SAINT PAUL
PLANNING & ECONOMIC DEVELOPMENT

DEPARTMENT OF PLANNING & ECONOMIC DEVELOPMENT
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Transportation Committee of the Planning Commission

Monday, December 13, 2021, 4:30 p.m. – 6:00 p.m.

Remote meeting

1. West Side SRTS Plan – Jimmy Shoemaker (Public Works), 30 minutes
2. Arcade Street SRTS Plan – Jimmy Shoemaker (Public Works), 30 minutes

NOTE TO COMMITTEE MEMBERS AND MEMBERS OF THE PUBLIC: The chair of the Planning Commission has determined that it is not practical nor prudent for the Planning Commission and its Committees to meet in-person or pursuant to Minnesota Statutes, Section 13D.02. In light of the COVID-19 health pandemic, it is not feasible for any member of Transportation Committee to be present at the regular location, and all members of the Transportation Committee will attend this meeting by telephone or other electronic means.
It is also not feasible for members of the public to attend the meeting at its regular location due to the health pandemic and emergency. Accordingly, no meeting will be held in the 13th Floor Conference Room in City Hall Annex at 25 W. 4th Street in the City of Saint Paul.

Members of the public may monitor this meeting remotely the following ways:

Join on your computer or mobile app (in Microsoft Teams)
Click here to join the meeting

Or call in (audio only)
612-315-7905, Phone Conference ID: 478 364 111#

Any presentation slides will be posted (as PDFs) to *bit.ly/StPaulTC* prior to the meeting.

Upcoming Transportation Committee Meetings

- ~~December 27~~ (will be canceled)
- January 10

Meetings are open to the public. Additional time may be allocated for comments or further discussion at the discretion of the Chair. Meetings may be cancelled if there is not a quorum expected, or if there are no agenda items. For additional information on the Transportation Committee of the Planning Commission, please visit our website at bit.ly/StPaulTC or contact Bill Dermody at Bill.Dermody@ci.stpaul.mn.us or 651-266-6617.

Transportation Committee Staff Report for Plans and Policies

Committee date: December 13, 2021

Plan Name/Policy Name: West Side Safe Routes to School Plan (2021); Arcade Street SRTS Engineering Study (2021)

Contact: Jimmy Shoemaker, Senior Planner, Department of Public Works
jimmy.shoemaker@ci.stpaul.mn.us

Plan/Policy Webpage: stpaul.gov/safe-routes-school

Description: The City of Saint Paul partnered with Saint Paul Public Schools and other agency and community partners on two planning efforts in 2020-2021: a plan for increasing the number of students walking and biking to school on the West Side, and an engineering study focused on walking and biking to schools in the area of Arcade Street.

General Timeline: Both plans are complete.

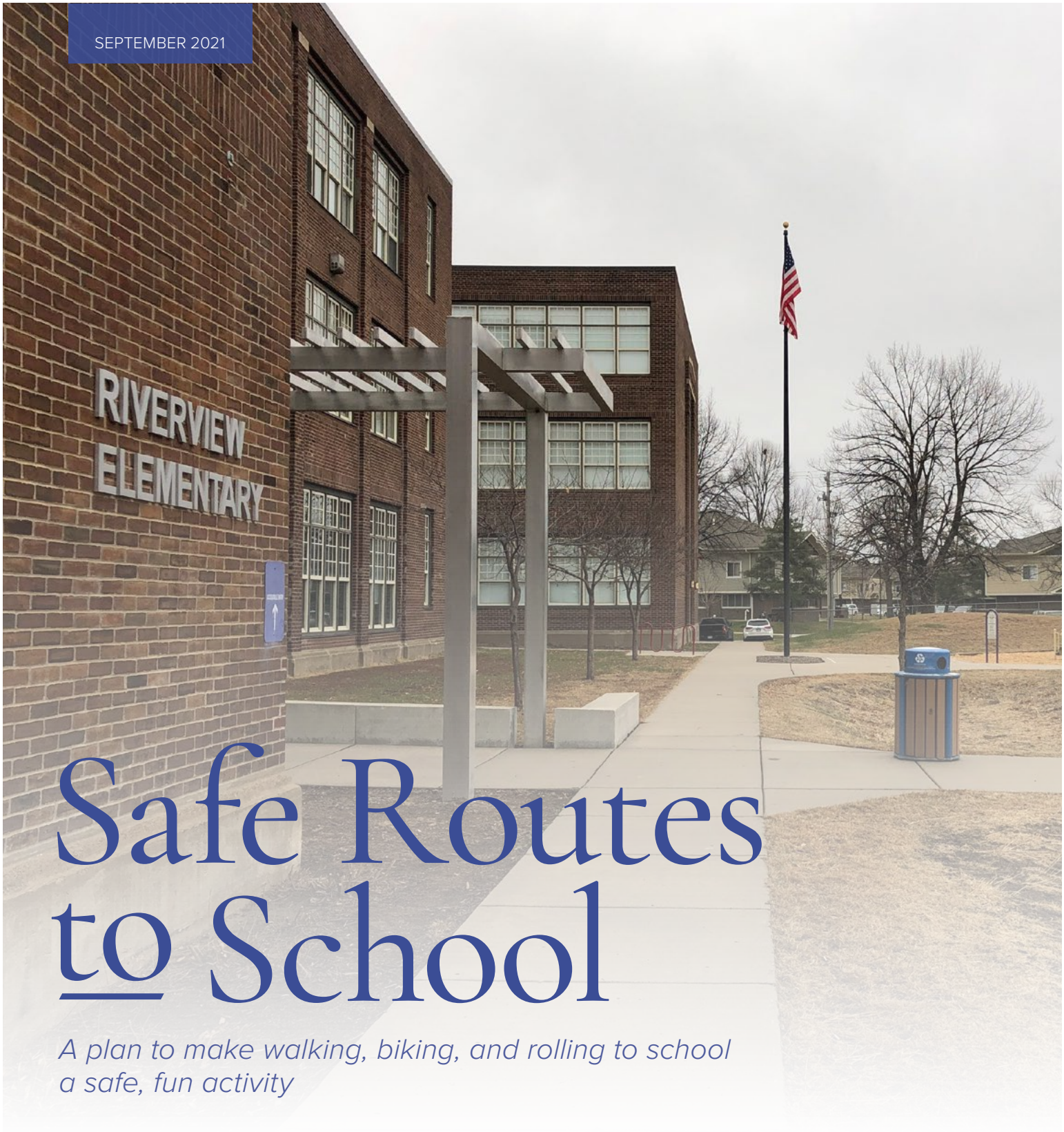
Public Hearing Date & Location: NA

Transportation Committee Role:

☐ Inform scope & approach ☐ Review draft ☐ Make recommendation

Explanation: Both plans are complete. Project staff are informing the Committee and will share next steps for the plans. The SRTS coordinator from SPPS will be joining this presentation.

SEPTEMBER 2021



Safe Routes to School

A plan to make walking, biking, and rolling to school a safe, fun activity

SAINT PAUL PUBLIC SCHOOLS - WEST SIDE
CHEROKEE HEIGHTS ELEMENTARY
RIVERVIEW WEST SIDE SCHOOL OF EXCELLENCE
OPEN WORLD LEARNING COMMUNITY
HUMBOLDT HIGH

DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

ACKNOWLEDGMENTS

We gratefully acknowledge the participation of the following individuals and organizations in the development of this Safe Routes to School Plan.

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MINNESOTA SAFE ROUTES TO SCHOOL

DEPARTMENT OF TRANSPORTATION

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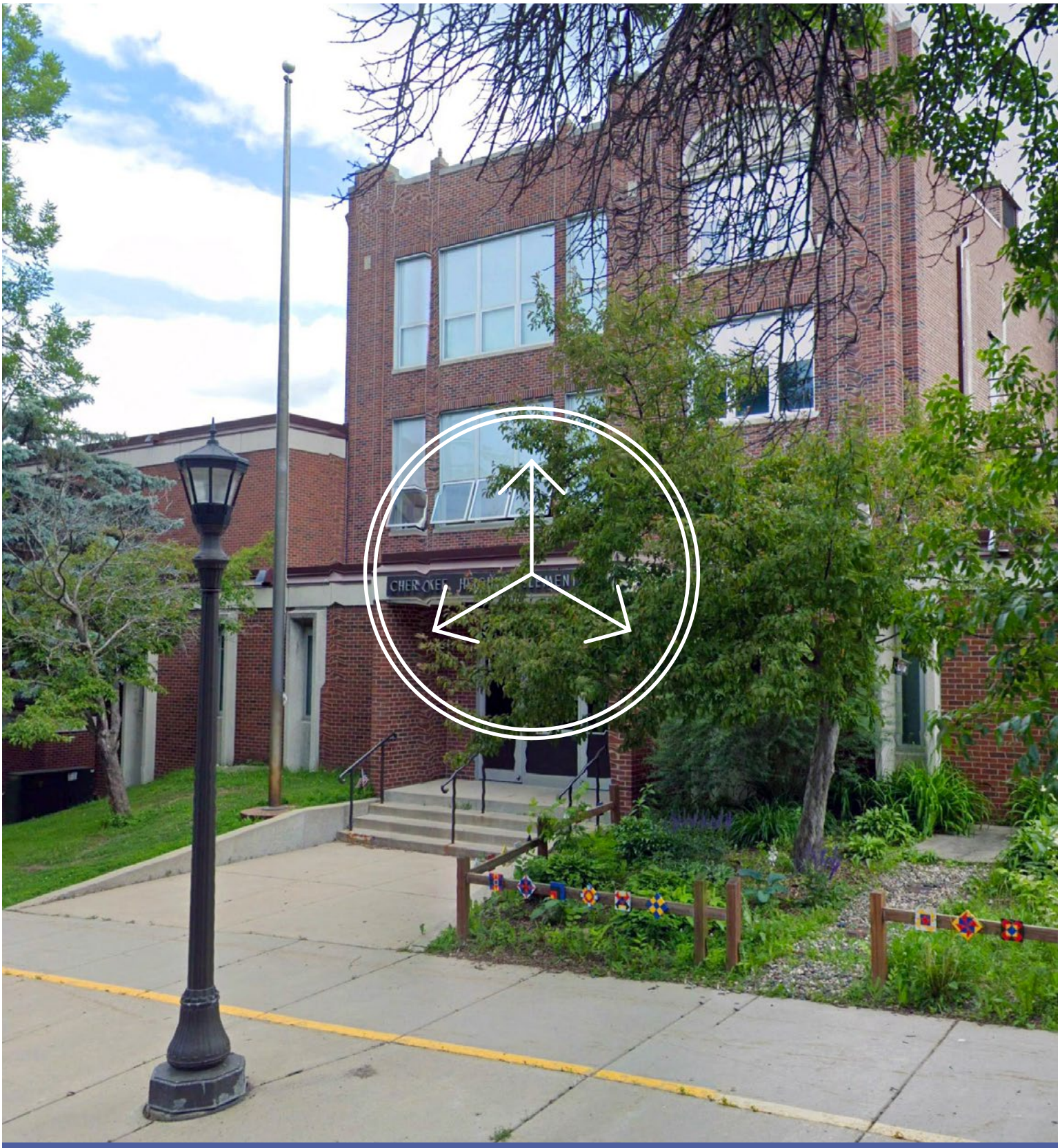
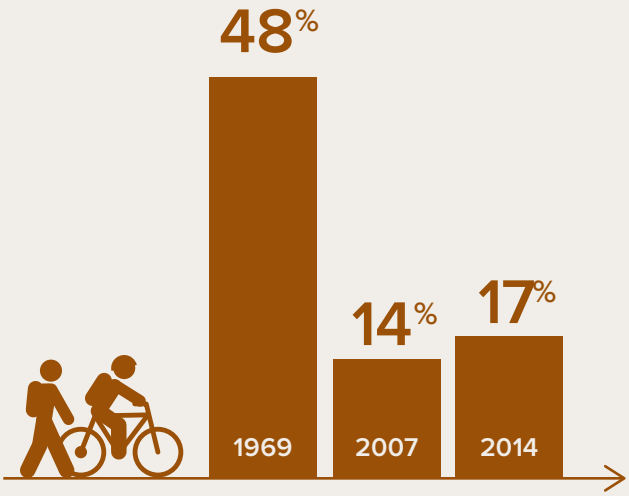


01

INTRODUCTION + CONTEXT

Why Safe Routes to School?



THE PERCENTAGE OF CHILDREN WALKING OR BIKING TO SCHOOL HAS DROPPED PRECIPITOUSLY WITHIN ONE GENERATION

MOST KIDS ARE NOT GETTING ENOUGH PHYSICAL ACTIVITY

ROADS NEAR SCHOOLS ARE CONGESTED, DECREASING SAFETY AND AIR QUALITY FOR CHILDREN

KIDS WHO WALK OR BIKE TO SCHOOL:

- Arrive alert and able to focus on school
- Are more likely to be a healthy body weight
- Are less likely to suffer from depression and anxiety
- Get most of the recommended 60 minutes of daily physical activity during the trip to and from school
- Demonstrate improved test scores and better school performance*

THE VICIOUS CYCLE OF INCREASED TRAFFIC LEADING TO REDUCED WALKING AND BICYCLING:

Fewer students walking & biking to school → More parents driving children to school → Increased traffic at and around school → Rising concern about safety of walking & biking → Fewer students walking & biking to school

*More information, including primary sources, can be found at http://guide.saferoutesinfo.org

THE SIX E'S

Safe Routes to School (SRTS) programs use a variety of strategies to make it easy, fun, and safe for students to walk and bike to school. These strategies are often called the "Six E's."

ENGAGEMENT

Listening to children, families, teachers, and school leaders and working with community partners and organizations to build intentional, ongoing engagement opportunities into the program structure.

EQUITY

Creating and implementing SRTS initiatives that benefit all demographic groups, with particular attention to ensuring positive outcomes for low-income students, Black students and students of color, students of all genders and sexual orientations, students with disabilities, and more.

ENGINEERING

Improving walking, biking, and rolling by making changes to the built environment.

EDUCATION

Providing children and community members with the skills safely walk and bike, educating them about the benefits active transportation, and teaching them about transportation options.

ENCOURAGEMENT

Building interest and enthusiasm for walking, biking, and rolling to school by using incentive programs, events, or classroom activities.

EVALUATION

Assessing which programs are more or less successful, ensuring that initiatives are supporting equitable outcomes, and identifying unintended consequences or opportunities to improve to effectiveness of each activity or approach.

NAVIGATING THIS PLAN

Below is a roadmap for navigating the way through this plan. Use it to find all the information you need for helping students be safer and more active!

PROGRAMS

Getting children to walk and bike to school requires fun and engaging programs for schools and families. Turn to this section for recommended events, activities, and strategies that will get children moving.

INFRASTRUCTURE

Ensuring the safety of children on their trips to and from school means upgrading streets. See this section for suggestions to improve the safety, comfort, and convenience of walking, biking, and rolling, including paint, signage, and signals.

HOW TO GET INVOLVED

The more people involved with a local SRTS process, the more successful it will be! Use this section to find out how you can be a part of this important initiative.

APPENDICES

There is more information available than could fit in this plan. For additional resources, turn to this section.

The Vision

Walking, biking, and rolling to school is safe, comfortable, and fun for all students on Saint Paul's West Side.

This plan was made possible with support from the Minnesota Department of Transportation (MnDOT) and was developed in coordination with Saint Paul Public Schools and the Saint Paul West Side community. Recommendations within this plan are the result of workshops, discussion, and site visits involving city, county, and MnDOT staff as well as teachers, school administrators, students, caregivers, and other stakeholders.

The West Side SRTS Plan identifies strategies to support a safe, comfortable, and inviting environment for active transportation around Cherokee Heights Elementary, Riverview West Side School of Excellence, Open World Learning Community, and Humboldt High. Some recommendations may be implemented almost immediately while others will require more planning, analysis, and funding. While not all of these recommendations can be implemented right away, achieving short-term successes where possible will help build momentum and lay the groundwork for more complex projects in the future.

EQUITY HIGHLIGHT

EQUITY IN SRTS

Equity in SRTS means that every student is able to safely, comfortably, and conveniently walk and bike to school, regardless of race, cultural identity, tribal affiliation, immigrant or refugee status, language, gender or sexual identity, income, religion, and whether or not a student receives special education, has a physical or mental disability, or is homeless or highly mobile.

An equity approach requires working with local partners to tailor programs and allocate resources to meet the unique needs of the community.

Plan Development

The West Side SRTS Plan was a collaboration between stakeholders who work with students and transportation at Saint Paul Public Schools, City of Saint Paul, Ramsey County, and MnDOT. For more information related to the planning process, see Appendix C.

- **SRTS Planning Team:** The SRTS Planning Team included representatives from Cherokee Heights Elementary, Riverview West Side School of Excellence (Riverview Elementary), Open World Learning Community (OWL), Humboldt High, Saint Paul Public Schools, the City of Saint Paul, Ramsey County, and MnDOT. Stakeholders brought varying perspectives and expertise to the team including teaching and learning, school administration, urban planning, engineering, and public health.
- **Informational Videos:** SRTS staff recorded informational presentations in English and Spanish for Riverview Elementary to distribute to families through the school newsletter.
- **Rapid Planning Workshop:** The SRTS Planning Team gathered for a virtual Rapid Planning Workshop in the fall of 2020. It brought together the local SRTS Team to identify issues and opportunities related to walking, biking, and rolling to school.
- **Caregiver Survey:** Surveys collected information from caregivers about habits and barriers related to walking, biking, and rolling to school on the Saint Paul's West Side.
- **Interactive Online Map:** An interactive online map allowed students, caregivers, and community stakeholders to identify destinations, routes, and barriers for walking, biking, and rolling.
- **Youth Engagement:** SRTS staff worked seventh graders at OWL to survey their peers on how OWL can improve walking and biking for students. SRTS staff presented to OWL students to introduce the peer survey project, and OWL teachers led students through in-class curriculum that taught students how to create, administer, and summarize the survey as part of math and English curriculum.

• KEY TAKEAWAYS

Challenges

- Distance and construction impacts were identified as issues that prevent more students from walking, biking, and rolling to school
- Busy streets and intersections pose barriers for walking and biking on the West Side, including: S Robert Street, George Street W, and others

Opportunities

- Major barriers like S Robert Street are currently being planned for reconstruction
- Students are interested in walking, biking, and rolling to, from, and during school more often
- Schools can collaborate on program implementation across campuses and grade levels

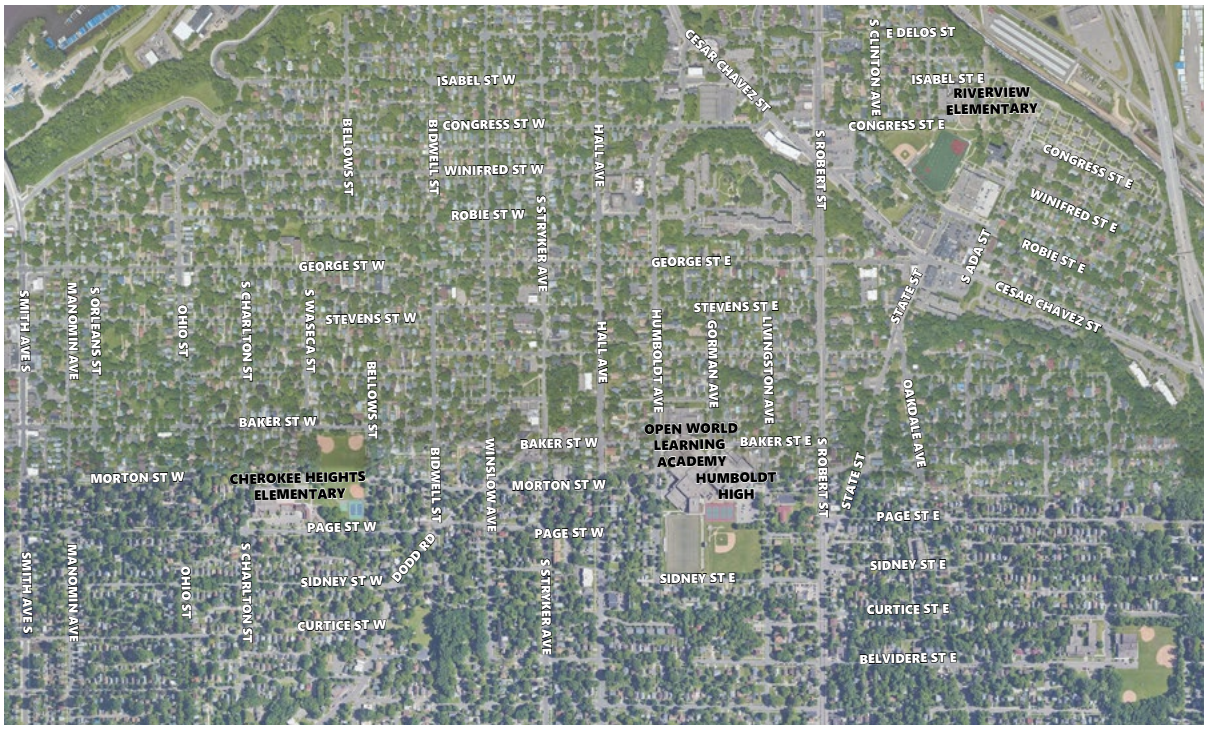
SHIFT IN THE PLANNING PROCESS

COVID-19 IMPACT

In early 2020, the COVID-19 Pandemic dramatically shifted the course of education, transportation, and the planning process.

Students no longer attended in-person classes and instead stayed home, completing coursework online. This shifted transportation needs as students no longer needed to leave their homes to receive their education.

COVID-19 also changed the typical planning process. The West Side SRTS Plan relied on virtual workshops and online data collection tools to engage with community members. Going forward, opportunities to engage with families in person will help to inform and strengthen future SRTS planning and project implementation.



Saint Paul's West Side Schools in Context

The West Side SRTS Plan includes program and infrastructure recommendations for Cherokee Heights Elementary, Riverview School of Excellence, Open World Learning Community, and Humboldt High.

Saint Paul's West Side is located south of downtown Saint Paul and north of West Saint Paul. The Mississippi River forms the west, north, and east boundaries of the neighborhood.

Major vehicular corridors include US Highway 52, Robert Street S (MN Hwy 3), and Smith Avenue S (MN Hwy 149). Robert Street in particular poses a challenge for pedestrian and bicycle connections to school. MnDOT is planning significant improvements to Robert Street on the West Side in 2025 or 2026, presenting opportunities to enhance pedestrian and bicycle connections along and across the corridor.

The West Side bluff area is primarily residential with commercial activities centered along major roadways and intersections. Outdoor recreation and industrial activities make up the flats area on the east end of the West Side and along the Mississippi River.

Cherokee Heights Elementary is a PreK-5 Montessori school. It's surrounded by residential streets, shares a building with the West Side Community Organization, and abuts Baker Park. Cherokee Heights' student body primarily live on the West Side.

Riverview West Side School of Excellence is located in the center of Saint Paul's Hispanic cultural center. It serves grades PreK-5 and has a Spanish-English dual language immersion program. Riverview students primarily live on the West Side. South Robert Street (MN Hwy 3) and Cesar Chavez Street are located west and south of Riverview, respectively. Both roads carry high vehicle traffic volumes and present barriers to pedestrian and bicycle mobility.

Humboldt High and OWL share a single campus nestled in a residential area one block west of S Robert Street. OWL serves 450 students grades 6-12 through an Expeditionary Learning model. Humboldt High is an Environmental Science magnet for grades 6-12. Both OWL and Humboldt enroll students from across the City of Saint Paul.

A comprehensive existing conditions map is provided in Appendix D and is available online here.

02

PROGRAMS

Introduction to Programs

The SRTS movement acknowledges that infrastructure changes are necessary for shifting school travel behavior, but are insufficient on their own. Programs are a necessary component of any successful SRTS plan.

While engineering improvements such as sidewalks, crosswalks, and bikeways are important, equally important are education programs to give students basic safety skills, encouragement programs to highlight walking and bicycling to school as fun and normal, engagement tools to give all community members a voice, and evaluation of the impact of investments and non-infrastructure efforts. When planning and implementing SRTS programs, it is important to design events and activities that are inclusive of students of all backgrounds and abilities.

Often, programs that help to get more youth walking, biking, and rolling lead to increased public support for infrastructure projects - they can be an important first step towards building out the physical elements that make walking, biking, and rolling safer and more comfortable. And relative to certain infrastructure projects, most programs are very low cost.

Existing Programs

Saint Paul Public Schools and the City of Saint Paul have been actively working towards providing safe and inviting spaces around school campuses for students. This foundation of encouraging student travel safety provides a valuable baseline for expanding programs to encourage more students to walk and bike.

Existing programs at schools on the West Side:

- Walk and Bike to School Day
- Bike Mechanics Classes
- Walk! Bike! Fun!
- In-Class Curriculum and After-School Programs

EQUITY HIGHLIGHT

EQUITY IN PROGRAMMING

When planning and implementing SRTS programs, it is important to design events and activities that are inclusive of students of all ethnicities, genders, backgrounds, and abilities. Language and cultural barriers, physical abilities, personal safety concerns, and infrastructure barriers can all create potential obstacles to participation. Creative outreach, low-cost solutions, and flexible implementation can help overcome obstacles and enable more students and families to participate.

For more information about equity in SRTS planning, see Appendix I.

Program Recommendations

The following programs are recommended to increase the awareness, understanding, and excitement for walking, biking, and rolling to school. Programs were selected through conversations with school and district staff, caregivers, students, community members, and city and county staff, and are tailored to meet the needs and interests of the school community in the near term (one to five years). Some build on existing programs while others will require new resources and partnerships. In-person engagement with families, which was impeded by COVID-19 this past year, will be a critical tool for informing program rollout, understanding program impacts, and improving program implementation.

Recommended programs include:

- Inter-School Partnership
- Walk & Bike to School Events
- School Communications
- Bike Mechanic Classes
- Park & Walk
- Walking School Bus & Bike Train
- Walk & Bike Field Trips
- Walk! Bike! Fun!
- Walk & Bike Route Map
- In-School Curriculum & Activities
- School Streets

Programs have been prioritized into implementation timelines based on existing programs, input from local stakeholders, and readiness of the school to launch the program:

- Immediate implementation
- Short-term (1-2 years)
- Medium-term (2-3 years)
- Long-term (3-5 years)

Additional details about each recommended program including a brief description, suggested leads, and implementation considerations are provided on the following pages.

INTER-SCHOOL PARTNERSHIP

West Side schools are uniquely positioned to build and leverage partnerships between campuses to increase the number of students who are able to walk and bike to and from school or during the school day. School staff and administrators can work together to develop and implement a coordinated approach to SRTS programs.

Which schools: All schools

Timeline: Immediate (within one year)

Lead/support: School administrators and staff

Implementation considerations:

- Model after previous inter-schools partnership
- Focus on schools as centers within the community
- Partner on volunteer recruitment, implementation, and area-wide coordination and perspective
- Consider opportunities to collaborate across schools and age groups on pedestrian and bike safety and education
- Consider inviting students to mentor younger students and peers to meet service requirements

WALK & BIKE TO SCHOOL EVENTS

National Walk to School Day and Bike to School Day attract millions of students and families to try walking and biking to school every October and May. In addition, Minnesota celebrates Winter Walk to School Day in February. Additional education, encouragement, and enforcement programming can be used to promote the event, increase awareness, and expand participation. Walk/bike to school days can also take place more frequently (e.g., Walking Wednesdays) if there's interest and capacity.

Which schools: All schools

Timeline: Immediate (within one year)

Lead/support: School administrators and staff, Saint Paul Public Schools, caregivers and community volunteers, students

Implementation considerations:

- Excellent first step for school that are new to SRTS
- Identify opportunities to build on previous efforts and engage youth in event organization
- Partner with neighborhood organizations to promote events and scale up area-wide
- Coordinate inter-school "West Side Walks" day to help with recruitment, promotion, and collaboration
- Consider piloting a Slow Roll as part of an event

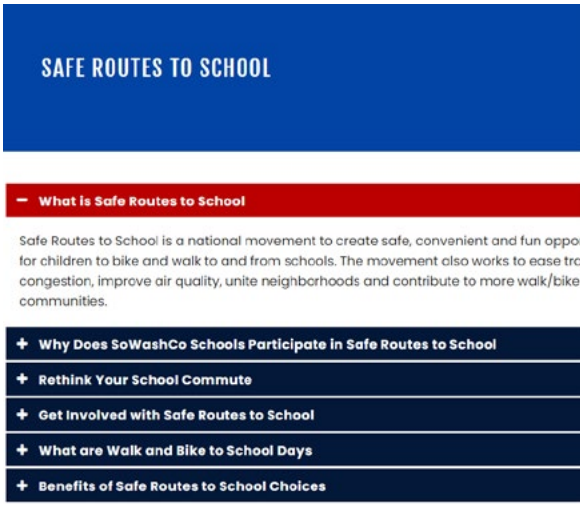


Image: https://www.sowashco.org/services/transportation#saferoutes

SCHOOL COMMUNICATIONS

Communication may include paper and electronic newsletters, video, social media blasts, parent workshops, and other outreach strategies to educate families about school transportation practices and promote walking and biking as an option. Outreach may include information on suggested routes and crossing locations, dressing for the weather, locking bikes, SRTS news and efforts to date, and opportunities to get involved in SRTS programs.

Which schools: All schools

Timeline: Immediate (up to one year)

Lead/support: School administrators, Saint Paul Public Schools

Implementation considerations:

- Include walking and biking information with annual bus safety week communications
- District can support schools in developing walking and biking communications for websites
- Use social media and neighborhood communications to build support and awareness for SRTS beyond the immediate school community

DEMONSTRATION PROJECTS

FURTHER READING

Demonstration projects are an approach to neighborhood building using short-term, low-cost, and scalable interventions to catalyze long-term change for safer streets and healthier, more vibrant communities.

Many infrastructure improvements near schools can start as demonstration projects in order to test installations and build support for more long term improvements. More information about demonstration projects near schools can be found at the link below.

http://www.dot.state.mn.us/mnsaferoutes/resources/demonstration_projects.html

BIKE MECHANIC CLASSES & COMMUNITY BIKE REPAIR

Bike mechanic classes provide students with hands-on skills to fix bicycles. Classes can be offered as an after-school extracurricular class or as an elective similar to shop classes. Earn-a-Bike programs are bike mechanic classes where students get to keep the bike they fix when the class is complete.

Which schools: OWL, possible expansion to Humboldt

Timeline: Immediate (up to one year) or short term (1-2 years)

Lead/support: School administrators and staff, Saint Paul Public Schools, local bike shops

Implementation considerations:

- Build off of OWL's existing Project Bike Tech bike mechanic program
- Focus on developing and promoting OWL Hub & Spoke community bike repair and after school program to serve as West Side bike hub
- Build community and student skills by allowing students to work with adults on bike repairs
- Humboldt has garage, storage, and shop spaces, and OWL has a shipping container, that can be used for storage
- Consider opportunities to develop a district-wide bike mechanic program over time

PARK & WALK

A Park & Walk (also called a Remote Bus Drop & Walk by Saint Paul Public Schools) takes place before school when school buses and family vehicles drop students at an established location a few blocks from school. Students are greeted by school staff, caregivers, or other volunteers and are supervised on their walk to school.

Which schools: Cherokee Heights and Riverview Elementary

Timeline: Short term (1-2 years)

Lead/support: Saint Paul Public Schools, school administrators and staff, caregivers and community volunteers

Implementation considerations:

- Coordinate with District SRTS lead
- Partner with West Side businesses for support
- Invite high school students to provide supervision
- Collaborate with PTOs to support event organization and implementation
- Consider combining with School Streets program
- Potential drop sites are identified on the map in the Infrastructure chapter

WALKING SCHOOL BUS & BIKE TRAIN

A Walking School Bus is a group of children who walk to school with one or more adults. A Bike Train is a group of students biking to school with adults. Walking School Buses and Bike Trains are typically led by caregivers or trusted adults. Walking and biking routes run along a designated route with an established schedule and meet-up spots. They often begin as one-time events but can happen on a recurring basis as interest and capacity allows. Once a route has been established, Walking School Buses and Bike Trains may be led by older students.

Which schools: Walking school bus at Cherokee Heights and Riverview Elementary, bike train at OWL and Humboldt High

Timeline: Short term (1-2 years)

Lead/support: School administrators and staff, Saint Paul Public Schools, caregivers, volunteers, Bike MN

Implementation considerations:

- Collaborate with Attendance Matters
- Pursue funding for a paraprofessional stipend to compensate route leaders
- Student expressed interest in walking and biking groups in the OWL peer survey
- BikeMN could help train route leaders
- Reference Randolph Heights' student walking lines

CAREGIVER SURVEYS AND STUDENT TRAVEL TALLIES

There are two great tools to evaluate all the SRTS work in the community:

Caregiver Surveys: Recommended once every 2-3 years. A hard copy survey or link to an online version can be sent to caregivers to gather their perceptions of walking, biking, and rolling to school. Surveys can be distributed through newsletters, school websites, or at conferences.

Student Travel Tally: Recommended in fall and spring of every year. In-class tallies ask students how they traveled to and from school on a given day. These tallies were not completed during the planning process in 2020 into 2021 due to COVID-19.

WALK & BIKE FIELD TRIPS

A field trip made by foot or by bicycle gives students a supportive environment in which to practice their pedestrian safety or bicycling skills. Walk/bike field trips can also showcase the many benefits of walking and bicycling for transportation including health and physical activity, pollution reduction, and cost savings. The destination of the field trip may vary, or the field trip could be the ride or walk itself.

Which schools: All schools

Timeline: Short term (1-2 years)

Lead/support: School administrators and staff, Saint Paul Public Schools

Implementation considerations:

- Potential destinations include Robert Piram Regional Trail and Harriet Island
- Opportunity for West Side group ride modeled after Minneapolis Public School's annual Bike to School Day Ride

WALK! BIKE! FUN!

Walk! Bike! Fun! Pedestrian and Bicycle Safety Curriculum is a three-part curriculum designed specifically for Minnesota's schools. It helps children and youth learn traffic rules and regulations, the potential hazards to traveling, and handling skills needed to bike and walk effectively, appropriately and safely through their community. Other educational curricula, including one under development by BikeMN, cover similar topics and are tailored to older students. Pedestrian and bicycle safety modules can also be integrated into driver education courses so that new drivers understand how to properly interact with people walking and biking when operating a motor vehicle.

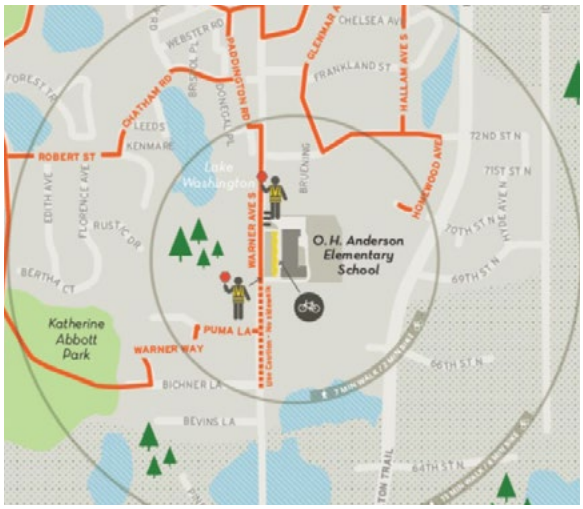
Which schools: All schools

Timeline: Short term (1-2 years)

Lead/support: School administrators and staff, Saint Paul Public Schools, Saint Paul Parks & Recreation

Implementation considerations:

- Continue using existing district bike fleet
- Train additional staff in Walk! Bike! Fun!
- Partner with BikeMN to provide training and activities
- Provide pedestrian and bicycle education to middle and high school students too



WALK/BIKE ROUTE MAP

A walking and biking route map suggests safe and low-stress routes and crossings for students and families traveling to school and other destinations in the community. Maps can identify existing sidewalks and sidewalk gaps, dedicated bikeways, controlled or enhanced crossing locations, and estimated distances and travel times to school. Google Maps can easily be used to create, edit, and share suggested route maps using the "My Maps" tool. Maps designed for print can include rules of the road, pedestrian and bicycle safety tips, and other messaging to build confidence for students walking or biking to school.

Which schools: All schools

Timeline: Short term (1-2 years)

Lead/support: School administrators and staff, Saint Paul Public Schools, students

Implementation considerations:

- Students noted that many people do not know about the best routes for walking or biking to school
- Maps could be created for each school or for the entire West Side
- Consider collaborating with students to develop and promote walking and biking route maps

FOR MORE INFORMATION

MN SRTS Resource Center

There are many great resources already available on the Minnesota Safe Routes to School Resource Center. You can find answers to many common questions, information about upcoming events, and even promotional material that can easily be customized for your community's SRTS event.

The MN SRTS Resource Center is a great way to stay engaged throughout the year!

mnsaferoutestoschool.org

PROGRAMS

FURTHER READING

For a complete list of all potential programs and descriptions, see http://mndotsrts.altaprojects.net/

IN-SCHOOL CURRICULUM & ACTIVITIES

There are a variety of ways that SRTS-related curriculum and activities can be incorporated into the school day. Students can measure and evaluate walking and biking routes in math classes, calculate environmental impacts of different transportation options in science, or design and fabricate custom bike parking or bike shelters in shop classes. They can plan Walk & Bike to School Day events and incentives, lead Walking School Buses for younger students, or develop their own projects through elective classes to make walking and biking an easier, safer, and more attractive option for their peers.

Which schools: All schools

Timeline: Short term (1-2 years) or medium term (3-4 years)

Lead/support: School administrators and staff

Implementation considerations:

- Build on existing activities including OWL Spring Week, student elected curriculum, and Story Walks
- Promote education through Loppet partnership
- Encourage walking meetings and regular walks around school tracks
- Evaluate impact of morning activity on discipline and attention throughout the day

SCHOOL STREETS

School Streets are temporary car-free zones adjacent to or leading up to a school that are strategically closed to vehicle traffic and opened to children walking, biking, and rolling. School Streets help manage traffic and improve safety during school by eliminating vehicle congestion in front of schools and creating an environment where students can safely walk, bike, roll, play, and learn before, during, and after school.

Which schools: OWL/Humboldt High and Riverview Elementary

Timeline: Short term (1-2 years) or medium term (3-4 years)

Lead/support: School administrators and staff, City of Saint Paul

Implementation considerations:

- City interested in supporting School Streets pending school and school district leadership and district transportation involvement
- A block party permit from the Saint Paul Police Department would be required
- Potential candidates include Gorman Ave/Baker St E near OWL/Humboldt and S Clinton Ave near Riverview
- Consider combining with Park & Walk programming

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03

INFRASTRUCTURE

Introduction to Infrastructure

In addition to program recommendations, changes to the streetscape are essential to making walking, biking, and rolling to school safer and more comfortable.

The initial field review and subsequent meetings yielded specific recommendations to address the key identified barriers to walking and bicycling on the West Side.

This plan does not represent a comprehensive list of every project that could improve conditions for walking and bicycling in the neighborhood. Instead, it calls attention to key conflict points and potential improvements. Recommendations range from simple striping changes and signing to more significant changes to the streets, intersections, and school infrastructure.

Engineering recommendations are shown and described on the following page. It should be noted that funding is limited and all recommendations are planning level concepts only. Additional planning and engineering study will be needed to confirm feasibility and costs for all projects.

Infrastructure improvements were prioritized according to multiple factors, including community and stakeholder input, traffic and roadway conditions, proximity to schools, and proximity to and use by equity priority populations. This prioritization process reflects a preliminary ranking; additional prioritization and project evlauation will be necessary as funding is identified and projects move toward implementation. School community and family engagement in developing this plan was limited by the COVID-19 pandemic and the prioritization may change once additional engagement is completed.

Existing Infrastructure

This section highlights existing infrastructure and challenge areas on and near campus. Photos and observations were made by the West Side SRTS Team during a fall 2019 Rapid Planning Workshop and walk assessment that allowed the team to experience what it's like for students who walk and bike in the area.

Opposite - left to right, from top left: *The intersection of S Charlton St and Page St W is a two-way stop with parallel line crosswalk markings on the north side only; the sidewalk on Morton St W approaching Baker Park; a staircase connects Baker Park to the Cherokee Heights campus; the SRTS Team conducts a walk assessment at Cherokee Heights; the intersection of George St W and S Stryker Ave; the intersection of George St W and Humboldt Ave.*

Above - left to right, from top left: *The main entrance of OWL on Humboldt Ave; the intersection of Humboldt Ave and Baker St S; Gorman Ave and Baker St E in front of OWL and Humboldt High; steps leading to the new main entrance of Humboldt High; S Robert St and Page St E; the SRTS Team gathers at S Robert St and Curtice St E.*

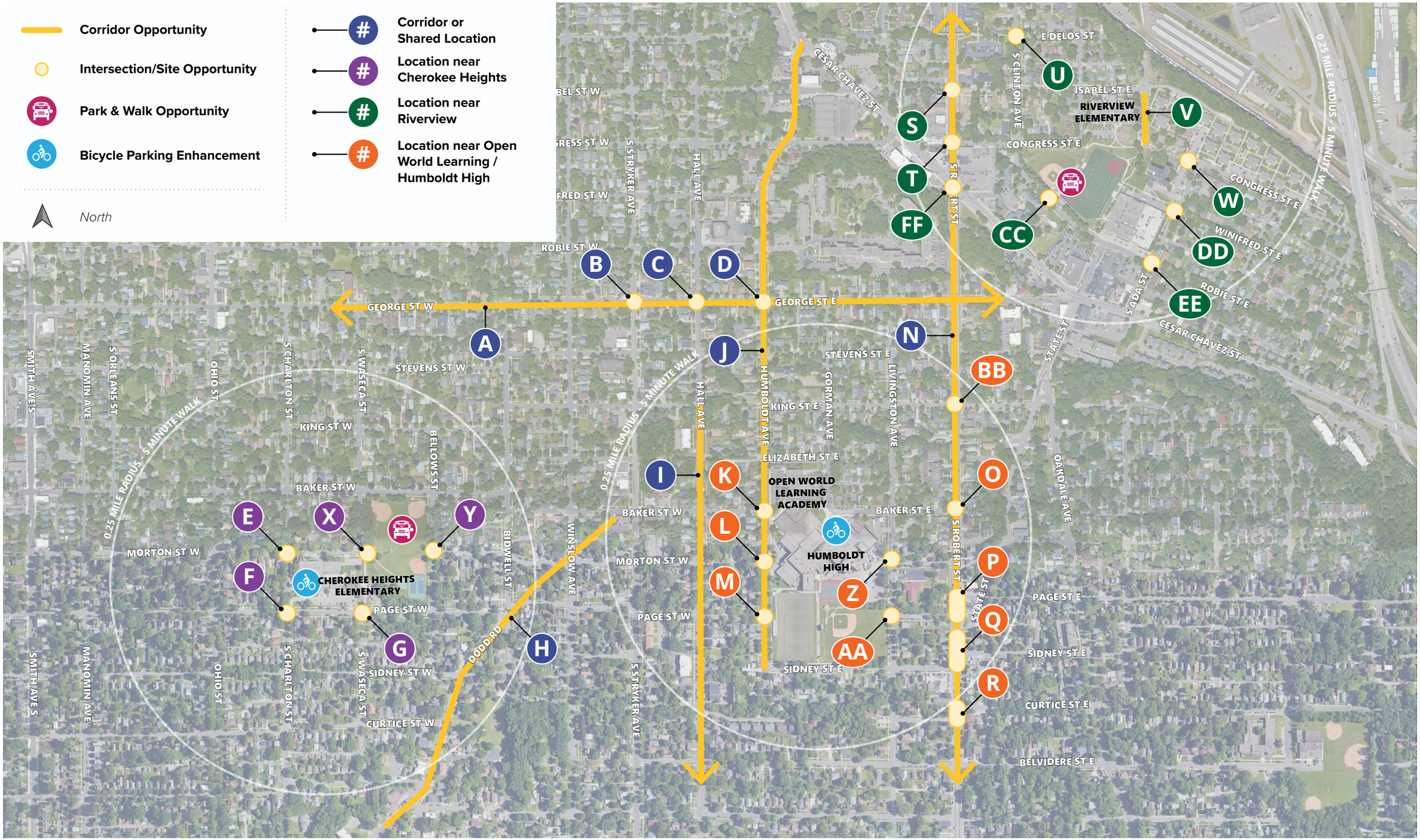
Left to right, from top left: *A pedestrian bridge connects students over S Robert St to S Clinton Ave; the intersection of S Clinton Ave and E Delos St does not include curb ramps or marked crosswalks; a trail through athletic fields connects S Clinton Ave to Riverview West Side School of Excellence; sidewalks connect Riverview West Side School of Excellence to single and multi-family housing to the east; there is not a clear or accessible route through the housing agency's eastern parking lot; Riverview West Side School of Excellence shares a narrow parking lot with the adjacent public housing development that does not include any accessible spaces.*

West Side Infrastructure Recommendations

- Corridor Opportunity
- Intersection/Site Opportunity
- Park & Walk Opportunity
- Bicycle Parking Enhancement

North

- # Corridor or Shared Location
- # Location near Cherokee Heights
- # Location near Riverview
- # Location near Open World Learning / Humboldt High



West Side Infrastructure Recommendations

	LOCATION	PROBLEM/ISSUE/OPPORTUNITY	POTENTIAL SOLUTION/RECOMMENDATION*	ANTICIPATED OUTCOME	LEAD	PRIORITY
A	George St W	Concerns about traffic speeds and volumes; poor driver yielding behavior; long distances between marked and/or controlled pedestrian crossings; curb ramps are not ADA compliant; history of pedestrian and bicycle collisions	Consider corridor-wide approach to pedestrian and bicycle improvements including traffic calming, enhanced pedestrian crossings, pedestrian-scale lighting, and ADA compliant pedestrian signals and curb ramps; coordinate with B, C, and D	Reduce traffic speeds; increase pedestrian comfort, safety, and mobility; improve driver yielding behavior; improve visibility between pedestrians and motorists; increase corridor accessibility; increase in students walking from north of George St W	City of Saint Paul	High
B	George St W & S Stryker Ave	Pedestrian signal heads, push buttons, and curb ramps are not ADA compliant; history of pedestrian and bicycle collisions	Install ADA compliant signal heads, push buttons, and curb ramps; implement leading pedestrian interval and/or no right turn on red; coordinate with A, C, and D	Increase intersection accessibility; increase pedestrian safety and comfort	City of Saint Paul	Medium
C	George St W & Hall Ave	Poor driver yielding behavior; curb ramps are not ADA compliant; poor visibility between pedestrians and motorists; history of pedestrian and bicycle collisions	Install curb extensions and ADA compliant curb ramps; coordinate with A, B and D	Reduce pedestrian crossing distances; increase visibility between pedestrians and motorists; improve driver yielding behavior; increase intersection accessibility	City of Saint Paul	Medium
D	George St E & Humboldt Ave	Curb ramps are not ADA compliant; no marked crosswalk on south leg; poor visibility between pedestrians and motorists	Install curb extensions and ADA compliant curb ramps; evaluate intersection for marked crosswalk on south leg; coordinate with A, B, and C	Reduce pedestrian crossing distances; increase visibility between pedestrians and motorists; highlight pedestrian crossing locations; increase intersection accessibility	City of Saint Paul	High
E	Morton St W & S Charlton St	Concerns about low light conditions; marked crosswalk on north side only with no connection to campus	Consider additional pedestrian lighting; evaluate intersection for marked crosswalks on all legs with preference to south and east legs that connect to campus	Increase pedestrian comfort and safety; highlight pedestrian crossing locations	City of Saint Paul	Medium
F	Page St W & S Charlton St	Concerns about low light conditions; marked crosswalk on north side only	Consider implementing additional pedestrian lighting; evaluate intersection for marked crosswalks on all legs with preference to north and east legs that connect to campus	Increase pedestrian comfort and safety; highlight pedestrian crossing locations	City of Saint Paul	Medium
G	Page St W & S Waseca St	No marked crosswalks at crossing to main entrance; poor visibility between pedestrians and motorists	Implement curb extensions with special consideration on the north side where parking is prohibited; evaluate the intersection for adding marked crosswalks	Reduce pedestrian crossing distances; increase visibility between pedestrians and motorists; increase pedestrian comfort and safety; passively enforce parking restriction	City of Saint Paul	Medium
H	Dodd Rd between Annapolis St W and Baker St W	Concerns about traffic speeds and volumes; sidewalk gaps between Sidney St W/Bidwell St and between Page St/Baker St.	Install sidewalks where missing; consider corridor-wide approach to traffic calming	Increase local sidewalk network; increase pedestrian comfort, safety, and mobility; reduce traffic speeds	City of Saint Paul	Low
I	Hall Ave south of King St	Long crossing distances; wide roadway; poor driver yielding behavior; curb ramps are not ADA compliant; concerns about traffic speeds; Hall Ave identified as a future bicycle boulevard in the Saint Paul Bike Plan; planned for reconstruction in 2026-2027	As part of planned reconstruction: reduce overall roadway width; implement traffic calming measures such as curb extensions, mini traffic circles, speed humps, etc; implement bicycle boulevard markings and signage; install ADA compliant curb ramps; consider other enhancements to increase pedestrian and bicycle comfort and safety	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; increase corridor accessibility; improve pedestrian and bicycle comfort and safety	City of Saint Paul	Medium
J	Humboldt Ave	Long crossing distances; wide roadway; concerns about driver speeding; poor visibility between pedestrians and motorists; curb ramps are not ADA compliant; opportunity to make Humboldt more consistent with residential street design	Install ADA compliant curb ramps; install traffic calming treatments, e.g., curb extensions, speed humps, pedestrian refuge islands; explore opportunities to implement school gateway treatments or temporary demonstration projects, such as placement of crossing signs along centerline and edge of roadway; coordinate with K, L, and M	Reduce pedestrian crossing distances; reduce traffic speeds; improve visibility between pedestrians and motorists; increase corridor accessibility; increase in students walking and biking to school, the library, and other destinations	City of Saint Paul	Medium
K	Humboldt Ave & Baker St W	Long crossing distances; poor visibility between pedestrians and motorists; concerns about low light conditions; curb ramps are not ADA compliant; Baker St W identified as a future bicycle boulevard in the Saint Paul Bike Plan; school district owns R1-6 signs that may be available	Implement curb extensions; evaluate pedestrian and traffic flows at intersection for marked crosswalk eligibility; consider implementing additional pedestrian lighting and markings/signage to transition onto future Baker St W bicycle boulevard; consider placing R1-6 pedestrian crossing sign; coordinate with J, L, and M	Reduce pedestrian crossing distances; improve visibility between pedestrians and motorists; increase pedestrian comfort and safety	City of Saint Paul	High
L	Humboldt Ave & Morton St W	Long crossing distances; poor visibility between pedestrians and motorists; concerns about low light conditions; curb ramps are not ADA compliant; school district owns R1-6 signs that may be available	Implement curb extensions; evaluate pedestrian and traffic flows at intersection for marked crosswalk eligibility; consider implementing additional pedestrian lighting; install ADA compliant curb ramps; consider placing R1-6 pedestrian crossing sign; coordinate with J, K, and M	Reduce pedestrian crossing distances; improve visibility between pedestrians and motorists; increase pedestrian comfort and safety; increase intersection accessibility	City of Saint Paul	High

** Potential solutions/recommendations include a list of potential improvements. Additional analysis must be conducted before final design decisions can be made.*

	LOCATION	PROBLEM/ISSUE/OPPORTUNITY	POTENTIAL SOLUTION/RECOMMENDATION*	ANTICIPATED OUTCOME	LEAD	PRIORITY
M	Humboldt Ave & Page St W	Long crossing distances; poor visibility between pedestrians and motorists; concerns about low light conditions; curb ramps are not ADA compliant; school district owns R1-6 signs that may be available	Implement curb extensions; evaluate pedestrian and traffic flows at intersection for marked crosswalk eligibility; consider implementing additional pedestrian lighting; install ADA compliant curb ramps; consider placing R1-6 pedestrian crossing sign; coordinate with J, K, and L	Reduce pedestrian crossing distances; improve visibility between pedestrians and motorists; increase pedestrian comfort and safety; increase intersection accessibility	City of Saint Paul	Low
N	S Robert St	Concerns about traffic speeds and volumes; poor driver yielding behavior; long crossing distances; long distances between controlled pedestrian crossings; frequent offset intersections; signals and curb ramps are not ADA compliant	Consider corridor-wide approach to pedestrian and bicycle improvements including speed reduction, traffic calming, enhanced pedestrian crossings, placemaking, and pedestrian lighting; install ADA compliant signals and curb ramps; coordinate with O, P, Q, R, S, T, BB and FF.	Reduce traffic speeds; increase pedestrian comfort, safety, and mobility; improve driver yielding behavior; improve visibility between pedestrians and motorists; increase corridor accessibility; increase sense of place; increase in students walking and biking from east of S Robert St	MnDOT City of Saint Paul	High
O	S Robert St & Baker St E	Long crossing distances; concerns about traffic speeds and volumes; poor driver yielding behavior; poor visibility between pedestrians and motorists; curb ramps are not ADA compliant; existing MnDOT demonstration project site	Review and evaluate results of temporary demonstration project; consider using a combination of treatments such as high visibility crosswalk markings, curb extensions, a median refuge island, and an RRFB or pedestrian hybrid beacon; install ADA compliant curb ramps; coordinate with N, P, Q, R, S, T, and BB.	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; highlight pedestrian crossing locations; improve visibility between pedestrians and motorists; increase intersection accessibility	MnDOT City of Saint Paul	High
P	S Robert St & Page St	Long crossing distances; concerns about traffic speeds and volumes; offset crossing; poor driver yielding behavior; south crosswalk does not align with curb ramp on east side; curb ramps are not ADA compliant	Evaluate consolidating or relocating pedestrian crossings as part of corridor-wide approach; if pedestrian crossings remain, consider using a combination of treatments such as high visibility crosswalk markings, curb extensions, a median refuge island, and an RRFB or pedestrian hybrid beacon; install ADA compliant curb ramps; coordinate with N, O, Q, R, S, T, and BB	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; improve pedestrian connectivity; highlight pedestrian crossing locations; improve visibility between pedestrians and motorists; increase intersection accessibility	MnDOT City of Saint Paul	High
Q	S Robert St & Sidney St E/State St	Long crossing distances; concerns about traffic speeds and volumes; offset crossing; free-flow right turn movement from S Robert St to State St; east porkchop challenging to navigate; poor visibility between pedestrians and motorists; curb ramps are not ADA compliant	Evaluate opportunities to realign State St access and provide an enhanced pedestrian crossing as part of corridor-wide approach; if an enhanced pedestrian crossing is installed, consider using a combination of treatments such as high visibility crosswalk markings, curb extensions, a median refuge island, and an RRFB or pedestrian hybrid beacon; install ADA compliant curb ramps; coordinate with N, O, P, R, S, T, and BB.	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; improve pedestrian connectivity; highlight pedestrian crossing locations; improve visibility between pedestrians and motorists; increase intersection accessibility	MnDOT City of Saint Paul	High
R	S Robert St & Curtice St E	Long crossing distances; concerns about traffic speeds and volumes; offset signalized intersection; pedestrian push buttons and marked crosswalks are not along natural walking path; curb ramps are not ADA compliant	Evaluate opportunities to modify Curtice St E signal and pedestrian crossing treatments as part of corridor-wide approach; consider using a combination of treatments such as high visibility crosswalk markings, curb extensions, and median refuge islands; if the Curtice St E signal is removed, consider implementing an RRFB or pedestrian hybrid beacon; install ADA compliant signal and curb ramps; coordinate with N, O, P, Q, S, T, and BB.	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; improve pedestrian connectivity; highlight pedestrian crossing locations; improve visibility between pedestrians and motorists; increase intersection accessibility	MnDOT City of Saint Paul	High
S	S Robert St & Isabel St E	Long crossing distances; concerns about traffic speeds and volumes; poor driver yielding behavior; curb ramps are not ADA compliant; existing MnDOT demonstration project site	Consider implementing treatments such as high visibility crosswalk markings, curb extensions, a median refuge island, and RRFB or pedestrian hybrid beacon; install ADA compliant curb ramps; coordinate with N, O, P, Q, R, T, and BB.	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; highlight pedestrian crossing locations; improve visibility between pedestrians and motorists; increase intersection accessibility	MnDOT City of Saint Paul	High
T	S Robert St & Congress St E	Long crossing distances; concerns about traffic speeds and volumes; poor driver yielding behavior; curb ramps are not all ADA compliant	Consider implementing treatments such as high visibility crosswalk markings, curb extensions, a median refuge island, and RRFB or pedestrian hybrid beacon; install ADA compliant curb ramps; coordinate with N, O, P, Q, R, S, and BB	Reduce pedestrian crossing distances; reduce traffic speeds; increase driver yielding behavior; highlight pedestrian crossing locations; improve visibility between pedestrians and motorists; increase intersection accessibility	MnDOT City of Saint Paul	High
U	S Clinton Ave & E Delos St	Primary crossing to access pedestrian bridge over S Robert St; curb ramps are missing or not ADA compliant	Shift the trail to align with pedestrian crossing locations; consider installing curb extension on west side; evaluate intersection for marked crosswalks; implement ADA compliant curb ramps	Improve pedestrian and bicycle mobility; highlight pedestrian crossing locations; increase intersection accessibility; passively enforce parking restriction	City of Saint Paul	High
V	East School Parking Lot	No accessible parking spaces or ADA compliant ramp; tight parking lot with frequent minor collision as motorists enter/exit spaces	Install accessible parking space and ADA compliant curb ramp; consider potential changes to the parking lot design to improve safety and navigability including angled parking spaces or a turnaround at the south end	Increase school and parking lot accessibility; increase parking lot safety for all users	Saint Paul Public Schools Saint Paul Public Housing Authority	Medium

** Potential solutions/recommendations include a list of potential improvements. Additional analysis must be conducted before final design decisions can be made.*

	LOCATION	PROBLEM/ISSUE/OPPORTUNITY	POTENTIAL SOLUTION/RECOMMENDATION*	ANTICIPATED OUTCOME	LEAD	PRIORITY
W	Dunedin Terrace Parking Lot	Curb ramps are missing or not ADA compliant; sight lines are poor and children may not be expected in the parking lot	Install ADA compliant curb ramps; consider installing high visibility crosswalk markings	Increase accessibility for people walking or biking through the parking lot; highlight pedestrian route through lot	Saint Paul Public Housing Authority	Medium
X	Sidewalk and stairway between Cherokee Heights and Baker Park	Concerns about winter maintenance responsibilities and care	Clarify winter maintenance responsibilities and procedures between Cherokee Heights/Saint Paul Public Schools and Saint Paul Parks & Recreation Department	Increase quality and reliability of winter maintenance; improve pedestrian safety, comfort, and access year round	Saint Paul Public Schools City of Saint Paul	Medium
Y	Bellows St & Morton St W	Poor visibility between pedestrians and motorists; skewed pedestrian crossing across Bellows St	Install curb extension on west side; relocate ADA compliant curb ramps and straighten pedestrian crossing	Reduce pedestrian crossing distances; improve visibility between pedestrians and motorists	City of Saint Paul	Low
Z	Livingston Ave & E Morton St	Poor visibility between pedestrians and motorists; curb ramps are not ADA compliant; school district owns R1-6 signs that may be available	Install curb extensions; install ADA compliant curb ramps; consider placing R1-6 pedestrian crossing sign	Reduce pedestrian crossing distances; improve visibility between pedestrians and motorists; improve intersection accessibility	City of Saint Paul	Low
AA	Livingston Ave & Page St E	Poor visibility between pedestrians and motorists; curb ramps are not ADA compliant; school district owns R1-6 signs that may be available	Install curb extensions; install ADA compliant curb ramps; consider placing R1-6 pedestrian crossing sign	Reduce pedestrian crossing distances; improve visibility between pedestrians and motorists; improve intersection accessibility	City of Saint Paul	Low
BB	S Robert St & King St E	Confusing roadway geometry; poor visibility between pedestrians and motorists due to viaduct; raised median and curb ramps are not ADA compliant	Evaluate opportunities to realign roadway geometry and enhance pedestrian crossing as part of corridor approach; if an enhanced pedestrian crossing is installed, consider combining treatments such as high visibility crosswalks, curb extensions, a median refuge island, and an RRFB; install ADA compliant curb ramps; coordinate with N, O, P, Q, R, S, and T	Improve intersection legibility for all users; reduce pedestrian crossing distances; increase visibility between pedestrians and motorists; increase crossing accessibility	MnDOT City of Saint Paul	High
CC	Clinton Ave at trail between Parque Castillo and El Rio Vista Rec Center athletic fields	Pedestrian desire line between Parque Castillo and El Rio Visa Recreation Center athletic fields; no marked or ADA accessible crossing; poor visibility between pedestrians and motorists; opportunity to formalize mid-block crossing	Implement mid-block crossing; consider installing treatments such as high visibility crosswalk markings, curb extensions, and a raised crossing; install ADA compliant curb ramps	Formalize existing mid-block pedestrian crossing; reduce pedestrian crossing distance; improve visibility between pedestrians and motorists; reduce traffic speeds; increase driver yielding behavior; increase crossing accessibility	City of Saint Paul	Medium
DD	S Ada St & Winifred St E	Curb ramps are not ADA compliant	Install ADA compliant curb ramps	Increase intersection accessibility	City of Saint Paul	Low
EE	S Ada St & Robie St E	Curb ramps are not ADA compliant	Install ADA compliant curb ramps	Increase intersection accessibility	City of Saint Paul	Low
FF	S Robert St & Cesar Chavez St	Multiple convergences of traffic (Robert St Service Rd and Winifred St); long crossing distances	Evaluate opportunities to reduce number of lanes at the intersection; evaluate opportunities for curb extensions; coordinate with N	Improve intersection legibility for all users; reduce pedestrian crossing distances; increase visibility between pedestrians and motorists	City of Saint Paul	Medium
	Baker Park and El Rio Vista Recreation Center	Many students are not able to walk to school from their homes due to distance, streets or intersections that are barriers to walking, and other factors	Park & Walk programs take place before school when school buses and caregivers drop students at a designated location a few blocks to school and are chaperoned by staff, parents, or other volunteers as they walk the rest of the way. More information about Park & Walk programs is included in the Programs Chapter.	Increase the number of students who are able to walk at least part of the way to school; increase physical activity among students before school; improved behavior and increased focus during the school day	Saint Paul Public Schools	See Program Chapter
	Cherokee Heights Elementary, OWL, and Humboldt High	Existing bicycle parking is not consistent with bike parking best practice due to the style or location of bike parking, or does not meet student demand	Upgrade, relocate, or expand bicycle parking to provide secure, convenient, and high quality parking for students who bike to school. More information about bike parking best practice is available in Appendix #.	Increase the number of students and staff who bike to school at least some of the time	Saint Paul Public Schools	High

** Potential solutions/recommendations include a list of potential improvements. Additional analysis must be conducted before final design decisions can be made.*

Related Projects

Two major initiatives that impact walking and biking to school on the West Side include the City-wide speed limit reduction and upcoming reconstruction of S Robert Street.

SPEED REDUCTION

In 2020, the Cities of Saint Paul and Minneapolis worked together on a coordinated effort to lower speed limits on city-owned streets. Slower speed improve traffic safety for all users and reduce the likelihood that a crash results in a death or life-changing injury.

New speed limits are 20 mph for local residential streets; 25 mph for larger arterial and collector city-owned streets, and 30 mph on a few select city-owned streets.

Visit the program website for more information:

www.stpaul.gov/departments/public-works/traffic-lighting/speed-limits

ROBERT STREET RECONSTRUCTION

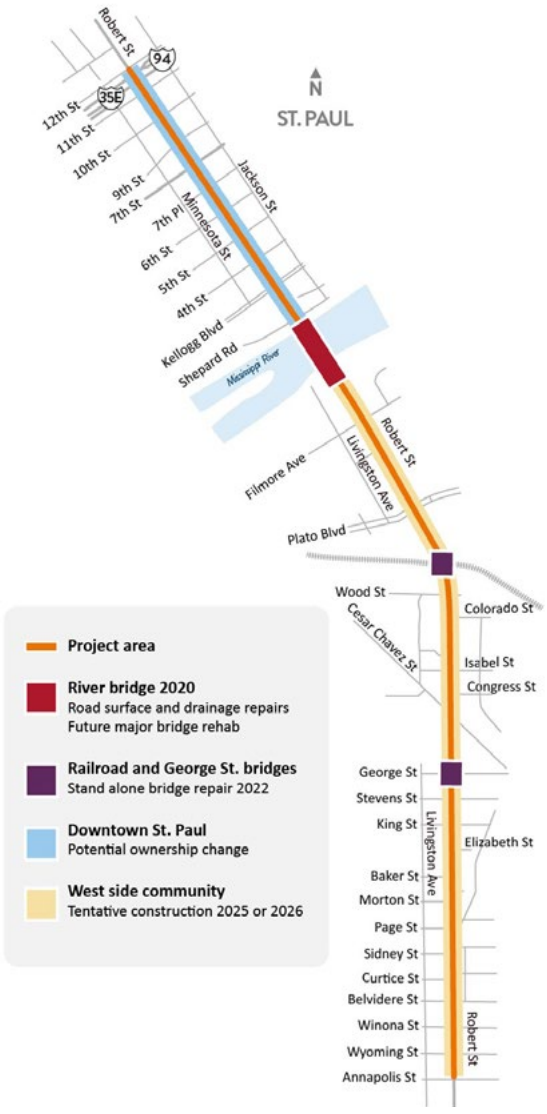
Robert Street was identified as a major challenge for walking and biking to school at Riverview, OWL, and Humboldt due to roadway design, traffic conditions, and driver behavior.

Fortunately, MnDOT is planning significant changes to Robert Street on Saint Paul's West Side in 2025 or 2026. As part of the Robert Street planning process, MnDOT sought community feedback through an online survey, interactive map, virtual meetings, and temporary demonstration projects. The following desires emerged from the Robert Street engagement process: improve sidewalks, crosswalks, and transit facilities; add bike dedicated facilities; reduce traffic speeds; address issues around turn lanes, medians, and U-turns.

Observations and recommendations from this plan should be considered as part of the Robert Street redesign and construction.

Visit the project website for more information:

www.dot.state.mn.us/metro/projects/robertstreet/



From top to bottom: *"20 is Plenty" yard signs and stickers were distributed to residents and community members to help educate others about the new lower speed limits; the Rober Street reconstruction project area on the West Side.*

04

HOW TO GET INVOLVED

Using this Plan

At the heart of every successful SRTS comprehensive program is a coordinated effort by caregiver volunteers, school staff, local agency staff, law enforcement, public health, and community advocates.

This plan provides an overview of SRTS with specific recommendations for a 6 E's approach to improve the safety and the health and wellness of students. The specific recommendations in this plan are intended to support improvements and programs over the next five years. These recommendations include both long- and short-term infrastructure improvements as well as programmatic recommendations.

It should be noted that not all of these projects and programs need to be implemented right away to improve the environment for walking and bicycling to school. The recommended projects and programs listed in this plan should be reviewed as part of the overall and ongoing SRTS strategy. Some projects will require more time, support, and funding than others. It is important to achieve shorter-term successes while laying the groundwork for progress toward some of the larger and more complex projects.

Who are you?

Successful programs are achieved through the coordinated efforts of caregiver volunteers, school staff, local agency staff, law enforcement, and community advocates, such as public health. Each partner has a key role to play in contributing to a plan's success. The following paragraphs highlight the unique contributions of key partners in SRTS.

I AM A STUDENT

Students can have incredible influence when advocating for change in their school and broader community. There are many ways that students can support and lead SRTS initiatives including: encourage safe walking, biking, and driving to, from, and near school; develop campaigns to generate enthusiasm and improve social conditions for SRTS; volunteer time to lead a Walking School Bus or organize a bike drive; promote SRTS activities through newspaper and media courses; advocate for funding and infrastructure improvements at City Hall, and more.

I AM A CAREGIVER

Caregivers can use this report to understand the conditions at their child's school and to become familiar with the ways an SRTS program can work to make walking and bicycling safer. Concerned caregivers or city residents have a very important role in the SRTS process. Caregiver groups, both formal and informal, have the ability and the responsibility to help implement many of the educational and encouragement programs suggested in this plan. Caregiver groups can also be key to ongoing success by helping to fundraiser for smaller projects and programs.

I AM A SCHOOL ADMINISTRATOR

School administrators have an important role in implementing the recommendations contained within this SRTS plan. For a plan to succeed, the impetus for change and improvement must be supported by the leadership of the school.

School administrators can help with making policy and procedural changes to projects that are within school grounds and by distributing informational materials to caregivers within school publications. Please read the SRTS talking points in Appendix B.

I WORK FOR THE SCHOOL DISTRICT

School district staff can use this report to prioritize improvements identified on District property and develop programs that educate and encourage students and caregivers to seek alternatives to single-family commutes to school.

District officials are perhaps the most stable of the stakeholders for a SRTS program and are in the best position to keep the program active over time. District staff can work with multiple schools, sharing information and bringing efficiencies to programs at each school working on Safe Routes.

I AM A TEACHER OR OTHER STAFF MEMBER

Other than caregivers, teachers might interact with students the most. Teachers can include bicycle and pedestrian safety in lesson plans (see *Walk! Bike! Fun!*). Sharing books in your classroom that promote walking, biking, and rolling is a good way to get kids interested at an early age. Teachers can also arrange for field trips within walking distance of school and incorporate informal lessons about safety along the way. In general, being positive and encouraging about walking, biking, and rolling is a great way to start!

I AM A COMMUNITY MEMBER

Community residents, even if they don't currently have children enrolled in school, can play an important role in supporting implementation of the plan. They can use this report to better understand where there may be opportunities to participate in programming initiatives and infrastructure improvements. Community members, including seniors or retirees who may have more flexible schedules than caregivers with school-aged children, may volunteer in established programs or work with school staff or community partners to start new programs recommended in this plan.

I WORK FOR THE CITY OR COUNTY

City and County staff can use this report to identify citywide issues and opportunities related to walking and bicycling and to prioritize infrastructure improvements. City staff can also use this report to support SRTS funding and support opportunities such as:

- MnDOT SRTS grants
- Federal SRTS grants
- Statewide Health Improvement Partnership (SHIP)

For all infrastructure recommendations, a traffic study and more detailed engineering may be necessary to evaluate project feasibility. Additional public outreach should be conducted before final design and construction. For recommendations within the public right-of-way, the responsible agency will determine how (and if) to incorporate suggestions into local improvement plans and prioritize funding to best meet the needs of each school community.

I WORK FOR LAW ENFORCEMENT

Police department staff can use this report to understand issues related to walking and bicycling to school and to lead and support education, encouragement, and enforcement activities that make it easier and safer for children to walk and bike to school. Enforcement efforts should focus on traffic safety education, rewarding positive behavior, and supporting school walk and bike events. Law enforcement representatives should be mindful of strategies that may disproportionately and negatively affect children and families of color, low wealth, or marginalized populations.

I WORK IN PUBLIC HEALTH

Public health staff can use this report to identify specific opportunities to collaborate with schools and local governments to support safety improvements and encourage healthy behaviors in school children and their families.


BURGER KING
PIZZA

Next Steps

With a SRTS Plan in place, it's time to shift attention to implementation.

The strategies identified in this plan may seem overwhelming at first. Just remember that anything you can do to make walking, biking, and rolling to school safer, easier, and more fun for students is a step in the right direction. Here are some things to remember:

START SMALL

Small actions can have a big impact, especially when it comes to building support, interest, and momentum for bigger initiatives.

FOCUS ON EQUITY

Not everyone has equal opportunities to walk and bike to school. Identify and prioritize strategies to address and overcome barriers that disproportionately impact the most vulnerable students.

BUILD PARTNERSHIPS

Look for opportunities to strengthen existing partnerships and build new ones. Reach out to caregivers, community members, local agencies and community organizations, and other stakeholders to expand capacity and support for Safe Routes to School initiatives.

EMPOWER STUDENTS AS LEADERS

Students-led initiatives can generate enthusiasm and improve social conditions for Safe Routes to School. Empower students to take ownership of programs to raise awareness, build excitement, and expand opportunities for their peers to walk and bike to school.

TRACK PROGRESS

Continue to track trips and survey caregivers and students about their experiences walking, biking, and rolling to school. Conducting regular evaluation will help your team understand what works and what doesn't work and allocate resources accordingly. Consider reporting annually on progress.

CELEBRATE SUCCESS

Take time to recognize efforts and celebrate progress. Whether it's changing travel habits, achieving a major milestone, implementing an infrastructure improvement, launching a new program, or hosting a successful event, recognize and celebrate success.


MINNESOTA
SAFE
ROUTES
TO SCHOOL

SAFE ROUTES TO SCHOOL

ST. PAUL ENGINEERING STUDY

April, 2021

SRF

DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

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.

Project Team

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EXECUTIVE SUMMARY

The Saint Paul Safe Routes to School Engineering Study focused on Arcade Street (US 61) from Neid Lane to Wheelock Parkway which connects five adjacent or nearby schools along the 1.2-mile north-south corridor. The Study's objective was to complete a technical analysis of a potential four- to three-lane conversion and other multimodal improvements along, and across, the corridor as a part of a broader roadway rehabilitation project planned in 2024 and for consideration in the long-term. The desired multimodal elements include enhanced crossings at major intersections and uncontrolled locations, as well as better connectivity along Arcade Street (US 61). As a part of Safe Routes to School (SRTS), proposed infrastructure specifically focused upon improving the safety, comfort, and convenience for children walking, rolling, or bicycling to the schools. SRTS is a national program intended to improve safety for children to access school and encourage a more active lifestyle through physical activity.

The Saint Paul Safe Routes to School Engineering Study was led by the City of Saint Paul in partnership with Saint Paul Public Schools. The Study illustrates strategies and potential improvements reviewed in coordination with numerous area stakeholders, including City, County, School District, Metro Transit, and MnDOT staff. The Study organizes needs and justifies improvements by the City of Saint Paul to implement the potential projects identified in this Study, as well as for MnDOT's consideration as part of a concurrent project underway to design and implement improvements to the corridor in 2024.

EXISTING CONDITIONS

Project Location and Focus Schools

The Arcade Street (US 61) corridor is in the east side of Saint Paul and is a regional transportation corridor primarily surrounded by residential neighborhoods while serving as the main commercial corridor for the area. The study area includes five public schools, parks, and other destinations children may want to access such as the Phalen Recreation Center, Arlington Hills Community Center, Lockwood Park, and the Saint Paul Eastside YMCA. There are 518 students total among the five schools that live within one-half mile of the study corridor, accounting for over 15 percent of the total enrollment.

Previous Plans and Other Studies

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

- *Safe Routes to School – Farnsworth Aerospace Upper Campus (2017)*
- *Saint Paul Safe Routes to School Policy Plan (2017)*
- *Saint Paul For All – 2040 Comprehensive Plan (2019)*

- *Saint Paul Pedestrian Plan (2019)*
- *Saint Paul Street Design Manual (2016)*
- *Saint Paul Bicycle Plan (2015)*

The planning documents identified supportive planning elements and synergies with this study.

Community Feedback

Online community engagement was facilitated as a part of this Study and was specifically tailored to student and parents of the five schools. The engagement occurred from September 22, 2020 through October 26, 2020 via an engagement website, online survey, and interactive mapping exercise. Approximately 125 survey responses were collected, as well as 38 open-ended comments, and 28 comments related to the interactive map. The survey included five questions to understand how the community uses and feels about Arcade Street (US 61). The top three issue areas identified by the community via the interactive map include the intersections of Cottage Avenue, Ivy Avenue, and Maryland Avenue.

Transportation Network

The transportation network was reviewed along Arcade Street (US 61) to identify existing infrastructure for walking, rolling, bicycling, transit, and driving on, and adjacent to, the corridor. Arcade Street (US 61) varies in lane configurations with six distinct cross-sections; however, the corridor is primarily either a two-lane with no turn lanes and on-street parking, or a four-lane, undivided roadway with on-street parking in the outside lanes during select times. Sidewalk is present along both sides of the corridor and marked crossings exist at the six signalized intersections, as well as two uncontrolled locations with no additional enhancements.

Ten years of vehicle-to-bicycle and vehicle-to-pedestrian crashes were reviewed to identify potential areas of need. Due to the multimodal focus of this Study, an additional five years of data was reviewed to provide a larger sample size of data from which to analyze trends and identify “hot spots”. All crashes were also reviewed, including the manner of collision which details the way in which the crash occurred (e.g., rear end), over the last five years. The data was derived from MnDOT’s Minnesota Crash Mapping Analysis Tool (MnCMAT 2) and includes recorded crashes by law enforcement that provide crash details and approximate location. A total of 308 crashes were reported along Arcade Street (US 61) over the last five years (see Figure 26 and Figure 27). This equates to a crash frequency of 62 crashes per year and a crash density of 257 crashes per mile for the 1.2-mile corridor. A total of 43 crashes involving a pedestrian (35) or bicyclist (8) were recorded, of which a significant number along Arcade Street (US 61) involved children ranging in age from 12- to 18-years-old. A total of 16 crashes (40 percent of all recorded pedestrian or bicyclist crashes) involved a child, of which 11 occurred during the school day either in the afternoon or early evening.

Detailed analysis of multimodal elements, traffic volumes and operations, on-street parking regulations and utilization, access, and safety is covered for each school in Chapter 2.

IDENTIFIED NEEDS

Broadly identified needs were recorded from the existing conditions analysis which detected potential issues. These include roadway design, crossing enhancements, and sidewalk infrastructure both along, and across, Arcade Street (US 61).

Roadway Design	Reconstruct the roadway to improve the configuration of Arcade Street and create a corridor that is safe and accessible for users of all ages and abilities.
Crossing Enhancements	Enhance crossing infrastructure at high-volume, signalized intersections to improve connections across Arcade Street at these key locations while ensuring they are not barriers for children. Implement crossing infrastructure at key uncontrolled locations along the 1.2-mile Arcade Street corridor to create a convenient and connected multimodal transportation network.
Connectivity to Walk	Reconstruct sidewalk infrastructure along Arcade Street to enhance the comfort, accessibility, and environment of walking or rolling along the corridor, as well as access to destinations (i.e., schools, parks, businesses, etc.).

ALTERNATIVE EVALUATION

Project alternatives are based upon evaluated opportunities proposed to improve or eliminate identified needs. Chapter 4 organizes potential improvements and project opportunities to address the high-level needs identified by the Study using the latest state and national guidance. Potential projects were vetted using engineering judgment and reviewed in coordination with numerous area stakeholders, including City, County, School District, Metro Transit, and MnDOT staff.

Roadway Configuration and Design

Four alternatives were studied for Arcade Street (US 61) using an evaluation matrix to identify tradeoffs for future consideration regarding four alternatives from York Avenue to Wheelock Parkway:

- **No Build:** Maintain existing conditions.
- **Alternative 1:** Two-lane roadway (one travel lane in each direction) with no turn lanes at any intersection except Maryland Avenue; left-turn lanes are added along Arcade Street at Maryland Avenue.
- **Alternative 2:** Two-lane roadway (one travel lane in each direction) with left-turn lanes at all intersections.
- **Alternative 3:** Three-lane roadway with one travel lane in each direction and continuous two-way, left-turn lane and left-turn lanes at all intersections.

A hybrid alternative identified by the project team was evaluated further with respect to traffic volumes, operations, queueing, parking, and access. The hybrid configuration includes a two-lane roadway with turn lanes from York Avenue to Geranium Avenue, and then a three-lane roadway to Wheelock Parkway.

Major, Uncontrolled, and Side-Street Crossings

Potential crossing improvements were studied along Arcade Street (US 61) at all 20 intersection in the study area including signalized intersections and uncontrolled locations. Infrastructure improvements could enhance each crossing and support a safer and more comfortable environment for children to cross. The crossings were prioritized quantitatively using a decision matrix to identify potential short-term and long-term upgrades. Those prioritized crossings are discussed further in Chapter 4 and Chapter 5.

Sidewalk and Pedestrian-realm Upgrades

Upgrades to the sidewalk system and pedestrian-realm along Arcade Street (US 61) were identified as a priority by the community from the online survey. A brief overview of potential considerations for the concurrent rehabilitation project are highlighted including widening, street trees, and ADA-improvements.

POTENTIAL PROJECTS

The potential crossings considered along Arcade Street (US 61) are organized by prioritized groups for short-, mid- and long-term consideration (see Figure 1).

NEXT STEPS

This Study offers a range of potential infrastructure improvements along Arcade Street (US 61) from Neid Lane to Wheelock Parkway. Actionable next steps were organized to ensure this document is fully utilized and implemented to the best of the City of Saint Paul's ability in coordination with MnDOT. Key next steps include:

- 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: Prioritize 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 schedule. The action plan will focus on implementation, identify synergies with other planned projects, and allow agencies to be prepared for funding opportunities.
- Celebrate wins!

Northern Segment

Southern Segment

61

Wheelock Parkway East

Arcade Street

Weide Street

Sherwood Avenue

Cottage Avenue East

Clear Avenue

Johnson Senior High School

Ivy Avenue East

Farnsworth Aerospace
Lower Campus

Hyacinth Avenue East

Orange Avenue East

Hawthorne Avenue East

Maryland Avenue East

Rose Avenue East

0 250 500 ft

Geranium Avenue East

Jessamine Avenue East

Phalen Lake Magnet School
900 ft.

Magnolia Avenue East

Cook Avenue East

Lawson Avenue East

Farnsworth Aerospace
Upper Campus

Jenks Avenue

Case Avenue

Sims Avenue

York Avenue

John A. Johnson
Achievement Plus
Elementary

Wells Street

Neid Lane

61

Prioritized Safe Routes to School Crossing Improvements

St. Paul, MN

Figure 1

Focus School

Existing Sidewalk

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

Improvement ID

Priority 1: High-priority crossings for implementation as a part of the upcoming rehabilitation project or in the near-term.
Priority 2: Medium-priority crossings for implementation when warranted by the City/MnDOT.
Priority 3: Low-priority crossings for tracking purposes and potential implementation in the long-term if desired.

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MINNESOTA SAFE ROUTES TO SCHOOL

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: Issue 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.

Chapter 5: Potential Projects

Summarizes the prioritized crossings and other considerations for when those improvements are potentially implemented.

Chapter 6: Next Steps

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

CHAPTER 1: INTRODUCTION

STUDY BACKGROUND

The Saint Paul Safe Routes to School Engineering Study (herein known as "the Study") sought to improve access to schools near Arcade Street (US 61) for children to walk, roll, or bike safely, comfortably, and conveniently along or across the roadway. The Study focused on a 1.2-mile section of Arcade Street (US 61) from Neid Lane to Wheelock Parkway which connects five adjacent or nearby schools along the north-south corridor. The Study's objective was to complete a technical analysis of a potential lane configuration changes to the roadway, and multimodal improvements along, and across, the corridor as both a part of a broader roadway rehabilitation project planned in 2024 and for consideration in the long-term. The desired multimodal elements include enhanced crossings and better connectivity along Arcade Street (US 61).

The Study was led by the City of Saint Paul in partnership with Saint Paul Public Schools. The Study illustrates strategies and improvements reviewed in coordination with numerous area stakeholders, including City, County, School District, Metro Transit, and MnDOT staff. The Study organizes needs and justifies improvements by the City of Saint Paul to implement the potential projects identified in this Study, as well as for MnDOT's consideration as part of the upcoming project.

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 increasing safety for children to walk, roll, or bike to school and in daily life to 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.[1]

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 a three-phase strategic planning process. Visit the Safe Routes to School webpage hosted by MnDOT for more information or to view the Strategic Plan.

[1] 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 along Arcade Street (US 61) in Saint Paul. It was funded and supported by MnDOT to complete planning and conceptual design for local agencies and school districts across Minnesota.

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, results from community outreach conducted for this Study, as well as data analyzed for the existing transportation system, operations, and safety along Arcade Street (US 61).

STUDY LOCATION AND FOCUS SCHOOLS

Location

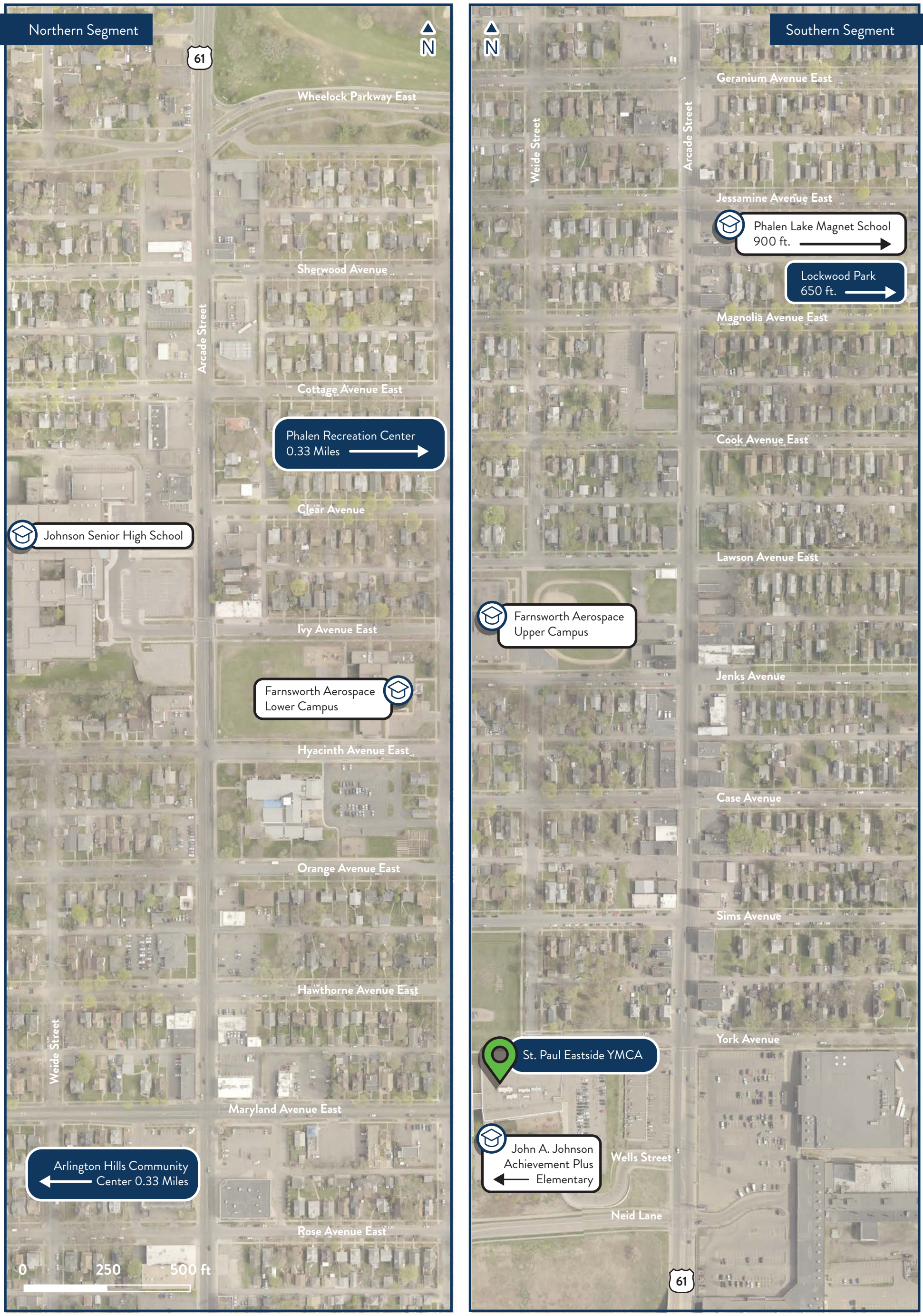
The City of Saint Paul is in Ramsey County and has an estimated population of approximately 305,000 as of 2019. The Arcade Street (US 61) study area is in the east side of the City and is primarily surrounded by residential neighborhoods while serving as the main commercial corridor for the area. The study area includes five public schools, parks, and other destinations children may want to access such as the Phalen Recreation Center, Arlington Hills Community Center, Lockwood Park, and Saint Paul Eastside YMCA (see Figure 2).

Most of the built environment along the study corridor includes low- to medium-density commercial and retail buildings with medium-density housing immediately adjacent (see Figure 3). An analysis of residential property density illustrated that most blocks near the corridor are consistently medium density with pockets of higher density two or more blocks away. Density can be the precursor for a higher propensity to walk or bike, as well as provide insight into where children may be living. This data is further organized using student enrollment data later in this chapter.

Arcade Street looking north at Case Avenue. Source: SRF Consulting Group, 2020

Northern Segment

Southern Segment



Project Area and Focus Schools

St. Paul, MN

Figure 2

Focus School

Destination

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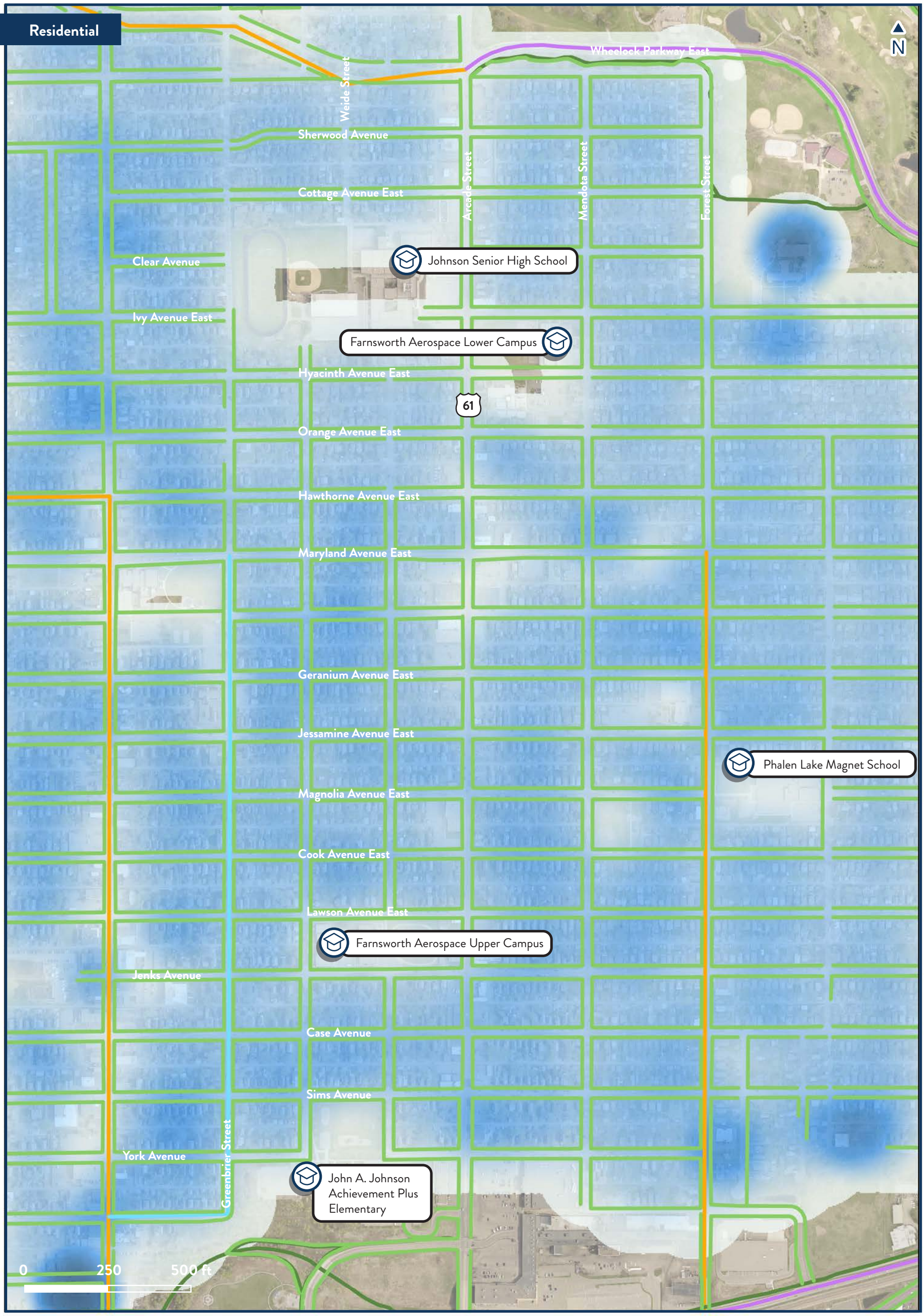
MINNESOTA SAFE ROUTES TO SCHOOL

Residential



Residential Density

St. Paul, MN

Figure 3

- Focus School
- Higher Residential Density
- Lower Residential Density
- Existing Sidewalk
- Existing Bike Boulevard
- Existing Shared Lane (Sharrow)
- Existing Trail
- Existing Bikeable/Wide Shoulder

SRF · Department of Transportation · Minnesota Safe Routes to School

Focus Schools

The Saint Paul Public Schools (District No. 625) serves the City of Saint Paul. As of 2020, the District had approximately 36,000 students which makes it the second largest in Minnesota. Approximately 3,328 students, or nearly ten percent of the district total, attend one of the five focus schools (see Table 1).

Table 1. Focus Schools Overview

Focus School	Grades	Location	Student Population	School Day	Arrival and Dismissal Times
John A. Johnson Achievement Plus Elementary	EC to 5th	Immediately west of Arcade Street and south of York Avenue.	299	7:30 a.m. to 2:00 p.m.	7:05 to 7:30 a.m. 2:00 to 2:20 p.m.
Farnsworth Aerospace Lower Campus	EC to 4th	Adjacent east of Arcade Street, between Ivy and Hyacinth Avenues.	508	9:30 a.m. to 4:00 p.m.	9:05 to 9:30 a.m. 4:00 to 4:20 p.m.
Farnsworth Aerospace Upper Campus	5th to 8th	Immediately west of Arcade Street, between Lawson and Jenks Avenues.	599	9:30 a.m. to 4:00 p.m.	9:05 to 9:30 a.m. 4:00 to 4:20 p.m.
Phalen Lake Hmong Studies Magnet	EC to 5th	Approximately 0.25 miles east of Arcade Street and Magnolia Avenue.	679	7:30 a.m. to 2:00 p.m.	7:05 to 7:30 a.m. 2:00 to 2:20 p.m.
Johnson Senior High School	9th to 12th	Adjacent west of Arcade Street, at Ivy Avenue.	1,243	8:30 a.m. to 3:00 p.m.	8:00 to 8:30 a.m. 3:00 to 3:30 p.m.

Source: Saint Paul Public Schools, 2020

Student household location data identifies the potential SRTS benefit from enhanced multimodal infrastructure to/from the schools and is helpful toward understanding routes that students could use to access their respective school. Potential improvements for those key areas such as a busy intersection are important to ensure a location is not a barrier for children to access their school safely, comfortably, and conveniently. The location of where students live who are enrolled at one of the focus schools was analyzed using data shared by the school district for the purposes of the Study.

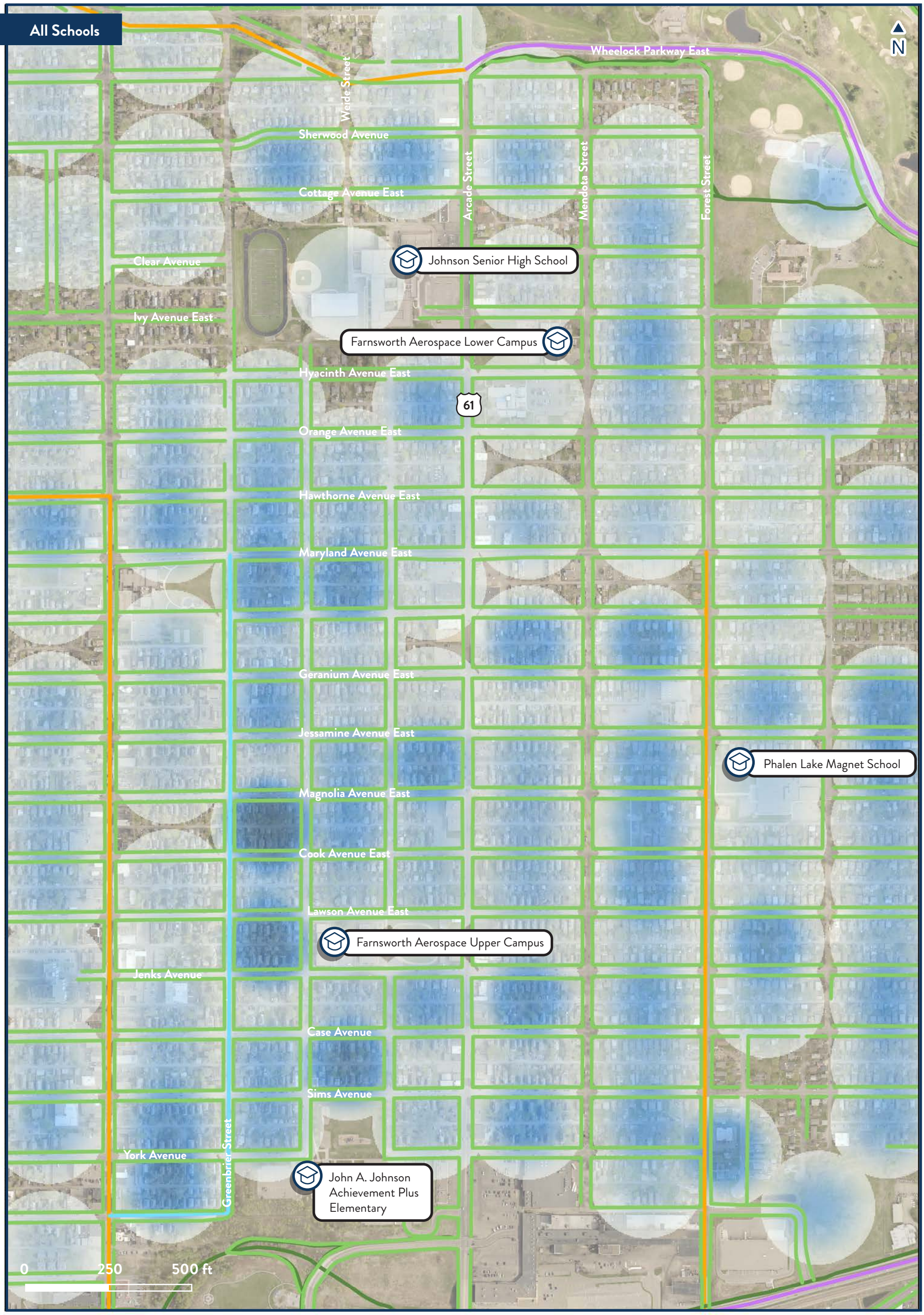
There are 518 students total among the five schools that live within one-half mile of the study corridor, accounting for over 15 percent of enrollment (see Figure 4). The school district uses both community and magnet schools as options to provide children and their parents the opportunity to prioritize the schools they wish to attend. This model can limit a child's ability to access their school by walking, rolling, or bicycling as they could live outside of a reasonable distance to do so because of citywide school attendance opportunities. The school district provides a methodology for their choice program, of which priority is given to students who live within a "community school zone" to promote attendance of schools within a child's neighborhood.

The following information from 2020 provides student locational data findings per focus school:

- **John A. Johnson Achievement Plus Elementary:** Approximately 28 percent of students (i.e., 84 students) live within one-half mile of the school and north of Phalen Boulevard which was considered a barrier for elementary children to access the school from neighborhoods to the south. Of them, 66 students live within one-half mile of Arcade Street (US 61), mainly west of the corridor. A total of seven students live within one-half mile of the school east of Arcade Street (US 61), primarily between York Avenue and Cook Avenue (see Figure 5).
- **Farnsworth Aerospace Lower Campus:** Nearly seven percent of students (i.e., 34 students) live within both one-half mile of the school and Arcade Street (US 61), mainly east of the corridor. A total of 14 students live within one-half mile of the school west of Arcade Street (US 61), primarily between Maryland Avenue and Sherwood Avenue (see Figure 6).
- **Farnsworth Aerospace Upper Campus:** About eight percent of students (i.e., 48 students) live within both one-half mile of the school and Arcade Street (US 61), mainly west of the corridor. A total of 15 students live within one-half mile of the school east of Arcade Street (US 61), primarily between York Avenue and Lawson Avenue (see Figure 7).
- **Phalen Lake Hmong Studies Magnet:** Over 12 percent of students (i.e., 83 students) live within one-half mile of the school. Of them, 48 students live within one-half mile of Arcade Street (US 61), mainly east of the corridor. A total of seven students live within one-half mile of the school west of Arcade Street (US 61), primarily between Jenks Avenue and Magnolia Avenue (see Figure 8).
- **Johnson Senior High School:** Nearly 30 percent of students (i.e., 364 students) live within one mile of the school. The one-mile threshold was used as high school students can walk, roll, or bike a longer distance than younger children and it is the threshold used by Saint Paul Public Schools. Of them, 217 students live within one-half mile of the Arcade Street (US 61) study area and are distributed almost equally between east and west sides. A total of 124 students live east of Arcade Street (US 61), primarily between York Avenue and Rose Avenue (see Figure 9).

Johnson Senior High School. Source: Saint Paul Public Schools

All Schools



Student Population, All Schools

St. Paul, MN

Figure 4

Focus School

Higher Density Student Population

Lower Density Student Population

Existing Sidewalk

Existing Bike Boulevard

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

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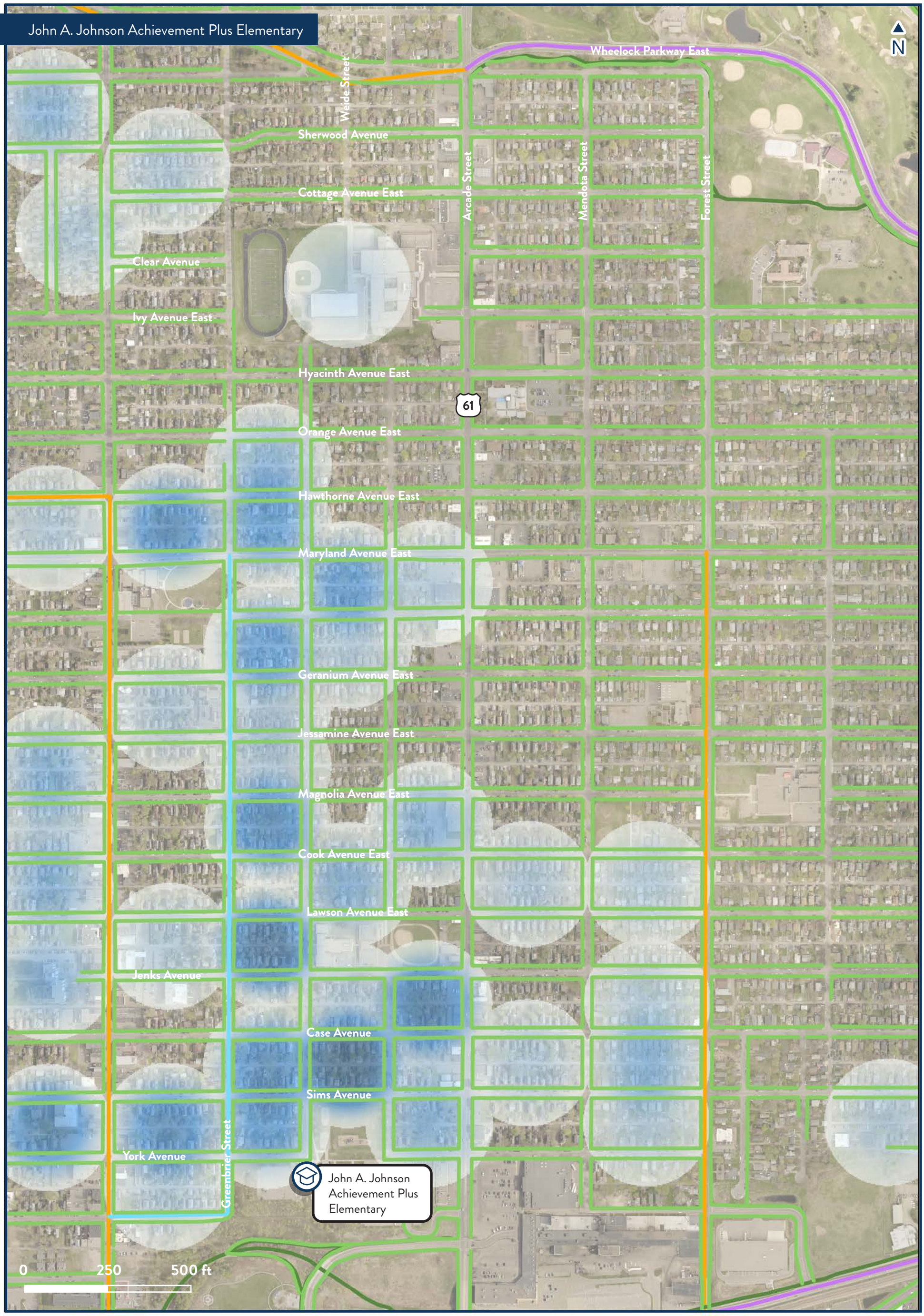
MINNESOTA SAFE ROUTES TO SCHOOL

John A. Johnson Achievement Plus Elementary



Student Population, John A. Johnson Achievement Plus Elementary
St. Paul, MN

Figure 5

Focus School

Higher Density Student Population

Lower Density Student Population

Existing Sidewalk

Existing Bike Boulevard

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

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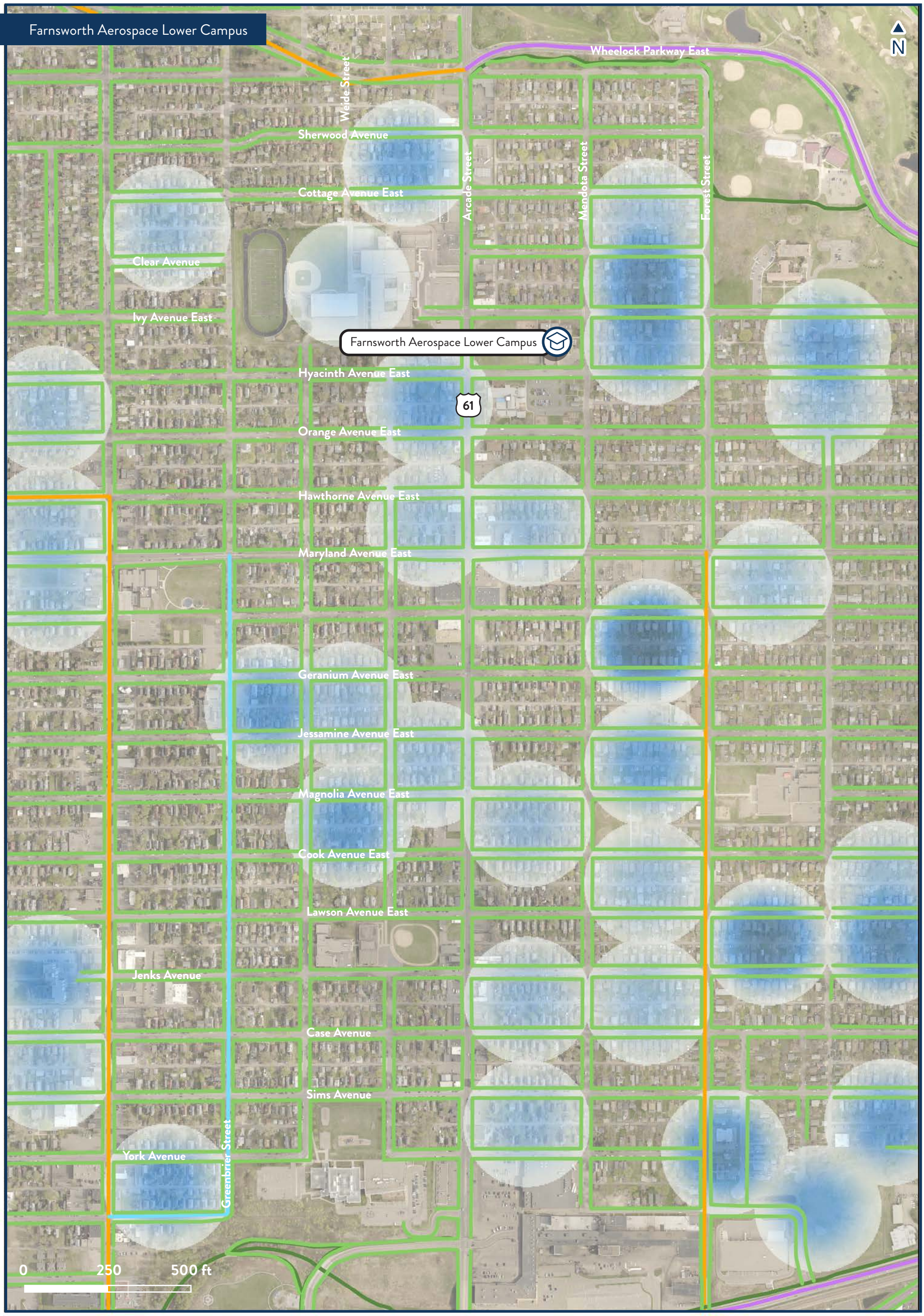
DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

Farnsworth Aerospace Lower Campus



Student Population, Farnsworth Aerospace Lower Campus
St. Paul, MN

Figure 6

Focus School

Higher Density Student Population

Lower Density Student Population

Existing Sidewalk

Existing Bike Boulevard

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

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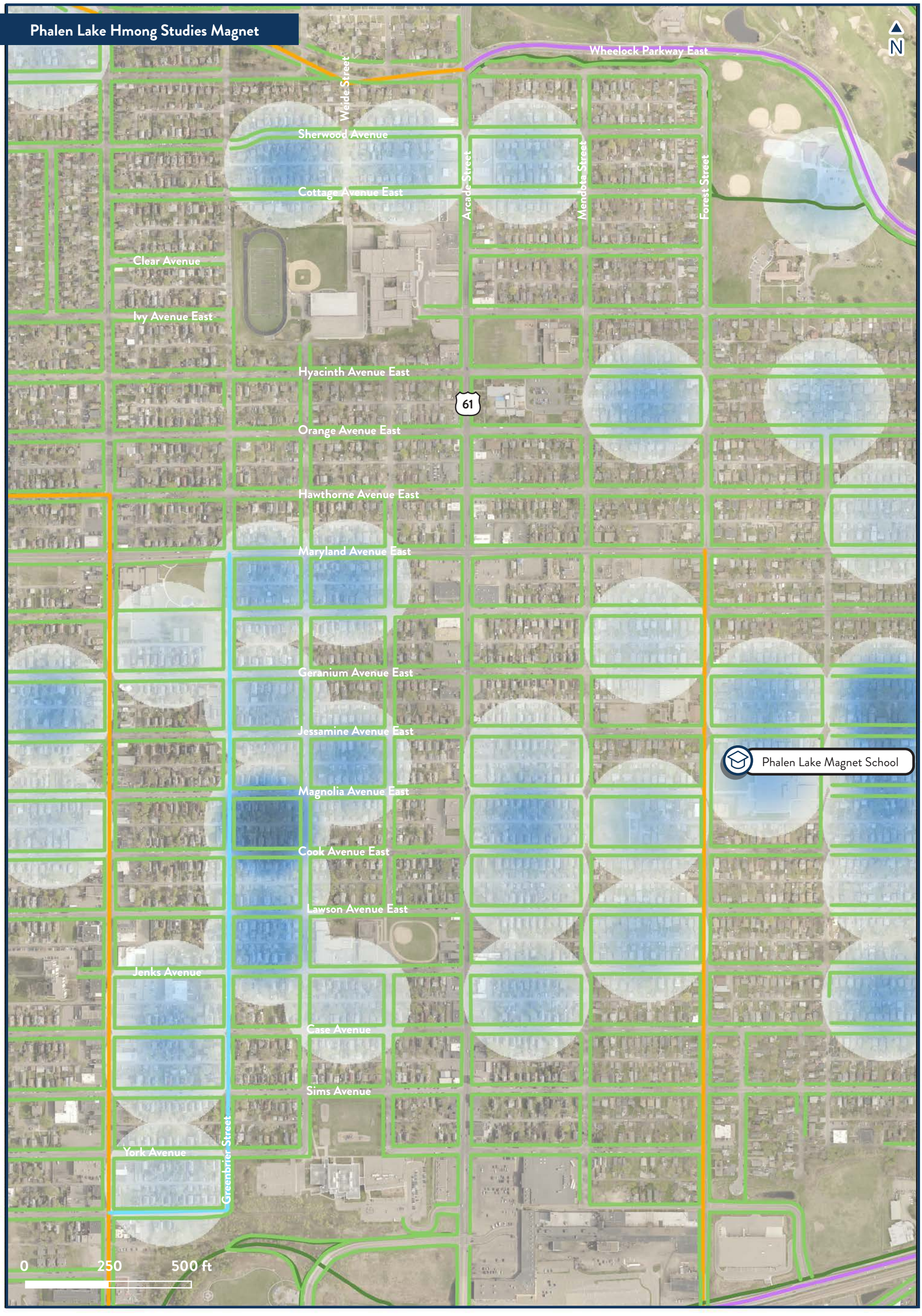
MINNESOTA SAFE ROUTES TO SCHOOL

Phalen Lake Hmong Studies Magnet



Student Population, Phalen Lake Hmong Studies Magnet
St. Paul, MN

Figure 7

Focus School

Higher Density Student Population

Lower Density Student Population

Existing Sidewalk

Existing Bike Boulevard

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

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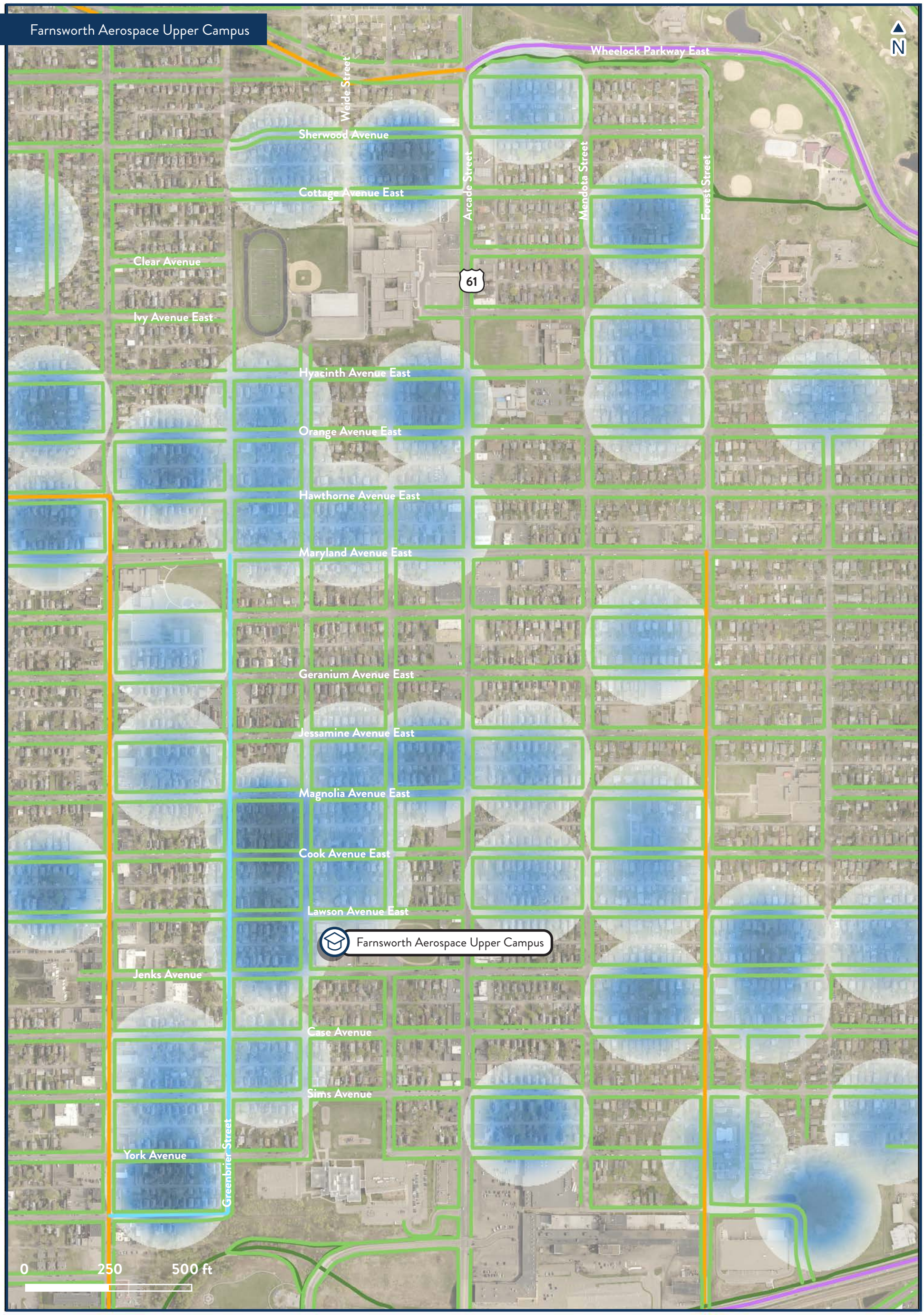
DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

Farnsworth Aerospace Upper Campus



Student Population, Farnsworth Aerospace Upper Campus
St. Paul, MN

Figure 8

Focus School

Higher Density Student Population

Lower Density Student Population

Existing Sidewalk

Existing Bike Boulevard

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

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MINNESOTA SAFE ROUTES TO SCHOOL

Johnson High School

Wheelock Parkway East
Weide Street
Sherwood Avenue
Arcade Street
Mendota Street
Forest Street
Cottage Avenue East
Clear Avenue
Johnson Senior High School
Ivy Avenue East
Hyacinth Avenue East
61
Orange Avenue East
Hawthorne Avenue East
Maryland Avenue East
Geranium Avenue East
Jessamine Avenue East
Magnolia Avenue East
Cook Avenue East
Lawson Avenue East
Jenks Avenue
Case Avenue
Sims Avenue
York Avenue
Greenbrier Street
0 250 500 ft
N

Student Population, Johnson High School

St. Paul, MN

Figure 9

Focus School

Higher Density Student Population

Lower Density Student Population

Existing Sidewalk

Existing Bike Boulevard

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

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DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

PREVIOUS PLANS AND OTHER STUDIES

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

Safe Routes to School – Farnsworth Aerospace Upper Campus (2017)

- Upgrade crossings at Arcade Street and Maryland Avenue, expand sidewalk approaches, and complete signal timing modifications for a leading pedestrian interval. Identified as a high priority.
- Implement crossing enhancements at Arcade Street and Jenks Avenue and align north leg crossing where there is a skew today. Identified as a high priority.
- Reduce Arcade Street from four-lanes to three-lanes and construct widened sidewalks along with increased buffer space. Identified as medium priority.
- Implement crossing enhancements at Arcade Street and Lawson Avenue. Identified as a low priority.

Saint Paul Safe Routes to School Policy Plan (2017)

- Recommended policy guidance for crossings at signalized intersections within one-half mile of a school, which include high visibility crosswalk markings at all legs, curb extensions when applicable, shortened traffic signal cycle length, protected left-turns at intersections near schools, and leading pedestrian intervals.

Saint Paul For All – 2040 Comprehensive Plan (2019)

This plan provides background, local policies, and direction for review as a part of the planning process. Applicable demographic considerations by Census Block Group:

- Up to 24 percent of nearby residents along Arcade Street do not own a car.
- Between 20 and 51 percent of the population are children under the age of 18 along Arcade Street.
- Between 25 and 35 percent of a families live in poverty, and the area is included in Saint Paul's "Area of Concentrated Poverty with over 50 Percent People of Color".

Applicable transportation policies for consideration as a part of this Study:

- Policy T-3: Design rights-of-way using the modal hierarchy of 1) pedestrians (safety focus), 2) bicyclists (safety focus), 3) transit, and 4) other vehicles.
- Policy T-6: Implement "road diets' for undivided four-lane roads to convert them to two or three lanes, where feasible, to prioritize pedestrian safety.
- Policy T-7: Implement intersection safety improvements.
- Policy T-9: Design the rights-of-way for all users, including older people, children, and those with mobility constraints as guided by the Street Design Manual and Safe Routes to School Plans.

- Policy T-34: Promote safe walking and bicycling to school by supporting Safe Routes to School efforts and investing in sidewalk connectivity and crossing enhancements near schools.

Saint Paul Pedestrian Plan (2019)

- The Arcade Street corridor is identified as a high-priority area for walking investments.
- Use funding sources such as Safe Routes to School and the Metropolitan Council's Regional Solicitation to leverage infrastructure improvements. The City also has an annual $125,000 program for Safe Routes to School projects which began in 2017.

Saint Paul Street Design Manual (2016)

- Arcade Street is identified as a mixed-use corridor with upgraded and expanded pedestrian realm.

Saint Paul Bicycle Plan (2015)

- No planned bikeway along Arcade Street due to parallel north-south facilities along adjacent streets including Forest Street (two blocks east) and Greenbrier Street (three blocks west).
- Two existing bikeways cross Arcade Street within the study area today including at Neid Lane where a connection exists to the Bruce Vento Regional Trail and Wheelock Parkway which will be a part of the future Grand Rounds trail system in Saint Paul.
- Three planned bikeways across Arcade Street within the study area are at Case Avenue (enhanced shared lane), Jessamine Avenue (bike boulevard), and Hyacinth Avenue (bike boulevard).

Arcade Street looking south at Magnolia Avenue. Source: SRF Consulting Gorup, 2020

COMMUNITY ENGAGEMENT

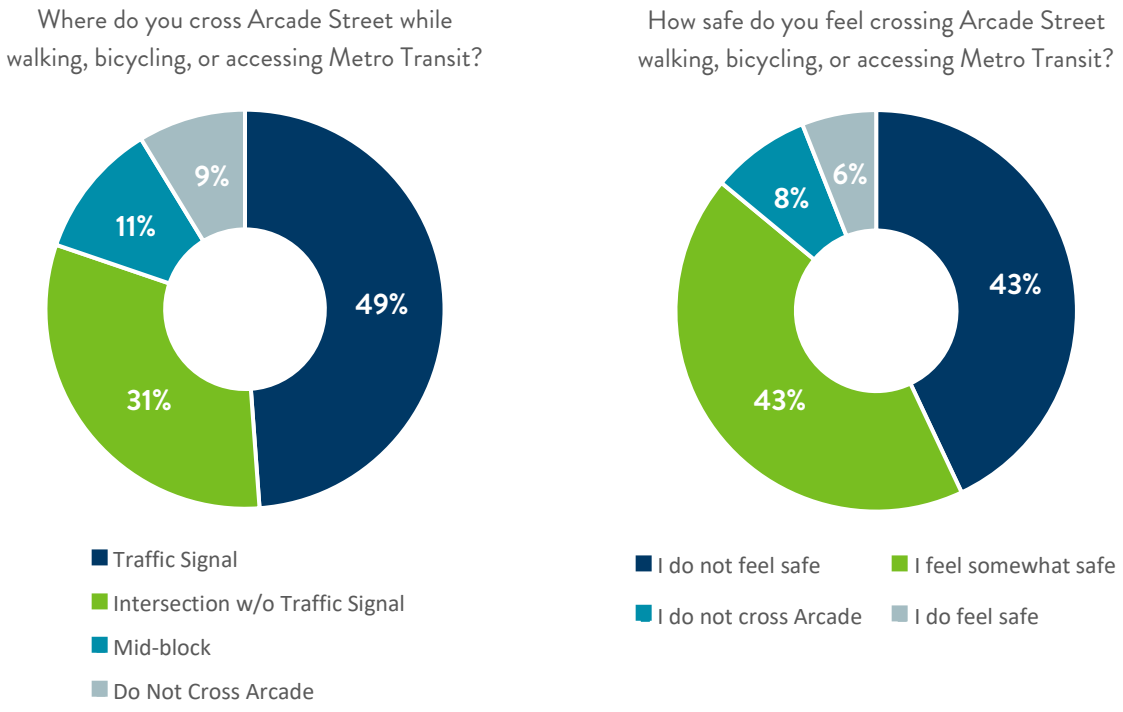
Online community engagement was facilitated as a part of this Study and was specifically tailored to students and parents of the five schools. The broader public engagement campaign was organized to align with a concurrent project effort underway during the Study's process to plan and design for the rehabilitation of Arcade Street (US 61) from Roselawn Avenue to East 7th Street (TH 5) which includes the study area.

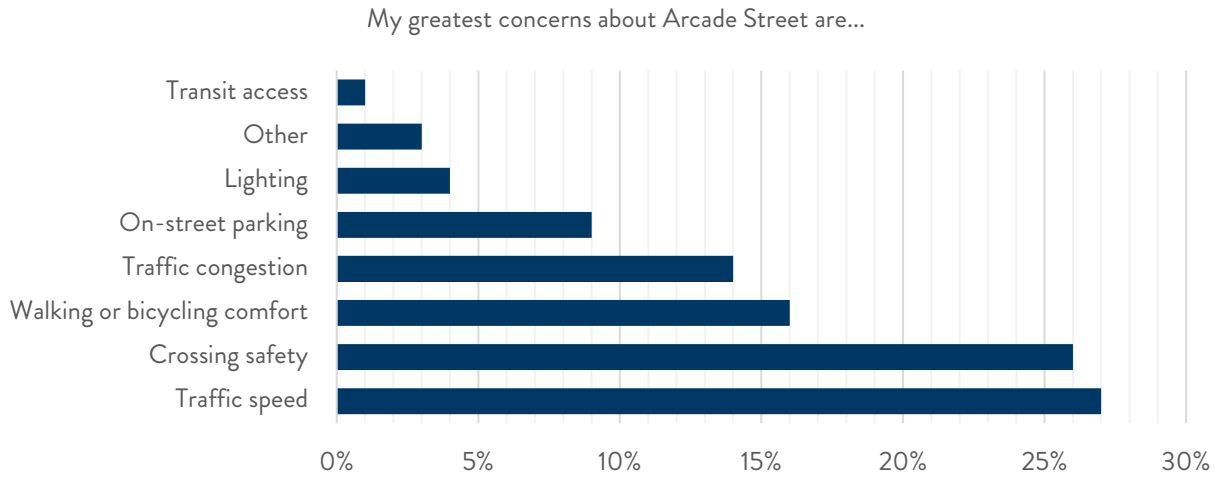
The engagement occurred from September 22, 2020 through October 26, 2020 via an engagement website, online survey, and interactive map. Approximately 125 survey responses were collected, as well as 38 open-ended comments, and 28 comments related to the interactive map (see Appendix A for raw data). Of the total survey responses, over one-third were from parents or students of the five focus schools. Additionally, over two-thirds of respondents lived on, or near (i.e., within four city blocks of) Arcade Street (US 61). Ten percent of respondents owned or worked at a business along the corridor and the remainder commuted to work or school via Arcade Street (US 61).

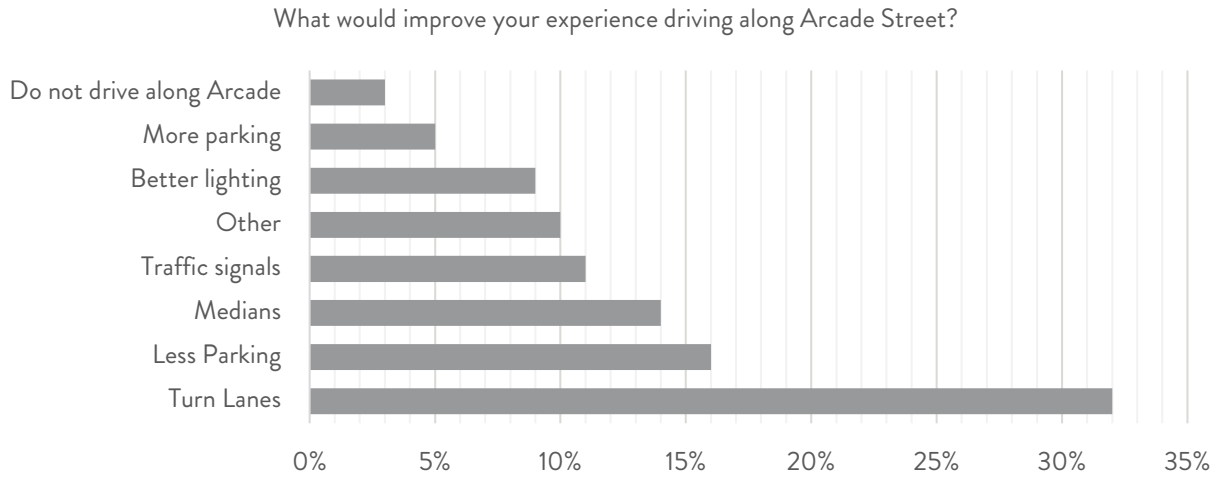
Online Survey

The survey included five questions to understand how the community uses and feels about Arcade Street (US 61). The following figures illustrate the results for each question (see Figure 10). A total of 42 comments were received via the survey questions that provided such responses by choosing "other".

Figure 10. Online Survey Results







Source: SRF Consulting Group, 2020

Of note, the three questions on this page required respondents to choose their top two choices only.

Interactive Map

The community identified issue areas by using points on an interactive online map. The issues could be identified by type including, walking, bicycling, transit, driving, overall safety, and other issues. A total of 28 comments were recorded of which some pertained to locations for the concurrent MnDOT project along Arcade Street (US 61) and outside the study area (see Appendix A for raw data). The top three issue areas identified by the community include the intersections of Cottage Avenue, Ivy Avenue, and Maryland Avenue.

Cottage Avenue[2]

- ”Many students get food from the gas station before and during school hours, but they have to cross without a crosswalk or signal and cars do not stop.”
- “Vehicles are going way too fast. They do not stop for people walking or bicycling.”
- ”I would like to see traffic calming such as what was implemented along Maryland Avenue. I would like to see [traffic calming] at least from Maryland Avenue to Larpentuer Avenue, if not Parkway Avenue/Frost Avenue.”

Ivy Avenue

- “Students use Metro Transit to commute to/from Johnson Senior High School…More than once a student has been hit by a car while crossing the intersection in front of a bus.”
- “Many Johnson Senior High School students, and a few staff, commute to school by bike. Please make sure to prioritize the safety of bicyclists – it is the greenest way to travel besides walking!”
- “Improved bike lanes and safety awareness for staff and students who choose to bike to school [is desired]. Total pedal power!”
- “There are not any bus shelters here. I know it would be a tight fit next to the elementary school playground, but it can still get pretty windy and cold.”
- ”Please add a left-turn signal here. Traffic gets really congested turning into Johnson [Senior High School].”

Maryland Avenue

- “Many students cross here, and it can be very dangerous since many motorists speed along Arcade Street. This could also be a better lighted intersection for everyone’s safety.”
- “This is a major intersection for transit. Make sure to prioritize Metro Transit buses through here and crossings to transfer in the redesign process.”
- “It is really hard to turn here because of the on-street parking and merging cars.”

[2] Quotes are edited for grammar and clarity.

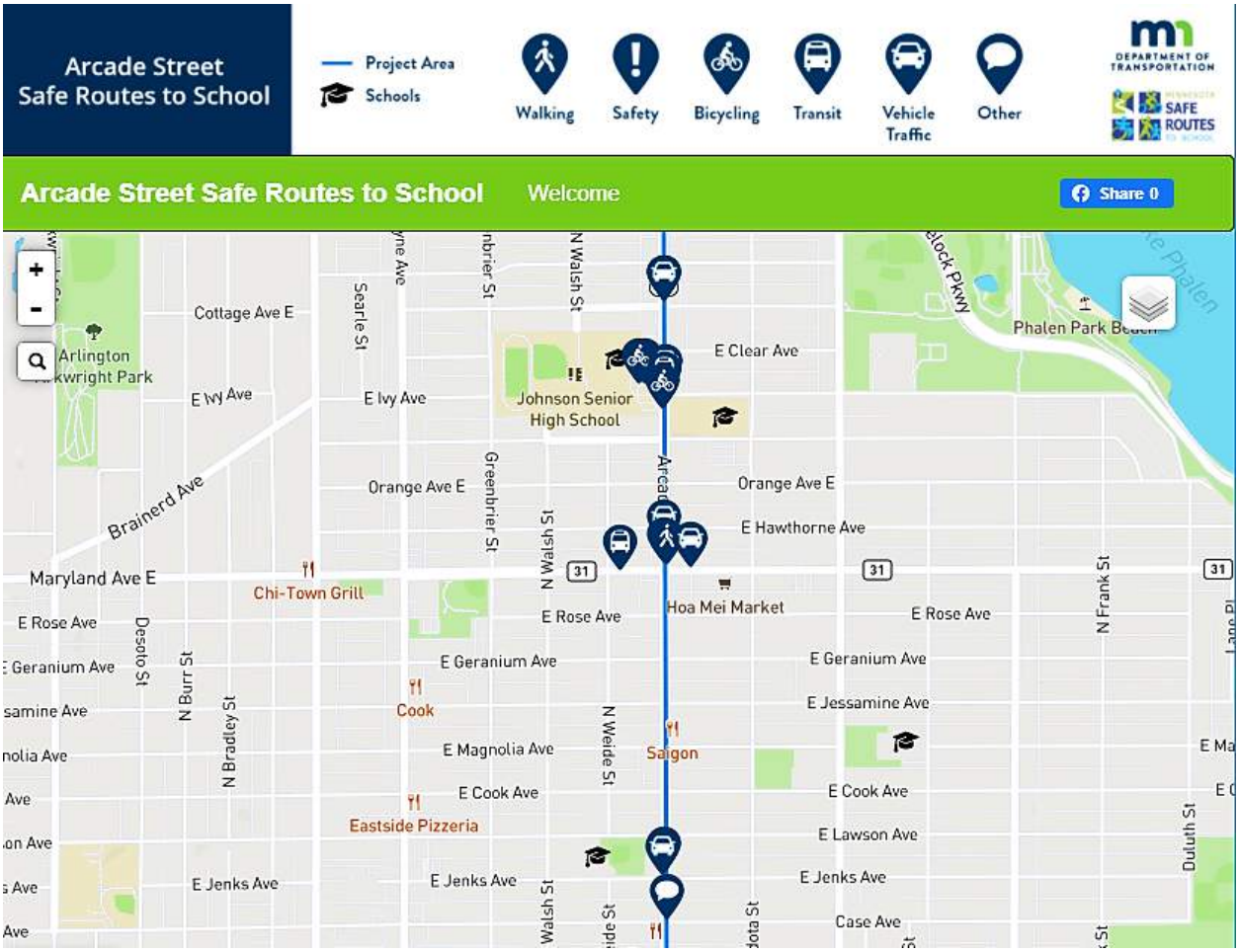
- ”This intersection can be nuts. There needs to be [left turn] arrows for Arcade Street traffic. If you are heading southbound and trying to turn left onto Maryland Avenue, you are taking your life into your hands [due to the sight distance and cars passing on the right]. The parked cars mess things up for southbound right turning vehicles. This is a dangerous intersection for everyone.”

Jenks Avenue

- ”A lot of students from Farnsworth [Aerospace Upper Campus] or Johnson [Senior High School] cross here and it can be dangerous to [both] pedestrians and motorists…”
- ”It is nearly impossible to turn left [from the east] onto Arcade Street. I worked at Farnsworth [Aerospace Upper Campus] for nine years and started using a different way since it could take forever to turn left here and often were backing cars up also trying to turn right.”

Case Avenue

- ”Many Johnson Senior High School students use this bus stop year-round. Even in the winter. There is only one small bench and no shelter to cover them from the rain and snow.”



Screenshot of feedback received via the interactive map. Source: SRF Consulting Group, 2020

TRANSPORTATION NETWORK

The transportation network was reviewed to identify existing infrastructure for walking, rolling, or bicycling, transit, and driving along Arcade Street (US 61). The following sections summarize each transportation mode as it exists today (see Figure 11).

Walking, Rolling, and Bicycling

The corridor is primarily auto-focused with nearly 75 percent of the total right-of-way devoted to vehicular uses including travel lanes and on-street parking. Existing multimodal infrastructure includes approximately eight-foot sidewalks along both sides of the street with a typical clear zone of six feet or less. There are no street trees or other landscaping present, and other amenities such as benches or trash receptables are very limited. Vehicular-focused street lighting is present along the corridor with approximately four light poles spaced along each city block. There is no pedestrian-scale lighting.

Marked crossings exist at eight locations within the 1.2-mile study corridor. Of those, six are at existing signalized intersections including: Neid Lane, Case Avenue, Magnolia Avenue, Maryland Avenue, Ivy Avenue, and Wheelock Parkway. Two uncontrolled marked crossings (i.e., crosswalks) are located at York Avenue and Jessamine Avenue. No crossing enhancements (e.g., curb extension, etc.) exist in the study area.

There are no existing or planned bicycle facilities along Arcade Street (US 61). Two off-street bicycle facilities either cross or connect to Arcade Street (US 61) at Wheelock Parkway and Neid Lane, respectively. The connection at Wheelock Parkway is a part of the future Grand Rounds network of off-street paths while a link to the Bruce Vento Regional Trail is located at Neid Lane.

Arcade Street looking south at York Avenue. Source: Google Streetview, 2019

Northern Segment

Southern Segment

Arcade Street

Weide Street

Wheelock Parkway East

Geranium Avenue East

Jessamine Avenue East

Sherwood Avenue

Magnolia Avenue East

Cottage Avenue East

Cook Avenue East

Clear Avenue

Lawson Avenue East

Johnson Senior High School

Ivy Avenue East

Farnsworth Aerospace Upper Campus

Farnsworth Aerospace Lower Campus

Jenks Avenue

Hyacinth Avenue East

Case Avenue

Orange Avenue East

Sims Avenue

Hawthorne Avenue East

York Avenue

Maryland Avenue East

John A. Johnson Achievement Plus Elementary

Wells Street

Neid Lane

Rose Avenue East

Phalen Lake Magnet School
900 ft.

0 250 500 ft

61

SPEED LIMIT 30

STOP

N

Existing Transportation Network

St. Paul, MN

Figure 11

- Focus School
- Side-Street Stop-Controlled Intersection
- Marked Crosswalk
- School Crossing Sign
- Traffic Signal
- Existing Sidewalk
- Existing Shared Lane (Sharrow)
- Existing Bikeable/Wide Shoulder
- Bus Route
- Bus Stop

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MINNESOTA SAFE ROUTES TO SCHOOL

Multimodal Activity

Multimodal activity was studied using StreetLight to estimate the frequency for pedestrians and bicyclists to cross at each intersection, instead of traditional pedestrian and bicyclist counts due to the COVID-19 pandemic that disrupted school operations. The 2019 data included daily estimates during the months when school was in session and only during Monday through Thursday. The data does not provide raw counts but rather an estimated level of use that can identify areas of higher activity. The data is organized using app-based locational cell phone data that is anonymized and organized by StreetLight using proprietary algorithms. Activity is estimated using this data and normalized using sample trip counts and Census Block population. StreetLight data can assist in identifying locations with higher usage, which can aid in the prioritization of improvements (see Figure 12 and Figure 13).

Figure 12. StreetLight Pedestrian Activity Estimate

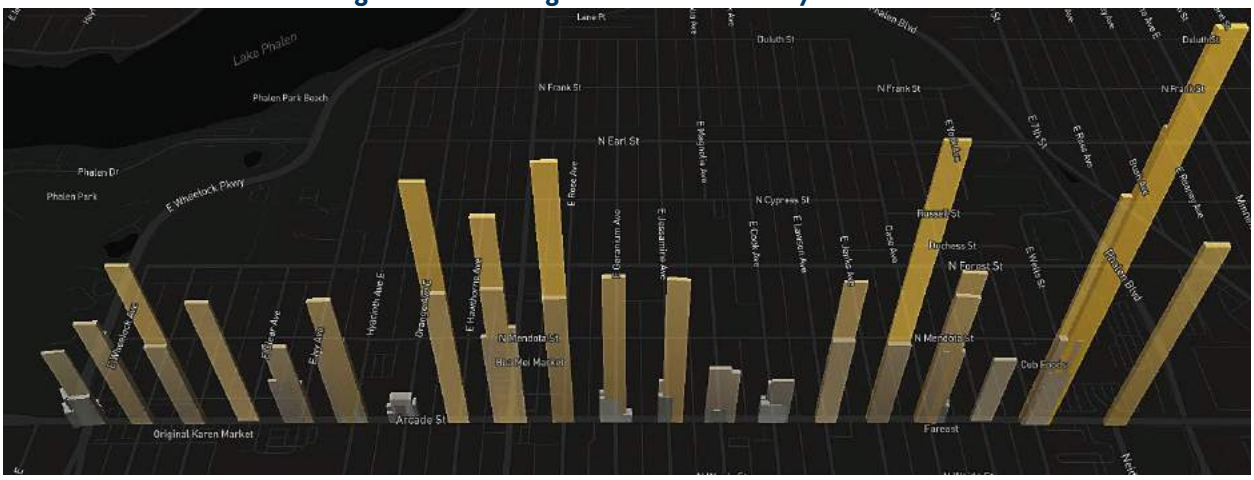
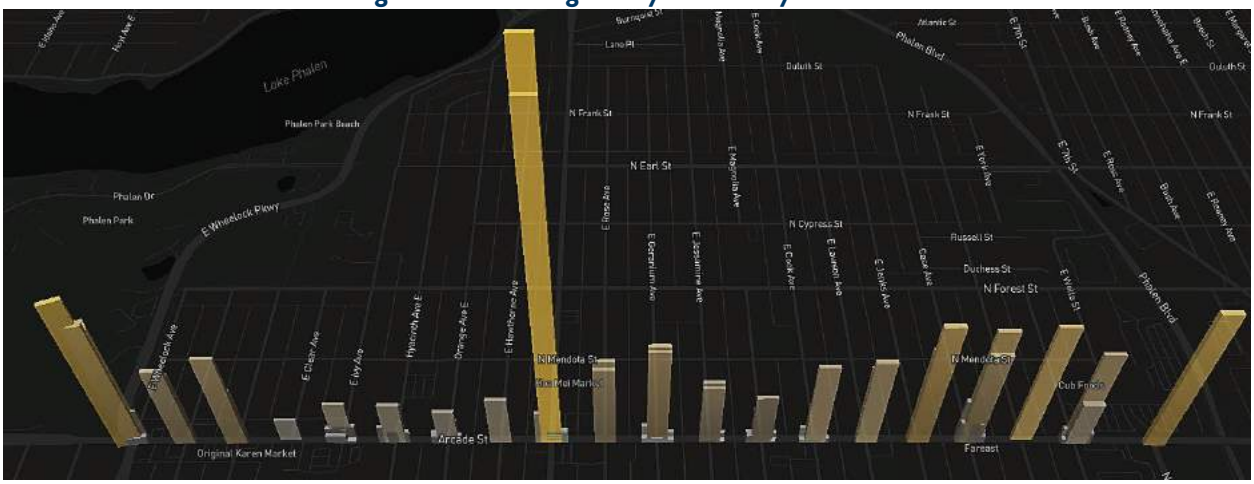


Figure 13. StreetLight Bicycle Activity Estimate



Source: StreetLight, 2020; SRF Consulting Group, 2020

Transit

Metro Transit buses are a critical connector for Johnson Senior High School students who receive metro transit passes from Saint Paul Public Schools for $50 per year if they live within one-mile of the school or are free if greater than one-mile. Some students cannot (or choose not to) walk, bike, drive, or carpool, so they must rely upon frequent and reliable transit service to access school. Metro Transit has four existing routes along all, or portions of, Arcade Street (US 61) from Neid Lane to Wheelock Parkway (see Figure 11).

- Route 61: East-west connector between downtown Minneapolis and Saint Paul via East Hennepin/ Larpenteur Avenue. It runs along Arcade Street (US 61) from Larpenteur Avenue to East 7th Street.
- Route 54: Connector between the Mall of America, Minneapolis-Saint Paul International Airport, downtown Saint Paul, and the Maplewood Mall. It runs along Arcade Street (US 61) from Maryland Avenue to East 7th Street.
- Route 64: One of Metro Transit's high-frequency routes operating between downtown Saint Paul and locations to the northeast via several different branches. It runs along Arcade Street (US 61) only for select trips serving Johnson Senior High School.
- Route 74: East-west connector between the Blue Line's 46th Street Station, downtown Saint Paul, and several locations to the east via a number of different branches. It runs along Arcade Street (US 61) only for select trips serving Johnson Senior High School.

As of 2019, over 1,500 boarding's and alighting's were recorded per day for the local bus routes in the study area. The top three bus stops by ridership, of which two serve the high school, are all affiliated with Route 61:

- Ivy Avenue (southbound / northbound): 187 / 142
- Maryland Avenue (southbound): 101

The Arcade Street (US 61) and Maryland Avenue intersection is a key connection for area transit riders via three bus routes serving that location, including high-frequency service. On average, almost 650 daily transit riders board or alight at the intersection, which accounts for over 40 percent of all ridership in the study area.

Students waiting for a Metro Transit bus. Source: Star Tribune, 2012

Roadway Network

Arcade Street (US 61) is a MnDOT functionally classified minor arterial roadway running north-south approximately one-mile east of Interstate 35E. Functional classification is the grouping of roadways into classes that define how the roadway serves vehicular travel within the broader roadway network. Local roadways service short, localized trips, while collector roadways provide key connections between local streets and the regional arterial network. As a minor arterial, the roadway operates as both a key connector and support route for regional north-south travel between downtown Saint Paul, as well as and suburban locations to the north. In addition to regional travel, the road is important to the local community by providing access to shopping, recreation, schools, and other neighborhood destinations.

The 1.2-mile study area has six different lane configurations, including:

- **Wheelock Parkway to Rose Avenue**: Four-lane, undivided with no turn lanes and on-street parking (outside lanes during certain times).
- **Rose Avenue to Jessamine Avenue**: Three-lane (two southbound lanes and one northbound lane), undivided with no turn lanes and on-street parking (east side only).
- **Jessamine Avenue to Case Avenue**: Two-lane, undivided with no turn lanes and on-street parking (both sides).
- **Case Avenue to Sims Avenue**: Two-lane, undivided with no turn lanes and on-street parking (east side only).
- **Sims Avenue to York Avenue**: Two-lane, undivided with a southbound turn lane and on-street parking (both sides).
- **York Avenue to Neid Lane**: Four-lane, divided with turn lanes and no on-street parking.

Though there are several lane configurations, the corridor maintains a relatively consistent cross-section of 60-feet from the back of sidewalk and approximately 44-feet-wide curb to curb. The only variation is from Neid Lane to Sims Avenue which has an estimated cross-section of 74-feet, and approximately 58-feet-wide curb to curb. Arcade Street (US 61) is urban in context (i.e., curb and gutter).

Traffic Volume

Vehicular activity was analyzed using average annual daily traffic (AADT) volumes along Arcade Street (US 61) from MnDOT's publicly available data (see Figure 14). The corridor volumes from 2018, along with 20 years of AADT volumes from 1998 to 2018, were reviewed to understand growth or fluctuations in traffic along Arcade Street (US 61). Based on this data, overall AADT volumes have decreased along most of the corridor, with minor increases or fluctuations between Case Avenue and Maryland Avenue. The limited or declining growth coincides with the surrounding context of established neighborhoods.

- **Wheelock Parkway to Maryland Avenue**: 11,800 (decreased 15 percent and fluctuated within a few hundred vehicles of the current volume since 2006)
- **Maryland Avenue to Case Avenue**: 13,000 (increased 12 percent and fluctuated between 12,000 and 13,000 since 2006)
- **Case Avenue to Neid Lane**: 12,000 (decreased 15 percent and fluctuated between 12,000 and 14,000)

The AADT volumes of state-aid cross-streets at major intersections were also reviewed where data was available. These locations included:

- Wheelock Parkway: 5,200 west (year 2016)
- Maryland Avenue: 19,400 west (year 2018); 18,600 east (year 2016)
- Case Avenue: 3,000 west (year 2017), 4,050 east (year 2016)
- Neid Lane: 4,450 (year 2017)

Intersection turning movement counts (TMCs) were studied using Synchro/SimTraffic at the 20 intersections within the study area to understand existing traffic operations. Data was available at the six signalized intersections from 2018 which formed the basis for the TMCs along the remainder of the corridor. All other intersections were organized using StreetLight traffic volume data due to the COVID-19 pandemic that significantly impacted traffic volumes and travel patterns in 2020. The volumes were balanced along the corridor using engineering judgment between both data sources.

The StreetLight data used for this Study includes hourly traffic volumes and daily estimates using 2019 data during the months when school was in session and only during Tuesday through Thursday. The data is organized using app-based locational cell phone data that is anonymized and organized by StreetLight using proprietary algorithms to determine vehicular counts.

Traffic volumes also play a key role in determining appropriate multimodal infrastructure such as a bike lane versus a multiuse trail or the type of pedestrian and bicycle crossing treatments (e.g., the threshold for a rectangular rapid flashing beacon). This is detailed further in Chapter 4.

Northern Segment

Southern Segment

N

61

Arcade Street

Weide Street

Cottage Avenue East

Sherwood Avenue

Maryland Avenue East

Wells Street

Neid Lane

East

Jessamine Avenue East

Cook Avenue East

Jenks Avenue

Sims Avenue

York Avenue

Johnson Senior High School

Farnsworth Aerospace Lower Campus

Farnsworth Aerospace Upper Campus

Phalen Lake Magnet School 900 ft.

John A. Johnson Achievement Plus Elementary

0 250 500 ft

Existing Turning Movement Counts

St. Paul, MN

Figure 14

Focus School

Morning Peak Hour Volume

(#) Evening Peak Hour Volume

STOP Side-Street Stop-Controlled Intersection

Traffic Signal

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MINNESOTA SAFE ROUTES TO SCHOOL

Traffic Speed

Arcade Street (US 61) has a 30 mile per hour (mph) speed limit and no school speed zones present in the study area. Vehicular speed data was not collected by traditional methods (i.e., road tubes) due to the COVID-19 pandemic. Various methods were used to determine average northbound and southbound speeds along Arcade Street (US 61) including SimTraffic (average peak hour speeds), Iteris (average peak hour speeds), StreetLight (all day average speeds), and Google (all day average speeds). All four sources were within one to three miles per hour of one another and averaged to display an overall directional speed of 23 mph (northbound) and 22 mph (southbound). The calculated average speeds are similar to those observed by the City of Saint Paul in 2007.

The 85th percentile speed is the industry standard measurement for setting roadway speeds; however, that was not studied due to the comparative data available that used average speeds. Moreover, the average speed is also considered by the Institute of Transportation Engineers (ITE), the National Association of City Transportation Officials (NACTO), and other multimodal-focused jurisdictions as an alternative threshold when focusing on safety and multimodal comfort as it relates to speed and roadway design.

Traffic Operations

Existing traffic operations were studied using turning movement counts at 20 intersection from Neid Lane to Wheelock Parkway (see Figure 15). The typical threshold of acceptable traffic operations for most jurisdictions is an LOS D. Due to the objective of this Study, other considerations beyond traffic operations were reviewed to ensure prioritization of children walking, rolling, and bicycling, over vehicular movement along, or across, Arcade Street (US 61), a neighborhood mixed-use corridor.

Arcade Street (US 61) experiences some congestion during the morning (7:00 a.m. to 8:00 a.m.) and evening (5:00 p.m. to 6:00 p.m.) peak periods of travel, which is generally concentrated at the Maryland Avenue intersection (though operating at an LOS D overall during both periods). During the evening peak period, the eastbound side-street approach at Lawson Avenue operates at a LOS F while Jenks Avenue, an adjacent intersection, operates at a LOS D during the same period. All other intersections operate better than a LOS D during both peak periods which indicates the traffic volume, lane configuration, and/or traffic controls provide adequate capacity for the corridor.

Northern Segment

Southern Segment

N

61

Wheelock Parkway East

5,200

17,300

Sherwood Avenue

Arcade Street

Cottage Avenue East

Clear Avenue

Johnson Senior High School

11,800

Ivy Avenue East

Farnsworth Aerospace
Lower Campus

Hyacinth Avenue East

Orange Avenue East

Hawthorne Avenue East

Weide Street

19,400

Maryland Avenue East

18,600

13,000

Rose Avenue East

0 250 500 ft

Geranium Avenue East

Jessamine Avenue East

Phalen Lake Magnet School
900 ft.

Magnolia Avenue East

13,000

Cook Avenue East

Lawson Avenue East

Farnsworth Aerospace
Upper Campus

Jenks Avenue

3,000

Case Avenue

4,050

Sims Avenue

York Avenue

John A. Johnson
Achievement Plus
Elementary

12,000

Wells Street

Neid Lane

4,450

61

Existing Traffic Conditions

St. Paul, MN

Figure 15

Focus School

Morning

Evening

Overall Intersection

Worst Movement

Level of Service

- A or B
- C
- D
- E or F

AADT

SRF

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MINNESOTA SAFE ROUTES TO SCHOOL

PARKING

On-street parking is allowed during most of the day between York Avenue and Wheelock Parkway. Existing parking restrictions and utilization per block were studied to understand how future improvements may impact existing parking. Parking is an opportunity to balance supply with demand to manage modal priorities and incentivize walking, rolling, bicycling, or taking transit in lieu of making it easier to drive.

Parking Regulations

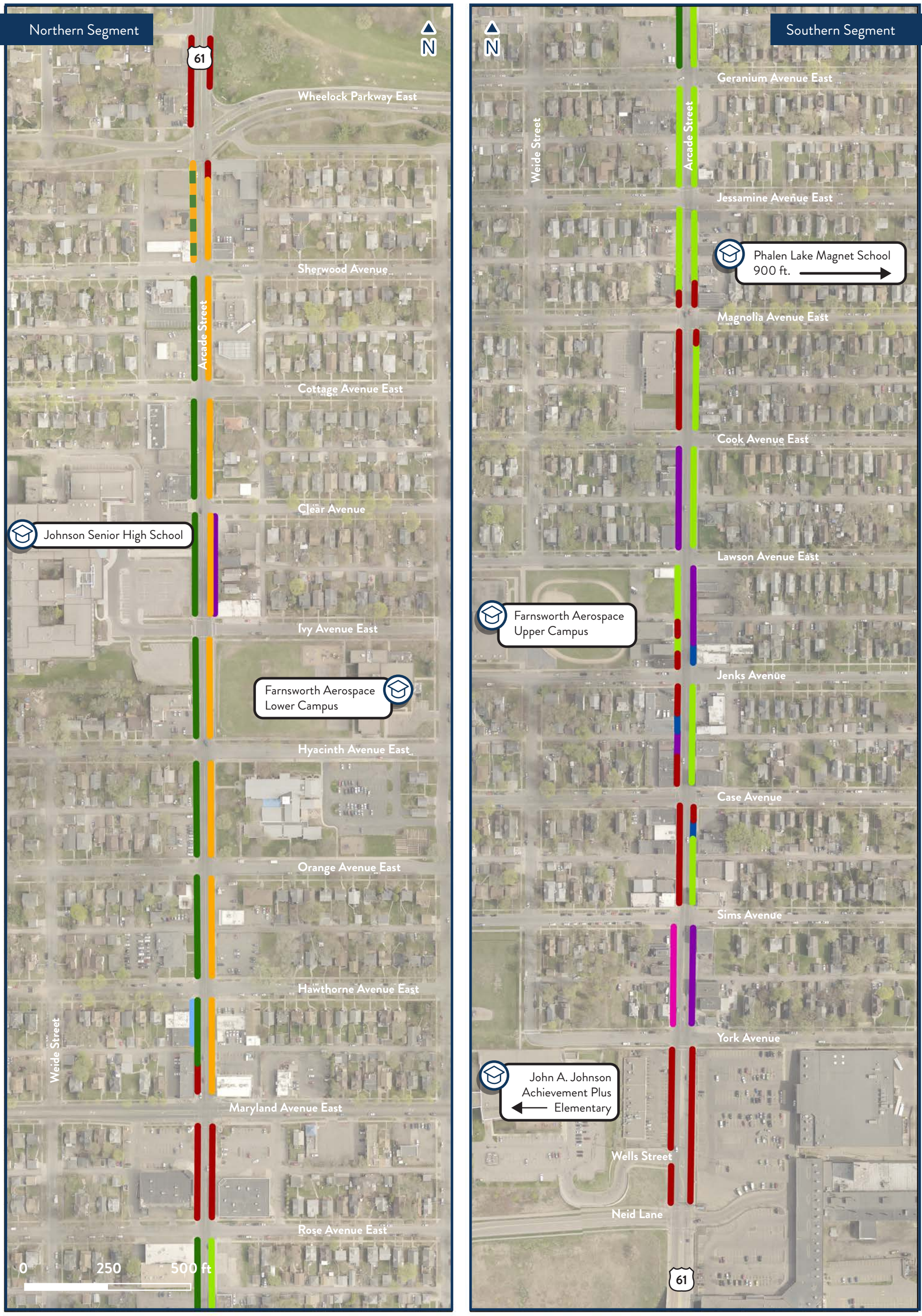
Of the 38 block faces studied from Neid Lane to Wheelock Parkway, a total of nine different parking regulations exist (Figure 16).

- **Corridor-wide Overnight Restriction**: No parking restriction from 2:00 a.m. to 7:00 a.m. exists along all blocks within the study area.
- **Peak Hour Restriction**: No parking or stopping from 7:00 a.m. to 9:00 a.m. or 4:00 p.m. to 7:00 p.m. from Geranium Avenue to Wheelock Parkway in the southbound and northbound directions, respectively. This restriction exists to ensure all travel lanes of the three- or four-lane undivided roadway sections are open during peak travel periods and limit the chance of parked cars narrowing the roadway to one travel lane in each direction which could exacerbate congestion.
- **Time Limit**: 15-minute, 30-minute, 1-hour, and 2-hour parking time limitations along certain sections of blocks.
- **No Parking Anytime**: Exists along all, or portions of, eight city blocks, as well as all bus stops.
- **No Limit**: Exists along all, or portions of, eight city blocks.

Existing parking restrictions are inconsistent and could be reviewed as a part of future studies or the upcoming rehabilitation project. Updates to parking regulations along Arcade Street (US 61) could produce more consistency than what exists today while better aligning with existing land uses, businesses, and demand that may have changed since the existing regulations were implemented. Furthermore, signage is either damaged or missing in some locations.

Northern Segment

Southern Segment



Existing Parking Regulations

St. Paul, MN

Figure 16

Focus School

No Parking Anytime

No Parking or Stopping 4-6 PM M-F

No Parking or Stopping 7-9 AM & 4-6 PM M-F

No Parking or Stopping 7-9 AM M-F

15-Minute Parking

30-Minute Parking

1-Hour Parking

2-Hour Parking

No Limit

SRF

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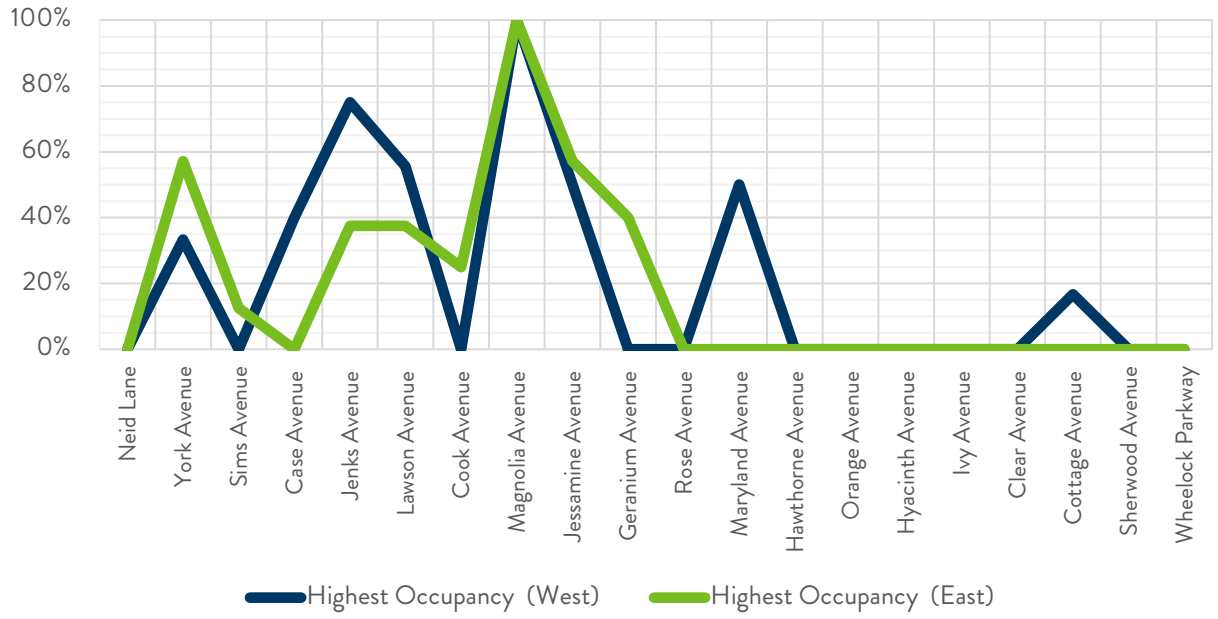
MINNESOTA SAFE ROUTES TO SCHOOL

On-Street Parking Utilization

Review of on-street parking utilization was performed with Nearmap, an online aerial imagery tool that has high-quality aerial images of urbanized areas with the exact date each image. The sun's shadow was used to estimate the time of day within a two-hour range. Four time periods were studied during the 2018 and 2019 school year, and on weekdays (Wednesday through Friday). All four analysis periods occurred at different estimated times of the day including 10:00 a.m. to 12:00 p.m., 11:00 a.m. to 1:00 p.m., 2:00 p.m. to 4:00 p.m., and 4:00 p.m. to 6:00 p.m. This provided varied peak and off-peak weekday periods for consideration. Two overnight time periods were also collected via recorded video at 1:00 a.m. on Thursday, June 25, 2020 and Saturday, June 27, 2020. Though this was collected during the COVID-19 pandemic, it was determined that review of overnight parking utilization was important to consider and potentially not as impacted by the pandemic because of the mixture of residential uses along Arcade Street (see Appendix C for raw data).

Parking supply per city block was estimated using the length of the block and divided by the average length of a parallel parking space (about 25 feet). An estimated 216 on-street parking spaces exist in the study area, excluding locations with no parking restrictions. The maximum demand represents the highest recorded total across all data collection periods and equated to 25 percent of all available spaces (i.e., 26 west side and 21 east side) (see Figure 17 and Figure 18). The industry standard 85 percent occupancy threshold, which means one space is expected to be available per block, is only met from Magnolia Avenue to Jessamine Avenue.[3]

Figure 17. Maximum Parking Demand

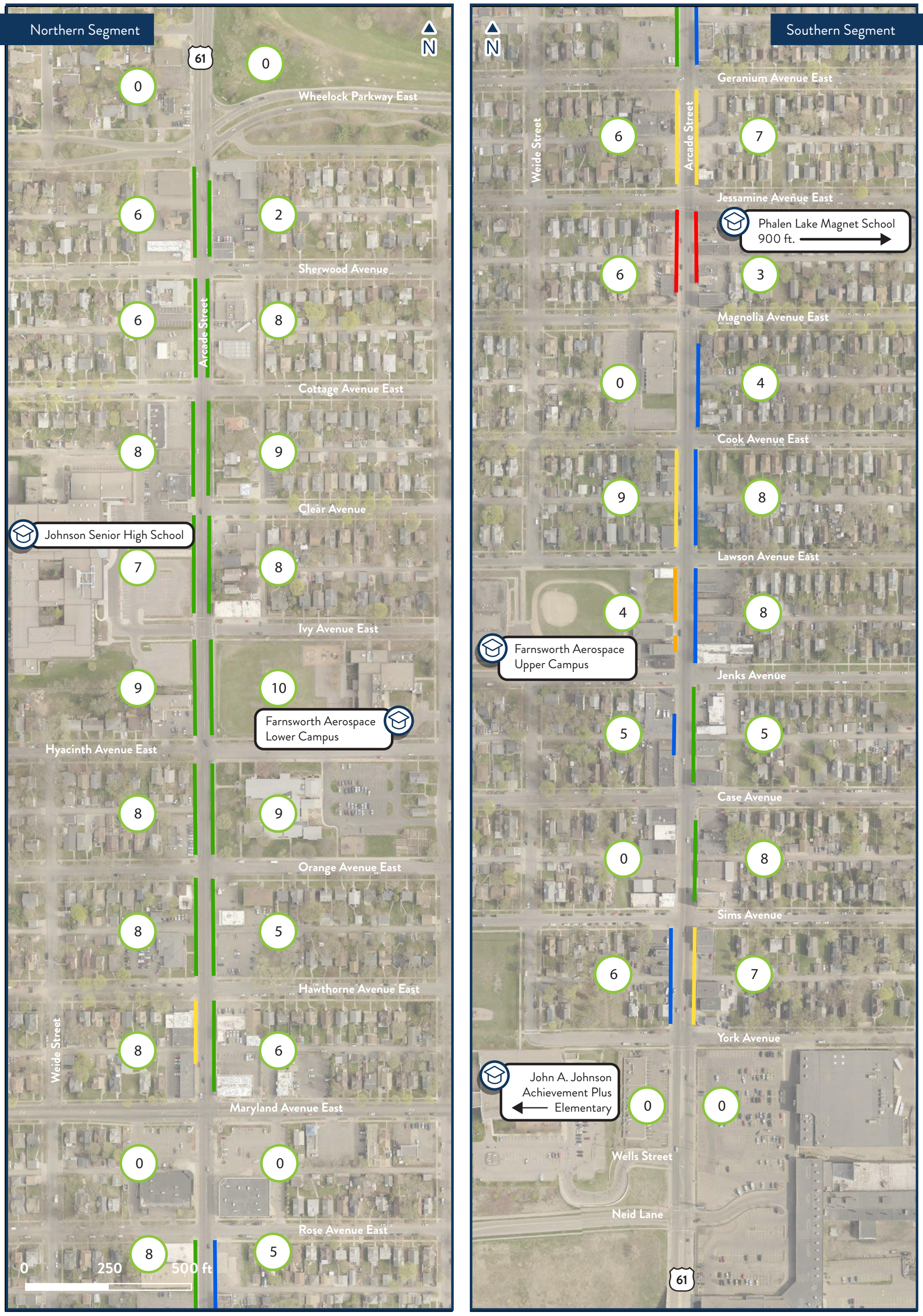


Graph depicts totals by block reading from left to right (i.e., Neid Lane to York Avenue is the first section, etc.). Source: SRF Consulting Group, 2020

[3] Kaufman, Matthew, et al. (2012). *Contemporary Approaches to Parking Pricing: A Primer*. FHWA-HOP-12-026, 11, Office of Operations, Federal Highway Administration.

Northern Segment

Southern Segment



Existing Maximum Parking Utilization

St. Paul, MN

Figure 18

Focus School

Parking Utilization (% Full)

- 0%
- 25%
- 50%
- 75%
- 100%

\# Number of Parking Spots

Blocks lacking utilization lines (e.g., Rose Avenue to Maryland Avenue) have a no parking restriction.

The analysis shows that on-street parking is not well utilized within the four-lane, undivided section of Arcade Street (US 61) per the maximum recorded demand. This could be due to a variety of factors such as:

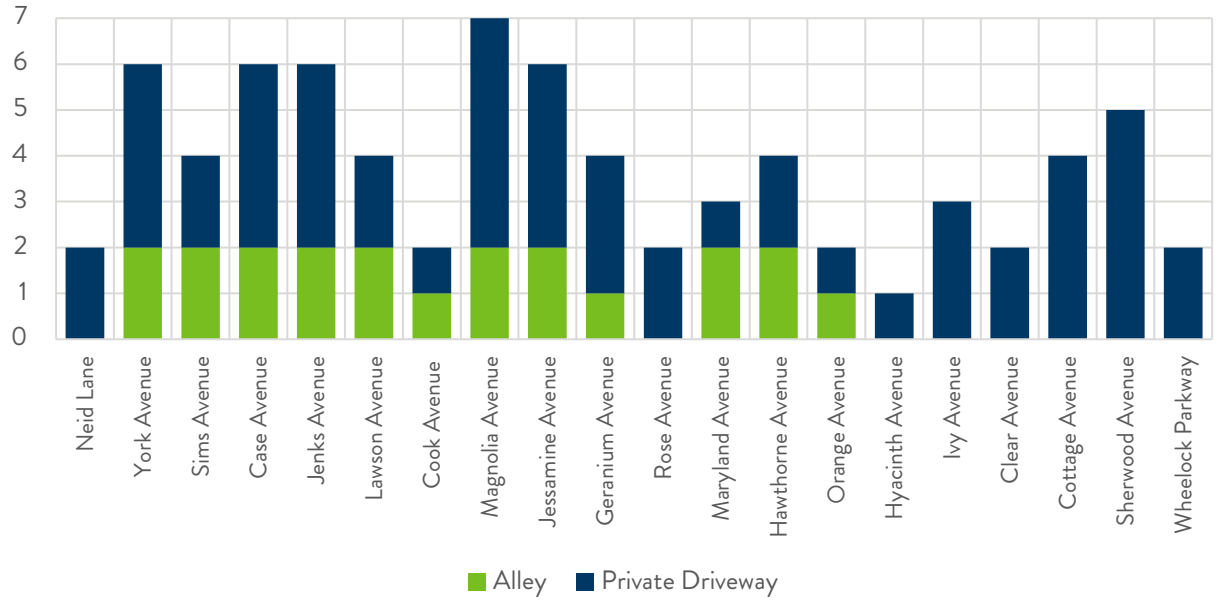
- Existing lane configurations, traffic volumes, and free flow vehicular speeds are not comfortable for someone to consider parking their car on-street.
- Land use context changes in this section of Arcade Street, with businesses primarily having off-street parking and set-back from the corridor.
- On-street parking supply along adjacent side-streets can accommodate the area's demand.

The two-lane section is more highly parked due to denser land uses and a lack of off-street parking, though many blocks remain below 50 percent occupied, illustrating generally low demand.

ACCESS

Access points were studied along the corridor which include alleyways and private driveways for businesses or residences (see Figure 19 and Figure 20). Due to the change in built context (i.e., urban versus suburban), the mixture of access changes from south to north along Arcade Street (US 61). In total, 75 access points exist along the 1.2-mile study area which equates to approximately 45 access points per mile. This exceeds MnDOT guidance which can negatively affect the safety and mobility of all users traveling along the corridor.[4] A balance of urban connectivity and access management could be considered during design development.

Figure 19. Number of Access Points per Block (total of both sides)



Graph depicts totals by block reading from left to right (i.e., Neid Lane to York Avenue is the first section, etc.). Source: SRF Consulting Group, 2020

[4] Minnesota Department of Transportation. (2012). *Access Management Manual, Chapter 3.*

Northern Segment

Southern Segment

N

61

Wheelock Parkway East

Arcade Street

Sherwood Avenue

Cottage Avenue East

Clear Avenue

Johnson Senior High School

Ivy Avenue East

Farnsworth Aerospace
Lower Campus

Hyacinth Avenue East

Orange Avenue East

Hawthorne Avenue East

Weide Street

Maryland Avenue East

Rose Avenue East

0 250 500 ft

Geranium Avenue East

Jessamine Avenue East

Phalen Lake Magnet School
900 ft.

Magnolia Avenue East

Cook Avenue East

Lawson Avenue East

Farnsworth Aerospace
Upper Campus

Jenks Avenue

Case Avenue

Sims Avenue

York Avenue

John A. Johnson
Achievement Plus
Elementary

Wells Street

Neid Lane

61

Existing Access Points

St. Paul, MN

Figure 20

Focus School

Access Type

Private Driveway

Alley

SRF

DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

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 manner of collision was also studied over the last five years which details the way in which the crash occurred (e.g., rear end). That data was derived from MnDOT's Minnesota Crash Mapping Analysis Tool (MnCMAT 2) and includes recorded crashes by law enforcement that provide crash details and approximate location. The following sections describe crashes along Arcade Street (US 61), or immediately adjacent to an intersection.

Source: streets.mn

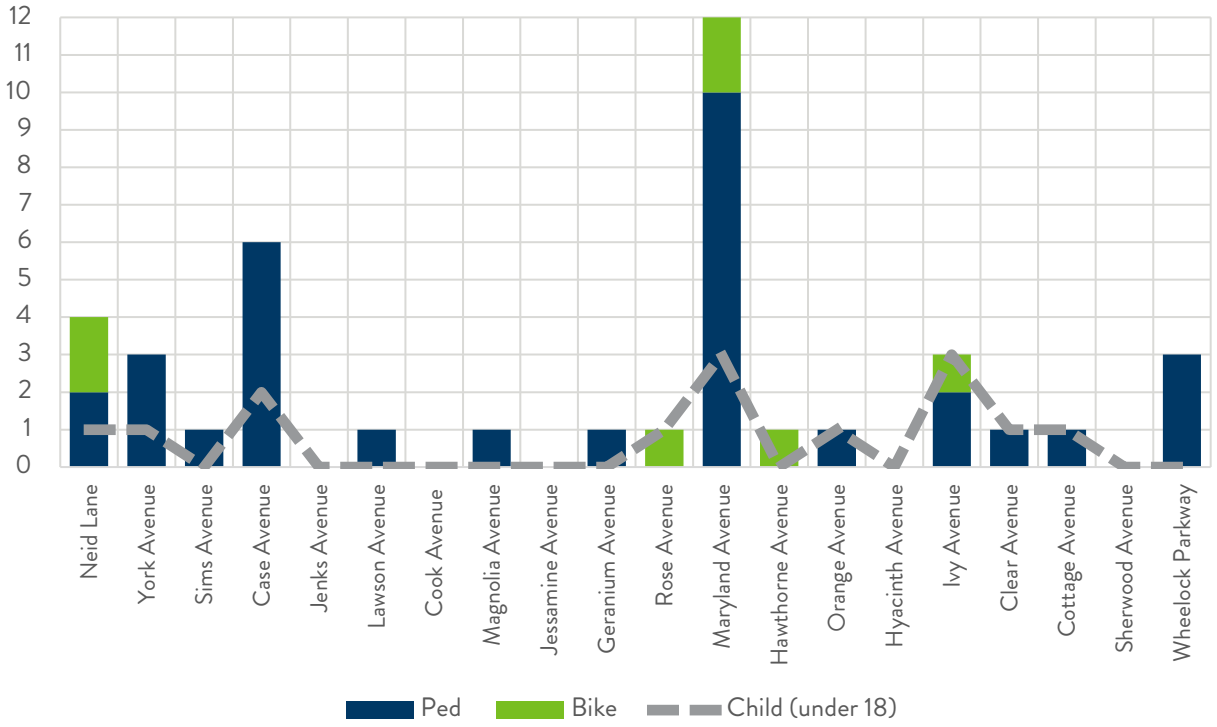
Pedestrian and Bicycle Crashes (2010-2019)

A total of 43 crashes involving a pedestrian (35) or bicyclist (8) were recorded in the last ten years (see Figure 24 and Figure 25). Due to the multimodal focus of this Study, ten years of data was used to provide a larger sample size of data from which to analyze trends and identify "hot spots". Of the 43 crashes, 40 occurred at intersections along Arcade Street (US 61) (see Figure 21).

Three crashes involving pedestrians resulted in serious injuries, which occurred at York Avenue, Case Avenue, and Clear Avenue (see Figure 22). The crashes at York Avenue and Clear Avenue involved children. The serious injury crash at Clear Avenue occurred during the school day and involved a 17-year-old who likely was trying to access the nearby gas station, which school staff confirmed is a popular destination for the high school students.

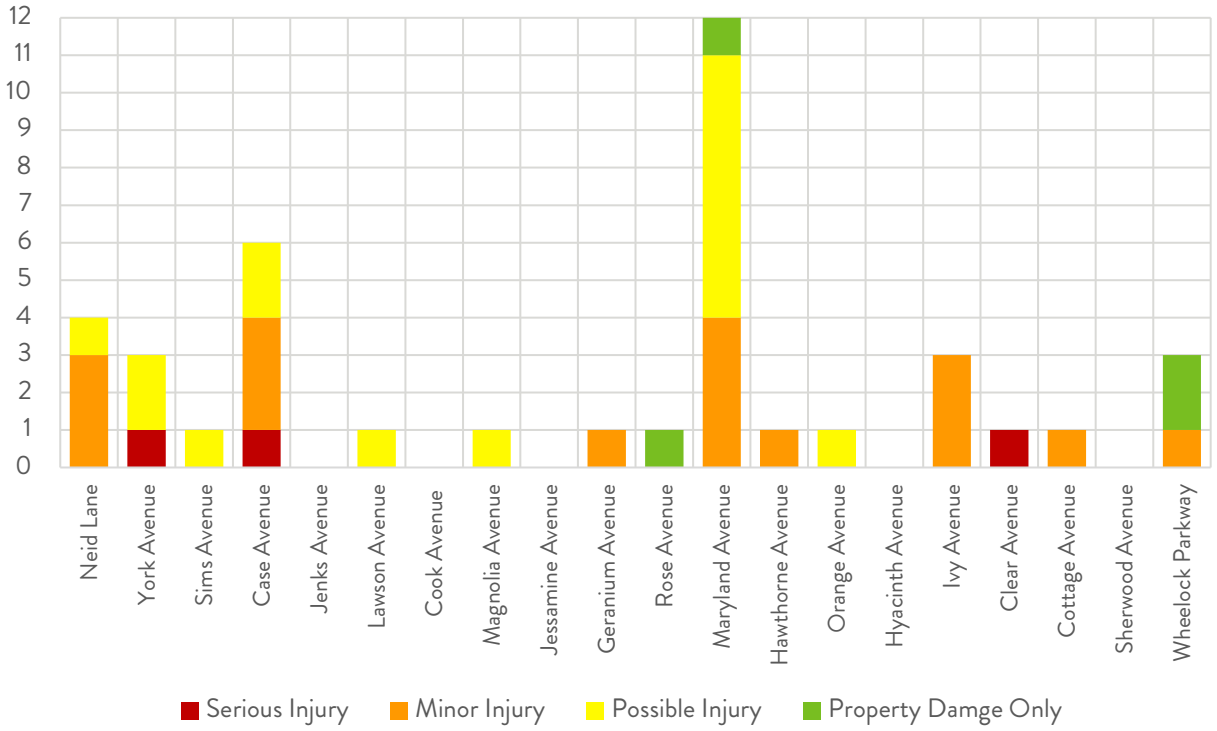
A significant number of pedestrian and bicyclist crashes along Arcade Street (US 61) involved children ranging in age from 12- to 18-years-old. A total of 16 crashes (40 percent of all recorded pedestrian or bicyclist crashes) involved a child, of which 11 occurred during the school day either in the afternoon or early evening. All crashes at Ivy Avenue, Clear Avenue, and Cottage Avenue, locations near Johnson Senior High School, involved children. Moreover, there is a concerning pattern at signalized intersections where nearly 75 percent of these crashes at an intersection occurred. This may illustrate a desire for people to cross at a traffic signal instead of an uncontrolled intersection. There were no time of day or weather trends; however, over 50 percent of crashes were angle which means a vehicle turned into a person crossing.

Figure 21. Pedestrian and Bicyclist Crashes by Intersection (2010-2019)



Source: SRF Consulting Group, 2020

Figure 22. Pedestrian and Bicyclist Crashes by Severity (2010-2019)



Source: SRF Consulting Group, 2020

All Crashes (2015-2019)

A total of 308 crashes were reported along Arcade Street (US 61) over the last five years (see Figure 26 and Figure 27). This equates to a crash frequency of 62 crashes per year and a crash density of 257 crashes per mile for the 1.2-mile corridor. Over 90 percent of crashes occurred at intersections (284 total), with nearly 60 percent of those (180) concentrated at the six signalized intersections in the study area. Crashes were evenly distributed by day of the week and month of the year; however, a significant number of crashes were observed between 3:00 p.m. and 6:00 p.m. which accounts for over 40 percent of all crashes.

A total of 40 crashes involved a young motorist or non-motorist (18 years or younger), which equates to 13 percent of all recorded crashes along Arcade Street (US 61). This illustrates how in addition to a high number of children being involved in crashes while primarily walking across Arcade Street (US 61), high schoolers that are new drivers also included in a significant portion of total crashes.

The top six intersections by number of recorded crashes along Arcade Street (US 61) are listed below, of which the top four are signalized (see Figure 23).

- Maryland Avenue: 81 (25 percent of total)
- Wheelock Parkway: 41 (13 percent of total)
- Case Avenue: 22 (seven percent of total)
- Ivy Avenue: 15 (five percent of total, half of all crashes involved a teenager aged 15 to 18)
- Jenks Avenue and York Avenue: 14 each (4.5 percent of total per intersection)

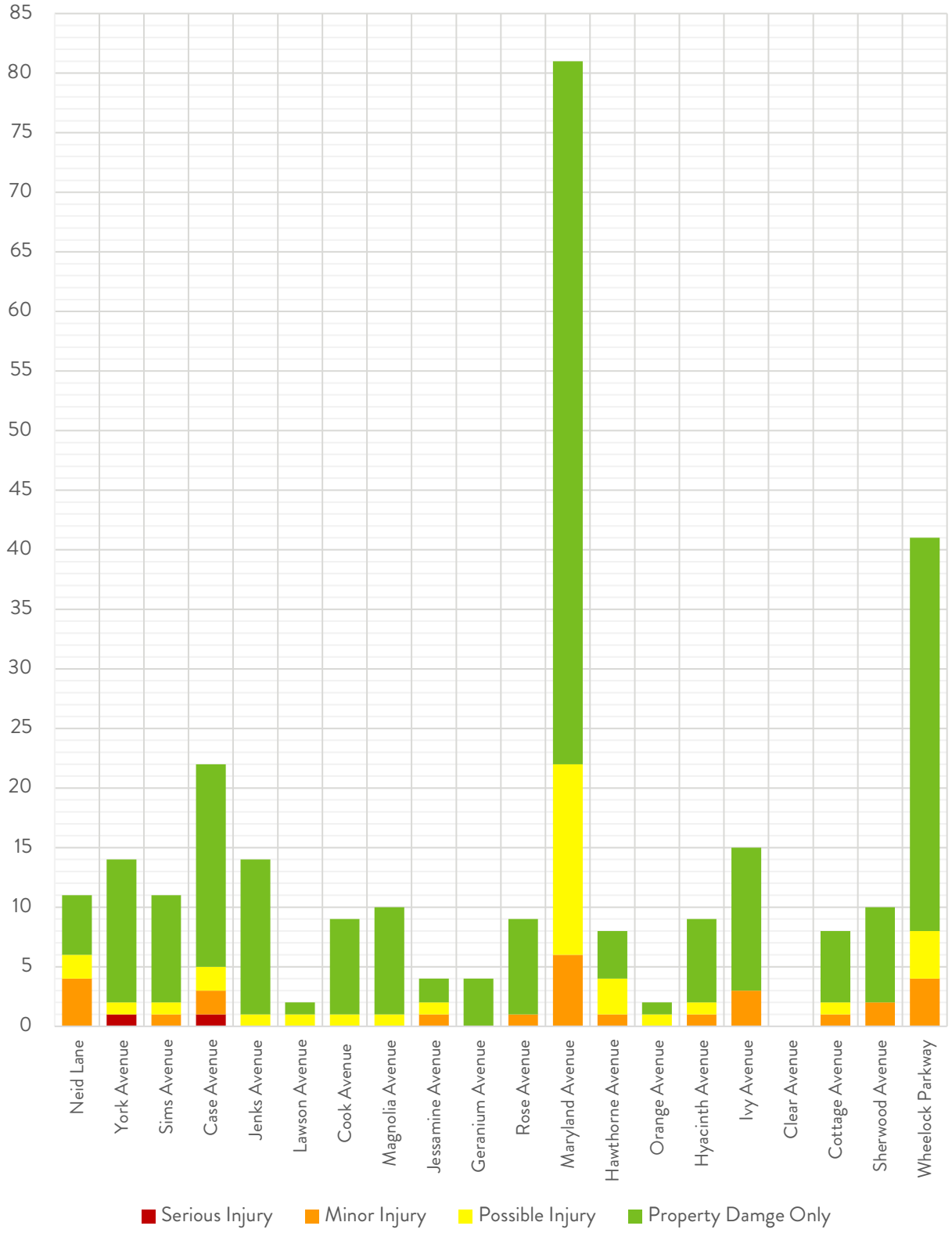
The frequent manner of collision at these high-crash locations were angle, rear-end, and left-turn crashes (see Figure 28). However, failure to yield was the top contributing factor in injury crashes at each location. The top contributing factors at Ivy Avenue, where younger drivers are potentially accessing Johnson Senior High School, were failure to yield right-of-way and driver distraction.

Notably, over 30 percent of all crashes were hit-and-run and approximately 12 percent involved a collision with a parked/stalled vehicle. Other frequent crash types along the corridor include angle crashes (22 percent) and rear-end collisions (17 percent), which were most common at signalized intersections.

A total of 24 crashes were recorded at a mid-block location with nearly 50 percent within a two-block segment of Arcade Street from Neid Lane to Sims Avenue. Much of this is driven by crashes recorded at driveways between Neid Lane and York Avenue.

Crash rates or other comparative safety data analysis was not considered due to the scope of this Study. This could be further analyzed as a part of the concurrent MnDOT project.

Figure 23. All Intersection Crashes by Severity (2015-2019)



Source: SRF Consulting Group, 2020

Northern Segment

Southern Segment

Wheelock Parkway East
Arcade Street
Sherwood Avenue
Cottage Avenue East
Clear Avenue
Johnson Senior High School
Ivy Avenue East
Farnsworth Aerospace Lower Campus
Hyacinth Avenue East
Orange Avenue East
Hawthorne Avenue East
Weide Street
Maryland Avenue East
Rose Avenue East
0 250 500 ft

Geranium Avenue East
Weide Street
Arcade Street
Jessamine Avenue East
Phalen Lake Magnet School
900 ft.
Magnolia Avenue East
Cook Avenue East
Lawson Avenue East
Farnsworth Aerospace Upper Campus
Jenks Avenue
Case Avenue
Sims Avenue
York Avenue
John A. Johnson Achievement Plus Elementary
Wells Street
Neid Lane

Pedestrian and Bicycle Crashes by Severity (2010-2019)

St. Paul, MN

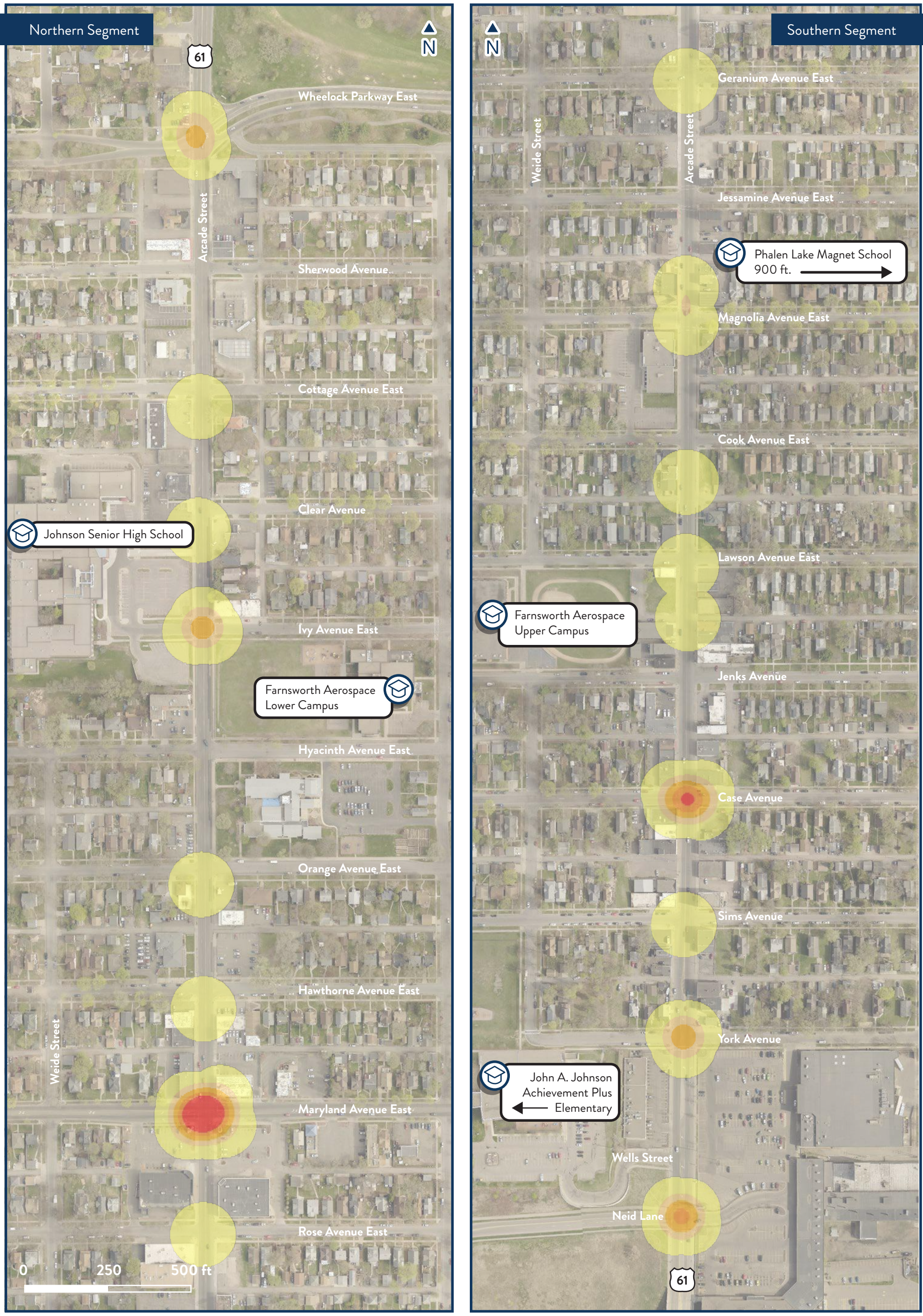
Figure 24

Focus School
Fatal
Serious Injury
Minor Injury
Possible Injury
Property Damage Only
Unknown Severity

Note: Circle size is not relevant to presented data.

Northern Segment

Southern Segment



Pedestrian and Bicycle Crash Density (2010-2019)

St. Paul, MN

Figure 25

Focus School

Higher Crash Density

Lower Crash Density

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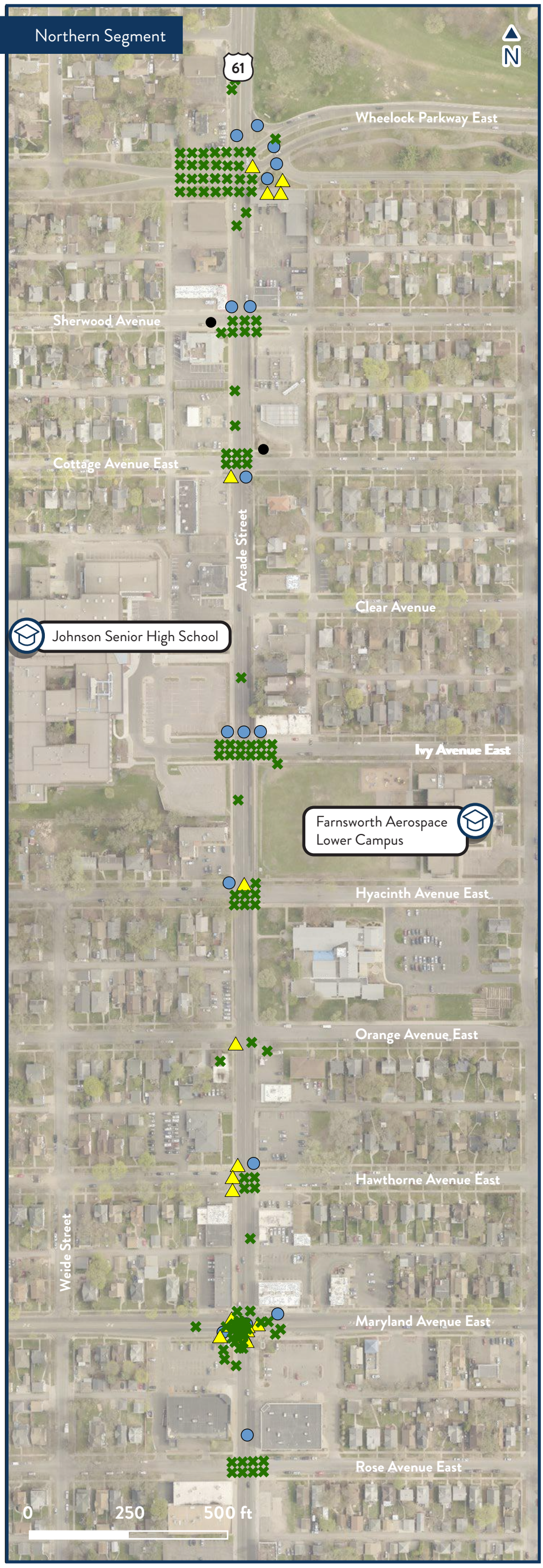
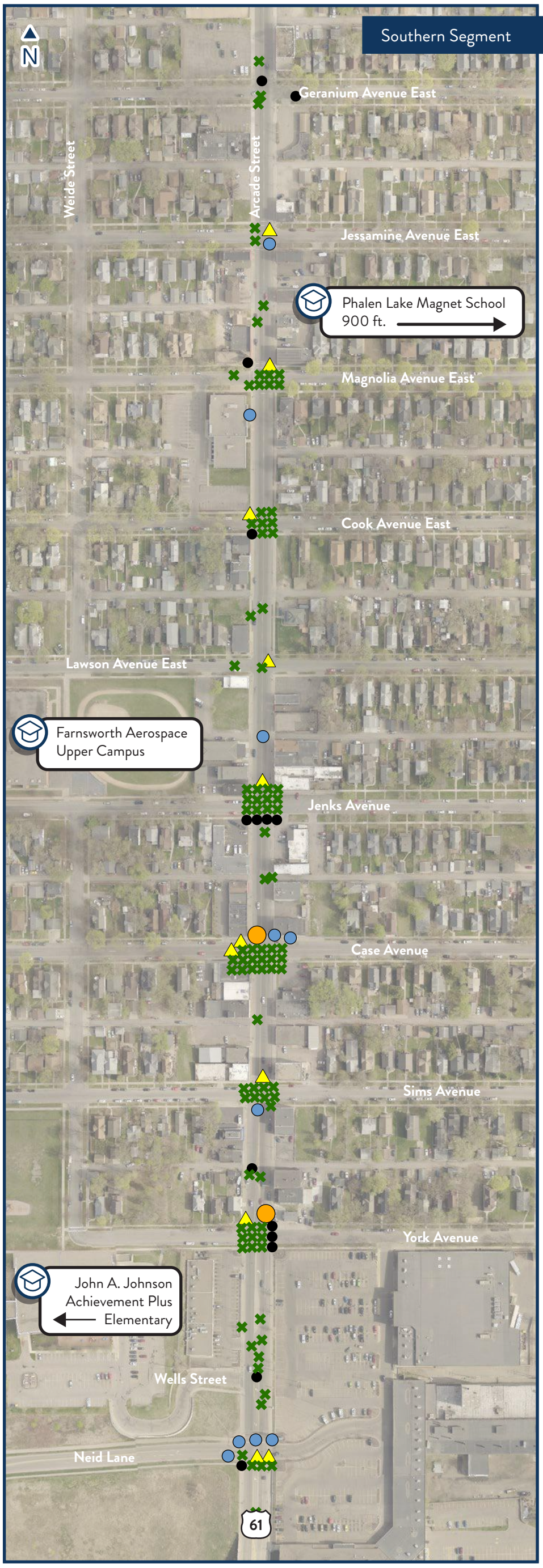
MINNESOTA SAFE ROUTES TO SCHOOL

Northern Segment



Southern Segment



All Crashes by Severity (2015 - 2019)

St. Paul, MN

Figure 26

- Focus School
- Fatal
- Serious Injury
- Minor Injury
- Possible Injury
- Property Damage Only
- Unknown Severity

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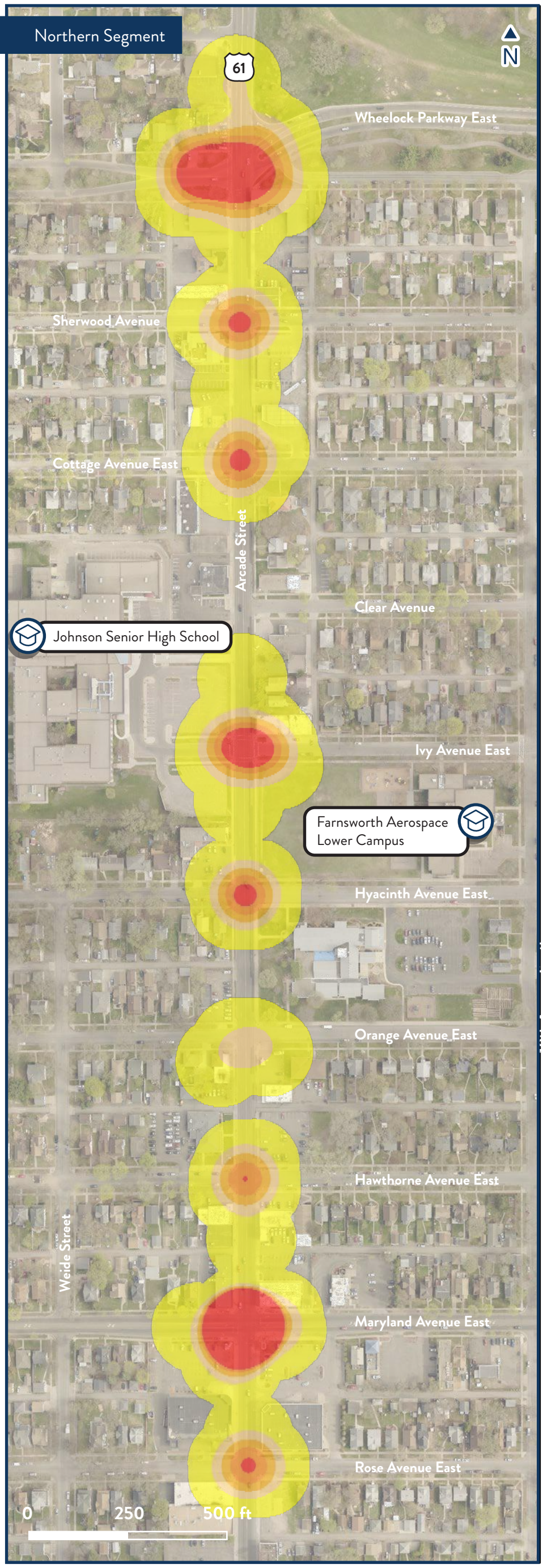
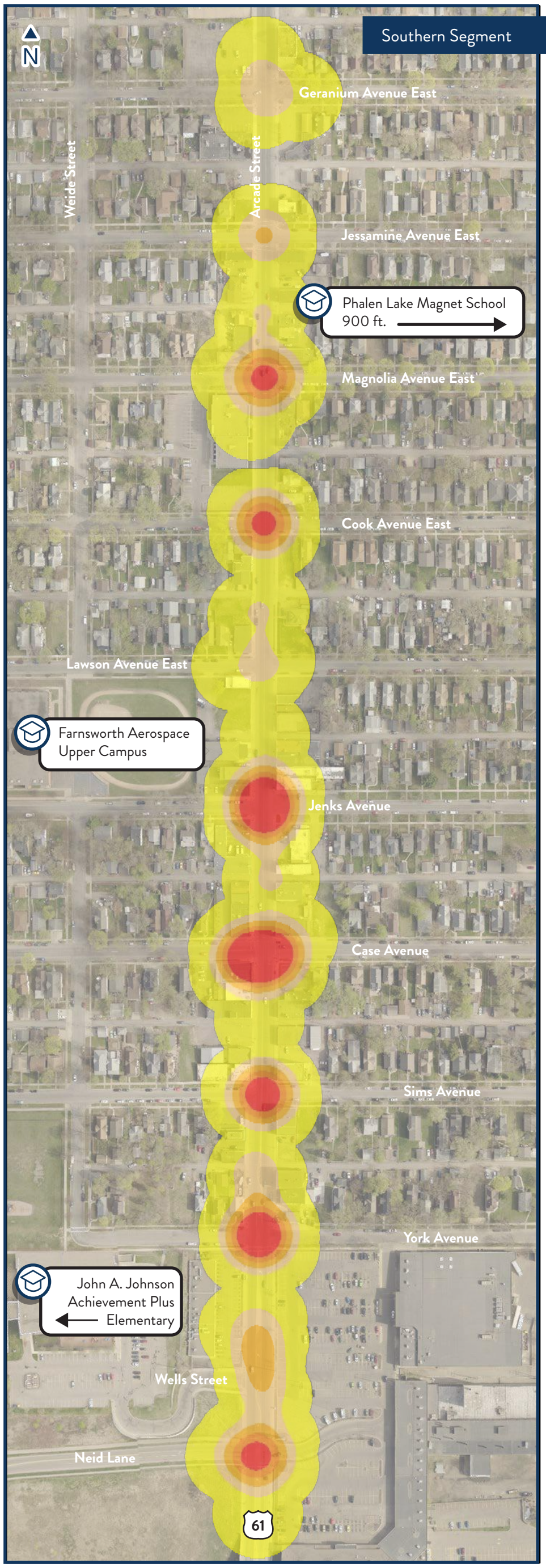
MINNESOTA SAFE ROUTES TO SCHOOL

Northern Segment



Southern Segment



All Crashes Density (2015-2019)

St. Paul, MN

Figure 27

Focus School

Higher Crash Density

Lower Crash Density

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MINNESOTA SAFE ROUTES TO SCHOOL

Northern Segment

Southern Segment

61

Wheelock Parkway East

Sherwood Avenue

Cottage Avenue East

Arcade Street

Clear Avenue

Johnson Senior High School

Ivy Avenue East

Farnsworth Aerospace
Lower Campus

Hyacinth Avenue East

Orange Avenue East

Weide Street

Hawthorne Avenue East

Maryland Avenue East

Rose Avenue East

0 250 500 ft

Geranium Avenue East

Weide Street

Arcade Street

Jessamine Avenue East

Phalen Lake Magnet School
900 ft.

Magnolia Avenue East

Cook Avenue East

Lawson Avenue East

Farnsworth Aerospace
Upper Campus

Jenks Avenue

Case Avenue

Sims Avenue

York Avenue

John A. Johnson
Achievement Plus
Elementary

Wells Street

Neid Lane

61

All Crashes by Manner of Collision (2015-2019)

St. Paul, MN

Figure 28

- Focus School
- Angle
- Front to Front
- Front to Rear
- Sideswipe
- Rear to Side
- Other

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DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

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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 issues that will highlight areas of need. Those locations will be the focus of the Study to prioritize solutions.

IDENTIFIED TRANSPORTATION ISSUES

The roadway design and multimodal issues for Arcade Street include broad themes organized from the issues analysis to devise key needs for further consideration (see Figure 29).

Issue #1	Existing design of Arcade Street (i.e., lane configurations) presents safety and mobility issues for all users and hinders multimodal access to/from the five schools on, or adjacent to, the corridor.
Issue #2	High-volume, signalized intersections represent a significant barrier for children to walk, roll, or bike safely or comfortably across Arcade Street as most crashes occur at these intersections. Safe and accessible crossings of Arcade Street do not exist between the signalized intersections. There are two marked crosswalks at uncontrolled locations with no other enhancements.
Issue #3	Existing sidewalk along Arcade Street is not well-maintained nor presents a comfortable and enjoyable area to walk or roll. A lack of street trees, pedestrian-scale lighting, and other improvements (e.g., ADA-compliance) create an unsafe and unwelcoming space.

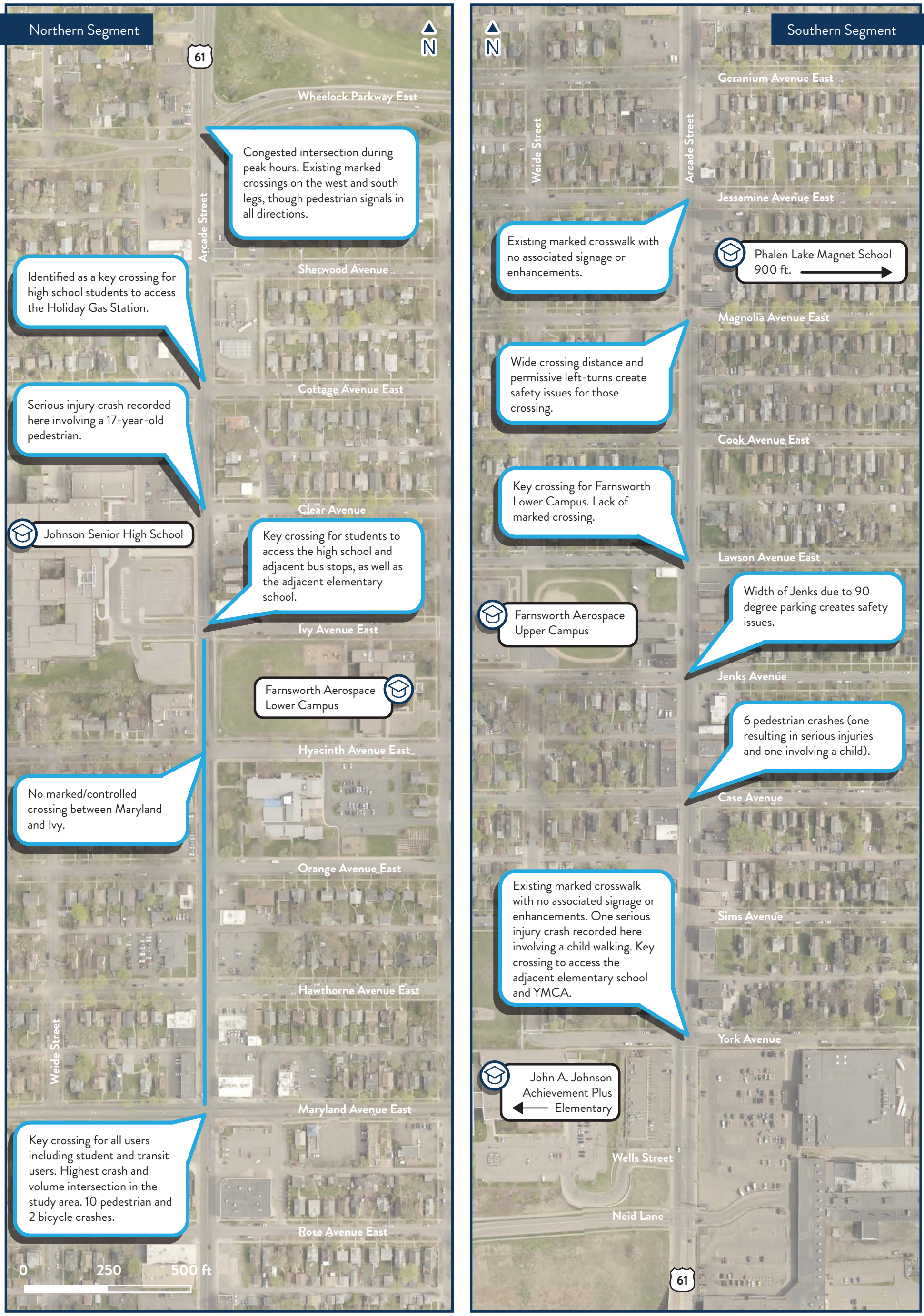
SUMMARY OF NEEDS

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

Roadway Design	Reconstruct the roadway to improve the configuration of Arcade Street and create a corridor that is safe and accessible for users of all ages and abilities.
Crossing Enhancements	Enhance crossing infrastructure at high-volume, signalized intersections to improve connections across Arcade Street and ensure that they do not continue to be potential barriers for children. Implement crossing infrastructure at key uncontrolled locations along the 1.2-mile Arcade Street corridor to create a convenient and connected multimodal transportation network.
Connectivity to Walk	Reconstruct sidewalk infrastructure along Arcade Street to enhance the comfort, accessibility, and environment of walking or rolling along the corridor, as well as access to destinations (i.e., schools, parks, businesses, etc.).

Northern Segment

Southern Segment



Identified Issues

St. Paul, MN

Figure 29

Focus School

Identified multimodal issue

CHAPTER 4: ALTERNATIVE EVALUATION

Potential alternatives are based upon evaluated opportunities that would improve or eliminate identified issues and needs. This section organizes potential improvements and project opportunities to address the high-level needs identified by the Study using the latest state and national guidance. Potential projects were vetted using engineering judgment and reviewed by Saint Paul Public Schools, the City of Saint Paul, Ramsey County, MnDOT, and Metro Transit.

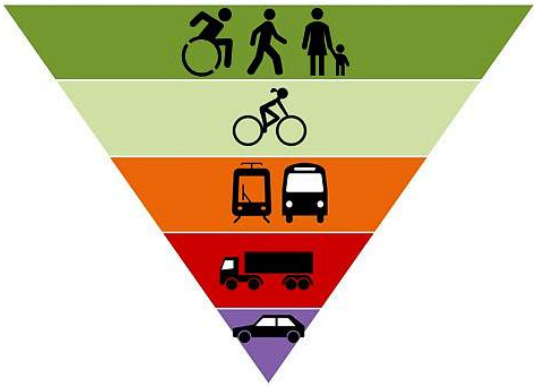
Roadway Configuration and Design	Review alternatives for a potential four- to three-lane conversion along a portion of Arcade Street. Consider other lane configuration, access, and traffic control changes as a part of a hybrid alternative that could be implemented during the 2024 project.
Major, Uncontrolled, and Side-Street Crossings	Analysis of crossing infrastructure enhancements at all crossings of Arcade Street and the perpendicular intersecting roadways. Prioritized upgrades will improve the safety and comfort for children to overcome the barrier that Arcade Street poses.
Sidewalk and Pedestrian-realm Upgrades	Organize potential upgrades to the existing sidewalk along Arcade Street and corresponding pedestrian-realm to improve the walking experience along the corridor as the community desires.

Arcade Street looking north at Rose Avenue. Source: SRF Consulting Group, 2020

ROADWAY CONFIGURATION AND DESIGN

Four alternatives (including a "no build" scenario) were initially studied from York Avenue to Wheelock Parkway to highlight tradeoffs for future consideration and how each fulfills the needs identified by this Study. These alternatives were evaluated using a combination of existing conditions data and engineering judgment to maximize multimodal access, overall safety, and maintain reasonable traffic flows on an urban roadway. Based on this preliminary evaluation, a hybrid alternative was identified by the project team and evaluated in more detail. Further analysis for the hybrid alternative including traffic operations and queueing analysis is provided later in this document.

Note that a key consideration of future roadway configurations is the need for modal priority to ensure driving is not incentivized as set forth by the *Saint Paul For All – 2040 Comprehensive Plan (2019)* and objectives highlighted by the "6 E's" of SRTS. The image at right illustrates how walking or rolling are the modal priority for improvements along Arcade Street (US 61), followed by bicycling and transit. Driving is the least prioritized mode.



Corridor Alternatives

The following initial corridor alternatives were evaluated from York Avenue to Wheelock Parkway:

- **No Build:** Maintain existing conditions.
- **Alternative 1:** Two-lane roadway (one travel lane in each direction) with no turn lanes at any intersection except Maryland Avenue; left-turn lanes are added along Arcade Street at Maryland Avenue.
- **Alternative 2:** Two-lane roadway (one travel lane in each direction) with left-turn lanes at all intersections.
- **Alternative 3:** Three-lane roadway with one travel lane in each direction and a continuous two-way, left-turn lane (or median).

Of note, no lane configuration changes were considered across all alternatives from Neid Lane to York Avenue due to the scope of this Study, as well as other concurrent projects studying Arcade Street and Neid Lane (i.e., the Rush Line Bus Rapid Transit project). It is recommended that further review during design development of access management along this segment be completed, as well as consideration of modifying the York Avenue intersection's south leg to reduce the existing crossing distance from a five-lane section.

Alternatives Evaluation

A preliminary evaluation of the alternatives was performed to identify tradeoffs for each option and to measure key criteria quantitatively and qualitatively (Table 2).

- **Access**: How the roadway configuration facilitates safe and efficient access to adjacent side-streets, alleyways, and driveways.
- **Operations**: How the roadway configuration accommodates average daily traffic demand at intersections and along roadway segments.
- **Parking**: How the roadway configuration maximizes the on-street parking supply where appropriate.
- **Safety**: How the roadway configuration enhances safety for all users along and across the corridor.
- **Multimodal**: How the roadway configuration supports safe, comfortable, and convenient connections and crossings of Arcade Street for children walking, rolling, or bicycling.

Table 2. Arcade Street Alternative Evaluation Matrix

	Access	Operations	Parking	Safety	Multimodal
Existing – No Build	–	–	–	–	–
Alternative 1	✖	✖	✚	✖	✚
Alternative 2	–	✖	–	✚	✚
Alternative 3	✚	✖	✖	✚	✚
Hybrid Alternative	✚	✖	–	✚	✚

✚ = *positive impact*, – = *neutral impact*, ✖ = *negative impact*

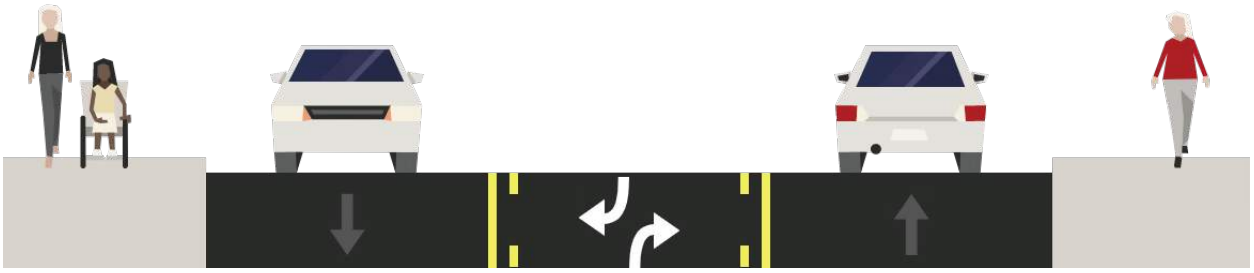
Source: SRF Consulting Group, 2020

Based upon the evaluation matrix, the most favorable alternative appears to be Alternative 3 as it provides the most opportunities for improvement while limiting impacts to access. The on-street parking supply may be more limited due to the new configuration while overall safety and multimodal connectivity is improved. Shorter crossings are expected because of fewer travel lanes, while also providing opportunities for curb extensions, pedestrian island refuge medians, and/or an expanded pedestrian realm.

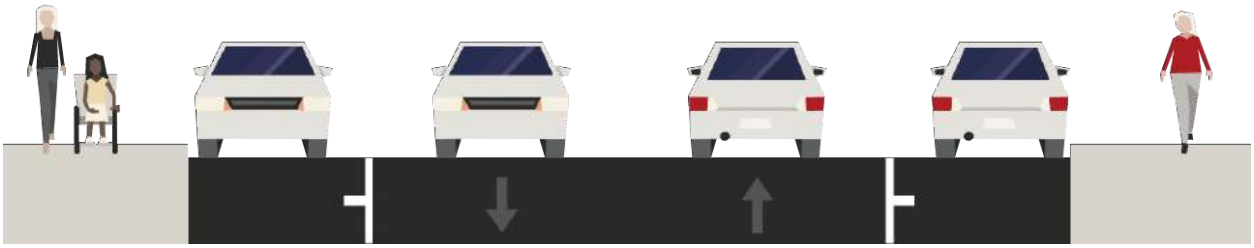
In November 2020, these alternatives were presented to staff from the school district, City of Saint Paul, Ramsey County, MnDOT, and Metro Transit. A hybrid alternative was further evaluated per the feedback that was received regarding a desire for combining Alternative's 2 and 3 along the south and north segments of Arcade Street (US 61), respectively. Therefore, the hybrid alternative was assumed to be the locally favored alternative for this Study, though this could change as the project continues into design development.

The hybrid alternative was developed with the following configurations (images illustrate potential lane configurations only and do not show additional detail to be decided upon by future design development):

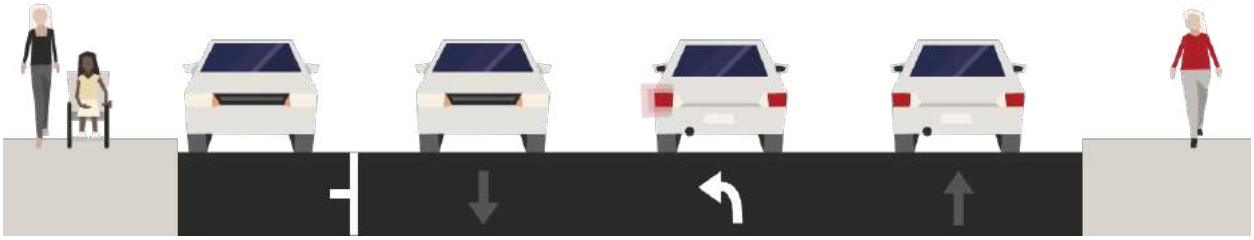
- **Three-lane Section:** A four-to-three lane conversion from Geranium Avenue to Wheelock Parkway largely maintains the existing roadway capacity while improving the safety, multimodal elements, and access along that section of Arcade Street. Traffic operations worsen under all alternatives requiring a consideration of other items such as proven safety benefits from four-to-three lane conversions and opportunities for curb extensions or pedestrian island refuge medians from the lane reduction to improve and prioritize conditions for people walking, rolling, bicycling, or taking transit.



- **Two-lane Section:** Maintaining one travel lane in each direction from York Avenue to Jessamine Avenue, and not adding traffic capacity via a three-lane expansion due to the steady or largely decreasing volumes over the last 20 years and ensuring a balance with multimodal improvements to note incentivize driving (which does not align with SRTS or the City of Saint Paul's modal goals).



- **Two-lane Section:** A three-to-two lane conversion from Jessamine Avenue to Geranium Avenue. Roadway capacity could be partially maintained with turn lanes. Overall traffic operations degrade over existing conditions; however, a balanced modal approach is important, as well as considering all-day operations instead of only the peak hours which may see increased congestion from the changes.



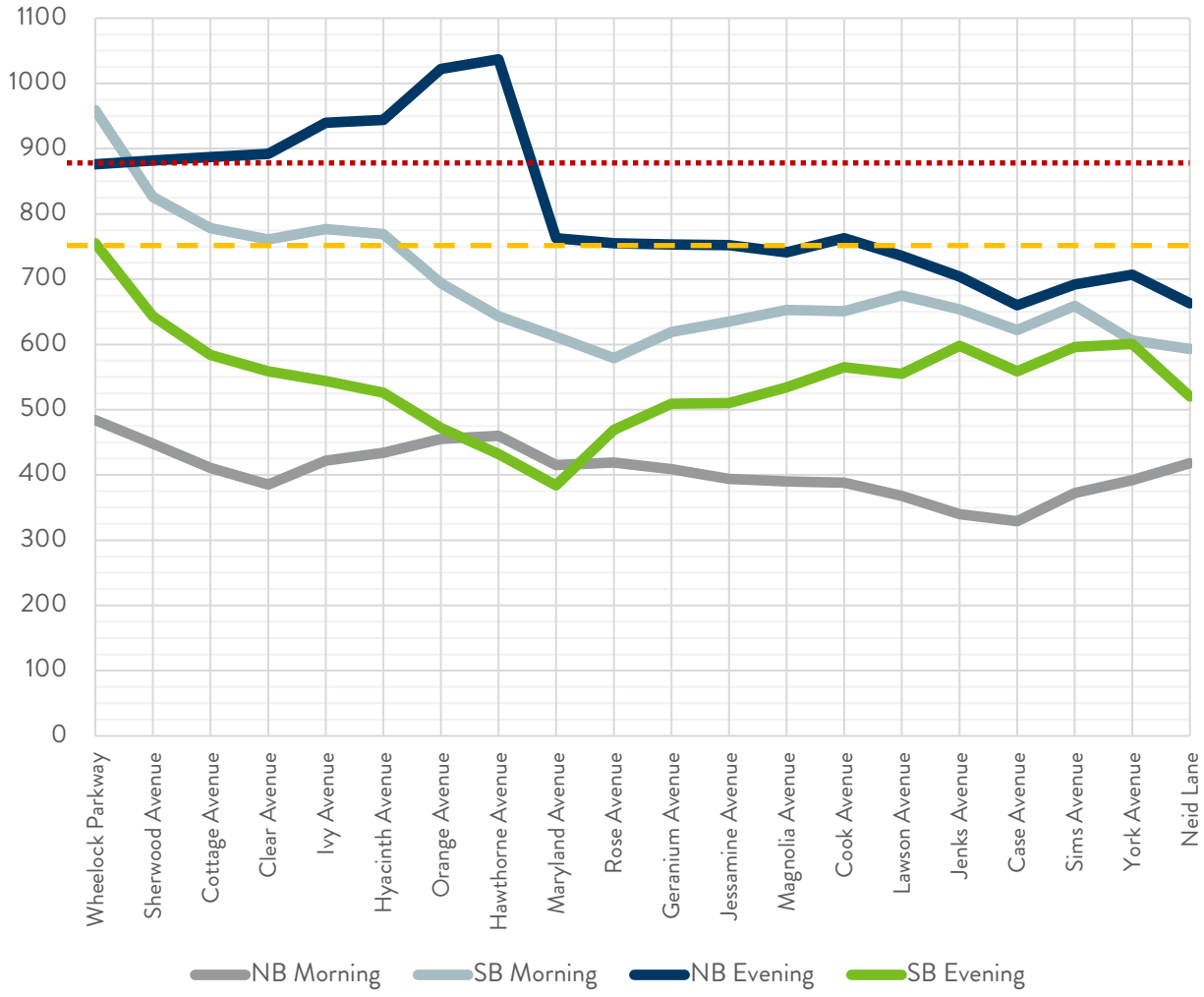
The project team confirmed the hybrid alternative approach; therefore, all potential crossing improvements evaluated as a part of this Study assumed those lane configurations. The following sections illustrate the hybrid alternative evaluation process with respect to traffic volumes, operations, queueing, parking, and access.

Traffic Volumes

Traffic volume profiles were studied to understand how a three-lane roadway configuration could accommodate existing traffic volumes during the morning and evening peak hours, as well as over a 13-hour period (6:00 a.m. to 7:00 p.m.).

Using the peak hour volume approach, most of Arcade Street would be under the threshold capacity for a three-lane roadway during both peak periods (see Figure 30). Traffic volumes along Arcade Street from Maryland Avenue to the south are low enough to continue to be a two-lane roadway. The only section that would potentially exceed the capacity of a three-lane roadway is the northbound direction during the evening peak hour from Maryland Avenue to Sherwood Avenue. However, the peak hour volume profile illustrates only two hours of the day where traffic volumes could exceed the hybrid alternative's planning level capacity.

Figure 30. Arcade Street Peak Hour Volume Profile



= three-lane roadway at-capacity *= three-lane roadway approaching capacity*

Volumes derived from peak hour TMCs at signalized intersections from 2018 and balanced using StreetLight and engineering judgment.

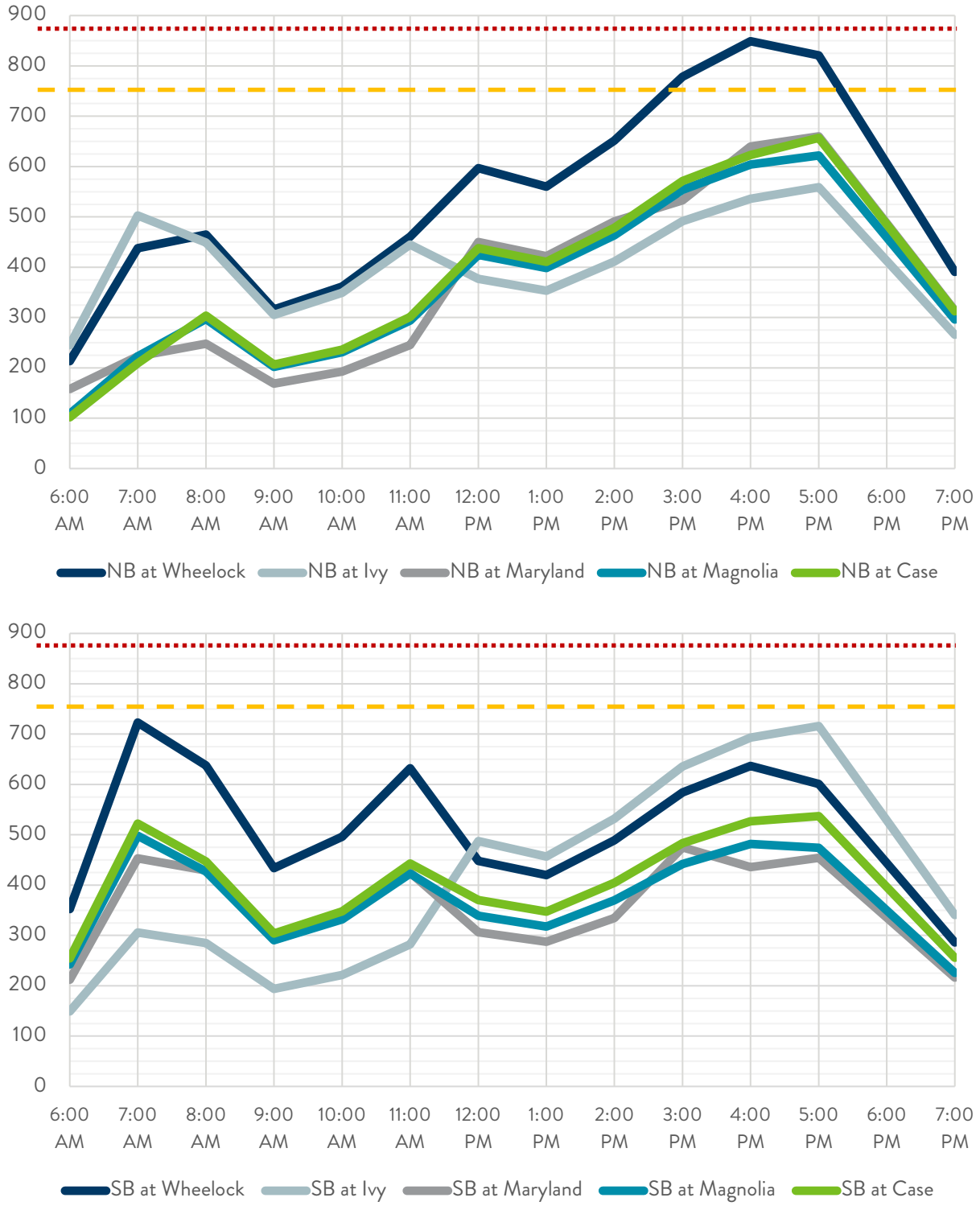
Source: SRF Consulting Group, 2020

Using the 12-hour hour volume profiles, northbound and southbound traffic was studied at five signalized intersections (see Figure 31). All southbound traffic volumes are below the capacity of a three-lane roadway; some sections are considerably lower and include all signalized intersections south of Maryland Avenue. All northbound traffic volumes are also below capacity, except at Wheelock Parkway where from 3:00 p.m. to 5:00 p.m. it is estimated that traffic volumes could approach the capacity of a three-lane facility.

Overall, this approach confirms that a two-lane roadway would be acceptable south of Maryland Avenue and a three-lane facility north of Maryland would provide sufficient capacity for the majority of the day. Further analysis is required per the concurrent MnDOT study and design development, and external to the scope of this Study.

Arcade Street looking south at Clear Avenue. Source: SRF Consulting Group, 2020

Figure 31. Arcade Street 12-Hour Volume Profile (northbound and southbound)



= three-lane roadway at-capacity *= three-lane roadway approaching capacity*

Volumes derived from peak hour TMCs at signalized intersections from 2018. Off-peak hours devised using NCHRP Report 365, table 41 – Urban Size of 200,000 to 499,999, page 84. Source: SRF Consulting Group, 2020

Traffic Operations

Traffic operations were studied using Synchro/SimTraffic 11 and the existing traffic volumes to compare current no-build operations to the hybrid alternative (see Table 3 and Figure 32).

Based on this operations analysis, the hybrid alternative largely maintains existing traffic operations with minimal increases in delay during the morning and afternoon from Neid Lane to Magnolia Avenue. From Jessamine Avenue to Wheelock Parkway, delays increase under the hybrid alternative. Most of the delay occurs from Geranium Avenue to Hyacinth Avenue, which is a result of congestion and queues from the Maryland Avenue intersection impacting adjacent intersections.

Table 3. Hybrid Alternative Traffic Operations Comparison

Intersection	Traffic Control[1]	Traffic Operations	Existing (No Build)		Hybrid Alternative	
			AM[2]	PM	AM	PM
Wheelock Parkway	Signal	Delay (sec)	13 (23)	30 (61)	14 (27)	46 **(>120)**
		LOS	B (C)	C (E)	B (C)	D **(F)**
Sherwood Avenue	SSSC	Delay (sec)	11	17	13	23
		LOS	B	C	B	C
Cottage Avenue	SSSC	Delay (sec)	8	15	18	20
		LOS	A	B	C	C
Clear Avenue	SSSC	Delay (sec)	8	8	24	17
		LOS	A	A	C	C
Ivy Avenue	Signal	Delay (sec)	7 (19)	6 (24)	10 (21)	9 (27)
		LOS	A (B)	A (C)	A (C)	A (C)
Hyacinth Avenue	SSSC	Delay (sec)	14	15	**45**	20
		LOS	B	B	**E**	C
Orange Avenue	SSSC	Delay (sec)	13	21	28	24
		LOS	B	C	D	C
Hawthorne Avenue	SSSC	Delay (sec)	9	17	**>120**	20
		LOS	A	C	**F**	C
Maryland Avenue	Signal	Delay (sec)	48 **(78)**	48 **(63)**	**67 (>120)**	**83 (116)**
		LOS	D **(E)**	D **(E)**	**E (F)**	**F (F)**

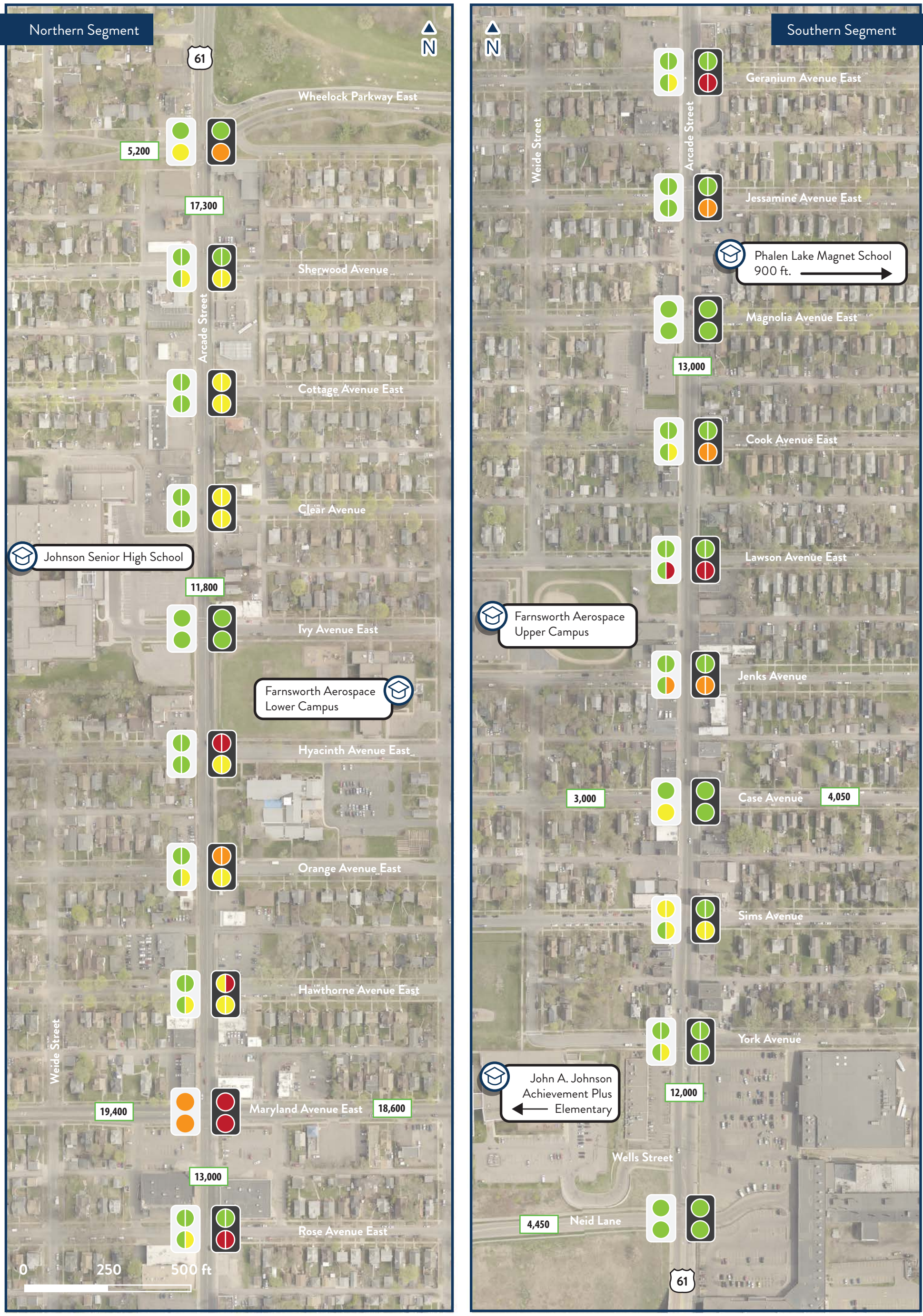
Intersection	Traffic Control[1]	Traffic Operations	Existing (No Build)		Hybrid Alternative	
			AM[2]	PM	AM	PM
Rose Avenue	SSSC	Delay (sec)	13	17	12	**>120**
		LOS	B	C	B	**F**
Geranium Avenue	SSSC	Delay (sec)	13	18	14	**>120**
		LOS	B	C	B	**F**
Jessamine Avenue	SSSC	Delay (sec)	13	15	12	30
		LOS	B	B	B	D
Magnolia Avenue	Signal	Delay (sec)	5 (29)	7 (26)	8 (26)	12 (27)
		LOS	A (C)	A (C)	A (C)	B (C)
Cook Avenue	SSSC	Delay (sec)	13	23	12	35
		LOS	B	C	B	D
Lawson Avenue	SSSC	Delay (sec)	11	**68**	12	**36**
		LOS	B	**F**	B	**E**
Jenks Avenue	SSSC	Delay (sec)	14	28	12	34
		LOS	B	D	B	D
Case Avenue	Signal	Delay (sec)	9 (32)	15 (27)	9 (30)	12 (32)
		LOS	A (C)	B (C)	A (C)	B (C)
Sims Avenue	SSSC	Delay (sec)	17	24	13	16
		LOS	C	C	B	C
York Avenue	SSSC	Delay (sec)	10	15	10	15
		LOS	A	C	B	B
Neid Lane	Signal	Delay (sec)	7 (34)	14 (29)	7 (34)	14 (29)
		LOS	A (C)	B (C)	A (C)	B (C)

[1] Northbound and southbound left-turns under the hybrid alternative are analyzed as protected-permissive at all signalized intersections. Signal = traffic signal; SSSC = side-street, stop-controlled.
[2] All SSSC delay = worst approach. All signal delay = overall (worst approach)
Source: SRF Consulting Group, 2020

Further traffic operations analysis is required per the concurrent MnDOT study, and external to the planning-level scope of this Study. Tradeoffs and modal priority considerations are likely required due to the estimated congestion that could occur during the peak hours, primarily driven by the Maryland Avenue intersection and spillback to adjacent locations.

Northern Segment

Southern Segment



Traffic Condition Comparison: Existing & Hybrid Alternative

St. Paul, MN

Figure 32

Focus School

EXISTING
Morning
Evening

HYBRID
Morning
Evening

Overall Intersection

Worst Movement

Level of Service
A or B
C
D
E or F

AADT

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A sensitivity test was completed at the Maryland Avenue intersection to understand geometric opportunities to improve the significant delays and spillover that effects adjacent intersections. Based upon discussions with the project team, geometric changes were not further considered due to negative impacts to crossing safety and limited existing right-of-way. Access modifications could be considered at Rose Avenue and Hawthorne Avenue to limit conflicts as they are adjacent to Maryland Avenue. This could include right-in/right-out or three-quarter access management strategies; however, further analysis is required during design development to determine the potential impacts to traffic operations, safety, and neighborhood access.

Traffic Queueing

A high-level study of potential queueing at each approach under the hybrid alternative was studied to understand locations where side-streets could be impacted during the morning or evening peak hours. Locations that could exceed queues greater than one city block include:

- Eastbound at Wheelock Parkway
- Eastbound, Southbound, and Westbound at Maryland Avenue
- Northbound, Eastbound, and Westbound at both Rose Avenue and Geranium Avenue

The main cause of most queueing, except for Wheelock Parkway, is deficient operations at Maryland Avenue which exacerbates adjacent intersections, most notably the two-blocks from Geranium Avenue to Rose Avenue. Further review of lane configurations, storage lane lengths, and traffic controls (i.e., protected or protected-permissive left-turns) is required during design development keeping in mind the balanced multimodal approach set forth by SRTS and the City of Saint Paul's plans.

Corridor Operations

Overall travel time and average speed from Neid Lane to Wheelock Parkway was studied using SimTraffic 11 (Table 4). This review indicates that travel is most effected by the hybrid alternative in the peak directions during the morning and evening peak hours which are southbound and northbound, respectively.

Table 4. Corridor Operations Comparison

Peak Hour	Traffic Operations	Existing (No Build)		Hybrid Alternative		Change	
		NB	SB	NB	SB	NB	SB
Morning	Travel Time (min)	4	4	4	5	+/-0	+1
	Avg. Speed (mph)	21	22	23	16	+2	-6
Afternoon	Travel Time (min)	5	5	6	4	+1	-1
	Avg. Speed (mph)	19	16	14	21	-5	+5

Source: SRF Consulting Group, 2020

CROSSING IMPROVEMENTS

The study of crossing improvements across, and along, Arcade Street was performed and included both uncontrolled and controlled crossings. Roadways with higher traffic volumes and perceived speeds can become barriers for children to walk, roll, or bike safely, comfortably, and conveniently to access their school. It is critical to ensure that children can safely and comfortably cross Arcade Street due to the five schools that are on, or adjacent to the corridor. Moreover, the crash history involving pedestrian and bicyclists (and more notably children) illustrate how crossing enhancements at key locations can improve access and safety for those of all ages and abilities.

Potential crossing infrastructure was reviewed using the latest guidance from the Federal Highway Administration's (FHWA) *Safe Transportation for Every Pedestrian (STEP) Guide (2018)*, *Minnesota Manual of Uniform Traffic Control Devices (2020)*, MnDOT's *Minnesota Best Practices for Pedestrian and Bicycle Safety (2021)*, Minnesota Local Road Research Board's (LRRB) *Uncontrolled Pedestrian Crossing Guide (2020)*, Saint Paul's *Street Design Manual (2016)*, and the 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 MnDOT's *Minnesota Best Practices for Pedestrian and Bicycle Safety* or the Minnesota LRRB *Uncontrolled Pedestrian Crossing Guide*. The net benefit is described as a crash modification factor (CMF) 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.

Crossing Prioritization

The 20 intersection crossings were prioritized using the following measures to quantitatively identify crossing locations that could be upgraded as a part of the concurrent rehabilitation project in 2024. This process also helps identify potential long-term improvements that could be implemented as funding opportunities arise.

Public Input Criteria

- **Community Feedback:** The number of times a location was identified by survey comment or the interactive map.

Safety Criteria

- **Child Pedestrian and Bicyclist Crashes:** The number of recorded crashes involving a child walking or bicycling between 2010 and 2019.
- **Pedestrian and Bicyclist Crashes:** The number of all recorded pedestrian and bicyclist crashes between 2010 and 2019.

- **Peak Hour Turning Volumes:** The sum of northbound and southbound right- and left-turning volumes along Arcade Street plus the sum of all side-street volumes.
- **StreetLight Pedestrian and Bicycle Demand:** The sum of the pedestrian and bicycle index per crossing which represent general demand or activity and does not demonstrate the actual count.

Potential Demand Criteria

- **Student Population:** The total number of students living within one-quarter of one-mile of the specific crossing point using student household location data by city block.
- **School or Destination for Children:** The number of schools or destinations that could attract children (i.e., parks, libraries, and community centers).
- **Metro Transit Bus Stop:** The number of bus stops immediately adjacent to the crossing.

Infrastructure Criteria (Existing and Planned)

- **Existing Marked Crossing:** If the crossing is currently marked or not.
- **Bicycle Network:** If the crossing is part of Saint Paul's existing or proposed bicycle network.
- **Previous Plan:** If the crossing was identified in a previous planning effort or study.

The crossings were numerically ranked by each of the 11 measures. The average ranking of all measures per criteria were organized to produce an overall criterion rank that illustrates how each intersection scored from a lower to higher number in order of priority. The breakdown by overall criteria shows how each intersection ranks by safety, demand, infrastructure, and public input (see Table 5). The intersections are further distilled in two ways (i.e., safety and demand criteria only and all criteria) to show the potential similarities or differences by measure or criteria, and how final prioritized improvements could be formulated as measured against each location and discussed further in Chapter 5 (see Table 6). Uncontrolled crossings were also ranked using the two distillation methods due to the skew presented by higher-activity signalized intersections (see Table 7). However, crossings could be implemented in any order as funding allows, stakeholders desire, and/or new multimodal infrastructure crossing Arcade Street is built (see Appendix B for the Excel tool).

Of note, mid-block crossings were not considered due to community feedback where very few do not cross at an intersection. Given the urban context and equal block spacing for a potential crossing every 300 feet, any crossing infrastructure should be focused on the intersections.

Table 5. Arcade Street Crossing Ranking by Criteria

Intersection	Safety	Intersection	Demand	Intersection	Infrast-ructure	Intersection	Public Input
Maryland Avenue	1.3	Maryland Avenue	3.3	Wheelock Parkway	1	Maryland Avenue	1
Case Avenue	3.0	Magnolia Avenue	4.3	Neid Lane	1	Ivy Avenue	1
York Avenue	5.0	York Avenue	5.3	Case Avenue	1	Cottage Avenue	3
Ivy Avenue	5.3	Lawson Avenue	5.5	Jessamine Avenue	1	Jenks Avenue	4
Wheelock Parkway	6.5	Case Avenue	5.8	Maryland Avenue	5	Case Avenue	5
Neid Lane	6.8	Ivy Avenue	6.3	Hyacinth Avenue	5	York Avenue	6
Rose Avenue	7.8	Cottage Avenue	6.6	Ivy Avenue	7	Lawsone Avenue	6
Cottage Avenue	8.3	Geranium Avenue	6.6	York Avenue	7	Wheelock Parkway	6
Lawson Avenue	9.0	Rose Avenue	7.4	Lawson Avenue	7	Rose Avenue	6
Jenks Avenue	9.5	Jenks Avenue	7.6	Jenks Avenue	7	Hyacinth Avenue	6
Hawthorne Avenue	10.0	Cook Avenue	8.2	Magnolia Avenue	7	Neid Lane	6
Hyacinth Avenue	10.3	Sims Avenue	8.3	Cottage Avenue	12	Jessamine Avenue	6
Geranium Avenue	10.3	Jessamine Avenue	9.3	Geranium Avenue	12	Geranium Avenue	6
Orange Avenue	10.8	Orange Avenue	9.9	Rose Avenue	12	Orange Avenue	6
Magnolia Avenue	12.3	Wheelock Parkway	10.6	Sims Avenue	12	Magnolia Avenue	6
Sims Avenue	12.3	Hyacinth Avenue	10.8	Orange Avenue	12	Sims Avenue	6
Sherwood Avenue	12.3	Neid Lane	10.9	Sherwood Avenue	12	Sherwood Avenue	6
Clear Avenue	12.5	Clear Avenue	11.9	Clear Avenue	12	Clear Avenue	6
Jessamine Avenue	13.3	Hawthorne Avenue	12.3	Hawthorne Avenue	12	Hawthorne Avenue	6
Cook Avenue	13.8	Sherwood Avenue	13.8	Cook Avenue	12	Cook Avenue	6

Source: SRF Consulting Group, 2020

The comparative ranking shows how the top four intersections do not change when tested for either safety and demand measures only, or all criteria. When all criteria are measured and ranked, signalized intersections rise to the top even if they do not represent a key location for the purposes of SRTS (i.e., Neid Lane). A combination of both rankings, along with engineering judgment, was used to formulate priority crossing locations further detailed in Chapter 5.

Table 6. Arcade Street Crossing Prioritization (all intersections)

Intersection	Safety + Demand	Intersection	All Criteria
Maryland Avenue	2.3	Maryland Avenue	2.6
Case Avenue	4.4	Case Avenue	3.7
York Avenue	5.1	Ivy Avenue	4.9
Ivy Avenue	5.8	York Avenue	5.8
Lawson Avenue	7.3	Wheelock Avenue	6.0
Cottage Avenue	7.4	Neid Avenue	6.2
Rose Avenue	7.6	Lawson Avenue	6.9
Magnolia Avenue	8.3	Jenks Avenue	7.0
Geranium Avenue	8.4	Jessamine Avenue	7.4
Wheelock Parkway	8.6	Magnolia Avenue	7.4
Jenks Avenue	8.6	Cottage Avenue	7.5
Neid Lane	8.8	Hyacinth Avenue	8.0
Sims Avenue	10.3	Rose Avenue	8.3
Orange Avenue	10.3	Geranium Avenue	8.7
Hyacinth Avenue	10.5	Sims Avenue	9.6
Cook Avenue	11.0	Orange Avenue	9.7
Hawthorne Avenue	11.1	Cook Avenue	10.0
Jessamine Avenue	11.3	Hawthorne Avenue	10.1
Clear Avenue	12.2	Clear Avenue	10.6
Sherwood Avenue	13.0	Sherwood Avenue	11.0

Source: SRF Consulting Group, 2020

Due to the weight of signalized intersections when ranked with all 20 study intersections, a test of reviewing only uncontrolled locations was completed to see how the rankings may change. The top five intersections remain the same between the two rankings of criteria. Furthermore, the top five uncontrolled intersections are in the top ten for at least one of the two overall rankings when included with the signalized intersections in the previous table.

Table 7. Arcade Street Crossing Prioritization (uncontrolled crossings only)

Intersection	Safety + Demand	Intersection	All Criteria
York Avenue	2.8	York Avenue	2.9
Lawson Avenue	3.8	Lawson Avenue	3.4
Cottage Avenue	4.0	Jenks Avenue	3.6
Rose Avenue	4.0	Cottage Avenue	3.8
Jenks Avenue	4.7	Rose Avenue	4.3
Geranium Avenue	5.2	Hyacinth Avenue	4.5
Sims Avenue	5.9	Jessamine Avenue	4.6
Hyacinth Avenue	6.5	Geranium Avenue	4.8
Orange Avenue	6.5	Sims Avenue	5.2
Cook Avenue	6.7	Orange Avenue	5.5
Hawthorne Avenue	7.1	Cook Avenue	5.6
Jessamine Avenue	7.2	Hawthorne Avenue	5.8
Clear Avenue	7.6	Clear Avenue	6.0
Sherwood Avenue	8.4	Sherwood Avenue	6.5

Source: SRF Consulting Group, 2020

Signalized Intersections

The signalized intersections along Arcade Street represent the busiest crossings (for all modes) and serve as important connections to access the schools, as well as other destinations such as transit and parks. There are six signalized intersections along Arcade Street, of which four are either directly adjacent to a school or within one-quarter of a mile and provide the only controlled crossing of Arcade Street to access the school. These locations include Ivy Avenue, Maryland Avenue, Magnolia Avenue, and Case Avenue. Potential crossing improvements were analyzed to increase the safety and comfort for these crossings and should be considered as a part of the concurrent design project (see Table 8). Accessibility features including accessible pedestrian signals and pedestrian countdown timers should be considered as a part of future design development.

Table 8. Crossing Infrastructure Options at Signalized Intersections

Infrastructure	Guidance	Avg Cost Est.	CMF
High Visibility Crosswalk Markings and Stop Bar	Continental design and at least six feet wide to provide a comfortable crossing. Stop bar minimum four feet, up to eight feet from crosswalk to limit vehicle encroachment.	$3,000 per crossing	0.6
Curb Ramps	Directional, ADA-compliant curb ramps to shorten crossing distance, reduce exposure, and enhance accessibility.	Location dependent	Unavailable
Hardened Centerline	Flex posts on the centerline with a modular rubber nose. Slows left-turning vehicles by impacting the turning angle.	$1,000 per crossing	Unavailable
No Right-Turn on Red Signage	Reduce conflicts between vehicles and people crossing by restricting right-turns at high-volume intersections.	$200 static; $3,000 LED	Unavailable
Leading Pedestrian Interval (LPI)[1]	Provides people crossing a minimum three second and maximum ten second head start to enter the intersection with a corresponding green signal for vehicles in the same direction.	Infrastructure dependent	0.87
Curb Extension	Maximize extension as it aligns with applicable design vehicle turning radius. Reduces the crossing distance as well as improves motorist vision of people crossing.	$2,000 to $3,500 per corner[2]	0.55
Pedestrian Island Refuge	Minimum six-feet wide, preferred eight to ten feet wide. Provides a two-stage crossing and shortens the overall crossing distance.	$25,000 to $50,000 per crossing	0.46 – 0.54
Pedestrian-scale Lighting	Adheres to illumination guidance.	$10,000 to $40,00 per intersection	0.55

[1] Range was determined by measuring the distance to clear one travel lane at 3 feet/second to 3.5 feet/second. Further analysis is required.

[2] $10,000 to $20,000 per corner with storm sewer impacts.

Source: Minnesota's Best Practices for Pedestrian and Bicycle Safety, MnDOT (2021); Manual on Uniform Traffic Control Devices (September 2020); Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020); Portland Bureau of Transportation; Evaluation Report Left-turn Calming Pilot Project (2020); Crash Modification Factors Clearinghouse

Signal Timing

Appropriate walk and pedestrian clearance time for people that may walk slower, such as children, is important to ensure crossings are accessible. The MN MUTCD guidance includes a walk time of at least seven seconds unless the pedestrian volumes and characteristics do not support such time in which it can be reduced to four seconds.[5] The federal MUTCD provides a visual guide for crossing distance, walking speed, and pedestrian clearance time.[6] Pedestrian clearance across all signalized intersection legs should be reviewed to ensure the timing is appropriate for children walking at three feet per second if possible. The suggested timing could change if curb extensions are implemented and the existing crossing distances change.

Protected or Protected/Permissive Left-turns

Permissive left-turn phasing can create conflict points for pedestrians crossing the street with a green light parallel to turning vehicles and motorists only looking for a gap in traffic. Implementing protected-permissive, or protected-only left-turns, would partially or fully separate left-turning traffic with pedestrians crossing. Furthermore, permissive left-turns (which all northbound and southbound signals along Arcade Street currently are) contribute to drivers accepting smaller gaps, turning at higher speeds, and trying to "sneak" through intersection following the yellow and all-red signal intervals (higher number of angle crashes). The left-turn signal control contributes to this bad behavior that endangers all users of the intersection.

No Right-Turn On Red

Prohibiting right-turns on red can potentially reduce crashes that involve turning vehicles and pedestrians by eliminating motorists looking for gaps in traffic to complete their turn while not seeing if someone is crossing (over 50 percent of multimodal crashes were angle). Static or electronic signs can be used (example of a LED sign at right). Right-turn prohibitions may be signed to occur during specific times of day or can be blank-out which means it is dark unless activated by a crosswalk-push button.

Leading Pedestrian Interval

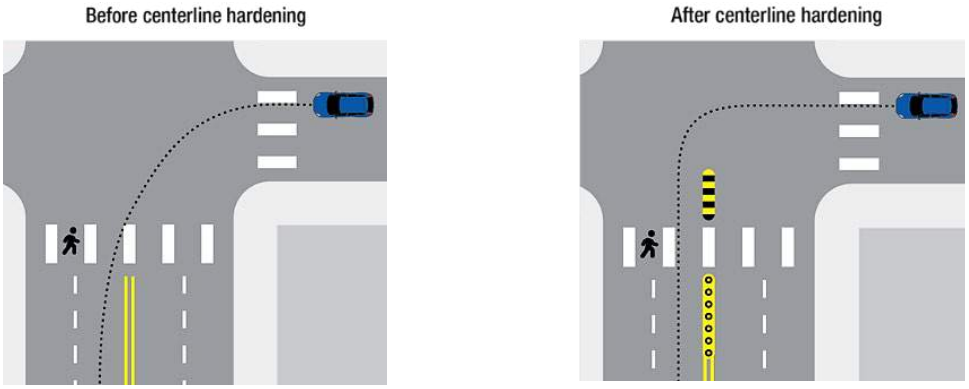
The MN MUTCD has guidance for LPIs stating that at least a three second duration and up to ten seconds may be used to provide pedestrians enough time to cross at least one lane of traffic, or far enough to position pedestrians ahead of right- and/or left-turning vehicles before traffic is released. To identify a reasonable time for crossing one lane of each intersection approach, a walking speed mesaure of three feet per second should be used to accommodate children who inherenlty walk slower. LPIs have been implemented along most intersections in the study area, though each should be reviewed to see how they accommodate children.

[5] Minnesota Department of Transportation. (2012). *Minnesota Manual of Uniform Traffic Control Devices*, 4E-3 – 4E-4.

[6] National Academies of Sciences, Engineering, and Medicine 2015. Signal Timing Manual - Second Edition. Washington, DC: The National Academies Press. https://doi.org/10.17226/22097.

Hardened Centerline

The enhancement includes interconnected flex posts and a rubber modular speed bump at the nose. The New York City Department of Transportation (NYC DOT) has extensively studied the improvement and identified that left-turn speeds decreased by more than 50 percent while significantly reducing pedestrian exposure to turning vehicles. This is an effective tool at locations where right-of-way cannot accommodate curb extensions or pedestrian island refuges, or low-cost and quick build improvements are desired (discussed further in Chapter 5). The NYC DOT also tracked snow maintenance and determined that about 20 percent of hardened centerlines (out of 82 locations as of 2020) were damaged over the course of one winter season. It was noted, however, that no snowplows were damaged, and the damage to the infrastructure was low enough in cost to support the overall benefit of the enhancement.[7]



Uncontrolled Crossings

The study of crossing improvements at uncontrolled crossings was completed to improve the connectivity across Arcade Street as it is a barrier today for children to walk, roll, or bike safely, comfortably, and conveniently to access their school. There are 14 side-street, stop-controlled intersections in the study area which are uncontrolled crossings of Arcade Street. Results from the online survey showed that many people trying to cross Arcade Street today have difficult doing so because motorists will not stop for them.

Enhancements were identified through a lens of accommodating those of all ages and abilities and increasing the number of controlled crossings to reduce the existing spacing of about one-quarter of a mile which is not convenient nor accessible (see Table 9).

Of note, Arcade Street was studied as a three-lane roadway with a median (or two-way left-turn lane) from Geranium Avenue to Wheelock Parkway, and either a three-lane without a median (or two-lanes with a turn lane) or two-lane (without a turn lane) due to the existing curb-to-curb width of Arcade Street along the other segments.

[7] New York City Department of Transportation. (2020). *Traffic Calming Program.* https://www1.nyc.gov/html/dot/html/pedestrians/turn-calming.shtml

Table 9. Crossing Infrastructure Options at Uncontrolled Crossings

Infrastructure	Guidance	Avg. Cost Est	CMF
High Visibility Crosswalk Marking	Continental design and at least six feet wide to provide a comfortable crossing.	$3,000 per crossing	0.6
Advanced Yield Markings	Minimum 20 feet, preferred 30-50 feet from crosswalk. Markings increase the comfort of people crossing and motorist site distance.	$1,500 per crossing	0.75 - 0.89
Curb Ramps	Directional, ADA-compliant curb ramps to shorten crossing distance, reduce exposure, and enhance accessibility. Tightened curb radii slow turning vehicles.	Location dependent	Unvail-able
Curb Extension	Maximize extension as it aligns with applicable design vehicle turning radius. Reduces the crossing distance as well as improves motorist vision of people crossing.	$2,000 to $3,500 per corner[1]	0.55
Pedestrian Island Refuge	Minimum six-feet wide, preferred eight to ten feet wide. Minimum 20 feet long, preferred 40 to 60 feet long.	$25,000 to $50,000 per crossing	0.46 – 0.54
Rectangular Rapid Flashing Beacon	Increases driver awareness of pedestrians crossing and has shown to produce motorist yield compliance of 70 to 95 percent.	$15,000+ (up to $100,000) each	0.53
Pedestrian Hybrid Beacon	Motorist yield compliance of over 90 percent, significantly improving the safety of crossing high-volume roadways. Mast and signal heads in each direction.	$100,000 to $170,000 each	0.45
Pedestrian-scale Lighting	Adheres to illumination guidance.	$10,000 to $40,00 per intersection	0.55

[1] *$10,000 to $20,000 per corner with storm sewer impacts.*

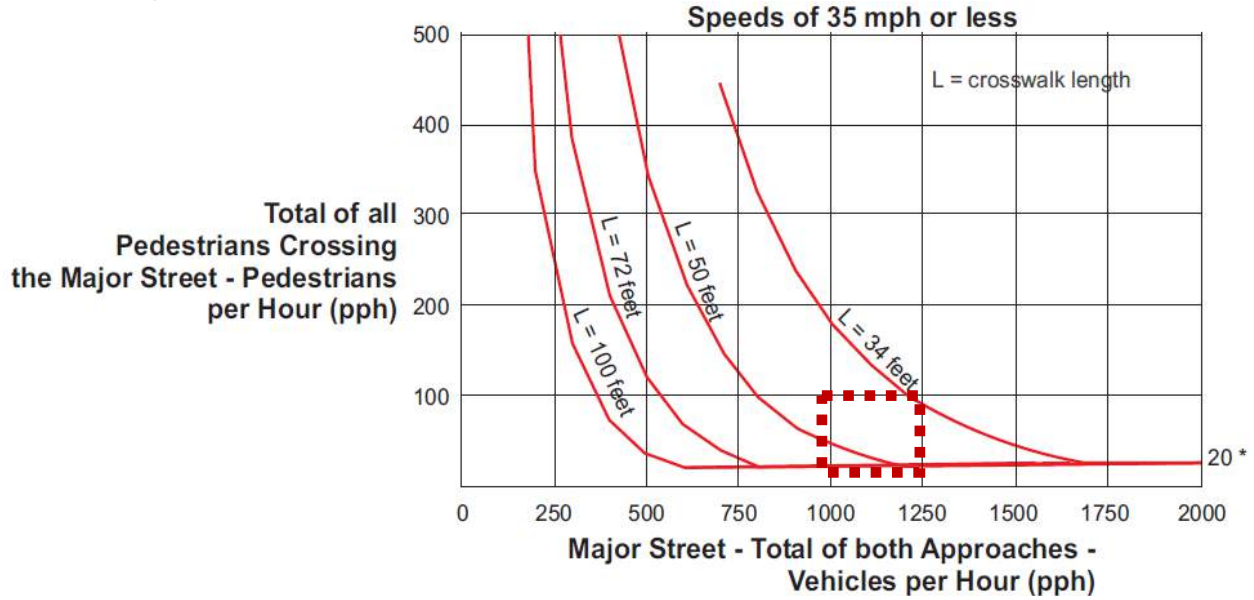
Source: Minnesota's Best Practices for Pedestrian and Bicycle Safety, MnDOT (2021); Manual on Uniform Traffic Control Devices (September 2020); Uncontrolled Pedestrian Crosswalk Quick Reference Guidance, Minnesota Local Road Research Board (2020); Crash Modification Factors Clearinghouse

Uncontrolled crossings of Arcade Street were studied to facilitate greater multimodal connectivity. The following guidance was reviewed for implementation of RRFBs, PHBs, or other crossing enhancements.

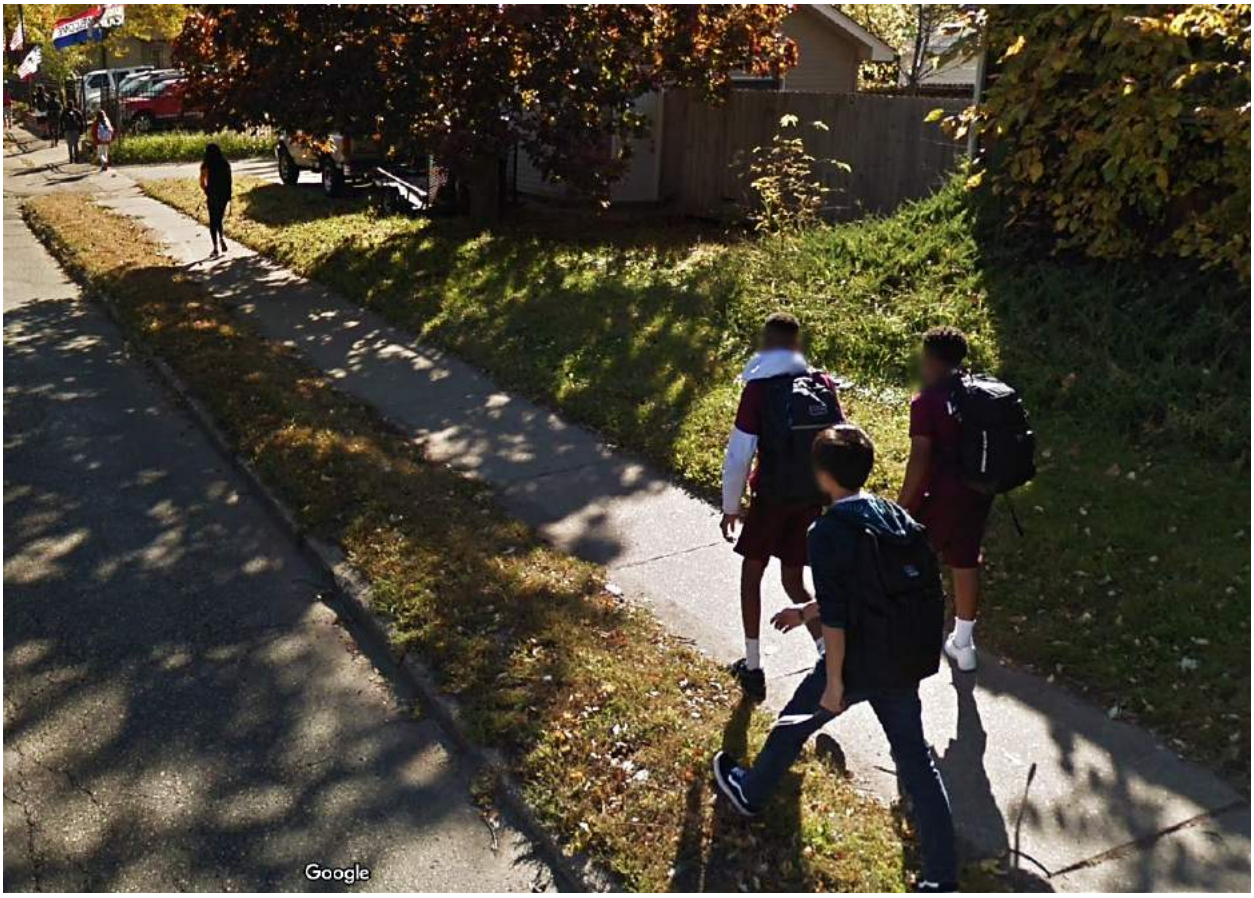
- MN MUTCD's warrant analysis for PHBs along lower speed roadways (see Figure 33)
- The FHWA's *Safe Transportation for Every Pedestrian (STEP) Guide (2018)* was reviewed to identify potential infrastructure for crossing enhancements (Figure 34).

Based on MnDOT's guidance, the peak vehicles per hour (vph) calculation was determined. The highest vph is approximately 1,200 and the crossing distance of Arcade Street is about 50 feet. This would require approximately 20 to 50 pedestrians per hour or 10 to 25 children to warrant implementation of a PHB.

Figure 33. Arcade Street PHB Warrant Analysis for Lower Speed Roadways (<35 mph)



▪▪ = *hourly range of the sum for peak hour northbound and southbound volumes*
Minimum threshold of 20 pedestrian per hour or 10 children per hour if near a school.
Source: Minnesota MUTCD (September 2020)



Children walking along Arcade Street immediately south of Hyacinth Avenue. Source: Google Streetview

Figure 34. Arcade Street 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
2 lanes (1 lane in each direction)	● 2 4 5 6	● 5 6 7 9	① 5 6 ● 9	● 4 5 6	● 5 6 7 9	① 5 6 ● 9	● 4 5 6 7 9	① 5 6 7 9	① 5 6 ● 9
3 lanes with raised median (1 lane in each direction)	● 2 3 4 5	● ❸ 5 7 9	① ❸ 5 ● 9	① 3 4 5 7 9	① ❸ 5 ● 9	① ❸ 5 ● 9	① ❸ 4 5 7 9	① ❸ 5 ● 9	① ❸ 5 ● 9
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	● 2 3 4 5 6 7 9	● ❸ 5 6 7 9	① ❸ 5 6 ● 9	① 3 4 5 6 7 9	① ❸ 5 6 ● 9	① ❸ 5 6 ● 9	① ❸ 4 5 6 7 9	① ❸ 5 6 ● 9	① ❸ 5 6 ● 9
4+ lanes with raised median (2 or more lanes in each direction)	● ❸ 5 7 8 9	● ❸ 5 7 8 9	① ❸ 5 8 ● 9	① ❸ 5 7 8 9	① ❸ 5 ● 8 9	① ❸ 5 8 ● 9	① ❸ 5 ● 7 8 9	① ❸ 5 ● 8 9	① ❸ 5 ● 8 9
4+ lanes w/o raised median (2 or more lanes in each direction)	● ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ● 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ● 8 9	① ❸ 5 ❻ 8 ● 9	① ❸ 5 ❻ ● 7 8 9	① ❸ 5 ❻ 8 ● 9	① ❸ 5 ❻ 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)**

= *Arcade Street*

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

The FHWA's STEP Guide supports the implementation of an RRFB or PHB, among other improvements, per the existing AADT, posted speed limit, and three-lane roadway configuration. If a two-lane section with no turn lanes is present, then RRFBs may not be warranted, though engineering judgment is required to ensure the crossing is accessible for people of all ages and abilities. A two-lane section with a turn-lane should be considered three-lanes. All three-lane sections would warrant an RRFB at minimum, unless a PHB is warranted. Further analysis is required per the concurrent MnDOT study and design development of the future project.

Other Considerations

Access Modifications

Side-street access closures could double as a pedestrian island refuge at key locations. Four were identified by this Study due to either their classification as future bike boulevards (Hyacinth Avenue and Jessamine Avenue) or proximity to Maryland Avenue (Rose Avenue and Hawthorne Avenue). A nearby example at Maryland Avenue and Greenbrier Street shows one way of how this could be accomplished (see below).

Source: Google Maps

Side-Street Crossings

Appropriate side-street traffic controls and crossing enhancements should be considered in addition to enhancements at key intersections along Arcade Street. Of note, most side-streets along Arcade Street have a crossing width of 40 or more feet which is considerably wider than required for low-volume intersection legs with no marked turn lanes. Curb extensions installed concurrently could significantly enhance crossings not only of Arcade Street but also those walking along Arcade Street. Sight distance could also be improved as right-turning vehicles today can slip around queued left-turning vehicles which creates unsafe conditions.

A critical side-street crossing to consider such improvements is the westbound leg of Jenks Avenue where the crossing distance is 50 feet (greater than Arcade Street), and 90-degree parking is allowed that contributes to hazards for all users using the intersection. The north leg crosswalk is skewed, creating an unnecessary jog, and crossing distance. Improvements to this specific location have been identified in previous studies as well.

PEDESTRIAN-REALM UPGRADES

Upgrades and enhancements to the sidewalk system and pedestrian-realm along Arcade Street were identified as a priority by the community from the online survey. A brief overview of potential considerations for the concurrent rehabilitation project are highlighted as that effort continues into design development.

Sidewalk

Sidewalk connectivity is a critical piece of multimodal infrastructure, providing space for children to walk, run, skate and play, and bike (if younger).[8] Providing sidewalk facilities can reduce pedestrian crashes by up to 88 percent per the FHWA when compared to walking in the roadway.

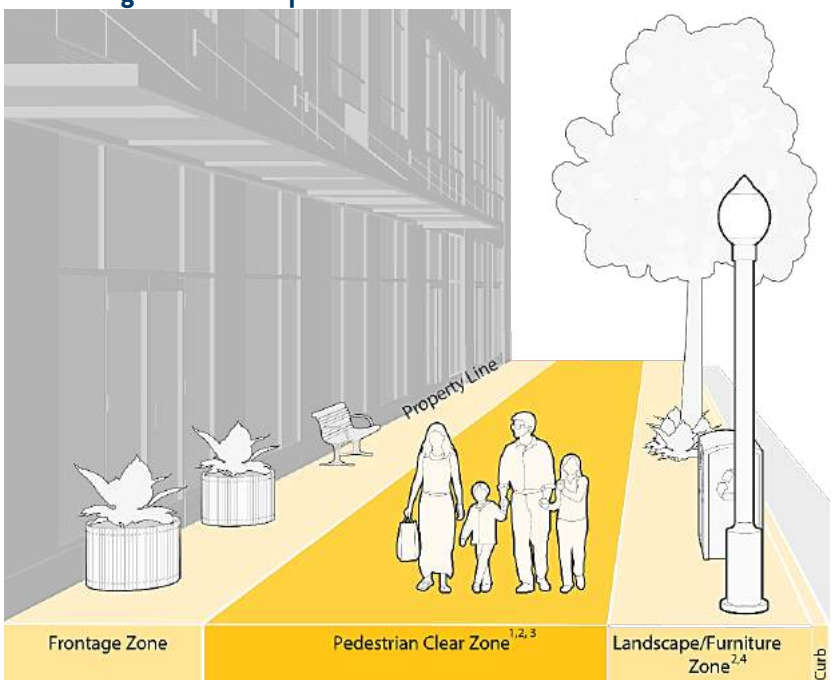
Adequately maintained sidewalks are important toward ensuring people of all ages and abilities can access their destination, including children walking or rolling to school. Sidewalks along Arcade Street should be further reviewed for future maintenance and upgrades. A preliminary review identified locations with heaving, cracks, and uneven sidewalk that could prevent a mobility challenged child from using the sidewalk and creating general safety hazards (i.e., tripping, etc.).

Sidewalk widening is another consideration that could benefit children accessing the schools who typically like to walk in groups or alongside an adult. Existing sidewalks are primarily six feet wide with a two-foot buffer (for signage, no landscaping present). The clear zone of a sidewalk is the unobstructed width of the sidewalk and must be a minimum of four feet per the Americans with Disabilities Act of 1990 (ADA) (see Figure 35).

The City of Saint Paul's Street Design Manual (2016) was reviewed to understand the desired sidewalk width along Arcade Street per local guidance (see Figure 36). The Manual would recommend a 11-foot-wide to 16-foot-wide pedestrian realm due to the corridor's classification as mixed-use and include appropriate street furniture, street trees/landscaping, lighting, and other amenities. The existing public realm is only 8-feet-wide today including the sidewalk and narrow buffer which does not align with guidance. The proposed cross-sections could provide opportunities to widen sidewalk by reducing travel lanes and potentially eliminating on-street parking. Exact increases in widths are dependent upon future design development.

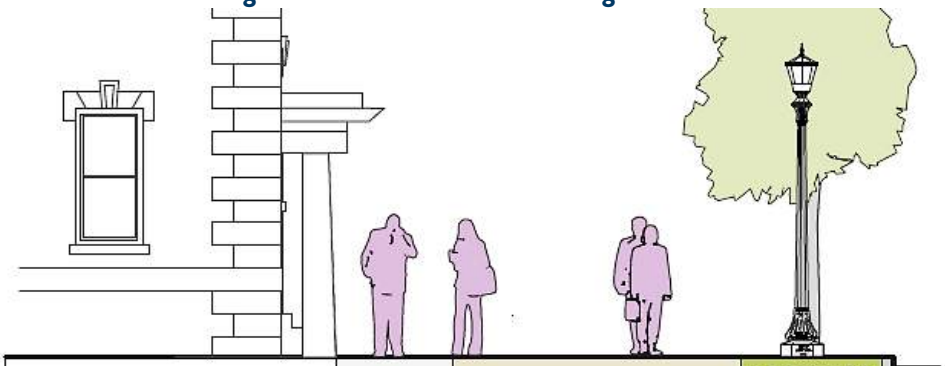
[8] Saferoutesinfo.org. (n.d.). *Sidewalks.* http://guide.saferoutesinfo.org/engineering/sidewalks.cfm#corridor

Figure 35. Example of Sidewalk Pedestrian Clear Zones



Source: City of Seattle

Figure 36. Saint Paul Street Design Manual



STREET TYPE	Frontage Zone Pref.	Frontage Zone Min. des.	Pedestrian Zone Preferred	Pedestrian Zone Minimum Desirable	Boulevard & Furnishings Zone Pref.	Boulevard & Furnishings Zone Min. des.	Curb & Gutter (varies)
Downtown Streets	2'	0'	12'	8'	6'	5'	
Mixed-Use Corridor Streets	2'	0'	8'	6'	6'	5'	
Residential Corridor Streets	2'	0'	5'	5'	6'	5'	
Neighborhood Streets	2'	0'	6'	6'	6'	5'	
Industrial Streets	2'	0'	5'	5'	6'	5'	
Parkways	Varies		6'	5'	10'	6'	

Table Notes: St. Paul is a built environment. These dimensions reflect ideals which may or may not be achieved.

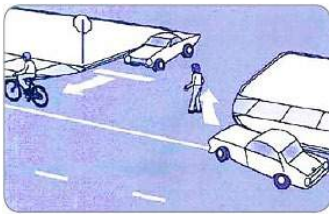
Source: City of Saint Paul Street Design Manual (2016)

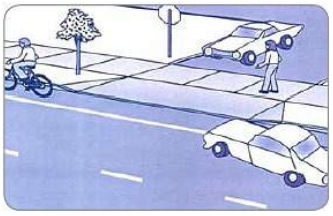
Landscaping and Trees

There are no street trees or landscaping along Arcade Street today. Survey results from the community showed a strong desire for landscaping, benches/trash receptables, public art, and other improvements to the public realm along the corridor. From a SRTS perspective, high-quality landscaping and trees have shown to support cognitive development and improve educational experiences for children and the environment (e.g., air quality, urban heat island reduction, etc.) which aligns with the program's objectives.[9] Potential improvements should consider street trees and other landscaping to improve the walking and bicycling experience, as well as the environment. Green infrastructure, such as stormwater filtration, could also be implemented as a part of the concurrent project and align with the environmental goals of SRTS. The green infrastructure could double as a living laboratory and educational space for children at nearby schools as well.

Driveway/Alleyway Crossings

A high-level review of driveway and alleyway crossings showed many locations not achieving ADA-compliance. An example pictured at right is an alleyway crossing between Jenks Avenue and Lawson Avenue, adjacent to Farnsworth Aerospace Upper Campus. There is not a continuous sidewalk connection across the alleyway access and the slope would make it difficult for an individual in a wheelchair to navigate (see existing and improved examples at right). All alleyway and driveway crossings should be reviewed by the concurrent MnDOT study to ensure ADA-compliant crossings exist or are appropriately upgraded during design development.





[9] *Turner-Skoff, Jessica B. (2019). The benefits of trees for livable and sustainable communities. Journal of Plants, People, Planet, 1(4), 323-335. https://doi.org/10.1002/ppp3.39*

CHAPTER 5: POTENTIAL PROJECTS

This chapter summarizes the prioritized crossings as identified and described in Chapter 4 (see Figure 37). Other considerations are discussed including vehicular speeds, pedestrian-scale lighting, bicycle parking, and creating joyful spaces for children to walk.

PRIORITY CROSSINGS

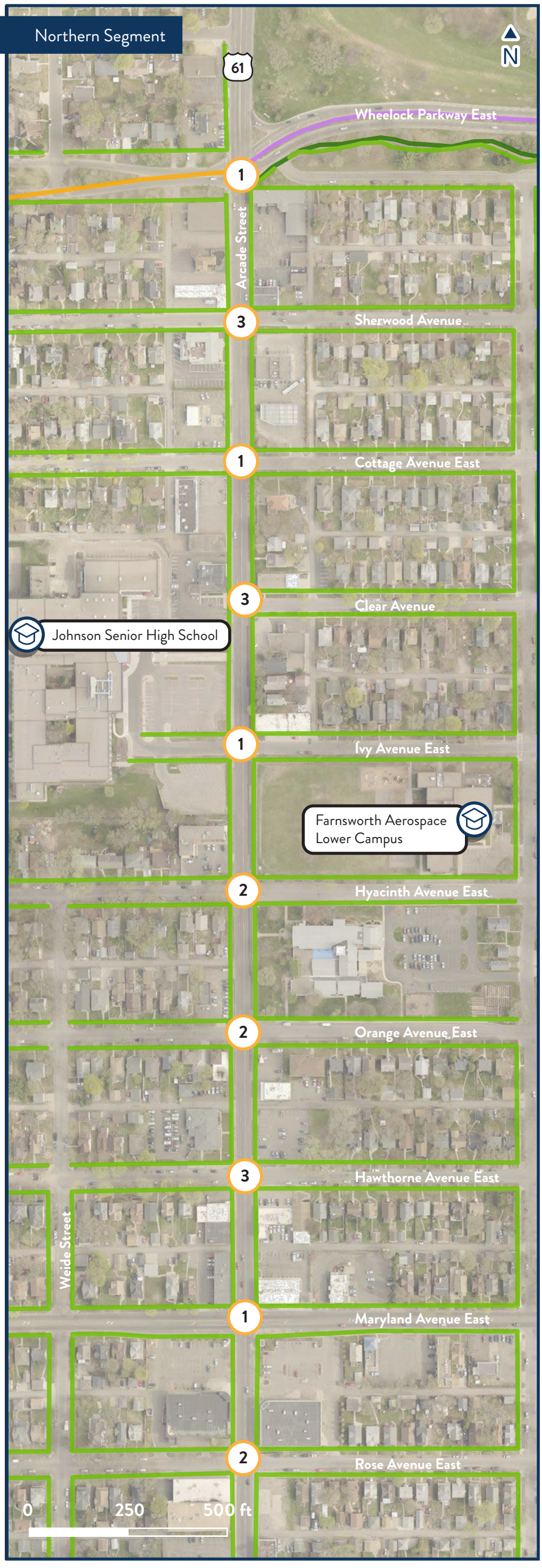
Based upon the ranking analysis, adherence to reasonable spacing between crossings, and engineering judgment, three priority levels were developed to organize crossing upgrades for implementation.

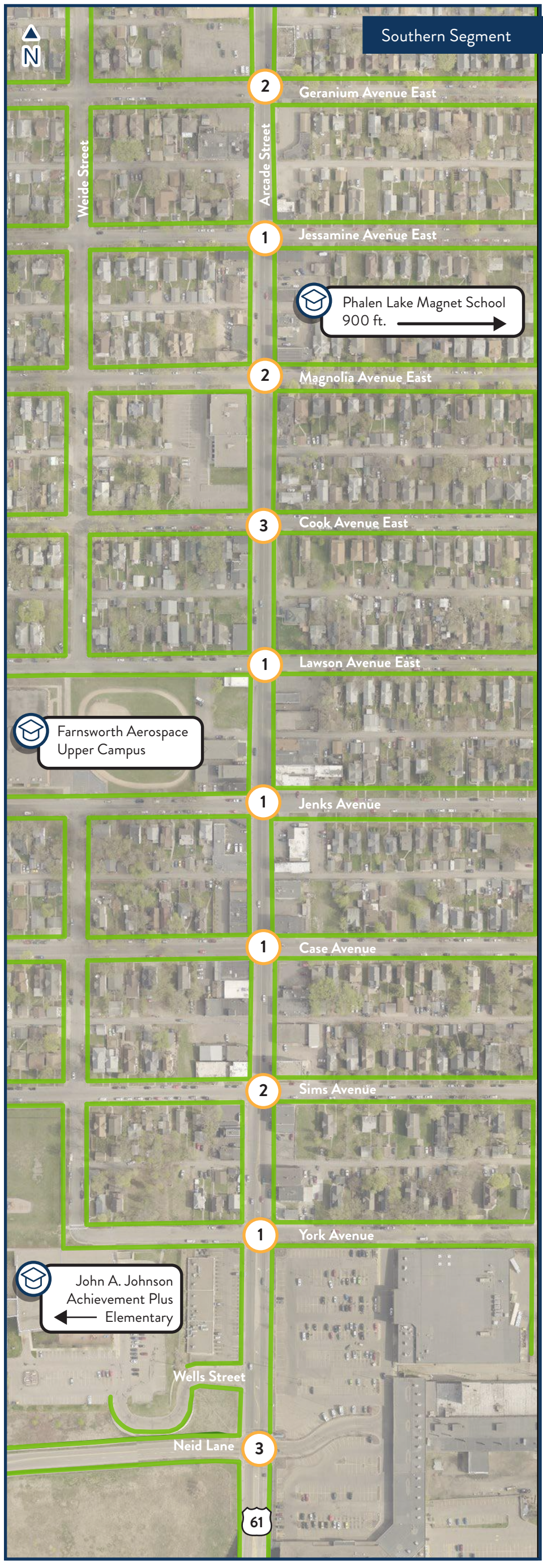
- **Priority 1:** High-priority crossings for potential implementation as a part of the upcoming rehabilitation project as funding allows.
- **Priority 2:** Medium-priority crossings that could be implemented in the mid-term as funding allows or as needs are tracked and identified by staff.
- **Priority 3:** Low-priority crossings that could be implemented in the long-term as funding allows or as needs are tracked and identified by staff.

Further analysis should be completed as a part of the design development process to maximize funding. Prioritized crossings do not consider potential physical barriers related to existing roadway or utility infrastructure, or other items that could arise upon further review and design of the rehabilitation project, and outside the scope of this Study.

Of note, adhering to reasonable spacing between crossings is important to ensure a corridor is not a barrier to walking, rolling, or bicycling. 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. Of note, no state or national guidance exists identifying specific measured distances between marked crossings. Crossing placement 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. A minimum spacing of 200 feet between signalized crossings is identified in the MN MUTCD.[10] A minimum spacing of 350 feet between marked crosswalks is identified in the City of Saint Paul's crosswalk evaluation guidance.

[10] Minnesota Department of Transportation. (2012). *Minnesota Manual of Uniform Traffic Control Devices,* 4C.05, Paragraph 04.





Prioritized Safe Routes to School Crossing Improvements

St. Paul, MN

Figure 37

Focus School

Existing Sidewalk

Existing Shared Lane (Sharrow)

Existing Trail

Existing Bikeable/Wide Shoulder

Improvement ID

Priority 1: High-priority crossings for implementation as a part of the upcoming rehabilitation project or in the near-term.
Priority 2: Medium-priority crossings for implementation when warranted by the City/MnDOT.
Priority 3: Low-priority crossings for tracking purposes and potential implementation in the long-term if desired.

SRF

DEPARTMENT OF TRANSPORTATION

MINNESOTA SAFE ROUTES TO SCHOOL

QUICK BUILD CROSSING INFRASTRUCTURE

The cost associated with temporary installation of crossing improvements identified in this Study were reviewed. If there is a need or desire by all relevant parties to expedite implementation, one option would be to install temporary infrastructure also referred to as a "quick build" process. "Quick build" is a project delivery method that allows for the rapid deployment of multimodal safety improvements using temporary materials.[11] Those materials can include signage, pavement markings or striping, and bollards or flex posts. Such materials can implement crossing upgrades or other multimodal infrastructure within an expedited timeline.

Implementing the potential crossing improvements with temporary infrastructure is an interim opportunity following the completion of final design and during the process of requesting and securing funding as well as constructing the permanent improvement.

Three considerations of quick-build infrastructure:

- Ensure a maintenance plan and agreement is in place. Bollards or flex posts can be routinely knocked over by motorists, pavement markings can fade, etc. It is important to not allow temporary projects to fall into disrepair while also understanding that these projects are not long-term solutions.
- Temporary infrastructure is an opportunity to see if a design works for relatively low up-front costs. An example could be the proposed curb extension where such a design could be tested, and tracked, to ensure it does not hinder larger vehicles turning. Depending upon the outcome the design can be tweaked or removed from consideration. This is the opportunity in which design modifications may be completed prior to construction of curb and gutter, pavement, and other permanent infrastructure that is much more costly to move or remove.
- There is also an opportunity to broadly collect data that could support funding requests and future construction of permanent improvements at these locations, as well as data for the school district or City to use in future applicable projects.

It is estimated that quick-build crossings could be implemented for approximately $8,500 per location on average, though it could be higher or lower depending upon the specific location. This cost estimate does not include infrastructure items such as pedestrian-scale lighting or account for potential maintenance needs.

[11] Metropolitan Transportation Commission. (n.d.). *Quick-Build Materials.* https://mtc.ca.gov/our-work/plans-projects/bicycle-pedestrian-mobility/complete-streets/quick-build-materials

OTHER CONSIDERATIONS

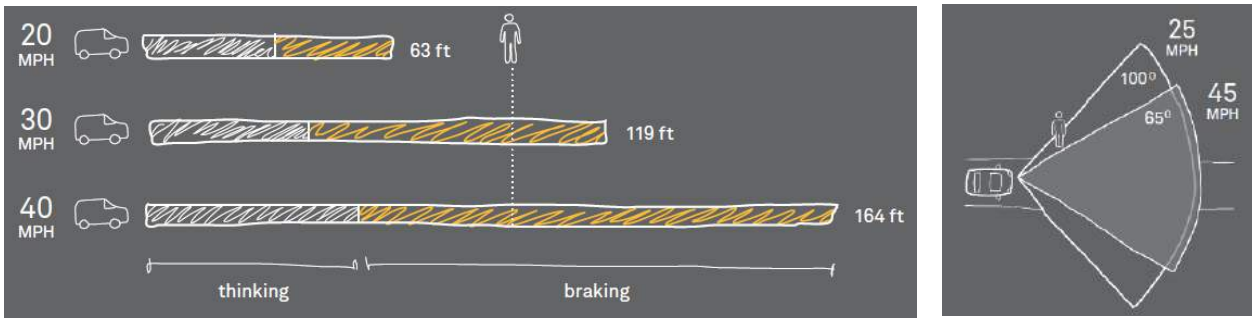
Vehicle Speeds

Geometric improvements (i.e., traffic calming), coupled with lowered posted speed, could reduce speeds along Arcade Street. 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, which meanders at intersections with pedestrian island refuges and narrowed lanes (ten feet plus gutter pan). Narrowed lanes and traffic calming could lower speeds due to increased friction for motorists while maximizing ROW for multimodal uses. MnDOT standards identify travel lane widths of 10 or 11 feet (inclusion of the gutter pan as a part of the lane width is location dependent) along urban and suburban collector roadways under 50 mph.[12] Tighter lane widths are credited with positively impacting a street's safety without affecting traffic operations.

Portland Avenue in Richfield. Source: Google Streetview

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 38).

Figure 38. Stopping and Sight Distance

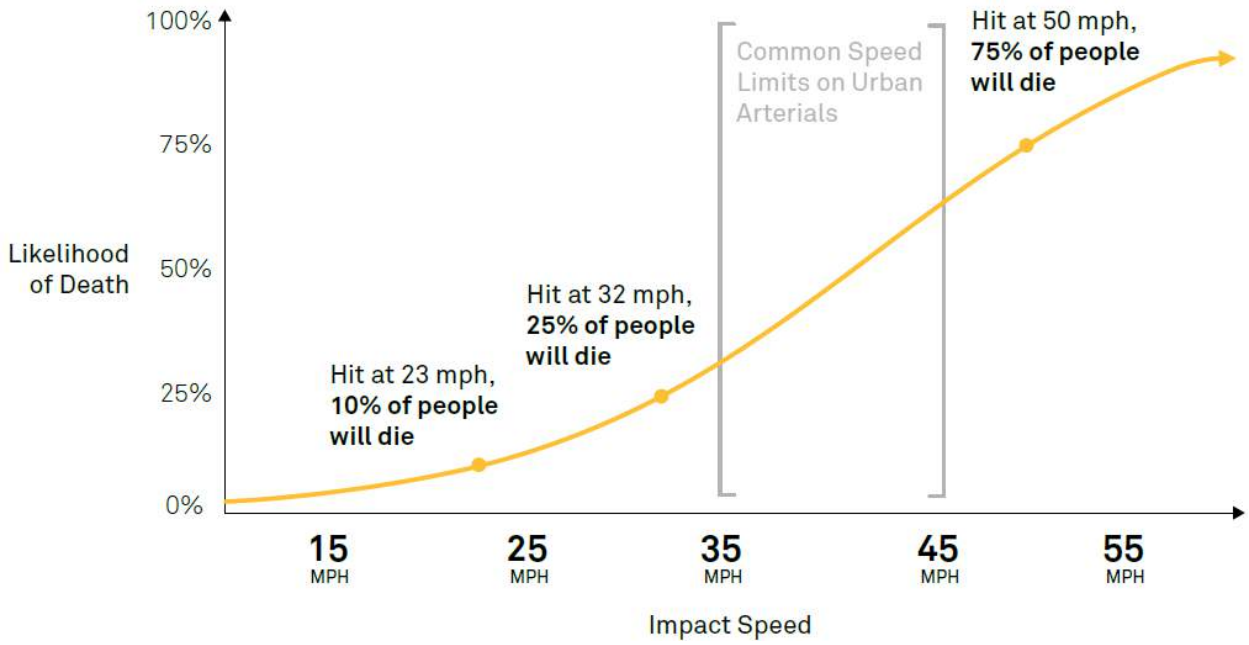


Source: City Limits: Setting Safe Speed Limits on Urban Streets (2020), National Association of Transportation Officials

[12] Minnesota Department of Transportation. (2018). *Travel Lane Width Standards for State Highways, Technical Memoranda 18-08-RS-06.*

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 39). A person could have an approximate 25 percent likelihood of death if they were hit by a car at 30 mph while crossing the road at an uncontrolled location while there is a 50 percent likelihood of death if hit by a car at 40 mph.

Figure 39. Likelihood of Injury or Death by Traffic Speed



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

In addition to posted speed reductions and geometric improvements, the use of both dynamic speed signs and speed enforcement during peak school periods should also be considered. A review of MnDOT-approved dynamic speeds signs showed one option for a school zone with speed feedback display and flashers to further draw a motorist's attention for compliance (see example image at right). Estimated cost per dynamic speeds display is $10,000 and per LED flashing school sign is $3,000. Both options draw motorist's attention and encourage drivers to slow down by making them aware of their current speed. The LED sign alerts drivers to the school zone speed and can be programmed for specific time of day, day of week, and month of year to ensure it only flashes when necessary.

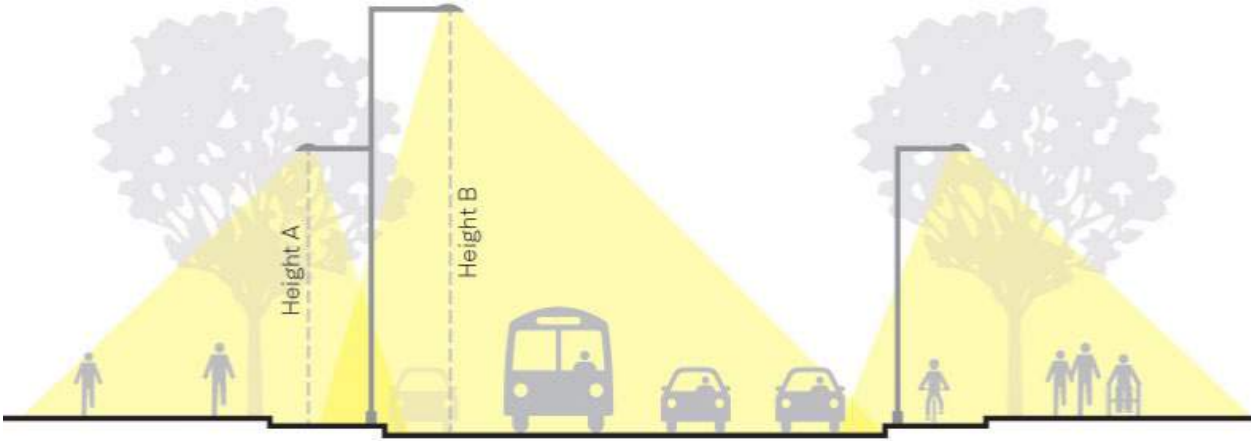
Source: RU2 Systems, Fast-250 Radar Speed Feedback Sign with Flashers

School zones could be explored along key segments of Arcade Street either adjacent to school property (i.e., Johnson Senior High School and Farnsworth Aerospace Lower Campus) or near a school crossing that serves the other three schools. Additional analysis is required per the MN MUTCD.

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 40). Such lighting is critical at roadway crossings and can reduce all types of injury crashes by 59 percent.[13] 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.

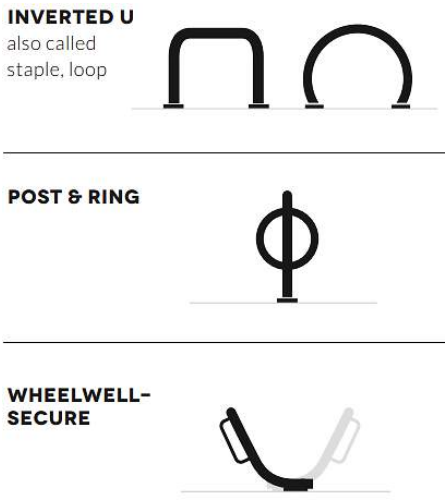
Figure 40. Lighting Design Guidance for Pedestrians and Bicyclists



Source: Lighting Design Guidance, Global Designing Cities Initiative

Bicycle Parking

Implement convenient, high-quality bicycle parking that match desire lines (internal sidewalk connections) and are near each school's main entrance. Placement should be in a location where a bicyclist would not have to dismount until reaching the bike parking area. The Association of Pedestrian and Bicycle Professionals' (APBP) *Essentials of Bike Parking (2015)* describes the various types and styles of racks, as well as those to avoid due to various performance concerns. The three styles pictured at right are those most recommended by APBP per their analysis.



[13] 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.

Wayfinding and Playful Spaces

NACTO's *Designing Streets for Kids (2020)* is a good resource when considering how to make streets and public spaces safer, more comfortable, healthier, and joyful for children. It is important to think about street design from a three-foot high perspective (i.e., the perspective of a child). Numerous opportunities are identified in the guidance document and could be included upon further review of future improvements proposed in this Study and applications relevant to school campuses.

One potentially applicable item is an example from Detroit, Michigan called the Brightmoor Runway. A sidewalk was transformed into a running track paved with red rubber surface, painted with the distance, and included a speed display. This interactive play space in the public realm provided children with an opportunity to engage in physical activity while waiting for their school bus (pictured below).[14] Such artistic and playful opportunities have numerous benefits and can be low-cost improvements with lasting impacts.

[14] National Association of City Transportation Officials. (2020). *Designing Cities for Kids, page 41.*

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CHAPTER 6: NEXT STEPS

This Study offers a range of potential infrastructure improvements to improve multimodal conditions along, and across, Arcade Street (US 61). Actionable next steps were organized to ensure this document is fully utilized and implemented to the best of the City of Saint Paul's ability in coordination with MnDOT and Saint Paul Public Schools. The proposed next steps are important as they will seek to maximize the Study's analysis and potential improvements that will enhance the Arcade Street corridor where children cannot safely, comfortably, or conveniently walk, roll, or bike today.

AGENCY COORDINATION

The most critical step toward implementing potential infrastructure improvements is to identify a champion that will devote some portion of their time implementing this Study. Champions could be applicable City and/or School District 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, MnDOT, 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 Saint Paul and Saint Paul Public 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 crossing prioritization was included in 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 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.

Source: MnDOT

APPENDICIES

Appendix A – Community Feedback Data

Appendix B – Crossing Prioritization Tool

Appendix C – Parking Utilization Data

APPENDIX A

ARCADE STREET **ENGAGEMENT SUMMARY**

WHAT ENGAGEMENT OCCURRED?

Project partners designed an engagement website to ask for community input on the Arcade Street Safe Routes to School initiative. Five public school campuses are located along, or within one-quarter mile of Arcade Street.

Community feedback and input received will influence how MnDOT prioritizes potential improvements for the Arcade Street project in 2024.

HOW DID WE GATHER FEEDBACK?

Online engagement occurred September 22nd through October 26th, 2020 via an Engagement Website, Online Survey and Wikimap.

WHO DID WE HEAR FROM?

ENGAGEMENT WEBSITE
343 unique visitors
576 total visits
55% accessed via Desktop
40% accessed via Cell Phone
5% accessed via Tablet

SURVEY RESULTS
125 survey responses
38 open-ended comments
28 Wikimap comments

DEMOGRAPHIC QUESTIONS
School Affiliation
Connection to Arcade Street
Zip Code
Age
Race/Ethnicity
Gender

WHAT DID WE ASK?

HOW SAFE DO YOU FEEL ON ARCADE STREET?

WHERE DO YOU CROSS ARCADE STREET?

- **Approximately 80 percent of respondents cross at an intersection** (49% traffic signal vs. 31% without a signal).
- Nearly 10 percent do not cross Arcade Street.

WHAT ARE YOUR TOP CONCERNS ABOUT ARCADE STREET?

- **The top three concerns (in order) are traffic speed, crossing safety, and walking or bicycling comfort.**
- Nearly 70 percent of resopndents voted for one of those three concerns.

HOW COULD ARCADE STREET BE IMPROVED?

WALKING

Top four choices (in order) include vehicles stopping at crossings, more street trees/landscaping, lower vehicle speed, and wider sidewalks. Nearly two-thirds of respondents chose one of these options.

DRIVING

The top four choices (in order) include turn lanes, less on-street parking, medians, and traffic signals. Nearly 75 percent of respondents voted for one of these improvements.

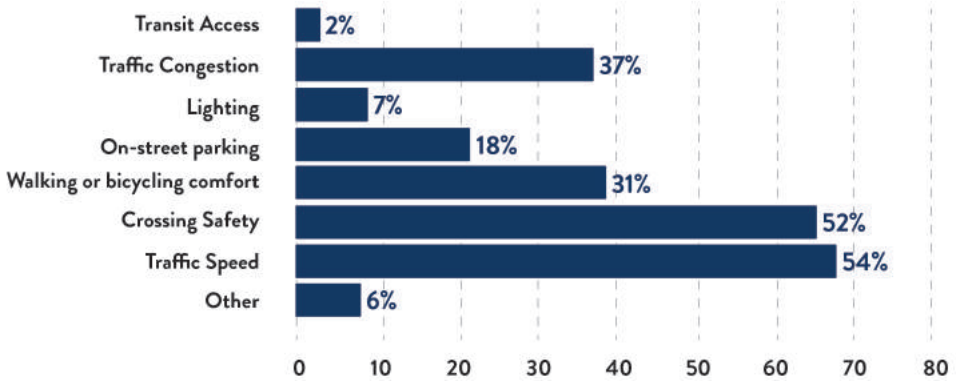
WHAT **THEMES** DID WE HEAR?

- **Prioritize safety** for people walking, bicycling, or taking transit.
- Desire for **bicycle connectivity and pedestrian improvements**. Most specifically separated bike lanes are desired.
- **Improve transit amenities** near Case Avenue, Maryland Avenue, Ivy Avenue, and Nebraska Avenue.
- **Balance on-street parking** by prioritizing right-of-way for people walking, bicycling, and taking transit while providing space for businesses if needed.
- **Many unsafe intersections** for pedestrians and bikers (controlled and uncontrolled).
- **Cleanliness, streetscaping and development** would enhance Arcade Street and create a safer and more comfortable feeling environment.

WHAT **CONCERNS** DID WE HEAR?

1. Vehicles speeding, unsafe driving behavior, and failure to yield for people walking or bicycling.
2. Lack of turn lanes create backups, congestion and unsafe driving.
3. Safety and comfort to walk or bike along or across Arcade Street.
4. Buses tend to block traffic and bus stops could be improved with shelters and amenities.

MY GREATEST CONCERNS ABOUT ARCADE STREET ARE:



WHAT **SUGGESTIONS** DID WE HEAR?

Reduce the number of traffic lanes for vehicles, create space for dedicated bike lanes.	Add left turn arrows at lights near Johnson Senior High School (E Ivy Avenue), E. Jenks Avenue, Maryland Avenue.	No parking signs within 60 feet of intersections near the schools to improve motorist sight distance of children crossing.
Improve crosswalks so vehicles stop for people crossing (i.e. flashing beacons).	Add traffic calming along Arcade Street to slow speeds and reduce unsafe driving behavior.	Improve bus stops to enhance the experience of transit users and upgrade streetscape (i.e. trees, lighting, trash cans).

St. Paul – Arcade Street

Introduction:
The Minnesota Department of Transportation (MnDOT) would like to hear from you about future transportation improvements along Arcade Street in Saint Paul. Five public school campuses are along, or within one-quarter mile, of Arcade Street. MnDOT is considering improvements to assist students walking or bicycling to these schools more comfortably and safely. The project will also benefit the community and how people safely and efficiently travel along the street.

Input from this survey will influence how MnDOT prioritizes potential improvements for inclusion within a repaving project planned for Arcade Street in 2024.

The project's objectives include:

- Repave the road for a smoother driving surface
- Replace cracked or not-level sidewalks
- Replace curb ramps and traffic signal push buttons so they are accessible to people with disabilities
- Improve the safety and comfort for people crossing the street
- Replace aging storm sewers

Questions:

1. When you cross Arcade Street while walking, bicycling, or accessing Metro Transit do you cross…
    a. At a traffic signal
    b. Mid-block (between two city blocks)
    c. At an intersection (without a traffic signal)
    d. I do not cross Arcade Street
2. How safe do you feel crossing Arcade Street while walking, bicycling, or accessing Metro Transit?
    a. I do not feel safe
    b. I feel somewhat safe
    c. I do feel safe
    d. I do not cross Arcade Street
3. My greatest concerns about Arcade Street are… (identify your top two choices)
    a. Traffic speed
    b. Crossing safety
    c. Walking or bicycling comfort
    d. On-street parking
    e. Lighting
    f. Traffic congestion
    g. Transit access
    h. Other (please specify)

4. What would improve your experience walking along Arcade Street? (identify your top two choices)
    a. Wider sidewalks
    b. Vehicles stopping when I cross
    c. More trees and landscaping
    d. Better lighting
    e. Public art and other infrastructure (trash receptacles, bike racks, benches, etc.)
    f. Lower vehicle speeds
    g. I do not walk along or across Arcade Street
    h. Other (please specify)
5. What would improve your experience on driving along the corridor? (identify your top two choices)
    a. More parking
    b. Less parking
    c. Turn lanes
    d. Traffic signals
    e. Medians
    f. Lighting
    g. Other (please specific)
6. Are you a parent or guardian of a student, or a student currently enrolled at one of the following schools (mark all that apply or select N/A if this does not pertain to you):
    a. John A. Johnson Elementary
    b. Phalen Lake Elementary
    c. Farnsworth Lower PreK-4
    d. Farnsworth Aerospace Upper 5-8
    e. Johnson Senior High School
    f. Not applicable (N/A)
7. Do you… (check all that apply)
    a. Live on Arcade Street
    b. Live near Arcade Street (within four city blocks)
    c. Live near Arcade Street (outside of four city blocks)
    d. Work at or own a business along Arcade Street
    e. Commute to work or school along Arcade Street
    f. Other (please describe)
8. What is your Zip Code?
9. What is your gender?
    a. Male
    b. Female
    c. Prefer not to say
    d. Other, please specify:
10. What is your Race/Ethnicity?
    a. White/Caucasian

   b. Black/African American
   c. Hispanic/Latinx
   d. Asian/Pacific Islander
   e. Native American
   f. Other, please specify:

11. What is your age?
   a. 10 or younger
   b. 11-13
   c. 14-18
   d. 18-34
   e. 35-54
   f. 55-64
   g. 65-74
   h. 75 or older

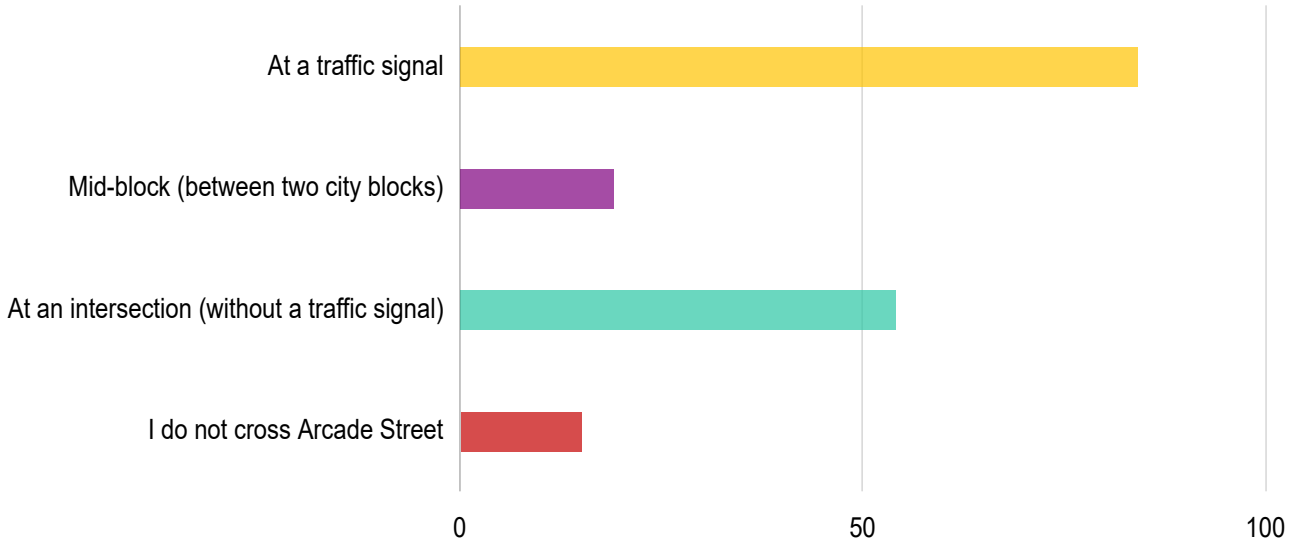
Interactive Map:

- Organize corridor extents to define the project area (E 7th St to Larpenteur)
- Points options:
   - Walking comment
   - Safety crossing the street comment
   - Bicycling comment
   - Transit comment
   - Vehicle traffic comment
   - Other comment

Safe Routes to School - Arcade Street

Saint Paul - Arcade Street Safe Routes to School Survey

○ 1.) When you cross Arcade Street while walking, bicycling, or accessing Metro Transit do you cross…

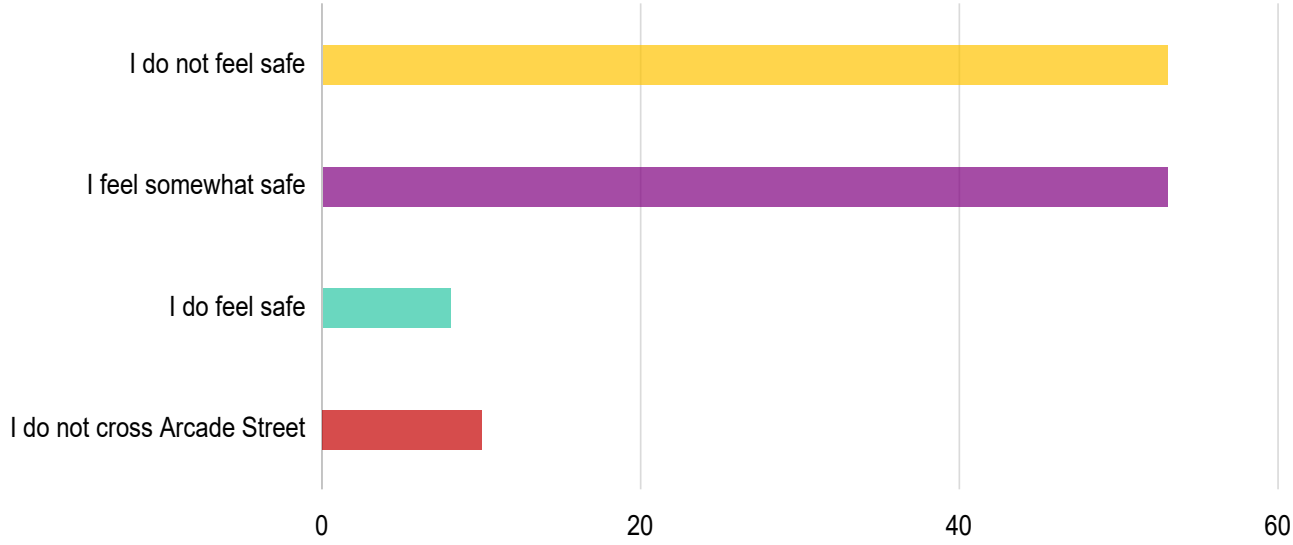


Answers	Count	Percentage
At a traffic signal	84	67.2%
Mid-block (between two city blocks)	19	15.2%
At an intersection (without a traffic signal)	54	43.2%
I do not cross Arcade Street	15	12%

Answered: 125 Skipped: 0

Saint Paul - Arcade Street Safe Routes to School Survey

○ 2.) How safe do you feel crossing Arcade Street while walking, bicycling, or accessing Metro Transit?

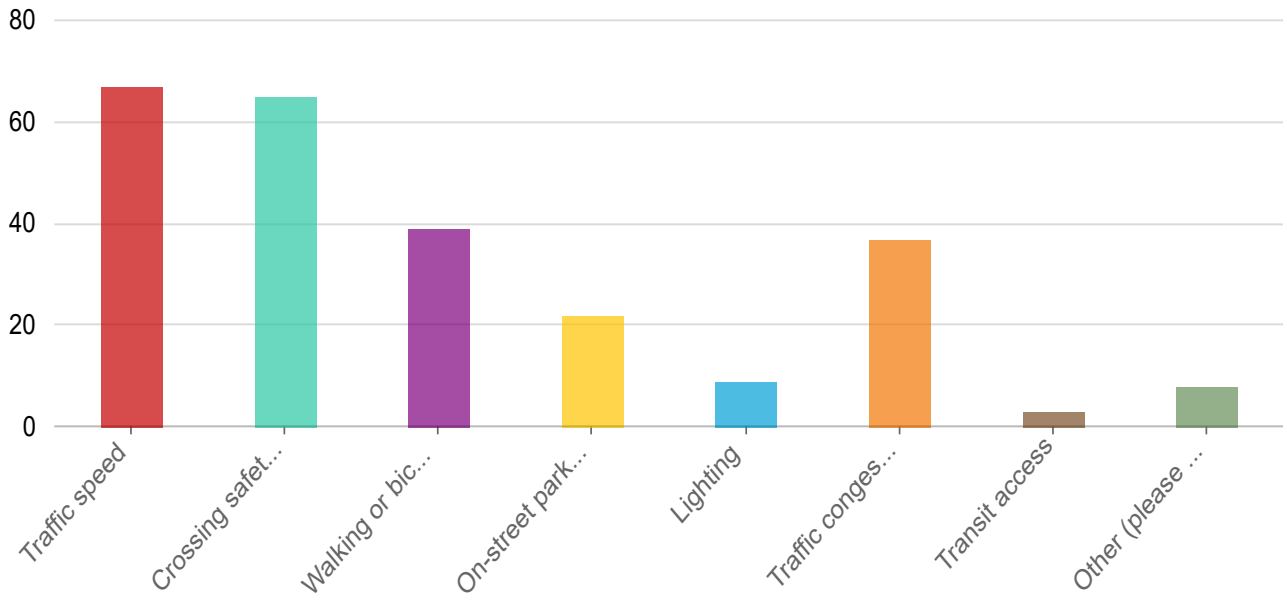


Answers	Count	Percentage
I do not feel safe	53	42.4%
I feel somewhat safe	53	42.4%
I do feel safe	8	6.4%
I do not cross Arcade Street	10	8%

Answered: 124 Skipped: 1

Saint Paul - Arcade Street Safe Routes to School Survey

○ **3.) My greatest concerns about Arcade Street are…**

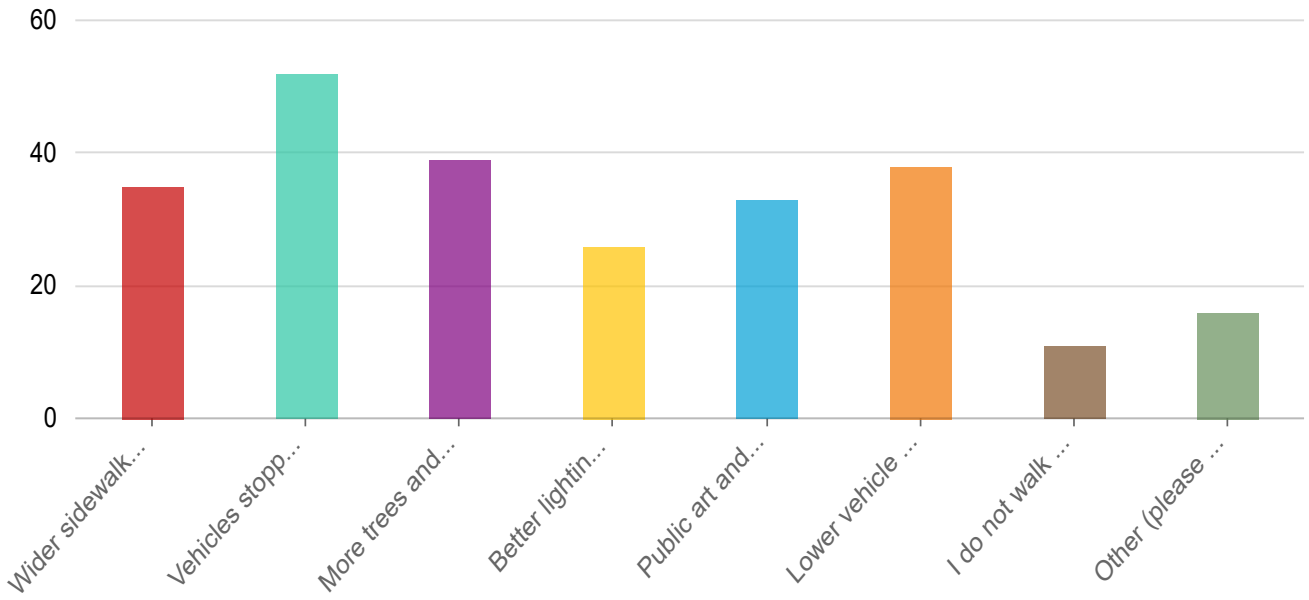


Answers	Count	Percentage
Traffic speed	67	53.6%
Crossing safety	65	52%
Walking or bicycling comfort	39	31.2%
On-street parking	22	17.6%
Lighting	9	7.2%
Traffic congestion	37	29.6%
Transit access	3	2.4%
Other (please specify)	8	6.4%

Answered: 125 Skipped: 0

Saint Paul - Arcade Street Safe Routes to School Survey

○ 4.) What would improve your experience walking along Arcade Street?

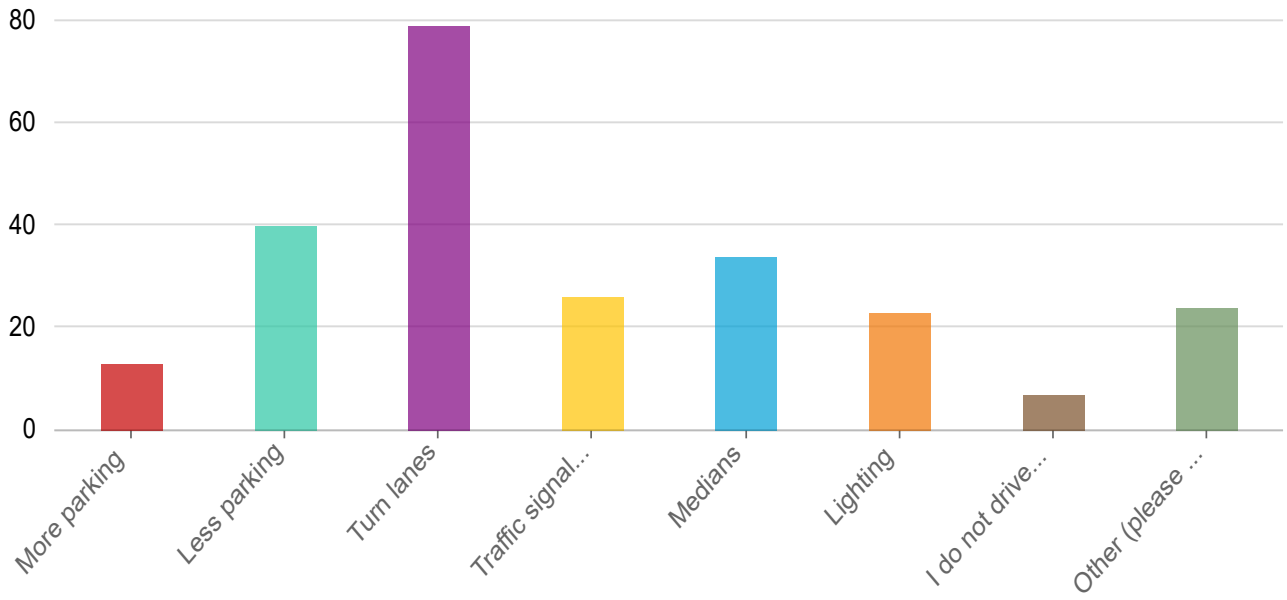


Answers	Count	Percentage
Wider sidewalks	35	28%
Vehicles stopping when I cross	52	41.6%
More trees and landscaping	39	31.2%
Better lighting	26	20.8%
Public art and other infrastructure (trash receptacles, bike racks, benches, etc.)	33	26.4%
Lower vehicle speeds	38	30.4%
I do not walk along or across Arcade Street	11	8.8%
Other (please specify)	16	12.8%

Answered: 125 Skipped: 0

Saint Paul - Arcade Street Safe Routes to School Survey

○ 5.) What would improve your experience on driving along Arcade Street?

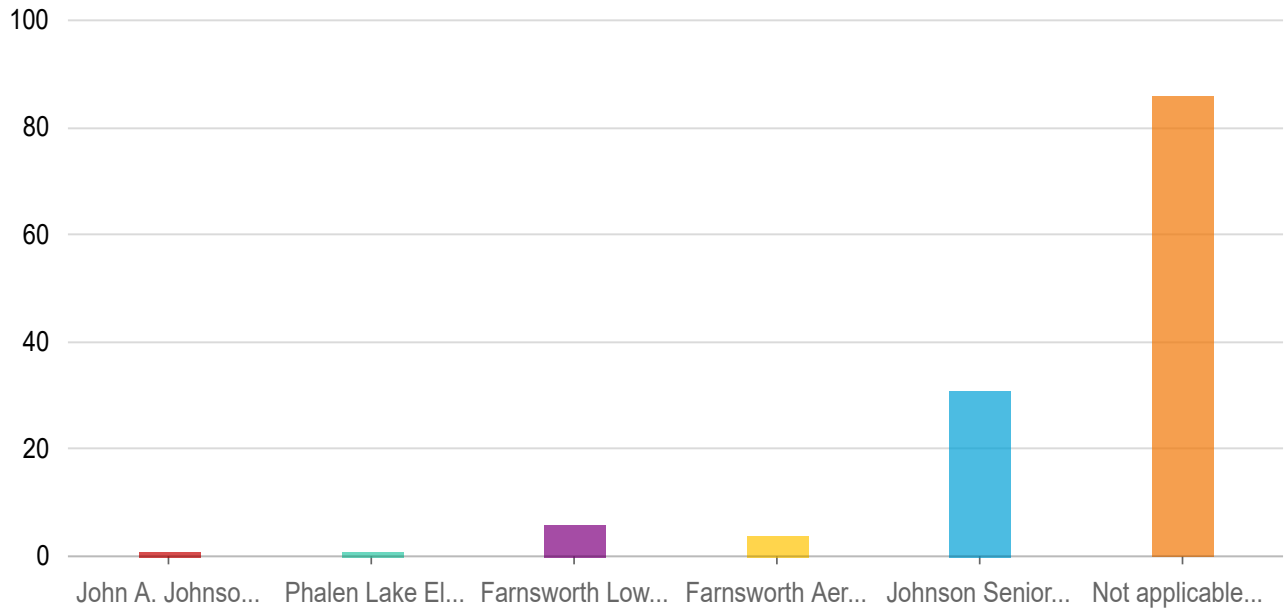


Answers	Count	Percentage
More parking	13	10.4%
Less parking	40	32%
Turn lanes	79	63.2%
Traffic signals	26	20.8%
Medians	34	27.2%
Lighting	23	18.4%
I do not drive along or across Arcade Street	7	5.6%
Other (please specify)	24	19.2%

Answered: 123 Skipped: 2

Saint Paul - Arcade Street Safe Routes to School Survey

○ 6.) Are you a parent or guardian of a student, or a student currently enrolled at one of the following s…

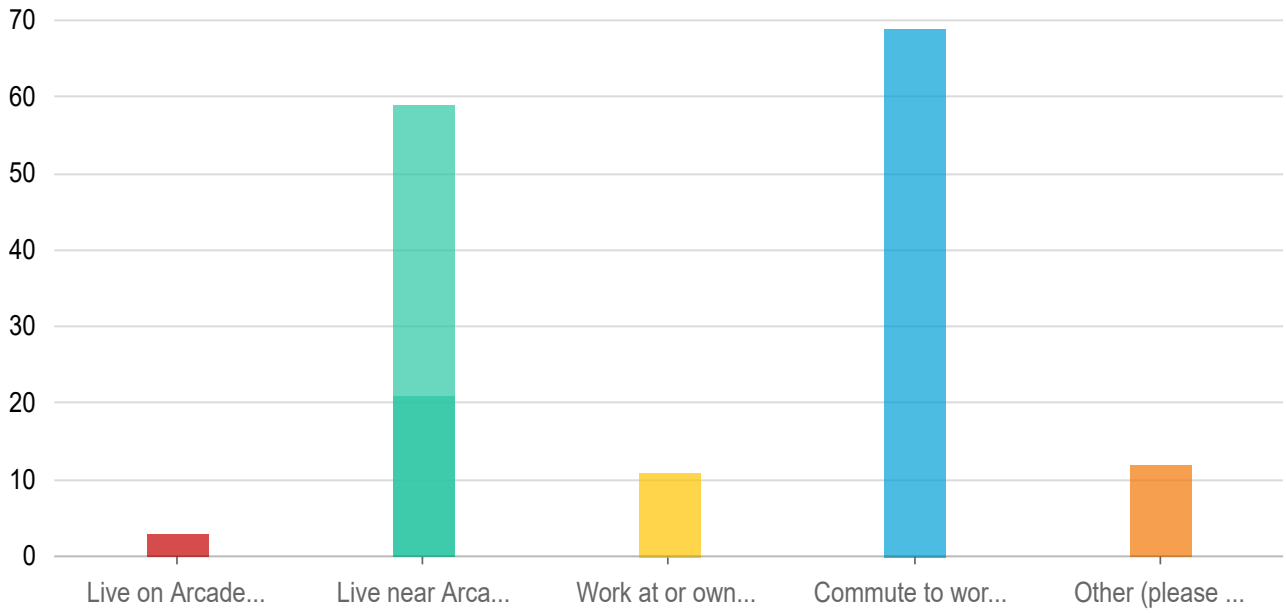


Answers	Count	Percentage
John A. Johnson Elementary	1	0.8%
Phalen Lake Elementary	1	0.8%
Farnsworth Lower PreK-4	6	4.8%
Farnsworth Aerospace Upper 5-8	4	3.2%
Johnson Senior High School	31	24.8%
Not applicable (N/A)	86	68.8%

Answered: 121 Skipped: 4

Saint Paul - Arcade Street Safe Routes to School Survey

○ **7.) Do you…**



Answers	Count	Percentage
Live on Arcade Street	3	2.4%
Live near Arcade Street (within four city blocks)	59	47.2%
Live near Arcade Street (outside of four city blocks)	21	16.8%
Work at or own a business along Arcade Street	11	8.8%
Commute to work or school along Arcade Street	69	55.2%
Other (please specify)	12	9.6%

Answered: 120 Skipped: 5

○ 8.) What is your Zip Code?

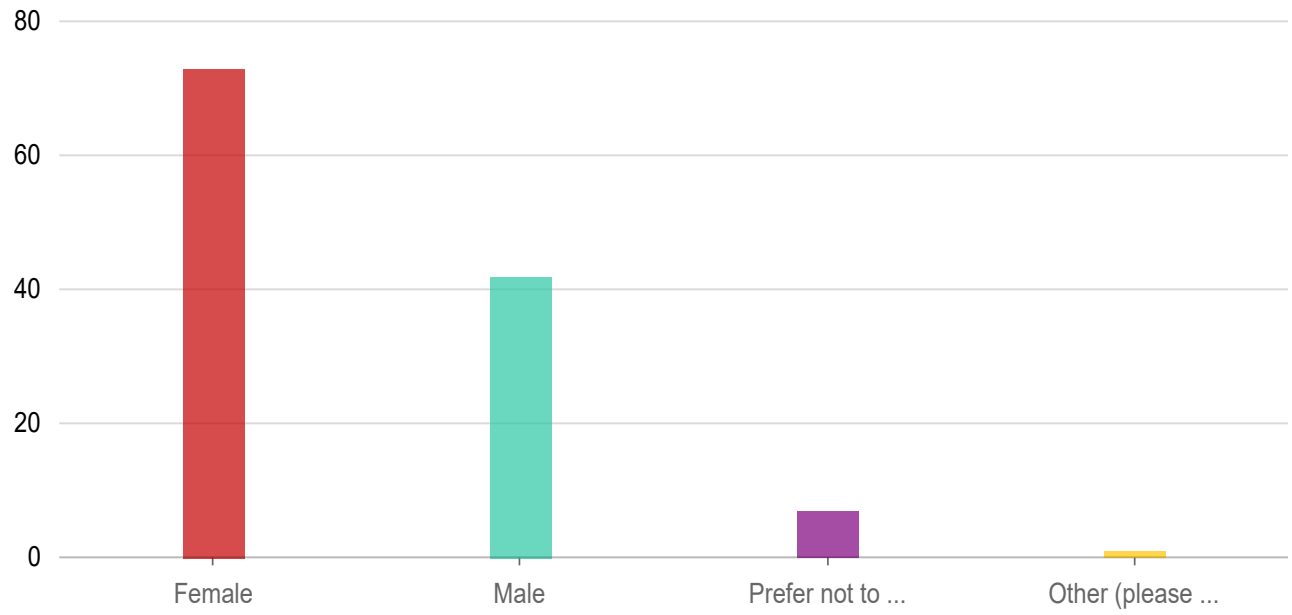
Word	Count
55106	76
55130	11
55117	6
55119	4
55109	3
55115	2
55033	1
55103	1
55104	1
55108	1
55116	1
55128	1
55343	1
55406	1
55415	1

55418	1
55432	1

Answered: 113 Skipped: 12

Saint Paul - Arcade Street Safe Routes to School Survey

○ **9.) What is your gender?**

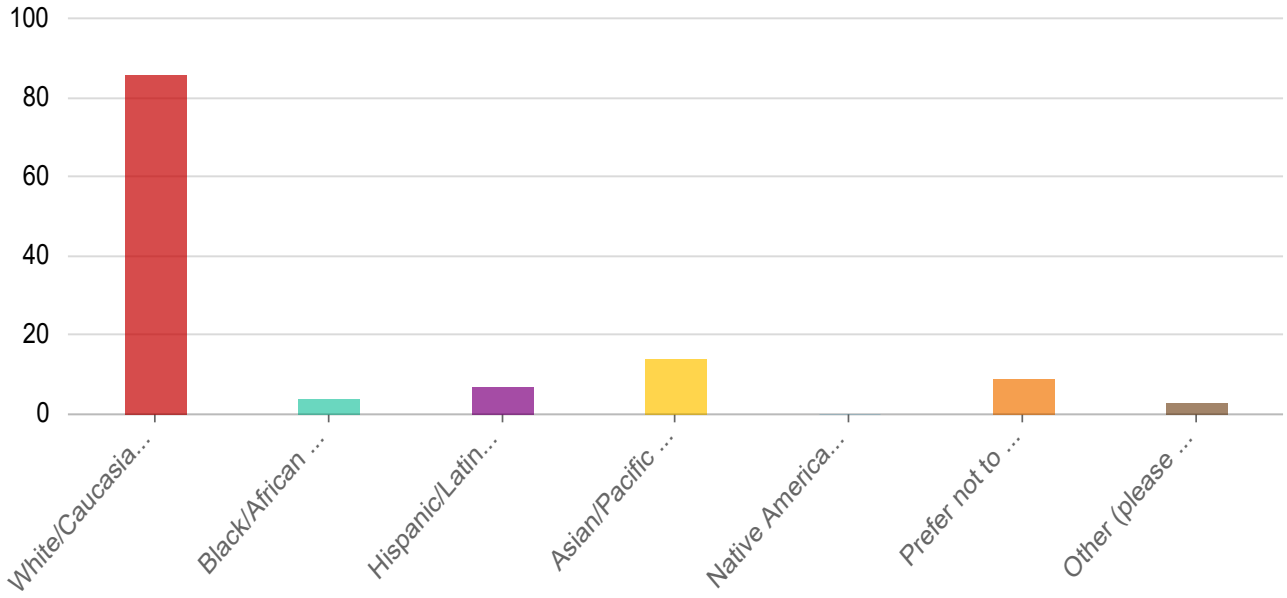


Answers	Count	Percentage
Female	73	58.4%
Male	42	33.6%
Prefer not to say	7	5.6%
Other (please specify)	1	0.8%

Answered: 123 Skipped: 2

Saint Paul - Arcade Street Safe Routes to School Survey

○ **10.) What is your Race/Ethnicity?**

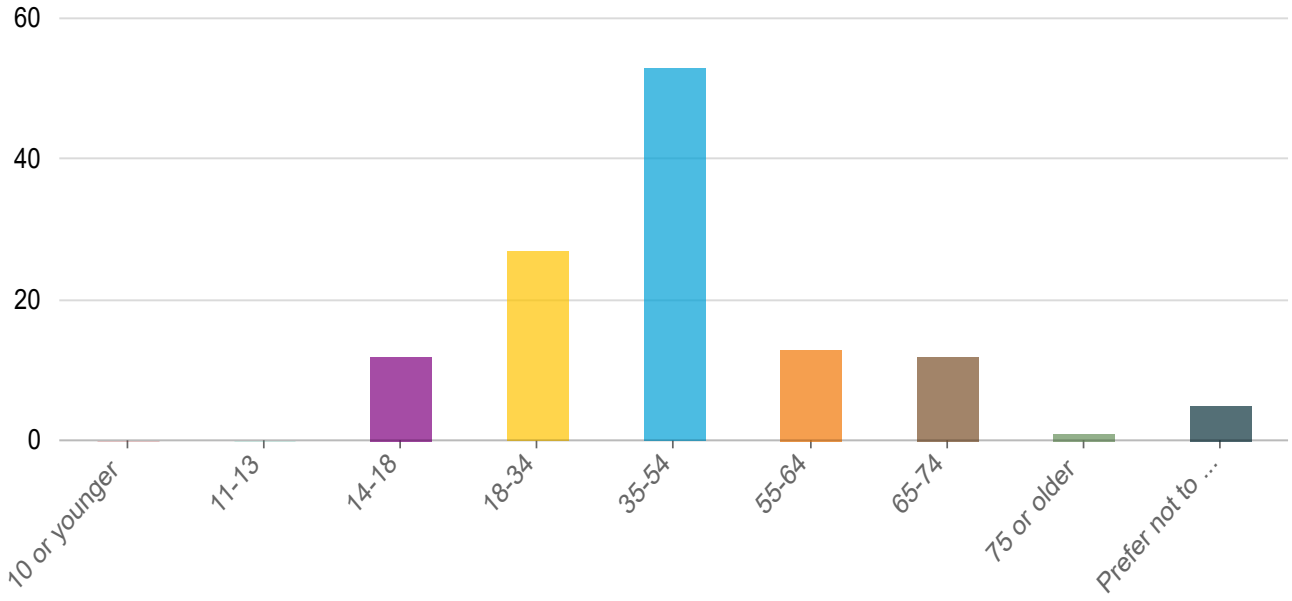


Answers	Count	Percentage
White/Caucasian	86	68.8%
Black/African American	4	3.2%
Hispanic/Latinx	7	5.6%
Asian/Pacific Islander	14	11.2%
Native American	0	0%
Prefer not to say	9	7.2%
Other (please specify)	3	2.4%

Answered: 123 Skipped: 2

Saint Paul - Arcade Street Safe Routes to School Survey

○ **What is your age?**



Answers	Count	Percentage
10 or younger	0	0%
11-13	0	0%
14-18	12	9.6%
18-34	27	21.6%
35-54	53	42.4%
55-64	13	10.4%
65-74	12	9.6%
75 or older	1	0.8%
Prefer not to say	5	4%

Answered: 123 Skipped: 2

My greatest concerns about Arcade Street are…

- I like Arcade as it is.
- Cars running lights (on purpose)
- Using turn lanes to pass.
- When cars are turning in or out of Arcade, the streets are so narrow that pedestrians can get hit often.
- Drivers never stop, even when required by law.
- Walking and Bicycling Safety- separated paths, green bike lanes or crossings. Flashing Beacons at crossings by schools
- North south bike lanes
- No turn lanes on Arcade and Maryland results in backup and car drivers moving into the lane to their right to try and get through a green light.
- When buses stopped, ALL traffic stop. Need indentation for buses!!

What would improve your experience walking along Arcade…

- Bigger street to accommodate street parking.
- Bike path
- No parking signs within 60 feet of intersections near the schools as to avoid blind spots when kids may start to cross.
- Make 1 lane each direction with a bike lane. Remove parking if you have to.
- New construction to help local businesses grow, safer overall would be great!
- Space between car lanes and sidewalk. The cars get so close to the sidewalk because the lanes are so narrow
- Something to mitigate amount of Trash on the street/sidewalks
- Reducing Arcade to two lanes with a turn lane in the middle, like Maryland Ave
- Less vehicle focus
- Better access to Lake Phalen by Frost Avenue park entrance off Arcade
- crosswalk signals (e.g. flashing light) at Orange Ave intersection
- Fewer traffic lanes for cars
- Separate bike paths and lanes. Flashing Beacons at intersections going to schools
- Bike lanes to get to where I can walk, such as eat street Payne Ave

What would improve your experience driving along Arcade…

- sidewalks where there are none, bike paths, coordinated lights so getting through one = through another; less parking
- Cleanliness
- Slower speed. One lane only. People swerve back and forth between the 2 lanes.
- Bike lanes
- It gets congested at lights and its hard to see people. Better turn lanes, similar to Phalen, Maryland
- either more or less parking. either make it a functioning city street with more parked cars and fewer lanes or stop letting cars part just north of Maryland for half a block
- Better enforcement of traffic laws (running lights, illegal turns, illegal passing, speeding)
- Lower LOS to aid in slower speeds
- Resurfacing!
- Traffic circles, to slow traffic and ease congestion at the stop lights, especially needed at the intersection of Arcade & Wheelock Pkwy.
- Bike lanes
- Left turn arrows at Arcade/Maryland intersection
- More police presence
- Free traffic lanes for cars
- I don't recall having any issues while driving on Arcade--it's mainly while walking and trying to cross Arcade at an uncontrolled intersection.
- Better surface
- Separated bike lanes and paths. Green painted bike lanes and crossings. Slow speeds 15-20 mph.
- Designated north south bike lane near by to keep traffic separated.
- Wider roads. Arcade needs to be two lane AND parking for businesses.

Category	Location	Initial Comment	Comment	Comment Date	Like	Dislike
Other Comment	Case Avenue	Many Johnson senior high students use this bus stop at case ave all year round. Even through the winter. There is only one small bench there and nothing to cover them from the rain or snow.				
Walking Comment	Cottage Avenue	many students get food from the gas station here before and during school hours, but they have to cross without a crosswalk or signal and cars don't stop	I Agree	9/25/2020 20:46	3	0
Walking Comment	Cottage Avenue	many students get food from the gas station here before and during school hours, but they have to cross without a crosswalk or signal and cars don't stop	I Agree, I worry about cars going to fast.	10/3/2020 4:17	3	0
Walking Comment	Cottage Avenue	many students get food from the gas station here before and during school hours, but they have to cross without a crosswalk or signal and cars don't stop	I Agree	10/6/2020 16:28	3	0
Vehicle Traffic Comment	Cottage Avenue	Vehicles are going much too fast. They don't stop for walkers or bicycles. I would like to see a traffic "calming system" such as Maryland Avenue has instituted. I would like to see it from Maryland Avenue to Larpentuer at least and possibly as far as Parkway Drive/Frost Avenue.				
Walking Comment	Ivy Avenue	Students at Johnson High School use the MTC busses to commute to and from school. The bus stop is near the northwest corner of the intersection of Arcade and Ivy. More than once a student has been hit by a car while crossing the intersection in front of the bus, while it is dropping passengers off. To be clear, the student should have looked, however, it seems like there is an easy way to make this situation less dangerous.	I Agree	9/25/2020 20:45	2	0
Walking Comment	Ivy Avenue	Students at Johnson High School use the MTC busses to commute to and from school. The bus stop is near the northwest corner of the intersection of Arcade and Ivy. More than once a student has been hit by a car while crossing the intersection in front of the bus, while it is dropping passengers off. To be clear, the student should have looked, however, it seems like there is an easy way to make this situation less dangerous.	I Agree, let's prioritize the situation to make it less dangerous.	10/3/2020 4:18	2	0
Vehicle Traffic Comment	Ivy Avenue	Please add a left turn signal. Traffic gets really congested when there is oncoming traffic when turning into Johnson.	I have witnessed an accident here. A green arrow going north would have helped. The woman traveling northbound had to be taken away in an ambulance.	10/3/2020 4:20		
Transit Comment	Ivy Avenue	There isn't a bus shelter here, and I know it would be tight to fit it next to the elementary school playground. Still, it can get pretty windy and cold.				
Bicycling Comment	Ivy Avenue	Many Johnson High School students and a few staff commute to school by bike. Please make sure to prioritize the safety of bikers--it's the greenest way to travel outside of walking!				
Bicycling Comment	Ivy Avenue	Improved bike lanes/safety awareness for those staff/students who choose to bike to school. Total Pedal Power!				
Walking Comment	Jenks Avenue	Lots of students from Farnsworth or Johnson cross here and it can be dangerous to pedestrians and motorists if traffic signals and walk signals are not being adhered to. Sometimes people (not saying students, just people) randomly walk across Maryland at all hours of the day, in a crosswalk, out of a crosswalk, diagonal across the road, and expect cars to stop, which is not safe.				
Vehicle Traffic Comment	Jenks Avenue	It is nearly impossible to turn left from Eastbound Jenks onto Nortbound Arcade. I worked at Farnsworth for 9 years and started coming home a different way since it can take forever to turn left here, and often you are backing cars up that are trying to turn right onto Southbound Arcade.				
Vehicle Traffic Comment	Larpenteur Avenue	Traffic comes in pretty quickly here. It would be safer to add a traffic light, then move from 4 lanes to 2 lanes and a turn lane at this point.	I Agree	10/6/2020 16:27	1	0
Transit Comment	Larpenteur Avenue	This is the saddest bus stop. It's so overgrown with weeds!				
Vehicle Traffic Comment	Maryland Avenue	It's so hard to get into the turn lane here because of the parking, and traffic gets really crazy just trying to merge around the parked cars	I Agree	9/25/2020 20:46	1	0
Vehicle Traffic Comment	Maryland Avenue	It's so hard to get into the turn lane here because of the parking, and traffic gets really crazy just trying to merge around the parked cars	I agree, this is hard. Because of this parking, I usually turn west earlier on Arcade, and drive through neighborhoods instead of going directly from Arcade to Maryland.	10/3/2020 4:21	1	0
Transit Comment	Maryland Avenue	This is a major intersection for transit. Let's make sure to prioritize bus traffic and transfers in the redesign process.				
Vehicle Traffic Comment	Maryland Avenue	This intersection can be nuts. There needs to be green turn arrows turning onto Maryland from the South or the North. If you are heading southbound on Arcade and are trying to turn left onto Maryland going East, you are taking your life in your hands on a green light since so many northbound cars zoom around the line of cars backed up to turn left to go West on Maryland, and you cannot often see them until you are out in the intersection and turning left yourself. This is just a dangerous intersection for everyone. And the parked cars allowed in the right southbound lane before Maryland screw everything up.				
Vehicle Traffic Comment	Maryland Avenue	Cars (heading Eastbound on Maryland) turning left into Burger King sometimes back traffic up a bit.				
Walking Comment	Maryland Avenue	Lots of Farnsworth Upper students cross Arcade here and it can be very dangerous since there are some motorists that speed up and down Arcade Street. This could/should be a 4 way stop or a lighted intersection for everyone's safety.				
Transit Comment	Nebraska Avenue	The current plan just drops northbound bus commuters off on the golf course, no matter what the weather. Could we put a crosswalk in here? Or at least a place to stand until it's safe to cross?				

APPENDIX B

Intersection	Traffic Control	Safety Criteria				Potential Demand Criteria (#)			Infrastructure (Existing + Planned) Criteria			Public Criteria														
		Total Bike/Ped Crashes (children)	Total Bike/Ped Crashes	Total Turning Volume (AM+PM)	Total StreetLight Index (Ped+Bike)	Student Population (0.25 miles)	School or Child Destinations (0.25 miles)	Adjacent Bus Stop	Existing Marked Crossing	Bicycle Network (planned or existing)	Included in a Previous Plan	Public Feedback (# identified)					Safety Rank				Demand Rank		Inf. Rank	Public Rank	Safety + Demand	All
Maryland	Signal	3	12	4,192	1,124	39	1	4	1	0	1	6	*1*	*1*	*1*	*2*	**1.3**	*7*	*4*	*1*	**3.3**	*2*	**5**	**1**	**2.3**	**2.6**
Case	Signal	2	6	795	790	49	0	2	1	1	1	1	*3*	*2*	*4*	*3*	**3.0**	*3*	*15*	*2*	**5.8**	*3*	**1**	**5**	**4.4**	**3.7**
Ivy	Signal	3	3	681	508	12	3	2	1	0	0	6	*1*	*4*	*5*	*11*	**5.3**	*17*	*1*	*2*	**6.3**	*1*	**7**	**1**	**5.8**	**4.9**
York	SSSC	1	3	442	1,781	24	2	2	1	0	0	0	*4*	*4*	*11*	*1*	**5.0**	*12*	*2*	*2*	**5.3**	*1*	**7**	**6**	**5.1**	**5.8**
Wheelock	Signal	0	3	1,965	513	4	0	2	1	1	1	0	*10*	*4*	*2*	*10*	**6.5**	*19*	*15*	*2*	**10.6**	*3*	**1**	**6**	**8.6**	**6.0**
Neid	Signal	1	4	1,100	341	0	0	2	1	1	1	0	*4*	*3*	*3*	*17*	**6.8**	*20*	*15*	*2*	**10.9**	*3*	**1**	**6**	**8.8**	**6.2**
Lawson	SSSC	0	1	508	436	39	1	2	0	0	1	0	*10*	*7*	*6*	*13*	**9.0**	*7*	*4*	*2*	**5.5**	*1*	**7**	**6**	**7.3**	**6.9**
Jenks	SSSC	0	0	493	630	45	1	0	0	0	1	2	*10*	*16*	*7*	*5*	**9.5**	*4*	*4*	*13*	**7.6**	*1*	**7**	**4**	**8.6**	**7.0**
Magnolia	Signal	0	1	294	399	65	2	2	1	0	0	0	*10*	*7*	*18*	*14*	**12.3**	*1*	*2*	*2*	**4.3**	*1*	**7**	**6**	**8.3**	**7.4**
Jessamine	SSSC	0	0	271	565	39	1	0	1	1	1	0	*10*	*16*	*19*	*8*	**13.3**	*7*	*4*	*13*	**9.3**	*3*	**1**	**6**	**11.3**	**7.4**
Cottage	SSSC	1	1	449	447	24	1	2	0	0	0	4	*4*	*7*	*10*	*12*	**8.3**	*12*	*4*	*2*	**6.6**	*0*	**12**	**3**	**7.4**	**7.5**
Hyacinth	SSSC	0	0	456	619	20	1	0	0	1	1	0	*10*	*16*	*9*	*6*	**10.3**	*16*	*4*	*13*	**10.8**	*2*	**5**	**6**	**10.5**	**8.0**
Rose	SSSC	1	1	296	656	41	1	1	0	0	0	0	*4*	*7*	*16*	*4*	**7.8**	*6*	*4*	*12*	**7.4**	*0*	**12**	**6**	**7.6**	**8.3**
Geranium	SSSC	0	1	334	528	34	1	2	0	0	0	0	*10*	*7*	*15*	*9*	**10.3**	*10*	*4*	*2*	**6.6**	*0*	**12**	**6**	**8.4**	**8.7**
Sims	SSSC	0	1	429	155	45	1	0	0	0	0	0	*10*	*7*	*12*	*20*	**12.3**	*4*	*4*	*13*	**8.3**	*0*	**12**	**6**	**10.3**	**9.6**
Orange	SSSC	1	1	372	233	24	0	2	0	0	0	0	*4*	*7*	*14*	*18*	**10.8**	*12*	*15*	*2*	**9.9**	*0*	**12**	**6**	**10.3**	**9.7**
Cook	SSSC	0	0	379	343	60	1	0	0	0	0	0	*10*	*16*	*13*	*16*	**13.8**	*2*	*4*	*13*	**8.2**	*0*	**12**	**6**	**11.0**	**10.0**
Hawthorne	SSSC	0	1	296	598	30	0	0	0	0	0	0	*10*	*7*	*16*	*7*	**10.0**	*11*	*15*	*13*	**12.3**	*0*	**12**	**6**	**11.1**	**10.1**
Clear	SSSC	1	1	144	208	11	1	0	0	0	0	0	*4*	*7*	*20*	*19*	**12.5**	*18*	*4*	*13*	**11.9**	*0*	**12**	**6**	**12.2**	**10.6**
Sherwood	SSSC	0	0	470	385	22	0	0	0	0	0	0	*10*	*16*	*8*	*15*	**12.3**	*15*	*15*	*13*	**13.8**	*0*	**12**	**6**	**13.0**	**11.0**

APPENDIX C

Major Street	Limit 1	Limit 2	Parking West (ft)	Parking East (ft)	Supply (West)	Supply (East)	Demand Wed, May 2, 2018, 2-4 pm (West)	Demand Wed, May 2, 2018, 2-4 pm (East)	Occupancy Wed, May 2, 2018, 2-4 pm (West)	Occupancy Wed, May 2, 2018, 2-4 pm (East)	Demand Fri, Sept 7, 2018, 4-6 pm (West)	Demand Fri, Sept 7, 2018 , 4-6 pm(East)	Occupancy Fri, Sept 7, 2018, 4-6 pm (West)	Occupancy Fri, Sept 7, 2018, 4-6 pm (East)	Demand Fri, April 19, 2019, 11a-1p (West)	Demand Fri, April 19, 2019, 11a-1p (East)	Occupancy Fri, April 19, 2019, 11a-1p (West)	Occupancy Fri, April 19, 2019, 11a-1p (East)	Demand Thur, Aug, 29, 2019, 10a-12p (West)	Demand Thur, Aug, 29, 2019, 10a-12p (East)	Occupancy Thur, Aug, 29, 2019, 10a-12p (West)	Occupancy Thur, Aug, 29, 2019, 10a-12p (East)	Demand Thur, June 25 2020, 11:30p (West)	Demand Thur, June 25, 2020, 11:30p (East)	Occupancy Thur, June 25, 2020, 11:30p (West)	Occupancy Thur, June 25, 2020, 11:30p (East)	Demand Sat, June 27, 2020 (West)	Demand Sat, June 27, 2020 (East)	Occupancy Sat, June 27, 2020 (West)	Occupancy Sat, June 27, 2020 (East)	Highest Demand (West)	Highest Demand (East)	Highest Occupancy (West)	Highest Occupancy (East)
Arcade Street	Neid Lane	York Avenue	0	0	0	0	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	York Avenue	Sims Avenue	170	175	6	7	0	4	0%	57%	2	4	33%	57%	0	2	0%	29%	1	4	17%	57%	0	0	0%	0%	0	0	0%	0%	2	4	33%	57%
Arcade Street	Sims Avenue	Case Avenue E	0	205	0	8	0	0	0%	0%	0	1	0%	13%	0	0	0%	0%	0	0	0%	0%	0	1	0%	13%	0	0	0%	0%	0	1	0%	13%
Arcade Street	Case Avenue	Jenks Avenue E	130	135	5	5	2	0	40%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	2	0	40%	0%
Arcade Street	Jenks Avenue	Lawson Avenue E	120	215	4	8	3	1	75%	13%	2	3	50%	38%	2	3	50%	38%	0	1	0%	13%	0	0	0%	0%	1	1	25%	13%	3	3	75%	38%
Arcade Street	Lawson Avenue	Cook Avenue	230	210	9	8	5	3	56%	38%	0	1	0%	13%	4	0	44%	0%	2	0	22%	0%	0	0	0%	0%	0	0	0%	0%	5	3	56%	38%
Arcade Street	Cook Avenue	Magnolia Avenue E	0	118	0	4	0	0	0%	0%	0	1	0%	25%	0	0	0%	0%	0	1	0%	25%	0	0	0%	0%	0	0	0%	0%	0	1	0%	25%
Arcade Street	Magnolia Avenue	Jessamine Avenue E	155	90	6	3	5	0	83%	0%	6	3	100%	100%	4	3	67%	100%	4	1	67%	33%	0	0	0%	0%	1	0	17%	0%	6	3	100%	100%
Arcade Street	Jessamine Avenue	Geranium Avenue E	165	175	6	7	2	0	33%	0%	3	4	50%	57%	0	1	0%	14%	0	1	0%	14%	0	0	0%	0%	0	0	0%	0%	3	4	50%	57%
Arcade Street	Geranium Avenue	Rose Avenue E	205	135	8	5	0	1	0%	20%	0	2	0%	40%	0	0	0%	0%	0	1	0%	20%	0	2	0%	40%	0	2	0%	40%	0	2	0%	40%
Arcade Street	Rose Avenue	Maryland Avenue E	0	0	0	0	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Maryland Avenue	Hawthorne Avenue E	215	165	8	6	0	0	0%	0%	0	0	0%	0%	2	0	25%	0%	4	0	50%	0%	1	0	13%	0%	0	0	0%	0%	4	0	50%	0%
Arcade Street	Hawthorne Avenue	Orange Avenue E	215	135	8	5	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Orange Avenue	Hyacinth Avenue E	210	225	8	9	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Hyacinth Avenue	Ivy Avenue E	240	260	9	10	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Ivy Avenue	Clear Avenue E	180	210	7	8	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Clear Avenue	Cottage Avenue E	200	240	8	9	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Cottage Avenue	Sherwood Avenue	170	202	6	8	1	0	17%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	1	0	17%	0%
Arcade Street	Sherwood Avenue	Wheelock Parkway	168	60	6	2	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Arcade Street	Wheelock Parkway	Nevada Avenue E	0	0	0	0	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%	0	0	0%	0%
				Total	**104**	**112**	**18**	**9**	**17%**	**8%**	**13**	**19**	**13%**	**17%**	**12**	**9**	**12%**	**8%**	**11**	**9**	**11%**	**8%**	**1**	**3**	**1%**	**3%**	**2**	**3**	**2%**	**3%**	**26**	**21**	**25%**	**19%**