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Traffic Analysis

73rd Street Corridor

Windsor Heights, IA

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Certification

Traffic Analysis

for

73rd Street Corridor

City of Windsor Heights, IA
BMI Project No. – A13.120659

June 11, 2020

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under that laws of the State of Iowa.

	6/11/2020
Rob J. Haaland	Date
License Number 19529	

MY LICENSE RENEWAL DATE IS DECEMBER 31, 2020
Pages or sheets covered by this seal:
Pages 1 to 21, Appendix A to C

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Appendix

I. Executive Summary

The City of Windsor Heights is planning improvements to 73rd Street from the south city limits (Center Street) to the north city limits (Hickman Road). The improvements are proposed to include resurfacing or reconstruction of the roadway and would be phased as funding allows. The purpose of this traffic analysis is to review the existing transportation system and determine if additional improvements are needed to provide an acceptable system for the corridor users today and in the years to come. This study follows the requirements outlined in the Manual of Transportation Engineering Studies, 2nd Ed, published by the Institute of Transportation Engineers.

Per requirements outlined in the Manual of Transportation Engineering Studies, data for this study was collected in early March 2020 with turning movement counts collected March 3, 2020.

The following summarizes the main outcomes of this study:

A. Safety

A review of crashes over the past 10 years shows that there have been 233 crashes at the nine study intersections and segments between the intersections from January 1, 2015 to December 31, 2019. The crash rates at two of the study intersections highlight a concern.

The following crash issues and trends were noted during the review and are listed below with recommended improvements:

- 73rd Street at I-235 Eastbound Ramp Termini/Center Street
    - The crash rate is above the statewide average for rear-end and angle, oncoming left turns crashes are predominant, each making up 23% of the crashes at the intersection. Northbound traffic was involved in a disproportionate amount of the crashes. The curve through the intersection and lack of northbound left turn lane are likely contributing factors. Adding a northbound left turn lane would help this situation.
- 73rd Street at Buffalo Road

  The crash rate is above the statewide average with rear-end crashes comprising 30% of the crashes. There is no specific trend in the direction of approach, therefore, no specific mitigation is recommended. With the low severity of crashes occurring on a mix of approach directions, this intersection may just have a higher crash rate due to the volume of traffic.

B. Proposed Improvements

The level of service for the intersections was within acceptable range, LOS A thru D for all scenarios as noted in the traffic modeling section of the report. The intersections were studied with their current actuated signal operations, which is not adaptive. Installing an adaptive signal system can create further improvements to level of service for the system by adjusting timings for high and low peak traffic times.

The segment north of University Avenue functions well and is expected to function well with LOS of A as a 2-lane section. Observations were made at the intersections near Clive Learning Academy. The existing system works well with short periods of delay during drop off and pick up, therefore, the existing geometry is recommended to stay the same. The pedestrian traffic signal in front of Clive Learning Academy on 73rd Street should be replaced with a pedestrian hybrid beacon.

The segment including University Avenue and south of University Avenue functions at LOS D or better for intersections with movements having LOS E and F in the existing conditions.

The addition of the Northbound left turn lane at 73rd Street at I-235 Eastbound Ramp Termini/Center Street highlighted in the safety improvements improves the intersection and corridor delays, therefore, the northbound left turn lane should be added.

C. Pedestrian / Bicyclist / Transit accommodations

Sidewalk and Trail along 73rd Street are already available north of Buffalo Road. While a pedestrian system is available, they are narrow and should be widened to 5 ft to meet ADA requirements. The sidewalk north of University Avenue on the east side should be widened to a trail to provide an expanded safe route for children from neighborhoods east of 73rd Street to the Clive Learning Academy.

There is a pedestrian signal used for a school crossing next to Clive Learning Academy. This pedestrian signal is needed to provide a crossing for the students that cross 73rd Street from the residential area on the east to the school. While the pedestrian signal appears to be effective, if it is replaced during construction a pedestrian hybrid beacon should be installed in its place as it is the appropriate traffic control for this type of crossing and it provides less disruption to the through traffic on 73rd Street.

Neither sidewalk nor trail extend south of Buffalo Road. There was a feasibility study completed in 2019 that noted due to constraints of the area it was determined adding the pedestrian facilities is not feasible without roadway modifications to accommodate a sidewalk or trail. However, if roadway modifications could be made to accommodate pedestrian facilities during construction adding these improvements should be further investigated during design.

II. Introduction

The City of Windsor Heights is planning improvements to 73rd Street from the south city limits near Interstate I-235 to the north city limits at Hickman Road. This segment is 1.67 miles long and runs north/south. The improvements are proposed to include resurfacing or reconstruction and would be phased as funding allows. Two project phases are currently identified with University Avenue being the dividing point. The purpose of this traffic analysis is to identify potential existing and future transportation issues due to growth on the corridor and recommend solutions to mitigate the potential issues to provide a safe transportation facility for vehicular, pedestrian and bicycle traffic.

The analysis includes the following nine study intersections:

1. 73rd Street at I-235 eastbound ramp termini/Center Street
2. 73rd Street at I-235 westbound ramp termini
3. 73rd Street at Buffalo Road
4. 73rd Street at Apple Valley Driveway
5. 73rd Street at University Avenue
6. 73rd Street at Del Matro Avenue
7. 73rd Street at Clive Learning Academy Entrance
8. 73rd Street at Washington Avenue
9. 73rd Street at College Drive

Note: the intersection at Hickman Road was not included because of the ongoing Hickman Road Signal Timing Improvements Project that should address traffic flow at the intersection.

The intersections of I-235 eastbound exit ramp termini, Center Street, I-235 westbound exit ramp termini, Buffalo Road, and University Avenue are signalized. The remaining intersections are side street stop controlled.

III. Existing Conditions Review

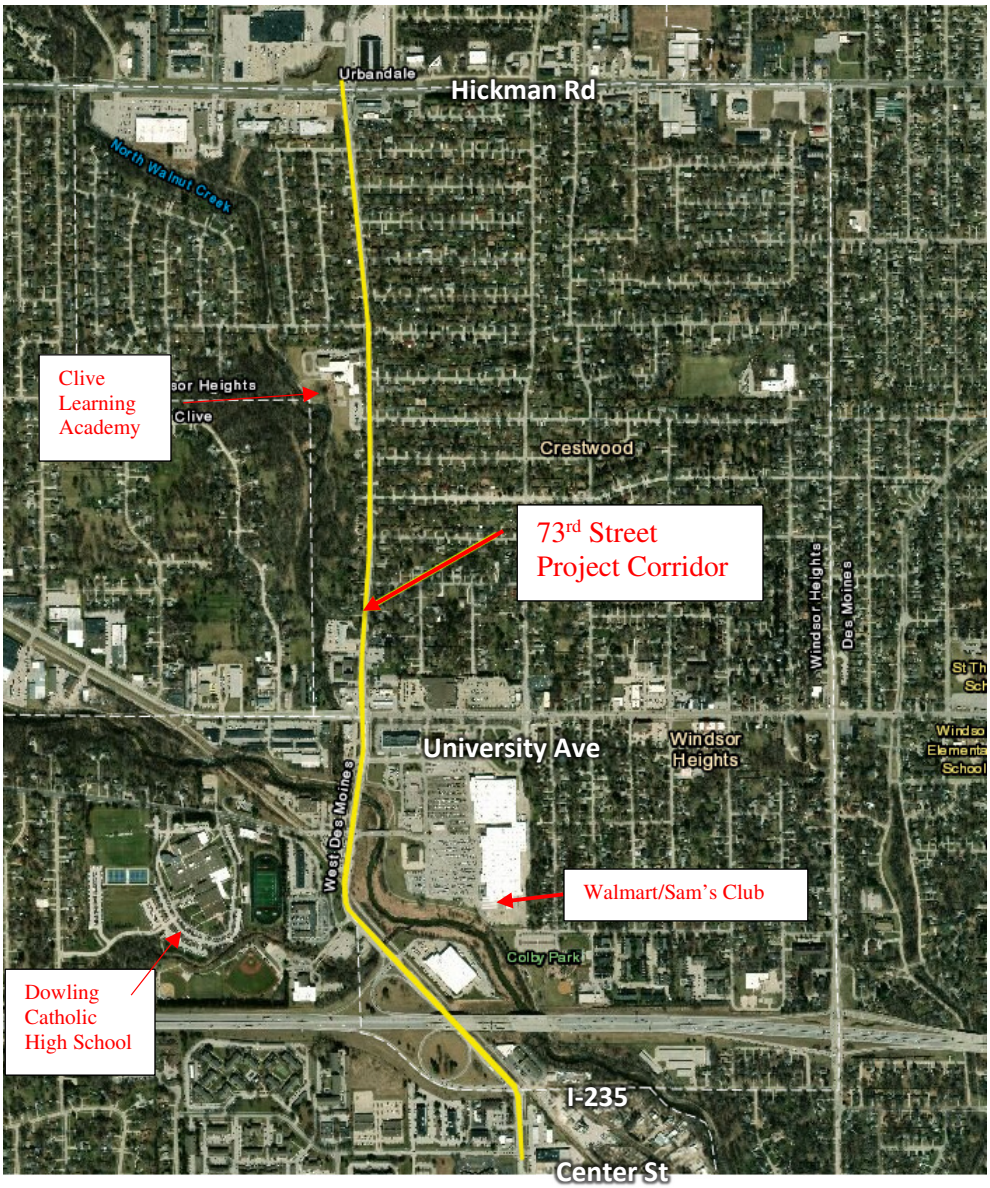
The proposed study area is the 73rd Street Corridor in Windsor Heights, Iowa extending south to north. The project location is shown in **Figure 1**.

73rd Street

73rd Street within the project area is surrounded by commercial and residential. From the south city limits to north of University Avenue, 73rd Street is bordered by commercial on both sides. North of University Avenue to the north city limits, 73rd Street is bordered by residential and a school.

73rd Street has two main typical cross sections within this corridor. From the south city limits to approximately 250 ft north of University Avenue, the corridor is 4-lane with two lanes in each direction and turn lanes added at certain intersections to accommodate turning movements. It is undivided south of the I-235 eastbound ramp intersection. It is divided with a painted median between the I-235 eastbound and westbound ramp intersections. North of the I-235 westbound ramp intersection to Buffalo Road it varies between divided with raised medians and undivided. From Buffalo Road to the south edge of University Avenue it remains divided with raised medians.

Figure 1: 73rd Street Project Corridor



73rd Street has a functional classification of minor arterial from south city limits to north city limits per the Iowa DOT Functional Classification Map.

There is a railroad crossing between the I-235 westbound ramp intersection and the Buffalo Road intersection. Although the trains through here are infrequent, they do stop traffic for the time they are using the tracks. While this does affect the traffic flow along 73rd Street, the infrequency of the trains makes it less of a concern.

There are signalized intersections at:

- I-235 eastbound exit ramp termini/Center Street,
- I-235 westbound exit ramp termini,
- Buffalo Road,
- University Avenue,

The signals are semi actuated and function using preset timing limits which adjust for the time of day.

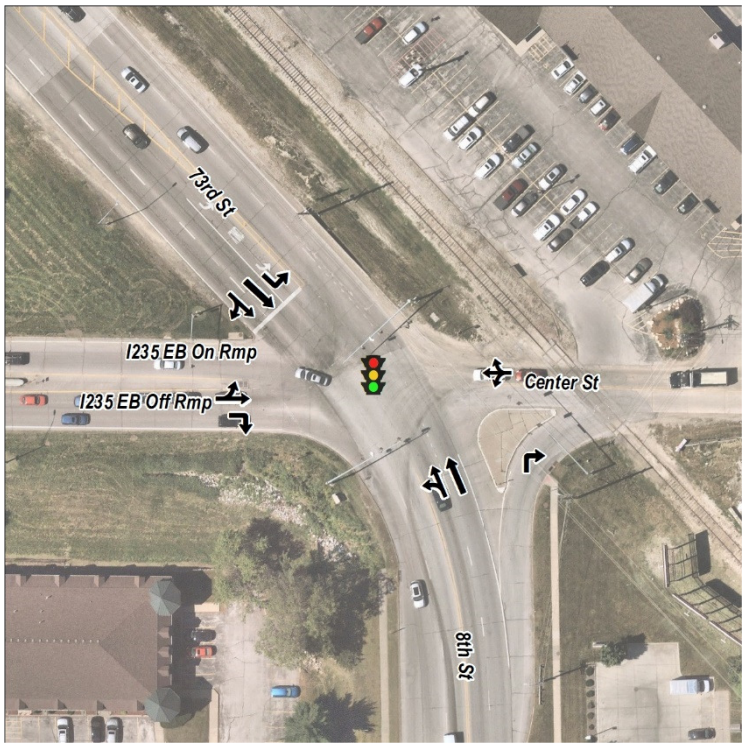
The speed limit along 73rd street is 35 mph south of University Avenue and 25 mph north of University Avenue.

Parking is not allowed along 73rd Street.

I-235 Eastbound exit ramp termini/Center Street (signalized)

The I-235 eastbound ramp intersection provides an entrance ramp and an exit ramp access to I-235 on the west side of 73rd Street. The east side of 73rd Street is Center Street, a two-lane local street. At this intersection, 73rd Street is four lane with two lanes in each direction with a southbound left turn lane and northbound channelized right turn lane. Access onto I-235 is provided through a shared lane for northbound through and left turning traffic. Southbound traffic accessing the eastbound I-235 ramp is provided a channelized right turn via a loop ramp located 475' north of this intersection. See **Figure 2.**

Figure 2: I-235 Eastbound exit ramp termini/Center Street Intersection



The eastbound approach traffic exiting the I-235 off-ramp has a single lane for through/left turning traffic and a right turn lane. The westbound Center street approach has one shared lane for all movements.

73rd Street curves through the intersection with northbound and southbound traffic required to maneuver a short curve with a 45-degree alignment change in the intersection.

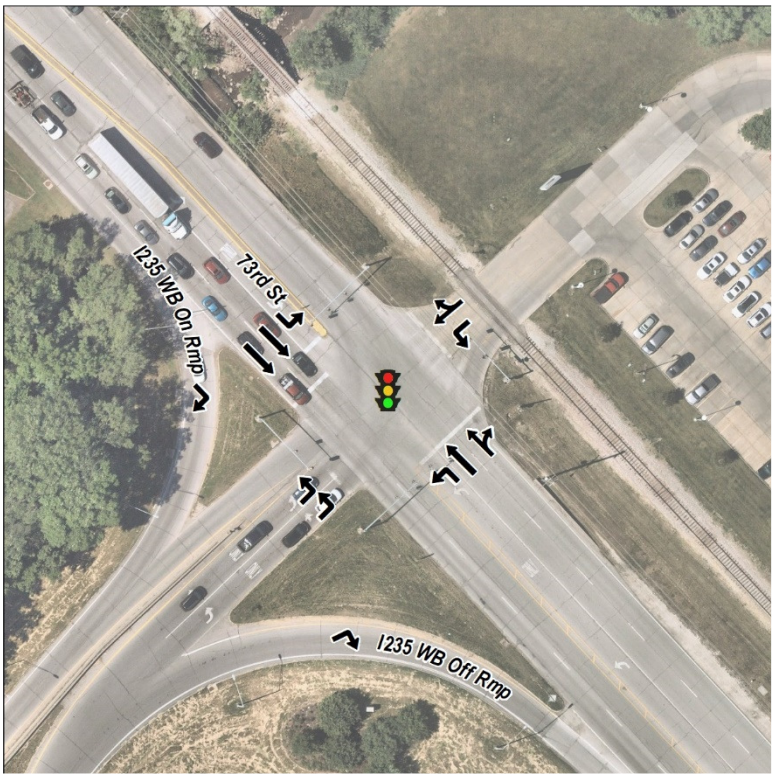
The speed limit for Center Street is posted at 25 mph. Parking is not allowed on the ramp or Center Street.

There are no sidewalks on the north, east, or west legs, however, 4 ft wide sidewalk extends south of the intersection on both sides of 73rd Street.

I-235 Westbound exit ramp termini (signalized)

The I-235 westbound ramp termini provides both entrance ramp and exit ramp access to I-235 on the west side of 73rd Street. The east side of 73rd Street is a private driveway to 3E – Electrical Engineering & Equipment Company. Access onto the interstate is provided through a northbound left turn lane and a southbound channelized right turn at the intersection. These segments connect into one on-ramp approximately 150 ft west of the intersection. The westbound traffic exiting I-235 uses a loop ramp that has a channelized right 150' west of the intersection to access southbound 73rd Street. The westbound traffic also has two lanes providing a through/left and left to access 3E and northbound 73rd Street. The 3E private drive has one receiving lane and two exit lanes, a through/right and a left. See **Figure 3.**

Figure 3: I-235 Westbound exit ramp termini Intersection



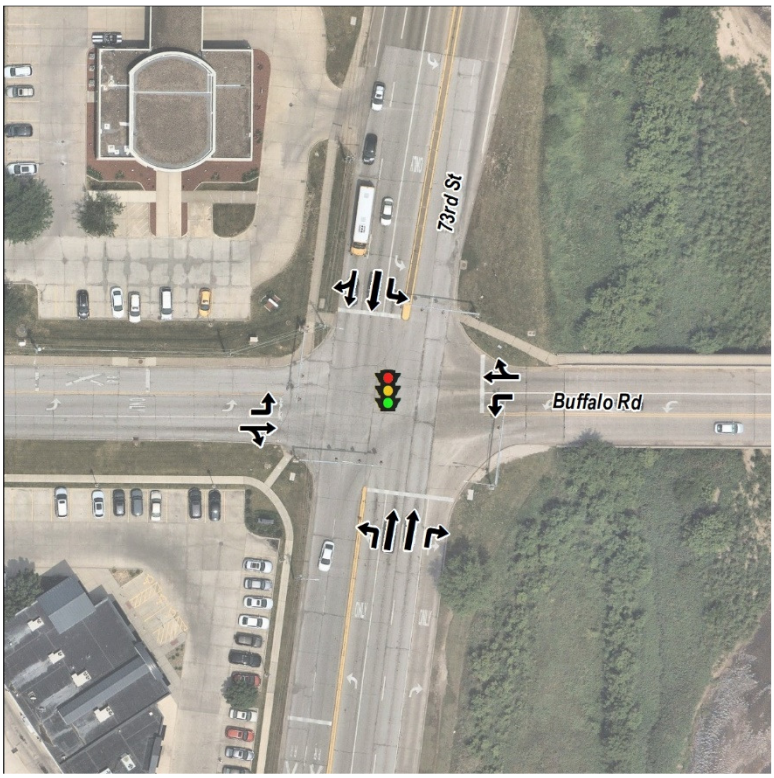
There are no posted speed limits for the interstate ramp or the private driveway. Parking is not allowed on the ramp and the driveway on the eastside leads immediately to a parking lot for 3E.

There are no sidewalks at the intersection.

Buffalo Road (signalized)

The Buffalo Road intersection provides access to commercial on both sides of the street, with large box stores to the east and connection to West Des Moines to the west. Buffalo Road in both directions is a two-lane road with one lane in each direction. There are added left turn lanes at the intersection to provide for the large volume of left turning traffic east and westbound. 73rd Street has added left turn lanes at the intersection both northbound and southbound. There is also an added northbound right turn lane. See **Figure 4.**

Figure 4: Buffalo Road Intersection



Buffalo Road has a functional classification of local road. West of 73rd Street, Buffalo Road has a posted speed limit of 25 mph. There is not a posted speed limit east of 73rd Street.

The city notes an issue with traffic for the strip mall on the southwest corner backing out of the driveway and blocking the lanes as vehicles wait to access the coffee shop drive-thru in the morning. This was not specifically observed during the site observations, but video collected for the turning movement counts shows times during the morning peak where traffic is waiting in the roadway to enter the site. Traffic crashes were reviewed for this specific location and while there are eight crashes in 5 years that occur adjacent to this driveway, none are during the AM peak when significant blocking occurs and all are property damage only.

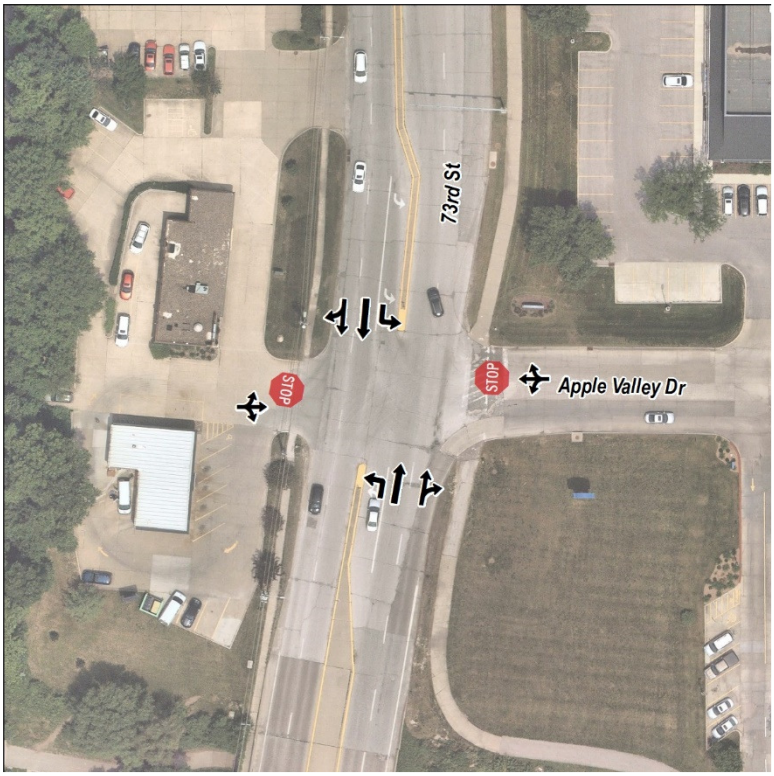
There is no parking allowed on Buffalo Road in either direction.

There are sidewalks on the north and west sides of the intersection. The sidewalks are 4 ft wide southwest of the intersection, 4.5 ft wide northwest of the intersection and 5 ft wide to the east, north of the intersection.

Apple Valley (side street stop)

The Apple Valley intersection is a combination of driveways. There is a driveway for small commercial on the west and a driveway for the same large box commercial to the east that also has access from Buffalo Road. 73rd Street has added left turn lanes for both north and southbound traffic. while having low volumes, the northbound left turn lane exists to match the opposing southbound left turn lane which has more significant flow. The Apple Valley driveways are each two-lane with one lane in each direction. See **Figure 5.**

Figure 5: Apple Valley Intersection



As the east and west legs are privately owned driveways, there is not a posted speed limit east or west of 73rd Street.

Parking restrictions are not signed in either direction, but both driveways lead to parking lots.

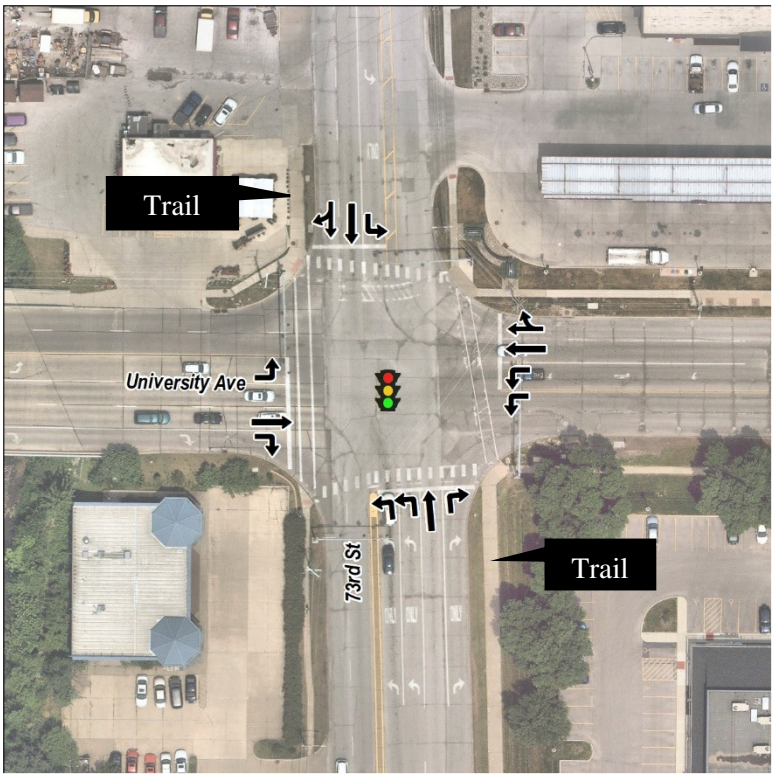
There is an 8 ft wide trail along the east side of 73rd Street and a 4 ft wide sidewalk along the west side of 73rd Street at this intersection. There are no sidewalks along the driveways into either site from the intersection.

University Avenue (signalized)

The University Avenue intersection provides access to commercial on all corners of the intersection. University Avenue is a main roadway through Windsor Heights to the east of the intersection. To the west of the intersection it provides connection to the City of Clive. University Avenue is in the process of being reconstructed from east of 73rd Street east to 63rd Street as part of the University Avenue Project. When reconstructed east of the intersection it will be a three-lane typical cross-section with an added westbound left turn lane for dual lefts, and a right turn lane on the westbound approach at 73rd Street. West of the intersection, University Avenue will remain the same width with pavement striping changes. The eastbound approach will be one through lane, one right turn lane and one left turn lane. The eastbound left turn lane will be offset from the through lane to match with the northern most opposing westbound left turn lane. South of the intersection is

expected to remain the same with two receiving lanes and four incoming northbound lanes. The incoming northbound approach will be dual northbound left turn lanes, one through lane, and one right turn lane. Southbound is also planned to remain the same with one receiving lane, a southbound left turn lane, a southbound through lane and a combined southbound through/right turn lane. See **Figure 6.** University Avenue has a functional classification of minor arterial.

Figure 6: University Avenue Intersection



West of 73rd Street, University Avenue has a posted speed limit of 35 mph. University Avenue through Windsor Heights has a posted speed limit of 30 mph.

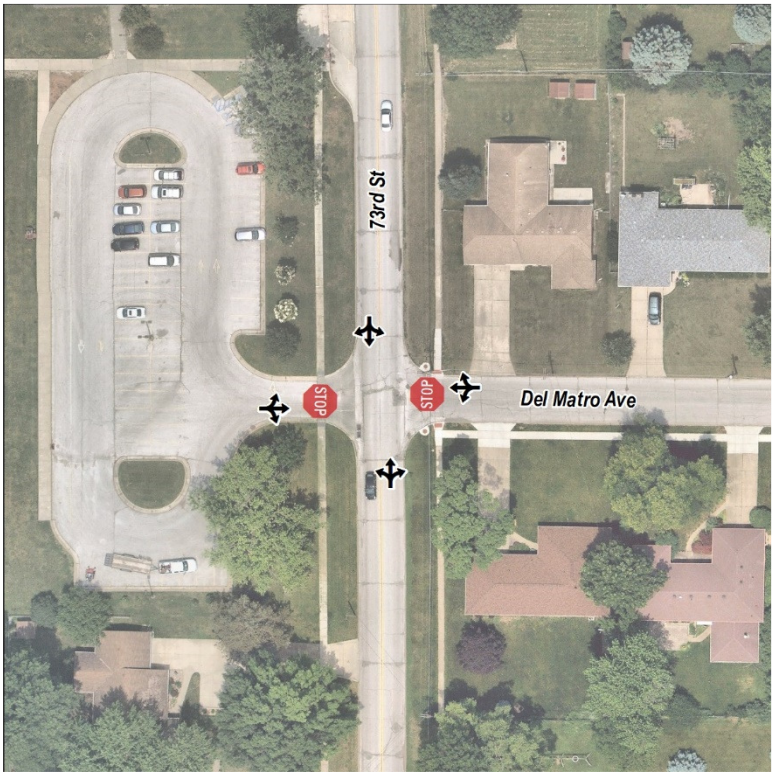
There is no parking allowed on University Avenue.

An existing 4 ft sidewalk extends north along the east side of 73rd Street, south along the west side of 73rd Street, and west along the north side of University Avenue. The 8 ft trail connects from the south on the east side of 73rd Street, crosses the east and north legs and extends north on the west side of 73rd Street. This trail extends 825 ft north of the intersection where it turns west away from 73rd Street. A 4 ft sidewalk continues north from this point. The University Avenue Project includes constructing a 10 ft trail extending east from the intersection on the south side of University Avenue. The project also includes a constructing a 5 ft sidewalk extending east along the north side of University Avenue. City of Windsor Heights staff noted they have received complaints from trail users about having to cross two legs of this intersection.

Del Matro Avenue (side street stop)

The Del Matro Avenue intersection is a combination of street to the east and driveway to the Clive Learning Academy parking lot to the west. Del Matro Avenue is a two-lane residential street with one lane in each direction. The driveway to Clive Learning Academy is also two-lane with one lane in each direction. It serves as parking for staff. The parking lot for students and parents is 570' further north on 73rd Street at the Clive Learning Academy Entrance. See **Figure 7.**

Figure 7: Del Matro Avenue Intersection



Del Matro Avenue has a functional classification of local street and a posted speed limit of 25 mph.

Parking is allowed on the south side of Del Matro Avenue east of the intersection but is restricted along the south side and both sides near the intersection.

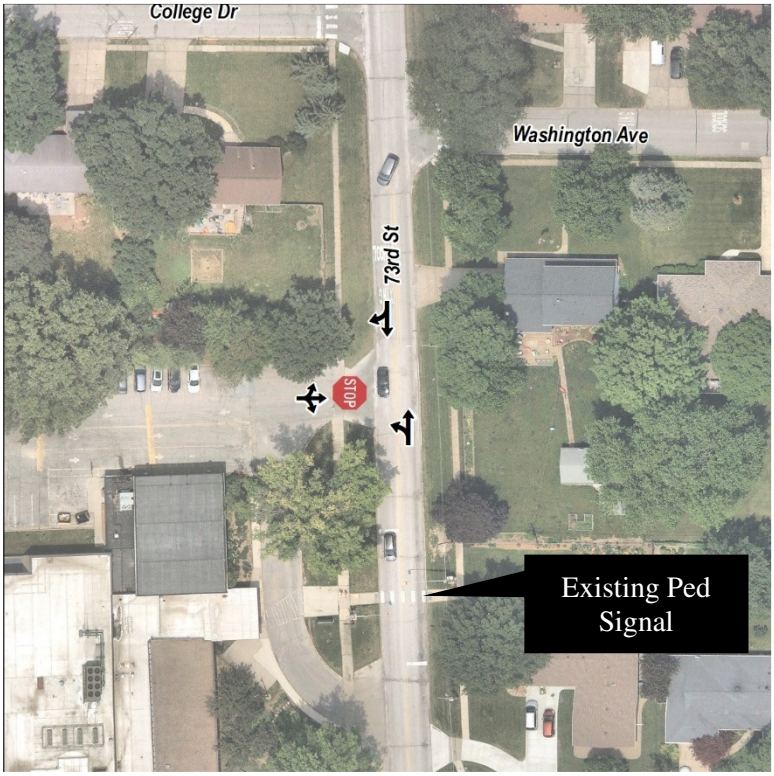
There is 4 ft wide sidewalk along the west side of 73rd Street and a 3.5 ft wide sidewalk along the east side of 73rd Street. There is also 4 ft wide sidewalk along the south side of Del Matro Avenue.

Clive Learning Academy Entrance (side street stop)

Clive Learning Academy uses their northmost driveway as the entrance only for school drop-off and pick-up. The driveway is the west leg of this three-leg intersection. This driveway is an entrance only with traffic maneuvering within the site and exiting 165 ft south. See **Figure 8.**

Between these driveways, there is a pedestrian signal used for a school crossing. This pedestrian signal is needed to provide a crossing for the students that cross 73rd Street from the residential area on the east to the school. While the pedestrian signal appears to be effective, if it is replaced during construction a pedestrian hybrid beacon should be installed in its place as it is the appropriate traffic control for this type of crossing and it provides less disruption to the through traffic on 73rd Street.

Figure 8: Clive Learning Academy Entrance Intersection



There is 6 ft wide sidewalk along the west side of 73rd Street adjacent to the school. The sidewalk on the east side is 3.5 ft wide.

Washington Avenue (side street stop)

The Washington Avenue intersection is a three-leg intersection, with Washington Avenue extending east from 73rd Street. It is 140' north of the Clive Learning Academy entrance drive and 50' south of College Street. See **Figure 9.** Washington Avenue is a local street but sees extra traffic because it is one of a few roads that connects east-west across Windsor Heights from 73rd Street to 63rd Street. It is a two-lane residential street with one lane in each direction.

Washington Avenue has a posted speed limit of 25 mph.

Parking is allowed on the south side of Washington Avenue, but is restricted along the north side along Washington Avenue and on both sides near the intersection.

There is 3.5 ft wide sidewalk along both sides of 73rd Street in this area. There is also a 4 ft wide sidewalk along the south side of Washington Avenue east of 73rd Street.

Figure 9: Washington Avenue Intersection

College Drive (side street stop)

The College Drive intersection is a three-leg intersection, with College Drive extending west from 73rd Street. It is 50' north of Washington Avenue. See **Figure 10.** College Drive is a local street but sees extra traffic because it is the only east-west connector to a residential neighborhood between University Avenue and Hickman Road. It is a two-lane residential street with one lane in each direction.

Figure 10: College Drive Intersection

College Drive has a posted speed limit of 25 mph.

Parking is allowed on the north side of College Drive but is restricted along the north side and both sides near the intersection.

The sidewalk is 3.5 ft wide along the west side of 73rd Street at this intersection and 4 ft wide along the east side of 73rd Street. There is also a 3.5 ft wide sidewalk along the south side of College Drive west of 73rd Street.

A. EXISTING TRAFFIC INFORMATION

13-hour turning movement counts for the nine study intersections were performed on March 3, 2020. The AM Peak Hour and PM Peak Hour was determined to be 7:15-8:15 am and 4:30-5:30 pm, respectively. Annual Average Daily Traffic information was obtained from the Iowa DOT's Traffic Flow Maps. The AADTs were used in calculating system growth and crash rates. See **Appendix A** for the study area aerial, AADT's, and peak hour count information.

IV. Safety Review

The crash history of the study corridor was completed using the crash data available through the Iowa DOT Iowa Crash Analysis Tool (ICAT) for January 1, 2015 through December 31, 2019. There were 174 reported crashes at the study intersections and 59 reported crashes along the segments between the study intersections for a total of 233 crashes along the corridor during this 5-year period.

There were no fatal crashes along the corridor and only two major injury crashes. One of the major injury crashes occurred in the segment between the I-235 ramps and the other occurred in the segment between the I-235 westbound ramp and Buffalo Road. The detailed crash reports state that the major injury crash between the I-235 ramps was a crash with a motorcycle following too close

and the crash between the I-235 westbound ramp and Buffalo Road was a single vehicle crash caused by an inebriated driver travelling too fast and losing control.

Of the remaining 231 total crashes along the corridor, there were 18 minor injury crashes along the corridor with 14 at the study intersections and four between the study intersections. Possible Injury crashes accounted for 50 crashes along the corridor with 39 of them at the study intersections and 11 between the study intersections. 163 crashes were property damage only crashes along the corridor, with 121 at the study intersections and 42 between intersections. **Chart 1** and **Table 1** show the breakdown of crash severities and types for the intersections and segments between.

Chart 1: Number of Crashes by Crash Severity 2015-2019

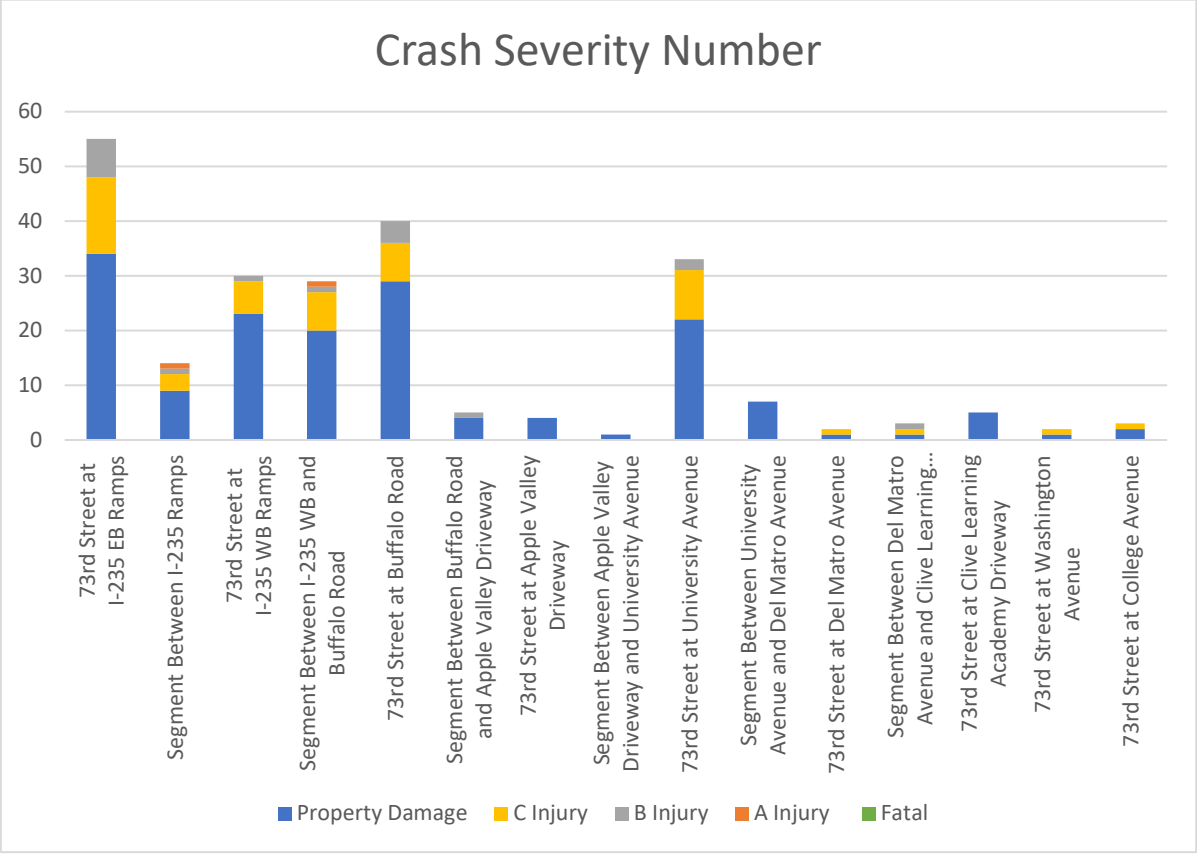


Table 1: Number of Intersection Crashes by Crash Type 2009-2018

Crash Type	73rd Street at I-235 EB Ramps	73rd Street at I-235 WB Ramps	73rd Street at Buffalo Road	73rd Street at Apple Valley Driveway	73rd Street at University Avenue	73rd Street at Del Matro Avenue	73rd Street at Clive Learning Academy Driveway	73rd Street at Washington Avenue	73rd Street at College Avenue
Non-Collision (Single Vehicle)	6	2	3	0	3	0	0	0	0
Head-on (Front to front)	6	4	7	0	2	0	0	0	0
Rear End (front to rear)	13	13	12	2	8	2	5	2	3
Angle, Oncoming Left Turn	13	5	4	0	5	0	0	0	0
Broadside (front to side)	4	6	8	2	11	0	0	0	0
Sideswipe, Same Direction	8	0	5	0	2	0	0	0	0
Sideswipe, Opposite Direction	5	0	0	0	1	0	0	0	0
Rear to Rear	0	0	0	0	0	0	0	0	0
Rear to Side	0	0	0	0	0	0	0	0	0
Not reported	0	0	0	0	0	0	0	0	0
Other	0	0	1	0	1	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0

The I-235 eastbound ramp/Center Street intersection has a disproportionately higher percentage of rear end (23%) and angle oncoming left turn (23%). There is also a trend showing that a significant

number of the crashes involve northbound traffic. The curve through this intersection, a southbound left turn lane without a northbound left turn lane, and the pavement jointing can lead a northbound through vehicle into the southbound left turn lane, likely contributing to some confusion for drivers traversing the intersection. The addition of a northbound left turn lane with protected left-turn phase would reduce some confusion as it would line up traffic through the intersection and provide safer left-turning.

Although the Buffalo Road intersection has a higher percentage of rear end crashes, there was no apparent trend to be mitigated as these crashes are occurring in all approach directions and the higher intersection crash rate is likely due to the volume of cars travelling through this intersection.

Crash rates were reviewed for the intersections and the segments between the study intersections to see if issues are present. Crash rates above the statewide average for a similar type of intersection or roadway segment are often indicative of an issue on the corridor that needs to be examined further. The crash rates were calculated using 2016 AADTs from the Iowa DOT's Traffic Flow Map. The crash rates for the study intersections and segments can be found in **Tables 2 and 3**, respectively. The crash rates for intersections are determined as a rate per million vehicles entering. The crash rates for segments are determined as a rate per 100 million vehicle miles traveled, which is the industry standard for this calculation.

Table 2: Intersection Crash Rates

Intersection	Crash Rate	Statewide Average
73rd Street at I-235 EB Ramps	1.29	0.9
73rd Street at I-235 WB Ramps	0.54	0.9
73rd Street at Buffalo Road	0.87	0.8
73rd Street at Apple Valley Driveway	0.12	0.8
73rd Street at University Avenue	0.72	0.8
73rd Street at Del Matro Avenue	0.12	0.8
73rd Street at Clive Learning Academy Driveway	0.32	0.8
73rd Street at Washington Avenue	0.12	0.8
73rd Street at College Avenue	0.18	0.8

The intersection crash rates for the I-235 eastbound ramp/Center Street and the Buffalo Road intersection were above the statewide average, as shown in red above. The remainder of the intersection crash rates are below the statewide average.

Table 3: Segment Crash Rates

Segment	Crash Rate	Statewide Average
Segment Between I-235 Ramps	162	382
Segment Between I-235 WB and Buffalo Road	316	382
Segment Between Buffalo Road and Apple Valley Driveway	126	382
Segment Between Apple Valley Driveway and University Avenue	43	382
Segment Between University Avenue and Del Matro Avenue	92	382
Segment Between Del Matro Avenue and Clive Learning Academy Driveway	168	382

All segments had crash rates are below the statewide average.

As shown in Tables 2 and 3, the intersection and segment crash rates are operating below the statewide averages based on roadway type, with the exception of the I-235 Eastbound ramp/Center Street and Buffalo Road intersections. For those intersections and segments with of crash rates below the statewide average, the crash rate and severity does not indicate any significant crash concern for those intersections or segments.

However, the crash rate and trend for the I-235 Eastbound ramp/Center Street is concerning and potential improvement to the intersection, such as the installation of a northbound left turn lane, could provide a safer intersection. The higher than average crash rate for the Buffalo road intersection is a cause for concern, but the lack of a trend in type and approach makes it difficult to mitigate.

V. Proposed Improvements

As part of this study, the proposed roadway improvements were analyzed. 73rd Street is being reviewed to see if it should be widened to a three-lane section north of University Avenue. The existing 73rd Street cross section south of University Avenue is planned to stay as is with mitigation added as needed to accommodate safety and traffic flow now and in the future.

A. ANNUAL GROWTH OF TRAFFIC

Annual growth of traffic is anticipated on this corridor due to development and/or redevelopment in areas both along the corridor and within Windsor Heights. The annual growth rates were calculated using historical data obtained from the Iowa DOT Traffic Flow Maps. Information on these maps included AADTs for 73rd Street and side roads throughout the corridor. Growth rates were calculated for the study intersections with negative growth rates between -2.50% and -1.00%. While a negative growth rates were determined a standard minimum 0.5% growth rate was used for this study. This is considered minimal growth and is representative for a developed area with potential for limited redevelopment. The growth rate was applied to the turning movement counts collected to determine the Construction Year (2024) and Design Year (2044) turning movement volumes. The 2024 construction year and 2044 design year turning movement count volumes can be found in **Appendix A**.

B. TRAFFIC SIGNAL WARRANTS

Traffic signal warrants have been developed as national guidelines to promote continuity of traffic control devices to ensure that traffic signals are installed at intersections that would benefit from their use. Traffic signal warrants were reviewed for the study intersections to determine if a new signal is needed at a stop-controlled location or if an existing signal should be removed.

The Manual on Uniform Traffic Control Devices (MUTCD) states that the investigation of the need for a traffic signal control shall include an analysis of the applicable factors contained in the following traffic signal warrants:

- 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

A traffic signal shall not be installed unless one or more of the warrants can be met. Furthermore, a signal shall not be installed unless an engineering study indicates that the signal will improve the overall safety and operation of the intersection. Finally, the signal should not disrupt the progressive flow of traffic.

Where traffic signals exist, 80% of the volumes for warrants can be used to determine if the signal should stay. The review determined the traffic control at each intersection was appropriate and should remain as is.

C. POTENTIAL DEVELOPMENT

Potential development that could generate additional traffic on the corridor was reviewed. Since the corridor is mostly developed, there is little area for new development, however, the area in front of the existing Walmart/Sam's Club south of Apple Valley has been discussed as a potential area for future mixed-use development. The main area where this development could occur is between Walnut Creek and the Walmart/Sam's Club parking lots. There are currently existing restaurants present, B-Bops and Burger King, but space does exist where an old auto service center, an open parking lot, and undeveloped ground currently exist. The size of this potential redevelopment area was determined using aerial photography. For the purposes of this study, the space was assumed to be a potential mixed-use strip mall/shopping center. Being there is no specific plan for timing of this development as of yet, the development was added only to the future year 2044 scenarios.

Trip generation was completed using the Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, 2017. Trip generation rates were evaluated using data for Shopping Center (ITE 820). The trip generation results are contained in **Appendix B.** The trip generation is summarized in **Table 4.**

Table 4: Trip Generation Summary

Land Use	ITE Code	Proposed Size	AM Peak Hour		PM Peak Hour		Weekday	
			Entering	Exiting	Entering	Exiting	Entering	Exiting
Shopping Center	820	37,500 sf	109	67	152	164	1823	1823
			AM Peak Hour total	176	PM Peak Hour total	316	Weekday total	3646

As shown in the traffic modeling section, there are no recommended improvements needed to accommodate the redevelopment of this area based on the development assumptions detailed above. As details for this redevelopment become firm, a separate traffic analysis should be prepared to analyze any potential impacts from this site to the surrounding roadway network.

VI. Traffic Modeling

The traffic operations analysis for the intersections consider the following measures to determine the adequacy of the intersection design to meet acceptable operations: intersection delay/Level of Service (LOS) and volume-to-capacity ratios. An explanation of each of these measures is provided below:

A. LEVEL OF SERVICE AND DELAY

The operational analysis results are described as a Level of Service (LOS) ranging from A to F. These letters serve to describe a range of operating conditions for different types of facilities. Levels of Service are calculated based on the Highway Capacity Manual 6th edition, which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. The control delay is modeled within the analysis software, Traffic ware Synchro. Level of Service D or higher are commonly taken as acceptable design year LOS. The level of service and its associated intersection delay for a signalized and unsignalized intersection is presented below. The delay threshold for unsignalized intersections is lower for each LOS compared to signalized intersections, which accounts for the fact that people expect a higher quality of service when at a stop-controlled intersection.

LOS A thru D provide continuous flow traffic without unexpected delay. LOS E indicates the system is congested and traffic will be delayed more. LOS F indicates system overload and failure with traffic delayed significantly. LOS A thru D is considered acceptable by many agencies throughout the metro area.

Table 5: Level of Service Criteria

	Signalized Intersection	Unsignalized Intersection
LOS	**Control Delay per Vehicle (sec.)**	**Control Delay per Vehicle (sec.)**
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

If v/c>1.0, LOS will be equal to F regardless of the delay value.

Four scenarios were analyzed to determine the effects of the traffic on the transportation system. Mitigation changes were created and analyzed to improve issues that were noted during the analysis. The scenarios analyzed were:

1) Existing conditions – The existing conditions (2020) were analyzed using the existing roadways and turning movement counts to determine if there were existing issues. Mitigation was reviewed for locations that have longer than acceptable delays. This also provides a basis for improvements required for the Opening Day Scenario and 20-year Projected No-Build Scenario.

2) Construction Year – The opening day conditions (2024) were analyzed to determine the

effects of a change from two-lane section to three-lane section with the addition of a two-way-left turn lane north of University Avenue.

3) Future Year Projected No-Build – The future projected no build conditions (2044) were analyzed to determine improvements required due to the annual growth of traffic on the system. These results were reviewed to determine if changes to the existing geometrics would be needed if reconstructed as is. Mitigation determined in the existing conditions was added. This scenario includes the additional traffic from the redevelopment area in front of Walmart/Sams Club.

4) Future Year Projected Build - The future projected build conditions (2044) were analyzed to determine the effects of a change from two-lane section to three-lane section with a two-way-left turn lane north of University Avenue. This scenario includes annual growth of traffic on the system and the additional traffic from the redevelopment area in front of Walmart/Sams Club.

Table 6: Intersection Level of Service by Scenario

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)															
			Existing Conditions		Existing Conditions w Mitigation		Current Year Build		Current Year Build w Mitigation		Future Year No Build		Future Year No Build w Mitigation		Future Year Build		Future Year Build w Mitigation	
1	73rd St & I-235 EB Ramps/Center St	AM Peak	33	C	11	B	37	D	11	B	36	D	11	B	41	D	15	B
	Signalized Intersection	PM Peak	42	D	17	B	44	D	16	B	45	D	16	B	48	D	26	C
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	12	B	12	B	12	B	12	B	12	B	14	B	14	B
	Signalized Intersection	PM Peak	15	B	16	B	15	B	16	B	17	B	16	B	20	C	21	C
3	73rd St & Buffalo Rd	AM Peak	14	B	14	B	13	B	15	B	14	B	14	B	16	B	17	B
	Signalized Intersection	PM Peak	20	C	20	C	21	C	22	C	19	B	22	C	35	D	33	C
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	2	A	2	A	2	A	2	A	2	A	2	A	2	A
	Stop Controlled	PM Peak	3	A	4	A	3	A	4	A	3	A	4	A	4	A	6	A
5	73rd St & University Ave	AM Peak	23	C	22	C	23	C	21	C	23	C	23	C	24	C	23	C
	Signalized Intersection	PM Peak	22	C	22	C	23	C	23	C	24	C	23	C	25	C	26	C
6	73rd St & Del Matro Ave	AM Peak	1	A	1	A	1	A	2	A	2	A	2	A	2	A	2	A
	Stop Controlled	PM Peak	2	A	3	A	2	A	3	A	2	A	3	A	2	A	3	A
7	73rd St & Clive Learning Academy	AM Peak	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
	Stop Controlled	PM Peak	1	A	1	A	1	A	1	A	1	A	2	A	1	A	1	A
8	73rd St & Washington Ave	AM Peak	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
	Stop Controlled	PM Peak	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
9	73rd St & College Dr	AM Peak	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
	Stop Controlled	PM Peak	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

As shown in **Table 6**, the level of service for the intersections was within acceptable range, LOS D or better, for all scenarios. A review of intersections north of University shows that the segment north of University Avenue functions well as a 2-lane section, with the greatest intersection delay being 2.6 s/veh.

More detailed level of service information for the intersection and specific turning movements for each scenario can be found in **Appendix C.**

Some turning movements experienced delays that are longer than the normally acceptable delays, LOS E or LOS F. The Northbound left at the I-235 Eastbound ramps is the only movement at LOS F and has significant delays at 215.2 s/veh. This movement also has issues with a long queue length approaching the next intersection to the south. The intersection was analyzed under a mitigation scenario with an added 200 ft long northbound turn lane. This remedies the issue with the long delays and long queue lengths.

The overall Corridor Delay, Travel Time, and Speed information were reviewed to see what effects the number of through lanes and discussed mitigation would have for traveling the length of the corridor. Overall Corridor Delay, Travel Time, and Speed information can be found in **Table 7.**

Table 7: Corridor Delay, Travel Time, and Speed

		Peak Hour	Existing Conditions	Existing Conditions with Mitigation	Opening Year	Opening Year with Mitigation	Future Year No Build	Future Year No Build with Mitigation	Future Year Build	Future Year Build with Mitigation
Northbound	Delay (s)	AM Peak	84.1	40.1	92.6	42.3	93	41.5	113.8	46.8
		PM Peak	129.1	52.4	135.9	71.5	133.2	70.7	165.2	91.8
	Travel Time (s)	AM Peak	357.7	204.9	460.7	206.6	465.1	206.8	1095.3	213.3
		PM Peak	721.4	218.6	840.8	238.2	995	237.1	1790.1	264
	Speed (mph)	AM Peak	21	25	20	25	20	25	18	24
		PM Peak	17	23	17	21	17	22	15	20
Southbound	Delay (s)	AM Peak	55.3	53.6	54.5	53.8	54.1	54.3	64.5	67.2
		PM Peak	60.8	77	64.3	66.2	67.6	68.1	85.4	92.3
	Travel Time (s)	AM Peak	223	221.2	222.4	221.7	222.2	222.1	232.1	234.4
		PM Peak	225.8	241.1	229	230.7	231.9	232.7	251.4	258.4
	Speed (mph)	AM Peak	23	23	23	23	23	23	22	22
		PM Peak	23	21	22	22	22	22	20	20

The overall delay, travel times, and speeds changed significantly for northbound traffic without mitigation, with the delays and travel times increasing and the speeds decreasing. Adding mitigation, consisting of a northbound left turn lane at I-235 Eastbound ramp, improves the metrics significantly. The comparison of base to mitigation scenarios with the northbound left turn lane at I-235 Eastbound Ramp included shows significant improvements with delays decreasing 50-57%, travel times improving 61-83%, and overall speeds increasing 24-33%.

The overall delay, travel times, and speeds remained similar for southbound traffic for all scenarios with a change of less than 10% from existing condition to future year build. The comparison of scenarios from base to mitigation shows less than 1% change in travel times for most of the scenarios, with only one having a difference of 6.4%. The added two-way left turn lane north of University Avenue makes little difference for traveling southbound. The mitigation of adding the northbound left turn lane at the I-235 eastbound ramp will negatively affect the southbound traffic through increased overall delay and travel times in each scenario, but these effects are minimal.

VII. Multimodal Review

Des Moines Area Regional Transit (DART) Route 3 follows University Avenue from downtown to just east of 73rd Street to a large station/stop at Wal-Mart/Sam's Club. It then crosses 73rd Street on Buffalo Road and passes Dowling Catholic High School on the way to Valley West Mall in West Des Moines.

There is a shared use path along the east side of the roadway from where it connects to the Clive Greenbelt along Walnut Creek, about 200 ft south of the Apple Valley driveway, to University Avenue where it switches to the west side and extends about 850 ft north of University Avenue before turning away from the roadway. As mentioned previously in the existing conditions section, city staff noted they have received complaints from trail users about having to cross two legs of this intersection. Options should be reviewed to determine if there are alternatives for trail connections in this area.

As mentioned previously in the existing conditions section, there are pedestrian facilities adjacent to the road north of Buffalo Road to the north end of the corridor. These existing pedestrian facilities vary in width from 3.5 ft to 10 ft. The sidewalk less than 4 ft wide should be replaced to meet ADA requirements. Sidewalks 4 ft to 5 ft wide, should either have 5 ft passing zones added at 150 ft spacing or be replaced with a 5 ft sidewalk to be brought into ADA compliance.

The sidewalk north of University Avenue on the east side should be widened to a trail to provide an expanded safe route for children from neighborhoods east of 73rd Street to the Clive Learning Academy.

Neither sidewalk nor trail extend south of Buffalo Road. There was a feasibility study completed in 2019 due to evidence of pedestrian use as counted in the existing turning movement counts collected and through the worn footpaths along 73rd Street in this area. Due to constraints of the area it was determined adding the pedestrian facilities is not feasible without roadway modifications to accommodate a sidewalk or trail. However, if roadway modifications could be made to accommodate pedestrian facilities during construction adding these improvements should be further investigated during design.

VIII. Conclusions & Recommendations

The following summarizes the main outcomes of this study:

A. Safety

A review of crashes over the past 10 years shows that there have been 233 crashes at the nine study intersections and segments between the intersections from January 1, 2015 to December 31, 2019. The crash rates at two of the study intersections highlight a concern.

The following crash issues and trends were noted during the review and are listed below with recommended improvements:

- 73rd Street at I-235 Eastbound Ramp Termini/Center Street
    - The crash rate is above the statewide average for rear-end and angle, oncoming left turns crashes are predominant, each making up 23% of the crashes at the intersection. Northbound traffic was involved in a disproportionate amount of the crashes. The curve through the intersection and lack of northbound left turn lane are likely contributing factors. Adding a northbound left turn lane would help this situation.
- 73rd Street at Buffalo Road

  The crash rate is above the statewide average with rear-end crashes comprising 30% of the crashes. There is no specific trend in the direction of approach, therefore, no specific mitigation is recommended. With the low severity of crashes occurring on a mix of approach directions, this intersection may just have a higher crash rate due to the volume of traffic.

B. Proposed Improvements

The level of service for the intersections was within acceptable range, LOS A thru D for all scenarios as noted in the traffic modeling section of the report. The intersections were studied with their current actuated signal operations, which is not adaptive. Installing an adaptive signal system can create further improvements to level of service for the system by adjusting timings for high and low peak traffic times.

The segment north of University Avenue functions well and is expected to function well with LOS of A as a 2-lane section. Observations were made at the intersections near Clive Learning Academy. The existing system works well with short periods of delay during drop off and pick up, therefore, the existing geometry is recommended to stay the same. The pedestrian traffic signal in front of Clive Learning Academy on 73rd Street should be replaced with a pedestrian hybrid beacon.

The segment including University Avenue and south of University Avenue functions at LOS D or better for intersections with movements having LOS E and F in the existing conditions. The addition of the Northbound left turn lane at 73rd Street at I-235 Eastbound Ramp Termini/Center Street highlighted in the safety improvements improves the intersection and

corridor delays, therefore, the northbound left turn lane should be added.

C. Pedestrian / Bicyclist / Transit accommodations

Sidewalk and Trail along 73rd Street are already available north of Buffalo Road. While a pedestrian system is available, they are narrow and should be widened to 5 ft to meet ADA requirements. The sidewalk north of University Avenue on the east side should be widened to a trail to provide an expanded safe route for children from neighborhoods east of 73rd Street to the Clive Learning Academy.

The Trail crossings for 73rd Street at University should be reviewed for options to determine if there are alternatives for trail connections in this area.

There is a pedestrian signal used for a school crossing next to Clive Learning Academy. This pedestrian signal is needed to provide a crossing for the students that cross 73rd Street from the residential area on the east to the school. While the pedestrian signal appears to be effective, if it is replaced during construction a pedestrian hybrid beacon should be installed in its place as it is the appropriate traffic control for this type of crossing and it provides less disruption to the through traffic on 73rd Street.

Neither sidewalk nor trail extend south of Buffalo Road. There was a feasibility study completed in 2019 that noted due to constraints of the area it was determined adding the pedestrian facilities is not feasible without roadway modifications to accommodate a sidewalk or trail. However, if roadway modifications could be made to accommodate pedestrian facilities during construction adding these improvements should be further investigated during design.

Appendix A: Peak Hour Count Information

WINDSOR HEIGHTS
the heart of it all

73rd Street Improvements

Windsor Heights, Iowa

Existing Conditions

May 2020

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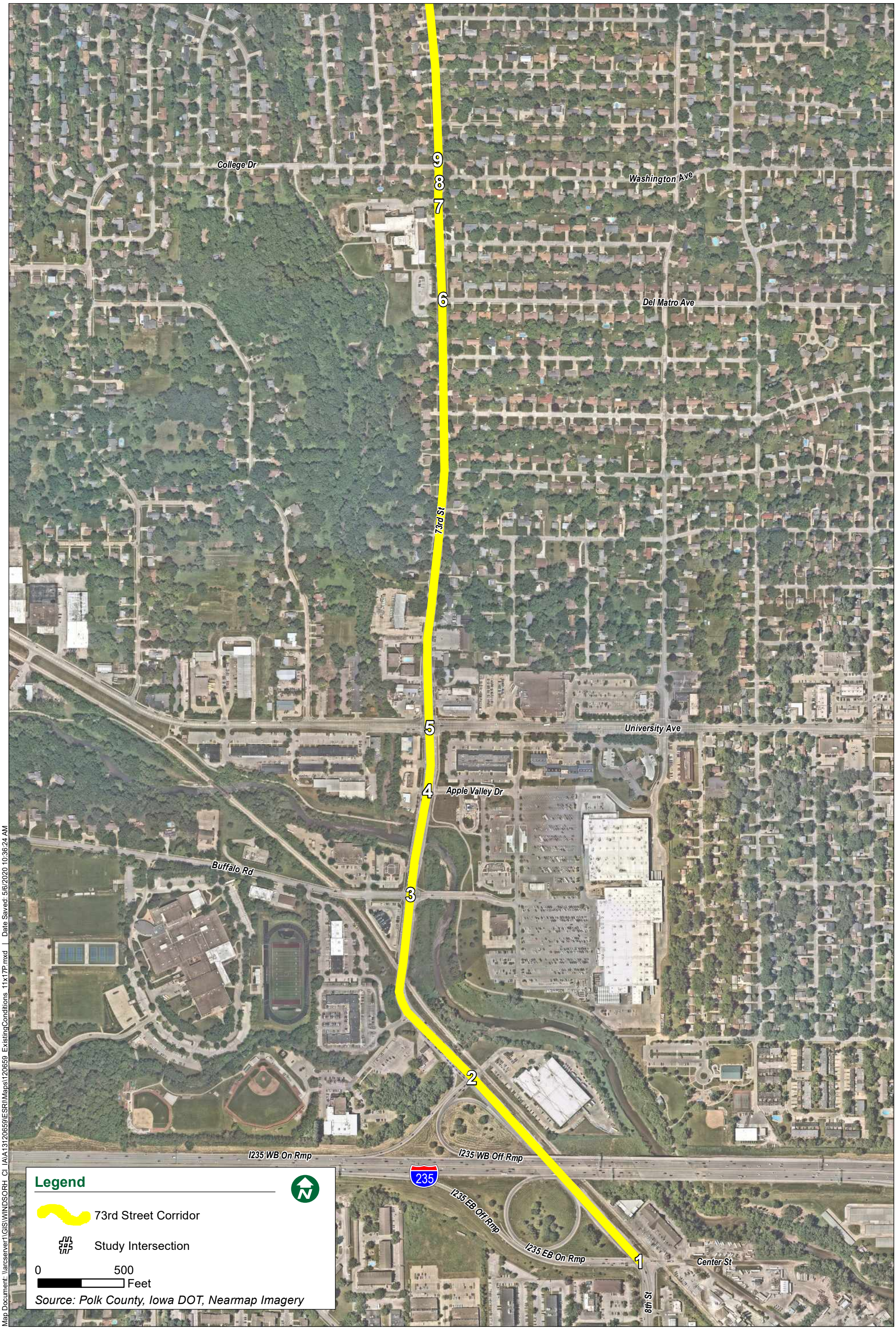
Real People. Real Solutions.



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73rd Street Improvements

Windsor Heights, Iowa

Existing Conditions Turning Movements

April 2020

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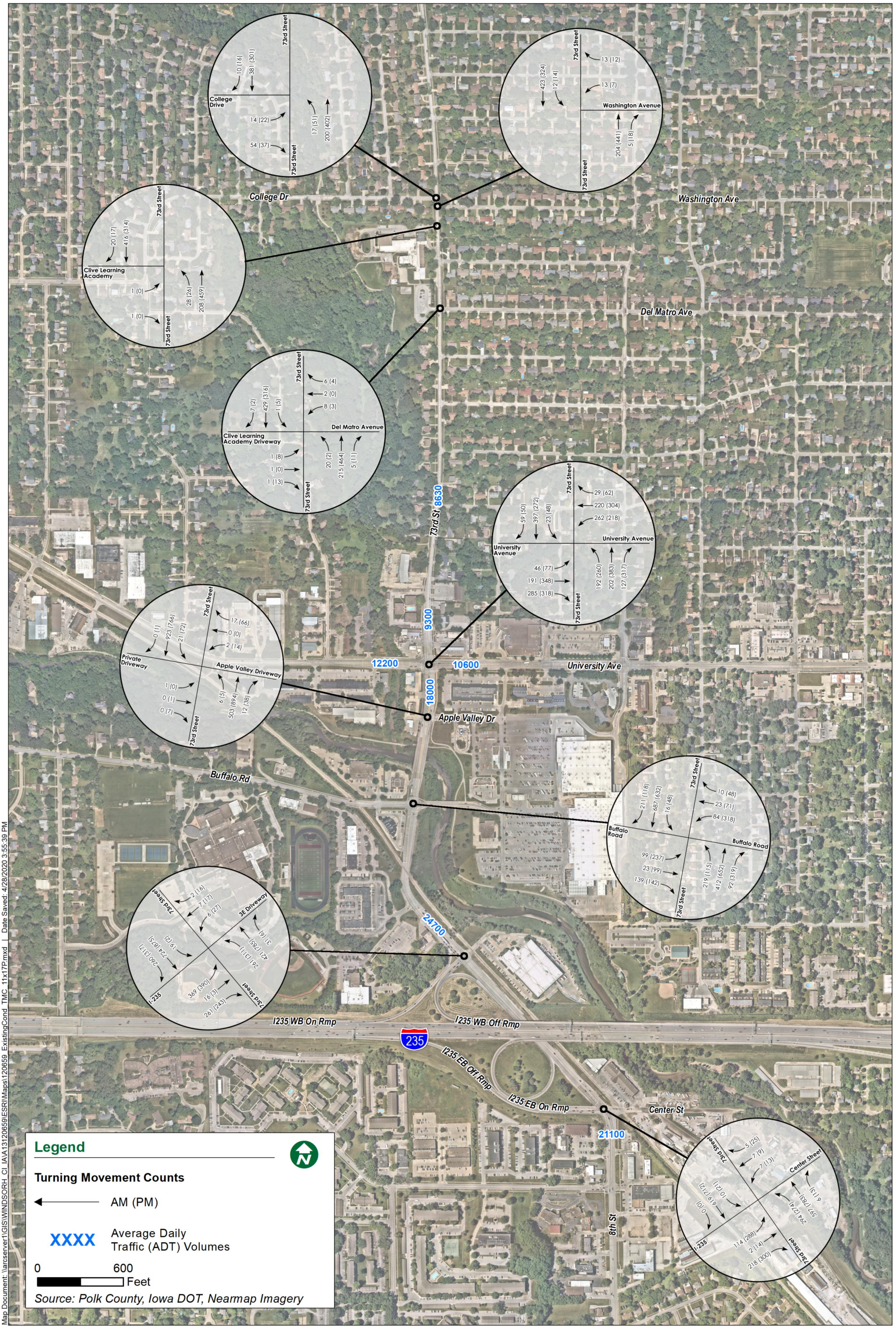

Legend

Turning Movement Counts

AM (PM)

XXXX Average Daily Traffic (ADT) Volumes

0 600 Feet

Source: Polk County, Iowa DOT, Nearmap Imagery

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73rd Street Improvements

Windsor Heights, Iowa

Current Build Turning Movements

April 2020

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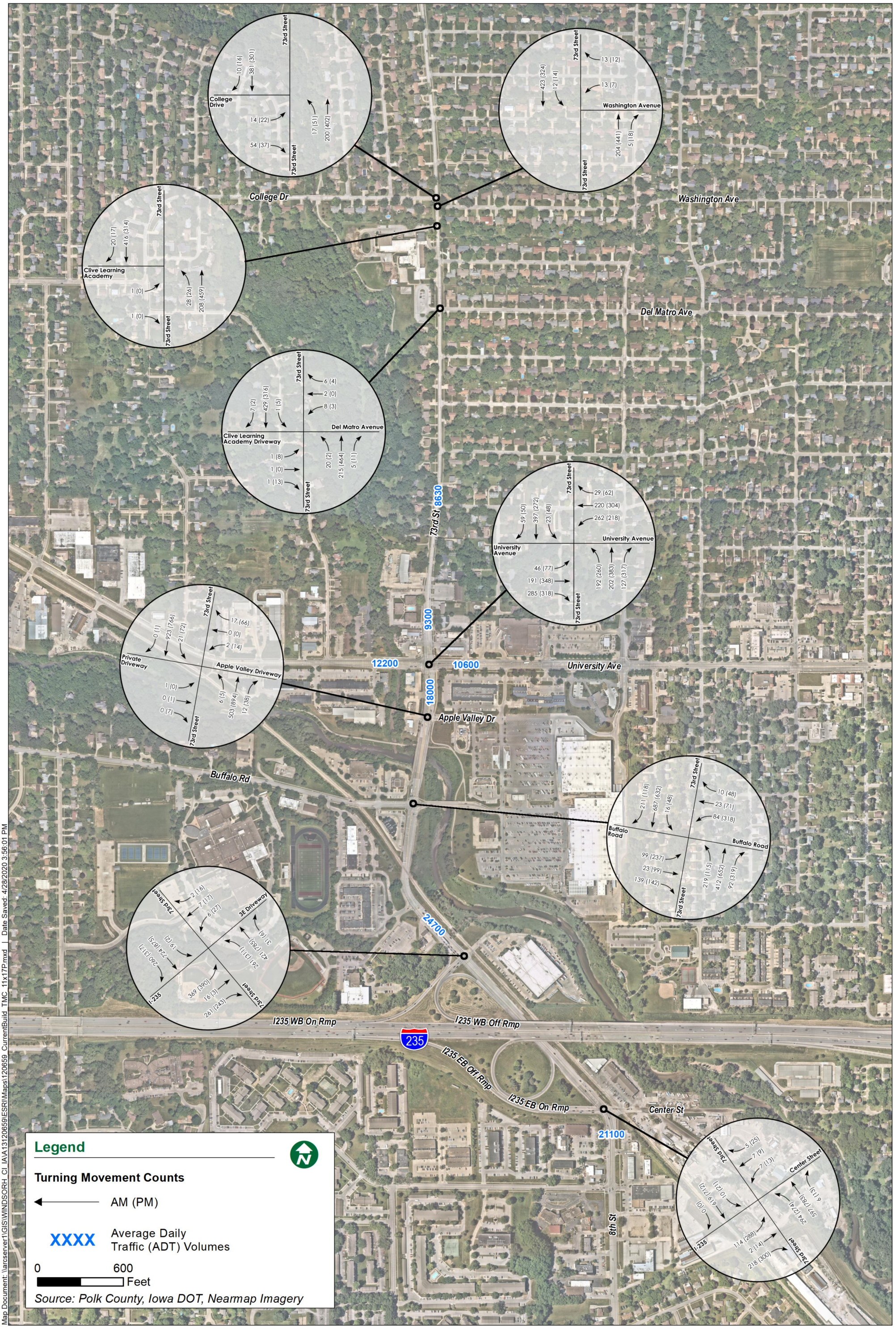

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Turning Movement Counts

AM (PM)

XXXX Average Daily Traffic (ADT) Volumes

0 600 Feet

Source: Polk County, Iowa DOT, Nearmap Imagery

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73rd Street Improvements

Windsor Heights, Iowa

Future No Build Turning Movements

April 2020

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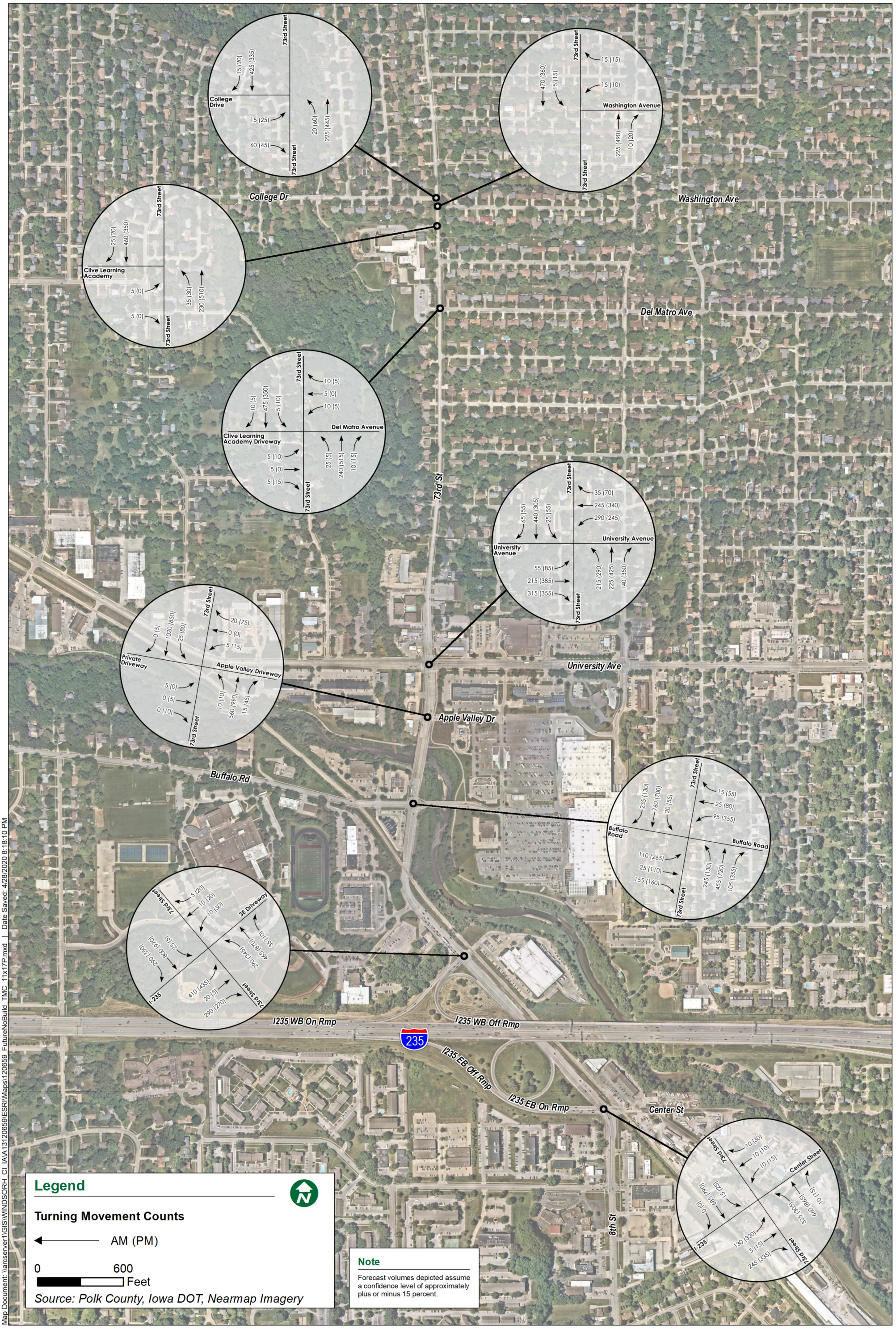

Legend

Turning Movement Counts

AM (PM)

0 600 Feet

Source: Polk County, Iowa DOT, Nearmap Imagery

Note

Forecast volumes depicted assume a confidence level of approximately plus or minus 15 percent.

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73rd Street Improvements

Windsor Heights, Iowa

Future Build Turning Movements

April 2020

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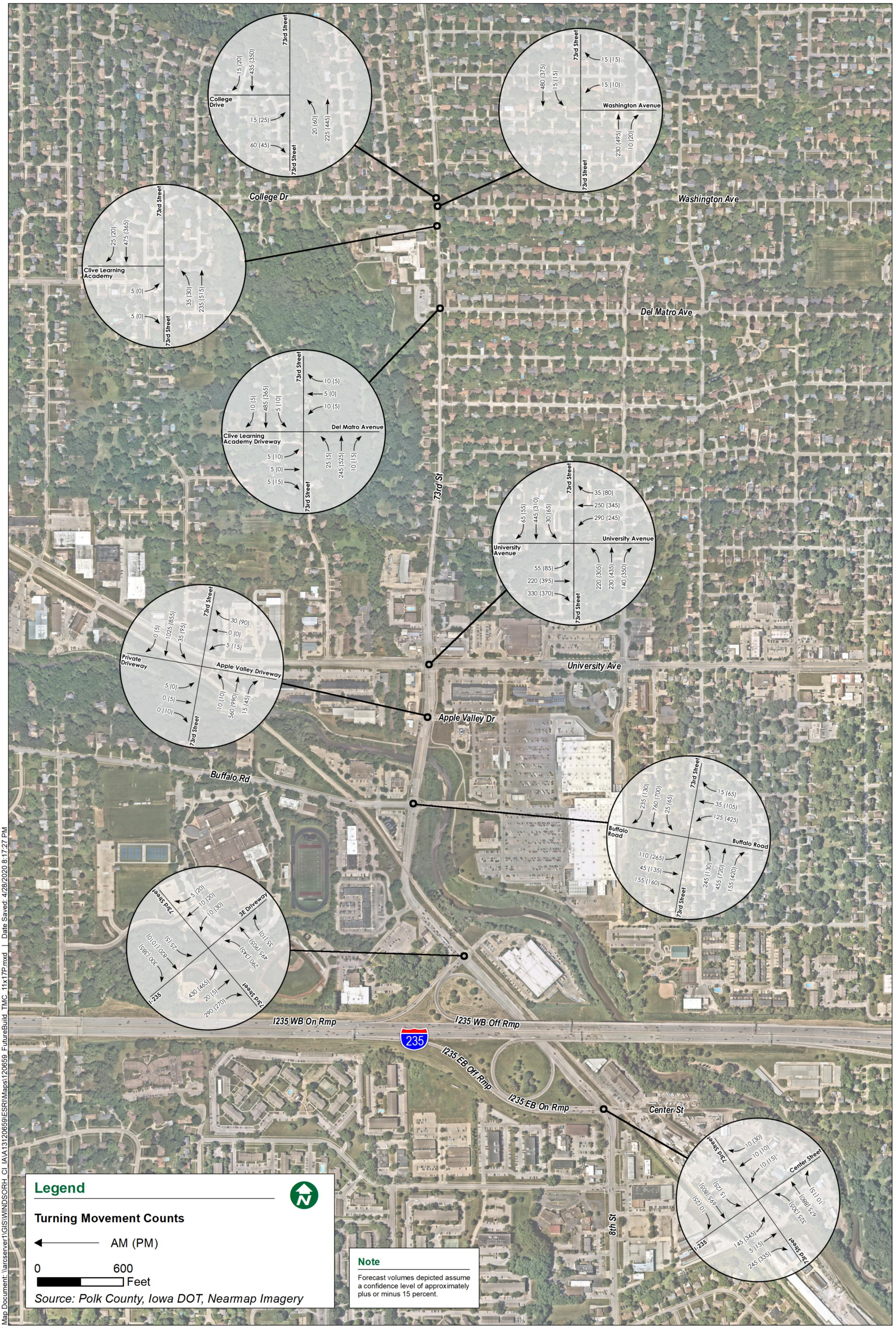

Legend

Turning Movement Counts

AM (PM)

0 600 Feet

Source: Polk County, Iowa DOT, Nearmap Imagery

Note

Forecast volumes depicted assume a confidence level of approximately plus or minus 15 percent.

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Appendix B: Trip Generation

Traffic Assumptions

Potential Development

Shopping Center 47.9 per 1,000 sf ITE Code 820 Internal-to-Internal Reduction

	Based on 1,000 sf Average Rate	Fitted Curve Equation	#	% enter	% exit	entering	exiting		entering	exiting		Pass-by entering	Pass-by exiting	New Trips entering	New Trips exiting
AM	0.94	(T) = 0.50(X)+151.78	176	62	38	109	67	0%	109	67	0%	0	0	109	67
PM	3.81	Ln(T) = 0.74Ln(X)+2.89	316	48	52	152	164	0%	152	164	0%	0	0	152	164
Weekday	37.75	Ln(T) = 0.68Ln(X)+5.57	3645	50	50	1823	1823	0%	1823	1823	0%	0	0	1823	1823

				Pass-by entering	Pass-by exiting	New Trips entering	New Trips exiting
AM	176	109	67	AM	0	0	109	67
PM	316	152	164	PM	0	0	152	164
Weekday	3645	1823	1823	Weekday	0	0	1823	1823

Area assumed is the area bounded by the Walmart and Sams Club Parking Lot to the east, Walnut Creek Trail to the south and west, and the drive adjacent to Apple Valley to the north. The area of Burger King and east of B-Bops was excluded.

Appendix C: LOS Tables

Table 1: Existing Conditions Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	33	C	106	F	51	D	22	C	15	B	8	A	-		33	C	33	C	9	A	29	C	27	C	7	A	106	F	NBL	NBL/T	450	550
	Signalized Intersection	PM Peak	42	D	172	F	69	E	21	C	24	C	9	A	-		41	D	43	D	23	C	20	C	28	C	9	A	172	F	NBL	NBL/T	500	550
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	20	C	7	A	4	A	11	B	11	B	6	A	26	C	33	C	1	A	45	D	38	D	8	A	45	D	WBL	EBL/T	150	225
	Signalized Intersection	PM Peak	15	B	22	C	9	A	6	A	16	B	18	B	6	A	28	C	37	D	0	A	32	C	32	C	12	B	37	D	EBT	SBT	150	250
3	73rd St & Buffalo Rd	AM Peak	14	B	28	C	5	A	3	A	12	B	13	B	13	B	36	D	30	C	11	B	25	C	24	C	6	A	36	D	EBL	SBT/R	125	250
	Signalized Intersection	PM Peak	20	C	32	C	20	C	8	A	27	C	18	B	18	B	37	D	31	C	20	C	23	C	13	B	8	A	37	D	EBL	EBT/R	125	375
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	12	B	1	A	1	A	4	A	2	A	-		14	B	-		-		15	C	-		5	A	15	C	WBL	WBL/T/R	25	50
	Stop Controlled	PM Peak	3	A	8	A	3	A	2	A	13	B	1	A	1	A	-		-		6	A	26	D	-		11	B	26	D	WBL	WBL/T/R	50	125
5	73rd St & University Ave	AM Peak	23	C	34	C	14	B	4	A	23	C	24	C	18	B	35	D	35	D	14	B	34	C	22	C	6	A	35	D	EBL	WBL	125	275
	Signalized Intersection	PM Peak	22	C	30	C	16	B	8	A	32	C	21	C	13	B	37	D	35	D	11	B	40	D	24	C	10	B	40	D	WBL	EBT	175	375
6	73rd St & Del Matro Ave	AM Peak	1	A	5	A	2	A	3	A	2	A	1	A	1	A	11	B	4	A	4	A	10	B	9	A	3	A	11	B	EBL	NBL/T/R	25	75
	Stop Controlled	PM Peak	2	A	6	A	3	A	4	A	3	A	0	A	1	A	7	A	-		4	A	10	B	-		5	A	10	B	WBL	EBL/T/R	25	50
7	73rd St & Clive Learning Academy	AM Peak	1	A	5	A	1	A	-		-		0	A	0	A	12	B	-		9	A	-		-		-		12	B	EBL	NBL/T	25	100
	Stop Controlled	PM Peak	1	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBL/T	25	125
8	73rd St & Washington Ave	AM Peak	1	A	-		0	A	0	A	2	A	0	A	-		-		-		-		7	A	-		4	A	7	A	WBL	WBL/R	25	50
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	2	A	0	A	-		-		-		-		9	A	-		5	A	9	A	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	3	A	0	A	-		-		1	A	0	A	8	A	-		6	A	-		-		-		8	A	EBL	EBL/R	50	75
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	10	B	-		4	A	-		-		-		10	B	EBL	EBL/R	50	75

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 2: Peak Hour Queues By Movement - Existing Conditions Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																											
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBL/T		NBL/T/R		NBT 1		NBT 2		NBT/R		NBR		SBL		SBL/T		SBL/T/R		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	50	150	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	450	550	-	-	425	550	-	-	-	-	25	50	25	25	-	-	-	-	25	100	50	125	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	200	400	-	-	-	-	-	-	100	125	-	-	-	-	-	-	50	100	-	-	-	-	-	-	-	-	-	-	500	550	-	-	500	550	-	-	-	-	25	75	25	50	-	-	-	-	25	125	50	125	-	-	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	150	225	-	-	-	-	-	-	25	50	25	50	-	-	-	-	-	-	-	-	25	50	-	-	100	225	-	-	-	-	-	-	50	200	-	-	50	150	-	-	25	50	-	-	-	-	100	150	75	150	-	-	25	75
	Signalized Intersection	PM Peak	100	150	-	-	175	225	-	-	-	-	-	-	25	100	25	100	-	-	-	-	-	-	-	-	25	100	-	-	125	250	-	-	-	-	-	-	75	175	-	-	100	175	-	-	25	50	-	-	-	-	150	250	125	225	-	-	25	75
3	73rd St & Buffalo Rd	AM Peak	75	150	-	-	-	-	-	-	-	-	75	175	-	-	50	125	-	-	-	-	-	-	-	-	25	75	-	-	100	200	-	-	-	-	-	-	50	225	50	100	-	-	25	50	25	50	-	-	-	-	75	225	-	-	125	250	-	-
	Signalized Intersection	PM Peak	125	175	-	-	-	-	-	-	-	-	125	375	-	-	150	200	-	-	-	-	-	-	-	-	75	275	-	-	75	150	-	-	-	-	-	-	100	250	150	300	-	-	75	200	50	75	-	-	-	-	100	250	-	-	125	250	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	0	25	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	75	-	-	25	100	-	-	-	-	25	25	-	-	-	-
5	73rd St & University Ave	AM Peak	50	125	-	-	-	-	-	-	125	225	-	-	100	175	50	225	125	275	-	-	-	-	100	250	-	-	25	125	50	125	75	150	-	-	-	-	75	175	-	-	-	-	25	75	25	75	-	-	-	-	100	200	-	-	125	250	-	-
	Signalized Intersection	PM Peak	75	225	-	-	-	-	-	-	175	375	-	-	100	325	50	175	125	250	-	-	-	-	150	275	-	-	50	125	75	125	100	150	-	-	-	-	100	250	-	-	-	-	75	200	50	100	-	-	-	-	75	125	-	-	100	175	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-
	Stop Controlled	PM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-

Table 3: Existing Conditions with Mitigation Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	11	B	25	C	5	A	3	A	20	C	8	A	-		34	C	45	D	10	B	28	C	28	C	6	A	45	D	EBT	NBT	75	300
	Signalized Intersection	PM Peak	17	B	38	D	8	A	3	A	24	C	10	B	-		40	D	47	D	23	C	15	B	22	C	9	A	47	D	EBT	EBL/T	200	400
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	16	B	6	A	4	A	11	B	10	B	6	A	27	C	26	C	1	A	36	D	45	D	7	A	45	D	WBT	EBL/T	150	250
	Signalized Intersection	PM Peak	16	B	22	C	9	A	5	A	13	B	22	C	7	A	28	C	28	C	0	A	27	C	35	D	12	B	35	D	WBT	SBT	175	325
3	73rd St & Buffalo Rd	AM Peak	14	B	26	C	5	A	2	A	13	B	12	B	12	B	37	D	31	C	11	B	25	C	23	C	8	A	37	D	EBL	SBT/R	125	250
	Signalized Intersection	PM Peak	20	C	26	C	15	B	8	A	29	C	20	C	20	C	41	D	36	D	22	C	22	C	15	B	9	A	41	D	EBL	EBT/R	150	375
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	11	B	1	A	1	A	5	A	2	A	-		41	E	-		-		14	B	-		5	A	41	E	EBL	WBL/T/R	25	50
	Stop Controlled	PM Peak	4	A	7	A	4	A	4	A	15	C	1	A	1	A	-		46	E	7	A	23	C	-		12	B	46	E	EBT	WBL/T/R	50	100
5	73rd St & University Ave	AM Peak	22	C	33	C	15	B	4	A	26	C	22	C	17	B	34	C	31	C	13	B	34	C	22	C	6	A	34	C	EBL	WBT	100	250
	Signalized Intersection	PM Peak	22	C	26	C	14	B	9	A	28	C	20	C	12	B	39	D	36	D	12	B	39	D	22	C	9	A	39	D	WBL	EBT	200	375
6	73rd St & Del Matro Ave	AM Peak	1	A	5	A	2	A	3	A	5	A	1	A	0	A	3	A	5	A	3	A	8	A	7	A	3	A	8	A	WBL	NBL/T/R	25	75
	Stop Controlled	PM Peak	3	A	8	A	4	A	3	A	4	A	1	A	0	A	8	A	-		4	A	7	A	-		5	A	8	A	EBL	EBL/T/R	25	75
7	73rd St & Clive Learning Academy	AM Peak	1	A	5	A	1	A	-		-		0	A	0	A	6	A	-		4	A	-		-		-		6	A	EBL	NBL/T	25	100
	Stop Controlled	PM Peak	1	A	5	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		5	A	NBL	NBL/T	25	100
8	73rd St & Washington Ave	AM Peak	1	A	-		1	A	0	A	1	A	0	A	-		-		-		-		7	A	-		4	A	7	A	WBL	NBT/R	25	75
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	3	A	0	A	-		-		-		-		9	A	-		7	A	9	A	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	3	A	0	A	-		-		1	A	0	A	7	A	-		6	A	-		-		-		7	A	EBL	EBL/R	50	75
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	9	A	-		5	A	-		-		-		9	A	EBL	EBL/R	50	75

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 4: Peak Hour Queues By Movement - Existing Conditions with Mitigation Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																							
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBL/T		NBL/T/R		NBT 1		NBT 2		NBT/R	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	75	200	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	75	-	-	-	-	-	-	125	225	-	-	-	-	-	-	75	300	50	225	-	-
	Signalized Intersection	PM Peak	-	-	-	-	200	400	-	-	-	-	-	-	100	125	-	-	-	-	-	-	50	100	-	-	-	-	-	-	150	225	-	-	-	-	-	-	125	350	75	225	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	150	250	-	-	-	-	-	-	25	175	25	50	-	-	-	-	-	-	-	-	25	50	-	-	100	175	-	-	-	-	-	-	50	125	-	-	50	125
	Signalized Intersection	PM Peak	100	150	-	-	175	250	-	-	-	-	-	-	25	150	25	100	-	-	-	-	-	-	-	-	25	100	-	-	125	225	-	-	-	-	-	-	75	200	-	-	100	225
3	73rd St & Buffalo Rd	AM Peak	75	150	-	-	-	-	-	-	-	-	75	200	-	-	50	125	-	-	-	-	-	-	-	-	25	75	-	-	100	225	-	-	-	-	-	-	50	150	50	125	-	-
	Signalized Intersection	PM Peak	150	175	-	-	-	-	-	-	-	-	150	375	-	-	150	200	-	-	-	-	-	-	-	-	75	325	-	-	75	150	-	-	-	-	-	-	100	200	150	275	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	50	100	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	50	125	-	-	-	-	-	-	125	200	-	-	100	200	50	200	125	250	-	-	-	-	100	250	-	-	25	100	50	125	75	125	-	-	-	-	75	150	-	-	-	-
	Signalized Intersection	PM Peak	75	225	-	-	-	-	-	-	200	375	-	-	100	300	50	175	100	200	-	-	-	-	150	250	-	-	50	125	50	150	100	175	-	-	-	-	-	-	-	-	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-
9	73rd St & College Dr	AM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-

Intersection ID	Intersection	Peak Hour	Queue Lengths																																							
			NBR		SBL		SBL/T		SBL/T/R		SBT 1		SBT 2		SBT/R		SBR																											
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max																											
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	25	50	-	-	-	-	25	100	50	100	-	-	-	-																											
	Signalized Intersection	PM Peak	-	-	25	75	-	-	-	-	50	150	75	150	-	-	-	-																											
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	-	-	25	50	-	-	-	-	75	175	75	200	-	-	25	125																											
	Signalized Intersection	PM Peak	-	-	25	25	-	-	-	-	175	325	175	325	-	-	25	250																											
3	73rd St & Buffalo Rd	AM Peak	25	50	25	50	-	-	-	-	75	200	-	-	125	250	-	-																											
	Signalized Intersection	PM Peak	50	150	50	100	-	-	-	-	100	250	-	-	150	275	-	-																											
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-																											
	Stop Controlled	PM Peak	-	-	50	100	-	-	-	-	25	50	-	-	25	50	-	-																											
5	73rd St & University Ave	AM Peak	25	100	25	75	-	-	-	-	100	175	-	-	125	250	-	-																											
	Signalized Intersection	PM Peak	75	200	50	100	-	-	-	-	75	150	-	-	100	150	-	-																											
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-																											
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-																											
7	73rd St & Clive Learning Academy	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-																											
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-																											
8	73rd St & Washington Ave	AM Peak	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-																											
	Stop Controlled	PM Peak	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-																											
9	73rd St & College Dr	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-																											
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-																											

Table 5: Current Year 3 lane Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	37	D	131	F	59	E	15	B	16	B	7	A	-		32	C	57	E	10	B	30	C	24	C	6	A	131	F	NBL	NBT	450	550
	Signalized Intersection	PM Peak	44	D	184	F	72	E	25	C	24	C	8	A	-		43	D	47	D	24	C	23	C	25	C	9	A	184	F	NBL	NBT	500	550
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	19	B	8	A	5	A	17	B	11	B	6	A	27	C	26	C	0	A	38	D	39	D	5	A	39	D	WBT	EBL/T	150	250
	Signalized Intersection	PM Peak	15	B	24	C	10	B	8	A	26	C	17	B	7	A	29	C	23	C	1	A	28	C	29	C	12	B	29	C	EBL	SBT	125	250
3	73rd St & Buffalo Rd	AM Peak	13	B	22	C	4	A	3	A	14	B	13	B	14	B	35	D	32	C	11	B	26	C	25	C	6	A	35	D	EBL	SBT/R	125	275
	Signalized Intersection	PM Peak	21	C	39	D	19	B	7	A	28	C	19	B	18	B	39	D	33	C	23	C	20	C	15	B	8	A	39	D	NBL	EBT/R	175	350
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	13	B	1	A	1	A	5	A	2	A	-		25	D	-		-		20	C	-		5	A	25	D	EBL	WBL/T/R	25	50
	Stop Controlled	PM Peak	3	A	5	A	3	A	3	A	12	B	1	A	1	A	-		21	C	8	A	30	D	-		12	B	30	D	WBL	WBL/T/R	50	125
5	73rd St & University Ave	AM Peak	23	C	35	D	15	B	3	A	26	C	22	C	17	B	34	C	32	C	13	B	35	D	20	C	6	A	35	D	NBL	SBT/R	125	250
	Signalized Intersection	PM Peak	23	C	31	C	17	B	9	A	28	C	22	C	13	B	38	D	34	C	11	B	38	D	23	C	9	A	38	D	WBL	EBT	200	375
6	73rd St & Del Matro Ave	AM Peak	1	A	5	A	2	A	3	A	5	A	1	A	0	A	8	A	9	A	3	A	8	A	9	A	5	A	9	A	EBT	NBL	25	50
	Stop Controlled	PM Peak	2	A	7	A	4	A	4	A	4	A	0	A	0	A	8	A	-		4	A	7	A	-		6	A	8	A	EBL	WBL/T/R	25	50
7	73rd St & Clive Learning Academy	AM Peak	1	A	4	A	1	A	-		-		0	A	0	A	8	A	-		9	A	-		-		-		9	A	EBR	NBL	25	50
	Stop Controlled	PM Peak	1	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBT	25	100
8	73rd St & Washington Ave	AM Peak	1	A	-		0	A	0	A	2	A	0	A	-		-		-		-		8	A	-		4	A	8	A	WBL	SBT	25	75
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	3	A	0	A	-		-		-		-		10	B	-		8	A	10	B	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	3	A	0	A	-		-		1	A	0	A	9	A	-		6	A	-		-		-		9	A	EBL	EBL/R	50	100
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	10	B	-		6	A	-		-		-		10	B	EBL	EBL/R	50	100

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 6: Peak Hour Queues By Movement - Current Year 3 lane Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																											
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBL/T		NBT 1		NBT 2		NBT/R		NBR		SBL		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	75	175	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	475	550	450	550	-	-	-	-	25	25	25	25	25	100	25	100	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	200	400	-	-	-	-	-	-	100	125	-	-	-	-	-	-	50	100	-	-	-	-	-	-	-	-	-	-	525	550	500	550	-	-	-	-	25	100	25	50	25	100	50	125	-	-	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	150	250	-	-	-	-	-	-	0	50	25	50	-	-	-	-	-	-	-	-	25	75	-	-	100	225	-	-	-	-	50	125	-	-	50	125	-	-	25	50	100	175	75	175	-	-	25	75
	Signalized Intersection	PM Peak	100	150	-	-	175	250	-	-	-	-	-	-	25	175	25	75	-	-	-	-	-	-	-	-	25	100	-	-	125	250	-	-	-	-	75	225	-	-	100	200	-	-	25	25	125	250	125	250	-	-	25	200
3	73rd St & Buffalo Rd	AM Peak	75	175	-	-	-	-	-	-	-	-	75	200	-	-	50	125	-	-	-	-	-	-	-	-	25	75	-	-	100	200	-	-	-	-	25	75	50	100	-	-	25	50	25	50	100	250	-	-	125	275	-	-
	Signalized Intersection	PM Peak	150	175	-	-	-	-	-	-	-	-	175	350	-	-	150	200	-	-	-	-	-	-	-	-	75	300	-	-	75	175	-	-	-	-	75	225	125	275	-	-	50	125	50	100	100	200	-	-	150	250	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	25	25	-	-	25	100	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	50	100	-	-	-	-	-	-	125	225	-	-	100	175	50	175	125	225	-	-	-	-	-	-	100	175	-	-	25	100	50	125	75	125	-	-	75	175	-	-	-	-	25	75	25	75	100	200	-	-	125	250	-	-
	Signalized Intersection	PM Peak	75	175	-	-	-	-	-	-	200	375	-	-	100	275	50	175	125	225	-	-	-	-	-	-	150	275	-	-	50	125	50	125	75	150	-	-	125	250	-	-	-	-	100	200	50	75	75	150	-	-	100	175	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	25	100	-	-	-	-	-	-	-	-	-	-	25	25	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	25	25	25	75	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	25	25	25	50	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	50	-	-
	Stop Controlled	PM Peak	-	-	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	75	-	-

Table 7: Current Year 3 Lane with Mitigation Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	11	B	20	C	5	A	3	A	19	B	10	B	-		32	C	28	C	10	B	23	C	29	C	8	A	32	C	EBL	NBT	75	250
	Signalized Intersection	PM Peak	16	B	25	C	7	A	3	A	24	C	10	B	-		44	D	41	D	24	C	23	C	22	C	9	A	44	D	EBL	EBL/T	225	400
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	26	C	8	A	4	A	11	B	9	A	6	A	26	C	27	C	1	A	43	D	44	D	7	A	44	D	WBT	EBL/T	150	250
	Signalized Intersection	PM Peak	16	B	37	D	10	B	7	A	23	C	17	B	7	A	28	C	39	D	0	A	29	C	25	C	13	B	39	D	EBT	NBT	100	325
3	73rd St & Buffalo Rd	AM Peak	15	B	28	C	7	A	3	A	13	B	14	B	15	B	34	C	31	C	12	B	25	C	22	C	5	A	34	C	EBL	SBT/R	150	300
	Signalized Intersection	PM Peak	22	C	43	D	20	C	7	A	33	C	22	C	21	C	38	D	32	C	23	C	19	B	14	B	8	A	43	D	NBL	EBT/R	150	350
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	8	A	1	A	1	A	4	A	1	A	-		23	C	-		-		17	C	-		4	A	23	C	EBL	WBL/T/R	25	50
	Stop Controlled	PM Peak	4	A	6	A	4	A	3	A	14	B	1	A	2	A	-		48	E	10	B	30	D	-		13	B	48	E	EBT	WBL/T/R	50	100
5	73rd St & University Ave	AM Peak	21	C	31	C	13	B	3	A	24	C	22	C	16	B	20	C	31	C	12	B	38	D	21	C	5	A	38	D	WBL	WBL	125	250
	Signalized Intersection	PM Peak	23	C	29	C	18	B	10	B	33	C	20	C	11	B	36	D	36	D	12	B	39	D	24	C	10	B	39	D	WBL	EBT	200	450
6	73rd St & Del Matro Ave	AM Peak	2	A	5	A	2	A	3	A	2	A	1	A	0	A	8	A	4	A	3	A	8	A	7	A	5	A	8	A	WBL	WBL/T/R	25	50
	Stop Controlled	PM Peak	3	A	6	A	4	A	3	A	5	A	0	A	0	A	12	B	-		4	A	6	A	-		4	A	12	B	EBL	EBL/T/R	25	75
7	73rd St & Clive Learning Academy	AM Peak	1	A	4	A	1	A	-		-		0	A	0	A	-		-		3	A	-		-		-		4	A	NBL	NBL	25	50
	Stop Controlled	PM Peak	1	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBT	25	75
8	73rd St & Washington Ave	AM Peak	1	A	-		0	A	0	A	2	A	0	A	-		-		-		-		9	A	-		4	A	9	A	WBL	NBT/R	25	75
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	3	A	0	A	-		-		-		-		11	B	-		7	A	11	B	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	3	A	0	A	-		-		1	A	0	A	9	A	-		6	A	-		-		-		9	A	EBL	EBL/R	50	100
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	11	B	-		5	A	-		-		-		11	B	EBL	EBL/R	50	75

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 8: Peak Hour Queues By Movement - Current Year 3 Lane with Mitigation Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																							
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBT 1		NBT 2		NBT/R		NBR		SBL		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	75	150	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	75	-	-	-	-	-	-	100	225	-	-	75	250	50	150	-	-	-	-	25	25	50	100	50	125	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	225	400	-	-	-	-	-	-	125	125	-	-	-	-	-	-	25	100	-	-	-	-	-	-	125	225	-	-	100	275	75	225	-	-	-	-	25	50	50	125	75	125	-	-	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	150	250	-	-	-	-	-	-	25	50	25	75	-	-	-	-	-	-	-	-	25	50	-	-	125	225	-	-	75	150	-	-	50	125	-	-	25	50	75	150	75	150	-	-	25	50
	Signalized Intersection	PM Peak	100	150	-	-	175	225	-	-	-	-	-	-	25	100	25	75	-	-	-	-	-	-	-	-	25	100	-	-	150	250	-	-	100	325	-	-	125	250	-	-	25	25	125	225	125	225	-	-	25	175
3	73rd St & Buffalo Rd	AM Peak	75	150	-	-	-	-	-	-	-	-	75	150	-	-	50	125	-	-	-	-	-	-	-	-	25	75	-	-	100	200	-	-	50	175	50	150	-	-	25	50	25	50	100	225	-	-	150	300	-	-
	Signalized Intersection	PM Peak	150	175	-	-	-	-	-	-	-	-	150	350	-	-	125	200	-	-	-	-	-	-	-	-	75	250	-	-	75	175	-	-	125	250	175	325	-	-	75	250	50	125	125	250	-	-	150	300	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	50	100	-	-	-	-	-	-	25	25	-	-	-	-	-	-	25	25	-	-	50	75	-	-	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	50	100	-	-	-	-	-	-	100	225	-	-	75	175	75	175	125	250	-	-	-	-	100	225	-	-	25	125	50	125	75	150	75	175	-	-	-	-	25	100	25	75	100	175	-	-	125	200	-	-
	Signalized Intersection	PM Peak	75	225	-	-	-	-	-	-	200	450	-	-	100	275	50	150	100	250	-	-	-	-	150	350	-	-	50	125	75	150	75	150	125	250	-	-	-	-	100	225	50	100	75	150	-	-	100	175	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	0	25	-	-	-	-	-	-	-	-	-	-	0	25	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	25	75	-	-	-	-	-	-	-	-	-	-	25	50	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-	25	25	25	50	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	25	25	25	50	-	-	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
	Stop Controlled	PM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-

Table 9: Future Year No Build Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	36	D	122	F	57	E	21	C	15	B	8	A	-		32	C	22	C	10	B	26	C	30	C	6	A	122	F	NBL	NBT	425	550
	Signalized Intersection	PM Peak	45	D	191	F	76	E	25	C	20	C	9	A	-		40	D	40	D	22	C	21	C	26	C	8	A	191	F	NBL	NBL/T	525	550
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	18	B	8	A	4	A	10	B	11	B	6	A	27	C	27	C	1	A	36	D	38	D	11	B	38	D	WBT	EBL/T	150	225
	Signalized Intersection	PM Peak	17	B	23	C	12	B	7	A	15	B	17	B	7	A	34	C	34	C	1	A	33	C	34	C	11	B	34	C	EBT	EBL/T	175	250
3	73rd St & Buffalo Rd	AM Peak	14	B	28	C	5	A	3	A	15	B	12	B	12	B	35	D	33	C	12	B	26	C	24	C	6	A	35	D	EBL	SBT/R	125	250
	Signalized Intersection	PM Peak	19	B	35	D	14	B	6	A	33	C	18	B	16	B	38	D	33	C	20	C	23	C	15	B	9	A	38	D	EBL	EBT/R	150	325
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	8	A	1	A	1	A	5	A	2	A	-		35	E	-		-		15	C	-		4	A	35	E	EBL	WBL/T/R	25	50
	Stop Controlled	PM Peak	3	A	9	A	3	A	2	A	13	B	1	A	1	A	-		12	B	7	A	33	D	-		15	C	33	D	WBL	WBL/T/R	50	125
5	73rd St & University Ave	AM Peak	23	C	33	C	15	B	4	A	25	C	23	C	16	B	36	D	33	C	13	B	35	D	22	C	6	A	36	D	EBL	WBL	125	250
	Signalized Intersection	PM Peak	24	C	28	C	19	B	8	A	32	C	25	C	15	B	40	D	39	D	13	B	41	D	26	C	11	B	41	D	WBL	EBT	200	550
6	73rd St & Del Matro Ave	AM Peak	2	A	5	A	2	A	3	A	2	A	1	A	0	A	11	B	-		3	A	8	A	8	A	5	A	11	B	EBL	NBL/T/R	25	75
	Stop Controlled	PM Peak	2	A	6	A	3	A	5	A	4	A	1	A	0	A	11	B	-		4	A	10	B	-		5	A	11	B	EBL	EBL/T/R	25	50
7	73rd St & Clive Learning Academy	AM Peak	1	A	4	A	1	A	-		-		0	A	0	A	14	B	-		5	A	-		-		-		14	B	EBL	NBL/T	25	125
	Stop Controlled	PM Peak	1	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBL/T	25	100
8	73rd St & Washington Ave	AM Peak	1	A	-		0	A	0	A	1	A	0	A	-		-		-		-		8	A	-		4	A	8	A	WBL	NBT/R	25	50
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	2	A	0	A	-		-		-		-		9	A	-		6	A	9	A	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	2	A	0	A	-		-		1	A	0	A	7	A	-		5	A	-		-		-		7	A	EBL	EBL/R	50	75
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	10	B	-		6	A	-		-		-		10	B	EBL	EBL/R	50	75

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 10: Peak Hour Queues By Movement - Future Year No Build Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																											
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBL/T		NBL/T/R		NBT 1		NBT 2		NBT/R		NBR		SBL		SBL/T		SBL/T/R		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	50	150	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	100	-	-	-	-	-	-	-	-	-	-	450	550	-	-	425	550	-	-	-	-	25	75	25	25	-	-	-	-	25	100	50	125	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	225	400	-	-	-	-	-	-	125	125	-	-	-	-	-	-	50	100	-	-	-	-	-	-	-	-	-	-	525	550	-	-	525	550	-	-	-	-	25	100	25	50	-	-	-	-	50	125	50	125	-	-	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	150	225	-	-	-	-	-	-	25	150	25	50	-	-	-	-	-	-	-	-	25	75	-	-	100	200	-	-	-	-	-	-	50	125	-	-	50	125	-	-	25	50	-	-	-	-	100	200	75	175	-	-	25	100
	Signalized Intersection	PM Peak	100	150	-	-	175	250	-	-	-	-	-	-	25	175	25	100	-	-	-	-	-	-	-	-	50	125	-	-	125	225	-	-	-	-	-	-	75	150	-	-	125	200	-	-	0	25	-	-	-	-	150	225	150	225	-	-	25	150
3	73rd St & Buffalo Rd	AM Peak	75	175	-	-	-	-	-	-	-	-	75	200	-	-	50	125	-	-	-	-	-	-	-	-	25	75	-	-	125	225	-	-	-	-	-	-	50	200	50	200	-	-	25	50	25	50	-	-	-	-	100	200	-	-	125	250	-	-
	Signalized Intersection	PM Peak	150	175	-	-	-	-	-	-	-	-	150	325	-	-	150	200	-	-	-	-	-	-	-	-	75	225	-	-	75	175	-	-	-	-	-	-	75	150	100	225	-	-	50	125	50	100	-	-	-	-	100	175	-	-	125	250	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	0	25	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	75	-	-	50	100	-	-	-	-	25	50	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	50	125	-	-	-	-	-	-	125	225	-	-	100	175	75	175	125	250	-	-	-	-	100	250	-	-	25	100	50	125	75	150	-	-	-	-	75	150	-	-	-	-	25	100	25	75	-	-	-	-	100	225	-	-	125	225	-	-
	Signalized Intersection	PM Peak	75	225	-	-	-	-	-	-	200	550	-	-	100	325	50	175	125	225	-	-	-	-	150	350	-	-	50	125	50	125	75	150	-	-	-	-	125	300	-	-	-	-	75	225	50	100	-	-	-	-	75	150	-	-	100	175	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	-	-	0	25	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	0	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
	Stop Controlled	PM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-

Table 11: Future Year No Build with Mitigation Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	11	B	22	C	5	A	3	A	18	B	8	A	-		32	C	40	D	9	A	27	C	25	C	9	A	40	D	EBT	NBL	125	225
	Signalized Intersection	PM Peak	16	B	29	C	9	A	3	A	23	C	12	B	-		36	D	42	D	19	B	25	C	31	C	11	B	42	D	EBT	EBL/T	200	400
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	12	B	17	B	7	A	4	A	10	B	11	B	6	A	26	C	30	C	1	A	35	D	47	D	14	B	47	D	WBT	EBL/T	150	250
	Signalized Intersection	PM Peak	16	B	34	C	9	A	9	A	27	C	16	B	7	A	32	C	41	D	1	A	35	D	35	D	14	B	41	D	EBT	NBT	100	275
3	73rd St & Buffalo Rd	AM Peak	14	B	26	C	5	A	2	A	15	B	12	B	14	B	35	D	34	C	12	B	27	C	22	C	7	A	35	D	EBL	SBT/R	125	275
	Signalized Intersection	PM Peak	22	C	47	D	19	B	7	A	37	D	20	C	19	B	37	D	33	C	20	C	23	C	16	B	9	A	47	D	NBL	EBT/R	150	325
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	10	B	1	A	1	A	5	A	2	A	-		23	C	-		-		14	B	-		4	A	23	C	EBL	SBL	25	50
	Stop Controlled	PM Peak	4	A	6	A	4	A	3	A	15	C	1	A	1	A	-		47	E	7	A	30	D	-		13	B	47	E	EBT	WBL/T/R	50	125
5	73rd St & University Ave	AM Peak	23	C	34	C	16	B	3	A	23	C	23	C	16	B	34	C	32	C	14	B	33	C	22	C	6	A	34	C	EBL	SBT/R	125	250
	Signalized Intersection	PM Peak	23	C	24	C	16	B	9	A	36	D	25	C	16	B	41	D	38	D	12	B	40	D	24	C	10	B	41	D	EBL	EBT	200	400
6	73rd St & Del Matro Ave	AM Peak	2	A	6	A	3	A	2	A	1	A	1	A	1	A	8	A	14	B	3	A	6	A	10	B	4	A	14	B	EBT	NBL/T/R	25	125
	Stop Controlled	PM Peak	3	A	11	B	4	A	3	A	4	A	1	A	0	A	9	A	-		4	A	7	A	-		5	A	11	B	NBL	SBL/T/R	25	50
7	73rd St & Clive Learning Academy	AM Peak	1	A	4	A	1	A	-		-		0	A	0	A	7	A	-		1	A	-		-		-		7	A	EBL	NBL/T	25	125
	Stop Controlled	PM Peak	2	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBL/T	25	150
8	73rd St & Washington Ave	AM Peak	1	A	-		1	A	0	A	1	A	0	A	-		-		-		-		7	A	-		4	A	7	A	WBL	NBT/R	25	75
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	2	A	0	A	-		-		-		-		11	B	-		9	A	11	B	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	2	A	0	A	-		-		1	A	0	A	10	B	-		7	A	-		-		-		10	B	EBL	EBL/R	50	75
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	11	B	-		6	A	-		-		-		11	B	EBL	EBL/R	50	75

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 12: Peak Hour Queues By Movement - Future Year No Build with Mitigation Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																											
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBL/T		NBL/T/R		NBT 1		NBT 2		NBT/R		NBR		SBL		SBL/T		SBL/T/R		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	75	200	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	100	-	-	-	-	-	-	125	225	-	-	-	-	-	-	75	200	50	150	-	-	-	-	25	50	-	-	-	-	25	100	50	100	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	200	400	-	-	-	-	-	-	125	125	-	-	-	-	-	-	50	100	-	-	-	-	-	-	125	225	-	-	-	-	-	-	125	250	100	250	-	-	-	-	25	25	-	-	-	-	50	125	75	125	-	-	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	150	250	-	-	-	-	-	-	25	150	25	50	-	-	-	-	-	-	-	-	25	75	-	-	100	225	-	-	-	-	-	-	50	175	-	-	50	175	-	-	25	50	-	-	-	-	75	175	75	175	-	-	25	50
	Signalized Intersection	PM Peak	100	150	-	-	175	225	-	-	-	-	-	-	25	150	25	100	-	-	-	-	-	-	-	-	50	125	-	-	150	250	-	-	-	-	-	-	100	275	-	-	100	200	-	-	25	50	-	-	-	-	125	250	125	250	-	-	25	250
3	73rd St & Buffalo Rd	AM Peak	75	150	-	-	-	-	-	-	-	-	75	175	-	-	50	150	-	-	-	-	-	-	-	-	25	75	-	-	100	225	-	-	-	-	-	-	50	150	50	100	-	-	25	50	25	50	-	-	-	-	100	225	-	-	125	275	-	-
	Signalized Intersection	PM Peak	150	175	-	-	-	-	-	-	-	-	150	325	-	-	150	200	-	-	-	-	-	-	-	-	75	275	-	-	100	175	-	-	-	-	-	-	125	275	175	300	-	-	50	125	50	100	-	-	-	-	100	250	-	-	150	300	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	25	-	-	50	100	-	-	-	-	-	-	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	50	125	-	-	-	-	-	-	125	225	-	-	100	225	75	200	125	225	-	-	-	-	100	200	-	-	25	125	50	100	75	125	-	-	-	-	75	175	-	-	-	-	25	100	25	75	-	-	-	-	100	200	-	-	125	250	-	-
	Signalized Intersection	PM Peak	75	225	-	-	-	-	-	-	200	400	-	-	100	325	50	150	125	250	-	-	-	-	150	325	-	-	50	125	75	150	100	150	-	-	-	-	125	275	-	-	-	-	100	225	50	100	-	-	-	-	75	150	-	-	100	175	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-
	Stop Controlled	PM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-	-	-

Table 13: Future Year Build Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	41	D	176	F	74	E	12	B	13	B	8	A	-		31	C	34	C	11	B	29	C	30	C	8	A	176	F	NBL	NBL/T	500	550
	Signalized Intersection	PM Peak	48	D	249	F	92	F	25	C	21	C	9	A	-		48	D	51	D	34	C	20	C	31	C	9	A	249	F	NBL	NBL/T	525	550
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	14	B	20	C	10	B	6	A	16	B	13	B	7	A	26	C	27	C	1	A	41	D	44	D	7	A	44	D	WBT	EBL/T	150	250
	Signalized Intersection	PM Peak	20	C	26	C	15	B	14	B	19	B	21	C	8	A	36	D	44	D	1	A	33	C	41	D	16	B	44	D	EBT	SBT	175	325
3	73rd St & Buffalo Rd	AM Peak	16	B	26	C	5	A	3	A	14	B	17	B	21	C	35	D	34	C	14	B	26	C	21	C	9	A	35	D	EBL	SBT/R	175	375
	Signalized Intersection	PM Peak	35	D	48	D	28	C	11	B	37	D	35	D	37	D	71	E	63	E	51	D	31	C	17	B	11	B	71	E	EBL	SBT/R	225	450
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	9	A	1	A	1	A	5	A	2	A	-		18	C	-		-		17	C	-		5	A	18	C	EBL	WBL/T/R	25	75
	Stop Controlled	PM Peak	4	A	7	A	4	A	3	A	14	B	2	A	1	A	-		18	C	8	A	34	D	-		14	B	34	D	WBL	WBL/T/R	75	150
5	73rd St & University Ave	AM Peak	24	C	33	C	17	B	4	A	24	C	26	C	20	C	33	C	31	C	16	B	36	D	22	C	6	A	36	D	WBL	SBT/R	150	250
	Signalized Intersection	PM Peak	25	C	25	C	17	B	9	A	39	D	26	C	18	B	47	D	39	D	17	B	43	D	27	C	11	B	47	D	EBL	EBT	225	500
6	73rd St & Del Matro Ave	AM Peak	2	A	5	A	2	A	3	A	-		1	A	0	A	10	B	10	B	3	A	8	A	5	A	4	A	10	B	EBT	WBL/T/R	25	50
	Stop Controlled	PM Peak	2	A	6	A	4	A	4	A	2	A	1	A	0	A	8	A	-		4	A	8	A	-		5	A	8	A	WBL	EBL/T/R	25	50
7	73rd St & Clive Learning Academy	AM Peak	1	A	5	A	1	A	-		-		0	A	0	A	6	A	-		4	A	-		-		-		6	A	EBL	NBL	25	75
	Stop Controlled	PM Peak	1	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBT	25	100
8	73rd St & Washington Ave	AM Peak	1	A	-		0	A	0	A	2	A	0	A	-		-		-		-		10	B	-		4	A	10	B	WBL	WBL/R	25	75
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	2	A	0	A	-		-		-		-		12	B	-		7	A	12	B	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	3	A	0	A	-		-		1	A	0	A	10	B	-		8	A	-		-		-		10	B	EBL	EBL/R	50	100
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	12	B	-		6	A	-		-		-		12	B	EBL	EBL/R	50	75

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 14: Peak Hour Queues By Movement - Future Year Build Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths													
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	75	200	-	-	-	-	-	-	50	125
	Signalized Intersection	PM Peak	-	-	-	-	275	375	-	-	-	-	-	-	125	125
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	125	150	-	-	150	250	-	-	-	-	-	-	25	175
	Signalized Intersection	PM Peak	125	150	-	-	200	250	-	-	-	-	-	-	25	225
3	73rd St & Buffalo Rd	AM Peak	75	175	-	-	-	-	-	-	-	-	100	200	-	-
	Signalized Intersection	PM Peak	175	175	-	-	-	-	-	-	-	-	300	425	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	50	125	-	-	-	-	-	-	125	250	-	-	100	225
	Signalized Intersection	PM Peak	100	225	-	-	-	-	-	-	225	500	-	-	150	325
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	100	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	50	75	-	-	-	-	-	-	-	-	-	-

Intersection ID	Intersection	Peak Hour	WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	-	-	25	75	-	-	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	-	-	50	125	-	-	-	-	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	25	50	-	-	-	-	-	-	-	-	25	75	-	-
	Signalized Intersection	PM Peak	25	100	-	-	-	-	-	-	-	-	50	125	-	-
3	73rd St & Buffalo Rd	AM Peak	75	150	-	-	-	-	-	-	-	-	50	100	-	-
	Signalized Intersection	PM Peak	175	200	-	-	-	-	-	-	-	-	175	375	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	75	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	75	150	-	-	-	-	-	-
5	73rd St & University Ave	AM Peak	75	225	150	250	-	-	-	-	100	225	-	-	25	125
	Signalized Intersection	PM Peak	75	175	125	250	-	-	-	-	175	325	-	-	50	125
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	25	75	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	25	50	-	-	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection ID	Intersection	Peak Hour	NBL 1		NBL 2		NBL/T		NBT 1		NBT 2		NBT/R		NBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	500	550	475	550	-	-	-	-	-	-
	Signalized Intersection	PM Peak	-	-	-	-	525	550	525	550	-	-	-	-	25	125
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	200	-	-	-	-	75	175	-	-	75	125	-	-
	Signalized Intersection	PM Peak	125	225	-	-	-	-	100	175	-	-	150	250	-	-
3	73rd St & Buffalo Rd	AM Peak	100	225	-	-	-	-	25	125	25	100	-	-	25	50
	Signalized Intersection	PM Peak	75	175	-	-	-	-	125	225	175	300	-	-	75	200
4	73rd St & Private Drive/Apple Valley	AM Peak	25	50	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	25	25	-	-	-	-	-	-	-	-	25	50	-	-
5	73rd St & University Ave	AM Peak	50	125	75	150	-	-	75	175	-	-	-	-	50	100
	Signalized Intersection	PM Peak	75	150	100	175	-	-	125	250	-	-	-	-	75	200
6	73rd St & Del Matro Ave	AM Peak	25	25	-	-	-	-	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	0	25	-	-	-	-	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	25	75	-	-	-	-	25	25	-	-	-	-	-	-
	Stop Controlled	PM Peak	25	50	-	-	-	-	25	100	-	-	-	-	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	25	75	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	25	100	-	-
9	73rd St & College Dr	AM Peak	25	25	-	-	-	-	25	50	-	-	-	-	-	-
	Stop Controlled	PM Peak	25	25	-	-	-	-	25	50	-	-	-	-	-	-

Intersection ID	Intersection	Peak Hour	SBL		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	0	25	25	75	-	-	50	100	-	-
	Signalized Intersection	PM Peak	25	25	25	100	-	-	50	125	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	25	75	100	225	100	200	-	-	25	75
	Signalized Intersection	PM Peak	25	50	150	300	175	325	-	-	25	225
3	73rd St & Buffalo Rd	AM Peak	25	50	125	325	-	-	175	375	-	-
	Signalized Intersection	PM Peak	50	250	175	425	-	-	225	450	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	25	50	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	50	100	25	25	-	-	0	25	-	-
5	73rd St & University Ave	AM Peak	25	75	125	225	-	-	150	250	-	-
	Signalized Intersection	PM Peak	50	125	100	175	-	-	100	200	-	-
6	73rd St & Del Matro Ave	AM Peak	0	25	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	-	-	-	-	25	50	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-
8	73rd St & Washington Ave	AM Peak	25	25	25	50	-	-	-	-	-	-
	Stop Controlled	PM Peak	25	25	25	75	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	-	-	-	-	25	75	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-

Table 15: Future Year Build Mitigated Traffic Operations Analysis - 73rd Street Corridor Study

Intersection ID	Intersection	Peak Hour	Intersection Delay (1.)		Movement Delay (sec/veh)																				Maximum Delay-LOS (2.)		Limiting Movement (3.)	Max Approach Queue		
					NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR				Direction	Average Queue (ft)	Max Queue (ft)
1	73rd St & I-235 EB Ramps/Center St	AM Peak	15	B	42	D	8	A	4	A	26	C	9	A	-		31	C	43	D	10	B	31	C	30	C	7	A	43	D	EBT	NBT	150	500
	Signalized Intersection	PM Peak	26	C	62	E	14	B	5	A	31	C	15	B	-		54	D	59	E	37	D	27	C	26	C	11	B	62	E	NBL	NBT	225	525
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	14	B	21	C	8	A	5	A	19	B	16	B	7	A	26	C	24	C	1	A	30	C	27	C	7	A	30	C	WBL	SBT	125	250
	Signalized Intersection	PM Peak	21	C	50	D	14	B	11	B	32	C	22	C	8	A	34	C	24	C	1	A	37	D	36	D	13	B	50	D	NBL	NBT	175	400
3	73rd St & Buffalo Rd	AM Peak	17	B	41	D	6	A	3	A	18	B	16	B	19	B	35	D	32	C	15	B	25	C	23	C	7	A	41	D	NBL	NBT	75	350
	Signalized Intersection	PM Peak	33	C	47	D	29	C	12	B	40	D	34	C	39	D	60	E	57	E	46	D	29	C	17	B	13	B	60	E	EBL	NBT	250	575
4	73rd St & Private Drive/Apple Valley	AM Peak	2	A	7	A	1	A	1	A	6	A	2	A	-		27	D	-		-		11	B	-		7	A	27	D	EBL	WBL/T/R	25	75
	Stop Controlled	PM Peak	6	A	9	A	5	A	5	A	20	C	2	A	2	A	-		-		8	A	67	F	-		31	D	67	F	WBL	WBL/T/R	75	175
5	73rd St & University Ave	AM Peak	23	C	32	C	16	B	4	A	25	C	25	C	20	C	32	C	32	C	16	B	34	C	21	C	7	A	34	C	WBL	EBT	125	275
	Signalized Intersection	PM Peak	26	C	23	C	20	C	12	B	38	D	27	C	19	B	47	D	43	D	18	B	45	D	27	C	13	B	47	D	EBL	EBT	250	600
6	73rd St & Del Matro Ave	AM Peak	2	A	5	A	3	A	3	A	5	A	1	A	1	A	8	A	-		3	A	8	A	9	A	5	A	9	A	WBT	WBL/T/R	25	50
	Stop Controlled	PM Peak	3	A	9	A	4	A	4	A	5	A	1	A	0	A	10	B	-		4	A	12	B	-		7	A	12	B	WBL	EBL/T/R	25	75
7	73rd St & Clive Learning Academy	AM Peak	1	A	5	A	1	A	-		-		0	A	0	A	7	A	-		9	A	-		-		-		9	A	EBR	NBL	25	50
	Stop Controlled	PM Peak	1	A	4	A	2	A	-		-		0	A	0	A	-		-		-		-		-		-		4	A	NBL	NBT	25	150
8	73rd St & Washington Ave	AM Peak	1	A	-		0	A	0	A	2	A	0	A	-		-		-		-		8	A	-		5	A	8	A	WBL	SBT	25	50
	Stop Controlled	PM Peak	1	A	-		1	A	0	A	4	A	0	A	-		-		-		-		13	B	-		9	A	13	B	WBL	NBT/R	25	100
9	73rd St & College Dr	AM Peak	1	A	3	A	0	A	-		-		1	A	1	A	11	B	-		6	A	-		-		-		11	B	EBL	EBL/R	50	100
	Stop Controlled	PM Peak	1	A	2	A	0	A	-		-		1	A	0	A	12	B	-		6	A	-		-		-		12	B	EBL	EBL/R	50	100

1. Delay in seconds per vehicle
2. Maximum delay and LOS on any approach and/or movement
3. Limiting Movement is the highest delay movement.

Table 16: Peak Hour Queues By Movement - Future Year Build Mitigated Geometry

Intersection ID	Intersection	Peak Hour	Queue Lengths																																											
			EBL		EBL/R		EBL/T		EBL/T/R		EBT		EBT/R		EBR		WBL 1		WBL 2		WBL/R		WBL/T/R		WBT		WBT/R		WBR		NBL 1		NBL 2		NBT 1		NBT 2		NBT/R		NBR		SBL		SBT 1		SBT 2		SBT/R		SBR	
			Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
1	73rd St & I-235 EB Ramps/Center St	AM Peak	-	-	-	-	75	175	-	-	-	-	-	-	50	125	-	-	-	-	-	-	25	100	-	-	-	-	-	-	150	225	-	-	150	500	75	375	-	-	-	-	25	25	25	100	-	-	50	125	-	-
	Signalized Intersection	PM Peak	-	-	-	-	300	400	-	-	-	-	-	-	125	125	-	-	-	-	-	-	50	100	-	-	-	-	-	-	175	225	-	-	225	525	175	475	-	-	25	75	25	25	75	175	-	-	75	200	-	-
2	73rd St & I-235 WB Ramps/Private Driveway	AM Peak	100	150	-	-	175	250	-	-	-	-	-	-	25	175	25	50	-	-	-	-	-	-	-	-	25	50	-	-	125	225	-	-	75	200	-	-	75	200	-	-	25	100	125	250	125	225	-	-	25	100
	Signalized Intersection	PM Peak	125	150	-	-	200	250	-	-	-	-	-	-	25	225	25	100	-	-	-	-	-	-	-	-	50	125	-	-	200	250	-	-	175	400	-	-	150	300	-	-	25	25	175	275	175	325	-	-	50	300
3	73rd St & Buffalo Rd	AM Peak	75	175	-	-	-	-	-	-	-	-	100	250	-	-	75	150	-	-	-	-	-	-	-	-	50	100	-	-	125	225	-	-	75	350	50	250	-	-	25	75	25	75	100	250	-	-	175	350	-	-
	Signalized Intersection	PM Peak	175	175	-	-	-	-	-	-	-	-	250	425	-	-	175	200	-	-	-	-	-	-	-	-	150	375	-	-	100	225	-	-	175	425	250	575	-	-	125	325	50	225	175	400	-	-	225	425	-	-
4	73rd St & Private Drive/Apple Valley	AM Peak	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-	-	-	-	-	25	25	-	-	-	-	-	-	0	25	-	-	25	50	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	75	175	-	-	-	-	-	-	25	50	-	-	25	25	-	-	25	175	-	-	50	100	25	75	-	-	0	25	-	-
5	73rd St & University Ave	AM Peak	50	200	-	-	-	-	-	-	125	275	-	-	125	225	75	225	150	250	-	-	-	-	100	200	-	-	25	100	50	125	75	150	75	200	-	-	-	-	25	100	25	75	125	200	-	-	150	250	-	-
	Signalized Intersection	PM Peak	100	225	-	-	-	-	-	-	250	600	-	-	150	325	75	200	125	275	-	-	-	-	175	425	-	-	50	125	75	150	100	150	150	325	-	-	-	-	125	225	50	125	100	175	-	-	100	200	-	-
6	73rd St & Del Matro Ave	AM Peak	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	25	75	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	0	25	-	-	-	-	-	-	-	-	-	-	25	25	-	-	-	-	-	-	-	-
7	73rd St & Clive Learning Academy	AM Peak	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	0	25	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	25	150	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-
8	73rd St & Washington Ave	AM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	25	25	25	50	-	-	-	-	-	-
	Stop Controlled	PM Peak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	100	-	-	25	25	25	75	-	-	-	-	-	-
9	73rd St & College Dr	AM Peak	-	-	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-
	Stop Controlled	PM Peak	-	-	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25	-	-	25	50	-	-	-	-	-	-	-	-	-	-	-	-	25	75	-	-