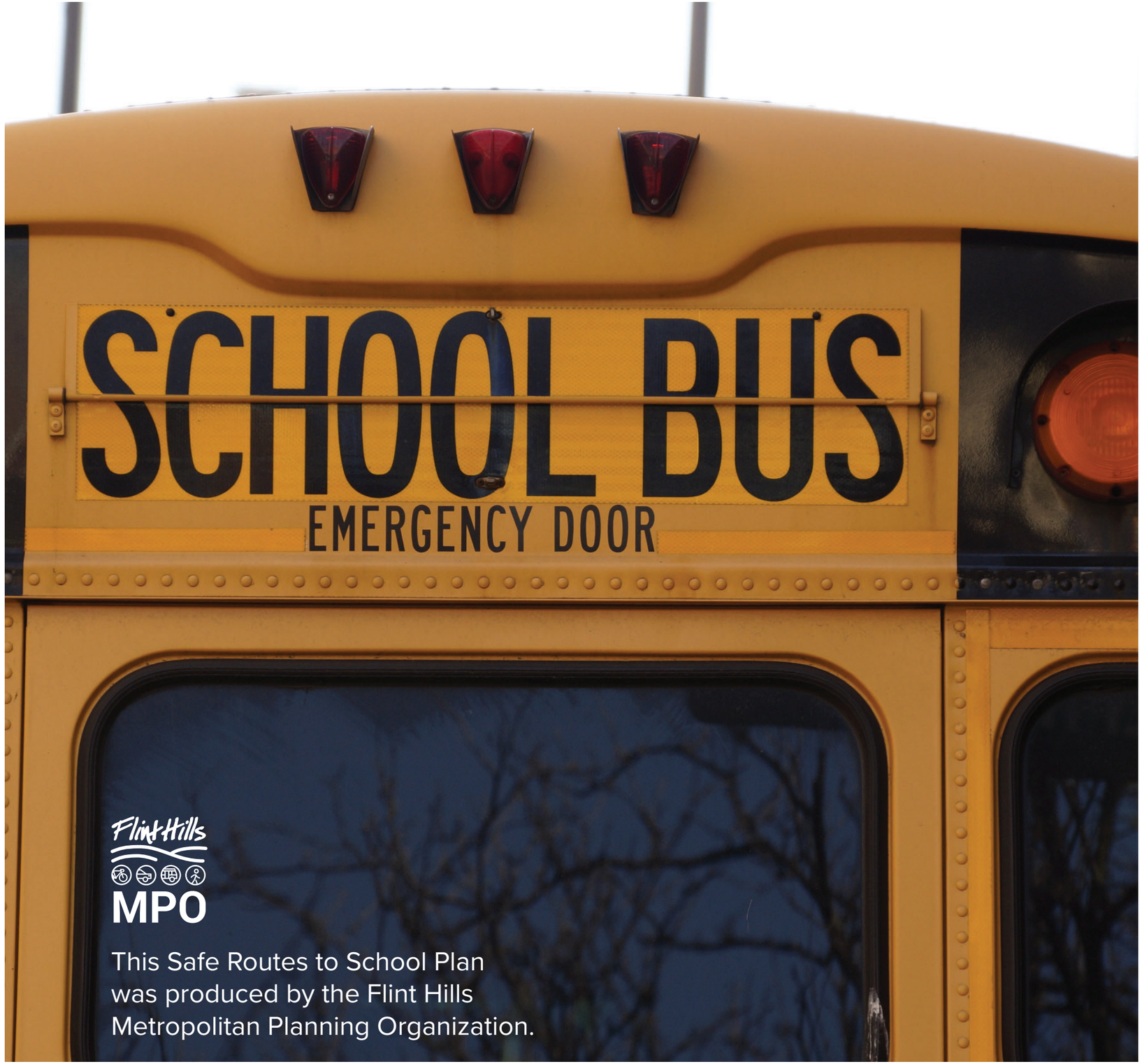
# USD 383
# Safe Routes to School
## 2023 Report Update

*Adopted by USD 383: Nov. 1, 2023 | City of Manhattan: Nov. 21, 2023 | Pottawatomie County: Dec. 4, 2023*

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# Safe Routes to School Overview

Safe Routes to School (SRTS)  is a federally-funded program administered by the Kansas Department of Transportation. The goal of the program is to improve safety for children walking and biking to school.

SRTS uses the Six Es to guide projects:

**Education** - teaches students, parents, drivers, and community residents about traffic safety and active transportation.

**Encouragement** - gets children and their families excited about walking and biking to school.

**Enforcement** - focuses on implementing traffic calming countermeasures or crossing guards.

**Equity** - benefits all students, regardless of race, household income, ability, or gender.

**Evaluation** - measures the impact of SRTS efforts over time and helps identify updates or changes.

**Engineering** - physical improvements to the transportation infrastructure in a community, with respect to getting children to school safely.


*Figure 1.*

# Safe Routes to School Context

This SRTS document builds on the 2015 SRTS plan, which focused primarily on sidewalk networks and gaps.  In the eight years since, there have been many changes in SRTS planning and policies, including new design standards and innovative programming.

In addition, this SRTS plan fits into the multi-modal transportation vision laid out in the Manhattan Area Transportation Strategy (MATS) and Connect 2040. The SRTS plan builds on and supports projects identified in the City of Manhattan's Bicycle & Pedestrian Systems Plan and Pottawatomie County's Green Valley Pedestrian Plan.

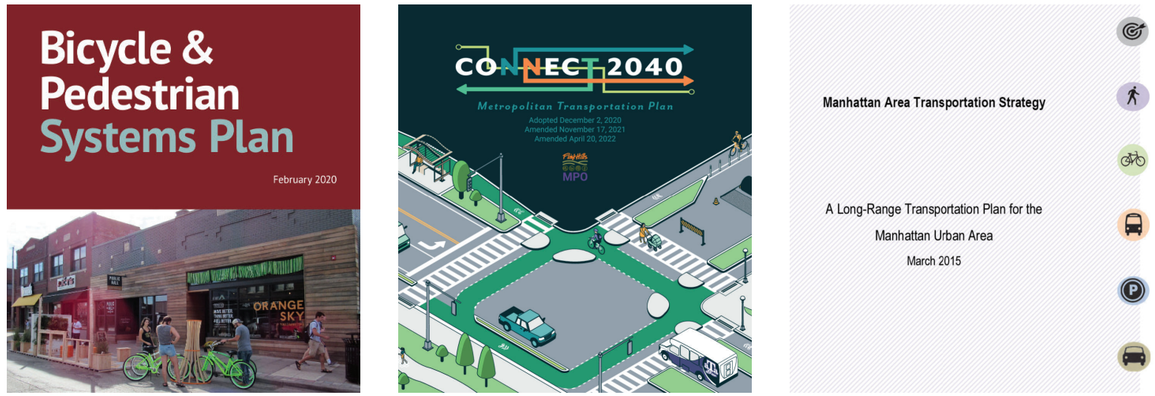



*Figure 2.*

# Manhattan, KS Overview

This report is designed to be concise and user-friendly. To this end, the report will be built on school-specific chapters, using graphics, tables and charts, project diagrams, and lists to address the 6Es of the Safe Routes to School (SRTS) program.

As USD 383 spans two towns and two counties, the individual school chapters allow all communities to utilize this document while maintaining a cohesive and unified standard. In addition to the 13 elementary, middle, and high schools in USD 383, this document also addresses two private schools, Manhattan Catholic School and Flint Hills Christian School, whose students utilize public infrastructure to get to and from school.

Figure 3 shows the attendance zones for USD 383's schools.

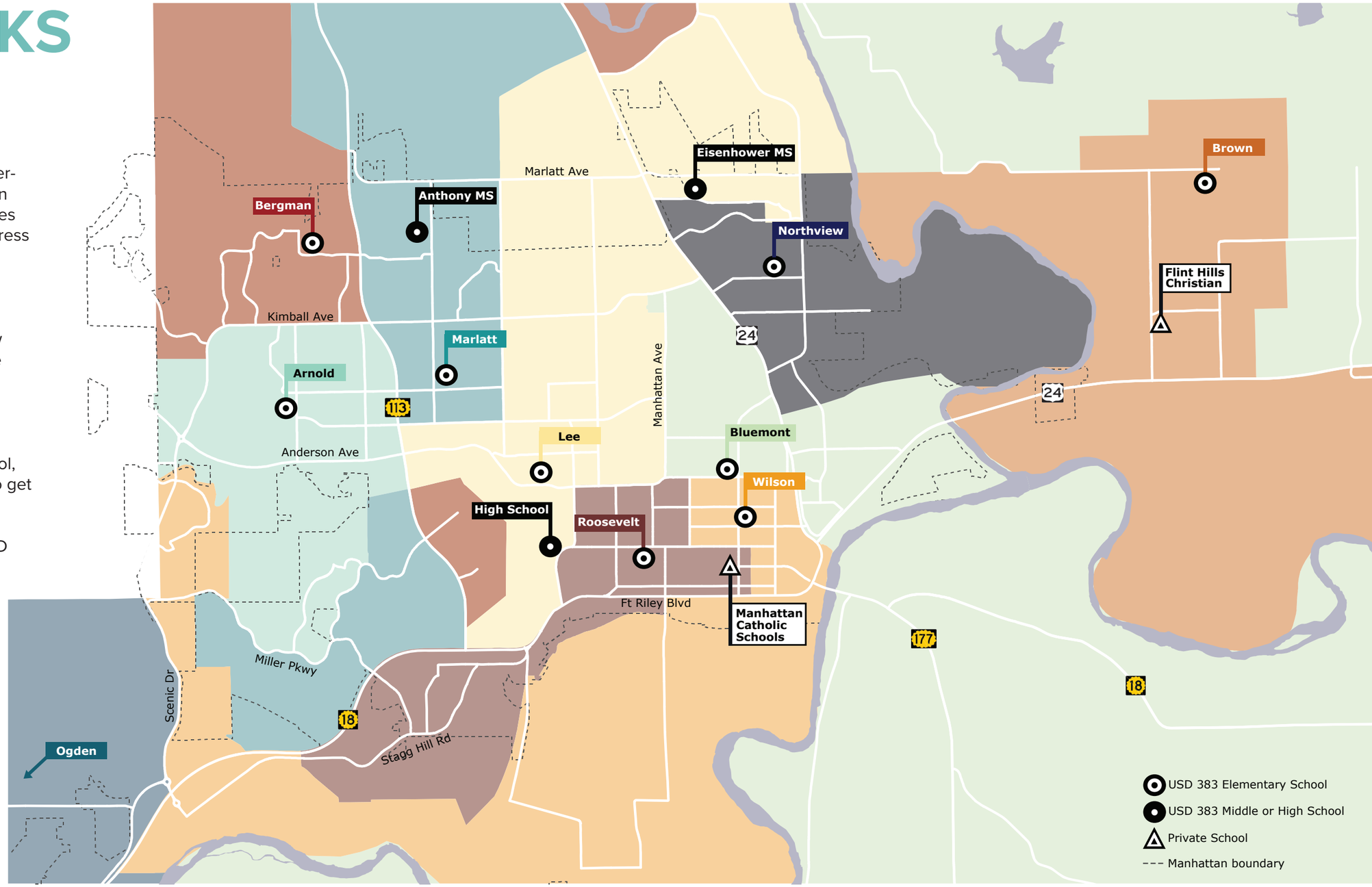



*Figure 3.*

# USD 383 SRTS Report Goals

## 1. Increase Walking and Biking To & From School

- *Increase USD 383 student walking and bicycling rates by 5% at each school.*
- *Create designated "Safe Routes" to school for all elementary and middle schools.*

## 2. Improve Crossings

- *Implement countermeasures supported in the Federal Highway Administration's (FHWA) STEP (Safe Transportation for Every Pedestrian) initiative at crossings identified as "Key Crossings" in this report, as well as those in the City of Manhattan's Bicycle & Pedestrian Safety Plan (BPSP).*
- *Upgrade crossings of arterial and collector roadways along designated Safe Routes with proven safety countermeasures to prioritize people walking and biking.*

## 3. Improve Biking & Walking Infrastructure

- *Fill sidewalk gaps to increase the number of completed sidewalks along Safe Routes from:*
  - *92% to 95% for elementary schools*
  - *85% to 90% for middle schools*
- *Implement projects identified in the BPSP that align with this Safe Routes to Schools Report.*

### *Status Quo & A Way Forward*

USD 383 has several schools that serve as traditional neighborhood schools, with students from adjacent neighborhoods within walking distance.

However, due to uneven school distribution and Environmental Justice issues, most schools do not function solely as such. Instead, attendance zones are often extended along boundaries that do not support walking and biking.

In several instances, separate island attendance zones are present, requiring buses or private vehicles to transport students across town, bypassing closer schools. Despite this, this report will focus on pragmatic and impactful policies and projects to allow students living within close proximity to their school the opportunity to walk and to do so safely and conveniently.

# Parent-Led Planning

To reach our goals, Manhattan must not only improve the built environment based on standard GIS and engineering analysis, but also understand and directly address parental concerns and barriers to having their children walk to school. This is Parent-led Planning.

Analysis of the 1,124 parental survey responses received from elementary and middle school parents identified issues and concerns with having their children walk or bike to school. Figure 4 provides a visual summary of survey data. The insights gained through parental surveys have directly influenced the goals, projects, and policy recommendations of this SRTS report.

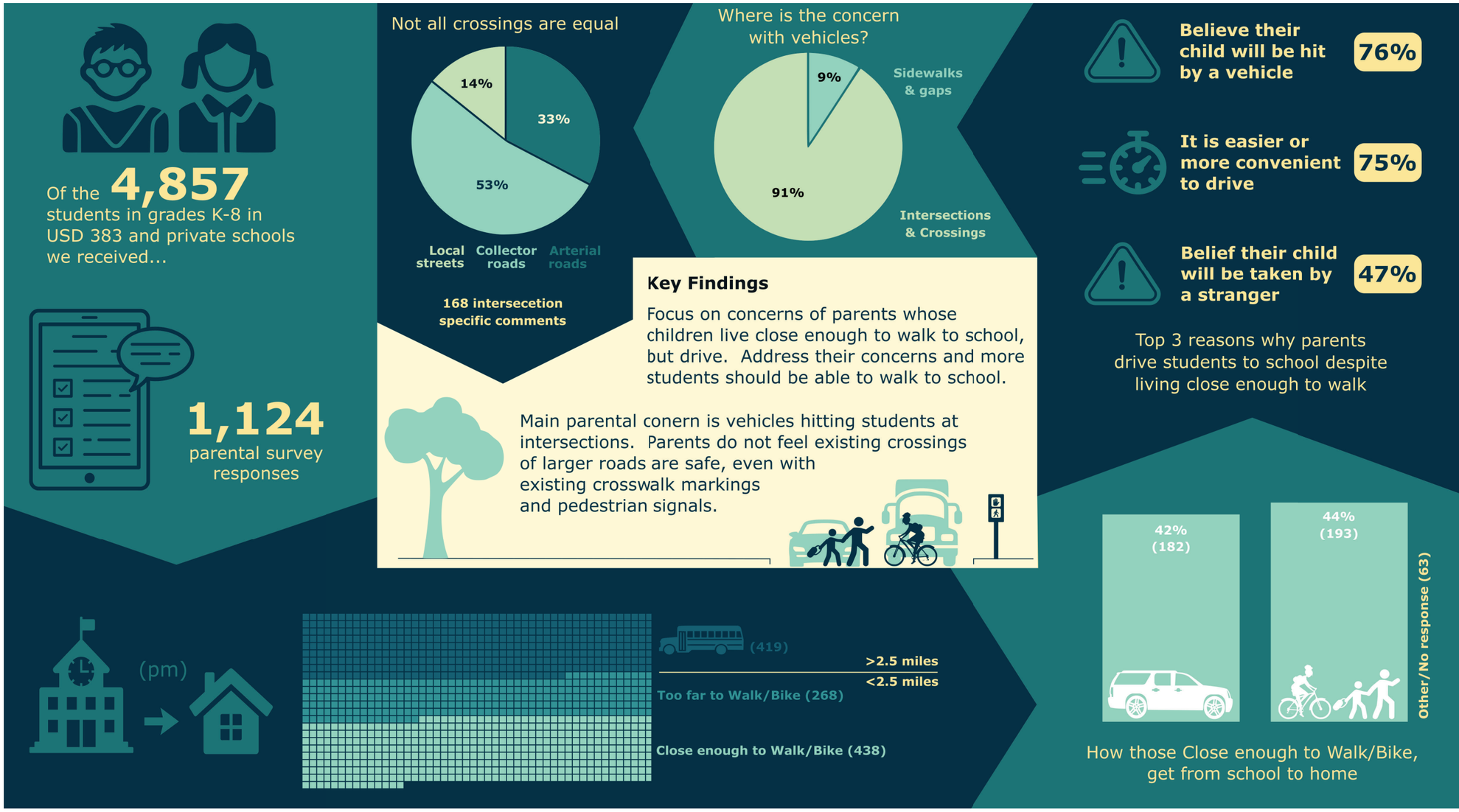



*Figure 4.*

# SRTS Strategy Overview

| Section | Policy | Curriculum | Project - Program |
|---|---|---|---|
| Education | | Bicycle Safety and Awareness Program (BSAP) *pg 14* | |
| Encouragement | | BSAP *pg 14* | Safe Routes *pg 17*<br>Walking School Bus *pg 18*<br>Bike Bus *pg 20*<br>School Streets *pg 20* |
| Enforcement | School Zone patrols *pg 21* | | Crossing guards *pg 21* |
| Equity | Sidewalk cost share policy *pg 26* | BSAP *pg 14* | Sidewalk cost share policy *pg 26* |
| Evaluation | | BSAP *pg 14* | School bike-walk counts *pg 27*<br>Parent surveys *pg 27*<br>FHWA Safety PM 5 *pg 29* |
| Engineering | Funding source(s) *pg 7*<br>Crossing improvements *pg 31* | | Sidewalks *pg 31*<br>Crossings *pg 31* |

*Figure 5.*

# Funding

Manhattan has multiple sources of funding for SRTS, each with specific requirements and limitations. The list below details the current funding sources. The City attempts to optimize these funds by joining them when applicable, as well as using them as local match for various grant opportunities.

1. **Community Development Block Grant (CDBG)**
   - » *While CDBG has been used in the past to improve sidewalk condition or connectivity, this federal source of funding is limited to specfic neighborhoods. The City's allocation of CDBG has continually decreased over the last five years, reducing the viability of this funding source.*
2. **Recreation & Trails Sales Tax**
   - » *$200,000 annually, but more recreation focused.*
3. **General Funds/Special Street and Highways (SSH)**
   - » *There is an annual $100,000 set-aside specficially for sidewalk gaps.*
4. **Blue Cross & Blue Shield of Kansas Pathways**
   - » *In partnership with FHWC, received $100,000 in 2022 as local match for KDOT Transportation Alternatives (TA) grant, more in future).*
5. **Surface Transportation Program (STP)**
   - » *Set aside for bicycle and pedestrian projects at the state level.*

# High Priority Projects

Dozens of projects were identified across USD 383 schools, including sidewalk gaps, crossings, etc.  As part of this report, the City of Manhattan was awarded funding to hire Benesch, an engineering firm assisting to create cost estimates for high priority projects.  Staff at the City of Manhattan and Flint Hills MPO worked together to identify these key projects, and Benesch provided the detailed cost estimates. These cost estimates can be found in Appendix D.

These estimates provide a better understanding of the total work and costs involved with these projects, including items such as grading, stormwater and utilities, road work and traffic control, etc.  With this detailed information, the goal is to allow the City of Manhattan to better plan and fund future projects as well as have more informed and competitive grant applications.

The following pages provide a list of projects designated as high priority. More detailed information, including maps and descriptions of both high priority and lower-priority projects, can be found in individual school chapters. A map of high priority projects is shown in Figure 7. Some of the listed projects fall under additional designations, including FHWA STEP and demonstration or semi-permanent eligible projects (semi-permanent project shown in Figure 6). Relevant abbreviations are shown in the table below.

| Acronym | Full Term* |
|---|---|
| LPI | Leading Pedestrian Interval |
| MUP | Multi Use Path |
| PHB | Pedestrian Hybrid Beacon |
| RRFB | Rectangular Rapid Flashing Beacon |

**For illustrations and definitions of each term, see Appendix C.*

*Figure 6.*

# List of High Priority Projects

| ID | School | Location | Type | Improvement | Project Details | BPSP Project | 2015 SRTS Project | ATA Partner Project | Demo/Semi-Perm. Eligible | FHWA STEP | Cost Estimate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **A1** | Amanda Arnold | Anderson Avenue at Hudson Avenue | Crossing | PHB | Install new curb ramps and PHB. | ● | | | | ● | ● |
| **A4** | Amanda Arnold | Plymouth Road | Sidewalk | New Sidewalk | Install sidewalk on the westside of Plymouth Road from ped island to Little Kitten Avenue. | | ● | | | | ● |
| **Bg1** | Frank Bergman | Hudson Trail at Englewood Street | Crossing | Ped. Island | Upgrade existing semi-permanent pedestrian island to permanent. | | | | ● | ● | ● |
| **Bg2** | Frank Bergman | Hudson Trail at Londondery Drive | Crossing | Ped. Island | Upgrade existing semi-permanent pedestrian island to permanent. | | | | ● | ● | ● |
| **Bg4** | Frank Bergman | Westbaker Street | Signage | School Zone | Install signage for School Zone as Westbaker Street is now a drop-off/pick-up zone. | | | | | | |
| **B1** | Bluemont | Juliette Avenue at Vattier Street | Sidewalk & Crossing | RRFBs | Install RRFBs at the crossing of Juliette Avenue at Vattier Street. | | | | | ● | ● |
| **L1** | Lee | Hunting Avenue at Harris & Lee Streets | Sidewalk & Crossing | Reconstruct Intersection | Replace the existing “Y” intersection with a standard “T” intersection and extend the sidewalk on the southside of Hunting west to the crosswalk at Lee. | | ● | | | | ● |
| **L2** | Lee | Claflin Road at Sunset Avenue/ Jarvis Drive | Crossing | Crosswalk and Signal | Remove the existing crosswalk and ped signals. Move the crosswalk to the eastern side of Sunset Avenue/Jarvis Drive and install new ramps. | ● | | ● | | ● | ● |
| **L3** | Lee | Claflin Road at Sunset Avenue/ Jarvis Drive | Crossing | LPI | Upgrade the signals (existing or new) with Lead Pedestrian Intervals (LPIs). Can be done in conjuction with L2. | | | ● | | ● | |
| **L4** | Lee | College Heights Road | Sidewalk | New & Replace Sidewalk | Install new segments and replace “Poor” condition sidewalk along the northside of College Heights Road from Lee Street to College Avenue. | | ● | | | | ● |

# High Priority (continued)

| ID | School | Location | Type | Improvement | Project Details | BPSP Project | 2015 SRTS Project | ATA Partner Project | Demo/Semi-Perm. Eligible | FHWA STEP | Cost Estimate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **L5** | Lee | Jarvis Drive | Sidewalk | New Sidewalk | Install sidewalk on the eastside of Jarvis Road from Todd Street to Jardine Drive. | | | ● | | | ● |
| **M2** | Marlatt | Kimball Avenue at Browning Avenue | Crossing | LPI | Upgrade existing signals with Lead Pedestrian Intervals (LPIs). | ● | | | | ● | |
| **M6** | Marlatt | Hillview Drive | Sidewalk | New Sidewalk | Install sidewalk on the westside of Hillview Drive from Kimball Avenue to existing sidewalk at St. Christopher Circle. | | | | | | ● |
| **M9a** | Marlatt | Browning Avenue | Sidewalk | Upgrade to MUP | Replace sidewalk with Multi-use Path (MUP) on the west side of Browning Avenue from Dickens Avenue to Kimball Ave. | | ● | ● | | | ● |
| **M9b** | Marlatt | Browning Avenue | Sidewalk | Upgrade to MUP | Replace sidewalk with Multi-use Path (MUP) on the west side of Browning Avenue from Kimball Avenue to Susan B. Anthony Trail. Remove existing crossing at Snowbird and install PHB and crosswalk at Rec Center entrance. | | ● | | | | ● |
| **N1** | Northview | Allen Road at Judson Street | Crossing | RRFBs | Install RRFBs at the crossing to Prairie Glen Trail. | ● | | | | ● | ● |
| **N2** | Northview | Casement Road at Allen Road | Crossing | PHB | Upgrade existing RRFB crossing to PHB or full signal. | ● | | ● | | ● | |
| **N9** | Northview | Griffith Drive | Sidewalk | New Sidewalk | Install sidewalk on the south side of Griffith Drive from Blue Valley Mobile Home Park to existing sidewalk at Northview Drive. | ● | ● | | | | ● |
| **O3a** | Oliver Brown | Green Valley Road at Junietta Road | Crossing | Multiple Options | Improve the crossing of Green Valley Road at Junietta Road following an engineering study. | | | | | | |
| **O3b** | Oliver Brown | Green Valley Road at Junietta Road | Crossing | Multiple Options | Install a mid-block pedestrian island with crosswalk, ADA ramps, and RRFBs approximately 250ft south of Junietta Road on Green Valley Road. Install sidewalk on the east side of Green Valley Road north to Junietta Road sidewalk. | | | | | ● | |

# High Priority (continued)

| ID | School | Location | Type | Improvement | Project Details | BPSP Project | 2015 SRTS Project | ATA Partner Project | Demo/Semi-Perm. Eligible | FHWA STEP | Cost Estimate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **O4** | Oliver Brown | Elk Creek Road | Sidewalk | New Sidewalk | Install sidewalks on the north side of Elk Creek Road from Green Valley Road to Excel Road. | | | | | | |
| **O5** | Oliver Brown | Excel Road | Sidewalk | New Sidewalk | Install sidewalks on both sides of Excel Road from Elk Creek Road to Harvest Road. | | | | | | |
| **O7** | Oliver Brown | Excel Road Extension | MUP | New MUP | Install a new Multi-use Path from the intersection of Excel and Harvest Roads north, across the creek, to Dave Drive and on to Oliver Brown. This extension could parallel an Excel Road extension, or be independent as a trail connection. | | | | | | |
| **O10b** | Oliver Brown | Junietta Road at Jackie's Way | Crossing | RRFBs | Install RRFBs at the eastern side crossing of Junietta Road at Jackie's Way. | | | | | ● | |
| **O14** | Oliver Brown | Elbo Creek: Nature Avenue to Raven Creek Drive | Creek Crossing | Bridge and Sidewalk | Install a pedestrian bridge across Elbo Creek, sidewalk extending to Nature Avenue on the west and the utility access road off of Raven Creek Drive. | | | | | | |
| **R1** | Roosevelt | S Manhattan Avenue at Houston Street | Crossing | Curb Extensions | Install crosswalk, signage, and curb extensions on S Manhattan Ave. | | | | ● | ● | ● |
| **R4** | Roosevelt | Poyntz Avenue and MLK Jr Drive | Crossing | LPI | Upgrade existing signals with Lead Pedestrian Intervals (LPIs). | | | ● | | ● | |
| **R5** | Roosevelt | 14th Street and Poyntz Avenue | Crossing | LPI | Upgrade existing signals with Lead Pedestrian Intervals (LPIs). | | | | | ● | |
| **R7** | Roosevelt | Ft Riley Boulevard | Sidewalk | New Sidewalk | Install sidewalk or multi-use path (MUP) on the north side of Ft Riley Boulevard from Westwood Road to MLK Jr. Drive and Yuma Street. | ● | ● | | | | ● |
| **W3** | Wilson | Juliette Avenue and Pierre Street | Crossing | Curb Extensions | Install curb extensions on all corners. | ● | | | ● | ● | ● |

# High Priority (continued)

| ID | School | Location | Type | Improvement | Project Details | BPSP Project | 2015 SRTS Project | ATA Partner Project | Demo/Semi-Perm. Eligible | FHWA STEP | Cost Estimate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **W7** | Wilson | Juliette Avenue at Railroad Tracks | Crossing | New Sidewalk and Signals | Install sidewalk on east side of Juliette filling the gap across the railroad tracks. Install signals & gates as needed. | | | | | | |
| **MCS1*** | Manhattan Catholic School | Pierre Street | Signage | School Zone signs | Move existing School Zone signs from northwest corner of Juliette Avenue and Pierre to the 600 block of Pierre to encompass the intersection. | | | | ● | | |
| **AMS1** | Anthony Middle School | Browning Avenue at Snowbird Drive | Crossing | PHB | Remove existing crosswalk and ramps at Snowbird Drive and install new crossing with PHB on the south side of the Rec Center driveway. | | | | | ● | ● |
| **EMS1** | Eisenhower Middle School | Walters Drive at Butterfield Road | Crossing & Sidewalk | Crosswalk and New Sidewalk | Remove the existing crossing of Walters Drive at Butterfield. Install a new mid-block crossing at the bus drop-off entry. Install sidewalk on the north side of Walters Drive from Brookville Drive to the Eisenhower parking lot entrance. Install new sidewalk north along the east side of the parking lot driveway to connect to the existing park sidewalk. | | | | | ● | ● |
| **HS1** | Manhattan High School | Westwood Road | Sidewalk | New Sidewalk | Install new sidewalk on the west side of Westwood Road from Ft. Riley Boulevard to Oak Street by removing existing curb line and shifting it 6ft east. Remove uphill bike lane and restripe roadway. | | | ● | | | ● |
| **HS2** | Manhattan High School | Poyntz Avenue and Sunset Avenue | Crossing | Multiple options | Improve the crossing of Sunset Avenue at Poyntz Avenue. Repair roadway. Options include roundabout, etc., dependent upon engineering study. | | | ● | | ● | |
| **HS4** | Manhattan High School | Anderson Avenue and Sunset Avenue | Crossing | LPI | Upgrade existing signals with Lead Pedestrian Intervals (LPIs). | | | | | ● | |

* Project details, including maps, can be found in Appendix E.

# High Priority Map

The map in Figure 7 shows the location of High Priority projects throughout the USD 383 attendance zones.

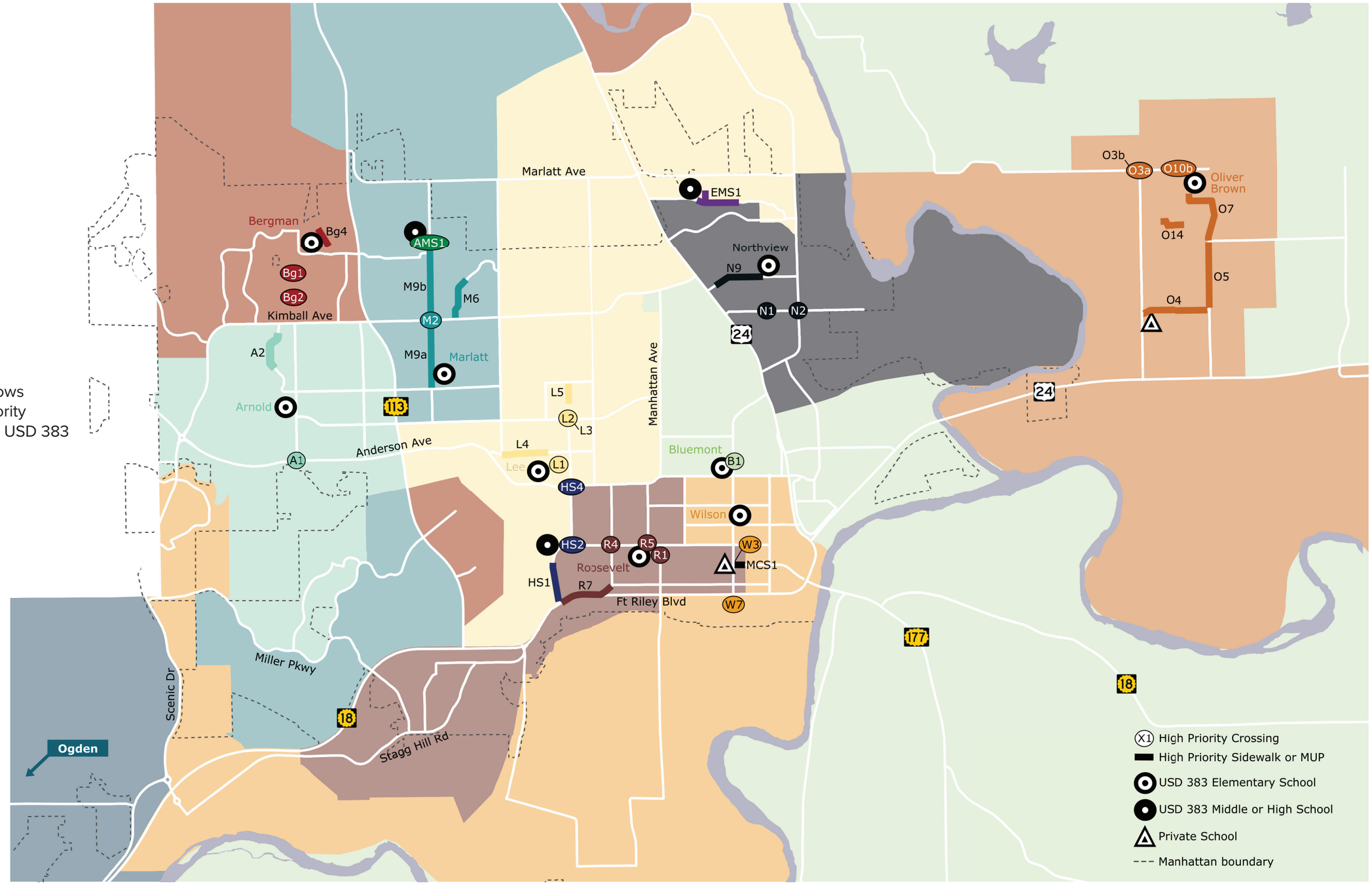



*Figure 7.*

# Education

***Bicycle Safety & Awareness Program (BSAP)***

BSAP is a curriculum that all 4th- and 5th-grade students complete annually. Students participate in bicycle safety lessons in the classroom and on bikes. The program, which improves bike riding competency and confidence, introduces students to transportation signage and rules, and has goals of creating safer cyclists in the short-term and safer drivers in the long-term.

BSAP was funded through a 2017 KDOT Transportation Alternatives grant, awarded to USD 383. The program began during the 2018-2019 school year, but was suspended in the spring of 2020 due to the COVID-19 pandemic. In the autumn of 2022, the program was restarted. Since its launching, this program has served as a model for several regional school districts, including Geary County USD 475 and Clay Center USD 379.

# Bicycle Safety & Awareness Program

> *"Personally, I think it has been **worth my time and effort**. I have had numerous students learn to ride for the very first time and the sense of accomplishment they feel is **priceless**."*
>
> Scott Snyder, Bluemont Elementary PE Teacher

*Figure 8.*
Students from Bluemont Elementary enjoying BSAP riding at Tuttle Creek State Park in April 2023, shown in Figures 8 and 9.

*Figure 9.*
Bluemont Elementary students navigating cones on their bicycles in Tuttle Creek State Park.

*Figure 10.*
During colder months and inclement weather, BSAP is held in school gymnasiums.

*Figure 11.*
All 30 BSAP bikes and accessories are stored in the USD's enclosed lockable trailer.

# Encouragement

This report provides four potential solutions to help students and parents feel more informed, supported, safe, and encouraged about walking and biking to school.

# ENCOURAGEMENT

## 1. Safe Routes

Using the pedestrian network of sidewalks and trails, designated **Safe Routes, which create identifiable and prioritized connections between schools and adjoining neighborhoods**, have been created for each school.

In effect, these routes function for people walking and biking in the same manner that collector and arterial roads do for vehicles, providing direct and safe access from local streets.  Proven successful in many communities, with investment in and promotion of these routes, students and parents can become more knowledgeable and feel more confident in the route taken to school.

Detailed information on individual routes is provided in the following school-specific chapters. Figure 12 maps the proposed designated Safe Routes across Manhattan and the district.

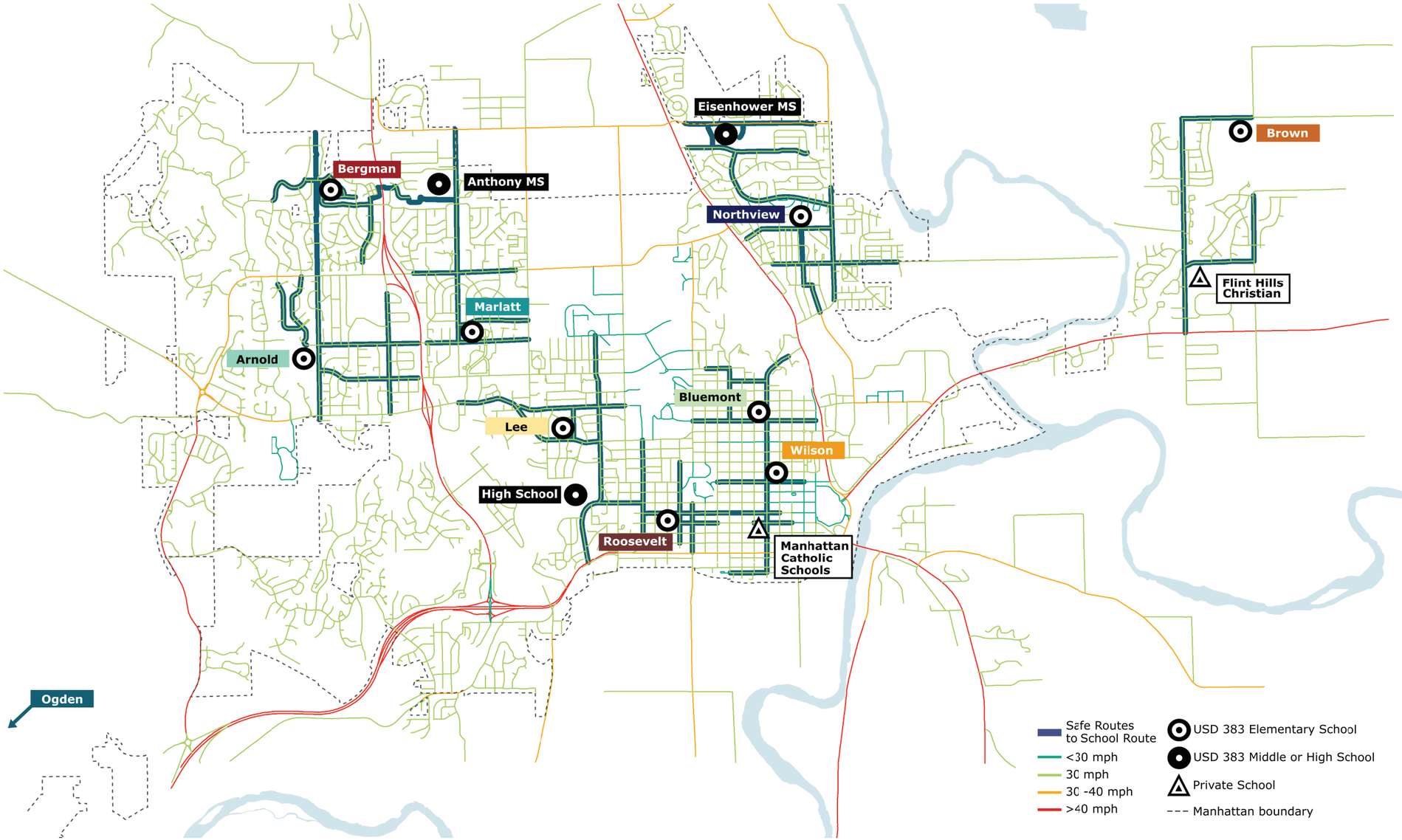



*Figure 12.*

# ENCOURAGEMENT

## 2. Walking School Bus

A Walking School Bus (WSB) is an organized program that involves a group of children walking to school with one or more adults along a defined route. As the bus progresses towards school, more students join. WSBs have grown in popularity around the nation and several are currently in operation in Kansas. These programs have been shown to have a major impact on the number and regularity of students walking to school. Most programs do not run daily (Monday, Wednesday, and Friday or Tuesday and Thursday) and are seasonal (August through Thanksgiving break and Spring Break through the end of the school year).

Parental Support: Parent surveys showed strong support for WSB across USD 383 schools (90% in support or interested), despite being a new idea to the region.

*Figure 13. Image courtesy of North Shore News.*

### *Walking School Bus Options*

Surveys asked a variety of questions to gauge parent support and comfort across a range of WSB options.

» **Parent/Volunteer-Led WSB**

Pros: Parent buy-in & flexibility
Cons: Potential volunteer shortage & reliability

» **Employee-Led WSB**

Pros: Reliable & background checks
Cons: Wages & costs, existing staff added hours or new staff

### *Arrival at School Confirmation*

Parental surveys indicated support for a text or email informing parents their student arrived at school. Options include using classroom attendance software paired with communications software. Currently, USD attendance software does not have this capability. Alternatively, the WSB lead could keep attendance and provide:

***Information on WSB Route***: Providing parents with information on the route of the WSB, which would follow defined Safe Routes to ensure safety and routine.

***Weather Backup:*** Inclement weather is a detractor to many for walking or biking. Depending upon the WSB details (employee-led vs parent/volunteer-led) there would be flexibility on this issue. It is not recommended the school provide transportation for those who normally participate in the WSB. Therefore, if a parent did not want their student walking, they would need to provide transportation.

# ENCOURAGEMENT | *Walking School Bus*

## *Funding Needs*

Regardless of program specifics, there will need to be some investment to establish a WSB program. Items that would require funding include:

**Parent Information System:** Currently the USD's attendance tracking system does not allow for text or email notifications. It is an internal tracking system only.

**Employee WSB leader:** Hiring a new part-time employee, or paying an existing employee, would require substantial funding.

## *Funding Sources*

With the potentially large impact on the number of students walking to school, there is the potential to pursue a KDOT Transportation Alternatives grant. This program would be a first of its kind for Kansas; however, the goals and outcomes perfectly align with the program. KDOT has been open to such ideas in the past, including the funding of BSAP. Additional funding options include Kansas Department of Health and Environment (KDHE), who has funded a WSB in Kansas recently, as well as Blue Cross and Blue Shield of Kansas's Healthy Pathways grants.

## *Getting Started in MHK*

While interest is high across the district, research and recommendations suggest starting small with one or two routes in neighborhoods most likely to support and participate in the program. This information, together with the need to secure funding and address parent concerns, supports starting the WSB program with one or two test pilots from the options listed below.

- **Northview Elementary - South Route**
- **Northview Elementary - North Route**
- **Roosevelt Elementary**

Proposed WSB routes for each school have been identified and detailed information can be found in the school-specific chapters.

# ENCOURAGEMENT


*Figure 14. Portland, OR bike bus.*

## 3. Bike Bus

Similar to a Walking School Bus, a “Bike Bus” is an adult-led bike ride of students along a defined route. As the Bike Bus progresses towards school, more students join. While new, the popularity of such Bike Buses have been highlighted across the nation, specifically those Alameda, California and Portland, Oregon. Figure 13 shows students and parents in a Bike Bus program in Portland.

Like WSBs, Bike Buses do not run daily. Rather, they are a weekly event, held regardless of weather and lighting conditions. Parent surveys did not inquire about Bike Buses as they were too new to have wide-spread understanding. As Bike Buses do function only weekly, they are volunteer or parent-led, thus not requiring funding for USD employees or student tracking.

### *Getting Started in MHK*

Based on existing bike counts, existing parent interest, and potential routes, the list below highlights top pilot locations.

- **Marlatt Elementary**
- **Anthony Middle School**
- **Oliver Brown**

Proposed bike bus routes have been identified for most schools and information can be found in school specific chapters.

## 4. School Streets

School streets are roadways adjacent to a school that has closed or restricted access during school drop-off and pick-up times. Through the removal of vehicles near the school, vehicle and student interactions and conflict points due to congestion and traffic are negated. Additionally, pollution is greatly reduced around the school. The empty roadway serves as a communal space where parents can interact and safely drop-off and pick-up their children. Figure 14 shows a school street in New York City.

### *Getting Started in MHK*

School Streets work best in traditional neighborhoods where schools can be accessed by several routes. Potential school streets are listed below.

- **Bluemont: Vattier Street, Juliette to 8th Street**
- **Wilson: Osage Street, 6th to Juliette**
- **Roosevelt: Houston Street, 14th to 15th**
- **Manhattan Catholic School: Pierre Street, Juliette to 8th**

*Figure 15. NYC school street.*


# Enforcement

### 1. Crossing Guards

Crossing guards are currently employed at several schools and provide increased visibility and supervision for students at key crossings near schools. Increasing the number of crossing guards is a simple way to improve safety and parental perceptions, however, funding and staffing are persistent issues.

In previous years, Riley County Police Department (RCPD) had provided officers to serve as crossing guards at schools across the city of Manhattan (as noted in the 2015 SRTS report). Budget constraints ended this practice and resulted in the USD taking over this function with reduced numbers of crossing guards. In future years, provided solid staffing and funding levels, collaboration with RCPD should be revisited. During meetings with principals for this report, students crossing streets was a major concern, with several stating they would like to have crossing guards at several locations but were currently unable to do so due to staffing and budgets.

# ENFORCEMENT

## 2. Speed Zone Enforcement

Despite school speed zones posted at 20mph at drop-off and pick-up times, parents perceive speeding near schools to be a major concern for their children walking or biking to school. Figure 15 shows the percentage of elementary school parents who agree that school zones are well enforced.

Discussions with RCPD noted staffing challenges as a major issue with increasing speed zone enforcement, with most weekdays having two to three officers to patrol speed zones on dozens of roads surrounding thirteen USD schools. This lack of consistent enforcement creates an environment where speeding is seldom ticketed and therefore commonplace. Reversing this is crucial to improving safety and parental perception of safety.

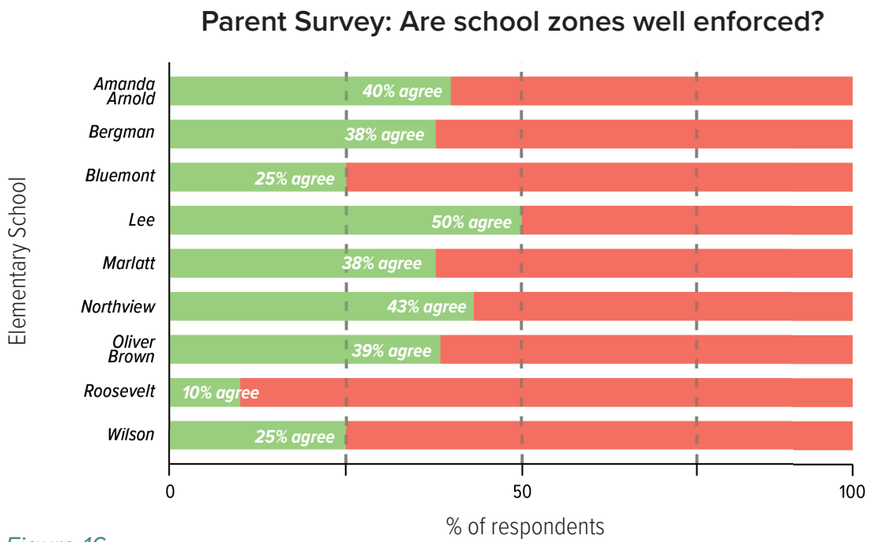



*Figure 16.*

In addition to increased staffing for more patrolling, the ideas below are options to help address school speed zone speeding through behavior change.

### *Future Ideas*

**Permanent School Zones:** Make the 20 mph school speed zones permanent (all-day) instead of the current intermittent morning and afternoon schedule. This would remove the issues of driver behavior due to the habit of observing the 30 mph speed limit for most of the day.. This permanent change in speed limits would lead to altered driving habits and slower speeds throughout the day.

**Twenty's Plenty:** In an effort to lower speeds and increase safety of all road users, pass a city-wide ordinance overriding the State Transportation Ordinance (STO) that replaces the standard 30 mph on local and unsigned roads to 20 mph. This effort has been shown to be successful across the nation and world in reducing speed, decreasing the number and severity of crashes, decreasing noise and air pollution from vehicles, and through this improvement in safety and environment, increases rates of walking and biking. This ordinance should extend to larger roads that are adjacent to schools, as outlined in the Permanent School Zones segment above.

# Equity

Equity is a key component of planning for all Safe Routes to School partners, including USD 383, the City of Manhattan, and the Flint Hills MPO. The analysis within this report was conducted by the Flint Hills MPO, using the US Census Bureau's 2022 GIS data layers consistent with the Environmental Justice (EJ) work it conducts for all federally-required documents. These layers, which include minority populations, low-moderate income (LMI) areas, and zero-car households, are used to create regionwide tracking measures found in the region's long range transportation plan, Connect2040.

This analysis has resulted in project and program recommendations across the City of Manhattan, the Green Valley area, and near all schools. As noted in the Goals section of this document, the USD balances equity across the district through busing and other programs to ensure that all schools receive adequate funding to provide services for all students. Additionally, health outcomes are tracked by the Riley County Health Department's Community Health Survey. Based on analysis, this report offers two possible approaches to improving equity across the school district:

# EQUITY

## *Sidewalk Overview*

The location and prevalence of “poor” quality sidewalks are not evenly spread across the City.  Figure 17 shows each Manhattan school’s percentage of walkable residential addresses that fall within environmental justice (EJ) areas.

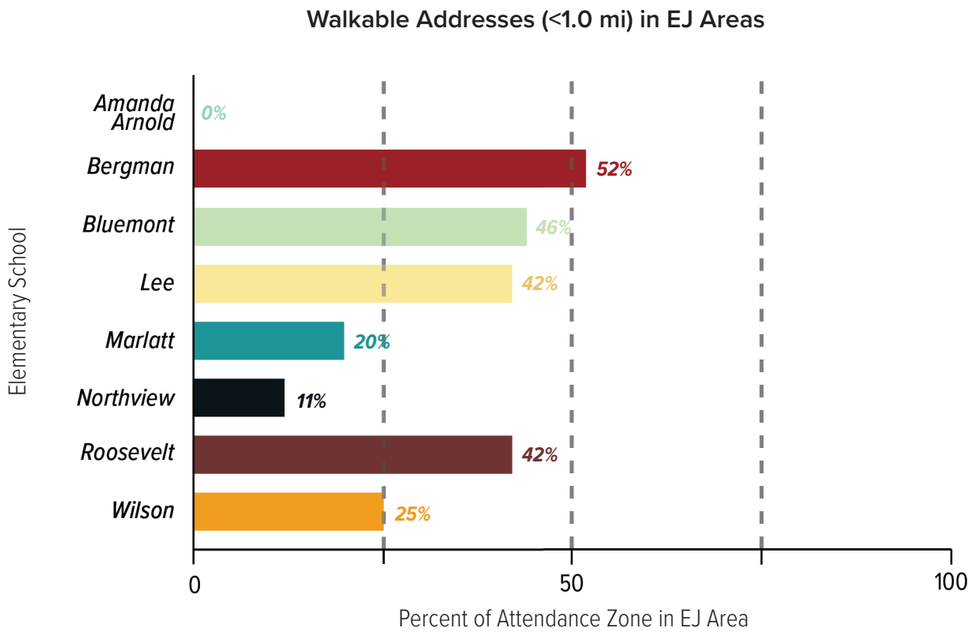



*Figure 17.*

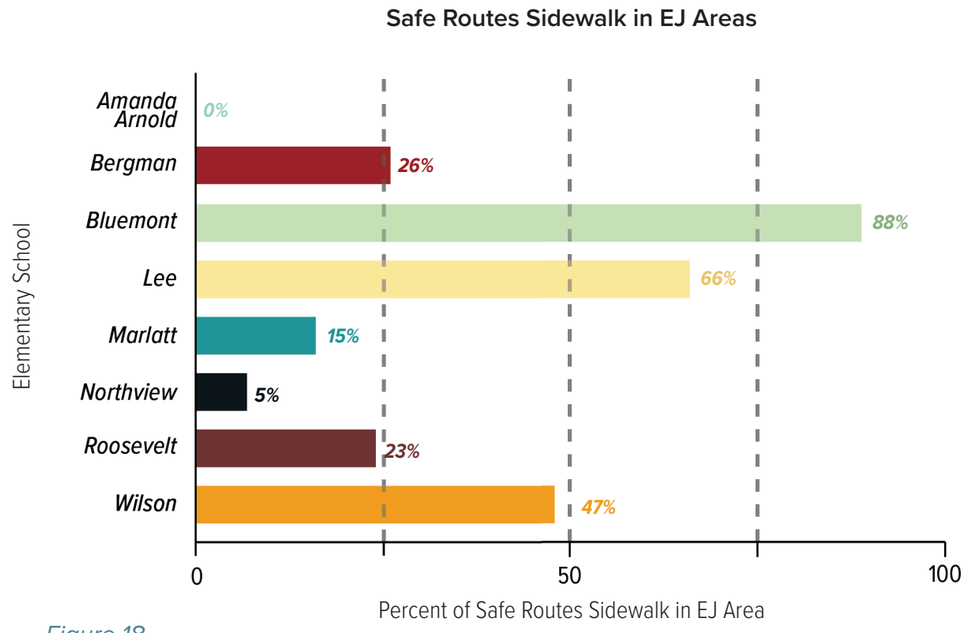



*Figure 18.*

Above, Figure 18 shows each school’s percentage of designated Safe Routes sidewalk in EJ areas.

# EQUITY | *Sidewalk Overview*

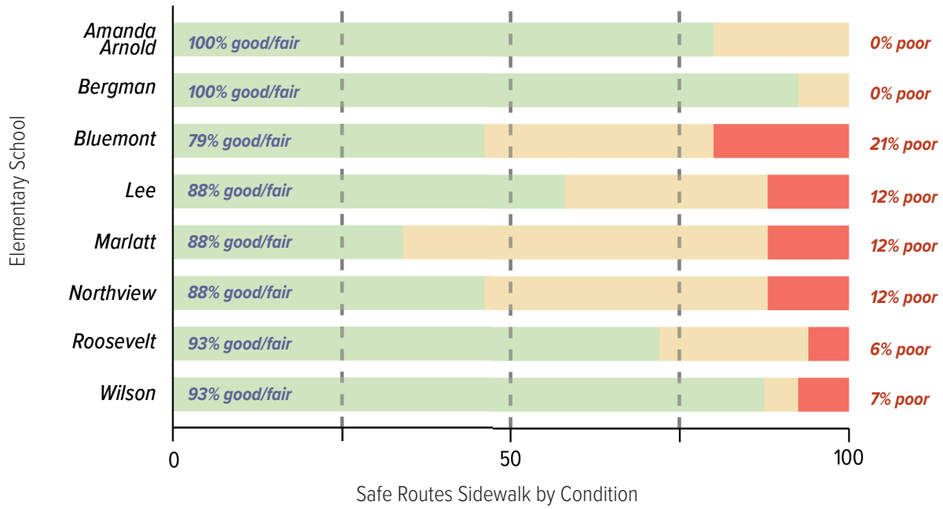



*Figure 19.*

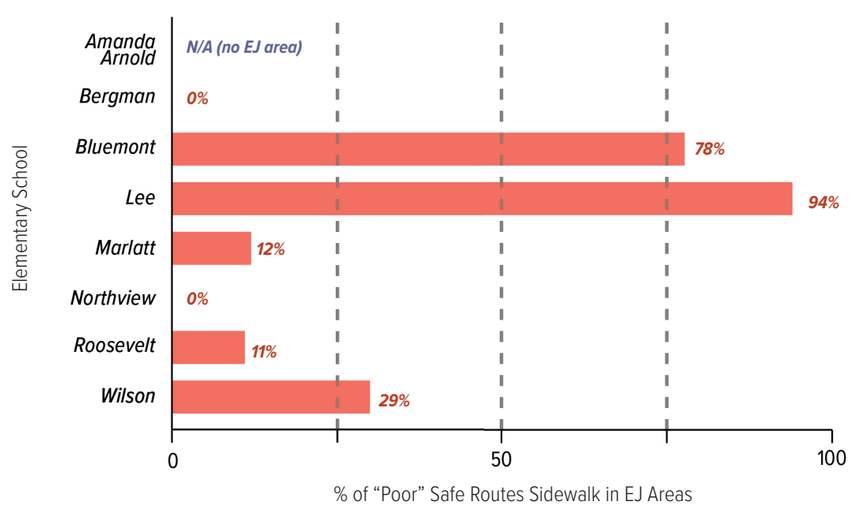



*Figure 20.*

Figures 19 through 21 show the quality of designated Safe Routes sidewalks across Manhattan. Newer and more wealthy areas have a lower amount of "poor" quality sidewalk, while EJ areas have far higher amounts.

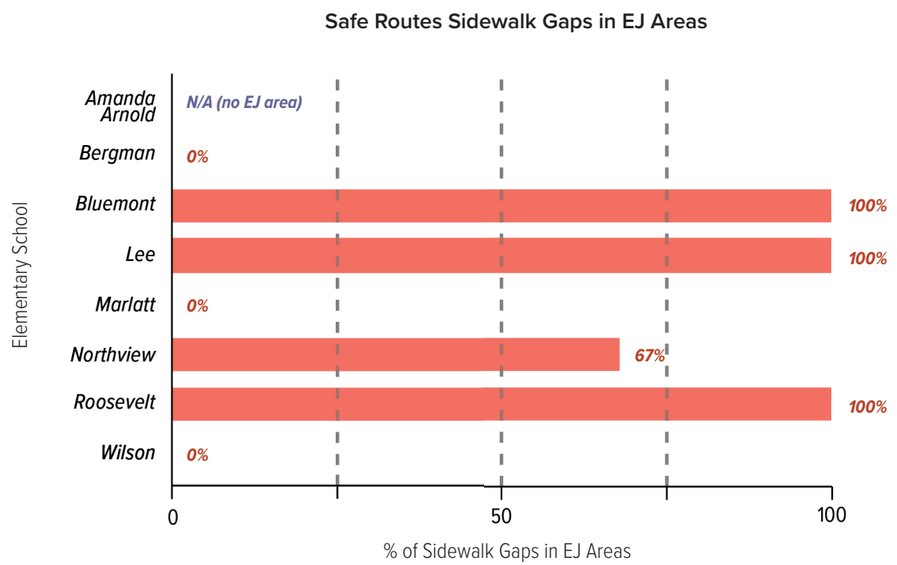



*Figure 21.*

### *Potential Solutions*

This report offers two potential solutions to address the disparity in sidewalk quality across Manhattan. Below, Figure 22 shows the advantages and disadvantages of each approach.

| | Cost Share Policy | City Maintenance Program |
|---|---|---|
| **Funding** | 50/50 City and Property Owner | 100% City |
| **Pros** | + Lower cost for City | + No administration<br>+ No property owner cooperation<br>+ Can be incorporated into existing work program |
| **Cons** | – Heavy administration of program<br>– Required property owner cooperation<br>– New work program required<br>– Property owner funding required | – Higher cost for City |

*Figure 22.*

## 1. Cost Share Policy

One way the City of Manhattan could address this issue is by implementing a **cost share policy**. While the specifics of such a program could vary, there are numerous existing models. For example, the City could create a program where homeowners in EJ areas apply for City funds to fix sidewalks in "poor" condition, as identified in this report.

The City funding could provide a portion of the repair costs (ie. 50%, 75%, etc.). Such a program would help homeowners invest in the needed privately maintained, public infrastructure.

## 2. City Maintenance

Another option for sidewalk maintenance of EJ area Safe Route sidewalks would be to have the City of Manhattan take over the maintenance and reconstruction. While requiring more city funding, this program would remove the difficult hurdle of property owner cooperation and funding, as well as remove the associated administrative work required in the Cost Share Policy program. City staff currently oversee and maintain numerous sections of sidewalk and multi-use paths, many on similar roadways. As a majority of designated Safe Route sidewalks are on collector and arterial roadways, this investment would be of great benefit to the entire community.

# Evaluation

### *Parent-Led Surveys*

As shown in the Parent-led Survey graphic (Figure 4), evaluation provides useful information on USD-wide issues parents weigh when deciding whether to have their children walk or bike to school.

Surveys were sent by school administrations to all parents and guardians via email.  The online survey was available for 30 days. The following pages compile “grade cards” to allow for easy comparison of data across the USD.

A more detailed breakdown of survey data for each school can be found in the individual school chapters. An example survey can be found in Appendix A.  Comprehensive survey results can be found in Appendix B.

### *School Bike/Walk Counts*

Currently, counts for walking and biking to school are held only during Safe Routes to School report updates. Staff and volunteers stand at key intersections near schools and count the number of students who walk and bike. In the future, counts should be held more frequently, ideally annually or as part of an in-classroom survey.

# EVALUATION

## *School Grade Cards*

As part of the Evaluation process, Grade Cards have been developed to provide a simple and clear snapshot to compare various aspects related to walking and biking to school. Data from parent surveys, GIS, and in-person counts, was collected and analyzed. This information was then grouped into the following categories: Proximity, Built Environment, Safety Perception, and Transportation. Figure 23 shows the grade card for all USD 383 schools.

Colors in the "Grade" column reflect each school's score in relation to others across USD 383. As the topics and scores identified within this table are so varied, each topic (row) has its own scoring system based upon consolidated scores across the district. Therefore, a score of 75% in one row may be average, whereas in another it could be below average. **Green represents satisfactory or better**, **yellow average,** and **red below average or underperforming.**

The data shows that conditions and perception vary from school to school, and therefore the recommended projects within this report address each school's individual issues. These grade cards are intended to be used going forward with periodic updates to allow for the tracking of progress over time.

| | | School | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Section** | **Item** | **Arnold** | **Bergman** | **Bluemont** | **Lee** | **Marlatt** | **Northview** | **O. Brown** | **Roosevelt** | **Wilson** | **Anthony MS** | **Eisenhower MS** | **High School** |
| ***Proximity*** | Residential parcels within 1 mile of school | 63% | 54% | 75% | 55% | 64% | 93% | 31% | 69% | 68% | 2,380 | 2,853 | 271 |
| | Student addresses within 1 mile of school | 51% | 84% | 20% | 64% | 72% | 83% | 40% | 54% | 37% | 21% | 24% | 7% |
| | Parent perception: "Close" to school | 68% | 74% | 35% | 65% | 65% | 81% | 76% | 63% | 69% | 24% | 22% | n/a |
| ***Built Environment*** | Safe Route sidewalk connectivity *(% of designated Safe Routes that have sidewalks)* | 95% | 100% | 83% | 80% | 100% | 87% | 40% | 100% | 100% | 100% | 82% | 79% |
| | Safe Route sidewalk condition *(% of sidewalk rated Good or Fair)* | 100% | 100% | 80% | 87% | 87% | 94% | 100% | 94% | 92% | 92% | 95% | 94% |
| | Intersection issues & comments | 79% | 89% | 83% | 70% | 90% | 82% | 98% | 100% | 100% | 81% | 71% | n/a |
| ***Safety Perception*** *(% of surveyed parents agreeing with each statement)* | Child will be hit by a vehicle | 67% | 76% | 75% | 67% | 76% | 74% | 89% | 67% | 100% | 79% | 67% | n/a |
| | Child will be taken by a stranger | 35% | 50% | 67% | 67% | 48% | 63% | 63% | 0% | 100% | 31% | 15% | n/a |
| | School zones well enforced | 40% | 38% | 25% | 50% | 38% | 43% | 39% | 10% | 25% | 24% | 22% | n/a |
| ***Transportation*** | Student walking & biking to school (counts) | Low | Avg | Low | Low | High | Avg | High | Avg | Low | Avg | Avg | High |
| | Students driven to school in private cars (survey) | High | High | Avg | Avg | Avg | Avg | Avg | Low | Avg | Avg | Avg | n/a |

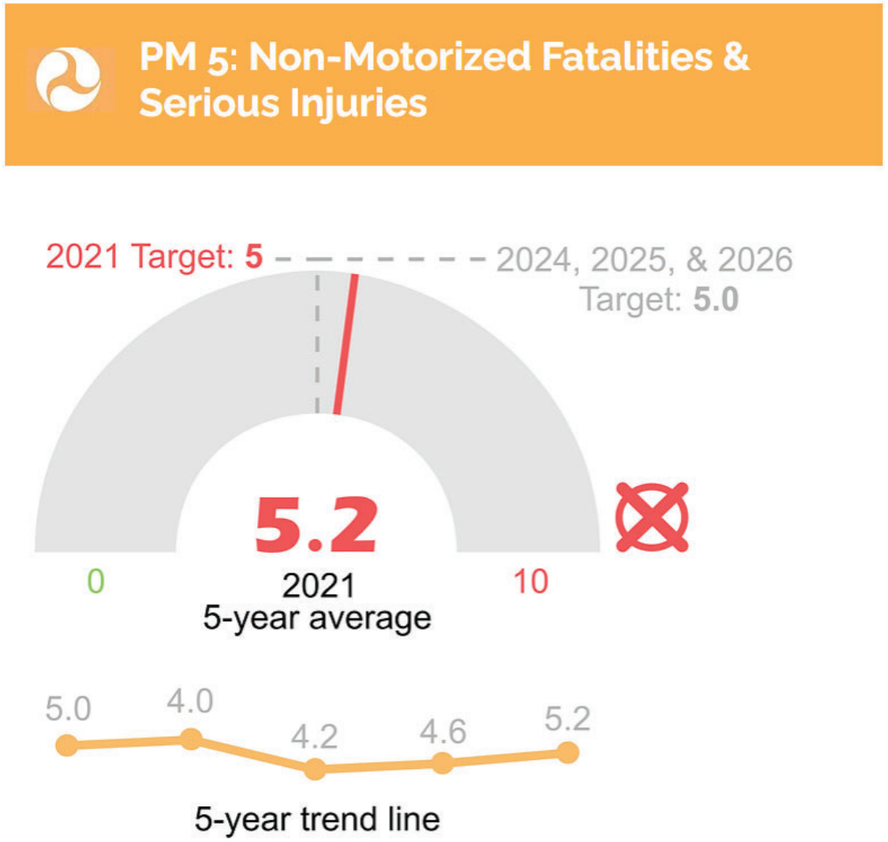
*Figure 23.*

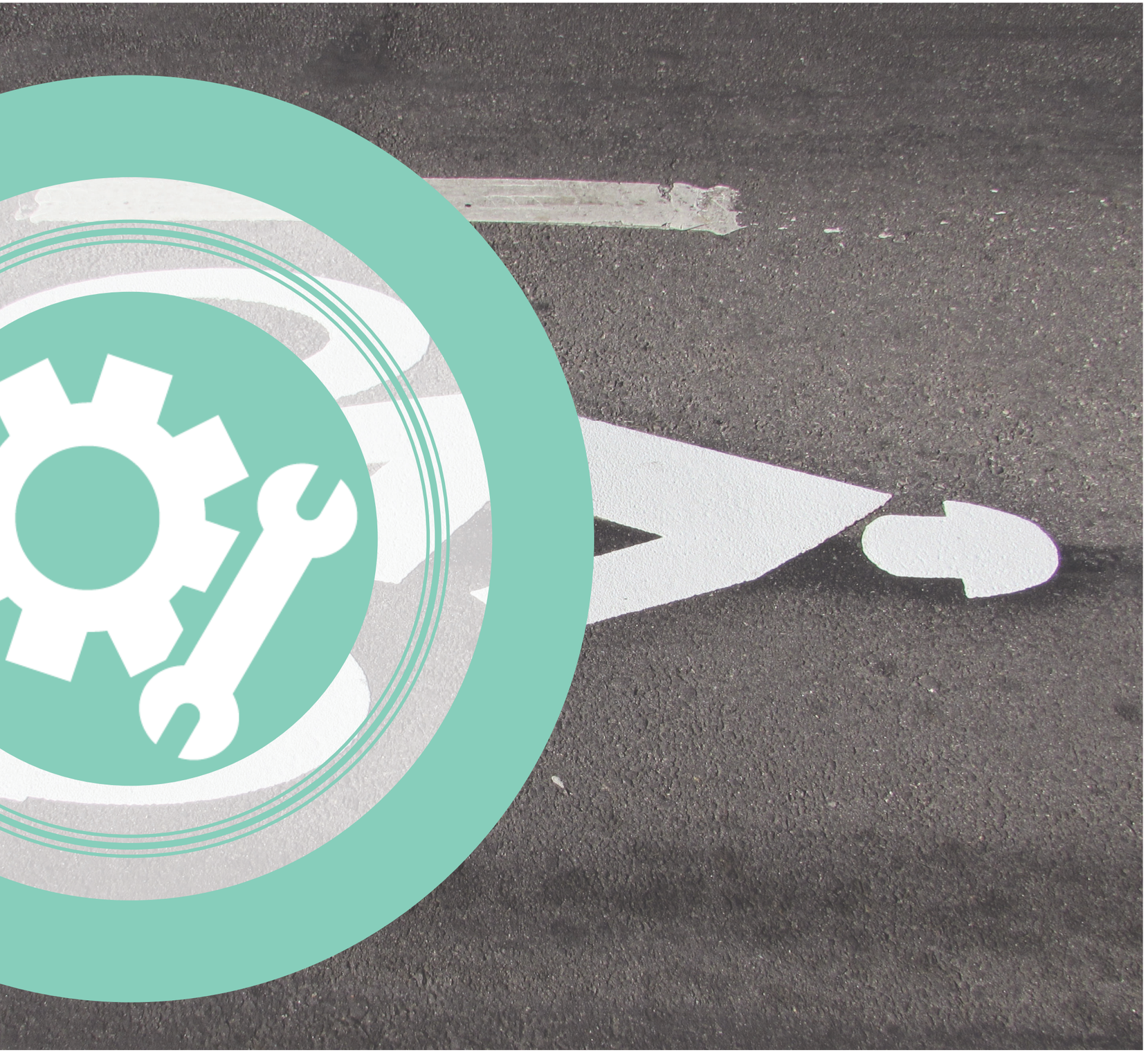
# EVALUATION

### *FHWA Safety PM 5*

As noted, safety, especially at intersections where vehicles interact with students, is the major concern of parents in allowing their child to walk or bike to school.  Regrettably, the region is following state and nation-wide trends, in that people walking and biking are accounting for a disproportionally large share of these fatal and serious injury crashes.

The Flint Hills MPO maintains a database of all fatal and serious injury crashes in the region, with the graph to the right highlighting the latest year's information in regards to walking and biking crashes.  This information is updated annually and captured in a report that is sent to KDOT and the Federal Highway Administration, as well as in the region's long range transportation plan, Connect 2040.





# Engineering

The purpose of the Engineering section is to understand the existing conditions of the built environment near schools and identify areas of improvement. The list of projects and policies proposed is long and varied. Project lists and maps are provided in the school-specific chapters later in this report. However, the items below are new to SRTS and are key to addressing parental concerns and increasing walking and biking.

## 1. Comfortable Crossings

As noted earlier, parent surveys provided clear data showing that crossings are a main concern and issue. The countermeasures below are recommended by the Federal Highway Administration (FHWA) through their Safe Transportation for Every Pedestrian (STEP) initiative. They have been proven effective in improving safety and should be installed where possible.

- **Crosswalk Visibility Enhancements**
- **Leading Pedestrian Intervals (LPI)**
- **Pedestrian Hybrid Beacons (PHB)**
- **Pedestrian Refuge Islands**
- **Raised Crosswalks**
- **Rectangular Rapid-Flashing Beacons (RRFB)**

A basic summary of these countermeasures can be found in the following pages. For more detailed information on each countermeasure, see the FHWA Countermeasure Tech Sheets in Appendix C.

### *Crosswalk Visibility Enhancements*

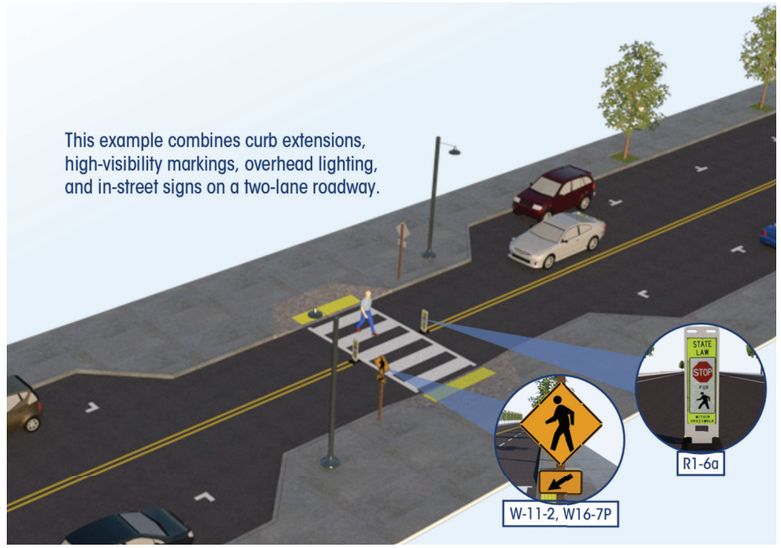



*Figure 24. Image courtesy of FHWA.*

This group of interventions focuses on improving the visibility of crosswalks and/or pedestrians. This can include warning signage, improved lighting, and pavement markings. Making crosswalks more visible helps indicate optimal locations for crossing to pedestrians.

At larger-volume crossings, more intense interventions (including pedestrian hybrid beacons and/or refuge islands) may be necessary.

### *Leading Pedestrian Intervals (LPI)*

*Figure 25. Image courtesy of FHWA.*

LPIs adjust signal times to give pedestrians a 3- to 7-second head start at signalized intersections before vehicles in the parallel direction are given a green signal. LPIs aim to improve visibility of pedestrians in the crosswalk and reduce vehicle-pedestrian conflicts.

### *Pedestrian Hybrid Beacons (PHBs)*

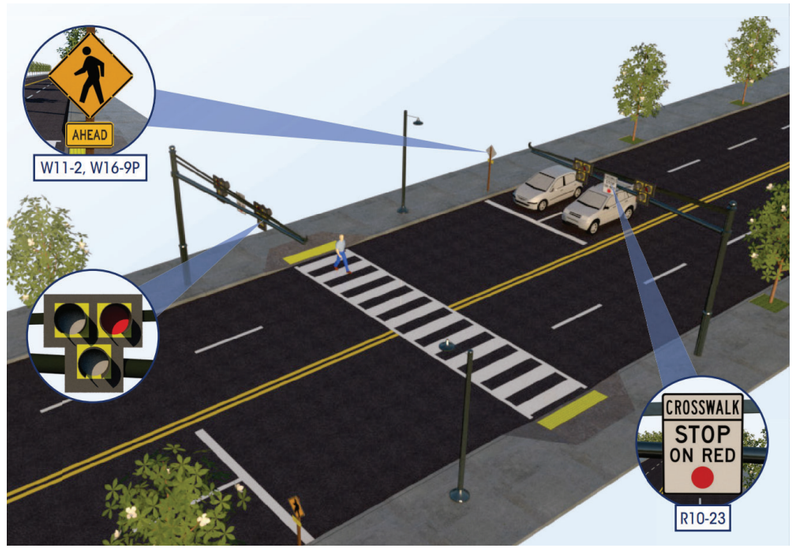
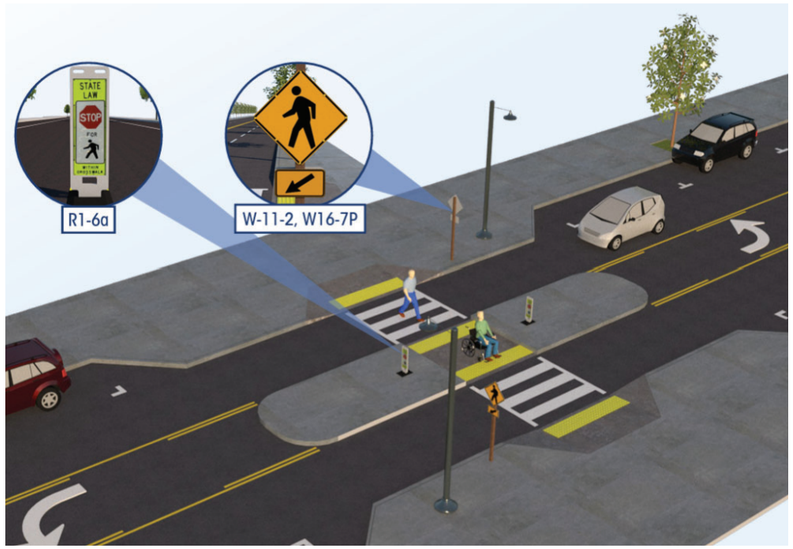



*Figure 26. Image courtesy of FHWA.*

PHBs remain dark until activated by a pedestrian. Once activated, the beacon indicates the pedestrian walk interval and when it is safe for drivers to proceed.

**Potential Applications:** Locations with high vehicle speed/volume that do not warrant a signalized intersection.

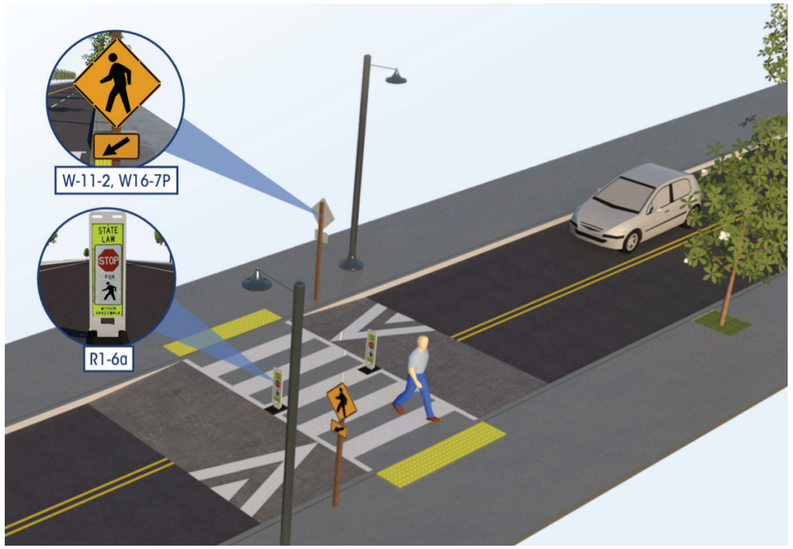
### *Pedestrian Refuge Islands*




Pedestrian refuge islands are intended to make multilane roads safer for pedestrians to cross. The island in the middle gives pedestrians a place to focus on one direction of traffic at a time and wait for an appropriate gap to cross. Pedestrian refuge islands must accommodate pedestrians with disabilities.

**Potential Applications:** Midblock pedestrian crossings on roads with four or more lanes of traffic; also suitable for 3-lane or 2-lane roads with high traffic volumes.

### *Raised Crosswalks*




Raised crosswalks are ramped speed tables that allow pedestrians to cross at grade with the sidewalk. They slow the flow of traffic and are often used with other crosswalk visibility enhancements. Raised crosswalks are usually demarcated with paint or a change in paving material.

**Potential Applications:** Midblock crossings on local and collector streets; pick-up/drop-off zones; shopping centers; campuses.

### *Rectangular Rapid-Flashing Beacon (RRFB)*

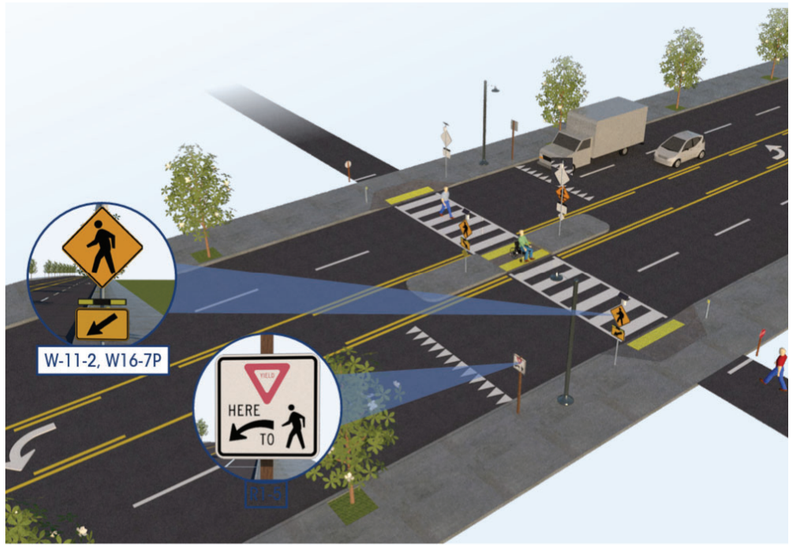



*Figure 27. Image courtesy of FHWA.*

RRFBs consist of two rectangular LED signals. These signals flash when activated to indicate a pedestrian crossing. They should always accompany a pedestrian warning sign. According to the FHWA, RRFBs should only be used in locations with significant pedestrian safety issues.

**Potential Applications:** Multilane crossings with speeds < 40 mph.

## 2. Demonstration Projects

Demonstration Projects are a way to test projects before committing large amounts of funding for permanent construction. These projects are quick to install and are left in place for a few days to a few weeks to allow the public an opportunity to experience the proposed project. Demonstration projects have been proven effective locally, with several dozen completed in Manhattan and across the region. Additionally, these projects raise the confidence of grant funders and therefore increase the likelihood of successful grant applications.

Demonstration projects use rubber curbing and delineator posts attached to the pavement with butyl pads. Tempura paint or temporary striping tape are used to outline the projects.

### *North Lawn Elementary - USD 461 Neodesha, KS*

*Figure 28.*

### 3) Semi-Permanent Projects

Once proven effective and supported by school administration, Demonstration Projects can easily and quickly be upgraded to semi-permanent projects.  Pairing the same rubber curbing and flexible delineator posts used demonstration projects, but securely bolted to the pavement, with traffic paint, these projects provide safety by filling the gap between demonstration projects and final construction.

*Caroline & St. Mary's - USD 475 Junction City*


*Figure 29.*

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## Theodore Roosevelt Elementary: Safe Routes to School survey

**This short survey will be used to develop USD 383's new Safe Routes to School Plan. The Plan will allow the USD and the City of Manhattan to access funding to address areas identified as needing improvement (i.e. improved crossings, adding sidewalks, etc). Thank you for your time.**

## Theodore Roosevelt Elementary: Safe Routes to School survey

1. Does the school provide bus service for your child?

- ◯ Yes ---> LOGIC: Go to Question 14
- ◯ No ---> LOGIC: Go to Question 2

## Theodore Roosevelt Elementary: Safe Routes to School survey

2. Is your home close enough for your child to walk or bike to Theodore Roosevelt Elementary?

- ◯ Yes ---> LOGIC: Go to Question 3
- ◯ No ---> LOGIC: Go to Question 14

## Theodore Roosevelt Elementary: Safe Routes to School survey

3. On a normal day, how does your child (children) travel from home to Theodore Roosevelt Elementary?

- ◯ Walk alone
- ◯ Walk with friends
- ◯ Walk with a parent/adult
- ◯ Bike
- ◯ Private car, including car pool

4. On a normal day, how does your child travel from school to home (after school)?

- ◯ Walk alone
- ◯ Walk with friends
- ◯ Walk with a parent/adult
- ◯ Bike
- ◯ Private car, including car pool
- ◯ Other: picked up by Boys & Girls Club, Cool Care Club, etc.

5. At what grade would/did you allow your child to walk or bike without an adult to/from school?

- ◯ Kindergarten
- ◯ 1st grade
- ◯ 2nd grade
- ◯ 3rd grade
- ◯ 4th grade
- ◯ 5th grade
- ◯ I would not feel comfortable at any grade

6. Which of the following would your child have to cross if he/she walks or bikes to school? (Check all that apply)

- ☐ Highway
- ☐ Road with busy traffic
- ☐ Intersection with a signal
- ☐ Intersection without a painted crosswalk
- ☐ None of the above
- ☐ Other (please specify)

7. Are there sidewalks along your child's way to school?

- ◯ Yes, on all streets
- ◯ Yes, on most streets
- ◯ Yes, on some streets
- ◯ Yes, on very few streets
- ◯ No

8. Is there any specific intersection/location that causes you concern about your child walking or biking to school? If so, please list the intersection and why it is concerning.

9. What do you think about the overall walking or biking environment (including sidewalks & roads) along your child's way to/from school?

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| It is convenient to walk to school | ◯ | ◯ | ◯ | ◯ | ◯ |
| The route is well maintained and clean | ◯ | ◯ | ◯ | ◯ | ◯ |
| It is quiet (without much noise from cars, etc.) | ◯ | ◯ | ◯ | ◯ | ◯ |
| There are nice things to see on the way | ◯ | ◯ | ◯ | ◯ | ◯ |
| Streets are well lit | ◯ | ◯ | ◯ | ◯ | ◯ |
| School zones are well enforced | ◯ | ◯ | ◯ | ◯ | ◯ |

10. Do you have any of the following concerns about your child walking or biking to school?

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| My child may be taken or hurt by a stranger | ◯ | ◯ | ◯ | ◯ | ◯ |
| My child may get lost | ◯ | ◯ | ◯ | ◯ | ◯ |
| My child may be hit by a car | ◯ | ◯ | ◯ | ◯ | ◯ |
| My child may get bullied, teased, or harassed | ◯ | ◯ | ◯ | ◯ | ◯ |
| My child may encounter inclement weather and extreme temperatures | ◯ | ◯ | ◯ | ◯ | ◯ |
| No one will be able to see or hear my child in the event of a medical emergency | ◯ | ◯ | ◯ | ◯ | ◯ |

11. How do you feel about the following statements about walking or biking to school?

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| It involves too much planning ahead | ○ | ○ | ○ | ○ | ○ |
| It is easier/faster for me to drive my child to/from school | ○ | ○ | ○ | ○ | ○ |
| My child has too much to carry | ○ | ○ | ○ | ○ | ○ |
| My child gets too hot or sweaty | ○ | ○ | ○ | ○ | ○ |
| It is a good way to get exercise | ○ | ○ | ○ | ○ | ○ |
| It is a good way to interact with your child | ○ | ○ | ○ | ○ | ○ |
| I do/would enjoy walking or biking with my child to/from school | ○ | ○ | ○ | ○ | ○ |
| Other kids walk or bike to/from school in my neighborhood | ○ | ○ | ○ | ○ | ○ |
| I don't want my child to be home alone after walking or biking home in the afternoons | ○ | ○ | ○ | ○ | ○ |

12. Would you support or use a Walking School Bus program for your child? A Walking School Bus is when an adult or two escorts a group children from the same neighborhood to/from school on a set route daily.

- ○ Yes
- ○ No
- ○ Maybe

13. Which of the following would make your feel more comfortable about your child using a Walking School Bus? (check all that apply)

- ☐ Having a parent or volunteer lead the Walking School Bus
- ☐ Having a school employee lead the Walking School Bus
- ☐ Knowing your child arrived at school
- ☐ Other (please specify)
- ☐ Knowing the route they will use
- ☐ Having a backup plan for inclement weather/temperature
- ☐ My child having a friend in the Walking School Bus

## Theodore Roosevelt Elementary: Safe Routes to School survey

14. What grade is your child in? (for multiple children, select all that apply)

- ☐ Kindergarten
- ☐ 1st grade
- ☐ 2nd grade
- ☐ 3rd grade
- ☐ 4th grade
- ☐ 5th grade

15. My child is (select all that apply for multiple children)

- ☐ Female
- ☐ Male
- ☐ Prefer not to answer

16. The Bicycle Safety & Awareness Program is a Physical Education (P.E.) curriculum that all 4th and 5th grade students complete. Students ride bicycles provided by the school, as well as take classroom instruction on bike safety and traffic signage. Were you aware of the Bicycle Safety & Awareness Program, prior to this survey?

- ○ Yes ---> LOGIC: Go to Question 17
- ○ No ---> LOGIC: Go to End of Survey

## Theodore Roosevelt Elementary: Safe Routes to School survey

17. Has your child completed the Bicycle Safety & Awareness Program?

- ○ Yes
- ○ No
- ○ Unsure

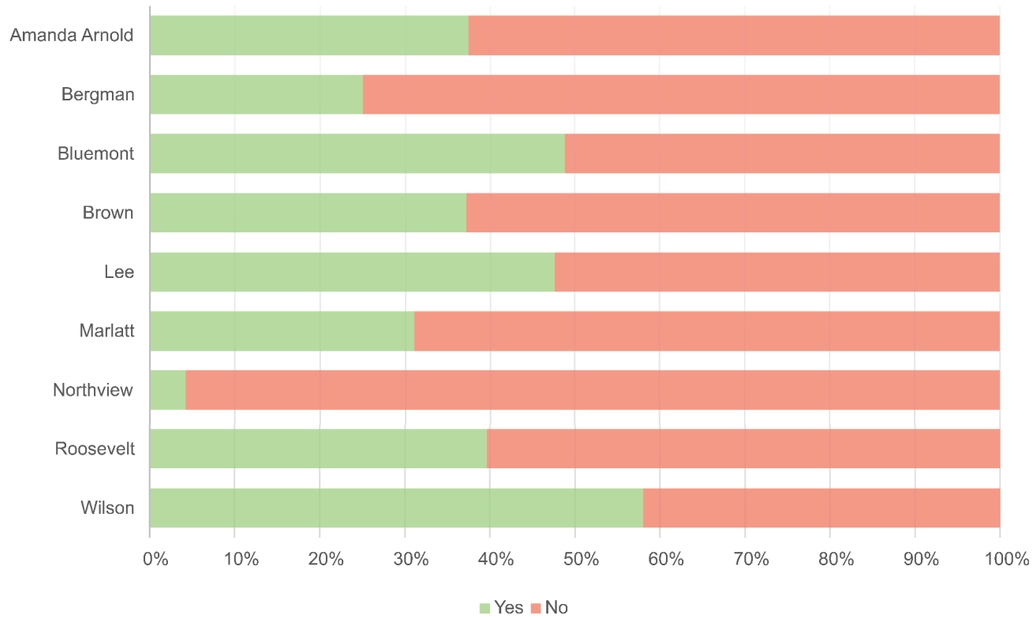
18. What impact did the Bicycle Safety & Awareness Program have on your child? (Check all that apply)

- ☐ My child learned to ride a bike
- ☐ My child learned to ride a bike better, more confidently
- ☐ My child enjoyed the bike curriculum and riding
- ☐ My child learned about road safety and traffic signage
- ☐ My child did not improve their bike riding ability
- ☐ My child did not learn about road safety and traffic signage
- ☐ My child does not know how to ride a bike (did not learn in class)

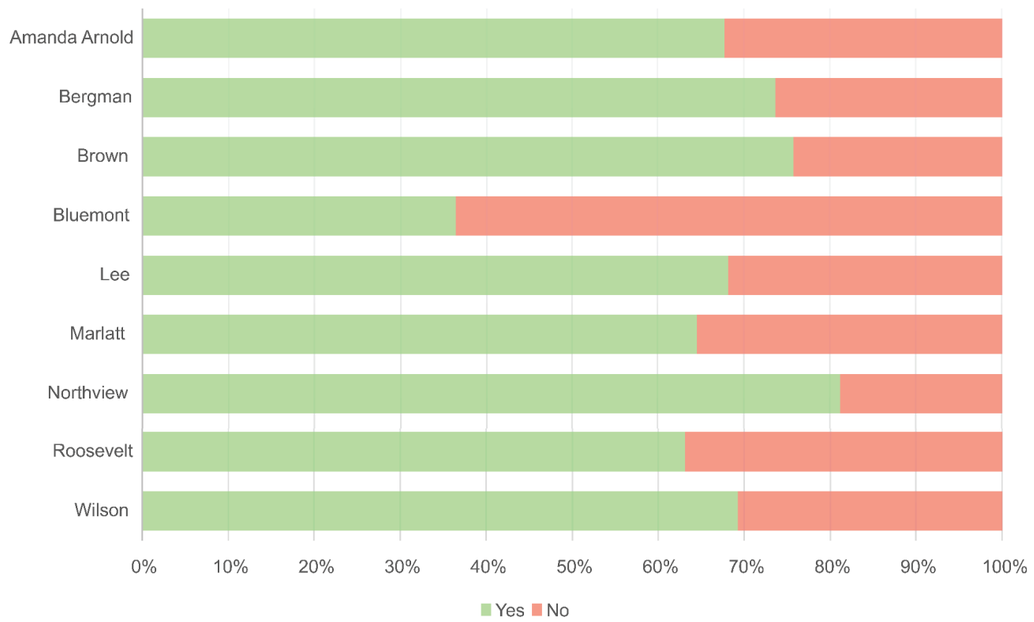
Other (please specify)

19. What additional thoughts/comments do you have about the Bicycle Safety & Awareness Program?

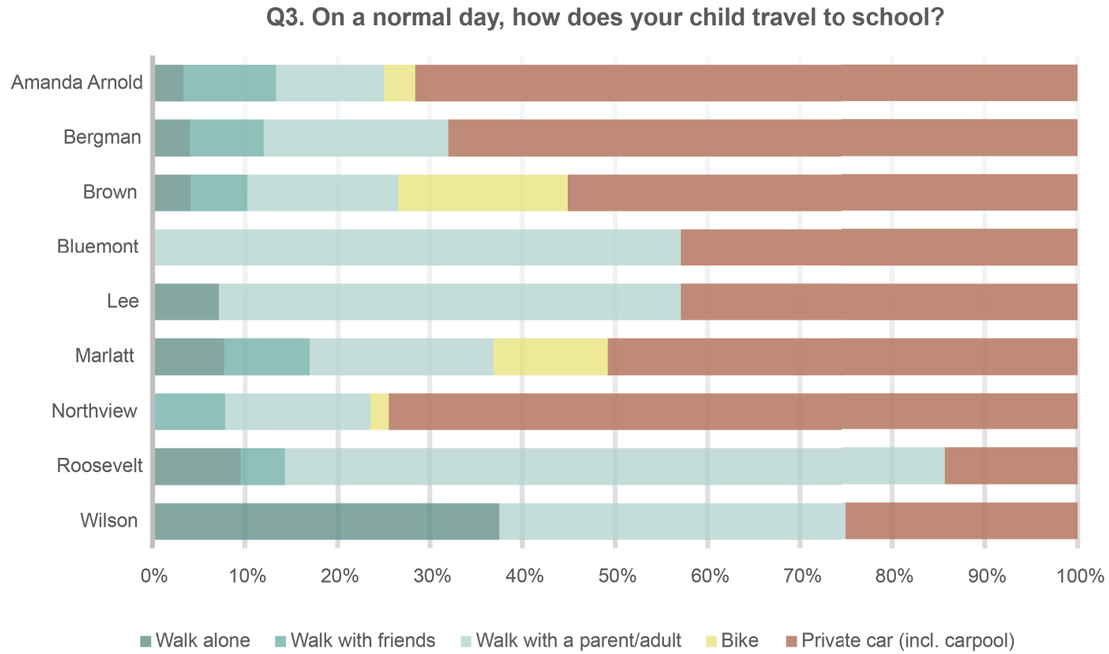
### Q1. Does the school provide bus service for your child?



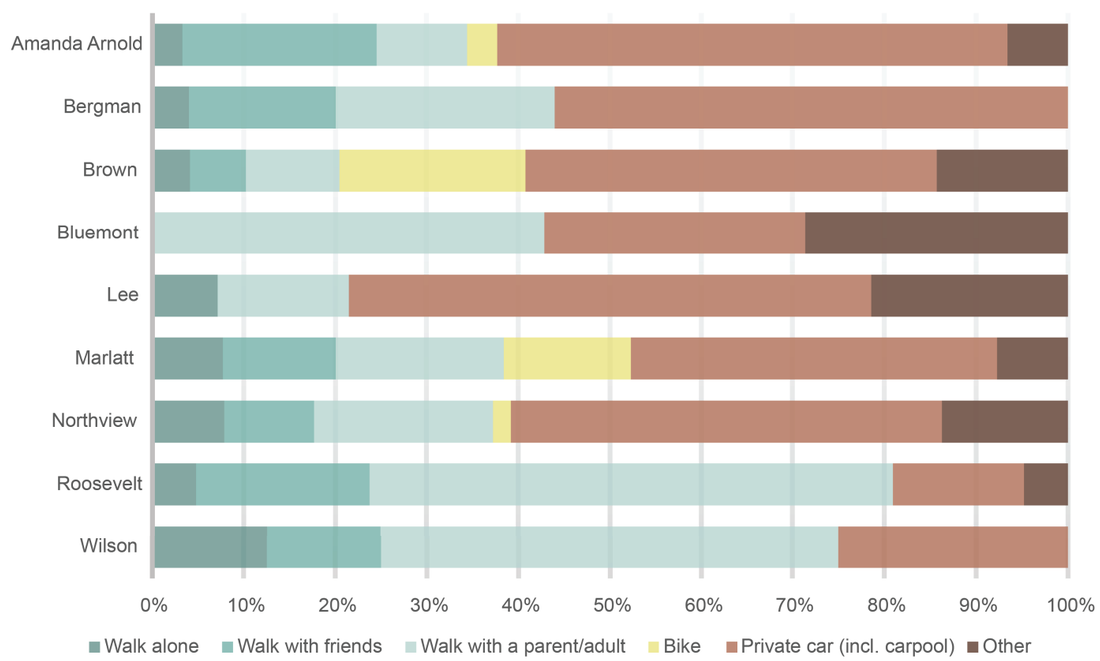

### Q2. Is your home close enough for your child to walk or bike?

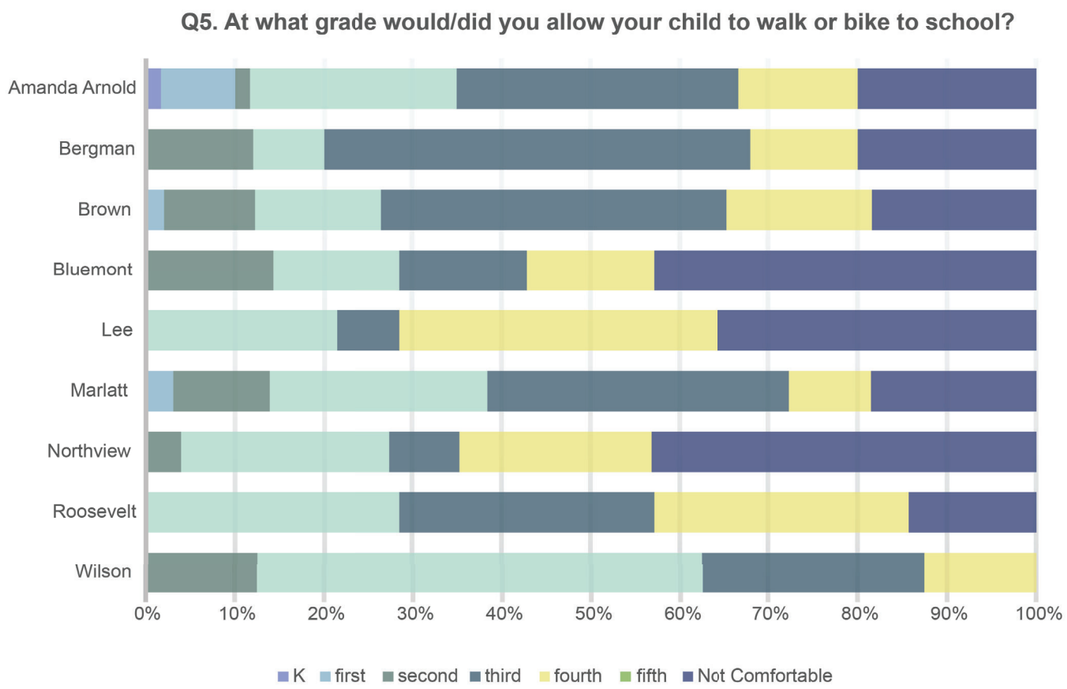


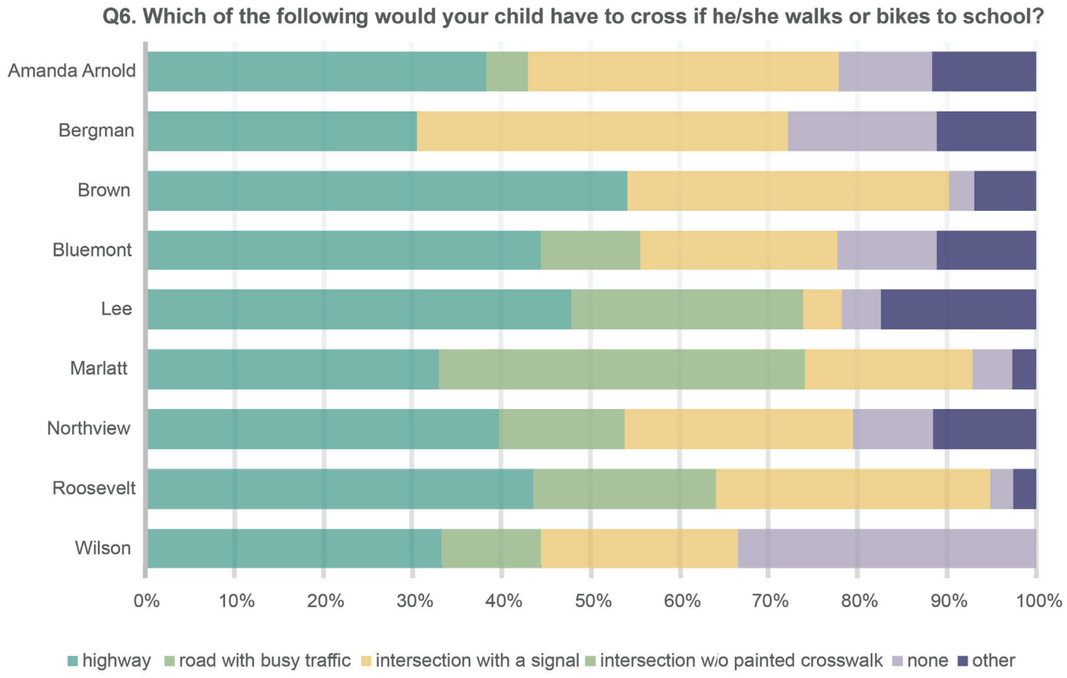

### Q3. On a normal day, how does your child travel to school?

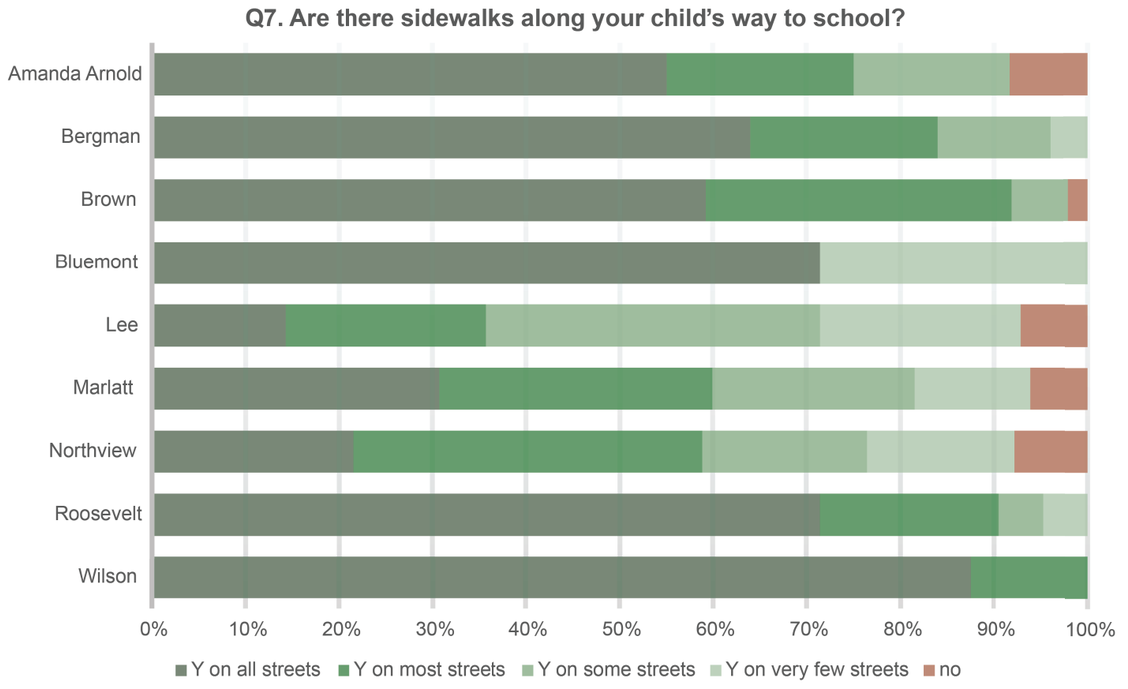



### Q4. On a normal day, how does your child travel home from school?

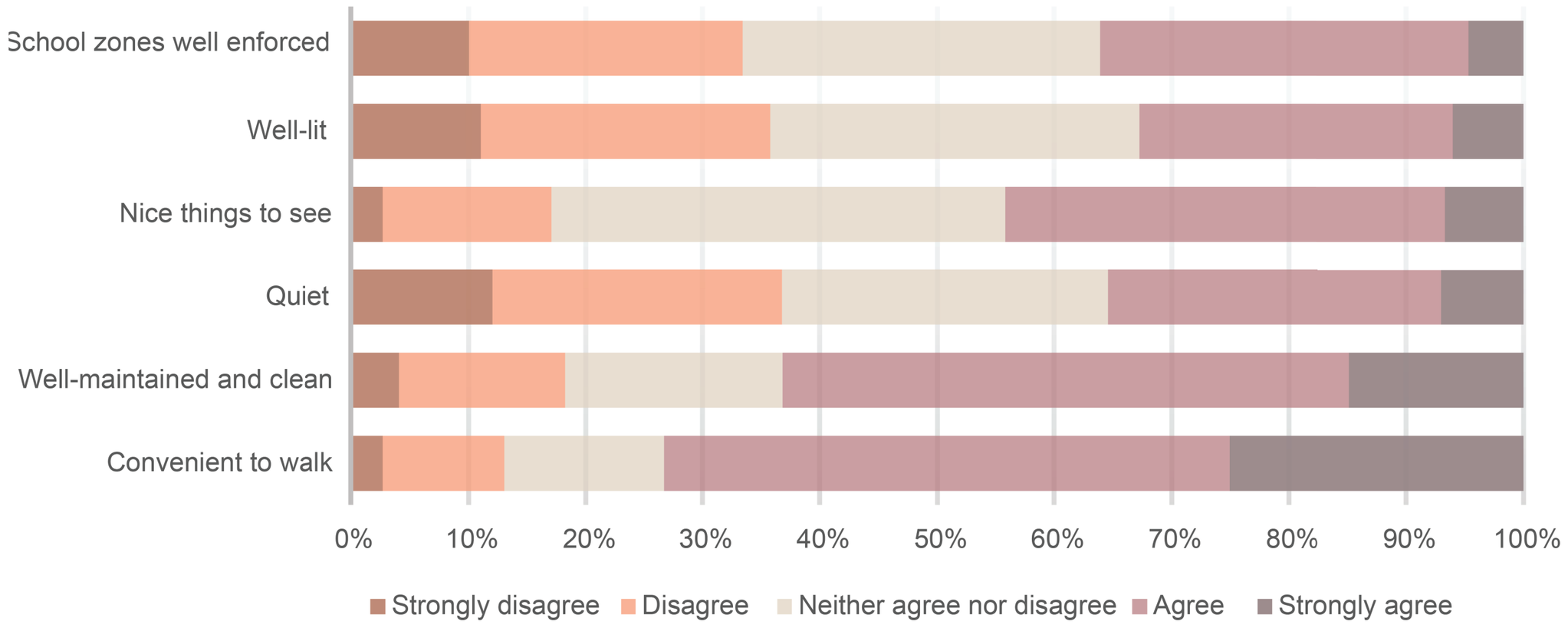



Q5. At what grade would/did you allow your child to walk or bike to school?
Amanda Arnold
Bergman
Brown
Bluemont
Lee
Marlatt
Northview
Roosevelt
Wilson
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
K
first
second
third
fourth
fifth
Not Comfortable

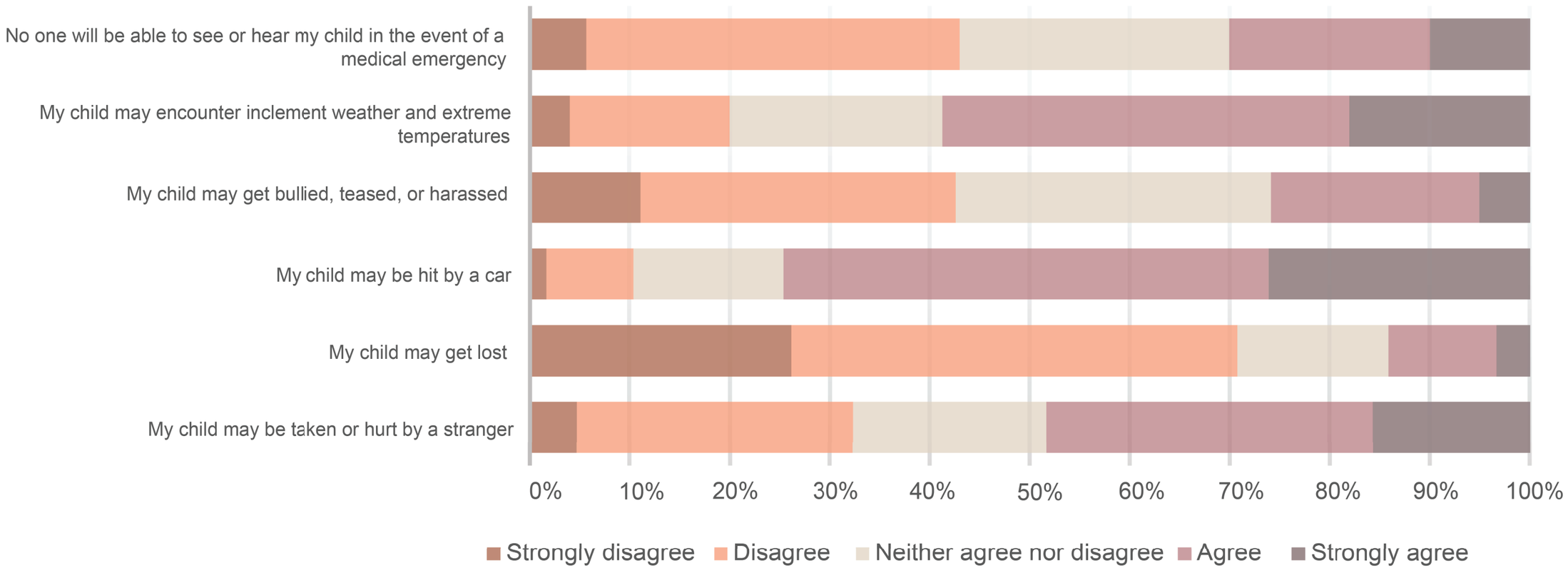

Q6. Which of the following would your child have to cross if he/she walks or bikes to school?
Amanda Arnold
Bergman
Brown
Bluemont
Lee
Marlatt
Northview
Roosevelt
Wilson
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
highway
road with busy traffic
intersection with a signal
intersection w/o painted crosswalk
none
other


Q7. Are there sidewalks along your child's way to school?
Amanda Arnold
Bergman
Brown
Bluemont
Lee
Marlatt
Northview
Roosevelt
Wilson
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Y on all streets
Y on most streets
Y on some streets
Y on very few streets
no

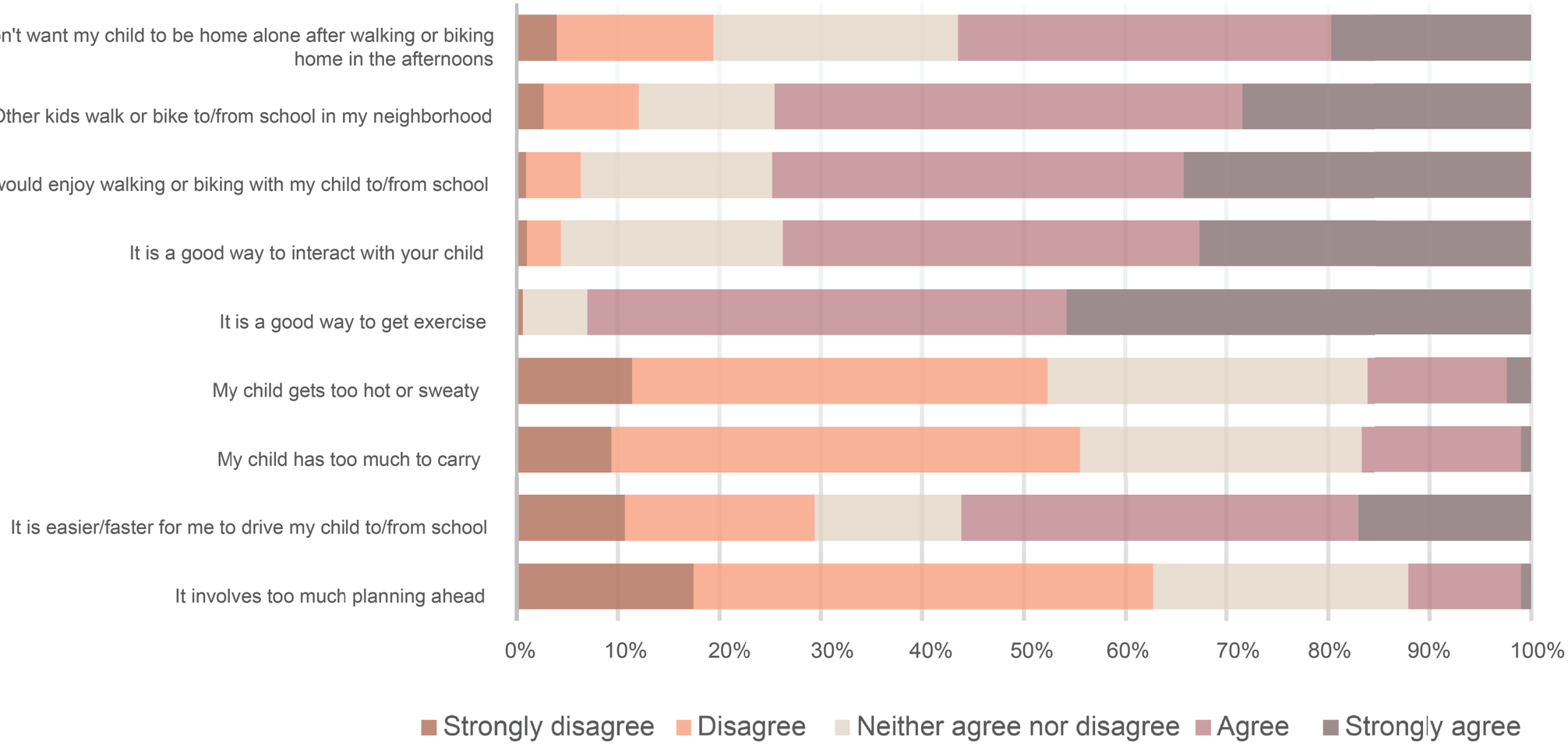
**Q8. What do you think about the overall walking or biking environment? (USD total for each option)**



**Q9. Do you have any of the following concerns about your child walking or biking to school? (USD total for each option)**

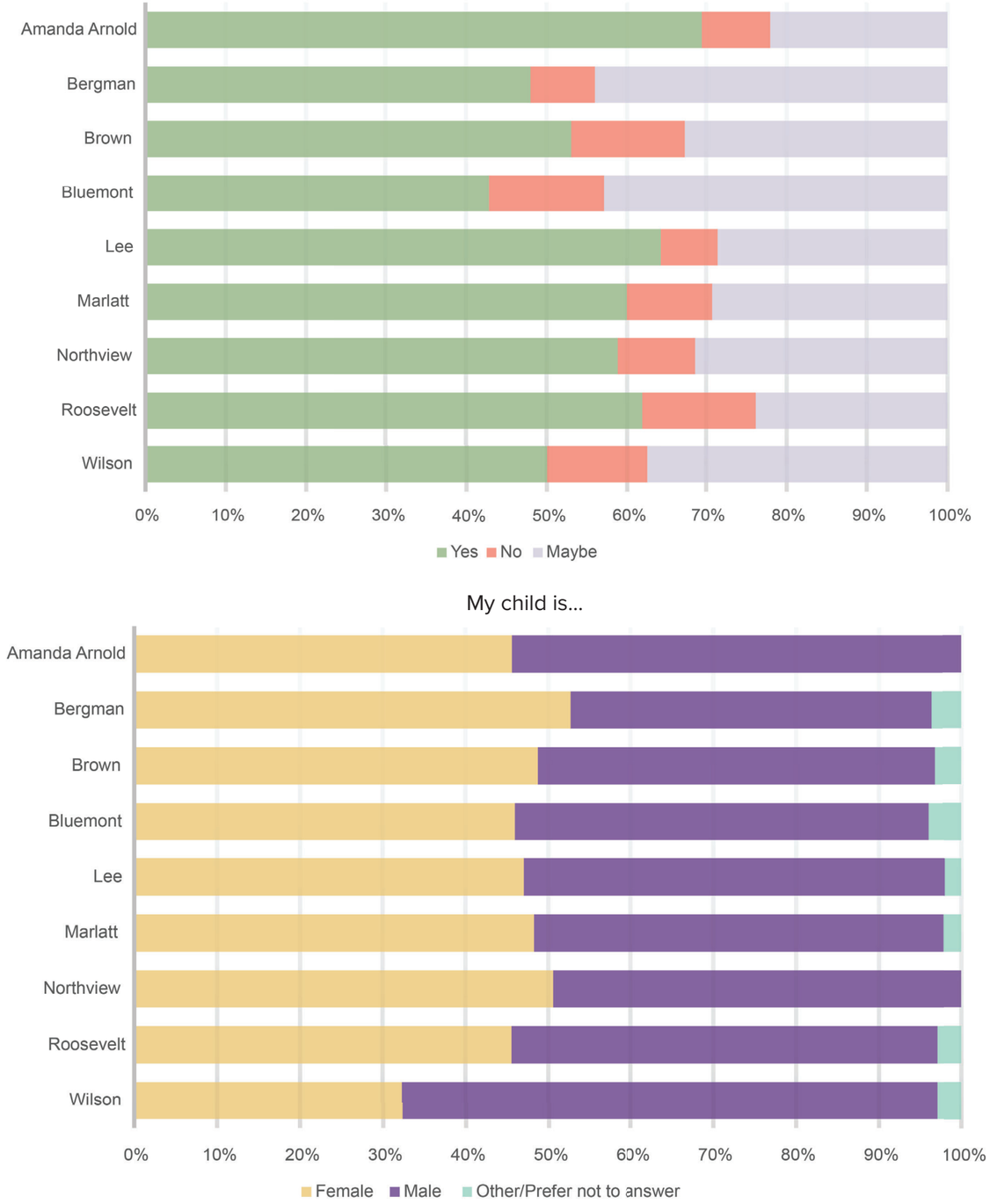


**Q10. How do you feel about the following statements about walking or biking to school? (USD total for each option)**



# APPENDIX B | *Survey Responses*

Would you support or use a Walking School Bus program for your child?

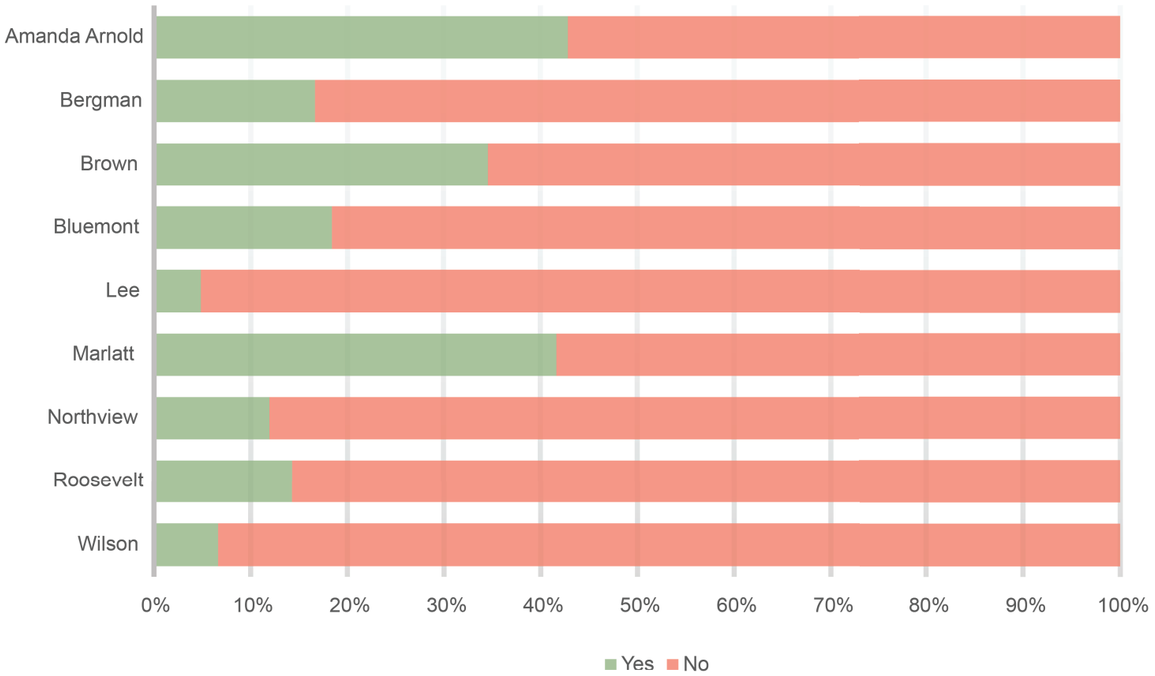



My child is...

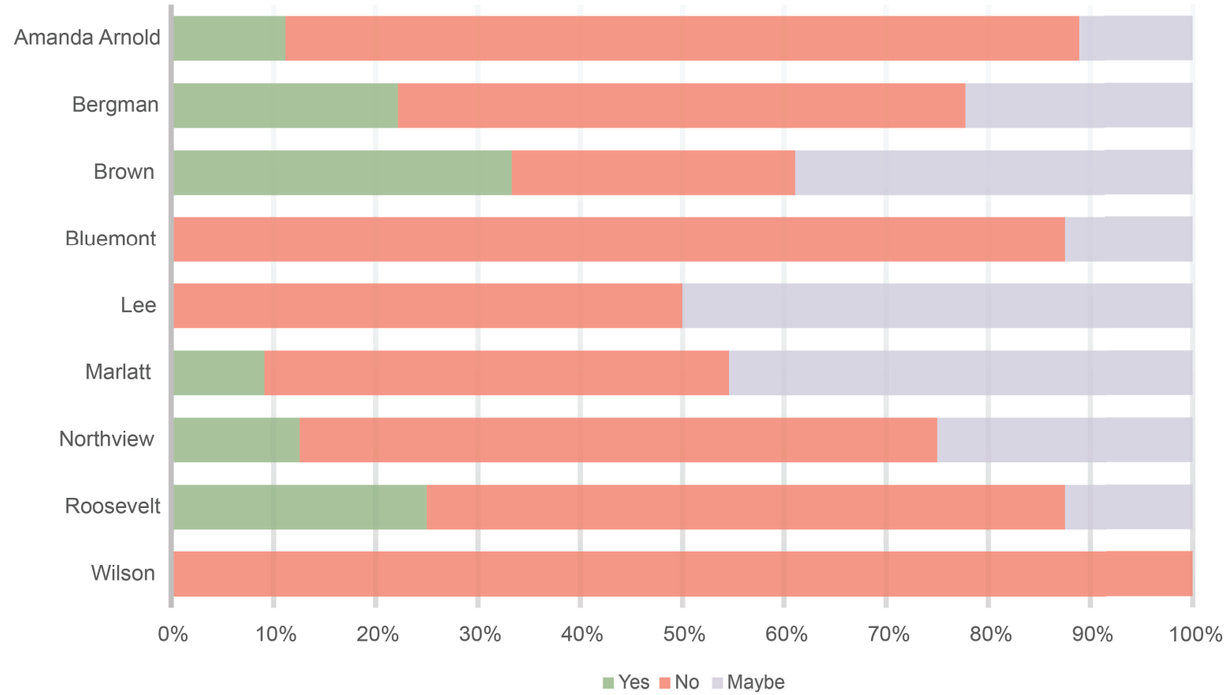



Which of the following would make you feel more comfortable about your child using a Walking School Bus?

Have you heard of the Bicycle Safety Awareness Program (BSAP)?




Has your child completed BSAP?



# Crosswalk Visibility Enhancements

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***


This example combines curb extensions, high-visibility markings, overhead lighting, and in-street signs on a two-lane roadway.

This group of countermeasures includes improved lighting, advance or in-street warning signage, pavement markings, and geometric design elements. Such features may be used in combination to indicate optimal or preferred locations for people to cross and to help reinforce the driver requirement to yield the right-of-way to pedestrians at crossing locations.

For multi-lane roadway crossings where vehicle AADTs are in excess of 10,000, a marked crosswalk alone is typically not sufficient (Zegeer, 2005). Under such conditions, more substantial crossing improvements are also needed to prevent an increase in pedestrian crash potential. Examples of more substantial treatments include the refuge island, PHB, and RRFB.

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**Poor lighting conditions, obstructions such as parked cars, and horizontal or vertical roadway curvature can reduce visibility at crosswalks, contributing to higher crash rates.**

**Crosswalk visibility enhancements help make crosswalks and/or pedestrians more visible and can help pedestrians decide where to cross.**

**Crosswalk visibility enhancements can reduce crashes by**

**23–48%**

**FEATURES:**

- **High visibility marking improves visibility of the crosswalk compared to the standard parallel lines.**
- **Parking restriction on the crosswalk approach improves the sightlines for motorists and pedestrians.**
- **Advance STOP or YIELD markings & signs reduce the risk of a multiple threat crash.**
- **Curb extension improves sight distance between drivers and pedestrians and narrows crossing distance.**
- **In street STOP or YIELD signs may improve driver yielding rates.**

June 2018, Updated | *FHWA-SA-18-061*

## Crosswalk Visibility Enhancements

**EDC-4 STEP:** https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm

**High-visibility crosswalk marking.** High-visibility crosswalks are preferred over parallel line crosswalks and should be provided at all established midblock pedestrian crossings. They should also be considered at uncontrolled intersections.

**Parking restriction on the crosswalk approach.** Parking restriction can include the removal of parking space markings, installation of new "parking prohibition" pavement markings or curb paint, and signs. The minimum setback is 20 feet in advance of the crosswalk where speeds are 25 mph or less, and 30 feet where speeds are between 26 and 35 mph.

**Advance YIELD or STOP markings and signs.**[1] The stop bar or "sharks teeth" yield markings are placed 20 to 50 feet in advance of a marked crosswalk to indicate where vehicles are required to stop or yield in compliance with the accompanying "STOP Here for Pedestrians" or "YIELD Here to Pedestrians" sign.

**Curb extension.** This treatment, also referred to as bulb-outs, extends the sidewalk or curb line out into the parking lane, which reduces the effective street width. Curb extensions must not extend into travel lanes and should not extend across bicycle lanes.

**Improved nighttime lighting.** Consideration should be given to placing lights in advance of midblock and intersection crosswalks on both approaches to illuminate the front of the pedestrian and avoid creating a silhouette.

**In-street STOP or YIELD to pedestrian sign.**[2] These signs serve to remind road users of laws regarding right-of-way, and they may be appropriate on 2-lane or 3-lane roads where speed limits are 30 mph or less. The sign can be placed in between travel lanes or in a median.

***COST***

| Countermeasure | Range | Average |
|---|---|---|
| High visibility crosswalk marking | $600-5,700 each | $2,540 each |
| Lighting | *Varies based on fixture type and utility service agreement* | |
| Parking restriction | *Varies based on the required signs and pavement markings* | |
| Curb extension | $2,000-20,000 | $13,000 each |
| Advance STOP/YIELD sign | N/A | $300 each |
| Advance STOP/YIELD line | N/A | $320 each |
| In-street STOP/YIELD sign | N/A | $240 each |

*[1]MUTCD section 2B.12 In-Street and Overhead Pedestrian Crossing Signs (R1-6, R1-6a, R1-9, and R1-9a)*

*[2]MUTCD reference:Section 2B.11 Yield Here To Pedestrians Signs and Stop Here For Pedestrians Signs (R1-5 Series)*

### References

Harkey, D.L., R. Srinivasan, J. Baek, F. Council, K. Eccles, N. Lefler, F. Gross, B. Persaud, C. Lyon, E. Hauer, and J. Bonneson. (2008). NCHRP Report 617: Crash Reduction Factors for Traffic Engineering and ITS Improvements. Transportation Research Board, Washington, D.C.

Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.

Gibbons, R. B., Edwards, C., Williams, B., & Andersen, C. K. (2008). Informational Report on Lighting Design for Midblock Crosswalks. Report No. FHWA-HRT-08-053. Federal Highway Administration.

Bushell, M., Poole, B., Zegeer, C., & Rodriguez, D. (2013). Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public. Pedestrian and Bicycle Information Center.

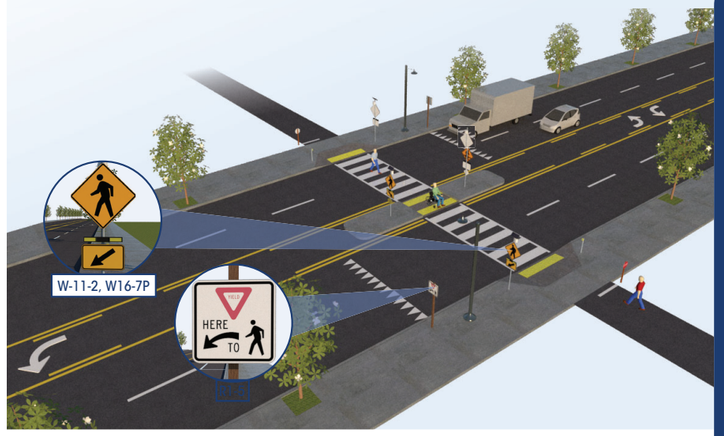
Federal Highway Administration. (2013). Multiple webpages in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System:

- Marked Crosswalks and Enhancements: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=4
- Lighting and Illumination: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=8
- Parking Restrictions: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=9
- Curb Extensions: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=5
- Advance Stop/Yield Lines: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=13

# Rectangular Rapid-Flashing Beacon (RRFB)

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***




RRFBs are pedestrian-actuated conspicuity enhancements used in combination with a pedestrian, school, or trail crossing warning sign to improve safety at uncontrolled, marked crosswalks. The device includes two rectangular-shaped yellow indications, each with an LED-array-based light source, that flash with high frequency when activated.

The RRFB is a treatment option at many types of established pedestrian crossings. Research indicates RRFBs can result in motorist yielding rates as high as 98 percent at marked crosswalks. However, yielding rates as low as 19 percent have also been noted. Compliance rates varied most per the city location, posted speed limit, crossing distance, and whether the road was one- or two-way. RRFBs are particularly effective at multilane crossings with speed limits less than 40 mph. Consider the Pedestrian Hybrid Beacon (PHB) instead for roadways with higher speeds. FHWA's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* (HSA-17-072) provides specific conditions where practitioners should strongly consider the PHB instead of the RRFB.

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Multiple lanes of traffic create challenges for pedestrians crossing at unsignalized locations.

RRFBs can make crosswalks and/or pedestrians more visible at a marked crosswalk.

**RRFBs can reduce pedestrian crashes by 47%**

**FEATURES:**

- Enhanced warning improves motorist yielding

**OFTEN USED WITH:**

- Crosswalk visibility enhancements
- Pedestrian refuge island
- Advance STOP or YIELD markings and signs

June 2018, Updated | *FHWA-SA-18-065*

## Rectangular Rapid-Flashing Beacon (RRFB)

**EDC-4 STEP:** https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm


Princeton, N.J. Photo: VHB

### *CONSIDERATIONS*

FHWA has issued interim approval for the use of the RRFB (IA-21). State and local agencies must request and receive permission to use this interim approval before they can use the RRFB. IA-21 does not provide guidance or criteria based on number of lanes, speed, or traffic volumes.

RRFBs are placed on both ends of a crosswalk. If the crosswalk contains a pedestrian refuge island or other type of median, an RRFB should be placed to the right of the crosswalk and on the median (instead of the left side of the crosswalk).

RRFBs typically draw power from standalone solar panel units, but may also be wired to a traditional power source. IA-21 provides conditions for the use of accessible pedestrian features with the RRFB assembly. When RRFBs are not in common use in a community, consider conducting an outreach effort to educate the public and law enforcement officers on their purpose and use.

### *COST*

The cost associated with RRFB installation ranges from $4,500 to $52,000 each, with the average cost estimated at $22,250. These costs include the complete system installation with labor and materials.

References

MUTCD section 2B.12 In-Street and Overhead Pedestrian Crossing Signs (R1-6, R1-6a, R1-9, and R1-9a).

Fitzpatrick, K., M. Brewer, R. Avelar, and T. Lindheimer. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." Report No. TTI-CTS-0010. Texas A&M Transportation Institute, College Station, Texas. June 2016. https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-CTS-0010.pdf

Federal Highway Administration. (2018). MUTCD – Interim Approval for Optional Use of Pedestrian-Actuated Rectangular Rapid-Flashing Beacons at Uncontrolled Marked Crosswalks (IA-21). U.S. Department of Transportation, Washington, DC.

Federal Highway Administration. (2013). "Rectangular Rapid Flash Beacon" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=54

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# Leading Pedestrian Interval (LPI)

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***

Leading Pedestrian Intervals (LPIs) are low-cost adjustments to signal timing to increase pedestrian safety at signalized intersections. An LPI gives pedestrians a typical 3- to 7-second head start before vehicles in the parallel direction are given the green signal indication. LPIs can help reduce conflicts between pedestrians and left- or right- turning vehicles. The LPI works to position the pedestrian within the crosswalk thereby decreasing the likelihood of a conflict or crash with a left- or right-turning vehicle ahead of the turning traffic. Agencies will often consider restricting Right Turns on Red (RTOR) in association with LPIs to better control for conflicts with right-turning vehicles.

The Manual on Uniform Traffic Control Devices (MUTCD) offers guidance on signal timing when LPI is used. The MUTCD says an LPI "should be at least 3 seconds in duration and should be timed to allow pedestrians to cross at least one lane of traffic or, in the case of a large corner radius, to travel far enough for pedestrians to establish their position before the turning traffic is released." Using Accessible Pedestrian Signals (APS) with LPI provides indications for persons with disabilities. MUTCD guidance also offers considerations for accessible pedestrian signals when LPIs are used.[2]

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**LPIs reduce conflicts between pedestrians and vehicles.**

**LPIs improve visibility of pedestrians in the crosswalk.**

**LPIs can reduce pedestrian crashes by[1]**

**13%**

**FEATURES:**

- **Increased likelihood of driver yielding.**
- **Enhanced safety for slower moving pedestrians.**

**COMPLIMENTARY TREATMENTS:**

- **Right Turn on Red (RTOR) Restrictions.**
- **Accessible Pedestrian Signals.**
- **Parallel Vehicular Green Extension Interval.[2]**

October 2019 | *FHWA-SA-19-040*

## Leading Pedestrian Interval (LPI)

**STEP:** https://safety.fhwa.dot.gov/ped_bike/step/

### *LPI LENGTH*

Researchers have developed formulas to help agencies calculate a desirable duration of an LPI, calculating the minimum time required for pedestrians to cross the first travel lane or halfway across one direction of travel. Streets with wide or multiple lanes may result in pedestrian crossing phases that are longer than the concurrent vehicle phase. This situation may lead the agency to consider elongated LPIs to reduce conflicts with left-turning vehicles.[3]

### *COST*

LPI installation requires reprogramming the traffic signal to accommodate the advance pedestrian interval. In rare cases, agencies may need to upgrade signal controllers. The cost associated with LPI can range from $200 (controller setting changes only) to $1200 each (pedestrian/vehicle study, retiming analyses, incorporating the formers setting changes).[1]

Source: FHWA

### *SELECTING SITES FOR LPI*

Several cities across the U.S. have decided to install LPIs across systems of signalized intersections to improve pedestrian safety. Agencies prioritize the intersections where they install LPIs to maximize limited resources and after considering several common factors:

- **Crash history.** A review of 3 or more years of crash data for intersections with multiple crashes or a history of severe injury/fatal crashes are often a priority. Cities also use information from observed conflicts to supplement crash data.
- **Pedestrian crossing volumes.** Cities may look for pedestrian volumes exceeding traditional pedestrian signal warrants when considering LPIs. The estimated exposure (product of pedestrian and turning traffic volumes) may be another consideration.
- **Vulnerable populations.** Agencies often prioritize LPIs where school-aged children or older adults are expected to cross. These pedestrians may enter the crosswalk more slowly than other pedestrians.
- **One-Way Streets or at T-intersections.** Where left-turning vehicles aren't typically expected to yield to oncoming vehicles, LPIs may be useful to increase yielding to pedestrians in the crosswalk.
- **Intersection Visibility.** LPIs may be prioritized where the visibility of a crosswalk is limited or restricted. General examples are geometry, location of stopped vehicles, vegetation, and streetside features.

References

[1] Goughnour, E., Carter, D., Lyon, C., Persaud, B., Lan, B., Chun, P., ... Signor, K. (2018). Safety Evaluation of Protected Left Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety, Federal Highway Administration, Report No. FHWA-HRT-18-044. Washington, D.C.

[2] Federal Highway Administration. (2009). Part 4, Chapter 4E Manual on Uniform Traffic Control Devices. Federal Highway Administration. Washington, D.C.

[3] Dittberner, R., & Vu, N. (2017). How Long Is Your LPI?: Balancing Pedestrian Comfort and Traffic Impacts with an Elongated Leading Pedestrian Interval. ITE Journal. Washington, D.C.

# Pedestrian Refuge Island

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***


A pedestrian refuge island is a median with a refuge area that is intended to help protect pedestrians who are crossing a multilane road. This countermeasure is sometimes referred to as a crossing island, refuge island, or pedestrian island. The presence of a pedestrian refuge island at a midblock location or intersection allows pedestrians to focus on one direction of traffic at a time as they cross, and gives them a place to wait for an adequate gap in oncoming traffic before finishing the second phase of a crossing.

Refuge islands are highly desirable for midblock pedestrian crossings on roads with four or more travel lanes, especially where speed limits are 35 mph or greater and/or where annual average daily traffic (AADT) is 9,000 or higher. They are also a candidate treatment option for uncontrolled pedestrian crossings on 3-lane or 2-lane roads that have high vehicle speeds or volumes. When installed at a midblock crossing, the island should be supplemented with a marked high-visibility crosswalk.

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The combination of a long crossing distance and multiple lanes of oncoming traffic can create an unsafe pedestrian environment.

A pedestrian refuge island can improve safety and comfort by providing pedestrians with the option of waiting in the median area before beginning the next stage of the crossing.

**Pedestrian refuge islands can reduce pedestrian crashes by**

**32%**

**FEATURES:**

- Median can enhance visibility of the crossing and reduce speed of approaching vehicles.
- Refuge area provides a place to rest and reduces the amount of time a pedestrian is in the roadway

**OFTEN USED WITH:**

- Crosswalk visibility enhancements
- Curb extensions (where road width allows)

June 2018, Updated | *FHWA-SA-18-062*

## Pedestrian Refuge Island

**EDC-4 STEP:** https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm


Asheville, NC. Photo: Lyubov Zuyeva, pedbikeimages.org

### *CONSIDERATIONS*

The design must accommodate pedestrians with disabilities. Islands should be at least 4 feet wide (preferably 8 feet) and of adequate length to allow the anticipated number of pedestrians to stand and wait for gaps in traffic before crossing. The cut-through must include detectable warnings if island width is at least 6 feet.

Islands should be illuminated or highlighted with street lights, signs, and/or reflectors to ensure that they are visible to motorists. They can be constructed so that crossing pedestrians are directed to the right, so they can more easily view oncoming traffic after they are halfway through the crossing. If applicable, evaluate the impact of the island on bicycle facility design.

### *COST*

The cost of a median island depends on its size and construction materials. The costs range from $2,140 to $41,170 per island, depending on the length of the island, with an average cost of $13,520. The average cost per square foot is approximately $10. Costs will be higher for concrete islands versus asphalt islands, though the lifespan of concrete is longer compared to the lifespan of asphalt. Cost reductions may be realized if the refuge island can be incorporated into planned roadway improvements or utility work.

References

Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.

Federal Highway Administration. (2013). "Crossing Islands" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=6

Federal Highway Administration. "Medians and Pedestrian Crossing Islands in Urban and Suburban Areas." Proven Safety Countermeasures. Available: https://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_011.cfm

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# Raised Crosswalk

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***


Raised crosswalks are ramped speed tables spanning the entire width of the roadway, often placed at midblock crossing locations. The crosswalk is demarcated with paint and/or special paving materials. These crosswalks act as traffic-calming measures that allow the pedestrian to cross at grade with the sidewalk.

In addition to their use on local and collector streets, raised crosswalks can be installed in campus settings, shopping centers, and pick-up/drop-off zones (e.g., airports, schools, transit centers).

Raised crosswalks are flush with the height of the sidewalk. The crosswalk table is typically at least 10 feet wide and designed to allow the front and rear wheels of a passenger vehicle to be on top of the table at the same time. Detectable warnings (truncated domes) and curb ramps are installed at the street edge for pedestrians with impaired vision.

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Local and collector roads with high speeds pose a significant challenge for pedestrians crossing the roadway.

A raised crosswalk can reduce vehicle speeds and enhance the pedestrian crossing environment.

Raised crosswalks can reduce pedestrian crashes by **45%**

**FEATURES:**

- Elevated crossing makes the pedestrian more prominent in the driver's field of vision, and allows pedestrians to cross at grade with the sidewalk
- Approach ramps may reduce vehicle speeds and improve motorist yielding

**OFTEN USED WITH:**

- Crosswalk visibility enhancements

June 2018, Updated | *FHWA-SA-18-063*

## Raised Crosswalk

**EDC-4 STEP:** https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm

Boston, MA. Photo: Peter Furth / nacto.org

### *CONSIDERATIONS*

Raised crosswalks are typically installed on 2-lane or 3-lane roads with speed limits of 30 mph or less and annual average daily traffic (AADT) below about 9,000. Raised crossings should generally be avoided on truck routes, emergency routes, and arterial streets.

Drainage can be an issue. Raised crosswalks may be installed with curb extensions where parking exists. They may also be used at intersections, particularly at the entrance of the minor street.

Since this countermeasure can cause discomfort and noise (especially with larger vehicles), it may be appropriate to get public buy-in. Raised crosswalks may not be appropriate for bus transit routes or primary emergency vehicle routes. For States that experience regular snowfall, snowplowing can be a concern.

### *COST*

The cost associated with a raised crosswalk ranges from $7,110 to $30,880 each, with the average cost estimated at $8,170.

References

Federal Highway Administration. (2013). "Raised Pedestrian Crossings" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=7

Thomas, L., Thirsk, N. J., & Zegeer, C. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington D.C.

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Elvik, R., Christensen, P., and Amundsen, A. (2004). "Speed and Road Accidents An Evaluation of the Power Model." Transportokonomisk Institutt, Oslo, Norway.

# Road Diet

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***

Before


After

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**Multilane roads can take longer to cross and vehicle speeds may be high.**

**Road Diets can decrease the lane crossing distance and reduce vehicle speeds.**

**Road Diets can reduce total crashes by**

**19–47%***

*19% in urban areas, 47% in suburban areas.

**FEATURES:**

- Reduced crossing distance and exposure.
- Reduced vehicle speeds.
- Promote Complete Streets.
- Provide space for installing curb extensions and widening sidewalks.
- Create space for bicycle, transit, and/or parking lanes.

June 2018, Updated | *FHWA-SA-18-066*

## Road Diet

**EDC-4 STEP:** https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm

A typical Road Diet converts an existing four-lane, undivided roadway to two through lanes and a center, two-way left turn lane. This design allows left-turning drivers to exit the traffic stream while waiting for a gap to complete their turn and frees up space that can be reallocated to other uses, including:

- Pedestrian refuge island
- Crosswalk visibility enhancements, such as curb extensions
- On-street parking, with parking restrictions on crosswalk approaches
- Widened sidewalks and landscaped buffers
- Bicycle lane and/or transit lanes

A Road Diet can be a relatively low-cost safety solution, particularly where only pavement marking modifications are required to implement the reconfigured roadway design. When planning in conjunction with reconstruction or overlay projects, the change in cross section may be completed without any additional cost.

### *CONSIDERATIONS*

While Road Diets are effective countermeasures for midblock collisions, they are not recommended for all multilane roadways. Typically, a suitable roadway has a current and future average daily traffic (ADT) equal to or less than about 20,000. In some instances, Road Diets have been successfully used on roads with ADTs as high as 25,000.

FHWA's Road Diet Informational Guide provides a closer look at the safety and operational benefits of Road Diets to help agencies determine if this countermeasure may suit their needs. Communities will need to consider a range of factors, including:

- Vehicle speed
- Level of Service (LOS)
- Quality of Service
- Vehicle volume (ADT)
- The operation and volume of pedestrians, bicyclists, transit, and freight
- Peak hour and peak direction traffic flow
- Vehicle turning volumes and patterns
- Frequency of stopping and slow moving vehicles
- Presence of parallel roadways

Since Road Diets may be new or uncommon in a community, consider conducting an outreach effort to educate the public on the purpose and potential benefits.

### *COST*

The cost associated with a Road Diet can vary widely. Restriping costs for the three lanes plus bicycle lanes are estimated at $25,000 to $40,000 per mile, depending on the amount of lane lines that need to be repainted. When a Road Diet involves geometric features like extended sidewalks, curb extensions, a raised median or refuge island, the costs can increase to $100,000 or more per mile.

References

Pawlovich, M.D., W. Li, A. Carriquiry, and T. Welch. "Iowa's Experience with Road Diet Measures—Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates." Transportation Research Record: Journal of the Transportation Research Board, No. 1953, Transportation Research Board, Washington, D.C., 2006.

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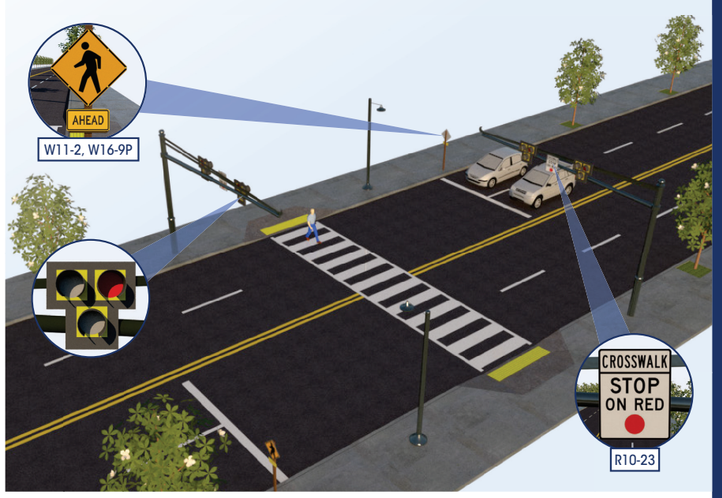
# Pedestrian Hybrid Beacon (PHB)

**SAFE TRANSPORTATION FOR EVERY PEDESTRIAN**

***COUNTERMEASURE TECH SHEET***




A Pedestrian Hybrid Beacon head consists of two red lenses above a single yellow lens. Unlike a traffic signal, the PHB rests in dark until a pedestrian activates it via pushbutton or other form of detection. When activated, the beacon displays a sequence of flashing and solid lights that indicate the pedestrian walk interval and when it is safe for drivers to proceed (see figure on back page).

The PHB is often considered for installation at locations where pedestrians need to cross and vehicle speeds or volumes are high, but traffic signal warrants are not met. These devices have been successfully used at school crossings, parks, senior centers, and other pedestrian crossings on multilane streets. PHBs are typically installed at the side of the road or on mast arms over midblock pedestrian crossings.

U.S. Department of Transportation
**Federal Highway Administration**

Safe Roads for a Safer Future
*Investment in roadway safety saves lives*

EDC

**High speeds and multiple lanes of traffic create challenges for pedestrians crossing at unsignalized locations.**

**PHBs can warn and control traffic at unsignalized locations and assist pedestrians in crossing a street or highway at a marked crosswalk.**

**PHBs can reduce pedestrian crashes by 55%**

**FEATURES:**

- Beacons stop all lanes of traffic, which can reduce pedestrian crashes.

**OFTEN USED WITH:**

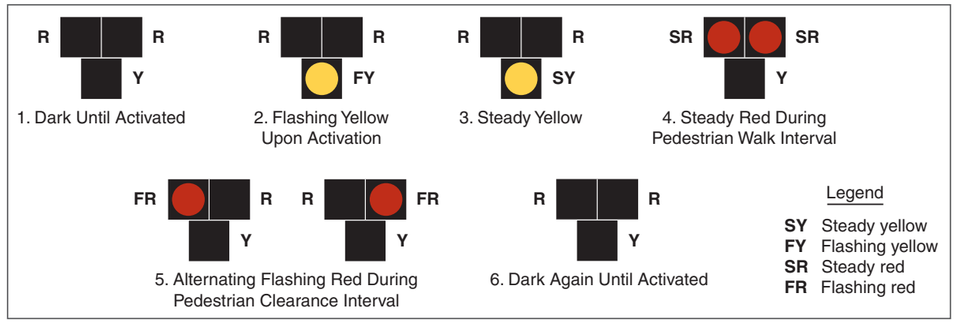
- High-visibility crosswalk markings
- Raised islands
- Advance STOP or YIELD signs and markings

June 2018, Updated | *FHWA-SA-18-064*

## Pedestrian Hybrid Beacon (PHB)

**EDC-4 STEP:** https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm

Figure 4F-3. Sequence for a Pedestrian Hybrid Beacon from FHWA's *Manual on Uniform Traffic Control Devices,* 2009 Edition, p. 511




When a pedestrian activates a PHB, a flashing yellow light is followed by a solid yellow light, alerting drivers to slow. A solid red light requires drivers to stop while pedestrians have the right-of-way to cross the street. When the pedestrian signals display a flashing DON'T WALK indication, the overhead beacon flashes red, and drivers may proceed if the crosswalk is clear.

### *CONSIDERATIONS*

PHBs are a candidate treatment for roads with three or more lanes that generally have annual average daily traffic (AADT) above 9,000. PHBs should be strongly considered for all midblock and intersection crossings where the roadway speed limits are equal to or greater than 40 miles per hour (mph). The PHB should meet the application guidelines provided in the Manual on Uniform Traffic Control Devices for existing or projected pedestrian volumes.

PHBs are intended for installation at midblock locations, but can be installed at intersections. They should only be installed in conjunction with marked crosswalks and pedestrian countdown signals.

When PHBs are not in common use in a community, consider conducting an outreach effort to educate the public and law enforcement officers on the PHBs' purpose and use.

### *COST*

The PHB is often less expensive than a full traffic signal installation. The costs range from $21,000 to $128,000, with an average per unit cost of $57,680.

References

Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.

Federal Highway Administration. (2013). "Pedestrian Hybrid Beacon" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=53

Bushell, M., Poole, B., Zegeer, C., & Rodriguez, D. (2013). Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public. *Pedestrian and Bicycle Information Center.*

City of Manhattan
A1, Anderson and Hudson Crossing
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| A1: Hudson and Anderson | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| | **GENERAL ITEMS** | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 2,505.08 | $ 2,505.08 | Assume 2% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 6,262.70 | $ 6,262.70 | Assume 5% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 2,505.08 | $ 2,505.08 | Assume 2% of Construction |
| 4 | EROSION CONTROL | 0.0 | LSUM | $ 1,252.54 | $ 1,252.54 | Assume 1% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 2,505.08 | $ 2,505.08 | Assume 2% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 6,262.70 | $ 6,262.70 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 2,505.08 | $ 2,505.08 | Assume 2% of Construction |
| | **CONSTRUCTION ITEMS** | | | | | |
| 8 | ROCK EXCAVATION | 6.0 | CU.YD. | $ 55.00 | $ 330.00 | Curb Removal |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 60.0 | SQ.YD. | $ 50.00 | $ 3,000.00 | |
| 10 | SIDEWALK RAMP | 40.0 | SQ.YD. | $ 260.00 | $ 10,400.00 | 6 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 120.0 | LIN.FT. | $ 25.00 | $ 3,000.00 | 6 Ramps |
| 12 | AGGREGATE BASE (AB-3)(6") | 33.0 | SQ.YD. | $ 16.00 | $ 528.00 | Under C&G |
| 13 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 216.0 | LIN. FT. | $ 18.50 | $ 3,996.00 | 3 Crosswalks |
| 14 | SIGNING | 1.0 | LSUM | $ 4,000.00 | $ 4,000.00 | |
| 15 | HAWK BEACON SYSTEM | 1.0 | LSUM | $ 100,000.00 | $ 100,000.00 | |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 149,052.26** | |
| | | | | CONTINGENCIES(20%) | $ 29,810.45 | |
| | | | | CONSTRUCTION TOTAL | $ 178,862.71 | |
| | | | | R/W ACQUISTION | $ 7,000.00 | 2 Properties. Temp and Perm. |
| | | | | UTILITIES | UNKNOWN | Power Poles |
| | | | | SURVEY (2%) | $ 3,577.25 | Assumed 2% of Construction |
| | | | | DESIGN (15%) | $ 26,829.41 | Assumed 15% of Construction |
| | | | | INSPECTION (15%) | $ 26,829.41 | Assumed 15% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 243,098.78*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
A4, Plymouth Sidewalk
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| A4: Plymouth Sidewalk | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| | **GENERAL ITEMS** | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 5,890.75 | $ 5,890.75 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 5,890.75 | $ 5,890.75 | Assume 5% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,890.75 | $ 5,890.75 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 3,534.45 | $ 3,534.45 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 11,781.50 | $ 11,781.50 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,890.75 | $ 5,890.75 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 8,247.05 | $ 8,247.05 | Assume 7% of Construction |
| | **CONSTRUCTION ITEMS** | | | | | |
| 8 | TREE REMOVAL | 15.0 | EACH | $ 2,000.00 | $ 30,000.00 | Assume 15 trees |
| 9 | ROCK EXCAVATION | 76.0 | CU.YD. | $ 55.00 | $ 4,180.00 | 13 Driveways & C&G |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 689.0 | SQ.YD. | $ 50.00 | $ 34,450.00 | 1000' x 5' wide + 200' x 6' wide |
| 11 | SIDEWALK RAMP | 30.0 | SQ.YD. | $ 260.00 | $ 7,800.00 | 6 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 90.0 | LIN.FT. | $ 25.00 | $ 2,250.00 | 6 Ramps |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 433.0 | SQ.YD. | $ 70.00 | $ 30,310.00 | 13 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 25.0 | SQ.YD. | $ 16.00 | $ 400.00 | Under C&G |
| 15 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 50.0 | LIN. FT. | $ 18.50 | $ 925.00 | 1 Crosswalk Striped |
| 16 | SIGNING | 1.0 | LSUM | $ 7,500.00 | $ 7,500.00 | Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 164,941.00** | |
| | | | | CONTINGENCIES(20%) | $ 32,988.20 | |
| | | | | CONSTRUCTION TOTAL | $ 197,929.20 | |
| | | | | R/W ACQUISTION | $ 52,500.00 | 15 Properties Temp Only |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 29,689.38 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 49,482.30 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 49,482.30 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 379,083.18*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
Bg1-Hudson Trail & Englewood
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| Bg1: Englewood St. & Hudson Trail Crossing | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 2,513.00 | $ 2,513.00 | Assume 20% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 2,513.00 | $ 2,513.00 | Assume 20% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 628.25 | $ 628.25 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 376.95 | $ 376.95 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 1,256.50 | $ 1,256.50 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 1,256.50 | $ 1,256.50 | Assume 10% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 376.95 | $ 376.95 | Assume 3% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | ROCK EXCAVATION | 3.0 | CU.YD. | $ 55.00 | $ 165.00 | 6' x 20' |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 10.0 | SQ.YD. | $ 50.00 | $ 500.00 | |
| 10 | SIDEWALK RAMP | 10.0 | SQ.YD. | $ 260.00 | $ 2,600.00 | 3 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 40.0 | LIN.FT. | $ 25.00 | $ 1,000.00 | Median Island |
| 12 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 10.0 | SQ.YD. | $ 500.00 | $ 5,000.00 | Median Island |
| 13 | AGGREGATE BASE (AB-3)(6") | 13.0 | SQ.YD. | $ 16.00 | $ 208.00 | Under Island |
| 14 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 32.0 | LIN. FT. | $ 18.50 | $ 592.00 | 1 Crosswalk Striped |
| 15 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 21,486.15** | |
| | | | | CONTINGENCIES(20%) | $ 4,297.23 | |
| | | | | CONSTRUCTION TOTAL | $ 25,783.38 | |
| | | | | R/W ACQUISTION | $ - | |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 3,867.51 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 6,445.85 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 6,445.85 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 42,542.58*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
Bg2-Hudson Trail & Londondery
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** 2/21/2023 **Benesch Proj.#:** 130876.00

## ENGINEER'S OPINION OF PROBABLE COST

| Bg2: Londondery & Hudson Trail Crossing | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 2,513.00 | $ 2,513.00 | Assume 20% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 2,513.00 | $ 2,513.00 | Assume 20% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 628.25 | $ 628.25 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 376.95 | $ 376.95 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 1,256.50 | $ 1,256.50 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 1,256.50 | $ 1,256.50 | Assume 10% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 376.95 | $ 376.95 | Assume 3% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | ROCK EXCAVATION | 3.0 | CU.YD. | $ 55.00 | $ 165.00 | 6' x 20' |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 10.0 | SQ.YD. | $ 50.00 | $ 500.00 | |
| 10 | SIDEWALK RAMP | 10.0 | SQ.YD. | $ 260.00 | $ 2,600.00 | 3 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 40.0 | LIN.FT. | $ 25.00 | $ 1,000.00 | Median Island |
| 12 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 10.0 | SQ.YD. | $ 500.00 | $ 5,000.00 | Median Island |
| 13 | AGGREGATE BASE (AB-3)(6") | 13.0 | SQ.YD. | $ 16.00 | $ 208.00 | Under Island |
| 14 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 32.0 | LIN. FT. | $ 18.50 | $ 592.00 | 1 Crosswalk Striped |
| 15 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 21,486.15** | |
| | | | | CONTINGENCIES(20%) | $ 4,297.23 | |
| | | | | CONSTRUCTION TOTAL | $ 25,783.38 | |
| | | | | R/W ACQUISTION | $ - | |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 3,867.51 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 6,445.85 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 6,445.85 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 42,542.58*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
B1-Juliette & Vattier
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| B1: Juliette & Vattier | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| | **GENERAL ITEMS** | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 1,626.15 | $ 1,626.15 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 3,252.30 | $ 3,252.30 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 975.69 | $ 975.69 | Assume 3% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 325.23 | $ 325.23 | Assume 1% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 3,252.30 | $ 3,252.30 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 1,626.15 | $ 1,626.15 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 975.69 | $ 975.69 | Assume 3% of Construction |
| | **CONSTRUCTION ITEMS** | | | | | |
| 8 | ROCK EXCAVATION | 1.0 | CU.YD. | $ 55.00 | $ 55.00 | Curb and Gutter |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 20.0 | SQ.YD. | $ 50.00 | $ 1,000.00 | |
| 10 | SIDEWALK RAMP | 10.0 | SQ.YD. | $ 260.00 | $ 2,600.00 | 2 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 20.0 | LIN.FT. | $ 25.00 | $ 500.00 | 2 Ramps |
| 12 | AGGREGATE BASE (AB-3)(6") | 8.0 | SQ.YD. | $ 16.00 | $ 128.00 | Under Island |
| 13 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 40.0 | LIN. FT. | $ 18.50 | $ 740.00 | 1 Crosswalk Striped |
| 14 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | |
| 15 | RECTANGULAR RAPID FLASHING BEACON SYSTEM | 1.0 | LSUM | $ 25,000.00 | $ 25,000.00 | |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 44,556.51** | |
| | | | | CONTINGENCIES(20%) | $ 8,911.30 | |
| | | | | CONSTRUCTION TOTAL | $ 53,467.81 | |
| | | | | R/W ACQUISTION | $ - | |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (5%) | $ 2,673.39 | Assumed 5% of Construction |
| | | | | DESIGN (15%) | $ 8,020.17 | Assumed 15% of Construction |
| | | | | INSPECTION (15%) | $ 8,020.17 | Assumed 15% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 72,181.55*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
L1-Hunting and Lee
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **5/9/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| L1: Hunting and Lee | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 5,223.40 | $ 5,223.40 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 10,446.80 | $ 10,446.80 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,223.40 | $ 5,223.40 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 3,134.04 | $ 3,134.04 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 10,446.80 | $ 10,446.80 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,223.40 | $ 5,223.40 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 5,223.40 | $ 5,223.40 | Assume 5% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 2.0 | EACH | $ 2,000.00 | $ 4,000.00 | By House |
| 9 | ROCK EXCAVATION | 100.0 | CU.YD. | $ 55.00 | $ 5,500.00 | Street Removals |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 138.0 | SQ.YD. | $ 60.00 | $ 8,280.00 | 90' x 6' wide + 140' x 5' wide |
| 11 | SIDEWALK RAMP | 20.0 | SQ.YD. | $ 260.00 | $ 5,200.00 | 4 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 250.0 | LIN.FT. | $ 30.00 | $ 7,500.00 | |
| 13 | CONCRETE PAVEMENT (7" UNIFORM)(AE) | 550.0 | SQ.YD. | $ 70.00 | $ 38,500.00 | 3 Driveways and Harris Ave. |
| 14 | AGGREGATE BASE (AB-3)(6") | 600.0 | SQ.YD. | $ 16.00 | $ 9,600.00 | Road, Driveways and C&G |
| 15 | LANDSCAPE RETAINING WALL | 1.0 | LSUM | $ 20,000.00 | $ 20,000.00 | 70' X 4' tall |
| 16 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 48.0 | LIN. FT. | $ 18.50 | $ 888.00 | Crosswalk |
| 17 | SIGNING | 1.0 | LSUM | $ 5,000.00 | $ 5,000.00 | Crosswalk |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 149,389.24** | |
| | | | | CONTINGENCIES(20%) | $ 29,877.85 | |
| | | | | CONSTRUCTION TOTAL | $ 179,267.09 | |
| | | | | R/W ACQUISTION | $ 10,500.00 | Assume 3 Temp for Drives |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (7%) | $ 12,548.70 | Assumed 7% of Construction |
| | | | | DESIGN (20%) | $ 35,853.42 | Assumed 20% of Construction |
| | | | | INSPECTION (20%) | $ 35,853.42 | Assumed 20% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 274,022.62*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
L2-Claflin and Sunset
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| L2: Claflin and Sunset | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| | **GENERAL ITEMS** | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 2,570.50 | $ 2,570.50 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 5,141.00 | $ 5,141.00 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 2,570.50 | $ 2,570.50 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 1,542.30 | $ 1,542.30 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 5,141.00 | $ 5,141.00 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 2,570.50 | $ 2,570.50 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 3,598.70 | $ 3,598.70 | Assume 7% of Construction |
| | **CONSTRUCTION ITEMS** | | | | | |
| 8 | ROCK EXCAVATION | 6.0 | CU.YD. | $ 55.00 | $ 330.00 | Curb and Gutter |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 156.0 | SQ.YD. | $ 50.00 | $ 7,800.00 | 280' x 5' |
| 10 | SIDEWALK RAMP | 40.0 | SQ.YD. | $ 260.00 | $ 10,400.00 | 8 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 120.0 | LIN.FT. | $ 25.00 | $ 3,000.00 | 8 Ramps |
| 12 | AGGREGATE BASE (AB-3)(6") | 47.0 | SQ.YD. | $ 16.00 | $ 752.00 | Under C&G |
| 13 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 88.0 | LIN. FT. | $ 18.50 | $ 1,628.00 | 1 Crosswalk Striped |
| 14 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | 4 Signs and 4 Plaques |
| 15 | PEDESTRIAN SIGNAL UPGRADES (APS) | 1.0 | LSUM | $ 25,000.00 | $ 25,000.00 | Push Button Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 74,544.50** | |
| | | | | CONTINGENCIES(20%) | $ 14,908.90 | |
| | | | | CONSTRUCTION TOTAL | $ 89,453.40 | |
| | | | | R/W ACQUISTION | $ - | |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (10%) | $ 8,945.34 | Assumed 10% of Construction |
| | | | | DESIGN (25%) | $ 22,363.35 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 22,363.35 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 143,125.44*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
L4-College Heights
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| L4: College Heights | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 14,373.65 | $ 14,373.65 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 28,747.30 | $ 28,747.30 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 14,373.65 | $ 14,373.65 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 14,373.65 | $ 14,373.65 | Assume 5% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 28,747.30 | $ 28,747.30 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 14,373.65 | $ 14,373.65 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 20,123.11 | $ 20,123.11 | Assume 7% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 25.0 | EACH | $ 2,000.00 | $ 50,000.00 | 25 Trees |
| 9 | ROCK EXCAVATION | 69.0 | CU.YD. | $ 55.00 | $ 3,795.00 | Curb and Gutter |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 1,044.0 | SQ.YD. | $ 50.00 | $ 52,200.00 | 1000' x 6'+680' x 5' |
| 11 | SIDEWALK RAMP | 30.0 | SQ.YD. | $ 260.00 | $ 7,800.00 | 6 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 1,060.0 | LIN.FT. | $ 25.00 | $ 26,500.00 | 6 Ramps + 1000' Curb & Gutter |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 500.0 | SQ.YD. | $ 70.00 | $ 35,000.00 | 15 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 2,998.0 | SQ.YD. | $ 16.00 | $ 47,968.00 | Under C&G and Trail |
| 15 | HMA COMMERCIAL GRADE CLASS A PATCHING | 77.0 | TON | $ 300.00 | $ 23,100.00 | |
| 16 | LANDSCAPE RETAINING WALL | 1.0 | LSUM | $ 30,000.00 | $ 30,000.00 | |
| 17 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 60.0 | LIN. FT. | $ 18.50 | $ 1,110.00 | Crosswalk |
| 18 | SIGNING | 1.0 | LSUM | $ 10,000.00 | $ 10,000.00 | Sign Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 422,585.31** | |
| | | | | CONTINGENCIES(20%) | $ 84,517.06 | |
| | | | | CONSTRUCTION TOTAL | $ 507,102.37 | |
| | | | | R/W ACQUISTION | $ 66,500.00 | Assume 19 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 76,065.36 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 126,775.59 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 126,775.59 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 903,218.91*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
L5-Jarvis
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| L5: Jarvis | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 5,353.80 | $ 5,353.80 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 10,707.60 | $ 10,707.60 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,353.80 | $ 5,353.80 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 3,212.28 | $ 3,212.28 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 10,707.60 | $ 10,707.60 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,353.80 | $ 5,353.80 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 7,495.32 | $ 7,495.32 | Assume 7% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 25.0 | EACH | $ 2,000.00 | $ 50,000.00 | 25 Trees |
| 9 | ROCK EXCAVATION | 1.0 | CU.YD. | $ 55.00 | $ 55.00 | Curb and Gutter |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 485.0 | SQ.YD. | $ 50.00 | $ 24,250.00 | 875' x 5' |
| 11 | SIDEWALK RAMP | 5.0 | SQ.YD. | $ 260.00 | $ 1,300.00 | 1 Ramp |
| 12 | CURB AND GUTTER COMBINED (AE) | 15.0 | LIN.FT. | $ 25.00 | $ 375.00 | 1 Ramp |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 300.0 | SQ.YD. | $ 70.00 | $ 21,000.00 | 9 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 6.0 | SQ.YD. | $ 16.00 | $ 96.00 | Under C&G |
| 15 | SIGNING | 1.0 | LSUM | $ 10,000.00 | $ 10,000.00 | Sign Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 155,260.20** | |
| | | | | CONTINGENCIES(20%) | $ 31,052.04 | |
| | | | | CONSTRUCTION TOTAL | $ 186,312.24 | |
| | | | | R/W ACQUISTION | $ 31,500.00 | Assume 9 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 27,946.84 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 46,578.06 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 46,578.06 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 338,915.20*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
M6-Hillview Drive
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| M6: Hillview Drive | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| | **GENERAL ITEMS** | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 5,686.55 | $ 5,686.55 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 11,373.10 | $ 11,373.10 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,686.55 | $ 5,686.55 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 3,411.93 | $ 3,411.93 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 11,373.10 | $ 11,373.10 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,686.55 | $ 5,686.55 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 7,961.17 | $ 7,961.17 | Assume 7% of Construction |
| | **CONSTRUCTION ITEMS** | | | | | |
| 8 | TREE REMOVAL | 8.0 | EACH | $ 2,000.00 | $ 16,000.00 | 7 Trees |
| 9 | ROCK EXCAVATION | 80.0 | CU.YD. | $ 55.00 | $ 4,400.00 | Drives & Curb and Gutter |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 889.0 | SQ.YD. | $ 50.00 | $ 44,450.00 | 1600' x 5' |
| 11 | SIDEWALK RAMP | 35.0 | SQ.YD. | $ 260.00 | $ 9,100.00 | 7 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 105.0 | LIN.FT. | $ 25.00 | $ 2,625.00 | 7 Ramps |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 450.0 | SQ.YD. | $ 70.00 | $ 31,500.00 | 13 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 41.0 | SQ.YD. | $ 16.00 | $ 656.00 | Under C&G |
| 15 | SIGNING | 1.0 | LSUM | $ 5,000.00 | $ 5,000.00 | Signing Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 164,909.95** | |
| | | | | CONTINGENCIES(20%) | $ 32,981.99 | |
| | | | | CONSTRUCTION TOTAL | $ 197,891.94 | |
| | | | | R/W ACQUISTION | $ 49,000.00 | Assume 14 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 29,683.79 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 49,472.99 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 49,472.99 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 375,521.70*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
M9a-Browning Trail (South)
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| M9a: Browning Trail, Dickens to Kimball | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 17,069.15 | $ 17,069.15 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 34,138.30 | $ 34,138.30 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 17,069.15 | $ 17,069.15 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 10,241.49 | $ 10,241.49 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 34,138.30 | $ 34,138.30 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 17,069.15 | $ 17,069.15 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 23,896.81 | $ 23,896.81 | Assume 7% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 15.0 | EACH | $ 2,000.00 | $ 30,000.00 | 7 Trees |
| 9 | ROCK EXCAVATION | 63.0 | CU.YD. | $ 55.00 | $ 3,465.00 | Drives & Curb and Gutter |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 2,889.0 | SQ.YD. | $ 50.00 | $ 144,450.00 | 2600' x 10' |
| 11 | SIDEWALK RAMP | 140.0 | SQ.YD. | $ 260.00 | $ 36,400.00 | 14 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 280.0 | LIN.FT. | $ 25.00 | $ 7,000.00 | 14 Ramps |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 300.0 | SQ.YD. | $ 70.00 | $ 21,000.00 | 9 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 2,998.0 | SQ.YD. | $ 16.00 | $ 47,968.00 | Under C&G and Trail |
| 15 | STORM SEWER (24")(RCP) | 10.0 | LIN.FT. | $ 110.00 | $ 1,100.00 | Storm Extension Int. Kimball |
| 16 | LANDSCAPE RETAINING WALL | 1.0 | LSUM | $ 15,000.00 | $ 15,000.00 | Near Marlatt Elementary |
| 17 | SIGNING | 1.0 | LSUM | $ 10,000.00 | $ 10,000.00 | Sign Relocations |
| 18 | SIGNAL ADJUSTMENTS | 1.0 | LSUM | $ 25,000.00 | $ 25,000.00 | Maybe needed at intersection of Kimball |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 495,005.35** | |
| | | | | CONTINGENCIES(20%) | $ 99,001.07 | |
| | | | | CONSTRUCTION TOTAL | $ 594,006.42 | |
| | | | | R/W ACQUISTION | $ 73,500.00 | Assume 21 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (4%) | $ 23,760.26 | Assumed 4% of Construction |
| | | | | DESIGN (15%) | $ 89,100.96 | Assumed 15% of Construction |
| | | | | INSPECTION (15%) | $ 89,100.96 | Assumed 15% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 869,468.60*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
M9b-Browning Trail (North)
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| M9b: Browning Trail, Kimball to Snowbird | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 21,496.95 | $ 21,496.95 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 42,993.90 | $ 42,993.90 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 21,496.95 | $ 21,496.95 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 12,898.17 | $ 12,898.17 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 42,993.90 | $ 42,993.90 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 21,496.95 | $ 21,496.95 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 30,095.73 | $ 30,095.73 | Assume 7% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 50.0 | EACH | $ 2,000.00 | $ 100,000.00 | 50 Trees (30ish on one property) |
| 9 | ROCK EXCAVATION | 67.0 | CU.YD. | $ 55.00 | $ 3,685.00 | Drives & Curb and Gutter |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 3,000.0 | SQ.YD. | $ 50.00 | $ 150,000.00 | 2700' x 10' |
| 11 | SIDEWALK RAMP | 70.0 | SQ.YD. | $ 260.00 | $ 18,200.00 | 7 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 140.0 | LIN.FT. | $ 25.00 | $ 3,500.00 | 7 Ramps |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 367.0 | SQ.YD. | $ 70.00 | $ 25,690.00 | 11 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 3,054.0 | SQ.YD. | $ 16.00 | $ 48,864.00 | Under C&G and Trail |
| 15 | BOX EXTENSION (3)-(5'X 7') | 1.0 | LSUM | $ 60,000.00 | $ 60,000.00 | Assumed 15' Extension West Side |
| 16 | DRAINAGE STRUCTURE MODIFICATIONS | 1.0 | LSUM | $ 10,000.00 | $ 10,000.00 | South of Kelly Drive |
| 17 | SIGNING | 1.0 | LSUM | $ 10,000.00 | $ 10,000.00 | Sign Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 623,411.55** | |
| | | | | CONTINGENCIES(20%) | $ 124,682.31 | |
| | | | | CONSTRUCTION TOTAL | $ 748,093.86 | |
| | | | | R/W ACQUISTION | $ 59,500.00 | Assume 17 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | Overhead Power Lines |
| | | | | SURVEY (15%) | $ 29,923.75 | Assumed 4% of Construction |
| | | | | DESIGN (25%) | $ 112,214.08 | Assumed 15% of Construction |
| | | | | INSPECTION (25%) | $ 112,214.08 | Assumed 15% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 1,061,945.77*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
N1-Allen Road
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| N1: Allen Road | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 1,792.85 | $ 1,792.85 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 3,585.70 | $ 3,585.70 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 1,075.71 | $ 1,075.71 | Assume 3% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 358.57 | $ 358.57 | Assume 1% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 3,585.70 | $ 3,585.70 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 1,792.85 | $ 1,792.85 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 1,075.71 | $ 1,075.71 | Assume 3% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 9 | ROCK EXCAVATION | 3.0 | CU.YD. | $ 55.00 | $ 165.00 | Curb and Gutter |
| 10 | SIDEWALK RAMP | 20.0 | SQ.YD. | $ 260.00 | $ 5,200.00 | 4 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 60.0 | LIN.FT. | $ 25.00 | $ 1,500.00 | 4 Ramps |
| 12 | AGGREGATE BASE (AB-3)(6") | 47.0 | SQ.YD. | $ 16.00 | $ 752.00 | Under C&G |
| 13 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 40.0 | LIN. FT. | $ 18.50 | $ 740.00 | 1 Crosswalk Striped |
| 14 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | 4 Signs and 4 Plaques |
| 15 | RECTANGULAR RAPID FLASHING BEACON SYSTEM | 1.0 | LSUM | $ 25,000.00 | $ 25,000.00 | Signing Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 49,124.09** | |
| | | | | CONTINGENCIES(20%) | $ 9,824.82 | |
| | | | | CONSTRUCTION TOTAL | $ 58,948.91 | |
| | | | | R/W ACQUISTION | $ 7,000.00 | Assume 2 Temp for Ramps |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (5%) | $ 2,947.45 | Assumed 5% of Construction |
| | | | | DESIGN (15%) | $ 8,842.34 | Assumed 15% of Construction |
| | | | | INSPECTION (15%) | $ 8,842.34 | Assumed 15% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 86,581.03*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
N9-Griffith Drive
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| N9: Griffith Drive | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 5,389.90 | $ 5,389.90 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 10,779.80 | $ 10,779.80 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,389.90 | $ 5,389.90 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 3,233.94 | $ 3,233.94 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 10,779.80 | $ 10,779.80 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,389.90 | $ 5,389.90 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 7,545.86 | $ 7,545.86 | Assume 7% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 12.0 | EACH | $ 2,000.00 | $ 24,000.00 | 12 Trees |
| 9 | ROCK EXCAVATION | 32.0 | CU.YD. | $ 55.00 | $ 1,760.00 | Drives and Curb and Gutter |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 867.0 | SQ.YD. | $ 50.00 | $ 43,350.00 | 1560' x 5' |
| 11 | SIDEWALK RAMP | 70.0 | SQ.YD. | $ 260.00 | $ 18,200.00 | 14 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 210.0 | LIN.FT. | $ 25.00 | $ 5,250.00 | 14 Ramps |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 133.0 | SQ.YD. | $ 70.00 | $ 9,310.00 | 4 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 58.0 | SQ.YD. | $ 16.00 | $ 928.00 | Under C&G |
| 15 | SIGNING | 1.0 | LSUM | $ 5,000.00 | $ 5,000.00 | Signing Relocations |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 156,307.10** | |
| | | | | CONTINGENCIES(20%) | $ 31,261.42 | |
| | | | | CONSTRUCTION TOTAL | $ 187,568.52 | |
| | | | | R/W ACQUISTION | $ 38,500.00 | Assume 11 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 28,135.28 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 46,892.13 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 46,892.13 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 347,988.06*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
R1- S Manhattan Avenue at Houston Street
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** 2/21/2023 **Benesch Proj.#:** 130876.00

## ENGINEER'S OPINION OF PROBABLE COST

| R1: Intersection Houston & Manhattan Ave. | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 8,805.85 | $ 8,805.85 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 17,611.70 | $ 17,611.70 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 8,805.85 | $ 8,805.85 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 5,283.51 | $ 5,283.51 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 17,611.70 | $ 17,611.70 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 8,805.85 | $ 8,805.85 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 8,805.85 | $ 8,805.85 | Assume 5% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | ROCK EXCAVATION | 83.0 | CU.YD. | $ 55.00 | $ 4,565.00 | Curb and Gutter |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 867.0 | SQ.YD. | $ 50.00 | $ 43,350.00 | 1560' x 5' |
| 10 | SIDEWALK RAMP | 40.0 | SQ.YD. | $ 260.00 | $ 10,400.00 | 8 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 250.0 | LIN.FT. | $ 25.00 | $ 6,250.00 | Entire Intersection |
| 12 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 500.0 | SQ.YD. | $ 70.00 | $ 35,000.00 | Entire Intersection |
| 13 | AGGREGATE BASE (AB-3)(6") | 597.0 | SQ.YD. | $ 16.00 | $ 9,552.00 | Under C&G & Road |
| 14 | STORM SEWER (24")(RCP) | 150.0 | LIN.FT. | $ 110.00 | $ 16,500.00 | |
| 15 | INLET (TYPE A-10) | 8.0 | EACH | $ 6,000.00 | $ 48,000.00 | |
| 16 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | 4 Signs and 4 Plaques |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 251,847.31** | |
| | | | | CONTINGENCIES(20%) | $ 50,369.46 | |
| | | | | CONSTRUCTION TOTAL | $ 302,216.77 | |
| | | | | R/W ACQUISTION | $ 38,500.00 | Assume 11 Temp for Drives and Grading |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (15%) | $ 45,332.52 | Assumed 15% of Construction |
| | | | | DESIGN (25%) | $ 75,554.19 | Assumed 25% of Construction |
| | | | | INSPECTION (25%) | $ 75,554.19 | Assumed 25% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 537,157.67*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
AMS1-Browning Ave. PHB
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** 2/21/2023 **Benesch Proj.#:** 130876.00

## ENGINEER'S OPINION OF PROBABLE COST

| AMS1: PHB Crossing | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 2,297.42 | $ 2,297.42 | Assume 2% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 5,743.55 | $ 5,743.55 | Assume 5% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,743.55 | $ 5,743.55 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 2,297.42 | $ 2,297.42 | Assume 2% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 5,743.55 | $ 5,743.55 | Assume 5% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,743.55 | $ 5,743.55 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 3,446.13 | $ 3,446.13 | Assume 3% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | ROCK EXCAVATION | 1.0 | CU.YD. | $ 55.00 | $ 55.00 | Under C&G |
| 9 | SIDEWALK CONSTRUCTION (6")(AE) | 111.0 | SQ.YD. | $ 60.00 | $ 6,660.00 | 100' x 10' wide |
| 10 | SIDEWALK RAMP | 8.0 | SQ.YD. | $ 260.00 | $ 2,080.00 | 2 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 20.0 | LIN.FT. | $ 25.00 | $ 500.00 | 2 Ramps |
| 12 | AGGREGATE BASE (AB-3)(6") | 6.0 | SQ.YD. | $ 16.00 | $ 96.00 | Under C&G |
| 13 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 80.0 | LIN. FT. | $ 18.50 | $ 1,480.00 | 1 Crosswalk Striped |
| 14 | SIGNING | 1.0 | LSUM | $ 4,000.00 | $ 4,000.00 | |
| 15 | HAWK BEACON SYSTEM | 1.0 | LSUM | $ 100,000.00 | $ 100,000.00 | |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 145,886.17** | |
| | | | | CONTINGENCIES(20%) | $ 29,177.23 | |
| | | | | CONSTRUCTION TOTAL | $ 175,063.40 | |
| | | | | R/W ACQUISTION | $ 7,000.00 | 2 Properties Temp Only |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (5%) | $ 8,753.17 | Assumed 15% of Construction |
| | | | | DESIGN (15%) | $ 26,259.51 | Assumed 15% of Construction |
| | | | | INSPECTION (15%) | $ 26,259.51 | Assumed 15% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 243,335.60*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
EMS1-Walters Drive
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| EMS1: Walters Drive | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 5,563.65 | $ 5,563.65 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 11,127.30 | $ 11,127.30 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 5,563.65 | $ 5,563.65 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 3,338.19 | $ 3,338.19 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 22,254.60 | $ 22,254.60 | Assume 20% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 5,563.65 | $ 5,563.65 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 11,127.30 | $ 11,127.30 | Assume 10% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | ROCK EXCAVATION | 30.0 | CU.YD. | $ 55.00 | $ 1,650.00 | Entrance and C&G |
| 9 | SIDEWALK CONSTRUCTION (4")(AE) | 1,167.0 | SQ.YD. | $ 50.00 | $ 58,350.00 | 1500' x 5 ' wide + 500' x 6' wide |
| 10 | SIDEWALK RAMP | 85.0 | SQ.YD. | $ 260.00 | $ 22,100.00 | 17 Ramps |
| 11 | CURB AND GUTTER COMBINED (AE) | 255.0 | LIN.FT. | $ 25.00 | $ 6,375.00 | 17 Ramps |
| 12 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 100.0 | SQ.YD. | $ 70.00 | $ 7,000.00 | 1 Entrance (15'x60' replacement area) |
| 13 | AGGREGATE BASE (AB-3)(6") | 200.0 | SQ.YD. | $ 16.00 | $ 3,200.00 | |
| 14 | CONCRETE FLUME | 39.0 | SQ.YD. | $ 70.00 | $ 2,730.00 | 50' x 7' Concrete Flume |
| 15 | FLUME COVER | 1.0 | EACH | $ 6,000.00 | $ 5,000.00 | |
| 16 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 128.0 | LIN. FT. | $ 18.50 | $ 2,368.00 | 2 Crosswalks |
| 17 | SIGNING | 1.0 | LSUM | $ 2,500.00 | $ 2,500.00 | 4 Signs and 4 Plaques |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 175,811.34** | |
| | | | | CONTINGENCIES(20%) | $ 35,162.27 | |
| | | | | CONSTRUCTION TOTAL | $ 210,973.61 | |
| | | | | R/W ACQUISTION | $ 14,000.00 | 3 Temp and 1 Perm |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (10%) | $ 21,097.36 | Assumed 10% of Construction |
| | | | | DESIGN (20%) | $ 42,194.72 | Assumed 20% of Construction |
| | | | | INSPECTION (20%) | $ 42,194.72 | Assumed 20% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 330,460.41*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

City of Manhattan
HS1-Westwood
Safe Routes to School Masterplan Update
Estimator: Michael, P.E. (Alfred Benesch & Company)

**Date:** **2/21/2023** **Benesch Proj.#:** **130876.00**

## ENGINEER'S OPINION OF PROBABLE COST

| HS1: Westwood | | | | | | |
|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **ESTIMATED QUANTITY** | **UNITS** | **ESTIMATED UNIT PRICE** | **TOTAL** | **ASSUMPTIONS** |
| **GENERAL ITEMS** | | | | | | |
| 1 | CONTRACTOR CONSTRUCTION STAKING | 1.0 | LSUM | $ 12,188.90 | $ 12,188.90 | Assume 5% of Construction |
| 2 | MOBILIZATION | 1.0 | LSUM | $ 24,377.80 | $ 24,377.80 | Assume 10% of Construction |
| 3 | CLEARING AND GRUBBING | 1.0 | LSUM | $ 12,188.90 | $ 12,188.90 | Assume 5% of Construction |
| 4 | EROSION CONTROL | 1.0 | LSUM | $ 7,313.34 | $ 7,313.34 | Assume 3% of Construction |
| 5 | EARTHWORK | 1.0 | LSUM | $ 24,377.80 | $ 24,377.80 | Assume 10% of Construction |
| 6 | TRAFFIC CONTROL | 1.0 | LSUM | $ 12,188.90 | $ 12,188.90 | Assume 5% of Construction |
| 7 | SEEDING | 1.0 | LSUM | $ 12,188.90 | $ 12,188.90 | Assume 5% of Construction |
| **CONSTRUCTION ITEMS** | | | | | | |
| 8 | TREE REMOVAL | 2.0 | EACH | $ 2,000.00 | $ 4,000.00 | By Motel |
| 9 | ROCK EXCAVATION | 242.0 | CU.YD. | $ 55.00 | $ 13,310.00 | 1540' x 8.5' Wide x 6" |
| 10 | SIDEWALK CONSTRUCTION (4")(AE) | 1,082.0 | SQ.YD. | $ 50.00 | $ 54,100.00 | 1540' x 6' wide + 100' x 5' wide |
| 11 | SIDEWALK RAMP | 20.0 | SQ.YD. | $ 260.00 | $ 5,200.00 | 4 Ramps |
| 12 | CURB AND GUTTER COMBINED (AE) | 1,540.0 | LIN.FT. | $ 25.00 | $ 38,500.00 | |
| 13 | CONCRETE PAVEMENT (6" UNIFORM)(AE) | 450.0 | SQ.YD. | $ 70.00 | $ 31,500.00 | 13 Driveways(15'x20' replacement area) |
| 14 | AGGREGATE BASE (AB-3)(6") | 1,050.0 | SQ.YD. | $ 16.00 | $ 16,800.00 | Driveways and C&G |
| 15 | INLET | 8.0 | EACH | $ 6,000.00 | $ 48,000.00 | |
| 16 | STORM SEWER 24" | 200.0 | LIN. FT. | $ 125.00 | $ 25,000.00 | |
| 17 | PAVT. MARK. (INTERSECTION GRADE)(WHITE)(24") | 128.0 | LIN. FT. | $ 18.50 | $ 2,368.00 | 2 Crosswalks |
| 18 | SIGNING | 1.0 | LSUM | $ 5,000.00 | $ 5,000.00 | No Parking Signs |
| | | | | **LOCATION CONSTRUCTION SUBTOTAL** | **$ 348,602.54** | |
| | | | | CONTINGENCIES(20%) | $ 69,720.51 | |
| | | | | CONSTRUCTION TOTAL | $ 418,323.05 | |
| | | | | R/W ACQUISTION | $ 17,500.00 | Assume 5 Temp for Drives |
| | | | | UTILITIES | UNKNOWN | |
| | | | | SURVEY (7%) | $ 29,282.61 | Assumed 7% of Construction |
| | | | | DESIGN (20%) | $ 83,664.61 | Assumed 20% of Construction |
| | | | | INSPECTION (20%) | $ 83,664.61 | Assumed 20% of Construction |
| | | | | ***ESTIMATED TOTAL CONSTRUCTION COST (FY 2022)*** | ***$ 632,434.88*** | |

Notes: Unit prices were estimated from statewide FY2022 KDOT bid averages and Phase IIC Bid Results.
Prices due not include an inflation factor for future adjustments
R/W acquistion costs are assumed as $2500 consultant fee to acquire and $1000 fee to purchase

# MCS1 Pierre Street

HIGH PRIORITY PROJECT

This project would adjust the current school zone to include the intersection of Juliette Avenue and Pierre Street as approached from the east. Currently the school zone signs on Pierre Street are placed west of Juliette Avenue. This project would move these signs a half block east, alerting drivers they are approaching the school and its busy crosswalks.