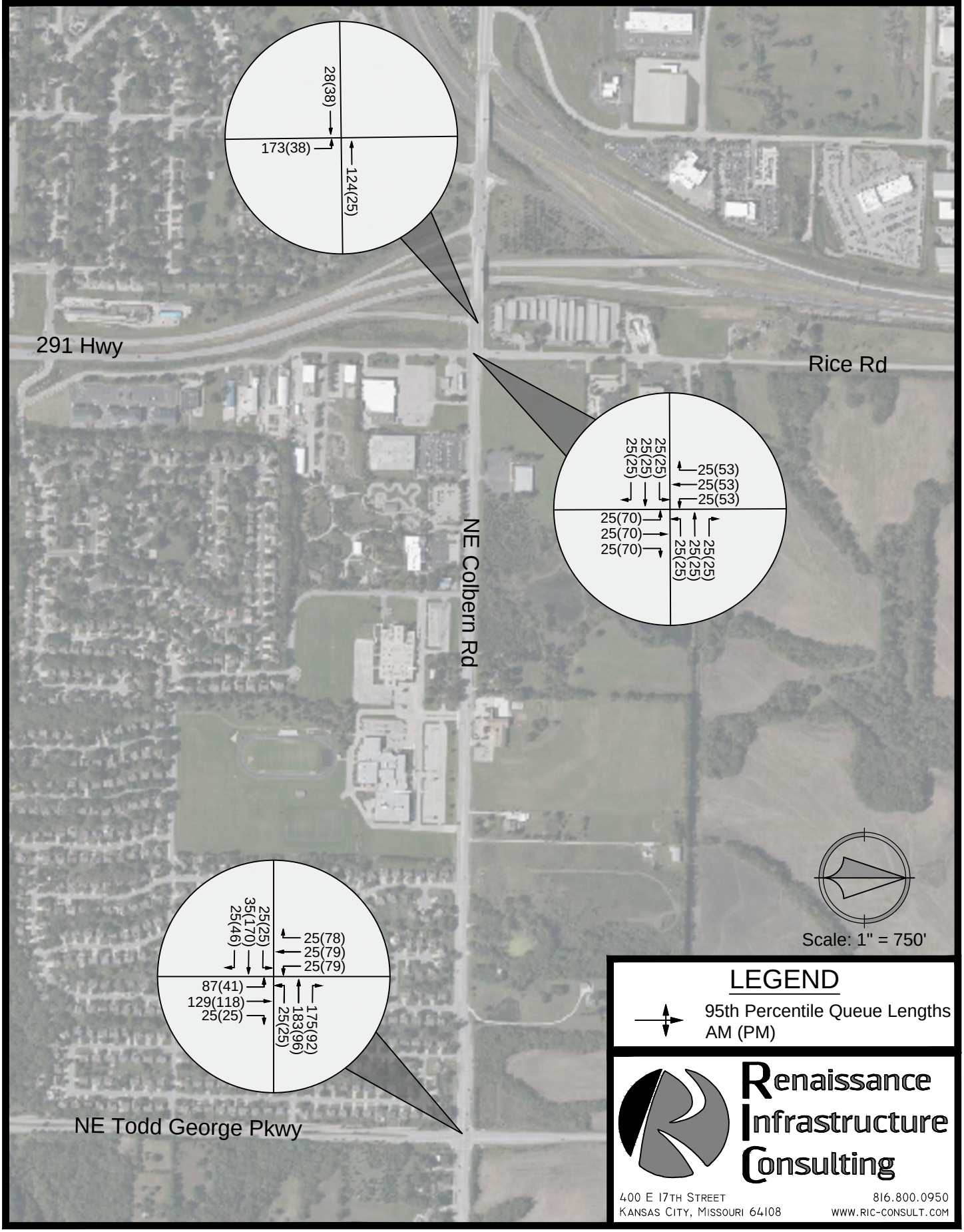
# Level of Service - Existing Conditions





Renaissance Infrastructure Consulting
400 E 17th Street
Kansas City, Missouri 64108
816.800.0950
www.ric-consult.com

# Queue Lengths - Existing Conditions




## LEGEND

95th Percentile Queue Lengths
AM (PM)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Kansas City, Missouri 64108

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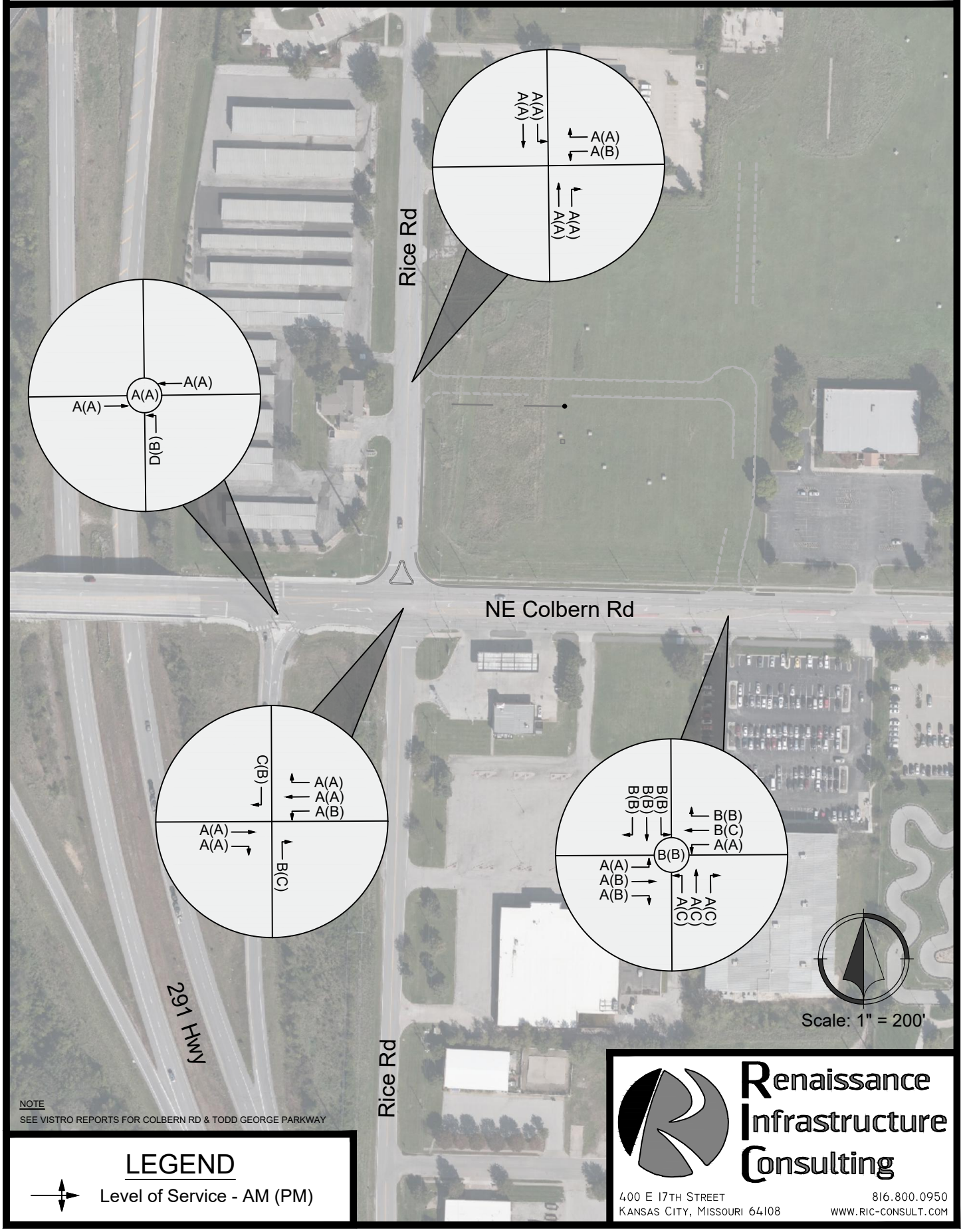
# Level of Service - Existing Plus Proposed Conditions w/ Improvements




NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

Level of Service - AM (PM)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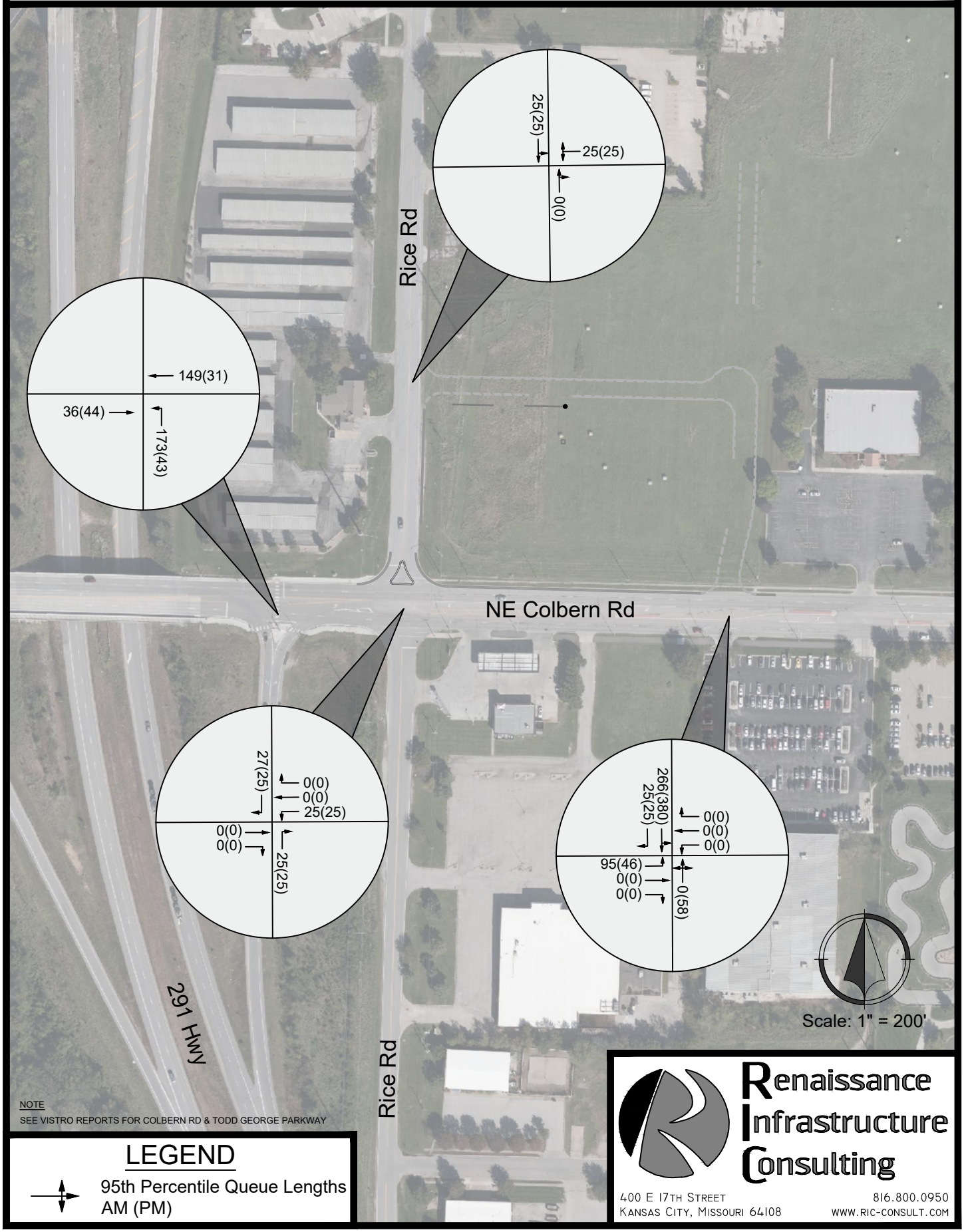
# Queue Lengths - Existing Plus Proposed Conditions




NOTE
SEE VISTRO REPORTS FOR COLBERN RD & TODD GEORGE PARKWAY

## LEGEND

95th Percentile Queue Lengths
AM (PM)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816.800.0950
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**Intersection Level Of Service Report**
**Intersection 1: MO 291 & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 8.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.420 |

**Intersection Setup**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 210.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 40.00 | | 40.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 148 | 52 | 337 | 0 | 0 | 1073 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 1.90 | 7.10 | 2.00 | 2.00 | 1.20 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 26 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 148 | 52 | 337 | 0 | 0 | 1073 |
| Peak Hour Factor | 0.9130 | 0.9130 | 0.9130 | 1.0000 | 1.0000 | 0.9130 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 41 | 14 | 92 | 0 | 0 | 294 |
| Total Analysis Volume [veh/h] | 162 | 57 | 369 | 0 | 0 | 1175 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 79.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Unsignalized | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 0 | 6 | 0 | 0 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 6 | 0 | 0 | 6 |
| Maximum Green [s] | 25 | 0 | 40 | 0 | 0 | 40 |
| Amber [s] | 3.0 | 0.0 | 4.4 | 0.0 | 0.0 | 3.5 |
| All red [s] | 2.9 | 0.0 | 1.3 | 0.0 | 0.0 | 2.9 |
| Split [s] | 30 | 0 | 36 | 0 | 0 | 40 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 18 | 0 | 28 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 |
| I2, Clearance Lost Time [s] | 3.9 | 0.0 | 3.7 | 0.0 | 0.0 | 4.4 |
| Minimum Recall | No | | Yes | | | Yes |
| Maximum Recall | No | | No | | | No |
| Pedestrian Recall | No | | No | | | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C |
|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 5.90 | 5.70 | 6.40 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.90 | 3.70 | 4.40 |
| g_i, Effective Green Time [s] | 10 | 68 | 67 |
| g / C, Green / Cycle | 0.11 | 0.76 | 0.75 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.11 | 0.33 |
| s, saturation flow rate [veh/h] | 1761 | 3415 | 3583 |
| c, Capacity [veh/h] | 200 | 2587 | 2687 |
| d1, Uniform Delay [s] | 38.92 | 2.96 | 4.18 |
| k, delay calibration | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.71 | 0.12 | 0.52 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | |
|---|---|---|---|
| X, volume / capacity | 0.81 | 0.14 | 0.44 |
| d, Delay for Lane Group [s/veh] | 46.63 | 3.08 | 4.70 |
| Lane Group LOS | D | A | A |
| Critical Lane Group | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.83 | 0.60 | 2.73 |
| 50th-Percentile Queue Length [ft/ln] | 95.65 | 15.06 | 68.35 |
| 95th-Percentile Queue Length [veh/ln] | 6.89 | 1.08 | 4.92 |
| 95th-Percentile Queue Length [ft/ln] | 172.17 | 27.11 | 123.04 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 46.63 | 0.00 | 3.08 | 0.00 | 0.00 | 4.70 |
| Movement LOS | D | | A | | | A |
| d_A, Approach Delay [s/veh] | 46.63 | | 3.08 | | 4.70 | |
| Approach LOS | D | | A | | A | |
| d_I, Intersection Delay [s/veh] | 8.33 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.420 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.65 | 0.00 | 34.65 |
| l_p,int, Pedestrian LOS Score for Intersection | 1.806 | 0.000 | 2.632 |
| Crosswalk LOS | A | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 536 | 674 | 747 |
| d_b, Bicycle Delay [s] | 24.10 | 19.78 | 17.65 |
| l_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.864 | 2.529 |
| Bicycle LOS | A | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## Intersection Level Of Service Report
## Intersection 2: Rice Rd & Colbern Rd

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 64.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.031 |

### Intersection Setup

| Name | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | No | | | No | | |

### Volumes

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 2 | 2 | 3 | 1 | 31 | 27 | 317 | 36 | 10 | 1004 | 21 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 50.00 | 0.00 | 0.00 | 0.00 | 3.20 | 0.00 | 5.70 | 8.30 | 10.00 | 1.10 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 20 | 2 | 2 | 3 | 1 | 31 | 27 | 317 | 36 | 10 | 1004 | 21 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 1 | 1 | 1 | 0 | 9 | 7 | 87 | 10 | 3 | 276 | 6 |
| Total Analysis Volume [veh/h] | 22 | 2 | 2 | 3 | 1 | 34 | 30 | 348 | 40 | 11 | 1103 | 23 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Stop | Stop | Free | Free |
|---|---|---|---|---|
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.13 | 0.03 | 0.00 | 0.03 | 0.01 | 0.07 | 0.05 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 30.03 | 64.80 | 13.59 | 43.23 | 41.24 | 14.08 | 11.02 | 0.00 | 0.00 | 8.27 | 0.00 | 0.00 |
| Movement LOS | D | F | B | E | E | B | B | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.56 | 0.56 | 0.56 | 0.38 | 0.38 | 0.38 | 0.15 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 13.89 | 13.89 | 13.89 | 9.49 | 9.49 | 9.49 | 3.76 | 0.00 | 0.00 | 0.75 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 31.44 | | | 17.10 | | | 0.79 | | | 0.08 | | |
| Approach LOS | D | | | C | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 1.17 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 3: NE Colbern Rd & Todd George Pkwy**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.5 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.482 |

**Intersection Setup**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 215.00 | 100.00 | 100.00 | 265.00 | 100.00 | 100.00 | 130.00 | 100.00 | 185.00 | 160.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | Yes | | | Yes | | | Yes | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 249 | 307 | 33 | 79 | 92 | 17 | 14 | 189 | 57 | 60 | 711 | 229 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.40 | 1.40 | 3.00 | 7.60 | 2.20 | 5.90 | 0.00 | 5.30 | 8.80 | 1.70 | 1.40 | 3.50 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 17 | 0 | 0 | 9 | 0 | 0 | 29 | 0 | 0 | 115 |
| Total Hourly Volume [veh/h] | 249 | 307 | 16 | 79 | 92 | 8 | 14 | 189 | 28 | 60 | 711 | 114 |
| Peak Hour Factor | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 86 | 4 | 22 | 26 | 2 | 4 | 53 | 8 | 17 | 198 | 32 |
| Total Analysis Volume [veh/h] | 278 | 343 | 18 | 88 | 103 | 9 | 16 | 211 | 31 | 67 | 794 | 127 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Beginning of First Red |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 7 | 4 | 0 | 3 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 15 | 40 | 0 | 20 | 40 | 0 | 20 | 40 | 0 |
| Amber [s] | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 |
| All red [s] | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 29 | 0 | 0 | 28 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| L, Total Lost Time per Cycle [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 27 | 17 | 17 | 27 | 15 | 15 | 26 | 16 | 16 | 26 | 18 | 18 |
| g / C, Green / Cycle | 0.51 | 0.32 | 0.32 | 0.51 | 0.28 | 0.28 | 0.49 | 0.31 | 0.31 | 0.49 | 0.35 | 0.35 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.18 | 0.01 | 0.07 | 0.03 | 0.03 | 0.02 | 0.06 | 0.02 | 0.05 | 0.25 | 0.25 |
| s, saturation flow rate [veh/h] | 1530 | 1879 | 1577 | 1247 | 1867 | 1815 | 964 | 3466 | 1503 | 1380 | 1879 | 1790 |
| c, Capacity [veh/h] | 888 | 599 | 503 | 625 | 515 | 501 | 473 | 1066 | 462 | 765 | 652 | 621 |
| d1, Uniform Delay [s] | 11.78 | 15.09 | 12.48 | 11.16 | 14.38 | 14.39 | 12.03 | 13.58 | 13.02 | 11.10 | 15.14 | 15.14 |
| k, delay calibration | 0.10 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.19 | 0.32 | 0.01 | 0.04 | 0.03 | 0.04 | 0.01 | 0.03 | 0.02 | 0.02 | 0.57 | 0.60 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.31 | 0.57 | 0.04 | 0.14 | 0.11 | 0.11 | 0.03 | 0.20 | 0.07 | 0.09 | 0.72 | 0.72 |
| d, Delay for Lane Group [s/veh] | 11.97 | 15.41 | 12.49 | 11.20 | 14.41 | 14.42 | 12.04 | 13.62 | 13.05 | 11.12 | 15.71 | 15.74 |
| Lane Group LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 1.91 | 2.86 | 0.12 | 0.51 | 0.42 | 0.41 | 0.10 | 0.78 | 0.22 | 0.42 | 4.05 | 3.87 |
| 50th-Percentile Queue Length [ft/ln] | 47.81 | 71.55 | 3.08 | 12.81 | 10.41 | 10.31 | 2.45 | 19.38 | 5.50 | 10.50 | 101.37 | 96.68 |
| 95th-Percentile Queue Length [veh/ln] | 3.44 | 5.15 | 0.22 | 0.92 | 0.75 | 0.74 | 0.18 | 1.40 | 0.40 | 0.76 | 7.30 | 6.96 |
| 95th-Percentile Queue Length [ft/ln] | 86.06 | 128.78 | 5.55 | 23.05 | 18.74 | 18.56 | 4.40 | 34.88 | 9.90 | 18.90 | 182.47 | 174.02 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 11.97 | 15.41 | 12.49 | 11.20 | 14.42 | 14.42 | 12.04 | 13.62 | 13.05 | 11.12 | 15.72 | 15.74 |
| Movement LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 13.83 | | | 13.00 | | | 13.45 | | | 15.41 | | |
| Approach LOS | B | | | B | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 14.45 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.482 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | -6.5 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 18.26 | 33.39 | 18.26 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersection | 2.557 | 2.446 | 2.875 | 0.000 |
| Crosswalk LOS | B | B | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1510 | 1510 | 1510 | 1510 |
| d_b, Bicycle Delay [s] | 1.59 | 1.59 | 1.59 | 1.59 |
| l_b,int, Bicycle LOS Score for Intersection | 2.642 | 1.732 | 1.796 | 2.470 |
| Bicycle LOS | B | A | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 1: MO 291 & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 6.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.403 |

**Intersection Setup**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 210.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 40.00 | | 40.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 138 | 121 | 1069 | 0 | 0 | 669 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.40 | 0.80 | 1.30 | 2.00 | 2.00 | 1.60 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 61 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 138 | 121 | 1069 | 0 | 0 | 669 |
| Peak Hour Factor | 0.9310 | 0.9310 | 0.9310 | 1.0000 | 1.0000 | 0.9310 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 37 | 32 | 287 | 0 | 0 | 180 |
| Total Analysis Volume [veh/h] | 148 | 130 | 1148 | 0 | 0 | 719 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 92.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Unsignalized | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 0 | 6 | 0 | 0 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 6 | 0 | 0 | 6 |
| Maximum Green [s] | 25 | 0 | 40 | 0 | 0 | 40 |
| Amber [s] | 3.0 | 0.0 | 4.4 | 0.0 | 0.0 | 3.5 |
| All red [s] | 2.9 | 0.0 | 1.3 | 0.0 | 0.0 | 2.9 |
| Split [s] | 20 | 0 | 80 | 0 | 0 | 80 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 18 | 0 | 28 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 |
| I2, Clearance Lost Time [s] | 3.9 | 0.0 | 3.7 | 0.0 | 0.0 | 4.4 |
| Minimum Recall | No | | Yes | | | Yes |
| Maximum Recall | No | | No | | | No |
| Pedestrian Recall | No | | No | | | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C |
|---|---|---|---|
| C, Cycle Length [s] | 28 | 28 | 28 |
| L, Total Lost Time per Cycle [s] | 5.90 | 5.70 | 6.40 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.90 | 3.70 | 4.40 |
| g_i, Effective Green Time [s] | 3 | 13 | 13 |
| g / C, Green / Cycle | 0.12 | 0.47 | 0.44 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.32 | 0.20 |
| s, saturation flow rate [veh/h] | 1790 | 3580 | 3572 |
| c, Capacity [veh/h] | 220 | 1682 | 1591 |
| d1, Uniform Delay [s] | 11.95 | 5.89 | 5.49 |
| k, delay calibration | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 3.53 | 0.49 | 0.20 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | |
|---|---|---|---|
| X, volume / capacity | 0.67 | 0.68 | 0.45 |
| d, Delay for Lane Group [s/veh] | 15.47 | 6.39 | 5.69 |
| Lane Group LOS | B | A | A |
| Critical Lane Group | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.83 | 0.83 | 0.52 |
| 50th-Percentile Queue Length [ft/ln] | 20.78 | 20.87 | 12.88 |
| 95th-Percentile Queue Length [veh/ln] | 1.50 | 1.50 | 0.93 |
| 95th-Percentile Queue Length [ft/ln] | 37.41 | 37.56 | 23.18 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 15.47 | 0.00 | 6.39 | 0.00 | 0.00 | 5.69 |
| Movement LOS | B | | A | | | A |
| d_A, Approach Delay [s/veh] | 15.47 | | 6.39 | | 5.69 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 6.81 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.403 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 5.33 | 0.00 | 5.33 |
| l_p,int, Pedestrian LOS Score for Intersection | 1.723 | 0.000 | 2.662 |
| Crosswalk LOS | A | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 993 | 5231 | 5182 |
| d_b, Bicycle Delay [s] | 3.60 | 37.07 | 35.95 |
| l_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.507 | 2.153 |
| Bicycle LOS | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Rice Rd & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 132.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.544 |

**Intersection Setup**

| Name | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | No | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 26 | 2 | 17 | 25 | 2 | 64 | 65 | 1084 | 32 | 12 | 571 | 29 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 0.70 | 3.10 | 0.00 | 1.80 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 26 | 2 | 17 | 25 | 2 | 64 | 65 | 1084 | 32 | 12 | 571 | 29 |
| Peak Hour Factor | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 1 | 5 | 7 | 1 | 17 | 17 | 292 | 9 | 3 | 154 | 8 |
| Total Analysis Volume [veh/h] | 28 | 2 | 18 | 27 | 2 | 69 | 70 | 1167 | 34 | 13 | 615 | 31 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | No | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.54 | 0.04 | 0.04 | 0.31 | 0.04 | 0.10 | 0.07 | 0.01 | 0.00 | 0.02 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 132.11 | 127.36 | 70.13 | 58.09 | 82.76 | 22.67 | 9.14 | 0.00 | 0.00 | 11.26 | 0.00 | 0.00 |
| Movement LOS | F | F | F | F | F | C | A | A | A | B | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.79 | 2.79 | 2.79 | 2.10 | 2.10 | 2.10 | 0.24 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 69.72 | 69.72 | 69.72 | 52.57 | 52.57 | 52.57 | 6.03 | 0.00 | 0.00 | 1.69 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 108.67 | | | 33.66 | | | 0.50 | | | 0.22 | | |
| Approach LOS | F | | | D | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 4.48 | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 3: NE Colbern Rd & Todd George Pkwy**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.520 |

**Intersection Setup**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 215.00 | 100.00 | 100.00 | 265.00 | 100.00 | 100.00 | 130.00 | 100.00 | 185.00 | 160.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | Yes | | | Yes | | | Yes | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 126 | 264 | 91 | 235 | 379 | 33 | 42 | 730 | 232 | 64 | 389 | 142 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.80 | 2.20 | 1.30 | 0.00 | 0.00 | 0.00 | 0.90 | 0.40 | 0.00 | 2.10 | 2.10 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 46 | 0 | 0 | 17 | 0 | 0 | 116 | 0 | 0 | 71 |
| Total Hourly Volume [veh/h] | 126 | 264 | 45 | 235 | 379 | 16 | 42 | 730 | 116 | 64 | 389 | 71 |
| Peak Hour Factor | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 34 | 72 | 12 | 64 | 103 | 4 | 11 | 198 | 31 | 17 | 106 | 19 |
| Total Analysis Volume [veh/h] | 137 | 287 | 49 | 255 | 412 | 17 | 46 | 793 | 126 | 69 | 422 | 77 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Beginning of First Red |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 7 | 4 | 0 | 3 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 15 | 40 | 0 | 20 | 40 | 0 | 20 | 40 | 0 |
| Amber [s] | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 |
| All red [s] | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 29 | 0 | 0 | 28 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 |
| L, Total Lost Time per Cycle [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 29 | 16 | 16 | 29 | 18 | 18 | 27 | 17 | 17 | 27 | 18 | 18 |
| g / C, Green / Cycle | 0.51 | 0.29 | 0.29 | 0.51 | 0.32 | 0.32 | 0.49 | 0.31 | 0.31 | 0.49 | 0.33 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.15 | 0.03 | 0.19 | 0.11 | 0.11 | 0.04 | 0.22 | 0.08 | 0.07 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1293 | 1888 | 1587 | 1364 | 1900 | 1874 | 1211 | 3592 | 1610 | 1045 | 1868 | 1770 |
| c, Capacity [veh/h] | 705 | 555 | 467 | 691 | 600 | 591 | 626 | 1127 | 505 | 521 | 611 | 578 |
| d1, Uniform Delay [s] | 11.34 | 16.46 | 14.40 | 12.57 | 14.80 | 14.80 | 11.61 | 16.93 | 14.31 | 12.61 | 14.70 | 14.72 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.05 | 0.28 | 0.04 | 0.12 | 0.14 | 0.14 | 0.02 | 0.30 | 0.09 | 0.04 | 0.17 | 0.18 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| X, volume / capacity | 0.19 | 0.52 | 0.11 | 0.37 | 0.36 | 0.36 | 0.07 | 0.70 | 0.25 | 0.13 | 0.42 | 0.42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d, Delay for Lane Group [s/veh] | 11.39 | 16.74 | 14.44 | 12.69 | 14.93 | 14.94 | 11.63 | 17.23 | 14.41 | 12.65 | 14.87 | 14.90 |
| Lane Group LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.91 | 2.61 | 0.39 | 1.75 | 1.74 | 1.72 | 0.31 | 3.77 | 1.01 | 0.46 | 2.13 | 2.04 |
| 50th-Percentile Queue Length [ft/ln] | 22.65 | 65.37 | 9.72 | 43.86 | 43.48 | 42.94 | 7.63 | 94.24 | 25.33 | 11.62 | 53.24 | 51.01 |
| 95th-Percentile Queue Length [veh/ln] | 1.63 | 4.71 | 0.70 | 3.16 | 3.13 | 3.09 | 0.55 | 6.79 | 1.82 | 0.84 | 3.83 | 3.67 |
| 95th-Percentile Queue Length [ft/ln] | 40.78 | 117.67 | 17.50 | 78.94 | 78.26 | 77.30 | 13.73 | 169.63 | 45.59 | 20.92 | 95.83 | 91.82 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 11.39 | 16.74 | 14.44 | 12.69 | 14.94 | 14.94 | 11.63 | 17.23 | 14.41 | 12.65 | 14.88 | 14.90 |
| Movement LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 14.95 | | | 14.10 | | | 16.59 | | | 14.61 | | |
| Approach LOS | B | | | B | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 15.25 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.520 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | -6.5 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 19.64 | 34.79 | 19.64 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersection | 2.696 | 2.608 | 3.019 | 0.000 |
| Crosswalk LOS | B | B | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1433 | 1433 | 1433 | 1433 |
| d_b, Bicycle Delay [s] | 2.24 | 2.24 | 2.24 | 2.24 |
| l_b,int, Bicycle LOS Score for Intersection | 2.416 | 2.138 | 2.451 | 2.087 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 1: MO 291 & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 8.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.462 |

**Intersection Setup**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 210.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 40.00 | | 40.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 148 | 52 | 337 | 0 | 0 | 1073 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 3.40 | 1.90 | 7.10 | 2.00 | 2.00 | 1.20 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 33 | 0 | 0 | 33 |
| Diverted Trips [veh/h] | 0 | 11 | 57 | 0 | 0 | 68 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 38 |
| Right Turn on Red Volume [veh/h] | 0 | 32 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 148 | 63 | 427 | 0 | 0 | 1212 |
| Peak Hour Factor | 0.9130 | 0.9130 | 0.9130 | 1.0000 | 1.0000 | 0.9130 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 41 | 17 | 117 | 0 | 0 | 332 |
| Total Analysis Volume [veh/h] | 162 | 69 | 468 | 0 | 0 | 1327 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Unsignalized | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 0 | 6 | 0 | 0 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 6 | 0 | 0 | 6 |
| Maximum Green [s] | 25 | 0 | 40 | 0 | 0 | 40 |
| Amber [s] | 3.0 | 0.0 | 4.4 | 0.0 | 0.0 | 3.5 |
| All red [s] | 2.9 | 0.0 | 1.3 | 0.0 | 0.0 | 2.9 |
| Split [s] | 30 | 0 | 36 | 0 | 0 | 40 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 18 | 0 | 28 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 |
| I2, Clearance Lost Time [s] | 3.9 | 0.0 | 3.7 | 0.0 | 0.0 | 4.4 |
| Minimum Recall | No | | Yes | | | Yes |
| Maximum Recall | No | | No | | | No |
| Pedestrian Recall | No | | No | | | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C |
|---|---|---|---|
| C, Cycle Length [s] | 90 | 90 | 90 |
| L, Total Lost Time per Cycle [s] | 5.90 | 5.70 | 6.40 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.90 | 3.70 | 4.40 |
| g_i, Effective Green Time [s] | 10 | 68 | 67 |
| g / C, Green / Cycle | 0.11 | 0.76 | 0.75 |
| (v / s)_i Volume / Saturation Flow Rate | 0.09 | 0.14 | 0.37 |
| s, saturation flow rate [veh/h] | 1761 | 3415 | 3583 |
| c, Capacity [veh/h] | 200 | 2587 | 2687 |
| d1, Uniform Delay [s] | 38.92 | 3.06 | 4.47 |
| k, delay calibration | 0.11 | 0.50 | 0.50 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 7.71 | 0.15 | 0.65 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | |
|---|---|---|---|
| X, volume / capacity | 0.81 | 0.18 | 0.49 |
| d, Delay for Lane Group [s/veh] | 46.63 | 3.21 | 5.12 |
| Lane Group LOS | D | A | A |
| Critical Lane Group | Yes | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 3.83 | 0.79 | 3.31 |
| 50th-Percentile Queue Length [ft/ln] | 95.65 | 19.76 | 82.63 |
| 95th-Percentile Queue Length [veh/ln] | 6.89 | 1.42 | 5.95 |
| 95th-Percentile Queue Length [ft/ln] | 172.17 | 35.57 | 148.74 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 46.63 | 0.00 | 3.21 | 0.00 | 0.00 | 5.12 |
| Movement LOS | D | | A | | | A |
| d_A, Approach Delay [s/veh] | 46.63 | | 3.21 | | 5.12 | |
| Approach LOS | D | | A | | A | |
| d_I, Intersection Delay [s/veh] | 8.10 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.462 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 34.65 | 0.00 | 34.65 |
| l_p,int, Pedestrian LOS Score for Intersection | 1.806 | 0.000 | 2.714 |
| Crosswalk LOS | A | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 536 | 674 | 747 |
| d_b, Bicycle Delay [s] | 24.10 | 19.78 | 17.65 |
| l_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.946 | 2.654 |
| Bicycle LOS | A | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Rice Rd & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 16.1 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.267 |

**Intersection Setup**

| Name | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | No | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 20 | 2 | 2 | 3 | 1 | 31 | 27 | 317 | 36 | 10 | 1004 | 21 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 50.00 | 0.00 | 0.00 | 0.00 | 3.20 | 0.00 | 5.70 | 8.30 | 10.00 | 1.10 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 11 | 0 | 0 | 17 | 0 | 33 | 0 | 11 | 17 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 68 | 0 | 0 | 35 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | -26 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 27 | 0 | 23 | 38 | 0 |
| Total Hourly Volume [veh/h] | 20 | 2 | 35 | 3 | 1 | 107 | 27 | 445 | 36 | 44 | 1068 | 21 |
| Peak Hour Factor | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 | 0.9100 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 5 | 1 | 10 | 1 | 0 | 29 | 7 | 122 | 10 | 12 | 293 | 6 |
| Total Analysis Volume [veh/h] | 22 | 2 | 38 | 3 | 1 | 118 | 30 | 489 | 40 | 48 | 1174 | 23 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Stop | Stop | Free | Free |
|---|---|---|---|---|
| Flared Lane | | | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.27 | 0.00 | 0.00 | 0.00 | 0.05 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 10.13 | 0.00 | 0.00 | 16.08 | 0.00 | 0.00 | 0.00 | 8.86 | 0.00 | 0.00 |
| Movement LOS | | | B | | | C | | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.16 | 0.00 | 0.00 | 1.06 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 4.05 | 0.00 | 0.00 | 26.61 | 0.00 | 0.00 | 0.00 | 3.86 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 10.13 | | | 16.08 | | | 0.00 | | | 0.34 | | |
| Approach LOS | B | | | C | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 1.40 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 3: NE Colbern Rd & Todd George Pkwy**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.498 |

**Intersection Setup**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 215.00 | 100.00 | 100.00 | 265.00 | 100.00 | 100.00 | 130.00 | 100.00 | 185.00 | 160.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | Yes | | | Yes | | | Yes | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 249 | 307 | 33 | 79 | 92 | 17 | 14 | 189 | 57 | 60 | 711 | 229 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.40 | 1.40 | 3.00 | 7.60 | 2.20 | 5.90 | 0.00 | 5.30 | 8.80 | 1.70 | 1.40 | 3.50 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 55 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 17 | 0 | 0 | 9 | 0 | 0 | 29 | 0 | 0 | 115 |
| Total Hourly Volume [veh/h] | 249 | 307 | 16 | 79 | 92 | 8 | 14 | 245 | 28 | 60 | 766 | 114 |
| Peak Hour Factor | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 | 0.8960 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 69 | 86 | 4 | 22 | 26 | 2 | 4 | 68 | 8 | 17 | 214 | 32 |
| Total Analysis Volume [veh/h] | 278 | 343 | 18 | 88 | 103 | 9 | 16 | 273 | 31 | 67 | 855 | 127 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Beginning of First Red |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 7 | 4 | 0 | 3 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 15 | 40 | 0 | 20 | 40 | 0 | 20 | 40 | 0 |
| Amber [s] | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 |
| All red [s] | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 29 | 0 | 0 | 28 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| L, Total Lost Time per Cycle [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 27 | 17 | 17 | 27 | 15 | 15 | 27 | 17 | 17 | 27 | 19 | 19 |
| g / C, Green / Cycle | 0.50 | 0.31 | 0.31 | 0.50 | 0.27 | 0.27 | 0.50 | 0.32 | 0.32 | 0.50 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.18 | 0.18 | 0.01 | 0.07 | 0.03 | 0.03 | 0.02 | 0.08 | 0.02 | 0.05 | 0.27 | 0.27 |
| s, saturation flow rate [veh/h] | 1531 | 1879 | 1577 | 1246 | 1867 | 1815 | 927 | 3466 | 1503 | 1332 | 1879 | 1795 |
| c, Capacity [veh/h] | 874 | 592 | 497 | 610 | 505 | 491 | 457 | 1104 | 478 | 736 | 672 | 642 |
| d1, Uniform Delay [s] | 12.24 | 15.60 | 12.90 | 11.60 | 14.91 | 14.92 | 12.15 | 13.71 | 12.90 | 11.03 | 15.32 | 15.32 |
| k, delay calibration | 0.11 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.22 | 0.33 | 0.01 | 0.04 | 0.04 | 0.04 | 0.01 | 0.04 | 0.02 | 0.02 | 0.63 | 0.66 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.32 | 0.58 | 0.04 | 0.14 | 0.11 | 0.11 | 0.03 | 0.25 | 0.06 | 0.09 | 0.75 | 0.75 |
| d, Delay for Lane Group [s/veh] | 12.46 | 15.93 | 12.91 | 11.64 | 14.95 | 14.96 | 12.16 | 13.75 | 12.92 | 11.05 | 15.95 | 15.98 |
| Lane Group LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | No | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 2.01 | 2.98 | 0.13 | 0.54 | 0.43 | 0.43 | 0.10 | 1.03 | 0.22 | 0.42 | 4.46 | 4.27 |
| 50th-Percentile Queue Length [ft/ln] | 50.20 | 74.52 | 3.21 | 13.44 | 10.87 | 10.77 | 2.47 | 25.83 | 5.55 | 10.61 | 111.58 | 106.77 |
| 95th-Percentile Queue Length [veh/ln] | 3.61 | 5.37 | 0.23 | 0.97 | 0.78 | 0.78 | 0.18 | 1.86 | 0.40 | 0.76 | 7.93 | 7.66 |
| 95th-Percentile Queue Length [ft/ln] | 90.35 | 134.13 | 5.78 | 24.19 | 19.57 | 19.39 | 4.45 | 46.50 | 9.99 | 19.10 | 198.20 | 191.50 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 12.46 | 15.93 | 12.91 | 11.64 | 14.95 | 14.96 | 12.16 | 13.75 | 12.92 | 11.05 | 15.96 | 15.98 |
| Movement LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 14.34 | | | 13.49 | | | 13.59 | | | 15.65 | | |
| Approach LOS | B | | | B | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 14.78 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.498 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | -6.5 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 18.84 | 33.98 | 18.84 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersection | 2.560 | 2.447 | 2.996 | 0.000 |
| Crosswalk LOS | B | B | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1476 | 1476 | 1476 | 1476 |
| d_b, Bicycle Delay [s] | 1.86 | 1.86 | 1.86 | 1.86 |
| l_b,int, Bicycle LOS Score for Intersection | 2.642 | 1.732 | 1.848 | 2.520 |
| Bicycle LOS | B | A | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 13: NE Rice Rd & NE Ikerd Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 9.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.092 |

**Intersection Setup**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 45.00 | | 45.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 21 | 0 | 0 | 31 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.04 | 2.00 | 2.00 | 3.20 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 11 | 0 | 17 | 11 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 33 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 26 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 4 | 0 | 0 | 29 |
| Total Hourly Volume [veh/h] | 21 | 0 | 15 | 31 | 76 | 40 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 6 | 0 | 4 | 8 | 21 | 11 |
| Total Analysis Volume [veh/h] | 23 | 0 | 16 | 34 | 83 | 43 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | | | | |
|---|---|---|---|---|---|---|
| Priority Scheme | Free | | Free | | Stop | |
| Flared Lane | | | | | No | |
| Storage Area [veh] | 0 | | 0 | | 0 | |
| Two-Stage Gap Acceptance | | | | | No | |
| Number of Storage Spaces in Median | 0 | | 0 | | 0 | |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.01 | 0.00 | 0.09 | 0.04 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.28 | 0.00 | 9.57 | 9.00 |
| Movement LOS | A | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.03 | 0.03 | 0.46 | 0.46 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.67 | 0.67 | 11.43 | 11.43 |
| d_A, Approach Delay [s/veh] | 0.00 | | 2.33 | | 9.37 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 6.52 | | | | | |
| Intersection LOS | A | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: NE Colbern Rd & NE Lucky Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 1,332.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 3.276 |

**Intersection Setup**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | U-tu | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.0 | 100.0 | 100.0 | 60.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 40.00 | | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | No | | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 316 | 0 | 0 | 1043 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 5.80 | 2.00 | 2.00 | 1.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 56 | 0 | 28 | 0 | 44 | 0 | 0 | 0 | 0 | 55 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 68 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 16 | 0 | 26 | 0 | 16 | -16 | 0 | 0 | -52 | 52 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 8 | 0 | 1 | 38 | 43 | 0 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 80 | 0 | 90 | 38 | 171 | 300 | 0 | 0 | 991 | 107 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.920 | 0.920 | 0.920 | 0.920 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 22 | 0 | 24 | 10 | 46 | 82 | 0 | 0 | 269 | 29 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 87 | 0 | 98 | 41 | 186 | 326 | 0 | 0 | 1077 | 116 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.00 | 3.28 | 0.00 | 0.22 | 0.28 | 0.32 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 87.28 | 124.96 | 9.22 | 1332.38 | 1307.14 | 15.32 | 43.36 | 24.71 | 0.00 | 0.00 | 7.93 | 0.00 | 0.00 |
| Movement LOS | F | F | A | F | F | C | E | C | A | A | A | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.00 | 10.63 | 10.63 | 0.83 | 3.79 | 3.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 0.00 | 265.64 | 265.64 | 20.70 | 94.75 | 94.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 73.82 | | | 634.69 | | | 11.53 | | | | 0.00 | | |
| Approach LOS | F | | | F | | | B | | | | A | | |
| d_I, Intersection Delay [s/veh] | 64.11 | | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 1: MO 291 & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 6.8 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | A |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.430 |

**Intersection Setup**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Eastbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Left | Right | Thru | Right | Left | Thru |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 1 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 210.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 35.00 | | 40.00 | | 40.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Curb Present | No | | No | | No | |
| Crosswalk | Yes | | No | | Yes | |

**Volumes**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 138 | 121 | 1069 | 0 | 0 | 669 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.40 | 0.80 | 1.30 | 2.00 | 2.00 | 1.60 |
| Proportion of CAVs [%] | 0.00 | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 12 | 0 | 0 | 12 |
| Diverted Trips [veh/h] | 0 | 11 | 75 | 0 | 0 | 87 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 37 |
| Right Turn on Red Volume [veh/h] | 0 | 66 | 0 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 138 | 132 | 1156 | 0 | 0 | 805 |
| Peak Hour Factor | 0.9310 | 0.9310 | 0.9310 | 1.0000 | 1.0000 | 0.9310 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 37 | 35 | 310 | 0 | 0 | 216 |
| Total Analysis Volume [veh/h] | 148 | 142 | 1242 | 0 | 0 | 865 |
| Presence of On-Street Parking | No | No | No | No | No | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | 0 | | 0 | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | 0 | | 0 | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | 0 | | 0 | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |
| Bicycle Volume [bicycles/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Coordinated |
| Actuation Type | Fully actuated |
| Offset [s] | 92.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permissive | Unsignalized | Permissive | Permissive | Permissive | Permissive |
|---|---|---|---|---|---|---|
| Signal Group | 3 | 0 | 6 | 0 | 0 | 2 |
| Auxiliary Signal Groups | | | | | | |
| Lead / Lag | Lead | - | - | - | - | - |
| Minimum Green [s] | 5 | 0 | 6 | 0 | 0 | 6 |
| Maximum Green [s] | 25 | 0 | 40 | 0 | 0 | 40 |
| Amber [s] | 3.0 | 0.0 | 4.4 | 0.0 | 0.0 | 3.5 |
| All red [s] | 2.9 | 0.0 | 1.3 | 0.0 | 0.0 | 2.9 |
| Split [s] | 20 | 0 | 80 | 0 | 0 | 80 |
| Vehicle Extension [s] | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 3.0 |
| Walk [s] | 7 | 0 | 7 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 18 | 0 | 28 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | No | | No | | | No |
| I1, Start-Up Lost Time [s] | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 |
| I2, Clearance Lost Time [s] | 3.9 | 0.0 | 3.7 | 0.0 | 0.0 | 4.4 |
| Minimum Recall | No | | Yes | | | Yes |
| Maximum Recall | No | | No | | | No |
| Pedestrian Recall | No | | No | | | No |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | C |
|---|---|---|---|
| C, Cycle Length [s] | 30 | 30 | 30 |
| L, Total Lost Time per Cycle [s] | 5.90 | 5.70 | 6.40 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.90 | 3.70 | 4.40 |
| g_i, Effective Green Time [s] | 4 | 15 | 14 |
| g / C, Green / Cycle | 0.12 | 0.50 | 0.48 |
| (v / s)_i Volume / Saturation Flow Rate | 0.08 | 0.35 | 0.24 |
| s, saturation flow rate [veh/h] | 1790 | 3580 | 3572 |
| c, Capacity [veh/h] | 213 | 1789 | 1703 |
| d1, Uniform Delay [s] | 12.87 | 5.83 | 5.50 |
| k, delay calibration | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 4.01 | 0.49 | 0.24 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | |
|---|---|---|---|
| X, volume / capacity | 0.69 | 0.69 | 0.51 |
| d, Delay for Lane Group [s/veh] | 16.89 | 6.32 | 5.73 |
| Lane Group LOS | B | A | A |
| Critical Lane Group | Yes | Yes | No |
| 50th-Percentile Queue Length [veh/ln] | 0.93 | 0.96 | 0.67 |
| 50th-Percentile Queue Length [ft/ln] | 23.36 | 24.07 | 16.78 |
| 95th-Percentile Queue Length [veh/ln] | 1.68 | 1.73 | 1.21 |
| 95th-Percentile Queue Length [ft/ln] | 42.06 | 43.33 | 30.21 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 16.89 | 0.00 | 6.32 | 0.00 | 0.00 | 5.73 |
| Movement LOS | B | | A | | | A |
| d_A, Approach Delay [s/veh] | 16.89 | | 6.32 | | 5.73 | |
| Approach LOS | B | | A | | A | |
| d_I, Intersection Delay [s/veh] | 6.79 | | | | | |
| Intersection LOS | A | | | | | |
| Intersection V/C | 0.430 | | | | | |

**Other Modes**

| | | | |
|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 0.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 6.17 | 0.00 | 6.17 |
| I_p,int, Pedestrian LOS Score for Intersection | 1.729 | 0.000 | 2.746 |
| Crosswalk LOS | A | F | B |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 929 | 4897 | 4851 |
| d_b, Bicycle Delay [s] | 4.35 | 31.84 | 30.83 |
| I_b,int, Bicycle LOS Score for Intersection | 1.560 | 2.584 | 2.273 |
| Bicycle LOS | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | - | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 2: Rice Rd & Colbern Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 15.6 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | C |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.135 |

**Intersection Setup**

| Name | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration | | | | | | | | | | | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | No | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 26 | 2 | 17 | 25 | 2 | 64 | 65 | 1084 | 32 | 12 | 571 | 29 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 2.00 | 3.10 | 0.00 | 2.00 | 0.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 4 | 0 | 0 | 6 | 0 | 12 | 0 | 4 | 6 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 86 | 0 | 0 | 44 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | -15 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 65 | 0 | 21 | 37 | 0 |
| Total Hourly Volume [veh/h] | 26 | 2 | 49 | 25 | 2 | 128 | 65 | 1247 | 32 | 37 | 643 | 29 |
| Peak Hour Factor | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 | 0.9290 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 7 | 1 | 13 | 7 | 1 | 34 | 17 | 336 | 9 | 10 | 173 | 8 |
| Total Analysis Volume [veh/h] | 28 | 2 | 53 | 27 | 2 | 138 | 70 | 1342 | 34 | 40 | 692 | 31 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| Priority Scheme | Stop | Stop | Free | Free |
|---|---|---|---|---|
| Flared Lane | | | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | 0.22 | 0.00 | 0.01 | 0.00 | 0.08 | 0.01 | 0.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 15.57 | 0.00 | 0.00 | 12.15 | 0.00 | 0.00 | 0.00 | 12.74 | 0.00 | 0.00 |
| Movement LOS | | | C | | | B | | A | A | B | A | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.46 | 0.00 | 0.00 | 0.81 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 11.55 | 0.00 | 0.00 | 20.31 | 0.00 | 0.00 | 0.00 | 6.43 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 15.57 | | | 12.15 | | | 0.00 | | | 0.67 | | |
| Approach LOS | C | | | B | | | A | | | A | | |
| d_I, Intersection Delay [s/veh] | 1.29 | | | | | | | | | | | |
| Intersection LOS | C | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 3: NE Colbern Rd & Todd George Pkwy**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 15.4 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.526 |

**Intersection Setup**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| Entry Pocket Length [ft] | 215.00 | 100.00 | 100.00 | 265.00 | 100.00 | 100.00 | 130.00 | 100.00 | 185.00 | 160.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.21 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 40.00 | | | 45.00 | | | 40.00 | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | 0.00 | | |
| Curb Present | Yes | | | Yes | | | Yes | | | Yes | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 126 | 264 | 91 | 235 | 379 | 33 | 42 | 730 | 232 | 64 | 389 | 142 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 0.00 | 0.80 | 2.20 | 1.30 | 0.00 | 0.00 | 0.00 | 0.90 | 0.40 | 0.00 | 2.10 | 2.10 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 20 | 0 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 46 | 0 | 0 | 17 | 0 | 0 | 116 | 0 | 0 | 71 |
| Total Hourly Volume [veh/h] | 126 | 264 | 45 | 235 | 379 | 16 | 42 | 749 | 116 | 64 | 409 | 71 |
| Peak Hour Factor | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 | 0.9210 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 34 | 72 | 12 | 64 | 103 | 4 | 11 | 203 | 31 | 17 | 111 | 19 |
| Total Analysis Volume [veh/h] | 137 | 287 | 49 | 255 | 412 | 17 | 46 | 813 | 126 | 69 | 444 | 77 |
| Presence of On-Street Parking | No | | No | No | | No | No | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 90 |
| Coordination Type | Free Running |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Beginning of First Red |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 7 | 4 | 0 | 3 | 8 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Maximum Green [s] | 15 | 40 | 0 | 15 | 40 | 0 | 20 | 40 | 0 | 20 | 40 | 0 |
| Amber [s] | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 |
| All red [s] | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 |
| Split [s] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vehicle Extension [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Walk [s] | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Pedestrian Clearance [s] | 0 | 30 | 0 | 0 | 29 | 0 | 0 | 28 | 0 | 0 | 0 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I2, Clearance Lost Time [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Minimum Recall | No | No | | No | No | | No | No | | No | No | |
| Maximum Recall | No | No | | No | No | | No | No | | No | No | |
| Pedestrian Recall | No | No | | No | No | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | L | C | R | L | C | C | L | C | R | L | C | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 | 56 |
| L, Total Lost Time per Cycle [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| g_i, Effective Green Time [s] | 29 | 16 | 16 | 29 | 18 | 18 | 28 | 18 | 18 | 28 | 19 | 19 |
| g / C, Green / Cycle | 0.51 | 0.29 | 0.29 | 0.51 | 0.31 | 0.31 | 0.49 | 0.32 | 0.32 | 0.49 | 0.33 | 0.33 |
| (v / s)_i Volume / Saturation Flow Rate | 0.11 | 0.15 | 0.03 | 0.19 | 0.11 | 0.11 | 0.04 | 0.23 | 0.08 | 0.07 | 0.14 | 0.14 |
| s, saturation flow rate [veh/h] | 1293 | 1888 | 1587 | 1366 | 1900 | 1874 | 1194 | 3592 | 1610 | 1032 | 1868 | 1774 |
| c, Capacity [veh/h] | 700 | 550 | 463 | 685 | 597 | 588 | 618 | 1142 | 512 | 516 | 618 | 587 |
| d1, Uniform Delay [s] | 11.51 | 16.72 | 14.63 | 12.77 | 14.99 | 15.00 | 11.60 | 16.99 | 14.26 | 12.64 | 14.74 | 14.76 |
| k, delay calibration | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.05 | 0.28 | 0.04 | 0.12 | 0.14 | 0.14 | 0.02 | 0.31 | 0.09 | 0.04 | 0.18 | 0.19 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.20 | 0.52 | 0.11 | 0.37 | 0.36 | 0.36 | 0.07 | 0.71 | 0.25 | 0.13 | 0.43 | 0.43 |
| d, Delay for Lane Group [s/veh] | 11.56 | 17.00 | 14.67 | 12.89 | 15.13 | 15.13 | 11.61 | 17.30 | 14.35 | 12.68 | 14.92 | 14.95 |
| Lane Group LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | Yes | No | Yes | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.92 | 2.66 | 0.40 | 1.79 | 1.77 | 1.75 | 0.31 | 3.91 | 1.02 | 0.47 | 2.25 | 2.15 |
| 50th-Percentile Queue Length [ft/ln] | 23.07 | 66.50 | 9.89 | 44.69 | 44.18 | 43.64 | 7.65 | 97.65 | 25.41 | 11.66 | 56.14 | 53.83 |
| 95th-Percentile Queue Length [veh/ln] | 1.66 | 4.79 | 0.71 | 3.22 | 3.18 | 3.14 | 0.55 | 7.03 | 1.83 | 0.84 | 4.04 | 3.88 |
| 95th-Percentile Queue Length [ft/ln] | 41.53 | 119.70 | 17.80 | 80.45 | 79.53 | 78.55 | 13.77 | 175.76 | 45.74 | 20.99 | 101.05 | 96.90 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 11.56 | 17.00 | 14.67 | 12.89 | 15.13 | 15.13 | 11.61 | 17.30 | 14.35 | 12.68 | 14.93 | 14.95 |
| Movement LOS | B | B | B | B | B | B | B | B | B | B | B | B |
| d_A, Approach Delay [s/veh] | 15.19 | | | 14.30 | | | 16.65 | | | 14.67 | | |
| Approach LOS | B | | | B | | | B | | | B | | |
| d_I, Intersection Delay [s/veh] | 15.38 | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | |
| Intersection V/C | 0.526 | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 9.0 | -6.5 | 9.0 | 0.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 19.87 | 35.03 | 19.87 | 0.00 |
| l_p,int, Pedestrian LOS Score for Intersection | 2.697 | 2.609 | 3.116 | 0.000 |
| Crosswalk LOS | B | B | C | F |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1421 | 1421 | 1421 | 1421 |
| d_b, Bicycle Delay [s] | 2.36 | 2.36 | 2.36 | 2.36 |
| l_b,int, Bicycle LOS Score for Intersection | 2.416 | 2.138 | 2.468 | 2.105 |
| Bicycle LOS | B | B | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | 1 | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 13: NE Rice Rd & NE Ikerd Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 10.2 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.087 |

**Intersection Setup**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Approach | Northbound | | Southbound | | Westbound | |
| Lane Configuration |  | |  | |  | |
| Turning Movement | Thru | Right | Left | Thru | Left | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 45.00 | | 45.00 | | 30.00 | |
| Grade [%] | 0.00 | | 0.00 | | 0.00 | |
| Crosswalk | No | | No | | No | |

**Volumes**

| Name | | | | | | |
|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 29 | 0 | 0 | 64 | 0 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 1.50 | 2.00 | 2.00 | 0.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 4 | 0 | 6 | 4 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 43 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 0 | 15 | 0 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 27 | 0 | 0 | 67 |
| Total Hourly Volume [veh/h] | 29 | 0 | 31 | 64 | 64 | 71 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 8 | 0 | 8 | 17 | 17 | 19 |
| Total Analysis Volume [veh/h] | 32 | 0 | 34 | 70 | 70 | 77 |
| Pedestrian Volume [ped/h] | 0 | | 0 | | 0 | |

**Intersection Settings**

| | | | |
|---|---|---|---|
| Priority Scheme | Free | Free | Stop |
| Flared Lane | | | No |
| Storage Area [veh] | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | | | No |
| Number of Storage Spaces in Median | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | |
|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.00 | 0.00 | 0.02 | 0.00 | 0.09 | 0.07 |
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 7.32 | 0.00 | 10.25 | 9.21 |
| Movement LOS | A | A | A | A | B | A |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 0.00 | 0.06 | 0.06 | 0.57 | 0.57 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 0.00 | 1.44 | 1.44 | 14.33 | 14.33 |
| d_A, Approach Delay [s/veh] | 0.00 | | 2.39 | | 9.71 | |
| Approach LOS | A | | A | | A | |
| d_I, Intersection Delay [s/veh] | 5.92 | | | | | |
| Intersection LOS | B | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: NE Colbern Rd & NE Lucky Rd**

| | | | |
|---|---|---|---|
| Control Type: | Two-way stop | Delay (sec / veh): | 1,612.9 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | F |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 4.018 |

**Intersection Setup**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | U-tu | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.0 | 100.0 | 100.0 | 60.00 | 100.00 | 150.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 40.00 | | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | | 0.00 | | |
| Crosswalk | Yes | | | Yes | | | No | | | | No | | |

**Volumes**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1118 | 0 | 0 | 615 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 19 | 0 | 10 | 0 | 16 | 0 | 0 | 0 | 0 | 20 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 86 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 56 | 0 | 16 | 0 | 56 | -56 | 0 | 0 | -31 | 31 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 15 | 0 | 0 | 43 | 0 | 2 | 37 | 67 | 0 | 25 | 0 | 0 | 0 |
| Total Hourly Volume [veh/h] | 15 | 0 | 0 | 118 | 0 | 72 | 37 | 225 | 1062 | 25 | 0 | 584 | 51 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.920 | 0.920 | 0.920 | 0.920 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 0 | 0 | 32 | 0 | 20 | 10 | 61 | 289 | 7 | 0 | 159 | 14 |
| Total Analysis Volume [veh/h] | 16 | 0 | 0 | 128 | 0 | 78 | 40 | 245 | 1154 | 27 | 0 | 635 | 55 |
| Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | | 0 | | |

**Intersection Settings**

| | | | | |
|---|---|---|---|---|
| Priority Scheme | Stop | Stop | Free | Free |
| Flared Lane | No | | | |
| Storage Area [veh] | 0 | 0 | 0 | 0 |
| Two-Stage Gap Acceptance | No | No | | |
| Number of Storage Spaces in Median | 0 | 0 | 0 | 0 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V/C, Movement V/C Ratio | 0.88 | 0.00 | 0.00 | 4.02 | 0.00 | 0.12 | 0.11 | 0.27 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh] | 455.17 | 434.05 | 265.81 | 1612.89 | 1672.49 | 11.28 | 18.08 | 11.99 | 0.00 | 0.00 | 11.13 | 0.00 | 0.00 |
| Movement LOS | F | F | F | F | F | B | C | B | A | A | B | A | A |
| 95th-Percentile Queue Length [veh/ln] | 2.31 | 2.31 | 2.31 | 15.18 | 15.18 | 0.41 | 1.81 | 1.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln] | 57.83 | 57.83 | 57.83 | 379.50 | 379.50 | 10.15 | 45.35 | 45.35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh] | 455.17 | | | 1006.45 | | | 2.50 | | | | 0.00 | | |
| Approach LOS | F | | | F | | | A | | | | A | | |
| d_I, Intersection Delay [s/veh] | 91.79 | | | | | | | | | | | | |
| Intersection LOS | F | | | | | | | | | | | | |

**Intersection Level Of Service Report**
**Intersection 14: NE Colbern Rd & NE Lucky Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 16.0 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.428 |

**Intersection Setup**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | U-tu | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.0 | 100.0 | 100.0 | 60.00 | 100.00 | 150.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 40.00 | | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | | Yes | | |

**Volumes**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 316 | 0 | 0 | 1043 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 5.80 | 2.00 | 2.00 | 1.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 56 | 0 | 28 | 0 | 44 | 0 | 0 | 0 | 0 | 55 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 68 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 16 | 0 | 26 | 0 | 16 | -16 | 0 | 0 | -52 | 52 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 0 | 0 | 0 | 8 | 0 | 1 | 38 | 43 | 0 | 0 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 54 |
| Total Hourly Volume [veh/h] | 0 | 0 | 0 | 80 | 0 | 45 | 38 | 171 | 300 | 0 | 0 | 991 | 53 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.920 | 0.920 | 0.920 | 0.920 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 0 | 0 | 0 | 22 | 0 | 12 | 10 | 46 | 82 | 0 | 0 | 269 | 14 |
| Total Analysis Volume [veh/h] | 0 | 0 | 0 | 87 | 0 | 49 | 41 | 186 | 326 | 0 | 0 | 1077 | 58 |
| Presence of On-Street Parking | No | | No | No | | No | No | | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | 0 | | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | 0 | | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | 0 | | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | 0 | | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | 0 | | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | Permi | ProtP | Permi | Permi | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 0 | 3 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | - | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |
| Maximum Green [s] | 10 | 30 | 0 | 10 | 30 | 0 | 0 | 30 | 30 | 0 | 30 | 30 | 0 |
| Amber [s] | 3.0 | 4.0 | 0.0 | 3.0 | 4.0 | 0.0 | 0.0 | 4.0 | 4.0 | 0.0 | 4.0 | 4.0 | 0.0 |
| All red [s] | 2.0 | 2.5 | 0.0 | 2.0 | 2.5 | 0.0 | 0.0 | 2.5 | 2.5 | 0.0 | 2.5 | 2.5 | 0.0 |
| Split [s] | 15 | 34 | 0 | 19 | 53 | 0 | 0 | 12 | 35 | 0 | 12 | 35 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 3.0 | 4.5 | 0.0 | 3.0 | 4.5 | 0.0 | 0.0 | 4.5 | 4.5 | 0.0 | 4.5 | 4.5 | 0.0 |
| Minimum Recall | | No | | Yes | No | | | No | No | | No | No | |
| Maximum Recall | | No | | No | No | | | No | No | | No | No | |
| Pedestrian Recall | | No | | No | No | | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | L | C | C | L | C | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| L, Total Lost Time per Cycle [s] | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 4.50 | 0.00 | 4.50 | 0.00 | 4.50 | 4.50 | 0.00 | 4.50 | 4.50 |
| g_i, Effective Green Time [s] | 0 | 10 | 10 | 32 | 26 | 26 | 32 | 20 | 20 |
| g / C, Green / Cycle | 0.00 | 0.18 | 0.18 | 0.58 | 0.47 | 0.47 | 0.58 | 0.36 | 0.36 |
| (v / s)_i Volume / Saturation Flow Rate | 0.00 | 0.05 | 0.03 | 0.25 | 0.09 | 0.09 | 0.00 | 0.30 | 0.30 |
| s, saturation flow rate [veh/h] | 1870 | 1708 | 1589 | 902 | 1813 | 1813 | 1155 | 1885 | 1851 |
| c, Capacity [veh/h] | 66 | 504 | 288 | 585 | 845 | 845 | 820 | 685 | 673 |
| d1, Uniform Delay [s] | 0.00 | 19.51 | 19.15 | 8.98 | 8.66 | 8.66 | 0.00 | 16.11 | 16.11 |
| k, delay calibration | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.00 | 0.16 | 0.28 | 0.42 | 0.11 | 0.11 | 0.00 | 2.79 | 2.85 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.00 | 0.17 | 0.17 | 0.39 | 0.19 | 0.19 | 0.00 | 0.84 | 0.84 |
| d, Delay for Lane Group [s/veh] | 0.00 | 19.67 | 19.43 | 9.40 | 8.77 | 8.77 | 0.00 | 18.90 | 18.96 |
| Lane Group LOS | A | B | B | A | A | A | A | B | B |
| Critical Lane Group | No | Yes | No | Yes | No | No | No | No | Yes |
| 50th-Percentile Queue Length [veh/ln] | 0.00 | 0.93 | 0.52 | 0.86 | 0.90 | 0.90 | 0.00 | 5.83 | 5.74 |
| 50th-Percentile Queue Length [ft/ln] | 0.00 | 23.21 | 13.07 | 21.57 | 22.41 | 22.41 | 0.00 | 145.67 | 143.43 |
| 95th-Percentile Queue Length [veh/ln] | 0.00 | 1.67 | 0.94 | 1.55 | 1.61 | 1.61 | 0.00 | 9.79 | 9.67 |
| 95th-Percentile Queue Length [ft/ln] | 0.00 | 41.77 | 23.53 | 38.83 | 40.34 | 40.34 | 0.00 | 244.64 | 241.63 |

**Movement, Approach, & Intersection Results**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 0.00 | 0.00 | 0.00 | 19.67 | 19.67 | 19.43 | 9.40 | 9.40 | 8.77 | 8.77 | 0.00 | 18.93 | 18.96 |
| Movement LOS | A | A | A | B | B | B | A | A | A | A | A | B | B |
| d_A, Approach Delay [s/veh] | 0.00 | | | 19.58 | | | 9.03 | | | | 18.93 | | |
| Approach LOS | A | | | B | | | A | | | | B | | |
| d_I, Intersection Delay [s/veh] | 15.98 | | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | | |
| Intersection V/C | 0.428 | | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 17.71 | 17.71 | 17.71 | 17.71 |
| l_p,int, Pedestrian LOS Score for Intersection | 1.687 | 2.235 | 2.849 | 2.770 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 996 | 1684 | 1032 | 1032 |
| d_b, Bicycle Delay [s] | 6.96 | 0.69 | 6.47 | 6.47 |
| l_b,int, Bicycle LOS Score for Intersection | 1.560 | 1.858 | 1.862 | 2.541 |
| Bicycle LOS | A | A | A | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Intersection Level Of Service Report**
**Intersection 14: NE Colbern Rd & NE Lucky Rd**

| | | | |
|---|---|---|---|
| Control Type: | Signalized | Delay (sec / veh): | 14.3 |
| Analysis Method: | HCM 7th Edition | Level Of Service: | B |
| Analysis Period: | 15 minutes | Volume to Capacity (v/c): | 0.893 |

**Intersection Setup**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | Northbound | | | Southbound | | | Eastbound | | | | Westbound | | |
| Lane Configuration |  | | |  | | |  | | | |  | | |
| Turning Movement | Left | Thru | Right | Left | Thru | Right | U-tu | Left | Thru | Right | Left | Thru | Right |
| Lane Width [ft] | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| No. of Lanes in Entry Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| Entry Pocket Length [ft] | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 60.00 | 100.0 | 100.0 | 100.0 | 60.00 | 100.00 | 150.00 |
| No. of Lanes in Exit Pocket | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exit Pocket Length [ft] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Speed [mph] | 25.00 | | | 25.00 | | | 40.00 | | | | 40.00 | | |
| Grade [%] | 0.00 | | | 0.00 | | | 0.00 | | | | 0.00 | | |
| Curb Present | No | | | No | | | No | | | | No | | |
| Crosswalk | Yes | | | Yes | | | Yes | | | | Yes | | |

**Volumes**

| Name | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Volume Input [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1118 | 0 | 0 | 615 | 0 |
| Base Volume Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Heavy Vehicles Percentage [%] | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Proportion of CAVs [%] | 0.00 | | | | | | | | | | | | |
| Growth Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| In-Process Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Site-Generated Trips [veh/h] | 0 | 0 | 0 | 19 | 0 | 10 | 0 | 16 | 0 | 0 | 0 | 0 | 20 |
| Diverted Trips [veh/h] | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 86 | 0 | 0 | 0 | 0 | 0 |
| Pass-by Trips [veh/h] | 0 | 0 | 0 | 56 | 0 | 16 | 0 | 56 | -56 | 0 | 0 | -31 | 31 |
| Existing Site Adjustment Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Volume [veh/h] | 15 | 0 | 0 | 43 | 0 | 2 | 37 | 102 | 0 | 25 | 0 | 0 | 0 |
| Right Turn on Red Volume [veh/h] | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 13 | 0 | 0 | 26 |
| Total Hourly Volume [veh/h] | 15 | 0 | 0 | 118 | 0 | 36 | 37 | 260 | 1062 | 12 | 0 | 584 | 25 |
| Peak Hour Factor | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.9200 | 0.920 | 0.920 | 0.920 | 0.920 | 0.9200 | 0.9200 | 0.9200 |
| Other Adjustment Factor | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.0000 | 1.0000 | 1.0000 |
| Total 15-Minute Volume [veh/h] | 4 | 0 | 0 | 32 | 0 | 10 | 10 | 71 | 289 | 3 | 0 | 159 | 7 |
| Total Analysis Volume [veh/h] | 16 | 0 | 0 | 128 | 0 | 39 | 40 | 283 | 1154 | 13 | 0 | 635 | 27 |
| Presence of On-Street Parking | No | | No | No | | No | No | | | No | No | | No |
| On-Street Parking Maneuver Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Bus Stopping Rate [/h] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| v_do, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | | 0 | | |
| v_di, Inbound Pedestrian Volume crossing m | 0 | | | 0 | | | 0 | | | | 0 | | |
| v_co, Outbound Pedestrian Volume crossing | 0 | | | 0 | | | 0 | | | | 0 | | |
| v_ci, Inbound Pedestrian Volume crossing mi | 0 | | | 0 | | | 0 | | | | 0 | | |
| v_ab, Corner Pedestrian Volume [ped/h] | 0 | | | 0 | | | 0 | | | | 0 | | |
| Bicycle Volume [bicycles/h] | 0 | | | 0 | | | 0 | | | | 0 | | |

**Intersection Settings**

| | |
|---|---|
| Located in CBD | No |
| Signal Coordination Group | - |
| Cycle Length [s] | 100 |
| Coordination Type | Time of Day Pattern Isolated |
| Actuation Type | Fully actuated |
| Offset [s] | 0.0 |
| Offset Reference | Lead Green - Beginning of First Green |
| Permissive Mode | SingleBand |
| Lost time [s] | 0.00 |

**Phasing & Timing**

| Control Type | Permiss | Permiss | Permiss | ProtPer | Permiss | Permiss | Permi | ProtP | Permi | Permi | ProtPer | Permiss | Permiss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Signal Group | 1 | 6 | 0 | 5 | 2 | 0 | 3 | 3 | 8 | 0 | 7 | 4 | 0 |
| Auxiliary Signal Groups | | | | | | | | | | | | | |
| Lead / Lag | Lead | - | - | Lead | - | - | Lead | Lead | - | - | Lead | - | - |
| Minimum Green [s] | 5 | 10 | 0 | 5 | 10 | 0 | 5 | 5 | 10 | 0 | 5 | 10 | 0 |
| Maximum Green [s] | 10 | 30 | 0 | 10 | 30 | 0 | 30 | 30 | 30 | 0 | 10 | 30 | 0 |
| Amber [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| All red [s] | 1.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| Split [s] | 13 | 34 | 0 | 10 | 44 | 0 | 24 | 24 | 46 | 0 | 10 | 32 | 0 |
| Vehicle Extension [s] | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Walk [s] | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 0 |
| Pedestrian Clearance [s] | 0 | 20 | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 0 | 0 | 20 | 0 |
| Delayed Vehicle Green [s] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rest In Walk | | No | | | No | | | | No | | | No | |
| I1, Start-Up Lost Time [s] | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 0.0 |
| I2, Clearance Lost Time [s] | 2.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 3.0 | 0.0 | 3.0 | 3.0 | 0.0 |
| Minimum Recall | | No | | Yes | No | | | No | No | | Yes | No | |
| Maximum Recall | | No | | No | No | | | No | No | | No | No | |
| Pedestrian Recall | | No | | No | No | | | No | No | | No | No | |
| Detector Location [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector Length [ft] | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Exclusive Pedestrian Phase**

| | |
|---|---|
| Pedestrian Signal Group | 0 |
| Pedestrian Walk [s] | 0 |
| Pedestrian Clearance [s] | 0 |

**Lane Group Calculations**

| Lane Group | C | C | R | L | C | C | L | C | C |
|---|---|---|---|---|---|---|---|---|---|
| C, Cycle Length [s] | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |
| L, Total Lost Time per Cycle [s] | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| l1_p, Permitted Start-Up Lost Time [s] | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| l2, Clearance Lost Time [s] | 3.00 | 0.00 | 3.00 | 0.00 | 3.00 | 3.00 | 0.00 | 3.00 | 3.00 |
| g_i, Effective Green Time [s] | 2 | 12 | 12 | 24 | 19 | 19 | 24 | 11 | 11 |
| g / C, Green / Cycle | 0.05 | 0.27 | 0.27 | 0.52 | 0.41 | 0.41 | 0.52 | 0.24 | 0.24 |
| (v / s)_i Volume / Saturation Flow Rate | 0.52 | 0.07 | 0.02 | 0.26 | 0.31 | 0.31 | 0.00 | 0.18 | 0.18 |
| s, saturation flow rate [veh/h] | 31 | 1742 | 1589 | 1225 | 1870 | 1863 | 641 | 1870 | 1843 |
| c, Capacity [veh/h] | 155 | 699 | 429 | 731 | 770 | 767 | 425 | 455 | 448 |
| d1, Uniform Delay [s] | 23.56 | 13.52 | 12.87 | 7.87 | 11.87 | 11.87 | 0.00 | 16.42 | 16.43 |
| k, delay calibration | 0.29 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| I, Upstream Filtering Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| d2, Incremental Delay [s] | 0.79 | 0.12 | 0.09 | 0.42 | 1.57 | 1.58 | 0.00 | 2.30 | 2.34 |
| d3, Initial Queue Delay [s] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rp, platoon ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| PF, progression factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**Lane Group Results**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| X, volume / capacity | 0.10 | 0.18 | 0.09 | 0.44 | 0.76 | 0.76 | 0.00 | 0.73 | 0.73 |
| d, Delay for Lane Group [s/veh] | 24.35 | 13.65 | 12.96 | 8.29 | 13.44 | 13.46 | 0.00 | 18.72 | 18.77 |
| Lane Group LOS | C | B | B | A | B | B | A | B | B |
| Critical Lane Group | Yes | Yes | No | No | No | Yes | No | No | No |
| 50th-Percentile Queue Length [veh/ln] | 0.20 | 0.96 | 0.28 | 1.22 | 3.96 | 3.96 | 0.00 | 2.90 | 2.87 |
| 50th-Percentile Queue Length [ft/ln] | 5.03 | 24.12 | 7.09 | 30.53 | 99.06 | 98.89 | 0.00 | 72.44 | 71.66 |
| 95th-Percentile Queue Length [veh/ln] | 0.36 | 1.74 | 0.51 | 2.20 | 7.13 | 7.12 | 0.00 | 5.22 | 5.16 |
| 95th-Percentile Queue Length [ft/ln] | 9.05 | 43.42 | 12.76 | 54.95 | 178.32 | 178.00 | 0.00 | 130.39 | 128.99 |

**Movement, Approach, & Intersection Results**

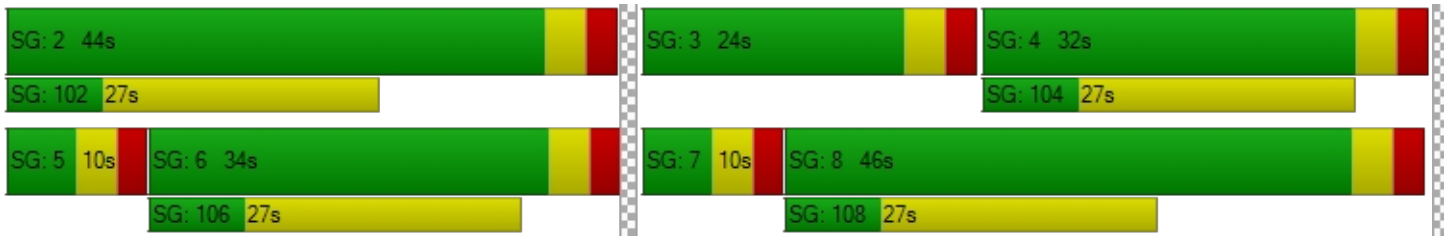
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d_M, Delay for Movement [s/veh] | 24.35 | 24.35 | 24.35 | 13.65 | 13.65 | 12.96 | 8.29 | 8.29 | 13.45 | 13.46 | 0.00 | 18.74 | 18.77 |
| Movement LOS | C | C | C | B | B | B | A | A | B | B | A | B | B |
| d_A, Approach Delay [s/veh] | 24.35 | | | 13.49 | | | 12.33 | | | | 18.75 | | |
| Approach LOS | C | | | B | | | B | | | | B | | |
| d_I, Intersection Delay [s/veh] | 14.31 | | | | | | | | | | | | |
| Intersection LOS | B | | | | | | | | | | | | |
| Intersection V/C | 0.893 | | | | | | | | | | | | |

**Other Modes**

| | | | | |
|---|---|---|---|---|
| g_Walk,mi, Effective Walk Time [s] | 11.0 | 11.0 | 11.0 | 11.0 |
| M_corner, Corner Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| M_CW, Crosswalk Circulation Area [ft²/ped] | 0.00 | 0.00 | 0.00 | 0.00 |
| d_p, Pedestrian Delay [s] | 13.55 | 13.55 | 13.55 | 13.55 |
| l_p,int, Pedestrian LOS Score for Intersection | 1.694 | 2.231 | 3.014 | 2.828 |
| Crosswalk LOS | A | B | C | C |
| s_b, Saturation Flow Rate of the bicycle lane | 2000 | 2000 | 2000 | 2000 |
| c_b, Capacity of the bicycle lane [bicycles/h] | 1247 | 1677 | 1763 | 1161 |
| d_b, Bicycle Delay [s] | 3.29 | 0.61 | 0.33 | 4.09 |
| l_b,int, Bicycle LOS Score for Intersection | 1.586 | 1.895 | 2.566 | 2.127 |
| Bicycle LOS | A | A | B | B |

## Sequence

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ring 1 | - | 2 | 3 | 4 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 2 | 5 | 6 | 7 | 8 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ring 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |



# Appendix D - Signal Warrant Analysis

# Traffic Signal Warrant Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Colbern Road & Prop. Lucky Road
County: Jackson County
City: Lee's Summit

Major Street: Colbern Road
Critical Approach Speed: 40 mph
Lanes: 2 or more lanes

Minor Street: Prop. Lucky Road
Critical Approach Speed: 25 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%?
Manually set volume level?

**Analysis based on PROJECTED volume data.**

| Forecast Year | Within 5 Years of Construction? | Time (HH:MM) | | | |
|---|---|---|---|---|---|
| | | From | AM / PM | To | AM / PM |

| Warrant Evaluation Summary | Warrant Met: |
|---|---|
| **Warrant 1: Eight - Hour Vehicular Volume** | **N/A** |
| Condition A: Minimum Vehicular Volume | |
| Condition B: Interruption of Continuous Traffic | |
| Condition C: Combination: 80% of A and B | |
| **Warrant 2: Four-Hour Volume** | **N/A** |
| **Warrant 3: Peak Hour Volume** | **Yes** |
| **Warrant 4: Pedestrian Volume** | **N/A** |
| Criterion A: Four-Hour | |
| Criterion B: Peak-Hour | |
| **Warrant 5: School Crossing** | **N/A** |
| **Warrant 6: Coordinated Signal System** | **N/A** |
| **Warrant 7: Crash Experience** | **N/A** |
| **Warrant 8: Roadway Network** | **N/A** |
| **Warrant 9: Intersection Near a Grade Crossing** | **N/A** |

**Warrant Analysis Conducted By:**

Name: Akshay Patel
Agency: Renaissance Infrastructure Consulting
Date: 10/11/2022

# Warrant 3: Peak Hour Volume 100%

**Warrant Evaluated? Yes** **Warrant Satisfied? Yes** **Manually Set To:**

Condition justifying use of warrant:

| Criteria | | Met? |
|---|---|---|
| Delay on Minor Approach | 4 | |
| Volume on Minor Approach | 100 | Yes |
| Total Entering Volume (veh/h) | 800 | |

**Manually Set Peak Hour?**

| Peak Hour | Major Road Vol. (Both App.) | Minor Road Vol. (High App.) |
|---|---|---|
| 16:00 | 2019 | 118 |