



# SAFE ROUTES TO SCHOOL



LAKEVILLE ENGINEERING STUDY

January, 2021



# ACKNOWLEDGEMENTS

The Study was made possible by funding from the Minnesota Department of Transportation (MnDOT). Special thanks to the individuals below who provided their expertise, time, and feedback for this Study to ensure it encompassed the needs of the children and broader community who will benefit when walking, rolling, or bicycling from these improvements.

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- Appendix A – Lakeville Safe Routes to School Grant Application (Parent Survey/Student Tallies)
- Appendix B – Pedestrian and Bicycle Count Data (April 22, 2020)
- Appendix C – Synchro Reports (Existing/Proposed Conditions at Jacquard and Holyoke Avenues)

# EXECUTIVE SUMMARY

The Lakeville Safe Routes to School (SRTS) Engineering Study focused on a 1.25-mile section of 210<sup>th</sup> Street from Jacquard Avenue to Holyoke Avenue which connects three schools along the east-west corridor. The study's objective was to complete a technical analysis of multimodal improvements to the corridor as a part of an upcoming roadway reconstruction project and in the long-term. The desired multimodal elements include better connectivity along 210<sup>th</sup> Street as well as enhanced crossings of the corridor at key locations and major intersections. As a part of SRTS, proposed infrastructure specifically focused upon improving the safety, comfort, and convenience for children walking, rolling, or bicycling along and across 210<sup>th</sup> Street. SRTS is a national program intended to improve safety for children to access school and encourage a more active lifestyle through physical activity.

The Lakeville Safe Routes to School Engineering Study was led by the City of Lakeville and illustrates strategies and potential improvements as recommended by the City Engineer. The Study organizes needs and justifies potential improvements for future funding requests by the City of Lakeville and/or Lakeville Area Schools to implement the projects proposed in this Study.

## EXISTING CONDITIONS

### Project Location and Focus Schools

The 210<sup>th</sup> Street study corridor is located along the far southern portion of the City of Lakeville and is primarily surrounded by low- or medium-density residential neighborhoods. Three focus schools were included due to their proximity to the study area: Lakeville South High School (adjacent), Donald J. McGuire Middle School (0.25 miles away), and John F. Kennedy Elementary (0.25 miles away). The elementary and middle schools have 1,389 students enrolled, while the high school has 1,835 students enrolled. There are 309 elementary and middle school students that live within one-half mile of the study corridor, accounting for approximately 22 percent of the total elementary and middle school student population. The densest student population nodes corresponded with denser housing found along Dodd Boulevard south of 210<sup>th</sup> Street, as well as a node northeast of the Dodd Boulevard and 210<sup>th</sup> Street intersection.

### Previous Plans and Other Studies

Other applicable studies were reviewed as a part of the planning process including:

- *Lakeville Safe Routes to School Plan (2009)*
- *Lakeville School Road Safety Task Force Report (2014)*
- *Lakeville Parks, Trails, and Open Space Plan (2015)*

## EXECUTIVE SUMMARY

One item included in all three plans is implementing a trail along one or both sides of 210<sup>th</sup> Street.

A concurrent effort was underway during the Study by the City of Lakeville to plan and design for the reconstruction of the 210<sup>th</sup> Street corridor. This included public outreach which was shared for this study and included the following high-level themes:

- Holyoke Avenue, Dodd Boulevard, and Jacquard Avenue are barriers for crossing 210<sup>th</sup> Street.
- A crossing at Italy Avenue is desired to connect the surrounding neighborhoods.
- Support for a trail along the 210<sup>th</sup> Street corridor.
- Desire for speeds along 210<sup>th</sup> Street to be lowered.

These themes also correspond with parent survey responses from McGuire Middle School and Kennedy Elementary School collected in October 2019. Note that most students at these two schools live further away than the typical threshold for walking or bicycling (i.e. greater than one mile) and very few students currently access school by other modes besides a family vehicle or school bus.

## Transportation Network

210<sup>th</sup> Street is a higher speed (35 mph to 50 mph), two-lane roadway with turn lanes at major, and some minor, intersections. It is classified as a major collector and intersected by two major collectors (Jacquard and Holyoke Avenues) and one minor arterial (Dodd Boulevard) which are all currently all-way stop-controlled. The existing roadway cross-section is 24-feet wide with narrow shoulders and is rural in context with no curb and gutter. The sidewalk and bicycle network are limited along and adjacent to the 210<sup>th</sup> Street corridor. Marked crossings exist at Jacquard Avenue and Holyoke Avenue, which are 1.25 miles apart at either end of the study corridor. Pedestrian and bicycle counts, turning movement counts, and vehicular speed data was collected for the corridor and is covered in detail in Chapter 2.

Ten years of vehicle-to-bicycle and vehicle-to-pedestrian crashes were reviewed as well as all crashes over the last five years. The data was derived from the Minnesota Department of Transportation's (MnDOT) Minnesota Crash Mapping Analysis Tool (MnCMAT2) and included only crashes along 210<sup>th</sup> Street or immediately adjacent to an intersection. A total of 34 crashes were recorded over the last five years. Of those, one resulted in serious injuries at the Ixonia Avenue intersection and two resulted in minor injuries at the Jacquard Avenue intersection. Nearly 50 percent of all crashes in the study area occurred at the Dodd Boulevard intersection, of which five involved teenage drivers. Another 40 percent (near equal split) of the total occurred at Jacquard Avenue and Holyoke Avenue intersections which demonstrates how almost all recorded crashes occurred within the three major intersections. At Jacquard Avenue, 13 of the 14 crashes involved teenage drivers (age 16 to 18) during peak school periods. The manner of collision was also studied which details the general way in which the crash occurred (e.g., rear end). Most recorded crashes either involved a rear end or angle crash. There was one pedestrian crash which occurred in 2010 at Holyoke Avenue resulting in minor injuries and no bicyclist crashes over the last ten years.

## EXECUTIVE SUMMARY

### IDENTIFIED NEEDS

Broadly identified needs were recorded from the existing conditions analysis which detected potential gap. These include multimodal connectivity along 210<sup>th</sup> Street, crossing enhancements at major intersections to overcome barriers, and additional uncontrolled crossings to better interconnect the multimodal network.

#### Connectivity to Walk, Roll, or Bike

Construct infrastructure along 210<sup>th</sup> Street (i.e., sidewalk, bike lanes, and/or multiuse trail) to connect the neighborhoods, schools, parks, and other destinations along or adjacent to the corridor.

#### Crossing High-Volume, Major Intersections

Improve the crossing infrastructure at all legs of Dodd Boulevard, Holyoke Avenue, and Jacquard Avenue to enhance the safety and comfort of those walking, rolling, or bicycling, as well as ensure they are not barriers for children to do so.

#### Crossing at Uncontrolled and Side-Street Locations

Implement crossing infrastructure both at key uncontrolled locations across 210<sup>th</sup> Street and side-streets along the 1.25-mile 210<sup>th</sup> Street corridor to create a convenient and connected multimodal transportation network.

### ALTERNATIVE EVALUATION

Project alternatives are based upon evaluated opportunities proposed to improve or eliminate identified needs. This section organizes potential improvements and project opportunities to address the three high-level needs identified by the Study using the latest state and national guidance. Potential projects were vetted using engineering judgment and reviewed by the City of Lakeville.

#### Multimodal Connectivity

Review pedestrian and bicycle infrastructure options including sidewalk, bicycle lanes, and multiuse trails to devise proposed enhancements for walking, rolling, and bicycling along 210<sup>th</sup> Street.

#### Major Intersection Crossings

Analysis of crossing infrastructure upgrades at the high-volume intersections of Dodd Boulevard, Jacquard Avenue, and Holyoke Avenue to improve the safety and comfort for children crossing to overcome these potential barriers.

#### Uncontrolled Crossings and Side-Street Crossings

Evaluation of enhanced infrastructure across 210<sup>th</sup> Street at uncontrolled locations in between the three major intersections in the study area. Assess side-street crossings along 210<sup>th</sup> Street to improve multimodal connectivity upgrades.

### Multimodal Connectivity

Multiuse trail, separated bike lane, and sidewalk enhancement alternatives were considered along 210<sup>th</sup> Street where none exists today. Infrastructure was reviewed using the *MnDOT Bicycle Facility Design Manual (2020)* to determine the most comfortable option for those of all ages and abilities. Additionally, the facility type along 210<sup>th</sup> Street and which side of the corridor (i.e., north, south, or both sides) to implement those improvements was evaluated. It was understood per the City that the preferred bicycle infrastructure would also accommodate pedestrians or separate pedestrian and bicycle infrastructure along 210<sup>th</sup> Street. A multiuse trail along both sides of 210<sup>th</sup> Street is proposed as it would offer the greatest benefit for both people walking and bicycling, increased connectivity to neighborhoods along both sides of the corridor and access to schools and destinations (e.g., parks, downtown Lakeville, etc.), and align with community feedback.

### Crossing Improvements

Potential crossing improvement options are organized into two categories that demonstrate the level of impact to transportation network users and potential project cost.

- **Transportation Balanced Option (TB):** Provides some multimodal upgrades while balances all modes of transportation to ensure limited operational impacts to traffic and reasonable cost savings.
- **Multimodal Focused Option (MF):** Provides the greatest impact toward multimodal safety and comfort and strives to create a crossing that is accessible to those of all ages and abilities, most notably children. Inherently this may result result in higher costs and the potential of a higher impact to traffic operations.

These two options and associated infrastructure items will illustrate the broad spectrum of opportunity or the minimum and maximum as identified by state and national guidance.

### Major Intersection

The Holyoke Avenue, Dodd Boulevard, and Jacquard Avenue intersections are crucial locations for multimodal enhancements. Particular attention is required to ensure these locations are not barriers for children. Crossings of 210<sup>th</sup> Street should be designed to ensure children of all ages and abilities can safely traverse these busy intersections. Two options were developed at each intersection and detailed in Chapter 5.

### Uncontrolled Crossing

Uncontrolled crossings of 210<sup>th</sup> Street between the three major intersections were identified at six locations based upon student residence locations, walking or bicycling desire lines to access destinations, and the distance between crossings. Infrastructure improvements could enhance each crossing and support a safer and more comfortable environment for children to cross. Those potential improvements were organized within the two options previously mentioned; additional detail is in Chapter 5.

## EXECUTIVE SUMMARY

### Side-Street Trail Crossing

Other street crossings along 210<sup>th</sup> Street where a future multiuse trail may impact were reviewed. Nine public streets that intersect 210<sup>th</sup> Street between Jacquard Avenue and Holyoke Avenue were included. The crossing enhancements are organized using the *MnDOT Bicycle Facility Design Manual (2020)* which organizes low, medium, and high-volume intersections by vehicles per hour. As the crossings become more active, additional signage and crossing enhancements are proposed; additional detail is in Chapter 5.

## PROPOSED PROJECTS

The universe of potential projects considered multimodal connectivity improvements along 210<sup>th</sup> Street, crossing enhancements at major intersections, uncontrolled locations, and side-streets (see Table 1 and Figure 1). Detailed summaries of each project are included in Chapter 5.

<b>210<sup>th</sup> Street Multiuse Trail</b>	<b>North side:</b> Holyoke Avenue to Kensington Boulevard	The multiuse trails along both sides of 210 <sup>th</sup> Street are the key proposed multimodal project of this Study, and will connect the three schools as well as adjacent neighborhoods, parks, and other destinations in southern Lakeville. It is envisioned that multiuse trails are implemented along both the north and south sides for 2.2 miles and 1.8 miles, respectively. In total, the proposed includes approximately four miles of new multiuse trail that further develops, and interconnects, the City's multimodal network. Without this improvement, the other proposed SRTS projects will not be fully realized.	<b>Total Estimated Cost: \$800,000</b>
	<b>South side:</b> Holyoke Avenue to 1,000 feet west of Jury Court (Trinity Church driveway)		

Other considerations do not have a specific project page due to additional analysis required outside of this Study as well as understanding of the concurrent roadway reconstruction project scope and other long-term factors.

- **Railroad Trail:** Rail-to-trail connection to McGuire Middle School and Kennedy Elementary School from 210<sup>th</sup> Street via the existing railroad corridor. This project is identified in other local plans for implementation when the opportunity arises.
- **Posted Speed:** Posted speed reduction could be considered from Kensington Boulevard to Dodd Boulevard. Acceptable uncontrolled crossing conditions are typically at less than or equal to 40 mph. Higher speeds could require greater infrastructure interventions to appropriately accommodate people crossing, most notably children, at these uncontrolled locations.

## EXECUTIVE SUMMARY

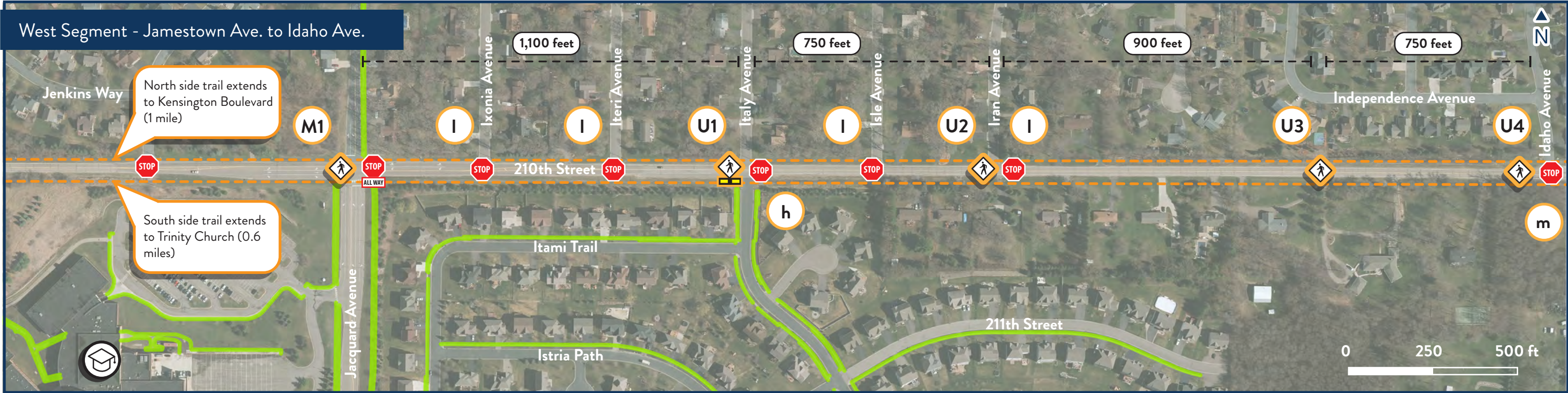
**Table 1. Proposed Crossing Projects**

ID <sup>1</sup>	Location	Project Type	Description	Estimated Cost <sup>2</sup>
M1	Jacquard Avenue	Major Intersection	Crossing upgrades to an all-way stop.	\$40,000 – \$260,000
M2	Dodd Boulevard	Major Intersection	Crossing upgrades to a planned single-lane roundabout.	\$75,000 – \$500,000
M3	Holyoke Avenue	Major Intersection	Crossing upgrades to an all-way stop.	\$25,000 – \$250,000
U1	Italy Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	\$90,000 – \$130,000 (RRFB) \$140,000 – \$180,000 (PHB)
U2	Iran Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	Requires future analysis
U3	Independence Avenue	Uncontrolled Crossing	Crossing of 210th Street near the future intersection.	Requires future analysis
U4	Idaho Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	Requires future analysis
U5	Hyacinth Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	Requires future analysis
U6	Railroad Crossing	Uncontrolled Crossing	Crossing of 210th Street near the future trail crossing.	Requires future analysis
l	Five locations (see Table 13)	Side-Street Trail Crossing	Crossing upgrades at side-streets along 210 <sup>th</sup> Street for the trail.	\$15,000 – \$45,000
m	Two locations (see Table 13)	Side-Street Trail Crossing	Crossing upgrades at side-streets along 210 <sup>th</sup> Street for the trail.	\$25,000 – \$75,000
h	Two locations (see Table 13)	Side-Street Trail Crossing	Crossing upgrades at side-streets along 210 <sup>th</sup> Street for the trail.	\$40,000 – \$120,000

<sup>1</sup> Order does not denote priority. M = Major Intersection; U = Uncontrolled Crossing; l, m, and h = Low, Medium, and High Side-Street Trail Crossing

<sup>2</sup> Cost estimates for crossing infrastructure as listed in each project page with the range denoting the transportation balanced and multimodal focused options and organized using the Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020). The costs only include applicable infrastructure and do not estimate other elements such as right-of-way, tree removal, mobilization, etc.

Source: SRF Consulting Group, 2020



**Potential Safe Routes to School Projects**  
 210th Street - Lakeville, MN  
 Figure 1

- Focus School
- Proposed Enhanced Crossing
- Proposed RRFB
- Proposed Roundabout
- Improvement ID
- Side-Street Stop-Controlled Intersection
- All-Way Stop-Controlled Intersection
- Proposed Trail
- Existing Sidewalk
- Distance Between Crossings

Lowered speed limits along 210th Street from Kensington Boulevard to Dodd Boulevard could enhance the safety and comfort of children walking, rolling, or bicycling along and across the corridor.

## EXECUTIVE SUMMARY

### NEXT STEPS

This Study offers a range of potential infrastructure improvements along 1.25 miles of 210<sup>th</sup> Street between Jacquard Avenue and Holyoke Avenue. Actionable next steps were organized to ensure this document is fully utilized and implemented to the best of the City of Lakeville and Lakeville Area School's ability.

- **Agency Coordination:** Identify a champion and regularly coordinate within a small team that includes various agency and school district representatives as well as other key area stakeholders.
- **Identify Priorities:** Prioritized projects using the Study and small group discussion.
- **Focused Timeline and Action Plan:** Create a timeline and action plan that identifies planned improvements, responsible parties, the estimated cost, and associated time period. The action plan will focus implementation, identify synergies with other planned projects, and allow agencies to be prepared for funding opportunities.
- **Celebrate wins!**



210<sup>th</sup> Street looking east at Italy Avenue.  
Source: SRF Consulting Group, 2020

# ENGINEERING STUDY FRAMEWORK

This engineering study is organized into six chapters outlined herein:



## **Chapter 1: Introduction**

Study introduction and Safe Routes to School program background.



## **Chapter 2: Existing Conditions Analysis**

Outlines the quantitative and qualitative approach undertaken for the Study and foundational elements to support the planning process.



## **Chapter 3: Issues Identification and Needs Summary**

Identifies issues and summarizes needs from the existing conditions analysis. Issues could include an unsafe crossing or sidewalk gap for example.



## **Chapter 4: Alternative Evaluation**

Analyzes potential infrastructure opportunities and evaluates opportunities to address known issue areas. Potential improvements are identified within two broadly defined options.



## **Chapter 5 – Proposed Projects**

Summarizes the proposed transportation infrastructure improvements derived from the alternative evaluation into one-page fact sheets per project.



## **Chapter 6 – Next Steps**

Actionable next steps to organize project champions and implement the Study's proposed improvements.

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# CHAPTER 1: INTRODUCTION

## STUDY BACKGROUND

The Lakeville Safe Routes to School Engineering Study (herein known as “the Study”) sought to improve the safety, comfort, and convenience for children to walk, roll, or bike along 210<sup>th</sup> Street in Lakeville, Minnesota. The Study focused on a 1.25-mile section of 210<sup>th</sup> Street from Jacquard Avenue to Holyoke Avenue which connects three schools along the east-west corridor: Lakeville South High School (adjacent), Donald J. McGuire Middle School (0.25 miles away), and John F. Kennedy Elementary School (0.25 miles away). The Study’s objective was to complete a technical analysis of multimodal improvements along the corridor as part of a broader roadway reconstruction project and in the long-term. The desired multimodal elements include better connectivity along 210<sup>th</sup> Street as well as enhanced crossings of the corridor at key locations and major intersections.

The Lakeville Safe Routes to School Engineering Study was led by the City of Lakeville and illustrates strategies and potential improvements as recommended by the City Engineer. The Study organizes needs and justifies potential improvements for future funding requests by the City of Lakeville and/or Lakeville Area Schools to implement the projects proposed in this Study.

## WHAT IS SAFE ROUTES TO SCHOOL?

Safe Routes to School (SRTS) is a program that receives federal and state funding in Minnesota with the objective of making it safer for children to walk, roll, or bike to school and encourage more active lifestyles through physical activity. The program began in 2005 with federal funding and has continued to receive support from all levels of government. The Minnesota Department of Transportation (MnDOT) administers the SRTS program in Minnesota which includes technical and programmatic support as well as competitive grant funds for SRTS studies, programs, education, and infrastructure. The statewide program is guided by a five-year strategic plan that was completed in September 2020 with a vision for youth in Minnesota to safely, confidently, and conveniently walk, bike, and roll to school and in daily life.<sup>1</sup>

The *Minnesota Safe Routes to School Strategic Plan* was updated in the fall of 2020. It updates the 2015 Strategic Plan and establishes a five-year action plan for MnDOT, the Minnesota Department of Health the Minnesota Department of Education, and other participating agencies and partners. There are six overarching goals that guide the Strategic Plan as well as three-phase strategic planning process. Visit the Safe Routes to School webpage hosted by MnDOT for more information or to view the Strategic Plan.

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<sup>1</sup> MnDOT. (n.d.). *About Safe Routes to School*. <http://www.dot.state.mn.us/saferoutes/about.html>



SRTS focuses on a multidisciplinary approach guided by the “6 E’s”:

- **Evaluation** – Understand the issues that need to be addressed and the projects and/or programs of each of the following 5 E’s that could be most effective.
- **Education** – Classes and activities that teach children (and their parents or guardians) pedestrian, bicycle, and traffic safety skills, the benefits of walking, rolling, or bicycling to school, the best route to get to school, and the positive impacts on personal health and the environment.
- **Encouragement** – Events and activities that create interest in both students and parents to walk, roll, or bike to school.
- **Equity** – Ensure that SRTS initiatives benefit all, with specific attention toward addressing barriers and inclusivity for lower-income students, students of color, and others that face ongoing disparities.
- **Enforcement** – Strategies to deter unsafe behavior of drivers and other modes to encourage all road users to obey traffic laws and share the transportation network safely around schools.
- **Engineering** – Infrastructure improvements designed to enhance the safety of children (and more broadly benefit parents, guardians, and/or community members) walking, rolling, bicycling, and driving along school routes.

The Study focuses on the “engineering” component to enhance the built environment for children walking, rolling, or bicycling near schools in Lakeville. It was funded and supported by MnDOT to complete planning and conceptual design for local agencies and school districts across Minnesota.

**SAFE ROUTES TO SCHOOL CAN:**

- Reduce the risk of PEDESTRIAN INJURY BY 44 PERCENT**  
Help build desirable communities by making it **EASIER AND SAFER FOR FAMILIES** and neighbors to walk and bike to school together.
- BRING MORE RESOURCES** to Greater Minnesota communities.  
In 2015, **THREE OUT OF FOUR** Safe Routes to School state-funded **INFRASTRUCTURE GRANTS** were awarded to communities in Greater Minnesota.
- GET KIDS MORE ACTIVE**  
Students who start walking or biking to school benefit from **47 MORE MINUTES OF PHYSICAL ACTIVITY PER WEEK.**
- Help reduce vehicle congestion & IMPROVE AIR QUALITY** around schools.  
Traffic-related air pollution **INCREASES** a child’s risk of developing **ASTHMA.**

Source: Minnesota Department of Health



## CHAPTER 2: EXISTING CONDITIONS ANALYSIS

Existing conditions data provides a foundation in which to identify issue areas, organize opportunities that attempt to resolve those issues, and summarize potential improvements. The following section outlines school-specific data and previous planning efforts, as well as data analyzed for the existing transportation system, operations, and safety along 210<sup>th</sup> Street.

### STUDY LOCATION AND FOCUS SCHOOLS

This section documents the study location and focus schools impacted by the proposed improvements.

#### Location

The City of Lakeville is located approximately 20 miles south of both Minneapolis and Saint Paul along Interstate 35 in Dakota County and has an estimated population of approximately 66,000 as of 2018. The 210<sup>th</sup> Street study area is located along the far southern portion of the City and is primarily surrounded by residential neighborhoods. The study area also includes three schools, public parks, and other destinations children might want to access such as the Lakeville Area Arts Center in the City's downtown (see Figure 2).

Most of the built environment along the study corridor includes low- or medium-density single-family housing (see Figure 3). An analysis of residential property density illustrated that the densest housing is located along Dodd Boulevard, south of 210<sup>th</sup> Street. Density can be the precursor for a higher propensity to walk or bike; however, due to the suburban context density is less of an identifier as opposed to other elements such as broader multimodal connectivity and accessibility. Residential density can also provide insight into where children may be living, which is further organized using student enrollment data later in this document.

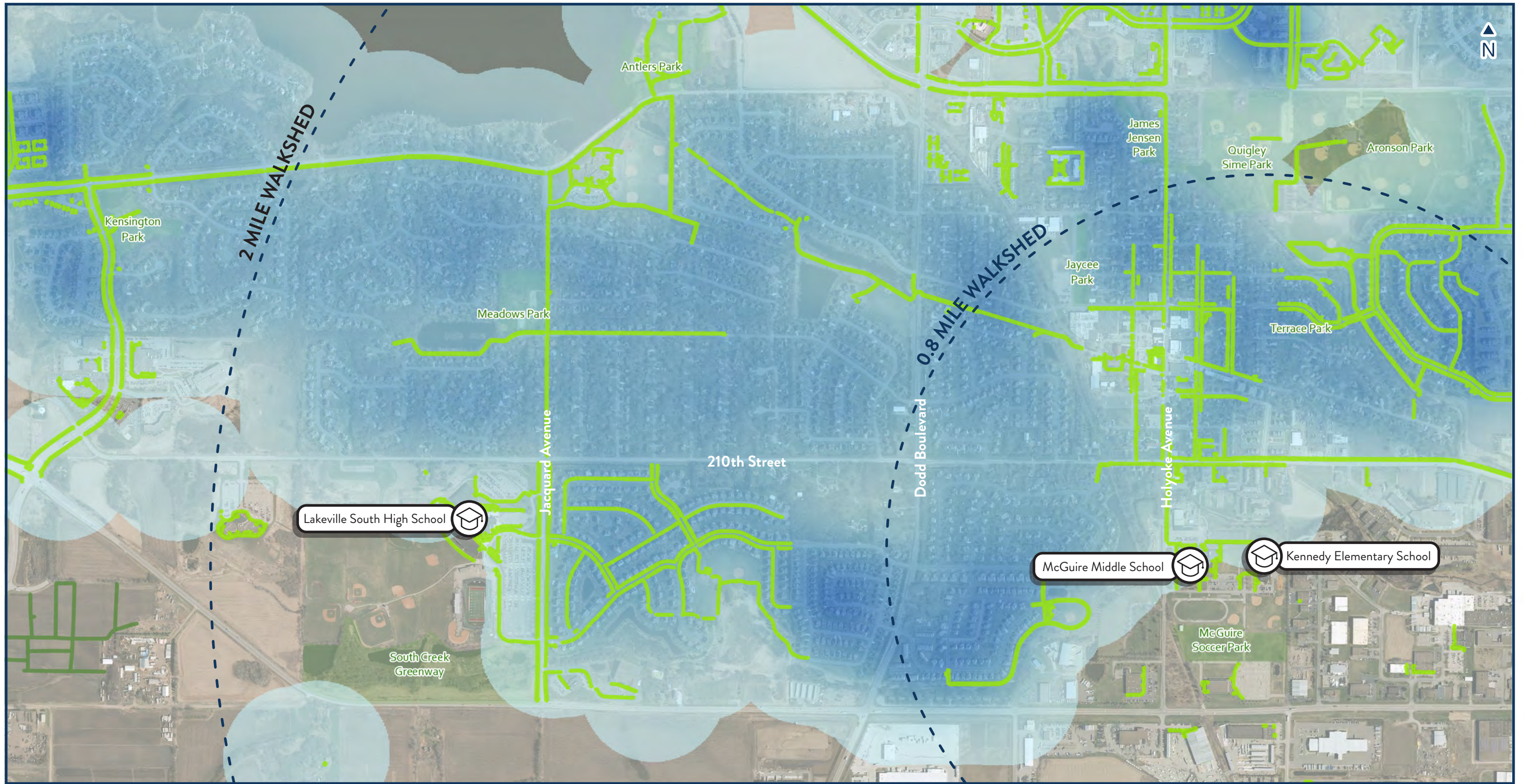


Lakeville South High School. Source: Wold Architects and Engineers



**Project Area and Focus Schools**  
 210th Street - Lakeville, MN  
 Figure 2

-  Focus School
-  Destination
-  Existing Sidewalk



### Residential Density

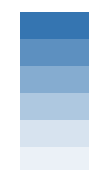
210th Street - Lakeville, MN

Figure 3



Focus School

Existing Sidewalk



Higher Density Residential Population

Lower Density Residential Population





## Focus Schools

The Lakeville Area Schools Independent School District No. 194 serves the City of Lakeville as well as surrounding communities in the south metropolitan area of Minneapolis and Saint Paul. As of 2020, the District serves approximately 11,000 students, of which 3,224 students or 30 percent of the district total, attend one of the three focus schools adjacent or near 210<sup>th</sup> Street. The schools included due to their proximity to the study corridor are: Lakeville South High School, McGuire Middle School, and Kennedy Elementary (see Table 2).

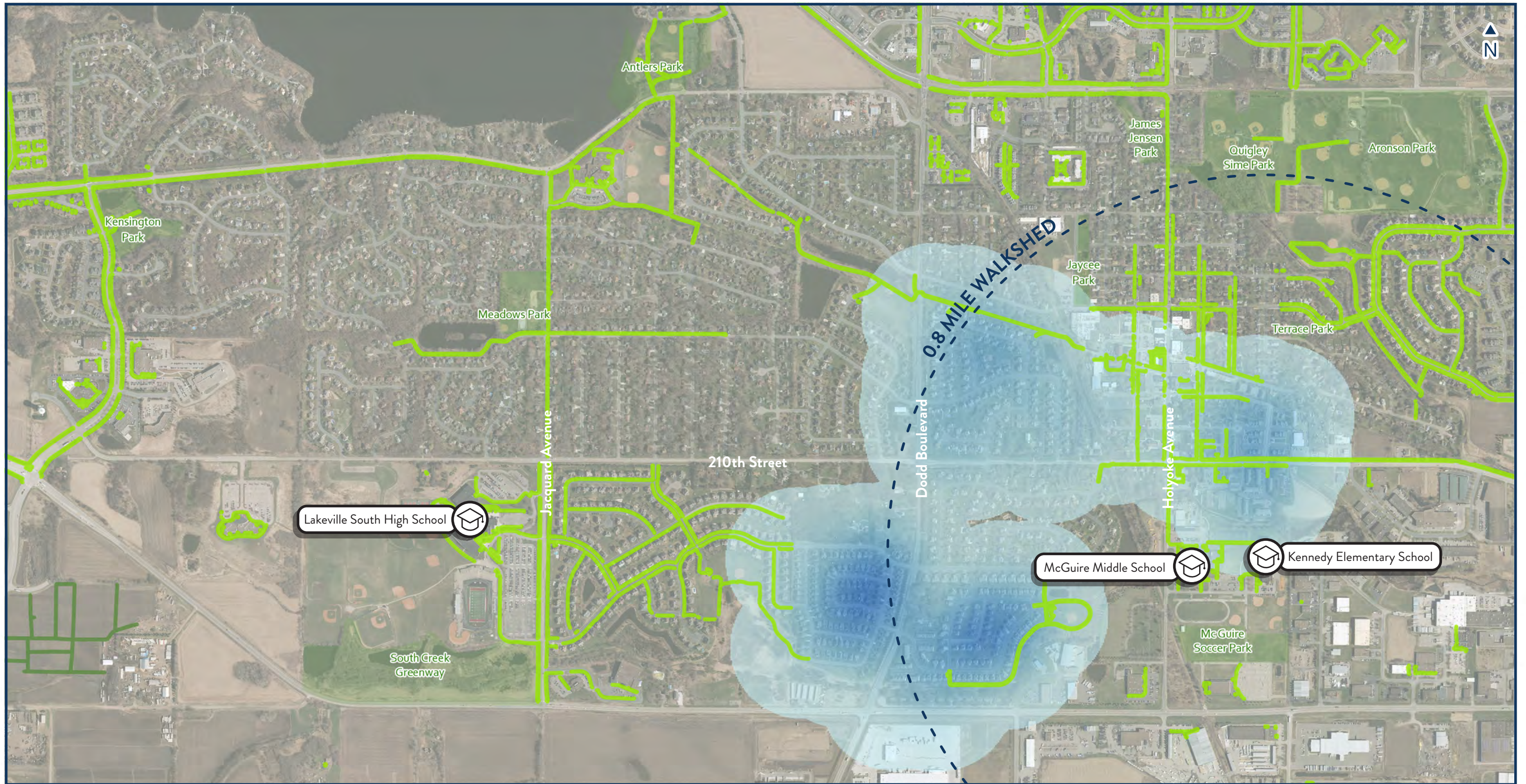
**Table 2. Focus School Overview**

Focus School	Location	Student Population	School Day	Arrival and Dismissal Times
Lakeville South High School	Immediately southwest of 210th Street and Jacquard Avenue	1,835	8:00 a.m. to 2:35 p.m.	7:30 to 8:00 a.m. and 2:30 to 3:00 p.m.
Donald J. McGuire Middle School	Approximately 1,000 feet south of 210th Street and Holyoke Avenue	878	8:10 a.m. to 2:45 p.m.	7:50 to 8:10 a.m. and 2:40 to 3:00 p.m.
John F. Kennedy Elementary School	Approximately 1,500 feet southeast of 210th Street and Holyoke Avenue intersection	511	9:25 a.m. to 3:55 p.m.	9:05 to 9:25 a.m. and 3:50 to 4:10 p.m.

Source: Lakeville Area Schools

The elementary and middle schools have a total of 1,389 students enrolled, while the high school has 1,835 students enrolled. There are 309 elementary and middle school students that live within one-half mile of the study corridor, accounting for approximately 22 percent of the total elementary and middle school student population. The densest student population nodes correspond with denser housing found along Dodd Boulevard south of 210<sup>th</sup> Street, as well as northeast of Dodd Boulevard and 210<sup>th</sup> Street.





Student household location identifies the potential SRTS benefit from enhanced multimodal infrastructure along and across 210<sup>th</sup> Street and is helpful toward understanding the routes students could use to access their respective schools. Potential improvements for those key areas such as a busy intersection are important to ensure a location is not a barrier for children to safely, comfortably, and conveniently access their school. The location of where students live who are enrolled at the elementary and middle schools was analyzed using data shared by the school district for the purposes of the Study (see Figure 4, Figure 5, and Figure 6).

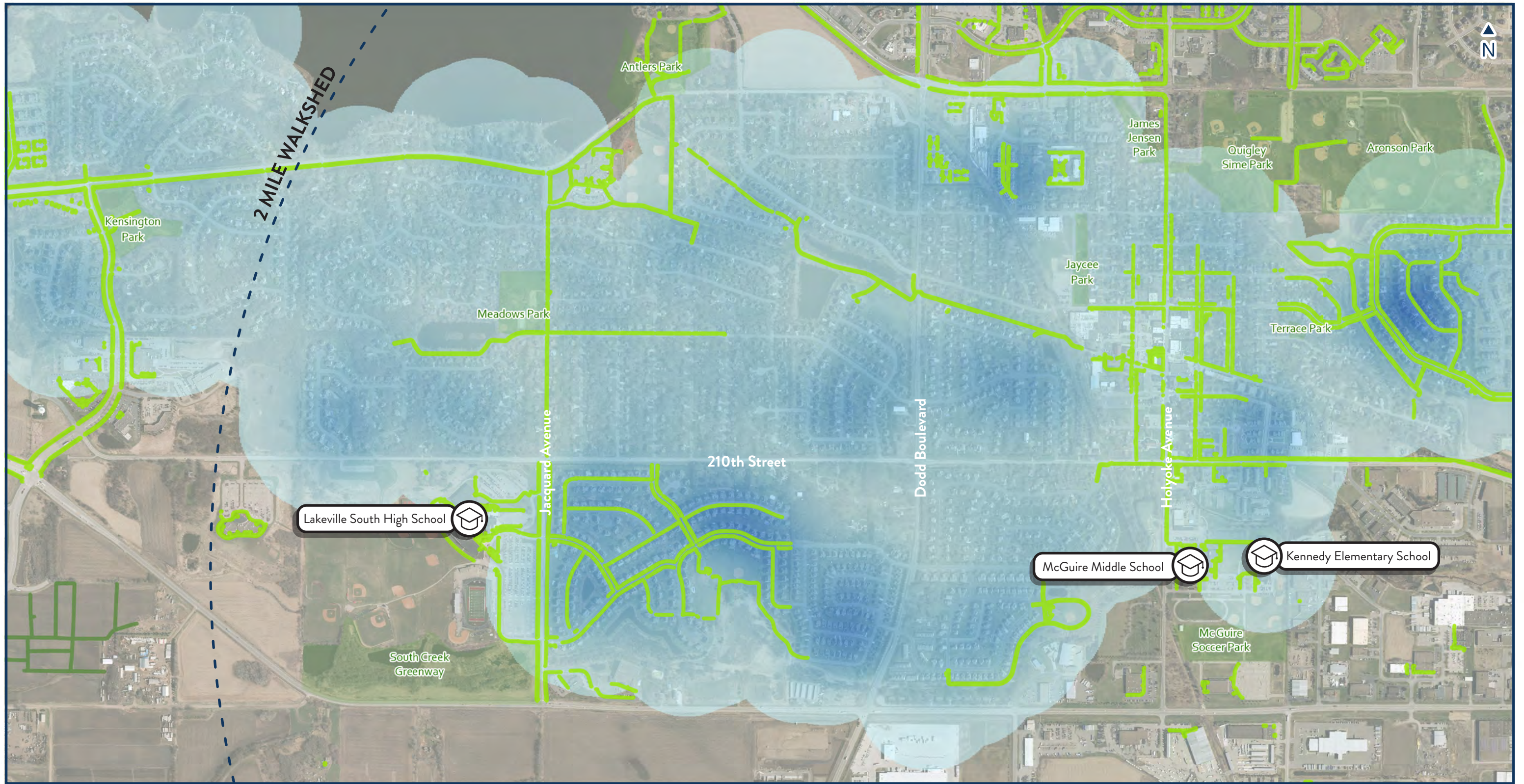


**Student Population - Kennedy Elementary School**

210th Street - Lakeville, MN

Figure 4

-  Focus School
-  Existing Sidewalk
-  Higher Density Student Population
-  Lower Density Student Population



### Student Population - McGuire Middle School

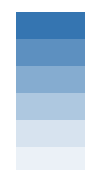
210th Street - Lakeville, MN

Figure 5



Focus School

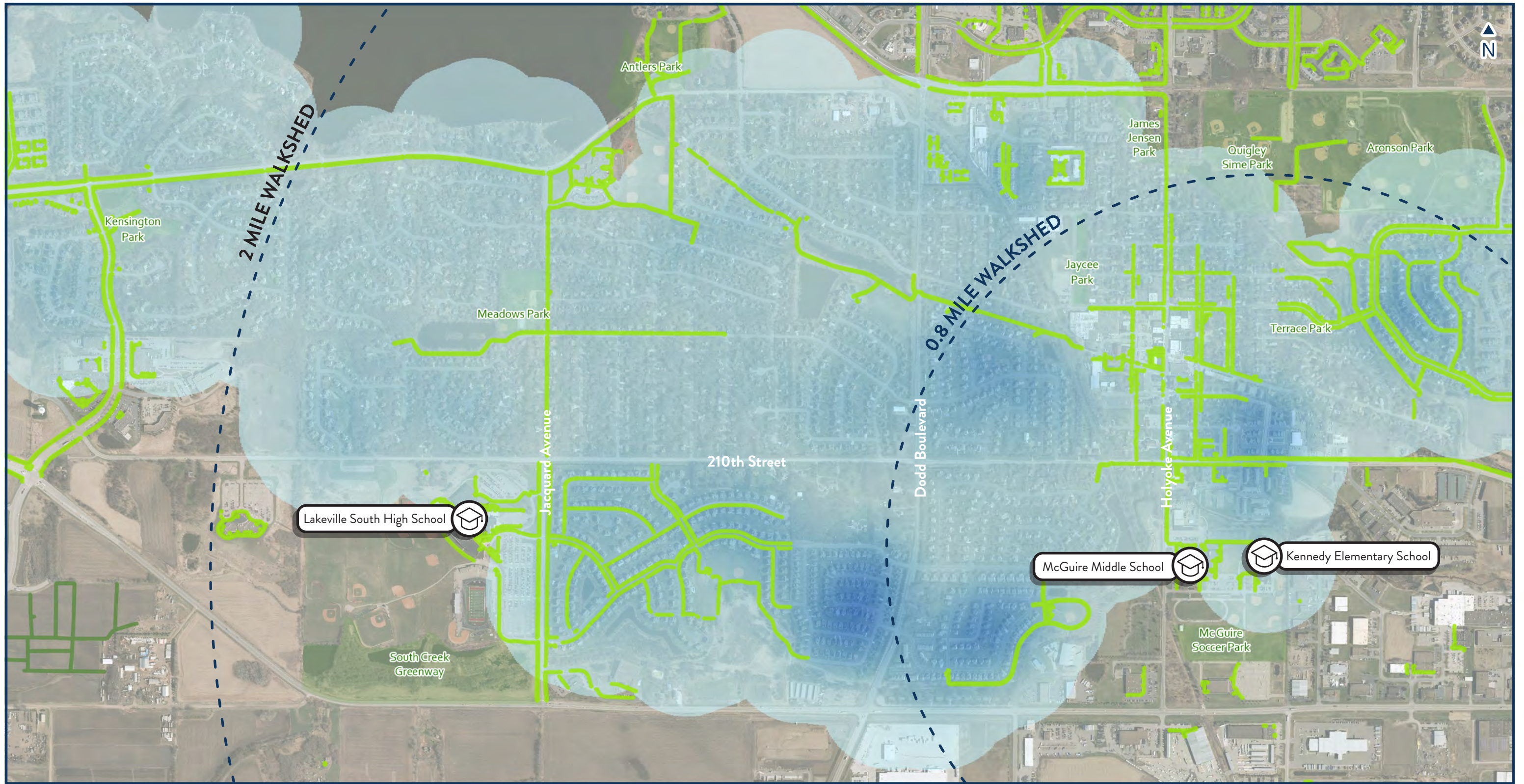
Existing Sidewalk



Higher Density Student Population

Lower Density Student Population





**Student Population - McGuire Middle and Kennedy Elementary Schools**

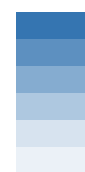
210th Street - Lakeville, MN

Figure 6



Focus School

Existing Sidewalk



Higher Density Student Population

Lower Density Student Population





## PREVIOUS PLANS AND OTHER STUDIES

A review of previous plans and ongoing studies was completed to identify supportive planning elements and synergies with the Study.

### Lakeville Safe Routes to School Plan (2009)

- Implement a multiuse trail along 210<sup>th</sup> Street.
- Improve safety and comfort crossing at the 210<sup>th</sup> Street and Holyoke Avenue intersection.
- Minimize vehicular access along Holyoke Avenue near schools to improve safety along the corridor.

### Lakeville School Road Safety Task Force Report (2014)

- Construct a multiuse trail along 210<sup>th</sup> Street.
- Implement red flashers on stop signs at 210<sup>th</sup> Street and Holyoke Avenue to improve crossing.
- Upgrade the Jacquard Avenue and 210<sup>th</sup> Street intersection crossings to improve safety and comfort.

### Lakeville Parks, Trails, and Open Space Plan (2015)

- Implement a multiuse trail along 210<sup>th</sup> Street.
- 210<sup>th</sup> Street is identified as a key transportation corridor.
- Construct a trail along the existing railroad right-of-way (rail-to-trail) that crosses 210<sup>th</sup> Street.

The three planning documents align with the vision of 210<sup>th</sup> Street to provide a safe and comfortable space for children walking, rolling, or bicycling. One item included in all three plans is to construct a multiuse trail along one or both sides of 210<sup>th</sup> Street.

A concurrent project effort was underway during the Study's process to plan and design for the full reconstruction of the 210<sup>th</sup> Street corridor. Resources collected for that planning process were shared with this Study and included traffic volumes and speed data, as well as general public feedback via an online survey administered in the Summer of 2020. The traffic data is detailed in the following sections, while high-level themes from the public input received include:

- Holyoke Avenue, Dodd Boulevard, and Jacquard Avenue are barriers to cross or access 210<sup>th</sup> Street.
- Desire for a crossing at Italy Avenue due to the distance between intersections and nearby public park destinations served by the corridor including Antlers and Chadwick Parks.
- Support for a trail along the corridor and desire to have that extend to Kensington Boulevard.
- Desire for speeds along 210<sup>th</sup> Street to be lowered to improve overall safety.

The study also provided a vision for certain corridor elements such as proposed intersection traffic controls (i.e., single-lane roundabout at Dodd Boulevard) and cross-section (i.e., urban three-lane roadway).



## COMMUNITY ENGAGEMENT

The school district engaged with parents and students at Kennedy Elementary School and McGuire Middle School to identify walking and bicycling demand and perceived issues for children to be able to access their school by those transportation modes.

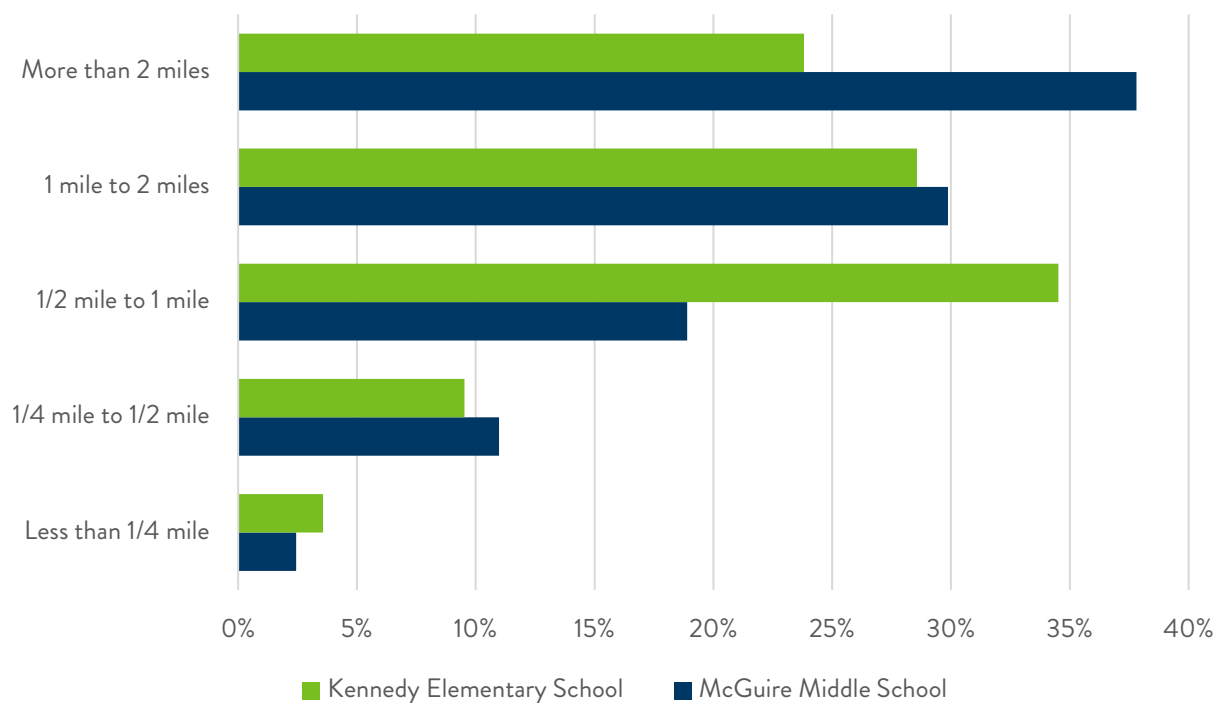
### Parent Survey

A survey was administered in October 2019 to parents with students enrolled at either school. A total of 262 survey responses were received as a part of the reporting process by the school district. The following details key results from each school (see Appendix A for raw data).

#### Distance between Home and School

Approximately 32 percent and 48 percent of students live less than one mile from McGuire Middle School or Kennedy Elementary School, respectively (see Figure 7). The one-mile threshold is a reasonable distance for most elementary and middle school-age children to walk, roll, or bike when safe and accessible connections are present. The distance threshold increases to 1.5 miles for high schoolers under similar conditions.<sup>2</sup>

**Figure 7. Student Distance between Home and School**



Source: Lakeville Safe Routes to School MnDOT Grant Application, 2019

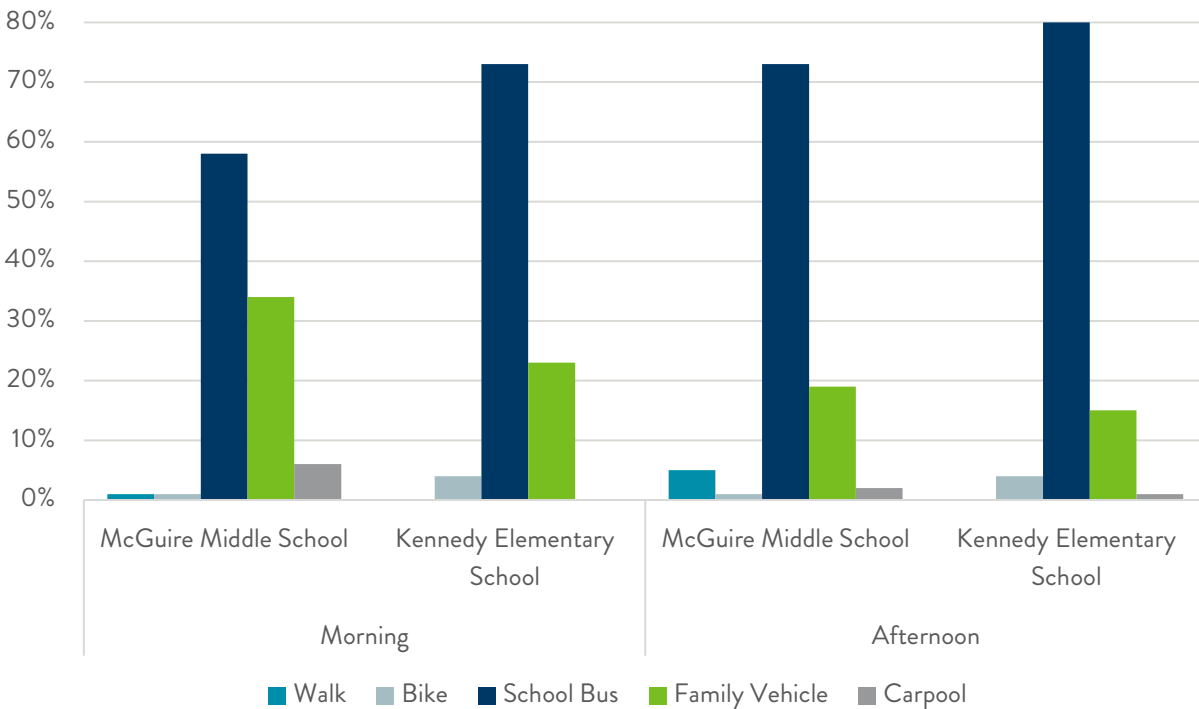
<sup>2</sup> Lam, Tiffany. (2018, May 22). Too far to walk? *National Safe Routes to School Partnership*. <https://www.saferoutespartnership.org/blog>



## Typical Mode by Student

Most students take the school bus to arrive and depart from their school. A small number of students at both schools currently walk or bike to access their school (see Figure 8). There is also some desire by students to walk or bike to/from their school with an estimated 35 percent and 31 percent asking for permission from their parents to do so at McGuire Middle School and Kennedy Elementary School, respectively.

Figure 8. Typical Mode by Student



Source: Lakeville Safe Routes to School MnDOT Grant Application, 2019

## Perception of Walking/Bicycling to School

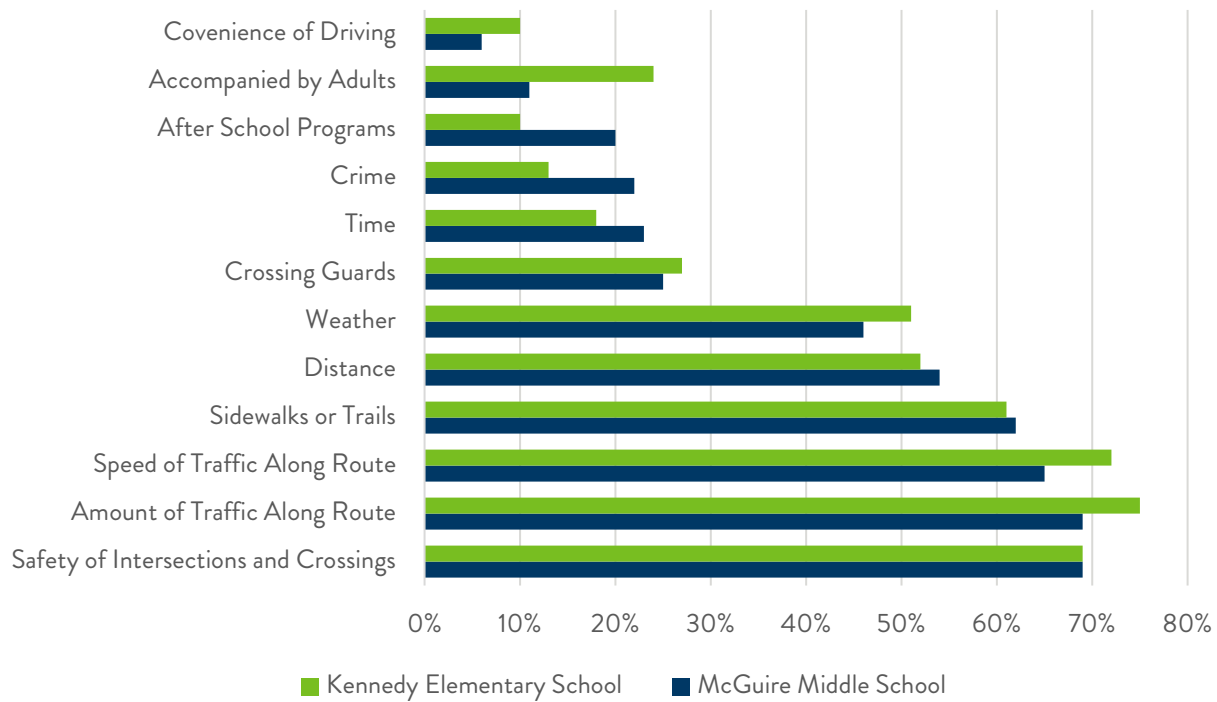
A parent’s perception will either allow or prohibit their child (or children) from walking, rolling, or bicycling to/from school (see Figure 9). Understanding trends from this survey question aids in the identification of issues and organization of project alternatives that could improve these perceptions.

Parents largely agree on the key perceived issues for their children. The top five perceptions are the same for both schools, of which four directly apply to infrastructure improvements including:

- safety improvements at intersections and crossings
- implementing upgrades that balance walking and bicycling with traffic volumes,
- addressing vehicular speed
- implementing multimodal connections via sidewalks or trails



**Figure 9. Parent Perception of Walking, Rolling, and Bicycling to School**



Source: Lakeville Safe Routes to School MnDOT Grant Application, 2019

## Open Ended Feedback

A total of 107 comments were collected from both surveys (71 from McGuire Middle School and 36 from Kennedy Elementary School parents), of which approximately one-third focused on multimodal safety and connectivity issues along 210<sup>th</sup> Street.

Key high-level themes include:

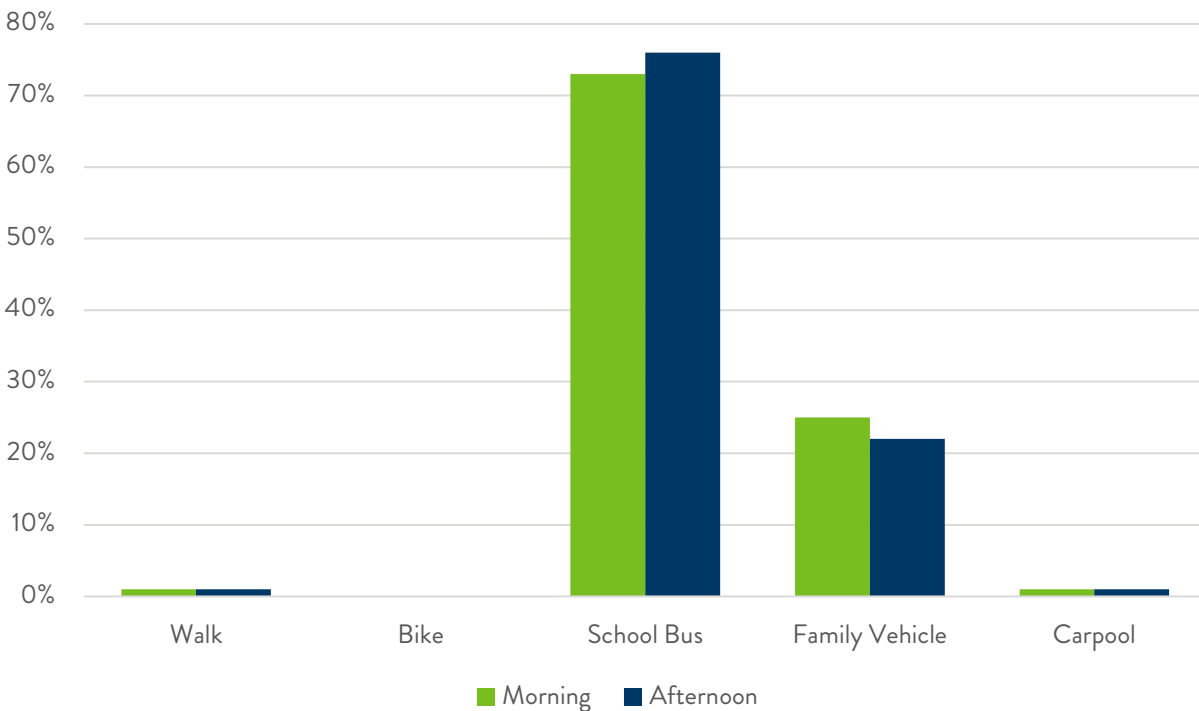
- The most significant perceived barriers are the Holyoke Avenue and Dodd Boulevard intersections. Traffic volumes, driver actions, and existing crossings are noted as key perceived issues.
- Jacquard Avenue is viewed as another crossing barrier, though only during peak periods due to the adjacent high school.
- Desire for more crossings along the corridor in addition to the intersections which are perceived as currently unsafe (most notable need between Jacquard Avenue and Dodd Boulevard).
- Desire for a crossing at Italy Avenue which is viewed as a key north-south connector for walking and bicycling to the schools and other local destinations.
- There is a very strong desire for a sidewalk or trail along 210th Street (areas of most focus/need extend from Jamestown Avenue to Holyoke Avenue).



## Student Tally

Student tallies measure how they get to and from school on a given day and whether the SRTS program affects their mode choice. Teachers record specific information about how children arrive and depart school to provide a snapshot of normal travel conditions. Students in 23 classrooms at Kennedy Elementary School were quizzed on a Tuesday, Wednesday, and Thursday in October 2019 totaling 583 data points. Most students traveled via the school bus or a family vehicle. Only one percent of students walked, and none bicycled, which could be dependent upon weather and other factors on those given days (see Figure 10).

**Figure 10. Student Modal Tallies**



Source: Lakeville Safe Routes to School MnDOT Grant Application, 2019



## TRANSPORTATION NETWORK

The transportation network was reviewed to identify existing infrastructure for walking, rolling, or bicycling, as well as driving along or adjacent to 210th Street. Very limited multimodal facilities exist along 210th Street today including only two marked crossings between Jacquard Avenue and Holyoke Avenue. The corridor and surrounding network are primarily auto focused with some intra-neighborhood sidewalks. The following sections provide a summary of each transportation mode as it exists today (see Figure 11).

### Walking, Rolling, and Bicycling

The sidewalk and bicycle network are very limited along and adjacent to the 210<sup>th</sup> Street corridor. Existing infrastructure includes a 550-foot segment of sidewalk along the south side of the roadway from Holyoke Avenue to the at-grade railroad crossing and then a multiuse trail connection to the adjacent neighborhood via Honeycomb Path. A multiuse trail also begins at Holyoke Avenue on 210<sup>th</sup> Street and extends east to the City of Farmington along the north side of the corridor. Sidewalk connections exist via side-streets along the corridor including Holyoke Avenue (both sides of 210<sup>th</sup> Street), Howland Avenue (north side only), Italy Avenue (south side only), and Jacquard Avenue (both sides). Sidewalk networks exist at the east end of the corridor in downtown Lakeville as well as the neighborhood south of 210<sup>th</sup> Street and east of Jacquard Avenue near Lakeville South High School.



*Jacquard Avenue looking north at Lakeville South High School.  
Source: SRF Consulting Group, 2020*

Marked crossings exist at two locations including Jacquard Avenue and Holyoke Avenue intersections which are 1.25 mile apart at both ends of the study area. Both intersections are all-way stop-controlled and represent two of the three high-volume intersection crossings in the study area. The other is Dodd Boulevard which does not have any marked crossings or multimodal facilities present and is also all-way stop-controlled. The closest facility to the intersection is a multiuse trail that ends approximately 600 feet north of 210<sup>th</sup> Street along Dodd Boulevard at 208<sup>th</sup> Street. Those three intersections represent the largest potential barriers for children to safely and comfortably walk, roll, or bike along 210<sup>th</sup> Street.

The three overarching needs for 210th Street include multimodal connectivity, major intersection crossing improvements, and uncontrolled or side-street crossing improvements.

West Segment - Jamestown Ave. to Idaho Ave.








East Segment - Idaho Ave. to Holt Ave.



Existing Transportation Network

210th Street - Lakeville, MN

Figure 11

-  Focus School
-  Existing Sidewalk
-  Side-Street Stop-Controlled Intersection
-  All-Way Stop-Controlled Intersection
-  Marked Crosswalk



## Multimodal Activity

Pedestrian and bicycle counts were collected during two time periods. The first on Tuesday, March 10, 2020 which coincided with a broader effort to collect traffic volumes at Jacquard Avenue, Dodd Boulevard, and Holyoke Avenue along 210<sup>th</sup> Street. The counts were collected prior to the COVID-19 pandemic in Minnesota; therefore, they are believed to represent “normal” conditions. The second on Wednesday, April 22, 2020 at Italy, Hyacinth, and Idaho Avenues, which was during the COVID-19 pandemic and likely does not reflect “normal” conditions, although a notable increase in pedestrian and bicycle activity was recorded (see Appendix B for raw data). The total number of pedestrians and bicyclists were recorded from 7:00 a.m. to 7:00 p.m. during the two collection periods across the six locations (see Table 3).

**Table 3. Existing Pedestrian and Bicyclist Crossings of 210<sup>th</sup> Street**

Cross Street	Total Walking	Total Bicycling	Children Walking <sup>1</sup>	Children Bicycling
Italy Avenue	118	57	30	19
Hyacinth Avenue	19	21	7	9
Idaho Avenue	1	0	0	0
Jacquard Avenue	159	5	Not Studied	Not Studied
Holyoke Avenue	45	10	Not Studied	Not Studied
Dodd Boulevard	0	0	Not Studied	Not Studied

<sup>1</sup> Children crossings only collected during April counts.; Source: Stonebrooke Engineering, March 2020; SRF Consulting Group, April 2020

A total of 219 crossings were recorded at Jacquard and Holyoke Avenues, 75 percent of which were at Jacquard Avenue. Most crossings occurred during afternoon dismissal at the three schools. Of the 216 crossings recorded at Italy, Idaho, and Hyacinth Avenues in April, approximately 30 percent were children. Italy Avenue had the highest total recorded crossings and exceeded the typical threshold of 20 crossings per hour to implement an enhanced crossing.<sup>3</sup>

## Roadway Network

210<sup>th</sup> Street is a higher speed (35 mph to 50 mph), two-lane roadway with turn lanes at major, and some minor, intersections. It is classified as a major collector and runs parallel one-half mile north of Dakota County Road 70, a regional east-west connector and Principal Arterial. The 210<sup>th</sup> Street corridor within the study area is intersected by two major collectors (Jacquard and Holyoke Avenues) and one minor arterial (Dodd Boulevard) which are all currently all-way stop controlled. The existing roadway cross-section is approximately 24-feet wide with very narrow shoulders and is rural in context with no curb and gutter.

<sup>3</sup> Other factors could be considered including crash history, key destinations (such as schools), etc.



210<sup>th</sup> Street looking east at Idaho Avenue with the Dodd Boulevard intersection shown.  
Source: SRF Consulting Group, 2020

## Traffic Volume

Intersection turning movement counts (TMCs) were collected from 7:00 a.m. to 7:00 p.m. on Tuesday, March 10, 2020 at Holyoke Avenue, Dodd Boulevard, and Jacquard Avenue. The counts were collected prior to the COVID-19 pandemic in Minnesota; therefore, they are believed to represent “normal” conditions. Those peak hour volumes were reviewed as a part of the concurrent reconstruction project for appropriate long-term improvements outside of this Study’s scope. They were considered in high-level evaluation of crossing improvements at the Jacquard Avenue and Holyoke Avenue intersections, described in Chapter 4.

Vehicular activity was also analyzed using MnDOT’s average annual daily traffic (AADT) volumes. The AADT volumes along 210<sup>th</sup> Street and at the cross-streets of major intersections were organized with the busiest section of 210<sup>th</sup> Street between Dodd Boulevard and Holyoke Avenue at 8,300 AADT as of 2017. The remaining sections from Dodd Boulevard to Jacquard Avenue, and west of Jacquard Avenue, have an AADT around 5,500 as of 2016 and 2018, respectively (see Figure 12).

A brief review of historic AADTs over the last twenty years showed that traffic volumes have steadily increased along 210<sup>th</sup> Street, coinciding with nearby residential development. By 2040, it is projected that AADT along 210<sup>th</sup> Street between Kensington Boulevard and Dodd Boulevard will increase by approximately nine percent or about 500 vehicles and approximately 14 percent or 1,300 vehicles between Dodd Boulevard and Holyoke Avenue. Future traffic operations using the 2040 estimates was completed via the concurrent reconstruction project and not a part of this Study’s scope.



Traffic volumes play a key role in determining what type of multimodal infrastructure to implement. State and national guidance use volumes, as well as other measures such as traffic speed to determine on-street versus off-street bicycle infrastructure (e.g., protected bike lane, multiuse trail) or the type of crossing treatments (e.g., a rectangular rapid flashing beacon).

## Traffic Speed

Vehicular speed data was collected on Tuesday, June 16, 2020 at multiple locations along 210<sup>th</sup> Street (see Table 4). The 85<sup>th</sup> percentile speed was determined from this analysis and compared to the posted speeds along the corridor. That threshold is the industry standard for setting roadway speed limits. The 50<sup>th</sup> percentile speed was also included as the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO), and other multimodal-focused jurisdictions have recently begun to consider that alternative threshold when focusing on safety and multimodal comfort as it relates to speed and roadway design. The 85<sup>th</sup> percentile speed along 210<sup>th</sup> Street is consistently four to six miles per hour over the posted speed limit. Speeding is most prevalent from Dodd Boulevard to Holyoke Avenue with the average speed also exceeding the posted speed.

**Table 4. Observed Vehicular Speeds**

Segment	Posted Speed	85 <sup>th</sup> Percentile Speed	50 <sup>th</sup> Percentile Speed
Kensington to Jacquard	50 mph	55 mph	50 mph
Jacquard to Dodd	45 mph	49 mph	45 mph
Dodd to Holyoke	35 mph	41 mph	37 mph

Source: Stonebrooke Engineering, June 2020

## Traffic Operations

Existing traffic operations were not studied due to the concurrent planning effort underway to plan and design the corridor’s reconstruction. Potential traffic impacts from turn lane removal were considered at a high-level as a part of the project alternatives analysis for crossings and Jacquard and Holyoke Avenues.

## SCHOOL ACCESS AND SITE OPERATIONS

Access to the school property is important for family vehicle drop-off and pick-up by a parent or guardian as well as school buses. Access and site operations are key toward limiting barriers (e.g. the existing parking lot cannot accommodate parent drop-off and pick-up) and ensuring acceptable site operations. It is critical to balance vehicular improvements to ensure they do not over incentivize driving in lieu of walking or bicycling. Environmental and health benefits are key SRTS objectives supported by multimodal access and connectivity.



## Parent Drop-off and Pick-up

Drop-off and pick-up design and processes at each school were not part of this Study's objective.

## School Bus

Lakeville Area Schools provides school bus transportation to students who live outside of 0.8 miles for elementary schools (grades K-5) and two miles for secondary schools (grades 6-12). Bus transportation is also offered to those who live in a designated safety zone by Lakeville Area Schools. Students that do not meet one of the three criteria have the option to pay for bus transportation, which can be cost prohibitive as identified in the parent survey feedback. Approximately 60 to 80 percent of students at McGuire Middle School and Kennedy Elementary School take the school bus in the morning and/or afternoon.



*Looking east along 210<sup>th</sup> Street at Hyacinth Avenue.  
Source: SRF Consulting Group, 2020*



**Existing Transportation Conditions**  
210th Street - Lakeville, MN  
Figure 12

- Focus School
- Pedestrian Volume
- Bike Volume
- Annual Average Daily Traffic
- Posted Speed Limit
- 85th Percentile Speed
- Existing Sidewalk

The recorded pedestrian and bicycle volumes are across 210th Street.



## SAFETY ANALYSIS

Crash analysis is a critical piece of the existing conditions data review process. Analyzed crashes include ten years of vehicle-to-bicycle and vehicle-to-pedestrian crashes as well as all crashes over the last five years. The data was derived from MnDOT's Minnesota Crash Mapping Analysis Tool (MnCMAT2) and includes recorded crashes by law enforcement that provide crash details and approximate location. Only crashes along 210<sup>th</sup> Street, or immediately adjacent to a perpendicular intersection, were analyzed.

### Pedestrian and Bicycle Crashes (2010-2019)

One pedestrian crash was recorded in 2010 resulting in minor injuries at the 210<sup>th</sup> Street and Holyoke Avenue intersection (see Figure 13). Otherwise, no further pedestrian or bicycle crashes were recorded.

### All Crashes (2015-2019)

A total of 34 crashes were recorded along 210<sup>th</sup> Street over the last five years. Of those, one resulted in serious injuries at Ixonia Avenue and two resulted in minor injuries at Jacquard Avenue. All others involved possible injuries or property damage only (PDO). Nearly 50 percent of all crashes in the study area occurred at the Dodd Boulevard intersection, of which five involved teenage drivers. Another 40 percent of the total (near equal split) occurred at Jacquard and Holyoke Avenues intersections, demonstrating that nearly all recorded crashes occurred within the three major intersections (see Figure 14). At Jacquard Avenue, 13 of the 14 crashes involved teenage drivers (age 16 to 18) during peak school periods. The manner of collision was also studied which details the general way in which the crash occurred (e.g., rear end). Most recorded crashes either involved a rear end or angle crash (see Figure 15).



Source: streets.mn

West Segment - Jamestown Ave. to Idaho Ave.











East Segment - Idaho Ave. to Holt Ave.



**Pedestrian & Bicycle Crashes by Severity (2010 - 2019)**

210th Street - Lakeville, MN

Figure 13

-  Focus School
-  Fatal (0)
-  Serious Injury (1)
-  Minor Injury (2)
-  Possible Injury (6)
-  Property Damage Only (26)
-  Unknown Severity (0)
-  Existing Sidewalk

West Segment - Jamestown Ave. to Idaho Ave.










East Segment - Idaho Ave. to Holt Ave.



All Crashes by Severity (2015 - 2019)

210th Street - Lakeville, MN

Figure 14

-  Focus School
-  Fatal (0)
-  Serious Injury (1)
-  Minor Injury (2)
-  Possible Injury (6)
-  Property Damage Only (24)
-  Unknown Severity (0)

West Segment - Jamestown Ave. to Idaho Ave.









East Segment - Idaho Ave. to Holt Ave.



All Crashes by Manner of Collision (2015 - 2019)

210th Street - Lakeville, MN

Figure 15

-  Focus School
-  Angle (9)
-  Front to Front (3)
-  Front to Rear (10)
-  Sideswipe (2)
-  Other (8)

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# CHAPTER 3: ISSUE IDENTIFICATION AND NEEDS SUMMARY

The next step in the planning process includes the application of existing conditions data to understand gaps and issues that will highlight areas of need. Those locations will be the focus of the Study to devise opportunities to develop project solutions for those items.

## IDENTIFIED TRANSPORTATION ISSUES

The multimodal transportation issues for 210<sup>th</sup> Street include broad themes organized from the issues analysis to devise key needs for further consideration (see Figure 16).

### Issue #1

No sidewalk or multiuse trail exists today along 210<sup>th</sup> Street presenting a considerable east-west gap in the network which hinders multimodal access between the three schools and adjacent neighborhoods.

### Issue #2

Three high-volume intersections represent a significant barrier for children to safely or comfortably walk, roll, or bike along or across 210<sup>th</sup> Street. Two of the three intersections currently have marked crosswalks; however, lack other enhancements.

### Issue #3

Safe and accessible crossings of 210<sup>th</sup> Street do not exist between the three major intersections. Today, there is a 1.25-mile gap between crossings with crosswalks only at each end of the study area.

## SUMMARY OF NEEDS

The needs are informed by the three broad issues defined for the Study (see corresponding colors).

### Connectivity to Walk, Roll, or Bike

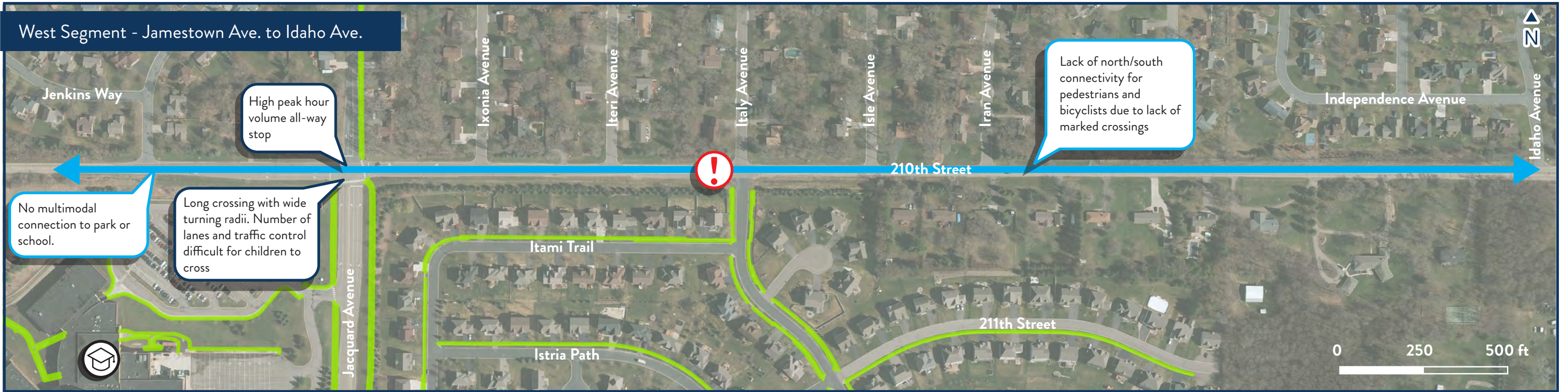
Construct infrastructure along 210<sup>th</sup> Street (i.e., sidewalk, bike lanes, and/or multiuse trail) to connect the neighborhoods, schools, parks, and other destinations along or adjacent to the corridor.

### Crossing High-Volume, Major Intersections







Improve the crossing infrastructure at all legs of Dodd Boulevard, Holyoke Avenue, and Jacquard Avenue to enhance the safety and comfort of those walking, rolling, or bicycling, as well as ensure they are not barriers for children to do so.

### Crossing at Uncontrolled and Side-Street Locations

Implement crossing infrastructure both at key uncontrolled locations across 210<sup>th</sup> Street and side-streets along the 1.25-mile 210<sup>th</sup> Street corridor to create a convenient and connected multimodal transportation network.



**Identified Issues**  
 210th Street - Lakeville, MN  
 Figure 16

-  Focus School
-  Key intersection with no marked crossings
-  Lack of multimodal connectivity
-  Identified multimodal issue
-  Other identified issue
-  Existing Sidewalk



# CHAPTER 4: ALTERNATIVE EVALUATION

Project alternatives are based upon evaluated opportunities that would improve or eliminate identified needs and issues. This section organizes potential improvements and project opportunities to address the three high-level needs identified by the Study using the latest state and national guidance. Potential projects were vetted using engineering judgment and reviewed by the City of Lakeville.

## Multimodal Connectivity

Review pedestrian and bicycle infrastructure options including sidewalk, bicycle lanes, and multiuse trails to devise proposed enhancements for walking, rolling, and bicycling along 210<sup>th</sup> Street.

## Major Intersection Crossings

Analysis of crossing infrastructure upgrades at the high-volume intersections of Dodd Boulevard, Jacquard Avenue, and Holyoke Avenue to improve the safety and comfort for children crossing to overcome these potential barriers.

## Uncontrolled Crossings and Side-Street Crossings

Evaluation of enhanced infrastructure across 210<sup>th</sup> Street at uncontrolled locations in between the three major intersections in the study area. Assess side-street crossings along 210<sup>th</sup> Street to improve multimodal connectivity upgrades.



Italy Avenue looking north at 210<sup>th</sup> Street with the existing sidewalk shown. Source: SRF Consulting Group, 2020



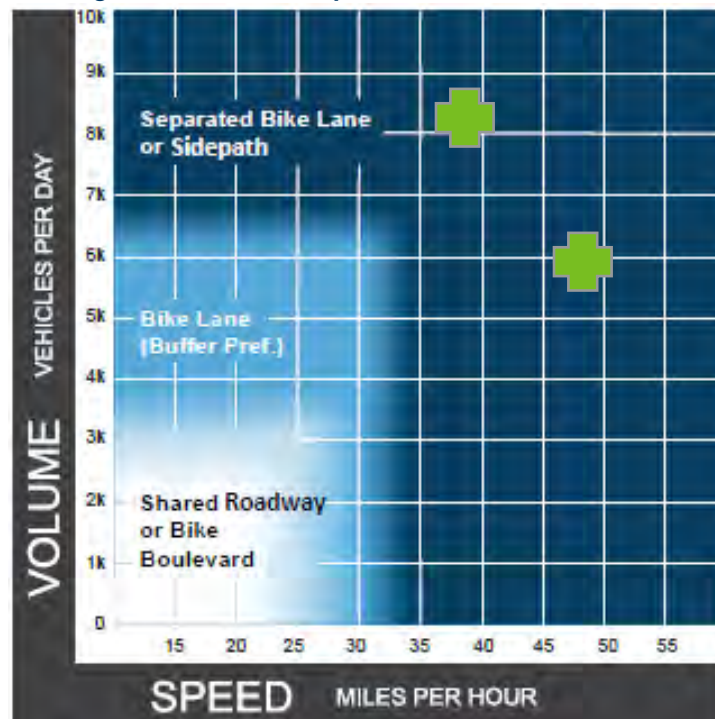
## PEDESTRIAN AND BICYCLIST CONNECTIVITY

Bicycle infrastructure, both on- and off-street, was reviewed using the *MnDOT Bicycle Facility Design Manual* (2020) to determine the most comfortable option for those of all ages and abilities. Additionally, the facility type (e.g., sidewalk versus multiuse trail) along 210th Street and which side of the corridor (e.g., north, south, or both sides) to implement those improvements was evaluated. It was understood per the City that the preferred bicycle infrastructure would also accommodate pedestrians or separate pedestrian and bicycle infrastructure along 210<sup>th</sup> Street.

### Infrastructure Type

To determine appropriate bicycle infrastructure along 210th Street, the AADT volumes and 85th percentile speeds were analyzed using MnDOT guidance for urban and suburban roadways (Figure 17). The green points denote the two segments studied from Jacquard Avenue to Dodd Boulevard (higher speed, lower volume) and then Dodd Boulevard to Holyoke Avenue (lower speed, higher volume).

Figure 17. MnDOT Bicycle Infrastructure Guidance

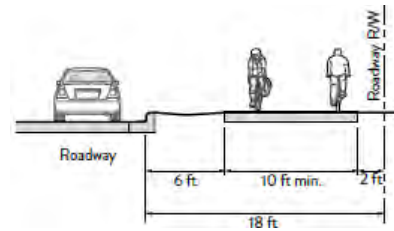


Source: MnDOT Bicycle Facility Design Manual (2020)



Two options were identified from the guidance:

- **Multiuse Trail<sup>4</sup>:** Preferred design of a multiuse trail by MnDOT uses 18-feet of right-of-way (ROW) which includes a ten-foot trail and associated buffer spaces on both sides. If ROW is limited, reduced trail and buffer widths are acceptable with a minimum multiuse trail width of eight feet.
- **Separated Bike Lane:** Preferred design of a separated bike lane by MnDOT includes a 6.5-foot bike lane and three-foot buffer which equates nearly ten feet of roadway space. Buffers could include protective elements such as bollards or flex posts, vertical separation (e.g., a cycle track), or horizontal separation such as roadway striping that denotes the buffered space.



An evaluation matrix was developed to quantitatively and qualitatively measure three infrastructure options including a multiuse trail, separated bike lanes, and/or sidewalk along 210<sup>th</sup> Street to accommodate children walking, rolling, or bicycling.

Six measures were considered in the decision matrix:

- **Pedestrian and Bicycle Connectivity (considered separately in the matrix):** How the proposed improvements connect to the existing network of walking, rolling, or bicycling.
- **Bicycle Comfort:** How comfortable a novice adult bicyclist or child biking would feel riding along the roadway which is heavily dependent upon traffic speed, traffic volumes, and the number of travel lanes. Separated facilities, such as multiuse trails, significantly enhance user comfort.
- **Constructability:** The planning-level estimate as it relates to right-of-way and topography.
- **Maintenance:** The perceived maintenance need by the City of Lakeville, primarily related to snow removal.
- **Public Feedback:** Community input received in outreach completed for the concurrent reconstruction project and applied to this Study.

The decision matrix shows that the best option for consideration would be to construct a multiuse trail along both sides of 210<sup>th</sup> Street (see Table 5).

<sup>4</sup> The term “multiuse trail” is used interchangeably in this Study for ease of understanding. MnDOT defines a sidepath and trail as the same infrastructure by general design; however, they are differentiated by location along or not along a roadway, respectively.



Table 5. Multimodal Infrastructure Decision Matrix

Option	Pedestrian Connectivity	Bicycle Connectivity	Bicycle Comfort	Construct-ability	Maintenance	Public Feedback
Sidewalk – One Side	—	✘	✘	+	—	✘
Trail – One Side	—	—	—	+	+	+
Sidewalk – Both Sides	+	✘	✘	—	—	✘
Sidewalk and Trail	+	+	+	—	—	—
Trail Both Sides	+	+	+	—	+	+
Sidewalk and Bike Lane	+	+	+	✘	✘	✘

+ = positive impact, 
 — = neutral impact, 
 ✘ = negative impact  
 Source: SRF Consulting Group, 2020



210<sup>th</sup> Street looking east at Howland Avenue.  
 Source: SRF Consulting Group, 2020



## Infrastructure Location

Another important consideration is the location of multimodal infrastructure along 210<sup>th</sup> Street. The following quantitative and qualitative analysis sought to further analyze the location of a multiuse trail along the corridor, even though the previous matrix shows a multiuse trail on both sides as the most positive option.

Six measures were studied in the decision matrix:

- **Network Connectivity:** Where the multiuse trail would best serve the existing multimodal network.
- **Access to Destinations:** How the multiuse trail placement would connect to youth destinations such as schools, parks, etc.
- **Number of Street and Driveway Crossings:** The number of crossings along the north versus south side of 210<sup>th</sup> Street which includes nine public streets and seven private driveways along the north side and three public streets and 24 private driveways along the south side.
- **Student Population Density:** The number of students living near the proposed multiuse trail that would benefit from that specific placement using student household data.
- **Constructability:** The planning-level estimate as it relates to right-of-way and topography.
- **Project Cost:** The planning-level estimate of potential project cost as it relates to constructability.

The decision matrix confirms the best option for multiuse trail placement is along both sides of 210<sup>th</sup> Street (see Table 6).

**Table 6. Multiuse Trail Placement Decision Matrix**

Option	Network Connectivity	Destination Access	Number of Crossings	Student Pop. Density	Constructability	Project Cost
North	+	—	×	—	—	+
South	—	—	+	+	—	—
Both	+	+	—	+	—	—

= positive impact, 
 = neutral impact, 
 = negative impact  
 Source: SRF Consulting Group, 2020



## Potential Improvements

A multiuse trail is proposed along both sides of 210<sup>th</sup> Street as it would best fulfill the vision for the reconstructed corridor, offer the greatest benefit to both people walking and bicycling, provide easier maintenance for the City (e.g., snow plowing), and align with community feedback. Moreover, access to a multiuse trail via either side of the corridor provides increased connectivity to the existing trail east of Holyoke Avenue along the north side, neighborhoods along both sides of the corridor, and access to schools and destinations (e.g., parks, downtown Lakeville, etc.). The corridor has significant ROW constraints; however, the multiuse trail should maximize horizontal separation (preferred six feet) from the roadway when possible. It is expected per discussions with the City of Lakeville that the proposed improvement will be constructed as a part of the concurrent reconstruction project.

The multiuse trail in this Study is proposed from Holyoke Avenue to Jacquard Avenue in relation to the scoped extends. The concurrent reconstruction project proposed to extend the trails further along 210<sup>th</sup> Street which maximizes the project timing and fulfills an opportunity at lesser overall cost. All three components are referred to interchangeably as one project in Chapter 5.

- North side extension approximately one mile west of Jacquard Avenue to Kensington Boulevard. This provides connectivity to those existing neighborhoods north and west of Lakeville South High School.
- South side extension approximately 3,100 feet west of Jacquard Avenue to the Trinity Church driveway. This will also connect to the existing parking lot at Jury Court and access to the sports complex behind Lakeville South High School.

Another key multimodal connection for mid- or long-term consideration includes a potential rail-to-trail connection to McGuire Middle School and Kennedy Elementary School from 210<sup>th</sup> Street via the existing railroad corridor. This project is identified in other local plans for implementation when the opportunity arises.



McGuire Middle School. Source: Google Streetview



## MAJOR INTERSECTION CROSSINGS

The major intersections of Jacquard Avenue, Dodd Boulevard, and Holyoke Avenue are crucial locations for multimodal enhancements. When multiuse trails are constructed along 210<sup>th</sup> Street, it will be critical to ensure that children, and those of all ages and abilities, can safely and comfortably cross any legs of the three high-volume intersections to access the multiuse trail or their destination. Otherwise, the east-west connectivity improvements will not be fully realized and access to the trail will be much more limited.

Potential crossing infrastructure at each intersection was reviewed using the latest guidance from the Federal Highway Administration's (FHWA) *Safe Transportation for Every Pedestrian (STEP) Guide (2018)*, MnDOT's *Bicycle Facility Design Manual (2020)*, Minnesota Manual of Uniform Traffic Control Devices (2020), Minnesota Local Road Research Board's (LRRB) *Uncontrolled Pedestrian Crossing Guide (2020)*, and National Association of City Transportation Officials' (NACTO) *Urban Street Design Guide*.

Each infrastructure item has an estimated average cost using planning-level guidance found in the Minnesota Local Road Research Board (LRRB) *Uncontrolled Pedestrian Crossing Guide* and net benefit described as a crash modification factor from the Crash Modification Factors Clearinghouse. A low-cost improvement could have a high benefit illustrating how the two measures are not exclusive. Infrastructure elements were identified using location-specific engineering judgment.

### Dodd Boulevard

The City proposed to implement a single-lane roundabout at the intersection based upon traffic engineering analysis performed as a part of the concurrent reconstruction project. Therefore, potential crossing infrastructure improvements were identified assuming future roundabout traffic control (see Table 7 and Figure 18).

The National Center for Safe Routes to School identifies roundabouts as especially difficult for children (as well as the elderly and those with visual or mobility impairments) due to their inability to accurately judge vehicle speeds, properly identify safe gaps in traffic, and understand motorist's yielding to those crossing. Yield compliance for pedestrians at roundabouts, especially for exiting vehicles, is shown to be very low per a MnDOT study of roundabouts and pedestrian crossing infrastructure.<sup>5</sup> These factors lend support for crossing enhancements. Crossing guards are also sometimes considered at roundabouts if schools are nearby; however, this is not applicable for Dodd Boulevard.<sup>6</sup>

<sup>5</sup> Hourdos, John. (2012). *Investigation of Pedestrian/Bicyclist Risk in Minnesota Roundabout Crossing*. Minnesota Traffic Observatory, Department of Civil Engineering, University of Minnesota. <https://www.lrrb.org/pdf/201228.pdf>

<sup>6</sup> Saferoutesinfo.org. (n.d.). *Roundabouts*. <http://guide.saferoutesinfo.org/engineering/roundabouts.cfm>



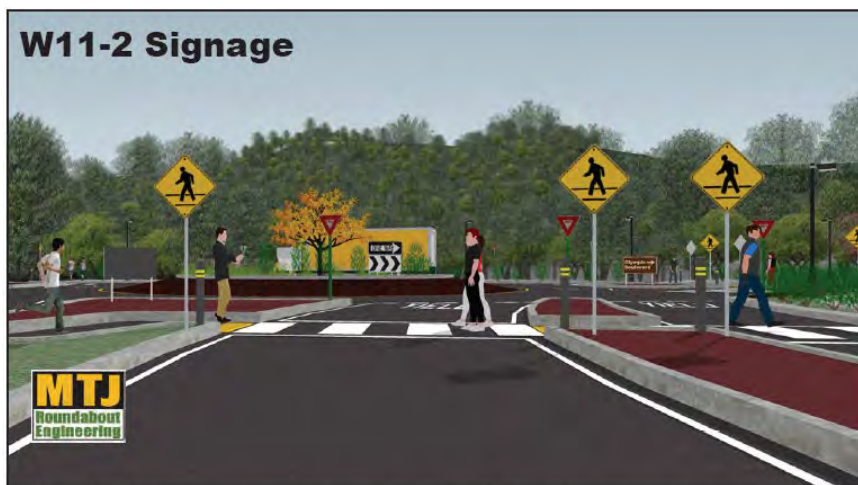
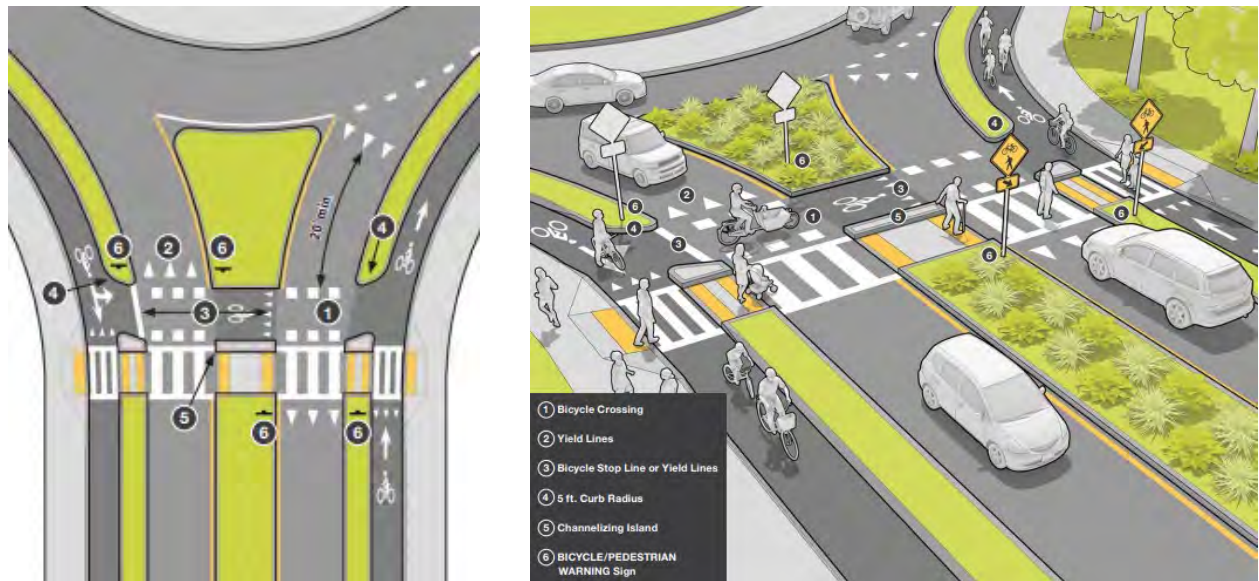
**Table 7. Crossing Infrastructure Options at Dodd Boulevard (single-lane roundabout)**

Infrastructure	Guidance and Benefit	Avg. Cost	CMF
<b>High Visibility Crosswalk Markings</b>	Minimum 20 feet, preferred 50 feet or two car lengths from the circulatory roadway. Added distance allows exiting vehicles space to yield as that movement has a significantly lower yield compliance compared to entering vehicles.	\$2,500 per crossing	0.6
<b>Advanced Yield Markings</b>	Minimum four feet, preferred up to eight feet from crosswalk on both sides to enhance the comfort of those crossing.	\$1,500 per crossing	0.75 - 0.886
<b>Enhanced Signage</b>	In addition to the R1-2 include R1-6 signs on both sides of the approach to properly alert drivers. If RRFBs are implemented the R1-6 signs are not needed. Example found in Figure 18.	\$1,000 per crossing	N/A
<b>Lane Width</b>	≤14 feet preferred to reduce speed and crossing distance. Reduced lane widths may be coupled with expanded truck apron if higher truck volumes are present for proper accommodation.	Location dependent	N/A
<b>Curb Radius</b>	Curb radii designed to limit entering and existing speeds at 15 mph or less. This can be accomplished with a combination of curb geometry and striping. Tightened curb radii may also enhance motorist sight distance for people at crosswalk.	Location dependent	N/A
<b>Pedestrian Island Refuge</b>	Minimum six-foot wide, preferred eight to ten feet wide. Wider medians increase the comfort for those crossing high-volume roadways or intersections.	\$13,500 each	0.685 - 0.742
<b>Rectangular Rapid Flashing Beacon</b>	Detailed review of RRFB warrants was completed for Dodd Boulevard and described below.	\$22,500 each	0.526
<b>Pedestrian-scale Lighting</b>	Adheres to illumination guidance.	\$26,000 per crossing	0.56

Source: Minnesota Manual on Uniform Traffic Control Devices (September 2020); MnDOT Bicycle Facility Design Manual (2020); Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020); Pedestrian/Vulnerable User Safety and Design Implementation (2017), MTJ Roundabout Engineering; Urban Street Design Guide, National Association of Transportation Officials; Crash Modification Factors Clearinghouse



Figure 18. Best Practices for Crossing Design, Striping, and Signage at Roundabouts



The W11-2 sign placement obstructs the view of the Yield and One Way signs



Source: MassDOT Separated Bike Lane Planning and Design Guide (2015) (top images); Pedestrian/Vulnerable User Safety and Design Implementation (2017), MTJ Roundabout Engineering (bottom images)



## Rectangular Rapid Flashing Beacons (RRFB) at Roundabouts

To consider the implementation of rectangular rapid flashing beacons (RRFB), yield compliance is a key factor. A study of pedestrian safety at roundabouts titled *Pedestrian/Vulnerable User Safety and Design Implementation* was completed in 2017 for MnDOT by MTJ Roundabout Engineering in partnership with the University of Minnesota at the 66<sup>th</sup> Street and Portland Avenue intersection in Richfield, Minnesota.<sup>7</sup> The study found that typical crossing signage (pictured earlier with the label “W11-2 Signage”) had a yield rate of less than 40 percent for pedestrians waiting at the crosswalk. Improved (and simplified) signage as well as revised lane markings increased driver yield compliance to approximately 67 percent on average. The breakdown between entering and exiting vehicles after the improvement was approximately 78 percent and 57 percent, respectively. This illustrates the importance of enhanced markings and signage at a minimum as well as considering crossing infrastructure for exiting vehicles.

According to the MUTCD *Interim Approval for Optional Use of Pedestrian-Actuated Rectangular Rapid Flashing Beacons at Uncontrolled Crosswalks (LA-21) (March 20, 2018)*, RRFBs are allowed at the approach to or egress from a roundabout for crosswalks. Furthermore, National Cooperative Highway Research Program (NCHRP) Report 674 found that driver yield compliance increased more than 20 percent following the implementation of an RRFB at a roundabout. This corresponds with other research showing that RRFBs have a driver yield compliance typically ranging from about 70 to 95 percent.<sup>8</sup> To ensure the crossing of Dodd Boulevard, the busiest intersection in the study area, is not a barrier for individuals of all ages and abilities such an improvement should be considered. A local example of an RRFB implemented at a roundabout is in Richfield at 66<sup>th</sup> Street and Nicollet Avenue.

Due to mixed yield compliance rates and the understanding that roundabouts are very difficult for children to cross, analysis was completed for additional crossing improvements under the engineering judgment of the crossing operating as “uncontrolled”. Controlled (e.g., stop sign) and uncontrolled intersections require specific crossing infrastructure. Two methods were used including the FHWA’s STEP Guide and guidance for installation of an RRFB or pedestrian hybrid beacon (PHB) from the City of Boulder using local research and the federal Manual of Uniform Traffic Control Devices (MUTCD). Boulder example has been adapted by other local jurisdictions such as the City of Edina. With the uncontrolled identifier, potential implementation of RRFBs at all legs of Dodd Boulevard would be advisable under both methods.

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<sup>7</sup> Johnson, Mark T., Hourdos, John. *Pedestrian/Vulnerable User Safety and Design Implementation* [Poster]. Teachamerica.com [http://teachamerica.com/RAB17/RAB17posters/RAB17\\_Johnson\\_Pedestrian\\_Poster.pdf](http://teachamerica.com/RAB17/RAB17posters/RAB17_Johnson_Pedestrian_Poster.pdf)

<sup>8</sup> United States Department of Transportation, Federal Highway Administration. (2010). *Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks*. <https://www.fhwa.dot.gov/publications/research/safety/pedbike/10043/10043.pdf>



Figure 19. Dodd Boulevard FHWA STEP Guidance Analysis

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
<b>2 lanes</b> (1 lane in each direction)	① 2 4 5 6	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 9
<b>3 lanes with raised median</b> (1 lane in each direction)	① 2 3 4 5	① ③ 5 7 9	① ③ 5 7 9	① ③ 4 5 7 9	① ③ 5 7 9	① ③ 5 7 9	① ③ 4 5 7 9	① ③ 5 7 9	① ③ 5 9
<b>3 lanes w/o raised median</b> (1 lane in each direction with a two-way left-turn lane)	① 2 3 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 9	① ③ 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 9	① ③ 4 5 6 7 9	① ③ 5 6 9	① ③ 5 6 9
<b>4+ lanes with raised median</b> (2 or more lanes in each direction)	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 8 9
<b>4+ lanes w/o raised median</b> (2 or more lanes in each direction)	① ③ 5 6 7 8 9	① ③ 5 6 7 8 9	① ③ 5 6 8 9	① ③ 5 6 7 8 9	① ③ 5 6 7 8 9	① ③ 5 6 8 9	① ③ 5 6 7 8 9	① ③ 5 6 8 9	① ③ 5 6 8 9

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.\*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

- 1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
- 2 Raised crosswalk
- 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Rectangular Rapid-Flashing Beacon (RRFB)\*\*
- 8 Road Diet
- 9 Pedestrian Hybrid Beacon (PHB)\*\*

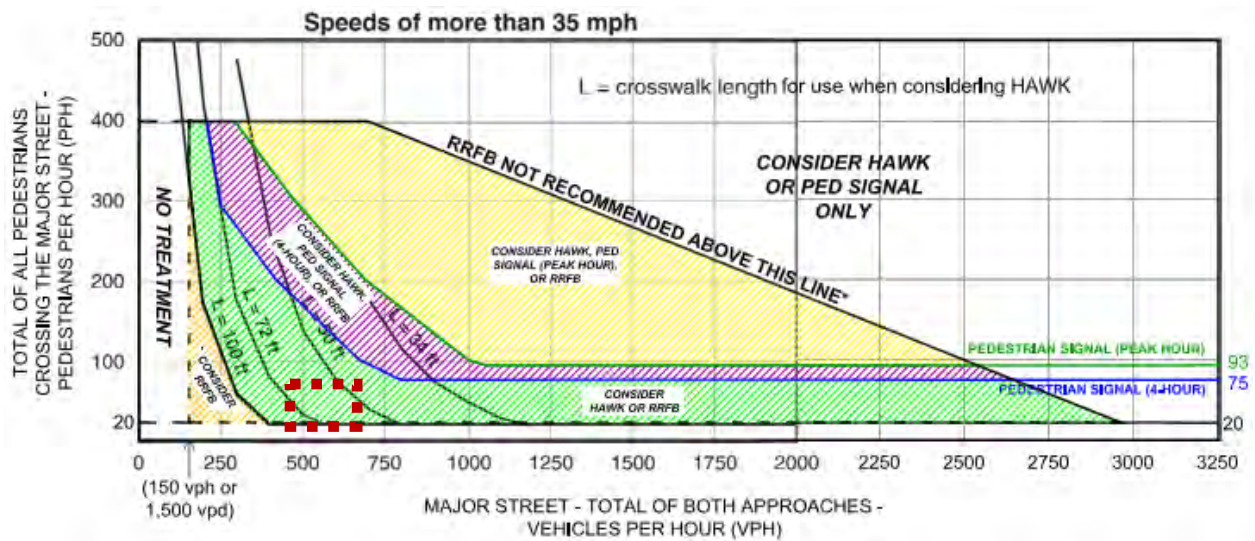
■ ■ = Dodd Boulevard

Source: Safe Transportation for Every Pedestrian (STEP) Guide (2018), Federal Highway Administration

Using the City of Boulder’s guidance, a minimum threshold of 20 pedestrians per hour (pph) would be required or ten children per hour if the crossing is near a school (see Figure 20). No pedestrians were recorded during the data collection on March 10, 2020, likely due to the absence of any multimodal infrastructure at the intersection. Upon completion of the 210<sup>th</sup> Street multiuse trail it is assumed that the threshold would be met given existing levels of demand at nearby intersections including Jacquard, Italy, Hyacinth, and Holyoke Avenues. Using turning movement counts (TMCs) collected at the intersection, it was determined that the sum of northbound and southbound traffic volumes along Dodd Boulevard (the major street approach) was 573 during the a.m. peak hour, 480 during the afternoon hour when school is dismissed, and 639 during the p.m. peak hour.



Figure 20. Dodd Boulevard RRFB Warrant Analysis for High-Speed Roadways (>35 mph)

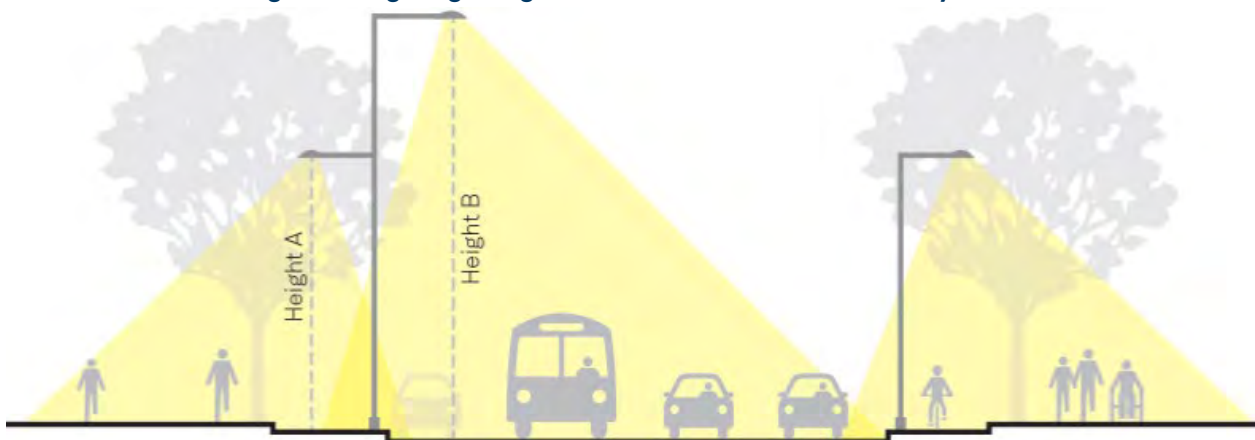


■ ■ = hourly range of sum for peak hour northbound and southbound volumes. Source: Boulder Pedestrian Crossing Treatment Installation Guidelines

### Pedestrian-Scale Lighting

Pedestrian-scale lighting is shorter and more frequently placed along a corridor to better illuminate people walking or bicycling as opposed to typical vehicle-oriented lighting (see Figure 21). Such lighting is critical at roadway crossings and can reduce all types of injury crashes by 59 percent.<sup>9</sup> The shorter lighting increases the lux (amount of light in lumens per square meter) which is recommended 20 to 40 lux at five feet above the road surface to provide adequate vertical illumination within a crosswalk. Typically, pedestrian-scaled lighting is 12 to 15 feet tall (less than 20 feet) and is spaced approximately every 50 to 80 feet along a corridor or within ten feet of a crosswalk. Spacing and placement is context specific, however.

Figure 21. Lighting Design Guidance for Pedestrians and Bicyclists



Source: Lighting Design Guidance, Global Designing Cities Initiative

<sup>9</sup> Gibbons, Ronald B. (2008). *Informational Report on Lighting Design for Midblock Crosswalks*. Virginia Tech Transportation Institute. FHWA-HRT-08-05, 1-32, Office of Safety Research and Development, Federal Highway Administration.



## Holyoke Avenue and Jacquard Avenue

The City proposes to maintain all-way stop control at both intersections based upon traffic engineering analysis performed as a part of the concurrent reconstruction project. All-way, stop-controlled intersections can be difficult to cross for children dependent upon the traffic volumes and number of lanes (e.g., crossing distance). Potential crossing infrastructure improvements were analyzed to increase the safety and comfort of those crossing (see Table 8).

**Table 8. Crossing Infrastructure Options at Holyoke and Jacquard Avenues (all-way stop)**

Infrastructure	Guidance	Avg. Cost	CMF
<b>High Visibility Crosswalk Markings and Stop Bar</b>	Continental design and at least six feet wide to provide a comfortable crossing. Minimum four feet, up to eight feet from crosswalk to limit vehicle encroachment.	\$3,500 per crossing	0.6
<b>In-street Pedestrian Sign</b>	In addition to the R1-1, include R1-6c signs at each approach to properly alert drivers. These could be paired with SCHOOL plaque.	\$1,000 per crossing	N/A
<b>Curb Radius and Directional ADA-compliant Curb Ramps</b>	Reduce curb radii at all intersection corners to minimum allowable by applicable design vehicle to slow turning speeds. Include directional curb ramps to shorten crossing distance, reduce exposure, and enhance accessibility.	Location dependent	N/A
<b>Pedestrian Island Refuge</b>	Minimum six-foot wide, preferred eight to ten feet wide. Wider medians increase the comfort for those waiting to cross high-volume roadways or intersections.	\$13,500 each	0.685 - 0.742
<b>Curb Extension</b>	Maximize extension as it aligns with applicable design vehicle turning radius. Reduces the crossing distance as well as improves motorist vision of people crossing.	\$13,000 each	0.63
<b>Pedestrian-scale Lighting</b>	Adheres to illumination guidance.	\$26,000 per crossing	0.56

Source: Minnesota Manual on Uniform Traffic Control Devices (September 2020); MnDOT Bicycle Facility Design Manual (2020); Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020); Urban Street Design Guide, National Association of Transportation Officials



## Potential Turn Lane Removal

Analysis was completed for removing existing turn lanes at Holyoke Avenue and Jacquard Avenue to balance traffic operations with multimodal comfort and safety by reducing crossing distances. Traffic operations of both intersections was modeled using Synchro/SimTraffic 11 under existing traffic volumes (see Table 9).

**Table 9. Traffic Operations at Holyoke and Jacquard Avenues with Multimodal Improvements**

Proposed Improvement	Multimodal Benefit	Existing Geometry <sup>1</sup>		Proposed Geometry	
		AM	PM	AM	PM
<b>Holyoke Avenue</b> – remove southbound right-turn lane	Crossing distance reduction from 68 feet to 54 feet on north leg.	28 sec delay, LOS D	21 sec delay, LOS C	30 sec delay, LOS D	22 sec delay, LOS C
<b>Jacquard Avenue</b> – remove eastbound left-turn lane and northbound right-turn lane	Crossing distance reduction of the south and west legs from 90 feet to 67 feet and 67 feet to 56 feet, respectively.	28 sec delay, LOS D	13 sec delay, LOS B	25 sec delay, LOS C	13 sec delay, LOS B

<sup>1</sup>Overall intersection operations for an all-way stop using the Highway Capacity Manual 6<sup>th</sup> Edition. See Appendix C for Synchro reports.  
Source: SRF Consulting Group, 2020, Highway Capacity Manual 6<sup>th</sup> Edition

There is little to no negative impact on existing traffic operations after removing the existing turn lanes at each intersection under existing conditions. Level of service at Jacquard Avenue improves due to streamlined lane configurations that outweigh increases in overall delay. Of note, additional analysis should be conducted prior to implementation to ensure existing and future traffic operations are adequately accommodated.

## Proposed Improvements

Potential improvement options for the crossing of all legs at the three major intersection are organized into two categories that demonstrate the level of impact to transportation network users and projected cost.

- **Transportation Balanced Option (TB):** Provides some multimodal upgrades while balances all modes of transportation to ensure limited operational impacts to traffic and reasonable cost savings.
- **Multimodal Focused Option (MF):** Provides the greatest impact toward multimodal safety and comfort and strives to create a crossing that is accessible to those of all ages and abilities, most notably children. Inherently this may result in higher costs and the potential of a higher impact to traffic operations.

Each intersection will have two options to illustrate the broad spectrum of opportunity or the minimum and maximum as identified by state and national guidance (see Table 10). Certain infrastructure should always be considered in conjunction with other options, such as crosswalk markings, stop bar, and in-street pedestrian signage implemented as a package of improvements.



**Table 10. Potential Crossing Improvements at 210th Street’s Major Intersections**

Infrastructure	TB <sup>1</sup>	MF <sup>2</sup>	Notes
<b>Dodd Boulevard and 210<sup>th</sup> Street</b>			
High Visibility Crosswalk Markings	20 feet	50 feet	Setback from circulatory roadway
Advanced Yield Markings	4 feet	8 feet	Distance from crosswalk markings
Enhanced Signage	R1-6	RRFB	Both sides of travel lane
Lane Width	>14 feet	≤14 feet	
Curb Radius	>15 mph	≤15 mph	Design speed by curb radii
Pedestrian Island Refuge (median)	6 feet	10 feet	
Rectangular Rapid Flashing Beacon (RRFB) <sup>1</sup>	No	Yes	Both sides of each approach
Pedestrian-scale Lighting	No	Yes	Adheres to illumination guidance
<b>Holyoke Avenue and 210<sup>th</sup> Street   Jacquard Avenue and 210<sup>th</sup> Street</b>			
High Visibility Crosswalk Markings	Yes	Yes	
Stop Bar	4 feet	5-8 feet	Distance from crosswalk markings
In-street Pedestrian Sign	Yes	Yes	Following MN MUTCD guidance
Curb Radius and Directional ADA-compliant Curb Ramps	Ramps only	Both	Limit turning speeds to less than 15 mph with tighter curb radii
Pedestrian Island Refuge (median)	No	Yes	6 feet minimum, 8-10 feet preferred
Curb Extension	SW only	Yes	All applicable intersection corners, minimum 6-feet
Pedestrian-scale Lighting	No	Yes	Adheres to illumination guidance
Turn Lane Removal	No	Yes	Holyoke: southbound right-turn lane; Jacquard: eastbound left-turn lane and northbound right-turn lane
Turn Lane Length Reduction	Yes	Yes	Reduce southbound right-turn lane length into Lakeville South High School so it does not extend to 210 <sup>th</sup> Street at Jacquard Avenue, thereby decreasing the crossing distance via a curb extension

<sup>1</sup>Transportation Balanced <sup>2</sup>Multimodal Focused  
 Source: SRF Consulting Group, 2020



# UNCONTROLLED CROSSING AND SIDE-STREET TRAIL CROSSING

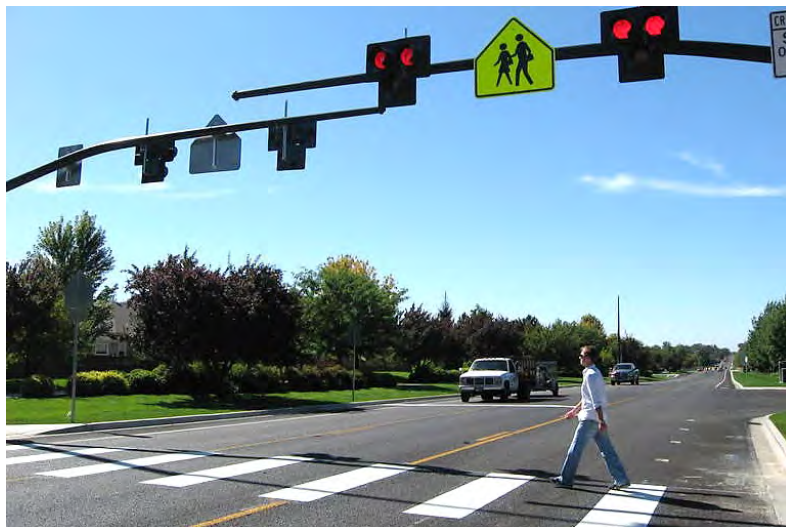
The study of other crossings along and across 210<sup>th</sup> Street was performed. This included both uncontrolled crossings across 210<sup>th</sup> Street as well as crossings of side-streets by the future multiuse trail along 210<sup>th</sup> Street.

## Uncontrolled Crossing

Six locations for crossings across 210<sup>th</sup> Street were identified either at an adjacent to existing side-street, stop-controlled intersections or at a mid-block location. The crossing is considered uncontrolled because 210<sup>th</sup> Street does not have a stop sign or other traffic control device at this location. Therefore, traffic will not stop unless a crossing device is activated so a child, for example, may safely cross the street. Additional analysis and consideration of crossing placement was reviewed to determine planning-level locations. Based upon student residence locations, walking or bicycling desire lines to access destinations, and the distance between crossings, locations were identified. Infrastructure improvements could enhance each crossing and support a safer and more comfortable environment for people of all ages and abilities (see Table 11).



Crossing with rectangular rapid flashing beacons (above).  
Source: FHWA



Crossing with pedestrian hybrid beacons (left).  
Source: tapinto.net



**Table 11. Uncontrolled Crossing Infrastructure Options**

Infrastructure	Guidance	Avg. Cost	CMF
High Visibility Crosswalk Markings	Continental design and at least six feet wide to provide a comfortable crossing.	\$2,500 per crossing	0.6
Advanced Yield Markings	Marked Crossing or RRFB: Minimum 20 feet, preferred 50 feet from crosswalk; PHB: Minimum 40 feet, preferred 50 feet from crosswalk. Markings increases the comfort of people crossing and motorist site distance.	\$1,500 per crossing	0.75 - 0.886
Enhanced Signage	R1-5b signs to denote the location where drivers should stop from crosswalk. Additional crosswalk advanced warning signs to alert drivers.	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Minimum six-foot wide, preferred eight to ten feet wide. Minimum 20 feet long, preferred 40 to 60 feet long. Wider and longer medians increase the comfort for those waiting to cross high-volume roadways or intersections.	\$13,500 each	0.685 - 0.742
Curb Extension	Minimum six-foot extension into roadway, preferred maximization of extension as it aligns with applicable design vehicle turning radius. Reduces the crossing distance and exposure to vehicles for people crossing as well as improves motorist vision of people crossing.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Placement on both sides of approach to increase driver awareness if median present.	\$22,500 each	0.56
Pedestrian Hybrid Beacon	At least two signal heads in each direction.	\$57,500 each	0.685 - 0.742
Pedestrian-scale Lighting	Adheres to illumination guidance.	\$26,000 per crossing	0.56

Source: Minnesota Manual on Uniform Traffic Control Devices (September 2020); MnDOT Bicycle Facility Design Manual (2020); Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020); Urban Street Design Guide, National Association of Transportation Officials



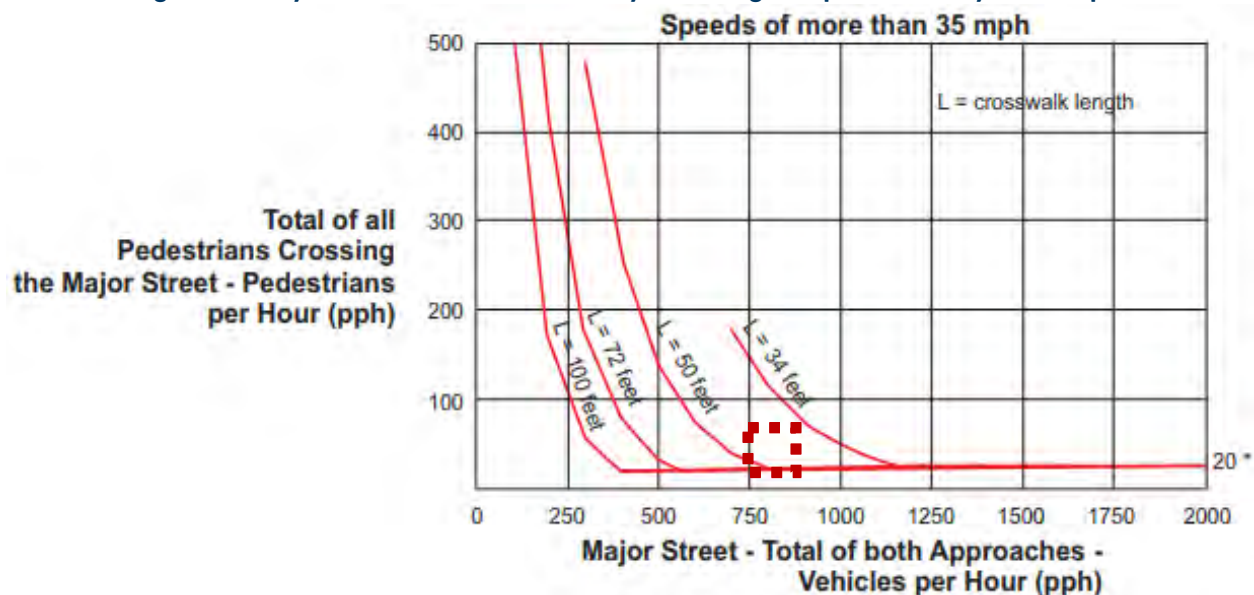
## Pedestrian Hybrid Beacon

The FHWA defines a PHB (also known as a “HAWK”) as distinct from traffic signals and constant flash warning beacons because it is pedestrian activated only when needed and uses unique signal heads.<sup>10</sup> PHBs reduce pedestrian and bicycle crashes by nearly 70 percent and have a driver yield compliance of over 90 percent. Comparatively, RRFBs typically reduce pedestrian and bicycle crashes by nearly 50 percent and have a driver yield compliance ranging from about 70 to 95 percent.

The FHWA strongly advises PHBs at uncontrolled crossings where speeds are greater than 40 mph.<sup>11</sup> The existing posted speed limit is 45 mph (85<sup>th</sup> percentile speed of 49 mph) along 210<sup>th</sup> Street between Jacquard Avenue and Dodd Boulevard. If a pedestrian island refuge is implemented at the crossing, then RRFBs could be acceptable per the FHWA’s STEP Guide and engineering judgment. However, lowered posted speeds could provide a more comfortable crossing and higher perceived safety for children as well.

Italy Avenue was studied for an RRFB or PHB due to the likelihood of implementation as a part of the concurrent reconstruction project. Future implemented crossings would likely use similar or the same crossing infrastructure as Italy Avenue. Two methods were used including the FHWA’s STEP Guide and the Minnesota MUTCD (see Figure 22). Implementation of an RRFB or PHB is advisable related to the speed, traffic volume, and number of lanes at the uncontrolled location.

**Figure 22. Italy Avenue PHB Warrant Analysis for Higher Speed Roadways (>35 mph)**



= hourly range of the sum for peak hour northbound and southbound volumes, Source: Minnesota MUTCD (September 2020)

<sup>10</sup> United States Department of Transportation, Federal Highway Administration. (2014). *Pedestrian Hybrid Beacon Guide: Recommendations and Case Study*. [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/fhwasa14014/](https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa14014/)

<sup>11</sup> United States Department of Transportation, Federal Highway Administration. (2018). *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*. <https://bit.ly/3n6YH0Q>



The MN MUTCD determines that a PHB would be warranted per turning movement counts (TMCs) extrapolated from StreetLight and pedestrian and bicycle counts collected in April at Italy Avenue. From 3 p.m. to 7 p.m. pedestrian and bicyclist exceeded the 20 PPH threshold (20 to 34 PPH). The corresponding traffic volumes are approximately 750 to 900 vehicles summed in both direction during the peak hours (see Figure 22). The crossing distance was estimated for a three-lane roadway which adheres to the concurrent reconstruction project’s vision.

The FHWA STEP Guide recommends an RRFB if speeds were lowered and a pedestrian island refuge was present, otherwise a PHB is recommended under current speed conditions and no median present (see Figure 23).

Figure 23. Italy Avenue FHWA STEP Guidance Analysis

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
<b>2 lanes</b> (1 lane in each direction)	① 2 4 5 6	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 9
<b>3 lanes with raised median</b> (1 lane in each direction)	① 2 3 4 5	① ③ ① 5 6 7 9	① ③ ① 5 6 7 9	① ③ 4 5 7 9	① ③ 5 7 9	① ③ 5 7 9	① ③ 4 5 7 9	① ③ 5 7 9	① ③ 5 9
<b>3 lanes w/o raised median</b> (1 lane in each direction with a two-way left-turn lane)	① 2 3 4 5 6 7 9	① ③ ① 5 6 7 9	① ③ ① 5 6 7 9	① ③ 4 5 6 7 9	① ③ 5 6 7 9	① ③ 5 6 7 9	① ③ 4 5 6 7 9	① ③ 5 6 9	① ③ 5 6 9
<b>4+ lanes with raised median</b> (2 or more lanes in each direction)	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 7 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 7 8 9	① ③ 5 8 9	① ③ 5 8 9
<b>4+ lanes w/o raised median</b> (2 or more lanes in each direction)	① ③ ① ③ 5 6 7 8 9	① ③ ① ③ 5 6 7 8 9	① ③ ① ③ 5 6 8 9	① ③ ① ③ 5 6 7 8 9	① ③ ① ③ 5 6 7 8 9	① ③ ① ③ 5 6 8 9	① ③ ① ③ 5 6 7 8 9	① ③ ① ③ 5 6 8 9	① ③ ① ③ 5 6 8 9

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
  - Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
  - Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.\*
- The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

- 1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
- 2 Raised crosswalk
- 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- 4 In-Street Pedestrian Crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Rectangular Rapid-Flashing Beacon (RRFB)\*\*
- 8 Road Diet
- 9 Pedestrian Hybrid Beacon (PHB)\*\*

■ ■ = Italy Avenue

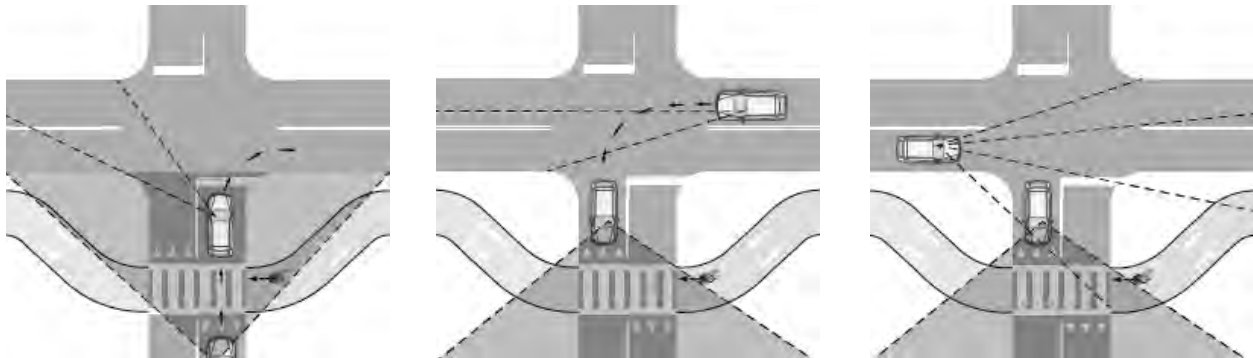
Source: Safe Transportation for Every Pedestrian (STEP) Guide (2018), Federal Highway Administration



## Side-Street Trail Crossing

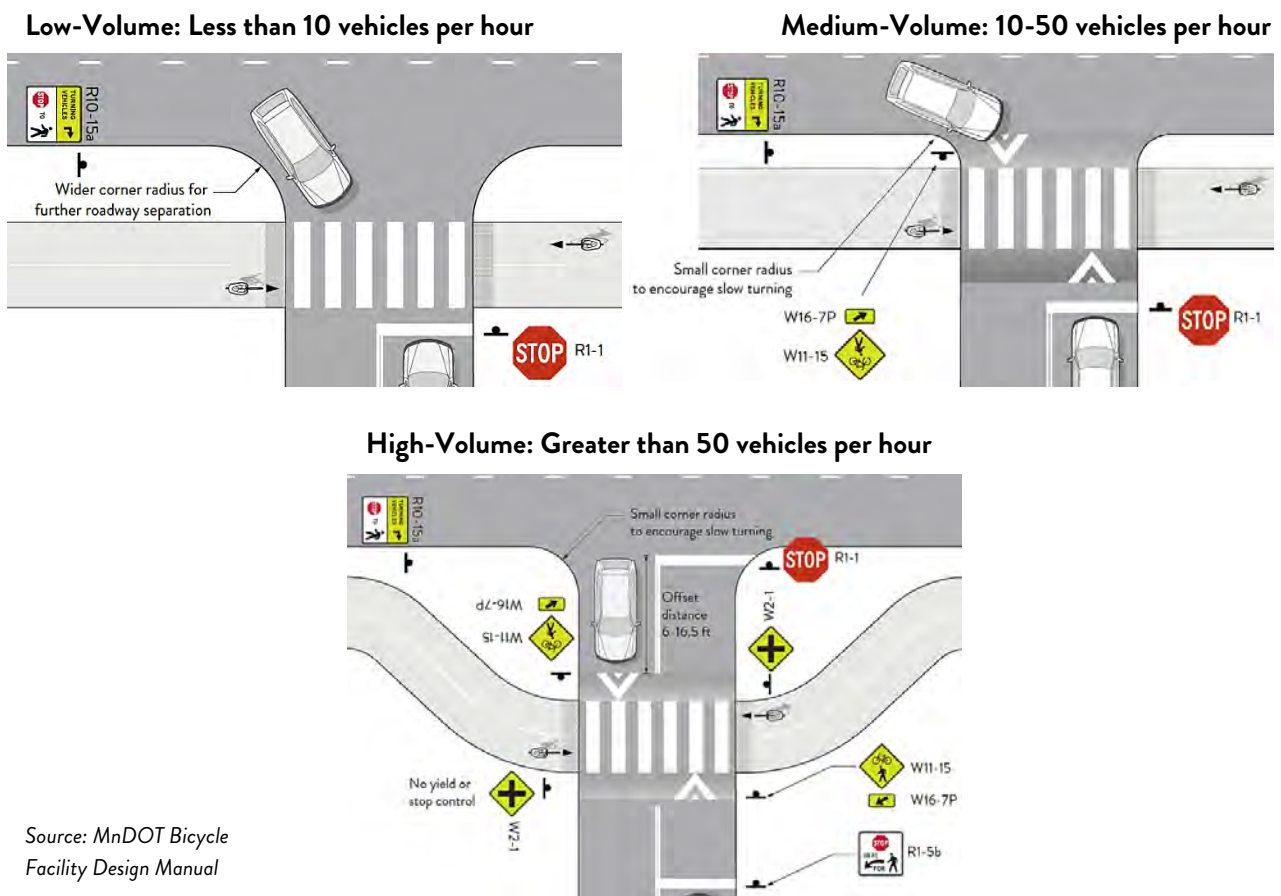
MnDOT intersection design guidance was reviewed for side-street crossings of a multiuse trail. Improvements are heavily dependent upon ROW availability and may not always be feasible. Roadways are classified by three level of improvements in vehicles per hour (see Figure 24). The corresponding benefit of the high-volume crossing improvement as it relates to a driver’s sight distance is a key consideration (see Figure 25).

Figure 24. Sight Distance Example



Source: MnDOT Bicycle Facility Design Manual

Figure 25. Side-Street Trail Crossing Guidance



Source: MnDOT Bicycle Facility Design Manual



## Proposed Improvements

### Uncontrolled Crossing Project Prioritization

Uncontrolled crossing locations were prioritized using five measures (see Table 12):

- **Network Connectivity:** Where the multiuse trail would best serve the existing multimodal network.
- **Access to Destinations:** How the multiuse trail placement would connect to youth destinations such as schools, parks, etc.
- **Pedestrian and Bicycle Volumes:** The existing or estimated volumes at the crossing location.
- **Number of Students:** The number of students living near the proposed multiuse trail that would benefit from that specific placement using student household data.
- **Public Feedback:** Community input received in outreach completed for the concurrent reconstruction project.

Adhering to reasonable spacing between each crossing was also considered. NACTO broadly defines acceptable distance between crossings as within an approximate three-minute walk, otherwise the likelihood for humans to perform risk-taking behavior exponentially increases due to the distance by out of direction travel and perceived benefit related to time savings. Using the industry standard walking speed of 3.5 feet per second, each of the six proposed crossings are estimated at less than four minutes apart. Of note, no state or national guidance exists identifying specific measured distances between marked crossings as that is heavily dependent upon the surrounding context, land use and destinations, network connectivity, and other factors. A high-level analysis of agency best practices in the United States showed typical marked crossing spacing from 200 to 600 feet when warranted. Proposed crossing locations along 210<sup>th</sup> Street are primarily further apart due to those aforementioned factors as well as engineering judgment.

The six crossings are prioritized per the prioritization matrix which numerically ranked all options for consideration to organize a planning-level implementation plan. However, the crossings could be implemented in any order as funding allows, warrants are met, future development is completed, and/or new multimodal infrastructure is built.



**Table 12. Uncontrolled Crossing Prioritization Matrix**

Rank	Crossing Location	Spacing (feet)	Network Connection	Destination Access	Ped/Bike Volume <sup>1</sup>	Number of Students <sup>2</sup>	Public Feedback
1	Italy Avenue	1,100 ft to Jacquard 750 ft to Iran	+	+	+	+	+
4	Iran Avenue	750 ft to Italy 900 ft to Independence	—	—	—	+	—
5	Independence Avenue	900 ft to Iran 750 ft to Idaho	×	×	×	—	—
6	Idaho Avenue	750 ft to Independence 400 ft to Dodd	×	×	×	×	—
2	Hyacinth Avenue	700 ft to Dodd 1,300 ft to Railroad	+	+	+	+	+
3	Railroad Crossing	1,300 ft to Hyacinth 600 ft to Holyoke	+	+	+	×	—

<sup>1</sup> Calculated using pedestrian and bicycle volumes collected at Italy, Idaho, and Hyacinth, or extrapolated using engineering judgment.

<sup>2</sup> Calculated using student residence location within a 750-foot radius of the proposed crossing. The 750-foot measurement is the approximate average of the corridor length divided by the total number of crossings (6,600 feet / 9 crossings) which includes the three major intersections.

+ = positive, — = neutral, × = negative impact; Source: SRF Consulting Group, 2020

### Side-Street Trail Crossing

Side-street trail crossings along 210<sup>th</sup> Street from Jacquard Avenue to Holyoke Avenue were reviewed to identify potential improvements based upon MnDOT guidance. StreetLight volumes were extrapolated for Italy Avenue and Hyacinth Avenue, while the other crossing volumes were estimated by using a threshold of ten cars per day for each single-family home and organizing volumes within a reasonable catchment area that would likely use the intersection. Ten percent of the total daily volume defines a peak hour that would apply to the volume thresholds (see Table 13). Crossing improvements are organized by the three levels and all include enhanced signage and striping/markings. Medium and high-volume options also included a raised crossing.

**Table 13. Side-Street Trail Crossing Improvements by Location**

Low-Volume	Medium-Volume	High-Volume
Ixonia Avenue	Idaho Avenue	Italy Avenue
Iteri Avenue	Howland Avenue	Hyacinth Avenue
Isle Avenue		
Iran Avenue		
Huntsville Trail		

Source: SRF Consulting Group, 2020



# CHAPTER 5: PROPOSED PROJECTS

This chapter organizes the proposed and potential projects identified and described in Chapter 4 (see Table 14 and Figure 28). Each project and associated key elements are organized in fact sheets that are designed to be independently used external to this Study document for public outreach or grant applications. Pertinent information such as key project items, estimated cost, and associated infrastructure are included.

<b>210<sup>th</sup> Street Multiuse Trail</b>	<b>North side:</b> Holyoke Avenue to Kensington Boulevard	The multiuse trails along both sides of 210 <sup>th</sup> Street are the key proposed multimodal project of this Study, and will connect the three schools as well as adjacent neighborhoods, parks, and other destinations in southern Lakeville. It is envisioned that multiuse trails are implemented along both the north and south sides for 2.2 miles and 1.8 miles, respectively. In total, the proposed includes approximately four miles of new multiuse trail that further develops, and interconnects, the City’s multimodal network. Without this improvement, the other proposed SRTS projects will not be fully realized.	<b>Total Estimated Cost: \$800,000</b>
	<b>South side:</b> Holyoke Avenue to 1,000 feet west of Jury Court (Trinity Church driveway)		

The following details methodologies and sources used in the project pages.

AADTs were estimated at the side-streets near uncontrolled crossing locations using this methodology:

- Italy and Hyacinth Avenues: 12-hour StreetLight data extrapolated to AADTs using an average of the sum of a.m. and p.m. peak hours  $((\text{a.m. peak hour}/0.08 + \text{p.m. peak hour}/0.1) / 2)$
- Iran Avenue: Used the estimated AADT for the north side of Italy Avenue due to similar context.
- Idaho Avenue: Used the estimated AADT for the north side of Hyacinth Avenue due to similar context.

The following are sources used for information on the project pages:

- *Minnesota Manual on Uniform Traffic Control Devices (September 2020)*
- *Bicycle Facility Design Manual (2020)*, MnDOT
- *Uncontrolled Pedestrian Crosswalk Quick Reference Guidance*, Minnesota Local Road Research Board (2020)
- *Pedestrian/Vulnerable User Safety and Design Implementation (2017)*, MnDOT
- *Urban Street Design Guide*, National Association of Transportation Officials
- *Crash Modification Factors Clearinghouse*



**Table 14. Proposed Crossing Projects**

ID <sup>1</sup>	Location	Project Type	Description	Estimated Cost <sup>2</sup>
M1	Jacquard Avenue	Major Intersection	Crossing upgrades to an all-way stop.	\$40,000 – \$260,000
M2	Dodd Boulevard	Major Intersection	Crossing upgrades to a planned single-lane roundabout.	\$75,000 – \$500,000
M3	Holyoke Avenue	Major Intersection	Crossing upgrades to an all-way stop.	\$25,000 – \$250,000
U1	Italy Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	\$90,000 – \$130,000 (RRFB) \$140,000 – \$180,000 (PHB)
U2	Iran Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	Requires future analysis
U3	Independence Avenue	Uncontrolled Crossing	Crossing of 210th Street near the future intersection.	Requires future analysis
U4	Idaho Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	Requires future analysis
U5	Hyacinth Avenue	Uncontrolled Crossing	Crossing of 210th Street at the intersection.	Requires future analysis
U6	Railroad Crossing	Uncontrolled Crossing	Crossing of 210th Street near the future trail crossing.	Requires future analysis
l	Five locations (see Table 13)	Side-Street Trail Crossing	Crossing upgrades at side-streets along 210 <sup>th</sup> Street for the trail.	\$15,000 – \$45,000
m	Two locations (see Table 13)	Side-Street Trail Crossing	Crossing upgrades at side-streets along 210 <sup>th</sup> Street for the trail.	\$25,000 – \$75,000
h	Two locations (see Table 13)	Side-Street Trail Crossing	Crossing upgrades at side-streets along 210 <sup>th</sup> Street for the trail.	\$40,000 – \$120,000

<sup>1</sup> Order does not denote priority. M = Major Intersection; U = Uncontrolled Crossing; l, m, and h = Low, Medium, and High Side-Street Trail Crossing

<sup>2</sup> Cost estimates for crossing infrastructure as listed in each project page with the range denoting the transportation balanced and multimodal focused options and organized using the Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020). The costs only include applicable infrastructure and do not estimate other elements such as right-of-way, tree removal, mobilization, etc.

Source: SRF Consulting Group, 2020



## OTHER CONSIDERATIONS

Other considerations do not have specific project pages due to additional analysis required outside of this Study as well as consideration of the concurrent roadway reconstruction project scope and other factors.

### Railroad Trail

A rail-to-trail connection to McGuire Middle School and Kennedy Elementary School from 210<sup>th</sup> Street via the existing railroad corridor. The trail could provide a convenient and more direct alternative to the schools from 210<sup>th</sup> Street as opposed to the 90-degree travel required via Holyoke Avenue. This project is identified in other local plans for implementation when the opportunity arises.

### Vehicle Speeds

Infrastructure interventions or geometric improvements, coupled with posted speed, could lower speeds to better align with the future urban and multimodal context of the 210<sup>th</sup> Street corridor. Lowering the posted speed will not decrease speeds alone. Medians can double as chicanes that slow traffic as lanes shift. An example is Portland Avenue in Richfield, pictured below, which meanders at intersections with pedestrian island refuges and narrowed lanes (ten feet plus curb). Narrowed lanes could also lower speeds along 210<sup>th</sup> Street due to increased friction for motorists while maximizing ROW for multimodal uses. MnDOT standards identify lane widths of 10 or 11 feet along urban and suburban collector roadways under 50 mph.<sup>12</sup> Tighter lane widths are credited with positively impacting a street's safety without impacting traffic operations.



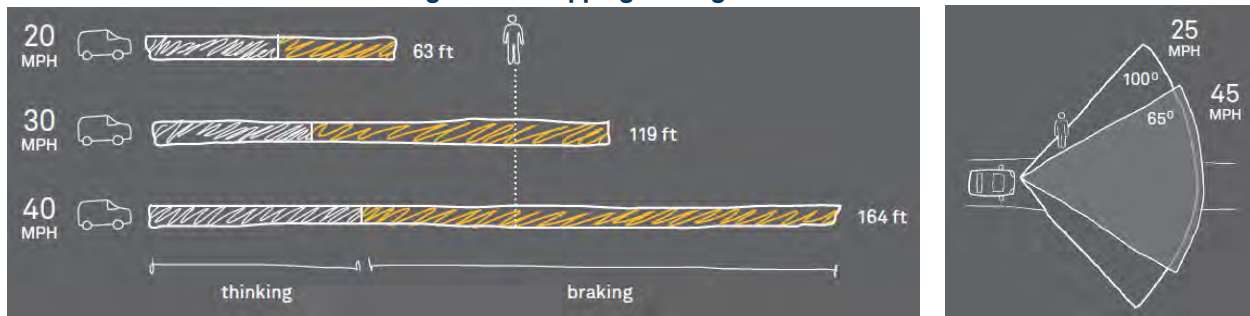
Portland Avenue in Richfield. Source: Google Streetview

<sup>12</sup> Minnesota Department of Transportation. (2018). *Travel Lane Width Standards for State Highways* (18-08-RS-06). <https://techmemos.dot.state.mn.us/>



Speed is a critical factor toward lowering the risk of serious injury or death when someone is struck by a vehicle. Children are at even higher risk due to their body size and corresponding increase in the popularity of larger vehicles (i.e., sport utility vehicles) in the United States. Speed correlates directly with a motorist’s stopping distance and vision which can be life or death for people walking and bicycling (see Figure 26). Posted speed reductions could improve perceived crossing safety.

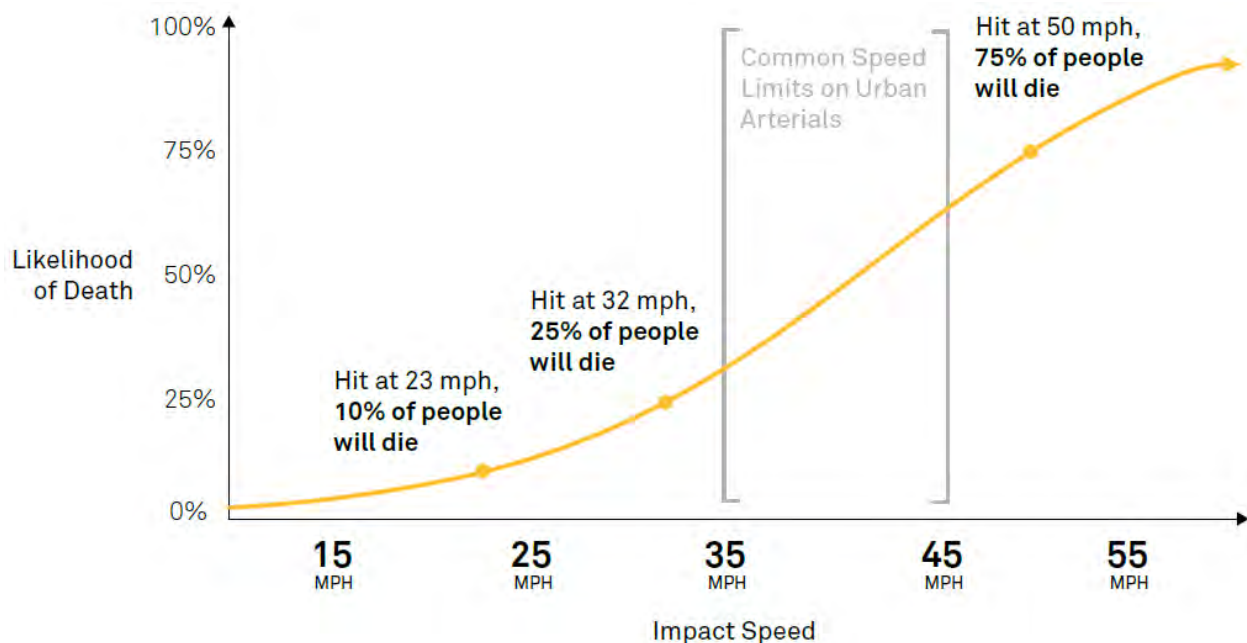
**Figure 26. Stopping and Sight Distance**



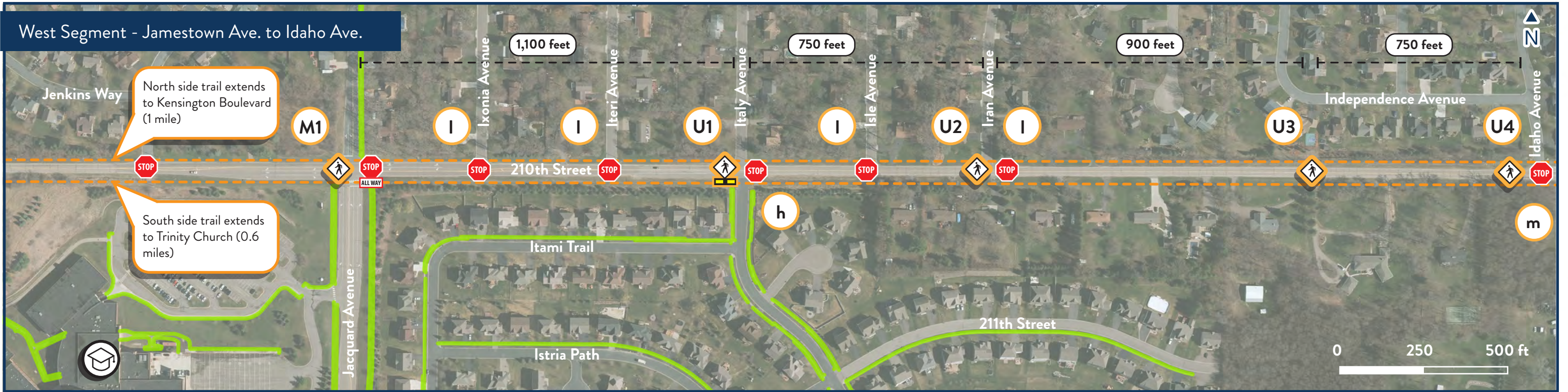
Source: *City Limits: Setting Safe Speed Limits on Urban Streets (2020)*, National Association of Transportation Officials


The traffic speed and corresponding risk of serious injury or death shows how even minor changes in vehicular speed can produce major benefits as severity exponentially increases with speed, most notably above 35 mph (see Figure 27). At current speeds along 210<sup>th</sup> Street between Kensington Boulevard and Dodd Boulevard, a person could have a 60 to 80 percent likelihood of death if they were hit by a car while crossing the road at an uncontrolled location. Between Dodd Boulevard and Holyoke Avenue, where the posted speed limit is lower, there is still a potential 30 to 40 percent chance that a person could be fatally hit.

**Figure 27. Likelihood of Injury or Death by Traffic Speed**



Source: *City Limits: Setting Safe Speed Limits on Urban Streets (2020)*, NACTO



-  Focus School
-  Proposed Enhanced Crossing
-  Proposed RRFB
-  Proposed Roundabout
-  Improvement ID
-  Side-Street Stop-Controlled Intersection
-  All-Way Stop-Controlled Intersection
-  Proposed Trail
-  Existing Sidewalk
-  Distance Between Crossings

Lowered speed limits along 210th Street from Kensington Boulevard to Dodd Boulevard could enhance the safety and comfort of children walking, rolling, or bicycling along and across the corridor.

# M1. JACQUARD AVENUE & 210TH STREET



## KEY PROJECT ITEMS

- All-way stop controlled intersection with crosswalks proposed at all four legs.
- The intersection is adjacent to Lakeville South High School, a destination for children of all ages due to after-school programs in addition to the over 1,800 enrolled students.
- All-way stops can be difficult for children to cross. The number of lanes is an important consideration to reduce crossing width and create more predictability of stopped vehicles for children.
- Proposed improvements could shorten crossing distances from up to 90 feet to as little as 40 feet.

## BACKGROUND



**PEDESTRIAN & BIKE CRASHES**  
0 and 0



**TRAFFIC VOLUMES (AADT)**  
5,500 (west), 5,400 (east),  
1,800 (north), 3,000 (south)



**PEDESTRIAN & BIKE VOLUMES**  
159 and 5 (Peak hour total: 70, 3-4 pm corresponding with Lakeville South High School dismissal)



**TRAFFIC SPEED**  
Jacquard Avenue – Posted 30 mph (north), 35 mph (south); 210th Street – Posted/85th percentile: 50 mph/55 mph (west), 45 mph/49mph (east)

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk & Stop Bar	Yes	Yes	Directs people where to cross the street and alerts drivers. Stop bar limits vehicle encroachment. Min. distance from crosswalk is 4-feet, preferred up to 8-feet.	\$3,500 per crossing	0.6
Enhanced Signage	Yes	Yes	Reminds motorists of state right-of-way laws for people crossing.	\$1,000 per crossing	N/A
Curb Radius & Curb Ramps	Ramps only	Both	Tightened curb radius to decrease turn speeds ( $\leq 15$ mph). Implementing directional, ADA-compliant ramps will shorten the crossing distance.	N/A	N/A
Pedestrian Island Refuge	No	Yes	Creates a two-stage crossing (min. 6-foot wide, preferred 8-10 feet). Potential implementation on the south, east, and west legs or as ROW allows.	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens crossing distance and increases motorist vision of people crossing. Potential implementation in the SW corner and others as ROW allows.	\$13,000 each	0.63
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56
Turn Lane Removal	No	Yes	Remove eastbound left-turn lane and northbound right-turn lane.	N/A	N/A
Turn Lane Length	Yes	Yes	Reduce SB right-turn lane into Lakeville South High School so it does not extend to 210th Street.	N/A	N/A

# M2. DODD BOULEVARD & 210TH STREET



## KEY PROJECT ITEMS

- Planned to be a single-lane roundabout with crosswalks at all four legs.
- Roundabouts are very difficult for children due to uncertain vehicle yielding. Crossing improvements will improve the comfort and safety of those crossing this high-volume intersection and lessen the potential for this intersection to be a barrier.
- Multimodal-focused upgrades such as RRFBs could enhance safety/comfort.
- The intersection could have other future multiuse trail connections to Dodd Boulevard making this a key crossroad for the City's regional trail system.

## BACKGROUND



### PEDESTRIAN & BIKE CRASHES

0 and 0



### TRAFFIC VOLUMES (AADT)

5,400 (west), 8,300 (east), 11,700 (north), 5,500 (south)



### PEDESTRIAN & BIKE VOLUMES

0 and 0



### TRAFFIC SPEED

Dodd Boulevard: Posted 45 mph (north), 50 mph (south); 210th Street: Posted/85th percentile: 45 mph/49 mph (west), 35 mph/41 mph (east)

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	20 feet	50 feet	Directs people where to cross the street. Distance from the circulatory roadway.	\$3,500 per crossing	0.6
Advanced Yield Markings	4 feet	8 feet	Increases motorist sight distance and limits vehicle encroachment of the crosswalk. Distance from the crosswalk on both sides.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-6	RRFB	Alerts motorists and could increase yield compliance. Place either type on both sides of the enter/exit lane (12 in total with a two-way sign in each median).	\$1,000 per crossing	N/A
Lane Width	>14 feet	≤14 feet	Reduces vehicular speeds and crossing distance of the intersection.	N/A	N/A
Curb Radius	>15 mph	≤15 mph	Tightened curb radius to maximum allowable per design vehicle to decrease entering/exiting vehicle speed.	N/A	N/A
Pedestrian Island Refuge	6 feet	10 feet	Creates a two-stage crossing. Maximize width as allowable by existing ROW.	\$13,500 each	0.69-0.74
RRFB	No	Yes	Yield compliance of 70 to 95 percent. Important at high-volume locations to enhance the safety and comfort to cross. Could eliminate a potential barrier.	\$22,500 each	0.53
Pedestrian-scale Lighting	No	Yes	Enhances crossing safety by better illuminating people crossing, especially children. Adheres to pedestrian-scale illumination guidance.	\$26,000 per crossing	0.56

# M3. HOLYOKE AVENUE & 210TH STREET



## KEY PROJECT ITEMS

- All-way stop controlled intersection with crosswalks proposed at all four legs.
- The intersection is one-quarter mile from two schools and would be a key crossing for children to access the future 210th Street multiuse trail.
- An all-way stop can be difficult for children to cross. The number of lanes is an important consideration to reduce crossing width and create more predictability of stopped vehicles for children.
- Proposed improvements could shorten crossing distances from as much as 65 feet today to as little as 40 feet.

## BACKGROUND



### PEDESTRIAN & BIKE CRASHES

1 (minor injury, not a child) and 0



### TRAFFIC VOLUMES (AADT)

8,300 (west), 7,300 (east), 7,900 (north), 6,400 (south)



### PEDESTRIAN & BIKE VOLUMES

45 and 10 (Peak hour total: 17, 2-3 pm corresponding with McGuire Middle School dismissal)



### TRAFFIC SPEED

Holyoke Avenue – Posted 30 mph (north/south); 210th Street – Posted 30 mph (east), posted/85th percentile: 35 mph/41 mph (west)

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk & Stop Bar	Yes	Yes	Directs people where to cross the street and alerts drivers. Stop bar limits vehicle encroachment. Min. distance from crosswalk is 4-feet, preferred up to 8-feet.	\$3,500 per crossing	0.6
Enhanced Signage	Yes	Yes	Reminds motorists of state right-of-way laws for people crossing.	\$1,000 per crossing	N/A
Curb Radius & Curb Ramps	Ramps only	Both	Tightened curb radius to decrease turn speeds ( $\leq 15$ mph). Implementing directional, ADA-compliant ramps will shorten the crossing distance.	N/A	N/A
Pedestrian Island Refuge	No	Yes	Creates a two-stage crossing (min. 6-foot wide, preferred 8-10 feet). Potential implementation on the south, east, and west legs or as ROW allows.	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens crossing distance and increases motorist vision of people crossing. Potential implementation in the SW corner and others as ROW allows.	\$13,000 each	0.63
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56
Turn Lane Removal	No	Yes	Remove eastbound left-turn lane and northbound right-turn lane.	N/A	N/A

# U1. ITALY AVENUE & 210TH STREET



**\$90,000 – \$130,000 (RRFBs)**  
**\$140,000 – \$180,000 (PHBs)**



## KEY PROJECT ITEMS

- Proposed enhanced crossing of west leg, adjacent to existing side-street stop-controlled intersection.
- The intersection is one-third of a mile from Lakeville South High School and has the highest number of pedestrians and bicyclists crossing 210th Street at an uncontrolled crossing, including children.
- Italy Avenue serves as a key corridor for children and community members to access Antlers and Chadwick Parks north and south of 210th Street, respectively.
- Sidewalks exist along both sides of Italy Avenue south of 210th Street but not to the north.
- Future crossing of west leg should connect existing Italy Avenue sidewalk to planned multistage trail.

## BACKGROUND



### PEDESTRIAN & BIKE CRASHES

0 and 0



### TRAFFIC VOLUMES (AADT)

5,400 (east/west), est. 250 (north),  
 est. 700 (south)



### PEDESTRIAN & BIKE VOLUMES

118 peds and 57 bikes (Peak hour total: 34, 6-7 pm.  
 4-hours above 20 pph, 3-7 pm)



### TRAFFIC SPEED

Posted/85th percentile: 45 mph/49mph

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	Yes	Yes	Directs people where to cross the street and alerts drivers. Crosswalk is at least 6-foot wide.	\$2,500 per crossing	0.6
Advanced Stop Bar	20	30-50 ft.	Increases motorist sight distance and identifies where drivers should stop in advance of crosswalk. Distance from the crosswalk.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-5b	R1-5b	Identifies where drivers should stop in advance of crosswalk. Include additional warning signage to alerts 210th Street drivers and turning vehicles on Italy Av	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Yes	Yes	Creates two-stage crossing (min. 6-foot wide, preferred 8-10 feet and min. 20 feet long, preferred 40-60 feet).	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens the crossing distance and increases motorist's vision of people crossing. Implement as ROW allows.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Yes	Yes, or PHB	Key at higher-volume locations to enhance crossing safety and comfort. RRFBs facing both directions and two-sided in the median (3 total).	\$22,500 each	0.53
Pedestrian Hybrid Beacon	No	Yes, or RRFB	Yield compliance of >90 percent, significantly improving the safety of crossing a high-volume roadway. Mast and signal heads in each direction (2 total).	\$57,500 each	0.45-0.71
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56

# U2. IRAN AVENUE & 210TH STREET



## KEY PROJECT ITEMS

- Potential enhanced crossing of west leg, adjacent to existing side-street stop-controlled intersection.
- The intersection is about one-half mile from Lakeville South High School and could provide another crossing for children and community members in the neighborhood north of 210th Street.
- Sidewalks do not currently exist along Iran Avenue.

## BACKGROUND



**PEDESTRIAN & BIKE CRASHES**  
0 and 0



**TRAFFIC VOLUMES (AADT)**  
5,400 (east/west), est. 250 (north)



**PEDESTRIAN & BIKE VOLUMES**  
Unknown, requires future study



**TRAFFIC SPEED**  
Posted/85th percentile: 45 mph/49mph

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	Yes	Yes	Directs people where to cross the street and alerts drivers. Crosswalk is at least 6-foot wide.	\$2,500 per crossing	0.6
Advanced Stop Bar	20	30-50 ft.	Increases motorist sight distance and identifies where drivers should stop in advance of crosswalk. Distance from the crosswalk.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-5b	R1-5b	Identifies where drivers should stop in advance of crosswalk. Include additional warning signage to alerts 210th Street drivers and turning vehicles on Italy Av	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Yes	Yes	Creates two-stage crossing (min. 6-foot wide, preferred 8-10 feet and min. 20 feet long, preferred 40-60 feet).	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens the crossing distance and increases motorist's vision of people crossing. Implement as ROW allows.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Yes	Yes, or PHB	Key at higher-volume locations to enhance crossing safety and comfort. RRFBs facing both directions and two-sided in the median (3 total).	\$22,500 each	0.53
Pedestrian Hybrid Beacon	No	Yes, or RRFB	Yield compliance of >90 percent, significantly improving the safety of crossing a high-volume roadway. Mast and signal heads in each direction (2 total).	\$57,500 each	0.45-0.71
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56

# U3. INDEPENDENCE AVENUE & 210TH STREET



**\$90,000 – \$130,000 (RRFBs)**  
**\$140,000 – \$180,000 (PHBs)**

## KEY PROJECT ITEMS

- No intersection is currently present at 210th Street, however, a future extension of Independence Avenue south of the corridor could be implemented as development occurs.
- The crossing is dependent upon future development and should be studied at that time.
- The crossing could provide connectivity via an alternate route to Chadwick Park and the neighborhoods south of 210th Street (existing and future).

## BACKGROUND



**PEDESTRIAN & BIKE CRASHES**  
 0 and 0



**TRAFFIC VOLUMES (AADT)**  
 5,400 (east/west)



**PEDESTRIAN & BIKE VOLUMES**  
 Unknown, requires future study



**TRAFFIC SPEED**  
 Posted/85th percentile: 45 mph/49mph

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	Yes	Yes	Directs people where to cross the street and alerts drivers. Crosswalk is at least 6-foot wide.	\$2,500 per crossing	0.6
Advanced Stop Bar	20	30-50 ft.	Increases motorist sight distance and identifies where drivers should stop in advance of crosswalk. Distance from the crosswalk.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-5b	R1-5b	Identifies where drivers should stop in advance of crosswalk. Include additional warning signage to alerts 210th Street drivers and turning vehicles on Italy Av	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Yes	Yes	Creates two-stage crossing (min. 6-foot wide, preferred 8-10 feet and min. 20 feet long, preferred 40-60 feet).	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens the crossing distance and increases motorist's vision of people crossing. Implement as ROW allows.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Yes	Yes, or PHB	Key at higher-volume locations to enhance crossing safety and comfort. RRFBs facing both directions and two-sided in the median (3 total).	\$22,500 each	0.53
Pedestrian Hybrid Beacon	No	Yes, or RRFB	Yield compliance of >90 percent, significantly improving the safety of crossing a high-volume roadway. Mast and signal heads in each direction (2 total).	\$57,500 each	0.45-0.71
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56

# U4. IDAHO AVENUE & 210TH STREET



## KEY PROJECT ITEMS

- Potential enhanced crossing of west leg, adjacent to existing side-street stop-controlled intersection.
- The intersection is 400 feet from Dodd Boulevard and could provide a safer or more comfortable feeling crossing opportunity as compared to the roundabout at 210th Street and Dodd Boulevard.
- Very limited crossing demand today, though a location to monitor as development occurs surrounding the intersection.
- Sidewalks do not currently exist along Idaho Avenue.

## BACKGROUND



**PEDESTRIAN & BIKE CRASHES**  
1 and 0



**TRAFFIC VOLUMES (AADT)**  
5,400 (east/west), est. 350 (north)



**PEDESTRIAN & BIKE VOLUMES**  
Unknown, requires future study



**TRAFFIC SPEED**  
Posted/85th percentile: 45 mph/49mph

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	Yes	Yes	Directs people where to cross the street and alerts drivers. Crosswalk is at least 6-foot wide.	\$2,500 per crossing	0.6
Advanced Stop Bar	20	30-50 ft.	Increases motorist sight distance and identifies where drivers should stop in advance of crosswalk. Distance from the crosswalk.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-5b	R1-5b	Identifies where drivers should stop in advance of crosswalk. Include additional warning signage to alerts 210th Street drivers and turning vehicles on Italy Av	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Yes	Yes	Creates two-stage crossing (min. 6-foot wide, preferred 8-10 feet and min. 20 feet long, preferred 40-60 feet).	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens the crossing distance and increases motorist's vision of people crossing. Implement as ROW allows.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Yes	Yes, or PHB	Key at higher-volume locations to enhance crossing safety and comfort. RRFBs facing both directions and two-sided in the median (3 total).	\$22,500 each	0.53
Pedestrian Hybrid Beacon	No	Yes, or RRFB	Yield compliance of >90 percent, significantly improving the safety of crossing a high-volume roadway. Mast and signal heads in each direction (2 total).	\$57,500 each	0.45-0.71
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56

# U5. HYACINTH AVENUE & 210TH STREET



## KEY PROJECT ITEMS

- Proposed enhanced crossing of west leg, adjacent to existing side-street stop-controlled intersection.
- The intersection is two-thirds of a mile from McGuire Middle School and Kennedy Elementary School and has the second highest number of pedestrians and bicyclists crossing 210th St. at an uncontrolled crossing, including children.
- Hyacinth Ave. serves as a key corridor for children and community members to access a east-west multiuse trail between Antlers Park and downtown Lakeville to the north and Stoneborough Park to the south.
- Sidewalks do not exist along either sides of Hyacinth Avenue.

## BACKGROUND



**PEDESTRIAN & BIKE CRASHES**  
0 and 0



**TRAFFIC VOLUMES (AADT)**  
8,300 (east/west), est. 350 (north), est. 1,100 (south)



**PEDESTRIAN & BIKE VOLUMES**  
23 peds and 33 bikes (Peak hour total: 14, 6-7 pm)



**TRAFFIC SPEED**  
Posted/85th percentile: 35 mph/41 mph

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	Yes	Yes	Directs people where to cross the street and alerts drivers. Crosswalk is at least 6-foot wide.	\$2,500 per crossing	0.6
Advanced Stop Bar	20	30-50 ft.	Increases motorist sight distance and identifies where drivers should stop in advance of crosswalk. Distance from the crosswalk.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-5b	R1-5b	Identifies where drivers should stop in advance of crosswalk. Include additional warning signage to alerts 210th Street drivers and turning vehicles on Italy Av	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Yes	Yes	Creates two-stage crossing (min. 6-foot wide, preferred 8-10 feet and min. 20 feet long, preferred 40-60 feet).	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens the crossing distance and increases motorist's vision of people crossing. Implement as ROW allows.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Yes	Yes, or PHB	Key at higher-volume locations to enhance crossing safety and comfort. RRFBs facing both directions and two-sided in the median (3 total).	\$22,500 each	0.53
Pedestrian Hybrid Beacon	No	Yes, or RRFB	Yield compliance of >90 percent, significantly improving the safety of crossing a high-volume roadway. Mast and signal heads in each direction (2 total).	\$57,500 each	0.45-0.71
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56

# U6. RAILROAD CROSSING & 210TH STREET



## KEY PROJECT ITEMS

- Crossing is currently a railroad that is planned in the long-term to become a multiuse trail.
- The crossing is dependent upon implementation of that future trail and should be studied at that time.
- This will be a key crossing of two regional trails upon completion of that planned improvement.

## BACKGROUND



**PEDESTRIAN & BIKE CRASHES**  
N/A



**TRAFFIC VOLUMES (AADT)**  
8,300 (east/west)



**PEDESTRIAN & BIKE VOLUMES**  
N/A



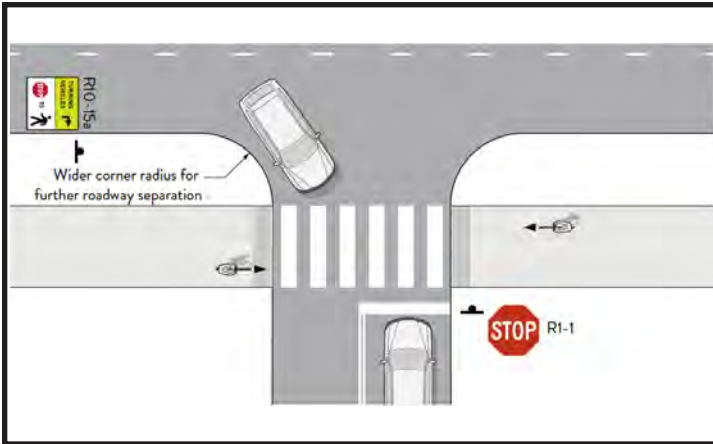
**TRAFFIC SPEED**  
Posted/85th percentile: 35 mph/41mph

Infrastructure	TB	MF	Improvement Description and Benefits	Avg. Cost	CMFs
High Visibility Crosswalk	Yes	Yes	Directs people where to cross the street and alerts drivers. Crosswalk is at least 6-feet wide.	\$2,500 per crossing	0.6
Advanced Stop Bar	20	30-50 ft.	Increases motorist sight distance and identifies where drivers should stop in advance of crosswalk. Distance from the crosswalk.	\$1,500 per crossing	0.75-0.89
Enhanced Signage	R1-5b	R1-5b	Identifies where drivers should stop in advance of crosswalk. Include additional warning signage to alerts 210th Street drivers and turning vehicles on Italy Av	\$1,000 per crossing	N/A
Pedestrian Island Refuge	Yes	Yes	Creates two-stage crossing (min. 6-feet wide, preferred 8-10 feet and min. 20 feet long, preferred 40-60 feet).	\$13,500 each	0.69-0.74
Curb Extension	No	Yes	Shortens the crossing distance and increases motorist's vision of people crossing. Implement as ROW allows.	\$13,000 each	0.63
Rectangular Rapid Flashing Beacon	Yes	Yes, or PHB	Key at higher-volume locations to enhance crossing safety and comfort. RRFBs facing both directions and two-sided in the median (3 total).	\$22,500 each	0.53
Pedestrian Hybrid Beacon	No	Yes, or RRFB	Yield compliance of >90 percent, significantly improving the safety of crossing a high-volume roadway. Mast and signal heads in each direction (2 total).	\$57,500 each	0.45-0.71
Pedestrian-scale Lighting	No	Yes	Enhances safety by better illuminating people crossing, especially children. Adheres to illumination guidance.	\$26,000 per crossing	0.56

# SIDE-STREET TRAIL CROSSINGS

## KEY PROJECT ITEMS

- Side-street trail crossings are important to provide safe and comfortable access to the multiuse trail along 210th Street.
- Each street crossing could be a barrier for children and such enhancements could improve the multiuse trail's connectivity.
- Estimated costs include enhanced signage and markings, pedestrian-scale lighting, and a raised crosswalk if applicable.



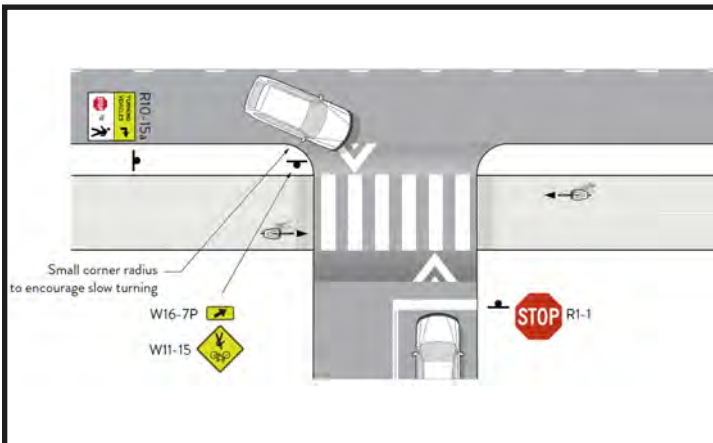
**\$** \$15,000 - \$45,000

### LOW VOLUME

LESS THAN 10 VEHICLES PER HOUR

Potential Locations

- Ixonia Avenue
- Iran Avenue
- Iteri Avenue
- Huntsville Trail
- Isle Avenue



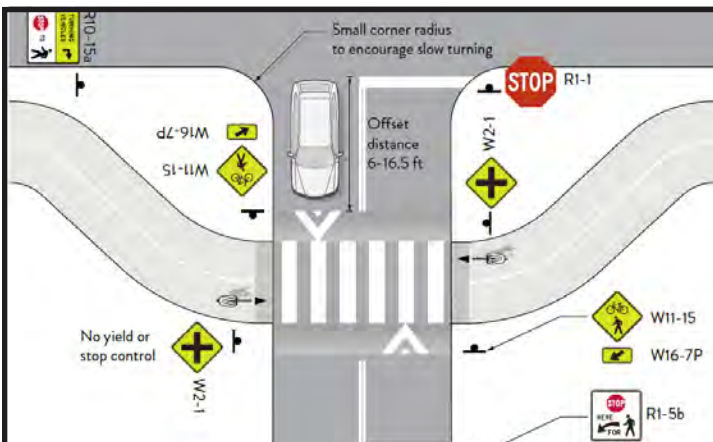
**\$** \$25,000 - \$75,000

### MEDIUM VOLUME

10-50 VEHICLES PER HOUR

Potential Locations

- Idaho Avenue
- Howland Avenue



**\$** \$40,000 - \$120,000

### HIGH VOLUME

MORE THAN 50 VEHICLES PER HOUR

Potential Locations

- Italy Avenue
- Hyacinth Avenue

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## CHAPTER 6: NEXT STEPS

This Study offers a range of potential infrastructure improvements along 1.25 miles of 210<sup>th</sup> Street between Holyoke Avenue and Jacquard Avenue. Actionable next steps were organized to ensure this document is fully utilized and implemented to the best of the City of Lakeville and Lakeville Area School’s ability. The proposed next steps are important as they will seek to maximize the Study’s analysis and proposed improvements that will enhance an area of Lakeville where children cannot safely, comfortably, or conveniently walk, roll, or bike today.

### AGENCY COORDINATION

The most critical step toward implementing proposed infrastructure is to identify a champion at the City of Lakeville that will devote some portion of their time implementing this Study. Some local agencies (e.g., public works) or school districts employ Safe Routes to School coordinators to pursue project implementation in addition to managing the other “6 E’s”. Otherwise, champions could be applicable City representatives as their time permits.

It is also helpful to organize a small team or committee (ideal size of five or less members) that include representatives from the City, school district, and school staff (i.e., school principals), as well as key stakeholders if applicable. The group’s objective can include identifying funding opportunities and creatively financing projects, building relationships and educating the community about the planned improvements, and prioritizing projects identified in the Study. It may be helpful to have this group maintain a regular meeting schedule such as monthly or quarterly meeting frequencies to maintain proper engagement.

### IDENTIFY PRIORITIES

Prioritizing projects is essential toward an orderly and timely implementation process. Key questions to consider include:

- What project would provide the most benefit relative to cost and effort?
- What does the City of Lakeville and Lakeville Area Schools view as key improvements?
- Which projects could be incorporated into other work already taking place?
- Which project is most likely to receive funding?

Potential project prioritization was included in the project pages of Chapter 5 based upon need per a variety of factors as well as engineering judgment. Additional local vetting is recommended.



## FOCUSED TIMELINE AND ACTIONABLE STEPS

Once priorities are identified, create a timeline of short- (0-1 years), mid- (1-3 years), and long-term goals (3-5 years). Do not extend past five years as that is a reasonable amount of time to require updated analysis and planning. The action plan does not need to be detailed and can simply identify planned improvements, responsible parties, the estimated cost, and associated time period. The action plan will help to focus the group on next steps and keep everyone on track, progress the plan forward each meeting, and be prepared for funding opportunities such as SRTS or those from the Metropolitan Council which are most applicable for multimodal projects. Additionally, integrating with work already planned by city, county, and state agencies, or the school district, will ensure cost effective implementation when those synergies arise. It is important to remember that project implementation takes time and each small step forward supports the broader effort and continues that longer progression forward towards eventual success.

## CELEBRATE WINS

Make sure to celebrate wins and promote the completion of Safe Routes to School projects (Walk and Bike to School Days are good times to do so) to educate the public and promote the program that is critical to children's health (47 more minutes of physical activity per week) and their ability to walk, roll, or bike to school.

***Don't Hibernate, Participate!***  
***Winter Walk Day is Feb. 5th***

MINNESOTA  
**SAFE  
ROUTES  
TO SCHOOL**

Celebrate Winter  
**WALK AND BIKE  
TO SCHOOL**  
With Us!  
London Park Elementary

*For more information, visit: [www.mnsaferoutestoschool.org](http://www.mnsaferoutestoschool.org)*

Source: MnDOT

# APPENDICIES

Appendix A – Lakeville Safe Routes to School Grant Application (Parent Survey/Student Tallies)

Appendix B – Pedestrian and Bicycle Count Data (April 22, 2020)

Appendix C – Synchro Reports (Existing/Proposed Conditions at Jacquard and Holyoke Avenues)

## APPENDIX A

# Parent Survey Report: One School in One Data Collection Period

**School Name:** Mcguire Middle School

**Set ID:** 19113

**School Group:** Lakeville SRTS

**Month and Year Collected:** October 2019

**School Enrollment:** 0

**Date Report Generated:** 12/12/2019

**% Range of Students Involved in SRTS:** Don't Know

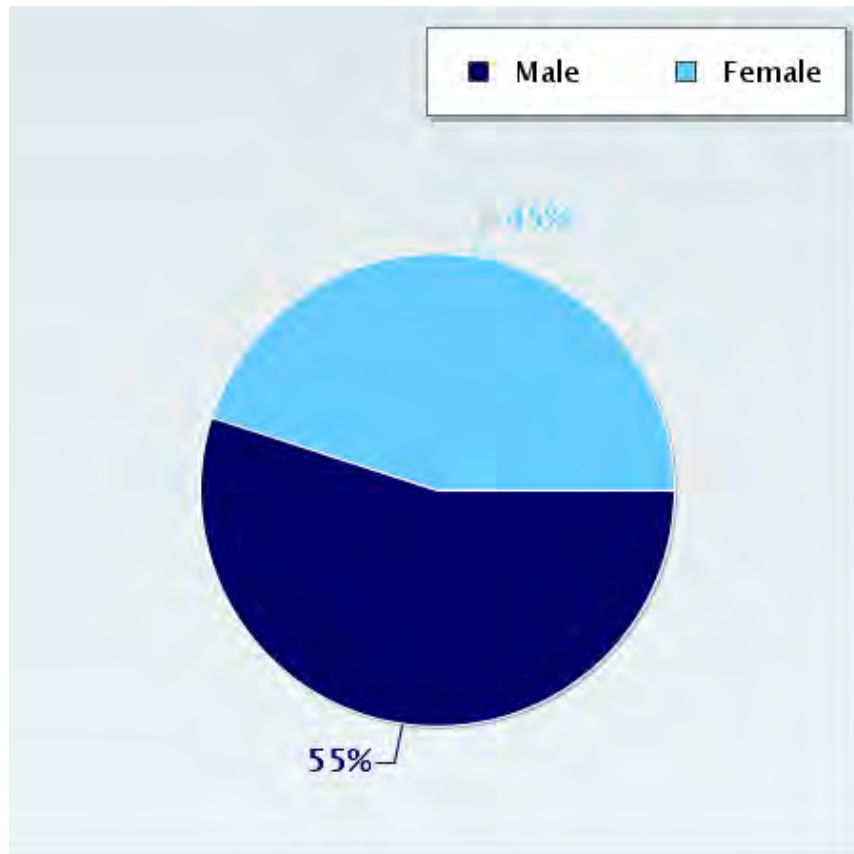
**Tags:**

**Number of Questionnaires Distributed:** 0

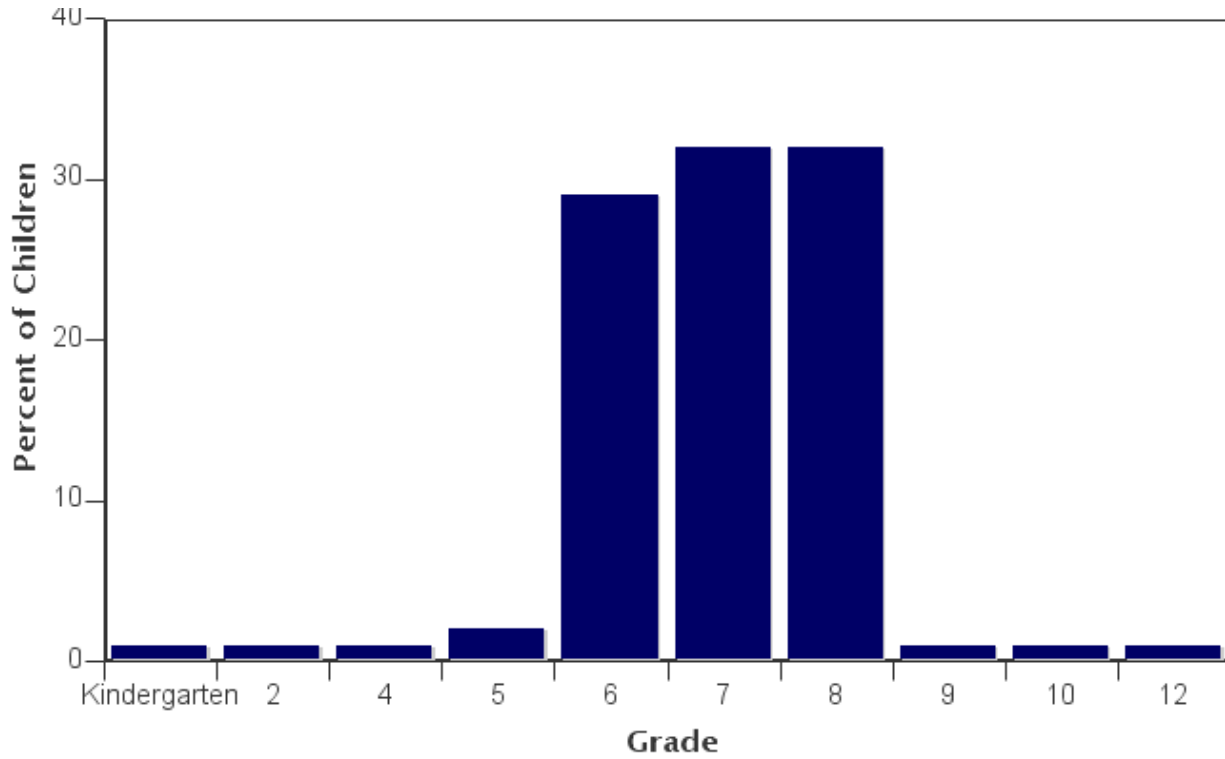
**Number of Questionnaires Analyzed for Report:** 175

This report contains information from parents about their children's trip to and from school. The report also reflects parents' perceptions regarding whether walking and bicycling to school is appropriate for their child. The data used in this report were collected using the Survey about Walking and Biking to School for Parents form from the National Center for Safe Routes to School.

Sex of children for parents that provided information



Grade levels of children represented in survey



Grade levels of children represented in survey

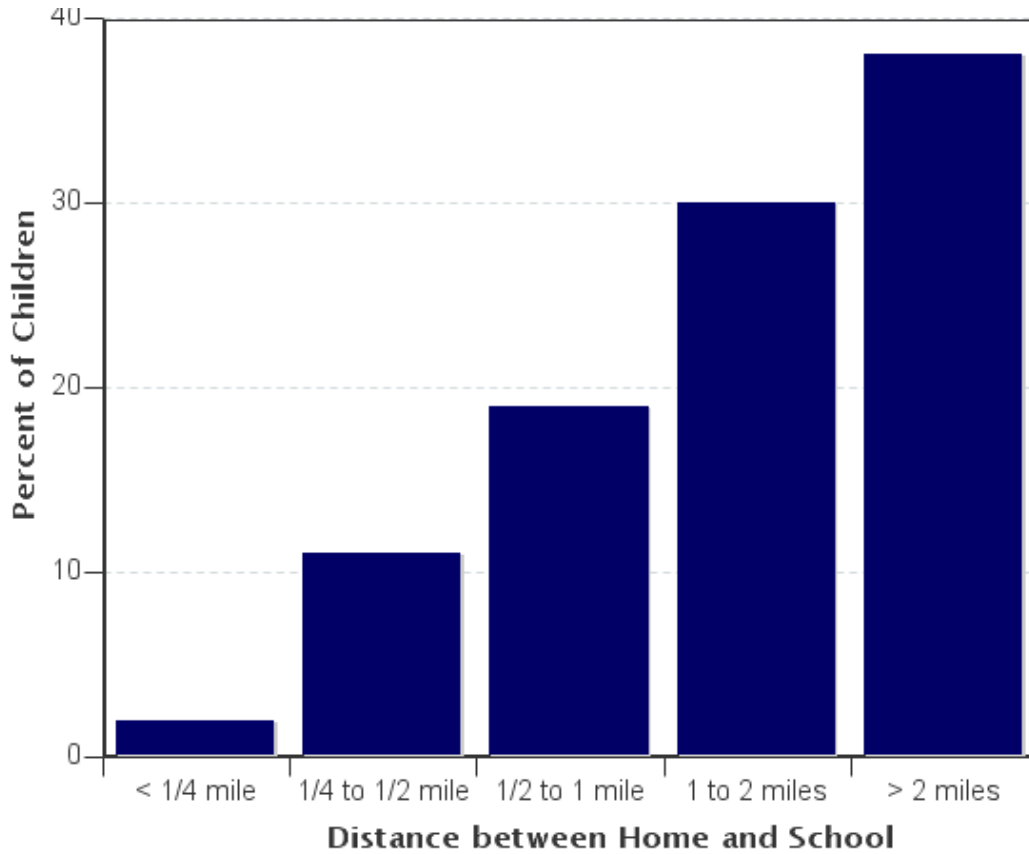
Grade in School	Responses per grade	
	Number	Percent
Kindergarten	1	1%
2	1	1%
4	2	1%
5	3	2%
6	50	29%
7	56	32%
8	56	32%
9	2	1%
10	2	1%

12	1	1%
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No response: 0

Percentages may not total 100% due to rounding.

Parent estimate of distance from child's home to school



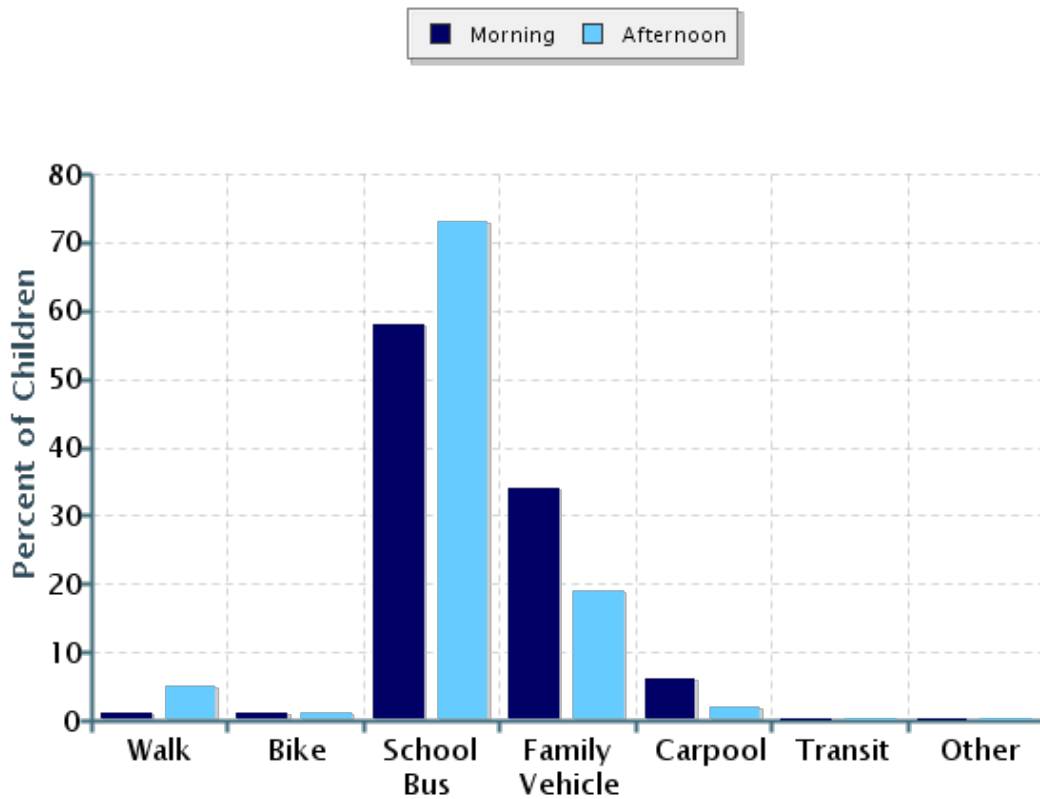
Parent estimate of distance from child's home to school

Distance between home and school	Number of children	Percent
Less than 1/4 mile	4	2%
1/4 mile up to 1/2 mile	18	11%
1/2 mile up to 1 mile	31	19%
1 mile up to 2 miles	49	30%
More than 2 miles	62	38%

Don't know or No response: 11

Percentages may not total 100% due to rounding.

### Typical mode of arrival at and departure from school



### Typical mode of arrival at and departure from school

Time of Trip	Number of Trips	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Morning	163	0.6%	0.6%	58%	34%	6%	0%	0%
Afternoon	164	5%	1%	73%	19%	2%	0%	0%

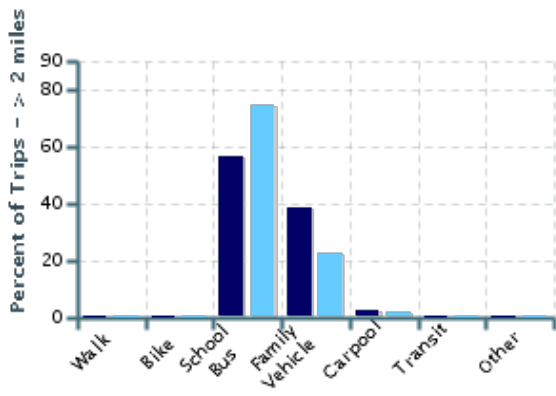
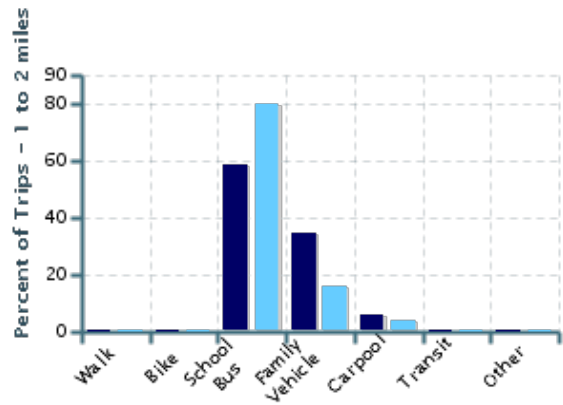
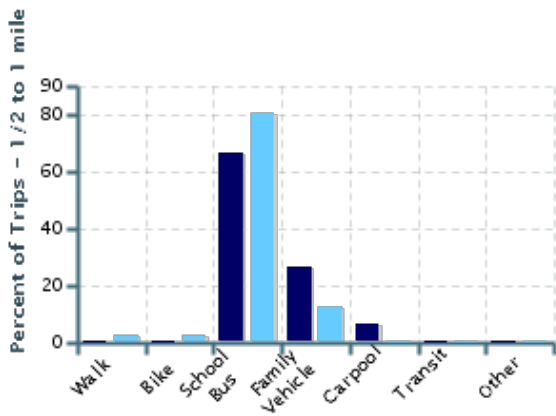
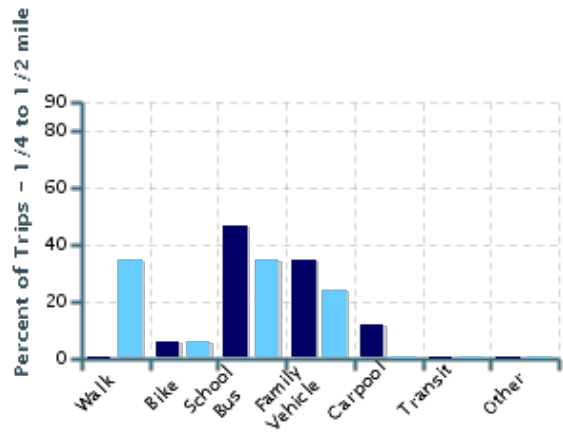
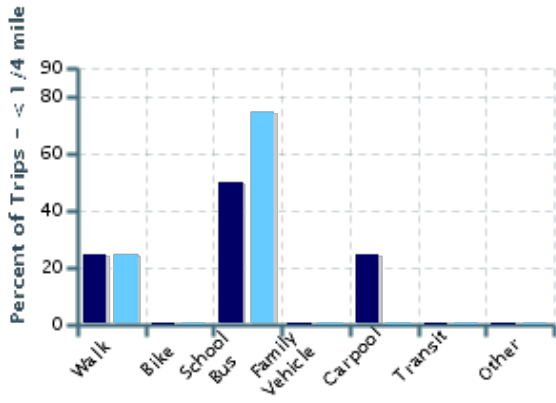
No Response Morning: 12

No Response Afternoon: 11

Percentages may not total 100% due to rounding.

# Typical mode of school arrival and departure by distance child lives from school

■ Morning
 ■ Afternoon



## Typical mode of school arrival and departure by distance child lives from school

### School Arrival

Distance	Number within Distance	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Less than 1/4 mile	4	25%	0%	50%	0%	25%	0%	0%
1/4 mile up to 1/2 mile	17	0%	6%	47%	35%	12%	0%	0%
1/2 mile up to 1 mile	30	0%	0%	67%	27%	7%	0%	0%
1 mile up to 2 miles	49	0%	0%	59%	35%	6%	0%	0%
More than 2 miles	61	0%	0%	57%	39%	3%	0%	0%

Don't know or No response: 14

Percentages may not total 100% due to rounding.

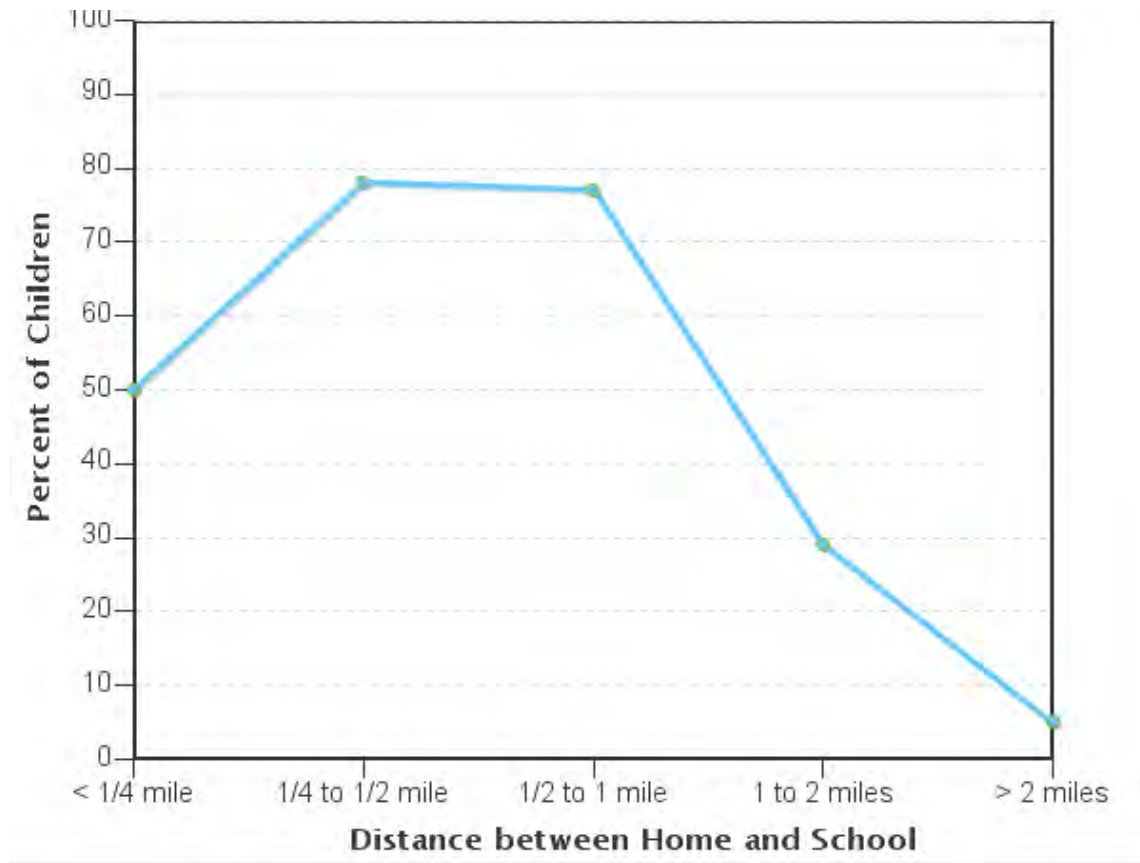
### School Departure

Distance	Number within Distance	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Less than 1/4 mile	4	25%	0%	75%	0%	0%	0%	0%
1/4 mile up to 1/2 mile	17	35%	6%	35%	24%	0%	0%	0%
1/2 mile up to 1 mile	31	3%	3%	81%	13%	0%	0%	0%
1 mile up to 2 miles	49	0%	0%	80%	16%	4%	0%	0%
More than 2 miles	61	0%	0%	75%	23%	2%	0%	0%

Don't know or No response: 13

Percentages may not total 100% due to rounding.

Percent of children who have asked for permission to walk or bike to/from school by distance they live from school

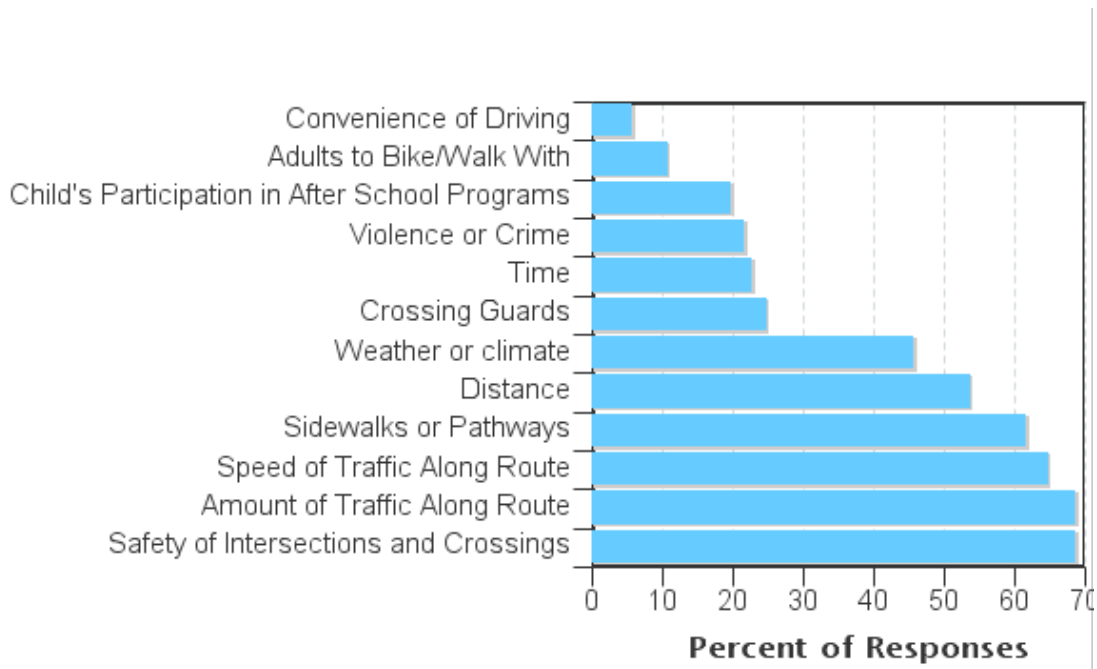


Percent of children who have asked for permission to walk or bike to/from school by distance they live from school

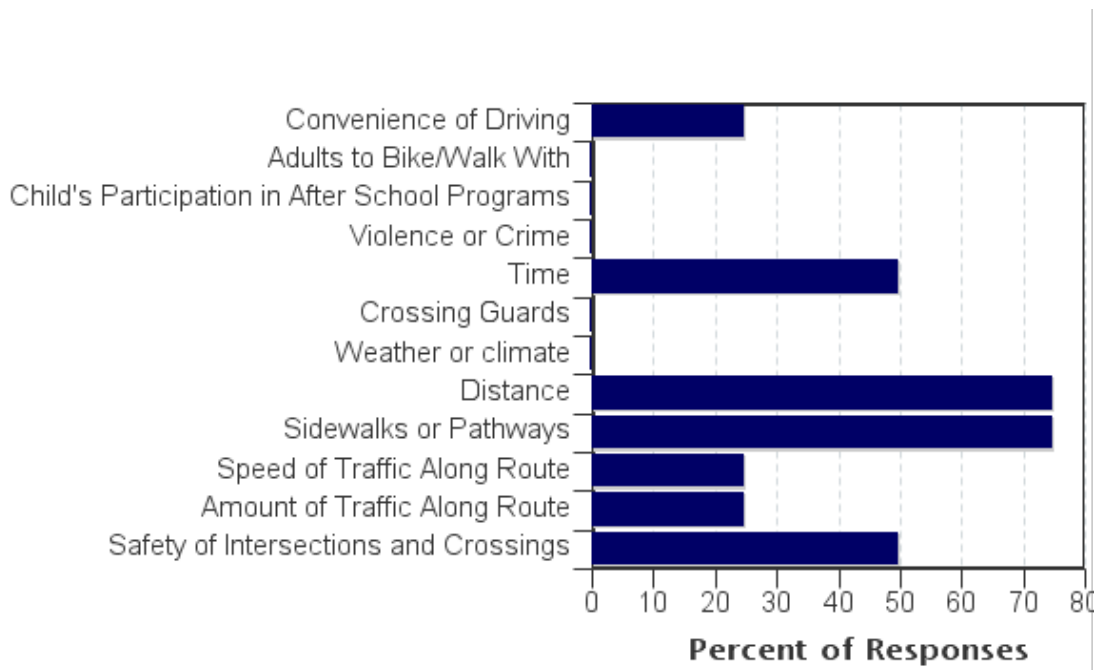
Asked Permission?	Number of Children	Less than 1/4 mile	1/4 mile up to 1/2 mile	1/2 mile up to 1 mile	1 mile up to 2 miles	More than 2 miles
Yes	57	50%	78%	77%	29%	5%
No	107	50%	22%	23%	71%	95%

Don't know or No response: 11  
 Percentages may not total 100% due to rounding.

Issues reported to affect the decision to not allow a child to walk or bike to/from school by parents of children who do not walk or bike to/from school



Issues reported to affect the decision to allow a child to walk or bike to/from school by parents of children who already walk or bike to/from school



Issues reported to affect the decision to allow a child to walk or bike to/from school by  
parents of children who already walk or bike to/from school

Issue	Child does not walk/bike to school	Child walks/bikes to school
Safety of Intersections and Crossings	69%	50%
Amount of Traffic Along Route	69%	25%
Speed of Traffic Along Route	65%	25%
Sidewalks or Pathways	62%	75%
Distance	54%	75%
Weather or climate	46%	0%
Crossing Guards	25%	0%
Time	23%	50%
Violence or Crime	22%	0%
Child's Participation in After School Programs	20%	0%
Adults to Bike/Walk With	11%	0%
Convenience of Driving	6%	25%
<b>Number of Respondents per Category</b>	<b>127</b>	<b>4</b>

No response: 44

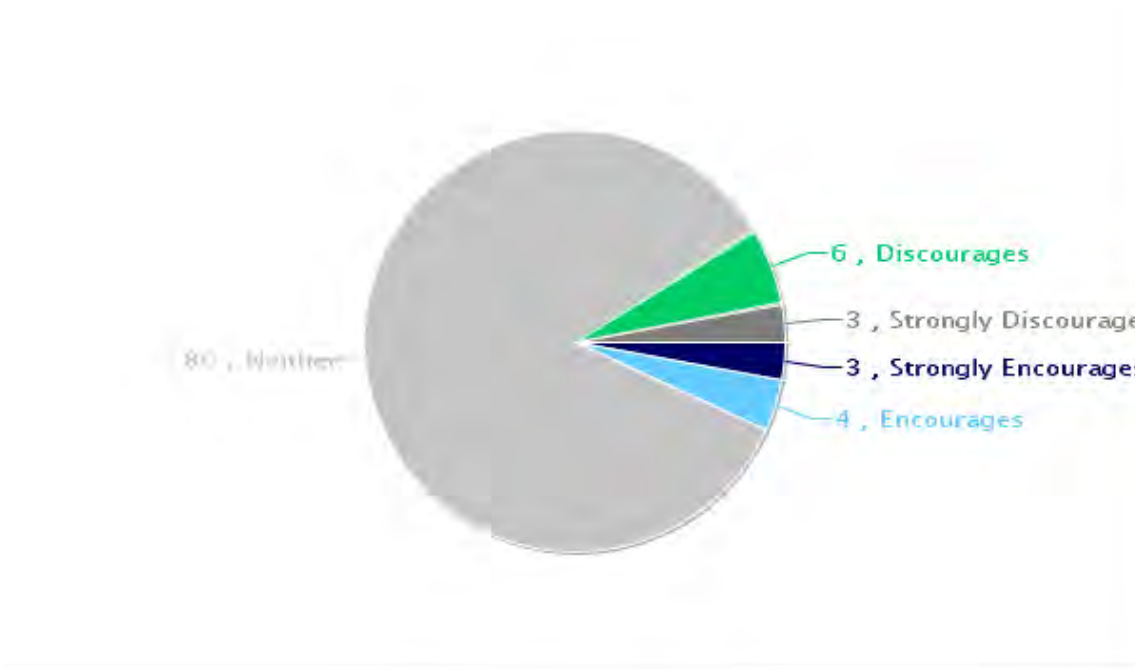
Note:

--Factors are listed from most to least influential for the 'Child does not walk/bike to school' group.

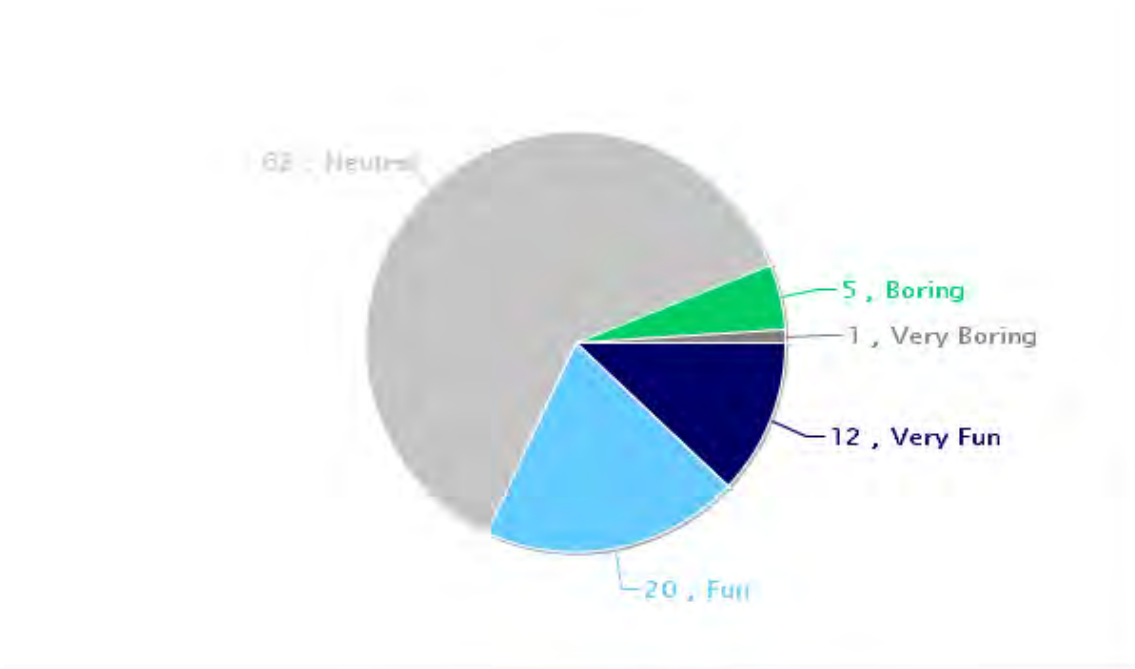
--Each column may sum to > 100% because respondent could select more than issue

--The calculation used to determine the percentage for each issue is based on the 'Number of Respondents per Category' within the respective columns (Child does not walk/bike to school and Child walks/bikes to school.) If comparing percentages between the two columns, please pay particular attention to each column's number of respondents because the two numbers can differ dramatically.

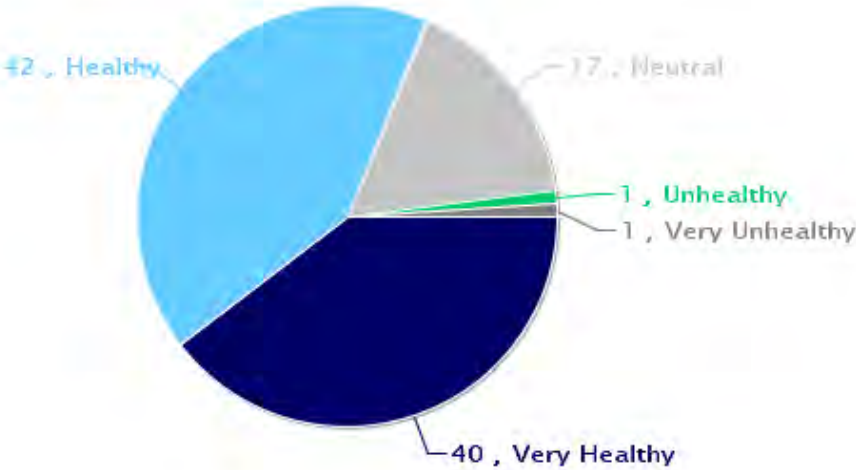
Parents' opinions about how much their child's school encourages or discourages walking and biking to/from school



Parents' opinions about how much fun walking and biking to/from school is for their child



Parents' opinions about how healthy walking and biking to/from school is for their child



## Comments Section

SurveyID	Comment
1688854	We only allow our 6th grade daughter to walk to/from school with at least one friend. If circumstances change and she would be walking by herself we would reevaluate her transportation options.
1688894	We live 7 miles from school. It is not an option to bike or walk.
1688951	Build those sidewalks along these busy roads.
1688964	The problem if the walk when is pretty cold they will be freezing once they are at the school. Other problem is when is too dark for them to walk or ride the bike
1688971	We live by LSHS in Chadwick. There are no safe routes for crossing Dodd to get to McGuire especially with the amount and kind of traffic. To get to Lakeview, the only traffic controlled intersection is Jacquard and 210th. This intersection is not safe even though it has crosswalks, with inexperienced HS drivers and parents that are in a hurry/distracted. I ask my kids to cross over 210th at Italy but wish there was a crosswalk or sidewalks on 210th. As far as my HS kids, crossing Jacquard is a nightmare during school hours on foot. I am always surprised that the LPD doesn't control traffic around the schools that need it. Of course, prime example of when someone gets hurt, rules will change. Families on the South side of Lakeville definitely have gotten the short end of the stick with the lack of sidewalks and trail systems where it is needed.
1688974	My child is open enrolled to a middle school that is on the other side of Lakeville. When we lived in that area we would walk/bike to school. Just too far now.
1689132	Lakeville NEEDS a walking path connecting MMS and LSHS. There is no shoulder, or walking path along 210 where I see many students walking and biking dangerously close to traffic. This is long overdue!
1689158	I would like to see sidewalks or pathways along 210th Street along with pedestrian crossing signs/lights to make it safer for children to get to and from school.
1689186	Too much traffic along route, unsafe intersection (Holoyoke &Dodd), unsafe sidewalks (snow/ice covered)
1689207	We can't change the distance but it would be good to get a direct route from McGuire area to the High School, such as a bike/walking path along 210th.
1688790	If there was a bike path along Cty Rd 9 / Dodd Blvd heading north from 235th and heading east on Cty Rd 70 I would allow student to ride their bike to school - takes almost 45 mins to get home on the bus and its only about 4 miles
1689171	We need a sidewalk and biking path along 210th street!!!!
1689038	We need a walking/biking path on 210th Street!!!
1688861	There is no good way for my child to get from where we live to school that is not what we feel is a "dangerous" route. When I brought these issues up to the transportation person I was told that a child having a route without sidewalks or good crossings wasn't taken into consideration so we have to pay for bussing. My child would have to cross where vehicles are traveling over 45mph and multiple red light accidents happen. I would like areas where a student would have to cross a road like this taken into consideration for either free bussing or reduced fee.

1688884	My kids would have to cross Dodd which is becoming a major traffic route. It will only get worse with more and more development. If my son wanted to, I'd probably let him, but he hasn't ever asked.
1689061	Next year we will be at LSHS. We are less than a block away from South, but because there is no sidewalk on 210th Street there is not a safe way for him to walk to school. Even a path from Jamestown to Jacquard would be helpful with a crosswalk on all 4 sides of the intersection.
1688985	My kids will walk/bike to school as often as possible.
1689183	Bike path needed near schools to encourage students to walk/bike. Youth don't get enough exercise
1689195	The kids will be going to LSHS in a couple short years and I really wish there were sidewalks along 209th for them to walk along and cross at Jacquard.
1688782	Would love to see a bike path connecting the existing path from Dodd and 208th to McGuire Middle School.
1688792	1. An exit from McGuire and Jefferson onto 210 St through the old district office site would alleviate traffic and safety issues with only one exit for two schools. Safety first. 2. A bike path from McGuire and Jefferson to LSHS would help safety of the neighborhood kids. It is dangerous to walk on 210 for the kids as is. A bike trail would be used by students and families, presumably on the south side of 210 from downtown to LSHS and perhaps a few more blocks up to the upper LSHS soccer parking lot.
1688816	There is not a safe way from our home to McGuire that does not add significant time to the route. There are no sidewalks on 210th street and the amount of traffic at 210th and Holyoke makes it hard to let my child navigate that intersections safely. While I trust his judgement, I do not trust drivers in the early morning and after school times to allow him to cross safely.
1688820	Traffic along 210th is so busy! Also, area out by the Hi-Hi is not incredibly safe/trusting.
1689199	We live in Elko. There is no school near us and the bus ride has always been the longest in the district.
1689299	Well, my youngest is 8th grade, would have been nice to have a walking path on 210th for the kids to and from Lakeview and from McGuire. 210th is Dangerous!
1689224	The amount of traffic and how close the sidewalks are to the cars concerns me. Also, from Hytrail Circle, there's a way neighborhood kids cut through the cemetery from our neighborhood to go to school but no real place to cross from the dirt lot across the road. As a parent I'd like to see a crosswalk from that lot too for when we have to park over there.
1688869	I have children at McGuire for 6 years. We are supposed to walk from the far golden pond neighborhood. It takes forever and that intersection is horrendous. 3 years I drove one and these three years I pay for the bus and so so many of my neighbors.
1688907	The main issue with walking or biking is the intersection at Holyoke and 210th. It is awful, and kids have a hard time navigating it without a crossing guard.
1689668	Crossing Dodd is my main concern. Since there are not sidewalks on 210th St or Dodd (south of 210th) it forces the kids to cross at a point without a formal intersection and/or crosswalk.
1688943	Middle school route is too far and dangerous with inadequate bike paths.

1688997	Biking/Walking to school is not my biggest concern as we live too far from the schools to take advantage (except for possibly going within town after school). However, I am very concerned with the length of the bus rides and time of arrival home after school for my elementary student. An hour bus ride after school and arriving just before 5 pm is way too long and late for a 4th grader. Also have concerns about my middle schoolers walking to the bus in the dark in the Fall months due to time changes. But biggest concern is length of time on the bus for elementary kids. Need more buses!!!
1688787	Not enough sidewalks. Child would need to cross Dodd, no lights or sidewalks.
1688815	I was blown away that we were busing our kids to schools since their walk was about 1/4 what mine was as a kid. But apparently that's the way it is now. And of course I didn't want mine to be the only kids walking. Oh well.
1688828	I'm more concerned with bus pick up drop off. I would like to see the bus come into the subdivision to pick up rather than have the kids wait at the corner of a fairly busy street. It wouldn't take any more time for the bus to come in and pick up at one or two designated areas of the subdivision, and it would be a safer option.
1688833	I watched a student on a bike almost get hit by a car at the intersection of 210th and Holyoke. Drivers seem to always be in a hurry. Seeing that scared me enough to be really nervous about my child riding her bike to school.
1689051	Where we live, riding or walking to McGuire is not safe.
1688868	There needs to be a safe sidewalk to use along 210th street from Holyoke to Lakeville South. There is way too much traffic and not a safe sidewalk to use (the partial sidewalk is unsafe walking single file with high speed traffic by the railroad tracks). I have seen kids walking through the ditches from South to MMS area and cars are going way too fast. It seems the rest of Lakeville has established paths except for the 210th/Dodd road area and there are 3 schools right there with South, MMS, and JFK. It is not safe for kids.
1688888	The intersection at Holyoke Ave and 210th St is one of the biggest deterrents to walking/biking to school. This intersection gets very busy with traffic at the beginning and end of school.
1689660	Hills, railroads, no sidewalks
1688948	We live in Elko so walking or biking is not even remotely an option.
1688972	Quite simply, 210th street needs paths from the Lakeville South HS to downtown Lakeville - McGuire MS. It really is an anomaly when compared to the rest of Lakeville. Lakeville has paths on both sides (seems excessive at times) of the road in multiple areas, yet for 2 schools there are no paths on 210th, except for a very small stretch near downtown. We've lived here 10 years and it didn't make sense back then when our older child went to Lakeville South HS. We had to pay for bussing back then since we were under a mile from the school, yet there was no safe path to the school in under a mile :) It is in no way safe for my child to walk, bike, or cross 210th street or Dodd Boulevard on his way to school - no path, ditch can be deep, narrow shoulder in places, and lots of traffic in the morning and evening. Yet, there is definitely room for one path on either side of the road, and at some point a stoplight or roundabout will be needed at the 210th street and Dodd Boulevard intersection. This is not a safe place to cross. But it doesn't matter as there are no paths to walk on :) Also, as one approaches downtown Lakeville on 210th the road condition gets worse. My 6th grader complains about how rough it is when we drive on it, which is NOT a normal complaint from him when we drive around. Hope this helps. Thank you!

1689231	It's strange to have a middle school that doesn't have clear sidewalk access in all directions from the school. As more homes have been built in walkable distances (including our own in 2013), it should be a city priority to make clear walking/biking paths for our kids. No sidewalks on parts of 210th, none on Dodd south of 210th, none on 70, & not even right in front of the school on Holyoke? Weird.
1689297	My son drives with me because I work at the school, so it is very convenient. We are too far out for him to bike and there isn't a safe path the entire way. I wouldn't be opposed to it, but it's just not the safest way for him to get to school.
1688836	The intersection of Highview and 210 is the biggest show stopper for me. I will not let my incoming 6th grader bike to Mcguire.
1688839	My kids did walk to elementary school k-5. Mms is farther and I would not want them crossing Dodd road.
1688840	My kids did walk to elementary school k-5. Mms is farther and I would not want them crossing Dodd road.
1689165	2 very busy roads to use to walk to school, Mcguire is on a very busy route for most drivers leaving lakeville so I would not encourage my child to walk for safety reasons.
1689438	We live close enough to the schools that we are charged in order for them to be allowed to ride the bus. I do not agree with this for elementary school children. They should not be required to walk.
1689166	If there were a sidewalk down 210 and safe crossings like stop lights, both my kids would have walked to school. Taking the bus home is much longer ride than walking
1688965	We have to pay for the bus because of the distance, I think we are too far for my daughter to walk, I cant afford the bus so I have to drive her.
1688967	A crossing guard SHOULD be at 210th and Holyoke for safety...one is NOT provided. Bus is too expensive for down the street. School needs to go back to doors being open at 7:00 not 7:15.
1688799	Sorry my answers probably aren't helpful. We live too far away to even think about walking or biking
1688800	Sorry my answers probably aren't helpful. We live too far away to even think about walking or biking
1688871	Walking or biking to/from school is impossible for residents of Elko New Market.
1688881	Any person who thinks crossing Dodd Blvd. from our neighborhood or biking with Zero connected or planned bike routes is acceptable is going to be sorry one day. Traffic northbound on Dodd coming through County Road 70 can be driving 55 mph. No way is my kid riding a bike across to go to school. That is what buses are for... safety.
1688936	The main school intersection, at 210th St W & Holyoke Ave is so clogged. Drivers are impatient, almost hitting each other, not to mention I've seen many students in the crosswalk almost get hit by drivers. While it was bad after elementary pickup, it's a thousand times worse after Jr High release. Something definitely needs to change & a patrol isn't gonna cut it
1689004	The roads are safe and it is far to cold/snowy most of the year.
1689180	Because of the distance we live from school it not practical to walk. When we need to, my child has walked to his dads work after school when he stays late for activities as long as weather and travel is safe. Has to walk up a steep grass hill that tends to have ice and drifts that can make it dangerous.

1689447	Speed of cars and lack of sidewalks on 210 is an issue. Am especially concerned as my son will be attending Lakeville South next year and the speed of traffic is even worse.
1689173	There is not a safe or walkable path to McGuire. Lakeville doesn't have sidewalks in most housing developments to provide a safe place to walk, nor on the north side of Co Rd 50/210th Street, and areas of the south side too. Crossing 50/210th street to get to the south side would NEVER be safe because people driving their cars drive way too fast and it's a VERY busy road. Children walking from our neighborhood has NEVER been an option. COMPLETELY UNSAFE ROUTES.
1690092	We need to get a path from LSHS to downtown on 210th! I see kids walking this route everyday and it is way too dangerous without a path! There really isn't another option- cars are swerving daily to miss kids. Please do something before it's too late- we need the main route to the HS to be safe and accessible for the kids! We live in the Chadwick neighborhood and we have sidewalks everywhere except on 201th where they dead end- please help!
1688893	We need a sidewalk on 210 because kids are walking home from Lakeville South and McQuire in unsafe road condition. Kids can't ride their bike or scooter home either because it's tough riding your bike or scooter on grass or an uneven road condition.
1688962	My children frequently walked or rode their bikes to school in elementary school, but it was only a mile away. The middle school is 3 miles from our house, so it's too far to walk in a reasonable amount of time before school. If it were closer, then the kids would walk frequently.
1688794	You should not charge for busing for some people in a neighborhood and not others. Not right.
1688795	You should not charge for busing for some people in a neighborhood and not others. Not right.
1688823	We are a little ways away, and she would have to walk down a very busy street and through a very busy intersection that does not have crossing guards. Plus I do not feel comfortable letting my daughter walk to/from school alone. It just doesn't feel safe.
1689221	I am uncomfortable letting my 13yr old daughter walk because she has been cat called by men driving by her in their vehicles. I have to pay for her to ride the bus to make sure she's safe.
1688865	Bus is not safe stopping on the county roads in Credit River township because cars are going 55-60 miles an hour, have passed the bus on the left, don't slow down quick enough. It's scary out there all around! Thanks for working to keep our kids safe!
1689194	We drive our children to school because we don't trust leaving them at the end of a long, isolated driveway waiting for a bus. Jacob Wetterling changed everything.
1688818	Is there a way to measure the child's self/environmental awareness, along with their physical abilities in relation to the distance and "vehicle" being used (if not walking)? What about a safety test similar to what they have at the DMV that can test for situational awareness, or even plot out their route with a virtual simulator... Okay, I'll stop! Good luck, and if this is to promote kids getting in exercise and developing independence, then Great work too!
1688825	There is no possible way my kids could walk or ride a bike, we live far away out in the country.

# Parent Survey Report: One School in One Data Collection Period

**School Name:** Kennedy Elementary School

**Set ID:** 19112

**School Group:** Lakeville SRTS

**Month and Year Collected:** October 2019

**School Enrollment:** 0

**Date Report Generated:** 12/12/2019

**% Range of Students Involved in SRTS:** Don't Know

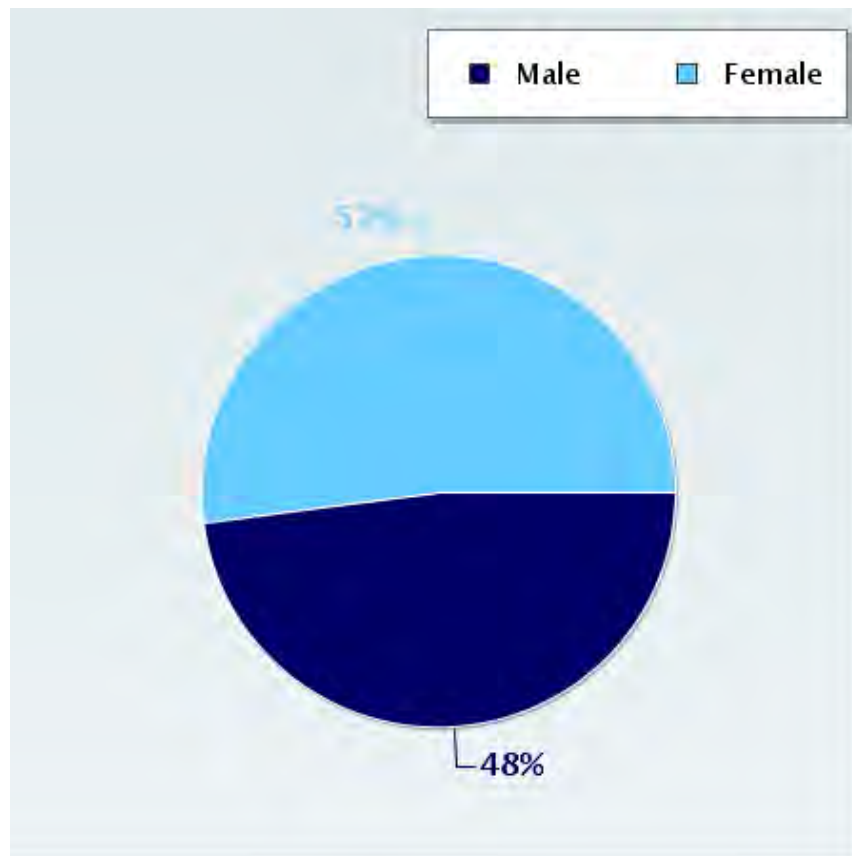
**Tags:**

**Number of Questionnaires Distributed:** 0

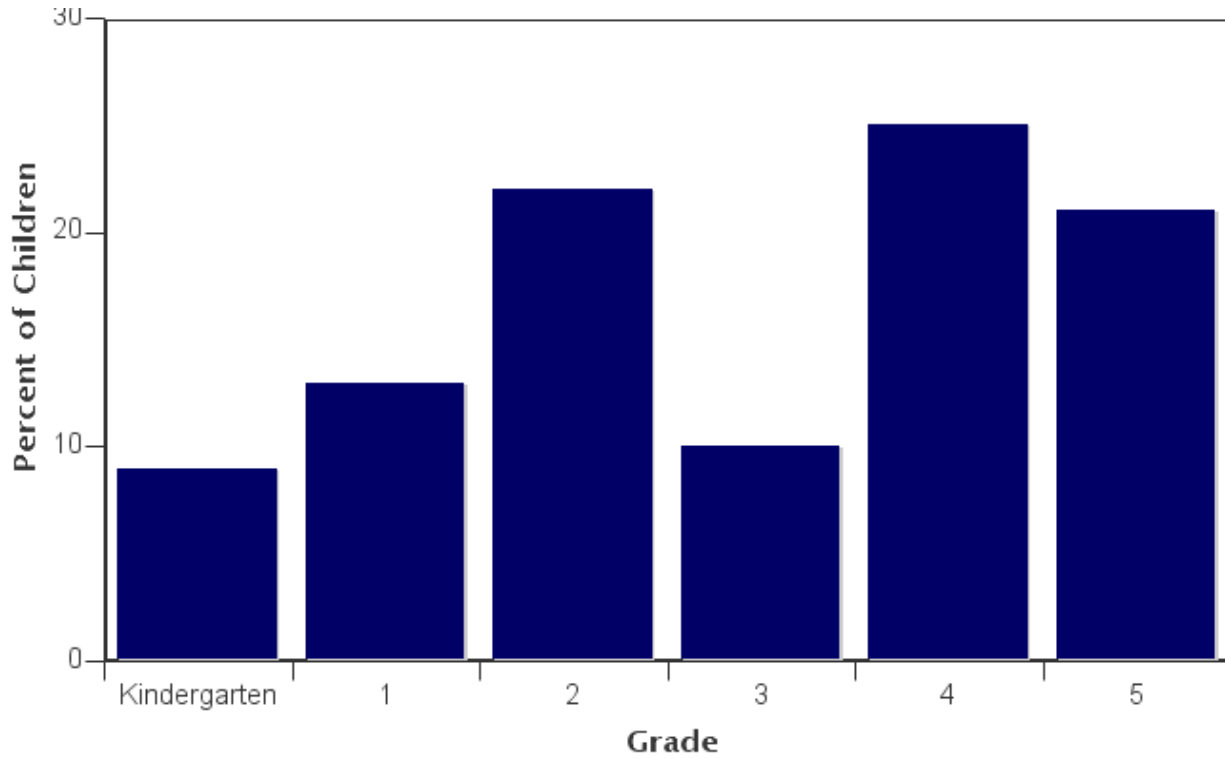
**Number of Questionnaires  
Analyzed for Report:** 87

This report contains information from parents about their children's trip to and from school. The report also reflects parents' perceptions regarding whether walking and bicycling to school is appropriate for their child. The data used in this report were collected using the Survey about Walking and Biking to School for Parents form from the National Center for Safe Routes to School.

Sex of children for parents that provided information



Grade levels of children represented in survey



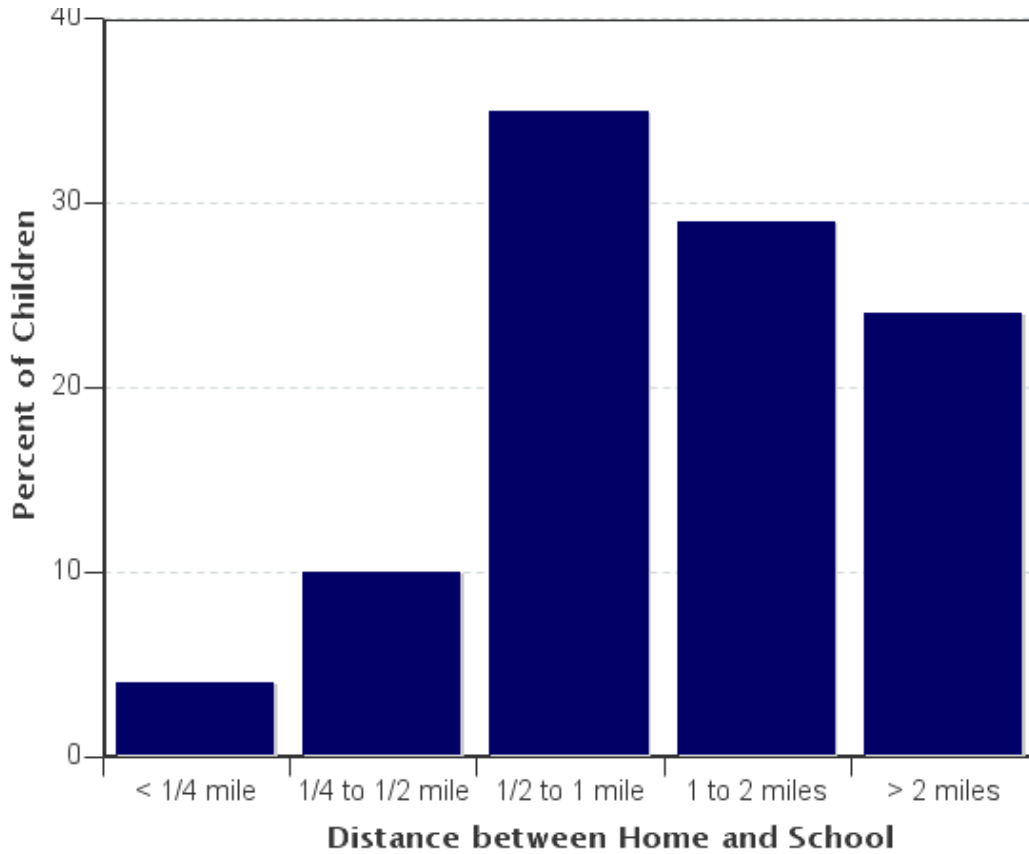
Grade levels of children represented in survey

Grade in School	Responses per grade	
	Number	Percent
Kindergarten	8	9%
1	11	13%
2	19	22%
3	9	10%
4	22	25%
5	18	21%

No response: 0

Percentages may not total 100% due to rounding.

Parent estimate of distance from child's home to school



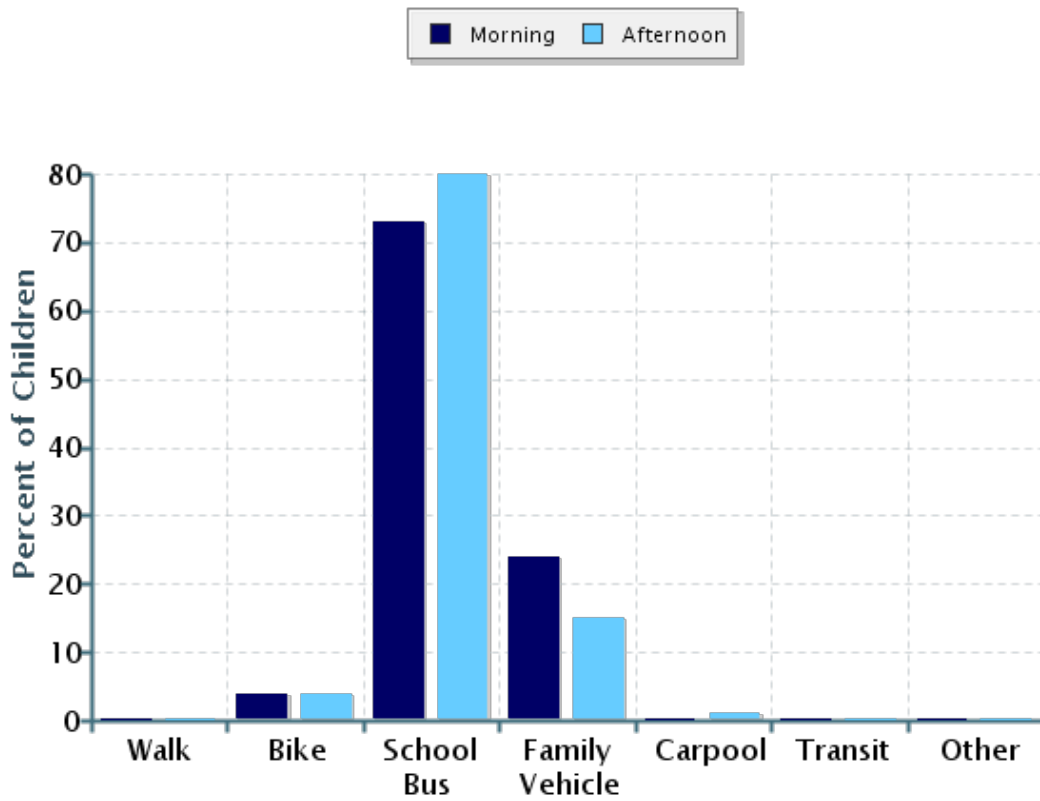
Parent estimate of distance from child's home to school

Distance between home and school	Number of children	Percent
Less than 1/4 mile	3	4%
1/4 mile up to 1/2 mile	8	10%
1/2 mile up to 1 mile	29	35%
1 mile up to 2 miles	24	29%
More than 2 miles	20	24%

Don't know or No response: 3

Percentages may not total 100% due to rounding.

### Typical mode of arrival at and departure from school



### Typical mode of arrival at and departure from school

Time of Trip	Number of Trips	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Morning	84	0%	4%	73%	24%	0%	0%	0%
Afternoon	85	0%	4%	80%	15%	1%	0%	0%

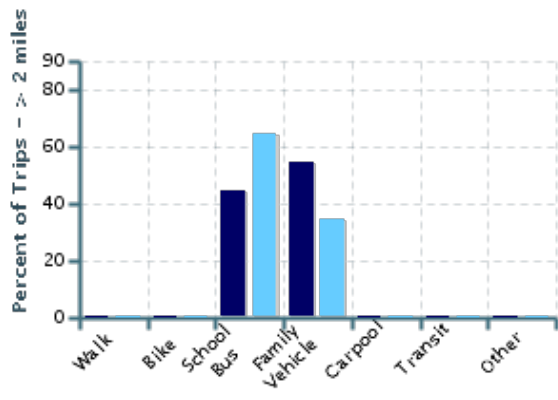
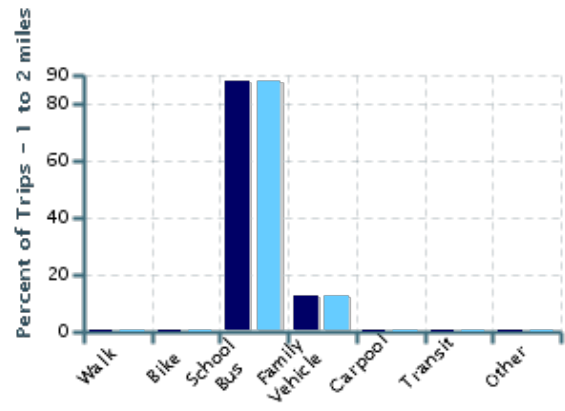
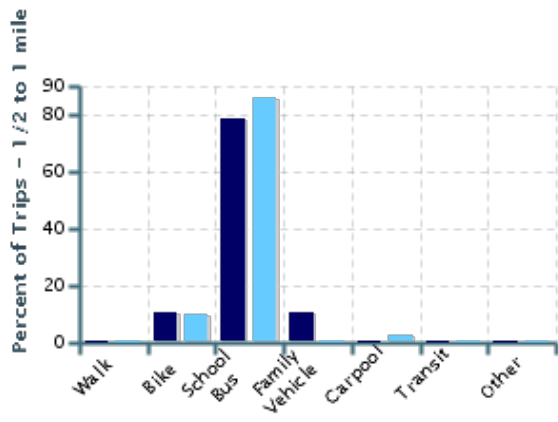
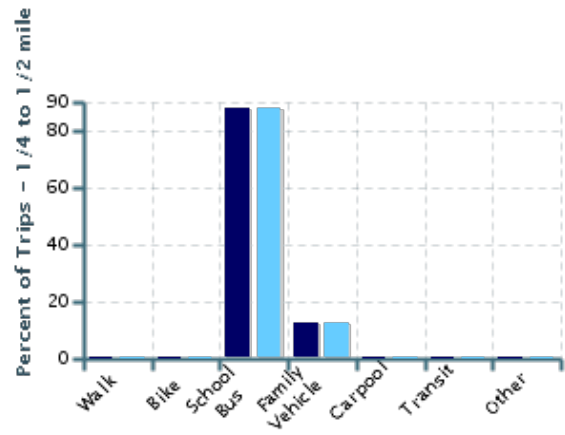
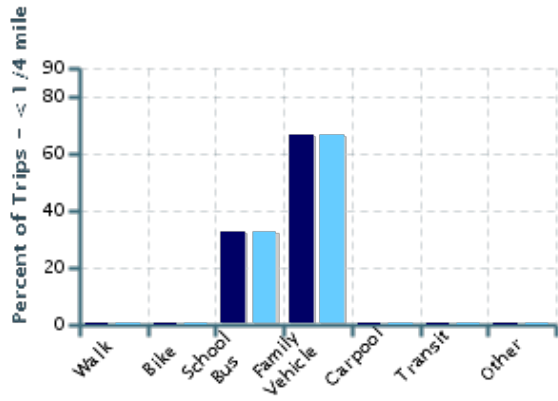
No Response Morning: 3

No Response Afternoon: 2

Percentages may not total 100% due to rounding.

# Typical mode of school arrival and departure by distance child lives from school

■ Morning      ■ Afternoon



## Typical mode of school arrival and departure by distance child lives from school

### School Arrival

Distance	Number within Distance	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Less than 1/4 mile	3	0%	0%	33%	67%	0%	0%	0%
1/4 mile up to 1/2 mile	8	0%	0%	88%	13%	0%	0%	0%
1/2 mile up to 1 mile	28	0%	11%	79%	11%	0%	0%	0%
1 mile up to 2 miles	24	0%	0%	88%	13%	0%	0%	0%
More than 2 miles	20	0%	0%	45%	55%	0%	0%	0%

Don't know or No response: 4

Percentages may not total 100% due to rounding.

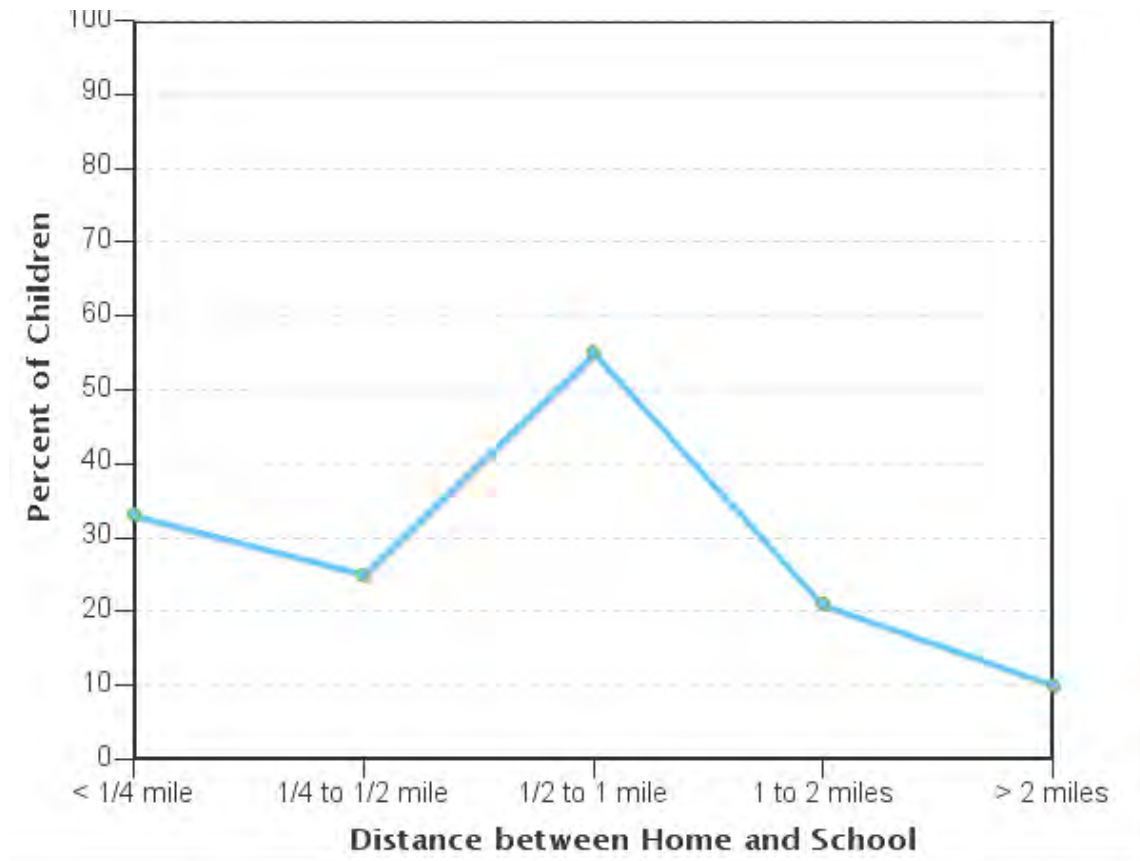
### School Departure

Distance	Number within Distance	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Less than 1/4 mile	3	0%	0%	33%	67%	0%	0%	0%
1/4 mile up to 1/2 mile	8	0%	0%	88%	13%	0%	0%	0%
1/2 mile up to 1 mile	29	0%	10%	86%	0%	3%	0%	0%
1 mile up to 2 miles	24	0%	0%	88%	13%	0%	0%	0%
More than 2 miles	20	0%	0%	65%	35%	0%	0%	0%

Don't know or No response: 3

Percentages may not total 100% due to rounding.

Percent of children who have asked for permission to walk or bike to/from school by distance they live from school

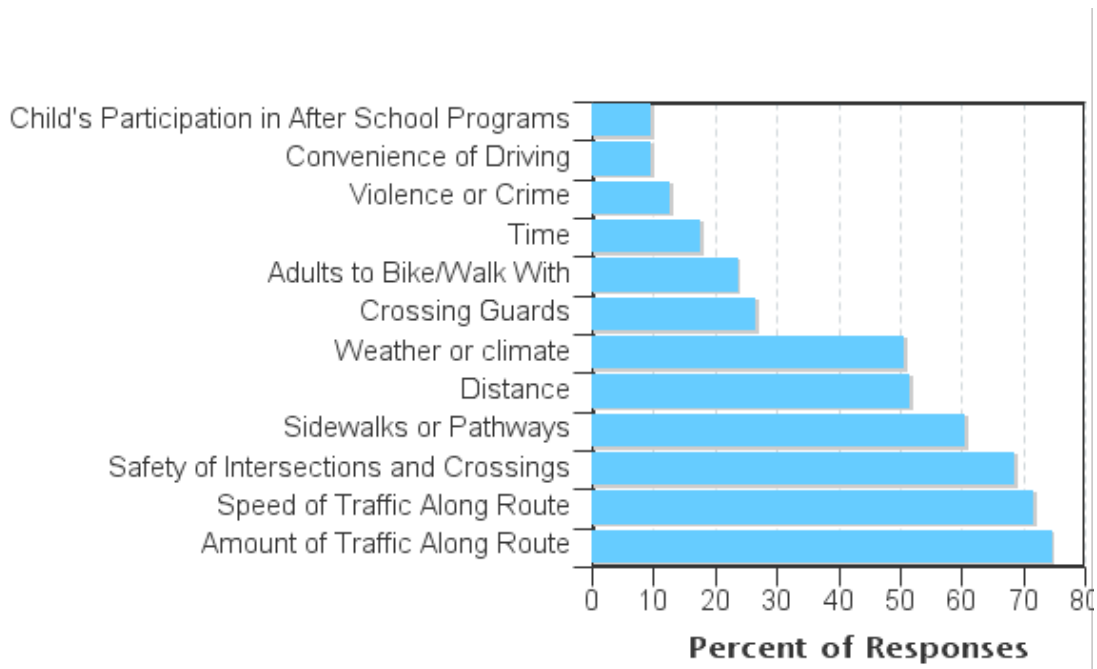


Percent of children who have asked for permission to walk or bike to/from school by distance they live from school

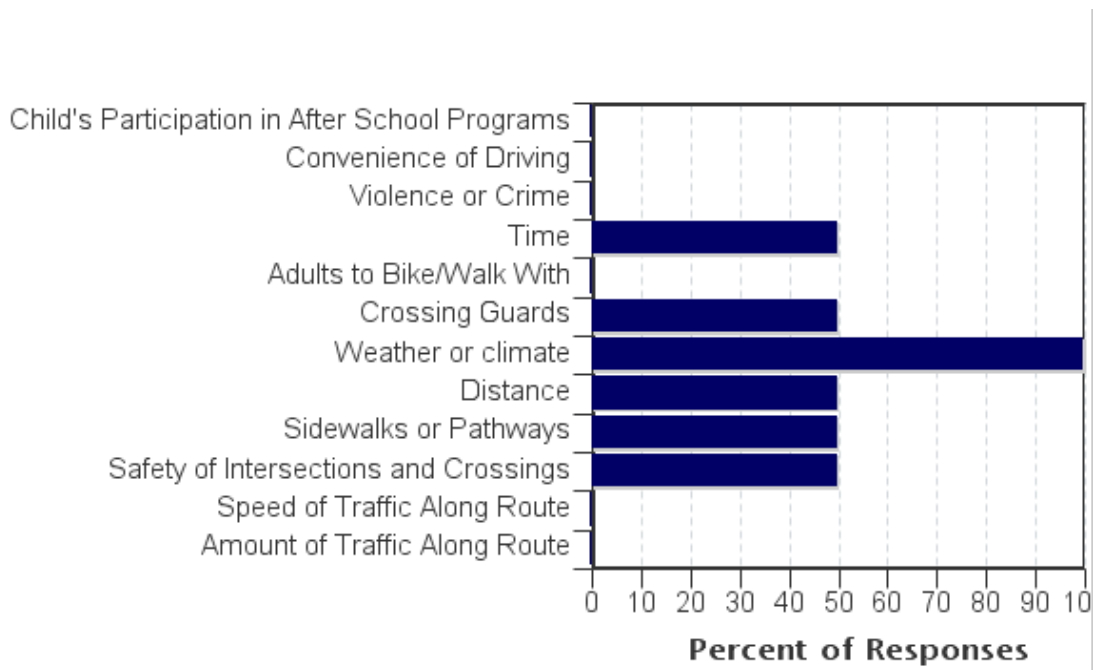
Asked Permission?	Number of Children	Less than 1/4 mile	1/4 mile up to 1/2 mile	1/2 mile up to 1 mile	1 mile up to 2 miles	More than 2 miles
Yes	26	33%	25%	55%	21%	10%
No	58	67%	75%	45%	79%	90%

Don't know or No response: 3  
 Percentages may not total 100% due to rounding.

Issues reported to affect the decision to not allow a child to walk or bike to/from school by parents of children who do not walk or bike to/from school



Issues reported to affect the decision to allow a child to walk or bike to/from school by parents of children who already walk or bike to/from school



Issues reported to affect the decision to allow a child to walk or bike to/from school by  
parents of children who already walk or bike to/from school

Issue	Child does not walk/bike to school	Child walks/bikes to school
Amount of Traffic Along Route	75%	0%
Speed of Traffic Along Route	72%	0%
Safety of Intersections and Crossings	69%	50%
Sidewalks or Pathways	61%	50%
Distance	52%	50%
Weather or climate	51%	100%
Crossing Guards	27%	50%
Adults to Bike/Walk With	24%	0%
Time	18%	50%
Violence or Crime	13%	0%
Convenience of Driving	10%	0%
Child's Participation in After School Programs	10%	0%
<b>Number of Respondents per Category</b>	<b>67</b>	<b>2</b>

No response: 18

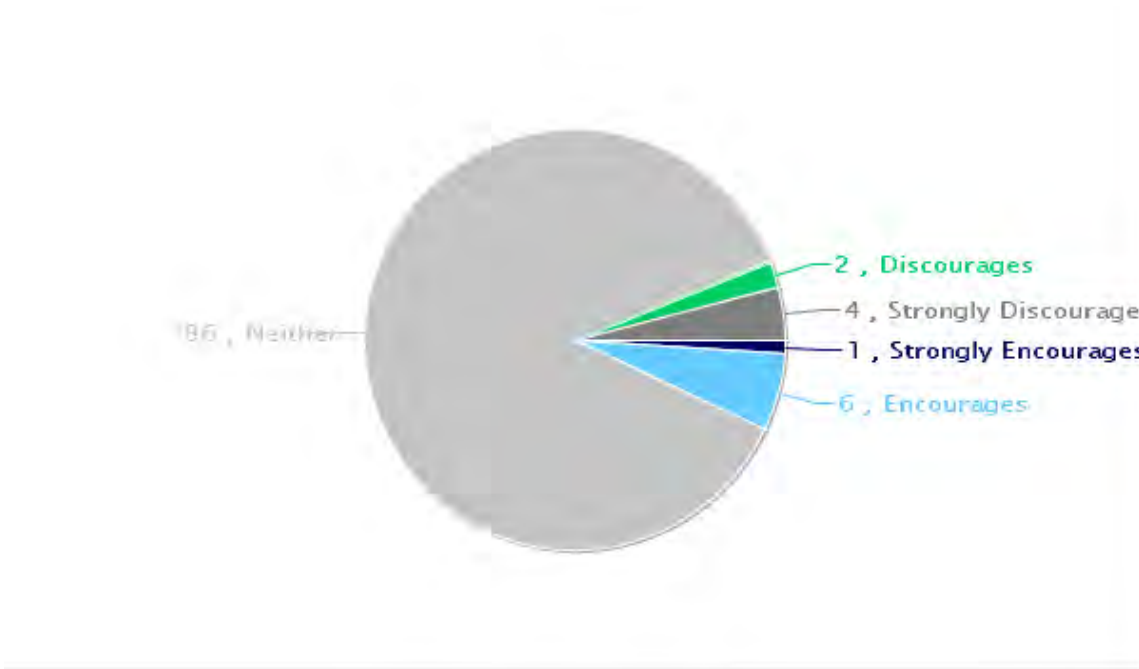
Note:

--Factors are listed from most to least influential for the 'Child does not walk/bike to school' group.

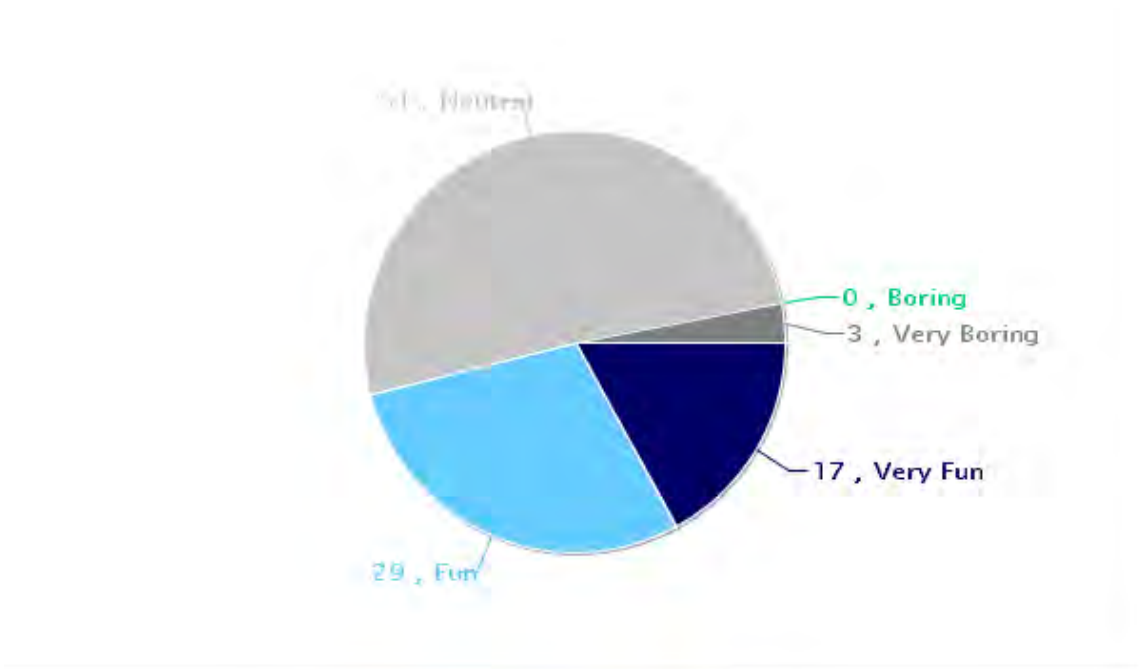
--Each column may sum to > 100% because respondent could select more than issue

--The calculation used to determine the percentage for each issue is based on the 'Number of Respondents per Category' within the respective columns (Child does not walk/bike to school and Child walks/bikes to school.) If comparing percentages between the two columns, please pay particular attention to each column's number of respondents because the two numbers can differ dramatically.

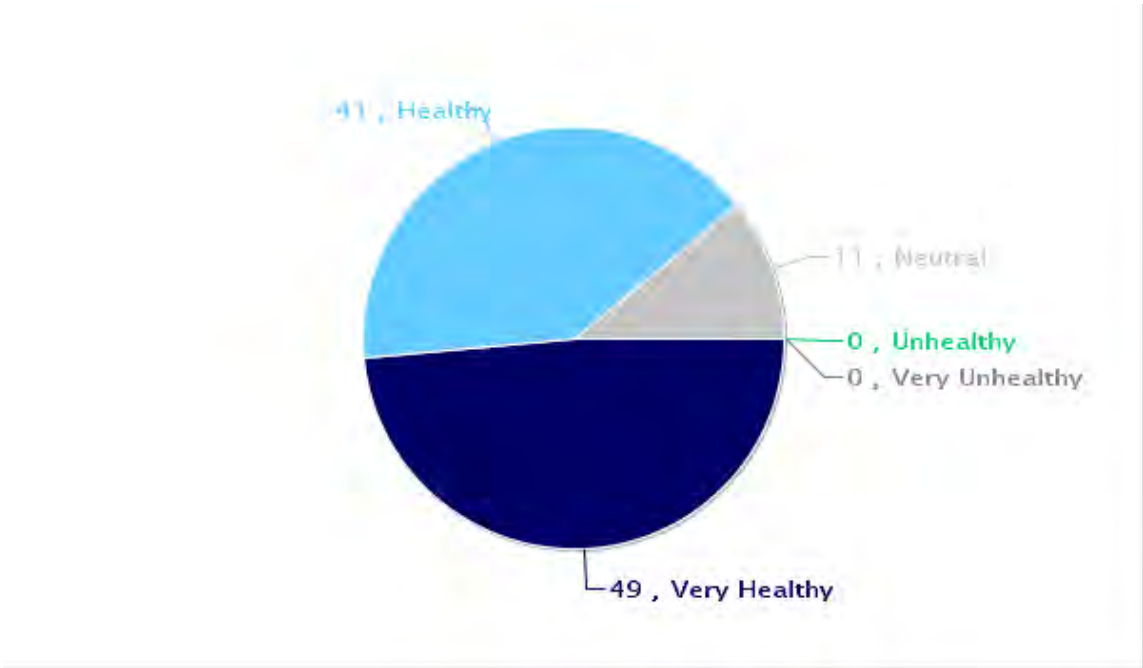
Parents' opinions about how much their child's school encourages or discourages walking and biking to/from school



Parents' opinions about how much fun walking and biking to/from school is for their child



Parents' opinions about how healthy walking and biking to/from school is for their child



## Comments Section

SurveyID	Comment
1690814	Living in Elko, unfortunately it won't ever be an option for my daughter to walk to school. However, I would love if we lived closer and this was an option.
1690830	lack of sidewalks and/or bike paths is the primary reason for not letting our daughter bike or walk to school.
1690849	There is not a direct route with sidewalks for my child. Would not feel comfortable with children walking along side Dodd and 210th.
1691006	We live very close to school, but the route is dangerous. The most direct route does not have a sidewalk. The kids need to cross a Major intersection that has poor traffic control. Having an adult crossing guard helps at this spot. There are lots of driveways and parking lots that the kids must cross to safely bike to school. They like to bike but I usually go with them to ensure safety.
1682667	Would love for my three kids to ride to JFK and/or McGuire during good weather. We are close enough to the school that I don;t think it would be a problem as long as there were paths the entire way and they did not have to cross a major road or there were crossing guards. I love the idea.
1689246	We do not live walking or biking distance to school but the current lack of sidewalk in front of the middle school is concerning. Also the lighting is poor- it is hard to make out the turn into JFK when it is dark.
1688511	Not a very friendly route to walk to JFK or MMS. Not many sidewalks and traffic is extremely high.
1688433	I have seen so many near accidents involving kids walking at the 4 way stop outside Mcguire and JFK ... Holyoke and county 50. There is no cross walk for middle school kids! People get so frustrated with that stop sign and then they speed thru and can't see the kids crossing! Too many lanes at that stop sign for any kid to safely cross. When I walk to pick up the kids it even scary for me to cross 50 safely! Its sad because we live so close but I would never and have never let my kids walk to school or home by themselves without an adult!
1682646	We live only about 3/8 mile from the school, but 210th Street is between our home and the school. There is a high volume of traffic and the traffic moves faster than it should much of the time.
1690809	Wish more children walked. Safety in numbers.
1690811	My son has been biking or walking to school for two years. Sometimes cars don't stop at the intersection of Holyoke and 210th. Also the sidewalk on 210th just west of Holyoke can be quite treacherous in the winter with ice and snow. People not clearing the sidewalk. Another bad thing is people put their garbage cans in the middle of the sidewalk so that kids either have to walk/bike in yards or worse, in the street with no shoulder. Cars speed in that area and need to slow down. That is the only part of his route that really scares me.
1690818	This survey is not relevant to us. We live in Elko-New Market and would not allow our children to bike to Lakeville. Also, why include questions in regards to the caregiver's educational level with that is not what you are asking?
1690832	I think this is a great idea to get safe routes for kids to walk/ride bikes to school.

1690921	I'd like to see a sidewalk next to the road into JFK (from Maguire) I feel nervous for kids walking from JFK out to Holyoke. Additionally I think a crosswalk needs to be added to the dirt lot across the street. Many neighborhood kids walk across the stream and pasture near the cemetery and cross Holyoke to get to school. I worry about them crossing Holyoke with all the traffic. I know the older kids don't go down to the crosswalk to cross.
1691036	Kiddo wants to walk and bike. He isn't old enough as is, but my main concern is the lack of sidewalks after you get to McGuire. The entrance of McGuire is fine, but after that, there is no safe spot for him as he approaches JFK. There are a lot of vehicles that come in and out of the JFK parking lot, which is the only area he would be able to walk/bike through in order to reach the entrance.
1688771	Teach my boy to be very cognizant of the traffic and stranger danger. He is a black-belt in karate. Still, I am always fearful for his safety.
1688425	Walking along 210th is very unsafe due to traffic and sketchy people.
1689033	Holyoke and 210 traffic are horrible. Crossing at any point is a dangerous proposition. Drivers don't pay attention. And the section just west of Holyoke on 210 has no sidewalk for a portion so crossing riding on the street is required.
1682620	We live in a neighborhood that is super close to the elementary and middle schools but there is no safe way for our kids to walk or bike.
1690815	There is no safe way to get to JFK from our neighborhood. There is a busy street (210th) without a crosswalk or sidewalk and also a railtrack. In addition, I'm not sure I would ever feel comfortable with my kids walking towards that industrial area of town. JFK is not in a neighborhood like many other schools.
1690816	210th from Lakeville South to downtown needs sidewalks. Dodd Blvd also needs sidewalks from county rd 70 to 208th.
1690876	I couldn't ever allow her to ride/walk without an adult because she has to cross Dodd and there are no sidewalks until she gets to the walking trail, which doesn't even provide a direct route to the school from where we are.
1691007	It's too cold for the kids to walk and is not safe for them! I don't trust crossroads
1682695	The weather and potential violence against young girls will always discourage me from allowing my daughters to bike/walk to and from school alone
1690813	Anything under a half a mile make me uncomfortable for my child to get to school. We are just on the one mile mark.
1690819	We live in Elko, walking and biking to JFK will never be an option.
1690878	I don't feel my kids are old enough to walk alone currently. I would be happy to walk them to school days when weather cooperates if there was a path. Once they are old enough, I would encourage them to walk vs ride the bus.
1688990	I think over one mile in heavy traffic areas is too much to expect from a child.
1689455	We are within 2 miles of the school so we are charged a fee in order to ride the bus. I do not agree with this at all. In my opinion, elementary aged children are FAR TOO young to be walking alone and should not be required to. I think free busing should be available for all students, no matter where they live, until they reach 6th grade (middle school)

1688503	210th St from LSHS to down town Lakeville needs sidewalks. That road is so unsafe, so many kids walk on the shoulder(or lack thereof). As does Dodd Blvd, Sidewalks are needed from County 70 to 208th St.
1688467	I walked to school from 4 grade through 8 grade but there was sidewalks and the roads I walked by were not busy like 210th is. Also I didn't have the option of a bus like my kids do. I do think the bus is safer when they are in elementary school and when the weather is very cold.
1688939	The health and fun questions are irrelevant riding or walking isn't practical for our family.
1688440	There is no safe way to our school from our house. Also, my kids are elementary age. There are too many predators to allow my 2nd grader to walk alone to school. NO! He can take the bus and I will continue to fight to make sure he will always be provided bussing.
1682619	I live too far away to ever think about having my child walk to school.
1688516	Mostly worry about the intersection of 210th Street and Holyoke. Also, does the school have a bike rack?
1688831	There is no way my kids could walk or ride their bikes. We live too far away out in the country. Have not been happy with the length of our bus rides for years, there have been 45-50 minute commutes on the bus at times.

# Student Travel Tally Report: One School in One Data Collection Period

**School Name:** Kennedy Elementary School

**Set ID:** 30389

**School Group:** Lakeville SRTS

**Month and Year Collected:** October 2019

**School Enrollment:** 583

**Date Report Generated:** 12/17/2019

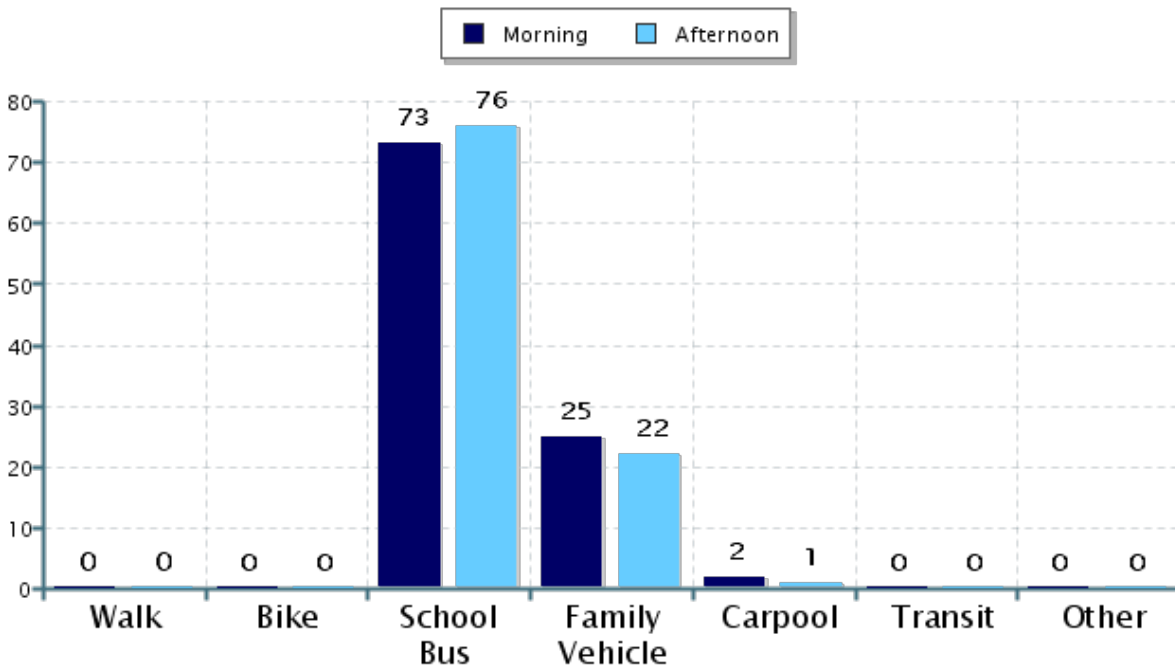
**% of Students reached by SRTS activities:** 76-100%

**Tags:**

**Number of Classrooms  
Included in Report:** 23

This report contains information from your school's classrooms about students' trip to and from school. The data used in this report were collected using the in-class Student Travel Tally questionnaire from the National Center for Safe Routes to School.

## Morning and Afternoon Travel Mode Comparison



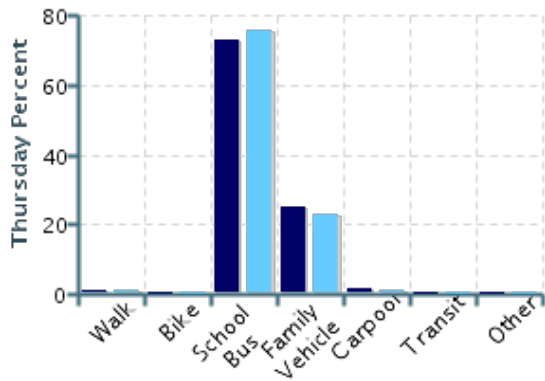
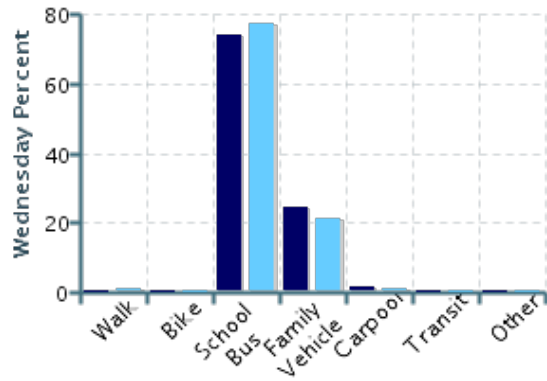
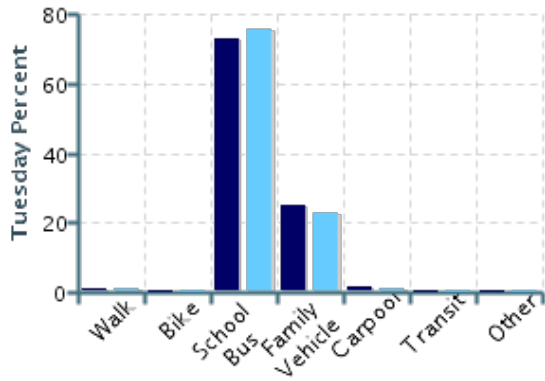
## Morning and Afternoon Travel Mode Comparison

	Number of Trips	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Morning	1395	0.3%	0%	73%	25%	2%	0%	0%
Afternoon	1414	0.4%	0%	76%	22%	1.0%	0%	0%

Percentages may not total 100% due to rounding.

## Morning and Afternoon Travel Mode Comparison by Day

■ Morning ■ Afternoon

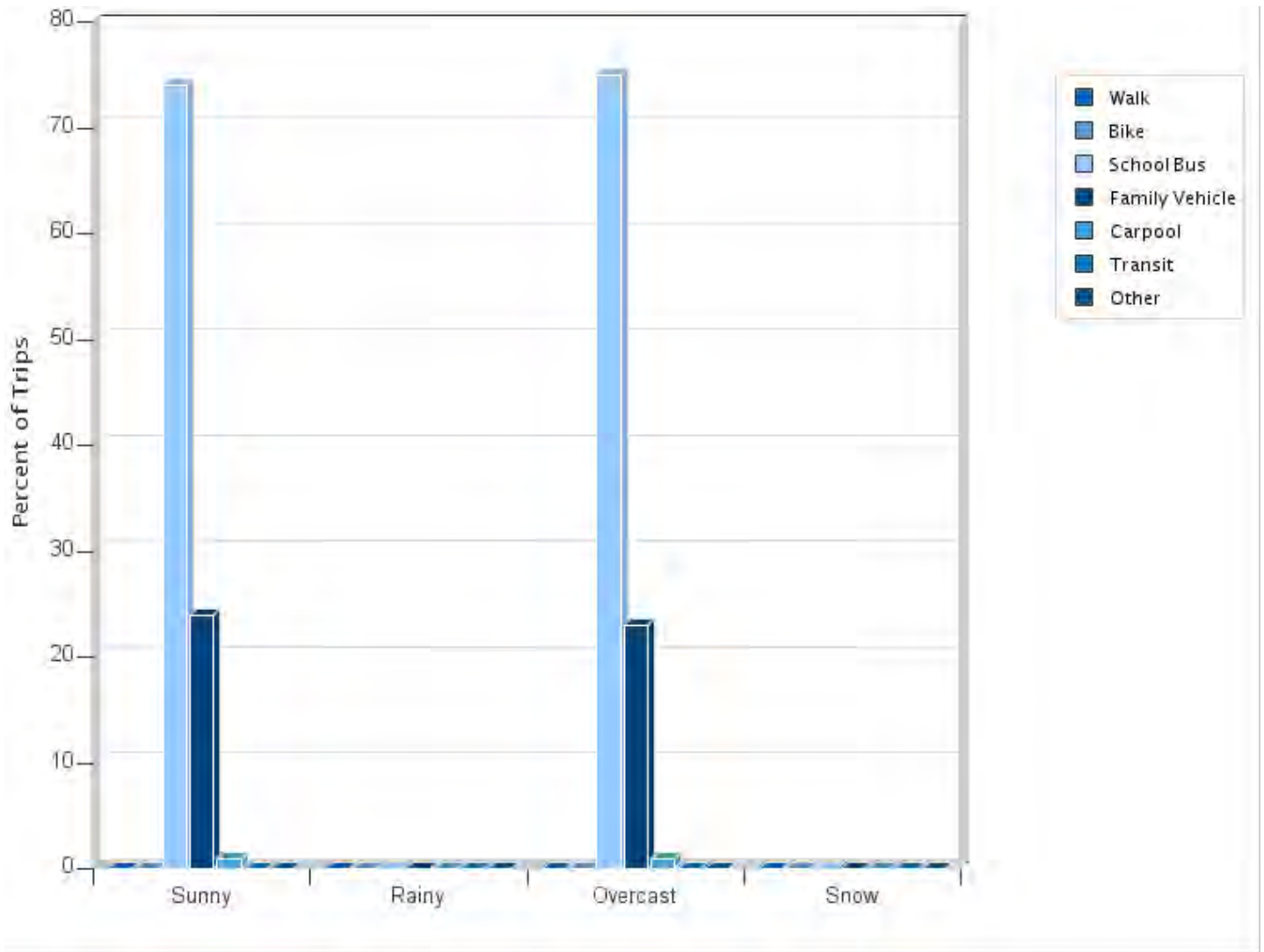


## Morning and Afternoon Travel Mode Comparison by Day

	Number of Trips	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Tuesday AM	454	0.7%	0%	73%	25%	2%	0%	0%
Tuesday PM	474	0.6%	0%	76%	23%	0.8%	0%	0%
Wednesday AM	470	0%	0%	74%	24%	1%	0%	0%
Wednesday PM	471	0.2%	0%	77%	21%	1%	0%	0%
Thursday AM	471	0.2%	0%	73%	25%	1%	0%	0%
Thursday PM	469	0.4%	0%	76%	23%	1%	0%	0%

Percentages may not total 100% due to rounding.

## Travel Mode by Weather Conditions



## Travel Mode by Weather Condition

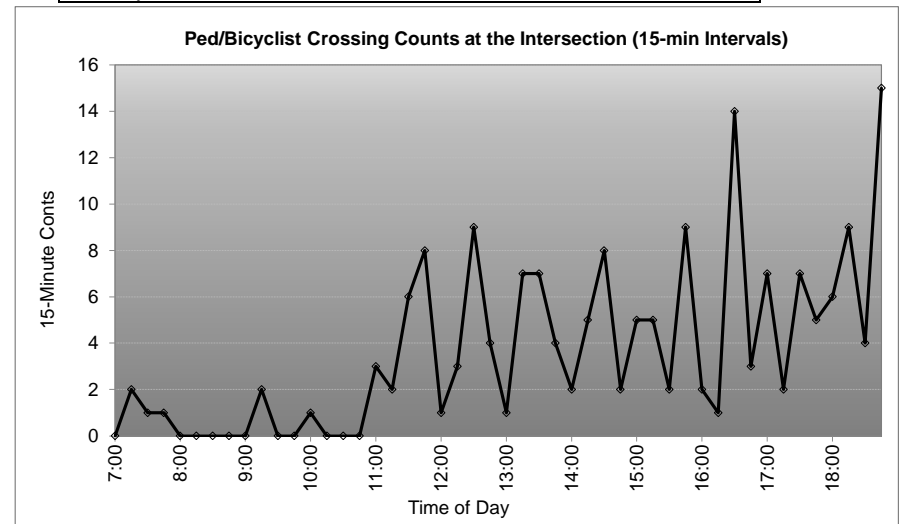
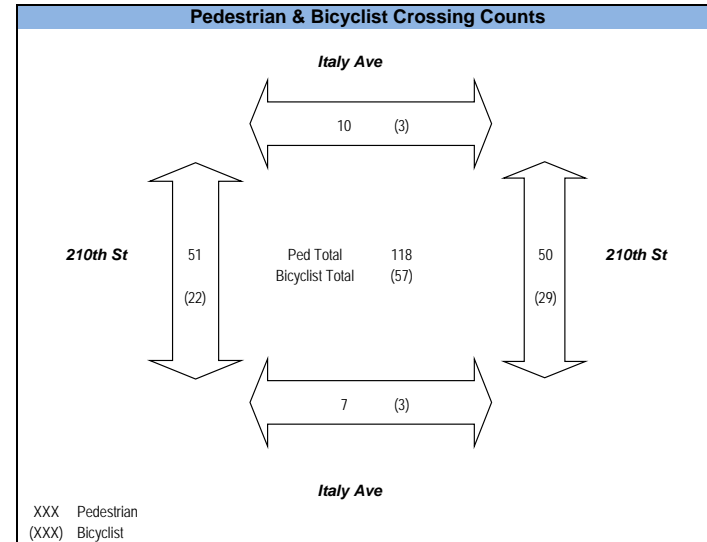
Weather Condition	Number of Trips	Walk	Bike	School Bus	Family Vehicle	Carpool	Transit	Other
Sunny	1398	0.4%	0%	74%	24%	1%	0%	0%
Rainy	0	0%	0%	0%	0%	0%	0%	0%
Overcast	1411	0.3%	0%	75%	23%	1%	0%	0%
Snow	0	0%	0%	0%	0%	0%	0%	0%

Percentages may not total 100% due to rounding.

## APPENDIX B

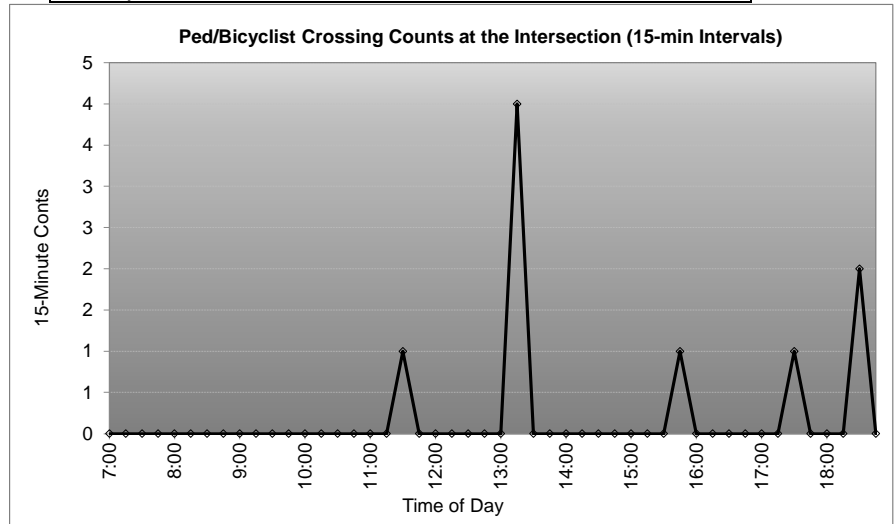
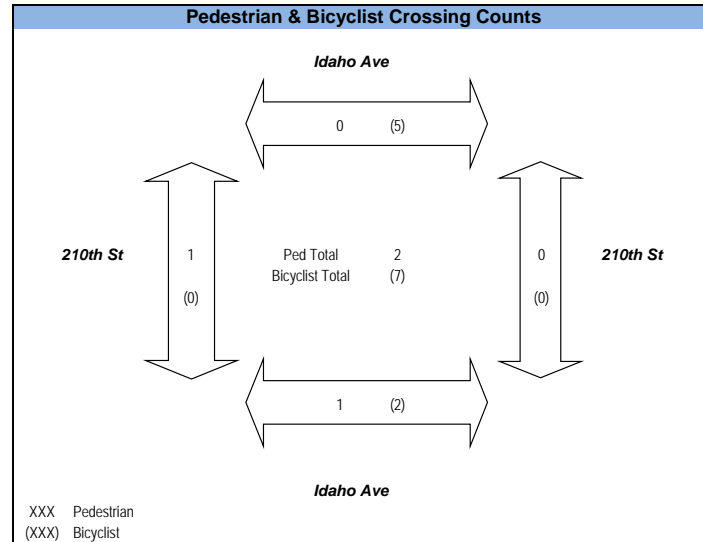
Bikes & Peds (7:00-19:00) at 210th St & Italy Ave										
Start Time	Italy Ave North Leg		210th St East Leg		Italy Ave South Leg		210th St West Leg		15-min Total	General Observations
	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike		
7:00	-	-	-	-	-	-	-	-	-	
7:15	-	-	1	-	1	-	-	-	2	
7:30	-	-	-	-	-	-	1	-	1	
7:45	-	-	1	-	-	-	-	-	1	No children crossed during this time period. Only 2 adult pedestrians were in a group. At 7:15:20, a pedestrian crossed diagonally, counted as East leg and South leg crossing.
8:00	-	-	-	-	-	-	-	-	-	
8:15	-	-	-	-	-	-	-	-	-	
8:30	-	-	-	-	-	-	-	-	-	
8:45	-	-	-	-	-	-	-	-	-	
9:00	-	-	-	-	-	-	-	-	-	There were no bicyclists during this time period.
9:15	-	-	-	-	-	-	2	-	2	
9:30	-	-	-	-	-	-	-	-	-	
9:45	-	-	-	-	-	-	-	-	-	
10:00	-	-	-	1	-	-	-	-	1	
10:15	-	-	-	-	-	-	-	-	-	9 of the 30 pedestrians were children. Pedestrian children included a group of four, while the remainder of children were accompanied by at least one parent. At 11:47, two peds crossed diagonally, counted as East and North leg crossing.
10:30	-	-	-	-	-	-	-	-	-	
10:45	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	-	-	-	3	-	3	
11:15	-	-	-	2	-	-	-	-	2	
11:30	-	-	-	-	1	-	5	-	6	
11:45	2	-	2	-	1	-	3	-	8	2 of the 7 bicyclists were children, who crossed together without adults.
12:00	-	-	-	-	-	-	1	-	1	
12:15	-	-	1	-	-	-	1	1	3	
12:30	-	-	2	1	-	-	4	2	9	Even mix of people in groups and people by themselves.
12:45	-	-	-	-	-	-	4	-	4	
13:00	-	-	1	-	-	-	-	-	1	
13:15	1	1	1	1	-	1	2	-	7	
13:30	1	-	4	2	-	-	-	-	7	11 of the 37 pedestrians were children. At 3:34, ped diagonal crossing, counted as West leg and North leg crossing.
13:45	-	-	3	1	-	-	-	-	4	
14:00	-	-	2	-	-	-	-	-	2	
14:15	-	-	-	3	-	-	-	2	5	
14:30	-	-	5	-	1	-	2	-	8	5 of the 19 bicyclists were children. There was an even mix of groups of children unaccompanied, and children accompanied by an adult.
14:45	-	-	1	1	-	-	-	-	2	
15:00	-	-	-	3	-	-	2	-	5	
15:15	1	-	1	-	-	-	1	2	5	
15:30	-	-	-	-	-	-	2	-	2	
15:45	-	1	3	1	2	-	2	-	9	
16:00	-	-	-	1	-	-	1	-	2	
16:15	-	-	-	-	-	-	-	1	1	
16:30	-	-	8	1	-	-	2	3	14	10 of the 44 pedestrians were children. At 18:47, a family of four crossed diagonally, counted as a East and North leg crossing.
16:45	-	-	-	-	-	-	3	-	3	
17:00	-	-	3	-	-	-	4	-	7	
17:15	-	-	-	-	-	-	2	-	2	
17:30	-	-	2	-	-	2	-	3	7	12 of the 31 bicyclists were children.
17:45	-	-	1	-	-	-	1	3	5	
18:00	-	-	2	3	-	-	-	1	6	Slightly more pedestrians/bicyclists crossed as part of a group, than crossed by themselves.
18:15	1	-	2	1	-	-	5	-	9	
18:30	-	-	-	2	1	-	1	-	4	
18:45	4	1	4	5	-	-	1	-	15	
Total	10	3	50	29	7	3	51	22	175	

Ped = pedestrian crossing  
 Bike = bicyclist crossing  
 dash (-) in the table indicates zero or not applicable



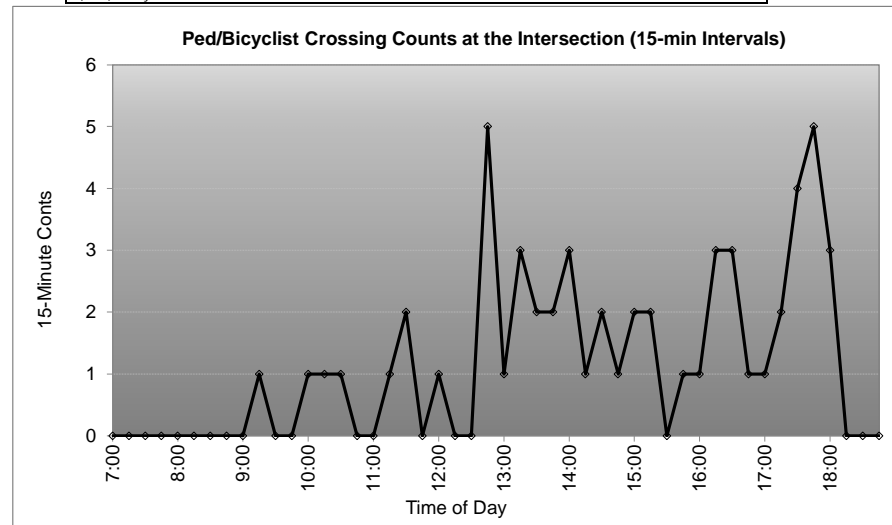
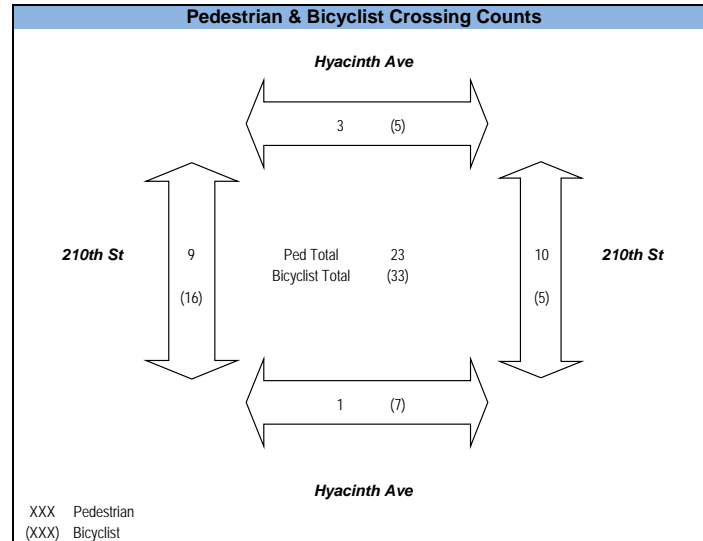
Bikes & Peds (7:00-19:00) at 210th St & Idaho Ave									General Observations	
Start Time	Idaho Ave North Leg		210th St East Leg		Idaho Ave South Leg		210th St West Leg			15-min Total
	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike		
7:00	-	-	-	-	-	-	-	-	-	Nobody crossed during this period.
7:15	-	-	-	-	-	-	-	-	-	
7:30	-	-	-	-	-	-	-	-	-	
7:45	-	-	-	-	-	-	-	-	-	
8:00	-	-	-	-	-	-	-	-	-	
8:15	-	-	-	-	-	-	-	-	-	
8:30	-	-	-	-	-	-	-	-	-	
8:45	-	-	-	-	-	-	-	-	-	
9:00	-	-	-	-	-	-	-	-	-	
9:15	-	-	-	-	-	-	-	-	-	
9:30	-	-	-	-	-	-	-	-	-	
9:45	-	-	-	-	-	-	-	-	-	
10:00	-	-	-	-	-	-	-	-	-	No children crossed during this period
10:15	-	-	-	-	-	-	-	-	-	
10:30	-	-	-	-	-	-	-	-	-	
10:45	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	-	-	-	-	-	-	
11:15	-	-	-	-	-	-	-	-	-	
11:30	-	-	-	-	1	-	-	-	1	
11:45	-	-	-	-	-	-	-	-	-	
12:00	-	-	-	-	-	-	-	-	-	
12:15	-	-	-	-	-	-	-	-	-	
12:30	-	-	-	-	-	-	-	-	-	
12:45	-	-	-	-	-	-	-	-	-	
13:00	-	-	-	-	-	-	-	-	-	No children crossed during this period
13:15	-	3	-	-	-	1	-	-	4	
13:30	-	-	-	-	-	-	-	-	-	
13:45	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
14:15	-	-	-	-	-	-	-	-	-	
14:30	-	-	-	-	-	-	-	-	-	
14:45	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
15:15	-	-	-	-	-	-	-	-	-	
15:30	-	-	-	-	-	-	-	-	-	
15:45	-	-	-	-	-	1	-	-	1	
16:00	-	-	-	-	-	-	-	-	-	No children crossed during this period
16:15	-	-	-	-	-	-	-	-	-	
16:30	-	-	-	-	-	-	-	-	-	
16:45	-	-	-	-	-	-	-	-	-	
17:00	-	-	-	-	-	-	-	-	-	
17:15	-	-	-	-	-	-	-	-	-	
17:30	-	-	-	-	-	-	1	-	1	
17:45	-	-	-	-	-	-	-	-	-	
18:00	-	-	-	-	-	-	-	-	-	
18:15	-	-	-	-	-	-	-	-	-	
18:30	-	2	-	-	-	-	-	-	2	
18:45	-	-	-	-	-	-	-	-	-	
<b>Total</b>	-	5	-	-	1	2	1	-	9	

Ped = pedestrian crossing  
 Bike = bicyclist crossing  
 dash (-) in the table indicates zero or not applicable



Bikes & Peds (7:00-19:00) at 210th St & Hyacinth Ave									General Observations	
Start Time	Hyacinth Ave North Leg		210th St East Leg		Hyacinth Ave South Leg		210th St West Leg			15-min Total
	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike		
7:00	-	-	-	-	-	-	-	-	-	No children crossed during this time period, all pedestrians and bicyclists were by themselves (not in a group).
7:15	-	-	-	-	-	-	-	-	-	
7:30	-	-	-	-	-	-	-	-	-	
7:45	-	-	-	-	-	-	-	-	-	
8:00	-	-	-	-	-	-	-	-	-	
8:15	-	-	-	-	-	-	-	-	-	
8:30	-	-	-	-	-	-	-	-	-	
8:45	-	-	-	-	-	-	-	-	-	
9:00	-	-	-	-	-	-	-	-	-	
9:15	-	-	-	-	-	-	-	1	1	
9:30	-	-	-	-	-	-	-	-	-	
9:45	-	-	-	-	-	-	-	-	-	
10:00	-	-	-	-	-	-	-	1	1	
10:15	-	-	-	-	-	-	-	1	1	
10:30	-	-	1	-	-	-	-	-	1	
10:45	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	-	-	-	-	-	-	
11:15	-	-	-	-	-	-	1	-	1	
11:30	1	-	1	-	-	-	-	-	2	
11:45	-	-	-	-	-	-	-	-	-	
12:00	-	-	1	-	-	-	-	-	1	
12:15	-	-	-	-	-	-	-	-	-	
12:30	-	-	-	-	-	-	-	-	-	
12:45	-	-	-	3	-	-	-	2	5	
13:00	-	1	-	-	-	-	-	-	1	
13:15	-	-	-	2	-	1	-	-	3	
13:30	-	-	1	-	-	-	-	1	2	
13:45	-	2	-	-	-	-	-	-	2	
14:00	-	-	-	-	-	-	-	3	3	
14:15	1	-	-	-	-	-	-	-	1	
14:30	-	-	-	-	2	-	-	-	2	
14:45	-	-	-	-	-	1	-	-	1	
15:00	-	-	-	-	-	-	1	1	2	
15:15	-	1	-	-	-	-	1	-	2	
15:30	-	-	-	-	-	-	-	-	-	
15:45	-	-	1	-	-	-	-	-	1	
16:00	-	-	-	-	-	-	-	1	1	
16:15	1	1	-	-	-	-	-	1	3	
16:30	-	-	-	-	1	-	1	1	3	
16:45	-	-	1	-	-	-	-	-	1	
17:00	-	-	-	-	-	1	-	-	1	
17:15	-	-	2	-	-	-	-	-	2	
17:30	-	-	2	-	-	2	-	-	4	
17:45	-	-	-	-	-	-	4	1	5	
18:00	-	-	-	-	-	-	1	2	3	
18:15	-	-	-	-	-	-	-	-	-	
18:30	-	-	-	-	-	-	-	-	-	
18:45	-	-	-	-	-	-	-	-	-	
<b>Total</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>1</b>	<b>7</b>	<b>9</b>	<b>16</b>	<b>56</b>	

Ped = pedestrian crossing  
 Bike = bicyclist crossing  
 dash (-) in the table indicates zero or not applicable



## APPENDIX C

Alternative	Eastbound				Westbound				Southbound				Northbound				Overall			
	AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Jacquard - Existing	23.7	C	12.4	B	34.4	D	14.1	B	32.0	D	12.8	B	17.1	C	12.2	B	27.4	D	12.9	B
Jacquard - Modified	19.3	C	11.9	B	28.0	D	13.0	B	25.6	D	11.8	B	25.2	D	13.1	B	24.7	C	12.6	B
Jacquard - Single lane RAB	13.9	B	6.7	A	8.3	A	6.8	A	10.1	B	6.2	A	5.9	A	6.6	A	9.5	A	6.6	A
Holyoke - Existing	40.3	E	22.3	C	20.0	C	22.6	C	17.1	C	15.3	C	29.3	D	19.7	C	27.4	D	20.4	C
Holyoke - Modified	44.1	E	23.4	C	20.7	C	23.5	C	19.8	C	17.0	C	31.1	D	20.4	C	29.6	D	21.4	C

Jacquard Modified = removal of EB left-turn lane and NB right-turn lane

Holyoke Modified = removal of SB right-turn lane

Intersection	
Intersection Delay, s/veh	27.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↑	↷	↶	↷		↶	↑	↷	↶	↷	
Traffic Vol, veh/h	5	66	175	197	131	11	27	77	67	26	154	8
Future Vol, veh/h	5	66	175	197	131	11	27	77	67	26	154	8
Peak Hour Factor	0.62	0.72	0.63	0.62	0.82	0.69	0.68	0.52	0.44	0.72	0.57	0.50
Heavy Vehicles, %	6	2	3	3	2	6	2	4	4	6	4	3
Mvmt Flow	8	92	278	318	160	16	40	148	152	36	270	16
Number of Lanes	1	1	1	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	3
HCM Control Delay	23.7	34.4	17.1	32
HCM LOS	C	D	C	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	92%	0%	95%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	8%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	77	67	5	66	175	197	142	26	162
LT Vol	27	0	0	5	0	0	197	0	26	0
Through Vol	0	77	0	0	66	0	0	131	0	154
RT Vol	0	0	67	0	0	175	0	11	0	8
Lane Flow Rate	40	148	152	8	92	278	318	176	36	286
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.11	0.391	0.371	0.022	0.237	0.663	0.823	0.427	0.099	0.738
Departure Headway (Hd)	9.989	9.506	8.781	9.887	9.3	8.594	9.328	8.741	9.871	9.285
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	358	378	408	361	385	419	388	411	362	389
Service Time	7.777	7.294	6.568	7.673	7.085	6.378	7.106	6.519	7.652	7.066
HCM Lane V/C Ratio	0.112	0.392	0.373	0.022	0.239	0.663	0.82	0.428	0.099	0.735
HCM Control Delay	14	18.3	16.7	12.9	15	26.9	43.5	17.9	13.7	34.3
HCM Lane LOS	B	C	C	B	B	D	E	C	B	D
HCM 95th-tile Q	0.4	1.8	1.7	0.1	0.9	4.7	7.4	2.1	0.3	5.8

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↑	↷	↶	↷		↶	↑	↷	↶	↷	
Traffic Vol, veh/h	15	131	84	126	133	19	73	71	82	25	88	10
Future Vol, veh/h	15	131	84	126	133	19	73	71	82	25	88	10
Peak Hour Factor	0.75	0.86	0.78	0.72	0.88	0.79	0.57	0.77	0.60	0.89	0.81	0.83
Heavy Vehicles, %	6	2	3	3	2	6	2	4	4	6	4	3
Mvmt Flow	20	152	108	175	151	24	128	92	137	28	109	12
Number of Lanes	1	1	1	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	3
HCM Control Delay	12.4	14.1	12.2	12.8
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	88%	0%	90%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	12%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	71	82	15	131	84	126	152	25	98
LT Vol	73	0	0	15	0	0	126	0	25	0
Through Vol	0	71	0	0	131	0	0	133	0	88
RT Vol	0	0	82	0	0	84	0	19	0	10
Lane Flow Rate	128	92	137	20	152	108	175	175	28	121
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.275	0.186	0.249	0.044	0.312	0.2	0.372	0.342	0.065	0.257
Departure Headway (Hd)	7.74	7.267	6.558	7.954	7.377	6.683	7.648	7.036	8.293	7.677
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	465	494	548	451	487	537	471	512	432	468
Service Time	5.48	5.007	4.297	5.695	5.117	4.423	5.386	4.774	6.04	5.424
HCM Lane V/C Ratio	0.275	0.186	0.25	0.044	0.312	0.201	0.372	0.342	0.065	0.259
HCM Control Delay	13.4	11.7	11.5	11.1	13.4	11.1	14.9	13.4	11.6	13.1
HCM Lane LOS	B	B	B	B	B	B	B	B	B	B
HCM 95th-tile Q	1.1	0.7	1	0.1	1.3	0.7	1.7	1.5	0.2	1

Intersection	
Intersection Delay, s/veh	24.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↶	↷	↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	5	66	175	197	131	11	27	77	67	26	154	8
Future Vol, veh/h	5	66	175	197	131	11	27	77	67	26	154	8
Peak Hour Factor	0.62	0.72	0.63	0.62	0.82	0.69	0.68	0.52	0.44	0.72	0.57	0.50
Heavy Vehicles, %	6	2	3	3	2	6	2	4	4	6	4	3
Mvmt Flow	8	92	278	318	160	16	40	148	152	36	270	16
Number of Lanes	0	1	1	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	19.3	28	25.2	25.6
HCM LOS	C	D	D	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	7%	0%	100%	0%	100%	0%
Vol Thru, %	0%	53%	93%	0%	0%	92%	0%	95%
Vol Right, %	0%	47%	0%	100%	0%	8%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	144	71	175	197	142	26	162
LT Vol	27	0	5	0	197	0	26	0
Through Vol	0	77	66	0	0	131	0	154
RT Vol	0	67	0	175	0	11	0	8
Lane Flow Rate	40	300	100	278	318	176	36	286
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.099	0.682	0.237	0.595	0.765	0.394	0.091	0.675
Departure Headway (Hd)	8.996	8.174	8.549	7.716	8.663	8.072	9.082	8.492
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	399	442	420	467	419	446	395	426
Service Time	6.747	5.925	6.303	5.469	6.415	5.824	6.834	6.244
HCM Lane V/C Ratio	0.1	0.679	0.238	0.595	0.759	0.395	0.091	0.671
HCM Control Delay	12.7	26.8	14	21.2	34.7	16	12.7	27.2
HCM Lane LOS	B	D	B	C	D	C	B	D
HCM 95th-tile Q	0.3	5	0.9	3.8	6.4	1.8	0.3	4.9

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗		↖	↗		↖	↗	
Traffic Vol, veh/h	15	131	84	126	133	19	73	71	82	25	88	10
Future Vol, veh/h	15	131	84	126	133	19	73	71	82	25	88	10
Peak Hour Factor	0.75	0.86	0.78	0.72	0.88	0.79	0.57	0.77	0.60	0.89	0.81	0.83
Heavy Vehicles, %	6	2	3	3	2	6	2	4	4	6	4	3
Mvmt Flow	20	152	108	175	151	24	128	92	137	28	109	12
Number of Lanes	0	1	1	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	11.9	13	13.1	11.8
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	10%	0%	100%	0%	100%	0%
Vol Thru, %	0%	46%	90%	0%	0%	88%	0%	90%
Vol Right, %	0%	54%	0%	100%	0%	12%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	153	146	84	126	152	25	98
LT Vol	73	0	15	0	126	0	25	0
Through Vol	0	71	131	0	0	133	0	88
RT Vol	0	82	0	84	0	19	0	10
Lane Flow Rate	128	229	172	108	175	175	28	121
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.256	0.403	0.328	0.18	0.346	0.316	0.06	0.235
Departure Headway (Hd)	7.189	6.333	6.847	6.012	7.109	6.494	7.638	7.019
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	497	565	522	592	502	550	466	508
Service Time	4.972	4.115	4.635	3.8	4.893	4.277	5.436	4.817
HCM Lane V/C Ratio	0.258	0.405	0.33	0.182	0.349	0.318	0.06	0.238
HCM Control Delay	12.5	13.4	13	10.1	13.7	12.3	10.9	12
HCM Lane LOS	B	B	B	B	B	B	B	B
HCM 95th-tile Q	1	1.9	1.4	0.7	1.5	1.3	0.2	0.9

Intersection				
Intersection Delay, s/veh	9.5			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	378	494	340	322
Demand Flow Rate, veh/h	388	508	353	335
Vehicles Circulating, veh/h	647	203	140	532
Vehicles Exiting, veh/h	220	290	895	179
Ped Vol Crossing Leg, #/h	0	1	1	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.9	8.3	5.9	10.1
Approach LOS	B	A	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	388	508	353	335
Cap Entry Lane, veh/h	713	1122	1196	802
Entry HV Adj Factor	0.975	0.972	0.963	0.962
Flow Entry, veh/h	378	494	340	322
Cap Entry, veh/h	695	1090	1152	771
V/C Ratio	0.544	0.453	0.295	0.418
Control Delay, s/veh	13.9	8.3	5.9	10.1
LOS	B	A	A	B
95th %tile Queue, veh	3	2	1	2

Intersection				
Intersection Delay, s/veh	6.6			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	280	350	357	149
Demand Flow Rate, veh/h	287	359	369	155
Vehicles Circulating, veh/h	323	248	206	465
Vehicles Exiting, veh/h	297	327	404	142
Ped Vol Crossing Leg, #/h	0	1	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.7	6.8	6.6	6.2
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	287	359	369	155
Cap Entry Lane, veh/h	993	1071	1118	859
Entry HV Adj Factor	0.975	0.975	0.968	0.959
Flow Entry, veh/h	280	350	357	149
Cap Entry, veh/h	968	1044	1083	824
V/C Ratio	0.289	0.335	0.330	0.180
Control Delay, s/veh	6.7	6.8	6.6	6.2
LOS	A	A	A	A
95th %tile Queue, veh	1	1	1	1

Intersection	
Intersection Delay, s/veh	27.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↵		↵	↶	↵	↵	↵	↵	↵	↶	↶
Traffic Vol, veh/h	27	126	134	92	192	44	91	136	68	74	92	26
Future Vol, veh/h	27	126	134	92	192	44	91	136	68	74	92	26
Peak Hour Factor	0.75	0.83	0.68	0.68	0.87	0.85	0.69	0.61	0.77	0.84	0.64	0.72
Heavy Vehicles, %	2	3	5	9	3	2	7	8	6	2	15	2
Mvmt Flow	36	152	197	135	221	52	132	223	88	88	144	36
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	2
HCM Control Delay	40.3	20	29.3	17.1
HCM LOS	E	C	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	67%	0%	48%	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	33%	0%	52%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	204	27	260	92	192	44	74	92	26
LT Vol	91	0	27	0	92	0	0	74	0	0
Through Vol	0	136	0	126	0	192	0	0	92	0
RT Vol	0	68	0	134	0	0	44	0	0	26
Lane Flow Rate	132	311	36	349	135	221	52	88	144	36
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.348	0.758	0.095	0.839	0.366	0.559	0.121	0.247	0.392	0.089
Departure Headway (Hd)	9.504	8.768	9.522	8.655	9.746	9.125	8.384	10.102	9.812	8.857
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	379	411	375	419	368	395	426	355	367	403
Service Time	7.277	6.541	7.297	6.429	7.526	6.904	6.163	7.888	7.598	6.642
HCM Lane V/C Ratio	0.348	0.757	0.096	0.833	0.367	0.559	0.122	0.248	0.392	0.089
HCM Control Delay	17.3	34.4	13.3	43.1	18.1	23	12.3	16.2	18.8	12.5
HCM Lane LOS	C	D	B	E	C	C	B	C	C	B
HCM 95th-tile Q	1.5	6.2	0.3	8	1.6	3.3	0.4	1	1.8	0.3

Intersection	
Intersection Delay, s/veh	20.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↵		↵	↵	↵	↵	↵		↵	↵	↵
Traffic Vol, veh/h	40	158	38	36	232	104	64	124	74	88	71	39
Future Vol, veh/h	40	158	38	36	232	104	64	124	74	88	71	39
Peak Hour Factor	0.71	0.81	0.59	0.69	0.78	0.87	0.53	0.86	0.77	0.71	0.71	0.81
Heavy Vehicles, %	2	3	5	9	3	2	7	8	6	2	15	2
Mvmt Flow	56	195	64	52	297	120	121	144	96	124	100	48
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	2
HCM Control Delay	22.3	22.6	19.7	15.3
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	63%	0%	81%	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	37%	0%	19%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	198	40	196	36	232	104	88	71	39
LT Vol	64	0	40	0	36	0	0	88	0	0
Through Vol	0	124	0	158	0	232	0	0	71	0
RT Vol	0	74	0	38	0	0	104	0	0	39
Lane Flow Rate	121	240	56	259	52	297	120	124	100	48
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.309	0.564	0.144	0.617	0.131	0.694	0.254	0.327	0.256	0.11
Departure Headway (Hd)	9.205	8.443	9.191	8.558	9.014	8.397	7.662	9.493	9.205	8.256
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	391	428	390	423	398	431	469	379	390	434
Service Time	6.958	6.195	6.945	6.311	6.766	6.148	5.413	7.251	6.963	6.014
HCM Lane V/C Ratio	0.309	0.561	0.144	0.612	0.131	0.689	0.256	0.327	0.256	0.111
HCM Control Delay	16	21.6	13.5	24.2	13.1	28.2	13	16.8	15.1	12
HCM Lane LOS	C	C	B	C	B	D	B	C	C	B
HCM 95th-tile Q	1.3	3.4	0.5	4	0.4	5.2	1	1.4	1	0.4

Intersection	
Intersection Delay, s/veh	29.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↵		↵	↵	↵	↵	↵		↵	↵	
Traffic Vol, veh/h	27	126	134	92	192	44	91	136	68	74	92	26
Future Vol, veh/h	27	126	134	92	192	44	91	136	68	74	92	26
Peak Hour Factor	0.75	0.83	0.68	0.68	0.87	0.85	0.69	0.61	0.77	0.84	0.64	0.72
Heavy Vehicles, %	2	3	5	9	3	2	7	8	6	2	15	2
Mvmt Flow	36	152	197	135	221	52	132	223	88	88	144	36
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	44.1	20.7	31.1	19.8
HCM LOS	E	C	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	67%	0%	48%	0%	100%	0%	0%	78%
Vol Right, %	0%	33%	0%	52%	0%	0%	100%	0%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	204	27	260	92	192	44	74	118
LT Vol	91	0	27	0	92	0	0	74	0
Through Vol	0	136	0	126	0	192	0	0	92
RT Vol	0	68	0	134	0	0	44	0	26
Lane Flow Rate	132	311	36	349	135	221	52	88	180
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.355	0.775	0.098	0.862	0.373	0.57	0.123	0.25	0.487
Departure Headway (Hd)	9.698	8.959	9.777	8.899	9.93	9.304	8.559	10.202	9.753
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	369	402	365	405	361	386	417	351	369
Service Time	7.484	6.744	7.563	6.684	7.721	7.095	6.349	8	7.549
HCM Lane V/C Ratio	0.358	0.774	0.099	0.862	0.374	0.573	0.125	0.251	0.488
HCM Control Delay	17.8	36.7	13.6	47.3	18.6	23.8	12.6	16.4	21.5
HCM Lane LOS	C	E	B	E	C	C	B	C	C
HCM 95th-tile Q	1.6	6.5	0.3	8.4	1.7	3.4	0.4	1	2.6

Intersection	
Intersection Delay, s/veh	21.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↵		↵	↵	↵	↵	↵		↵	↵	
Traffic Vol, veh/h	40	158	38	36	232	104	64	124	74	88	71	39
Future Vol, veh/h	40	158	38	36	232	104	64	124	74	88	71	39
Peak Hour Factor	0.71	0.81	0.59	0.69	0.78	0.87	0.53	0.86	0.77	0.71	0.71	0.81
Heavy Vehicles, %	2	3	5	9	3	2	7	8	6	2	15	2
Mvmt Flow	56	195	64	52	297	120	121	144	96	124	100	48
Number of Lanes	1	1	0	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	2
HCM Control Delay	23.4	23.5	20.4	17
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	63%	0%	81%	0%	100%	0%	0%	65%
Vol Right, %	0%	37%	0%	19%	0%	0%	100%	0%	35%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	198	40	196	36	232	104	88	110
LT Vol	64	0	40	0	36	0	0	88	0
Through Vol	0	124	0	158	0	232	0	0	71
RT Vol	0	74	0	38	0	0	104	0	39
Lane Flow Rate	121	240	56	259	52	297	120	124	148
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.314	0.574	0.147	0.632	0.133	0.705	0.259	0.329	0.371
Departure Headway (Hd)	9.361	8.596	9.409	8.767	9.154	8.533	7.793	9.566	9.022
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	384	421	381	413	392	422	460	376	399
Service Time	7.121	6.355	7.171	6.529	6.912	6.291	5.551	7.33	6.786
HCM Lane V/C Ratio	0.315	0.57	0.147	0.627	0.133	0.704	0.261	0.33	0.371
HCM Control Delay	16.4	22.4	13.8	25.5	13.3	29.4	13.3	17	17
HCM Lane LOS	C	C	B	D	B	D	B	C	C
HCM 95th-tile Q	1.3	3.5	0.5	4.2	0.5	5.3	1	1.4	1.7