USD 383

SAFE ROUTES TO SCHOOL PLAN

Phase I Report

City of Manhattan Kansas

benesch
engineers · scientists · planners

BACKGROUND

This project was initiated to assist the City of Manhattan and Unified School District (USD) 383 in developing a Safe Routes to School (SRTS) Phase 1 Plan; and subsequently assisting with a Phase 2 funding submittal. SRTS is a federally funded program administered by the Kansas Department of Transportation (KDOT) that strives to create a safe environment for children to walk and bike to school. SRTS incorporates the "5 E's" into all activities: Education, Encouragement, Enforcement, Engineering, and Evaluation. The SRTS Plan develops a program that identifies, encourages, and educates students and parents about active transportation and the preferred routes to walk or bike to USD 383 elementary schools. The ultimate goal of the SRTS program will be to:

- improve education initiatives to foster a safer environment for children to walk and bicycle to school;
- encourage initiatives to change social-behavioral;
- implement enforcement strategies to alter motorists' behaviors;
- improve route conditions through a combination of traffic calming techniques;
- Improve sidewalk conditions, signage, and roadway striping; and
- continously evaluate the program and make changes as needed to make the program more effective.

PLAN OF ACTION

A SRTS project team was developed to oversee the development of the SRTS Plan. The Project Team consisted of individuals from the following organizations: USD 383, City of Manhattan Public Works Department, Manhattan Bicycle & Pedestrian Advisory Committee, Riley County Police Department (RCPD), Alfred Benesch and Company (Benesch), and Kansas State University. The City of Manhattan contracted with Benesch to assist with the engineering component of the plan and Professors Hyung Jin Kim and Katie Heinrich, with Kansas State University, for the evaluation process.

Meetings were coordinated with each school's principal and Parent-Teacher Association (PTA) organization to explain the program and to gather information regarding:

- Dismissal and arrival processes
- Crossing guard information
- Before and after school programs
- Attendance
- Busing procedures
- Expected parent participation

The City of Manhattan, Benesch, and RCPD also attended site council meetings. After these meetings, a field study was conducted in the vicinity of each elementary school at peak times of arrival and dismissal to assess and report on the current state of each school. Recommendations and cost estimates were assembled for each school, which can be found in the “Budget” section.

EDUCATION AND ENCOURAGEMENT

EDUCATION AND ENCOURAGEMENT

The overarching goal of a SRTS education campaign is to teach bicyclists, pedestrians, and motorists about all components of transportation. This including safety, environmental impact, and the overall affect transportation can have on health and wellbeing.

Current research on active transportation suggests that educational and encouragement campaigns are integral to the survival of a SRTS plan. James Sallis (University of California, San Diego) has intensely studied active transportation and the built environment. He suggests that physical environmental changes are not sufficient to change behavior. To change an individual's mode of travel, education and encouragement needs to occur. This is even more important where the environment is poorly designed for biking and walking to school.

Just as each school environment in Manhattan is different, so should be the approach used for each of their education and encouragement campaigns. This section will provide an overview of the educational and encouragement programs from a structural perspective. However, each school is expected to assess their environment and develop a unique approach for their social, physical, and administrative environments.

Goal 1: Create a structure that provides long-term sustainability of a SRTS plan

It is important that USD 383 students, parents, and teachers feel that the Safe Routes to School program is supported by the school board, high-level administrators, and City staff. To facilitate a top-down approach, it is important that structural changes be made. The first suggested recommendation is to identify a single individual with the responsibility of coordinating the Safe Routes to School program and implementing the Plan. An individual with marketing, public health, and behavioral experience is ideal. To make this economically feasible, this person will likely have duties outside of Safe Routes to School program. It is unlikely that USD 383 has the resources to hire an individual to fulfill these duties. Therefore, it is likely that another agency will be tasked with the high-level administration of the program. If a full-time Bicycle and Pedestrian Coordinator is hired by a local agency, Safe Routes to School would fit well among the position's responsiblities.

It is recommended that a standing SRTS committee be created and meet monthly to facilitate SRTS on a district-wide level. This committee would be tasked with implementing the SRTS Plan. It is important the SRTS committee consist of individuals representing a variety of organizations and agencies. Suggested committee members include, at a minimum, representatives from each elementary school, USD 383 administration, City of Manhattan Public Works, Manhattan Bicycle & Pedestrian Advisory Committee, RCPD, Riley County Health Department, and Kansas State University.

Representation from several different agencies will bring a variety of perspectives to the group. For example, Riley County Police Department plays an important enforcement role in the program planning and implementation of the Plan. RCPD has a unique perspective on travel behavior and provided valuable insight during the development of the SRTS Plan. However, that insight will also valuable in the future as the program develops. Additionally, Riley County Health Department employs a Health Educator who is trained in techniques used to facilitate behavior change. This knowledge and experience may be useful as the SRTS program evolves to meet the changing social, political and administrative environment.

Data on the relationship between physical activity and educational attainment is robust and comprehensive. Research shows that children who engage in physical activity typically demonstrate higher test scores, have greater levels of concentration, and are more likely to graduate from high school. In order to make physical activity a higher priority, social and administrative environments need to be changed. To provide long-term sustainability and commitment to the SRTS program, it is important to identify someone at each school to serve as a SRTS school liaison and lead the program at the school-level. This liaison, whether a teacher, administrator, or parent, should have an interest in or recognize the importance of SRTS. They should have a working knowledge of what may or may not work for their school. Each SRTS school liaison will serve as a member of the SRTS standing committee and provide insight into the site-specific needs of their individual school. The SRTS school liaisons should find ways to educate and encourage walking and biking to school.

The SRTS Coordinator and committee should bring in outside expertise to train the committee, school staff, and volunteers to implement the program. The SRTS Coordinator should recruit presenters to teach effective SRTS strategies or new approaches to implementation. Committee members, school liaisons, and others involved in the SRTS program should take advantage of the many health and wellness conferences held in Manhattan each year, many of which are free or relatively inexpensive. This “train the trainer” approach allows for cost effective dissemination of information and ideas among all of those involved in implementing the SRTS program.

Goal 2: Increase the educational opportunities for students, parents, and teachers regarding walking and biking to school

In order for SRTS to succeed, it must be an integral part of the first few days of the school year. Large-scale implementation of the program should be conducted to teach children the best ways to walk and bike to school, to establish walking school busses and bike trains, to curb the effects of vehicular transportation on active transit, and mitigate any other concerns by parents. Before the semester begins, systems for promoting walking and biking to school—like walking school busses or bike trains—should be in place to encourage children to use an alternative mode of transportation. The success of

both of these approaches requires a partnership between the schools and the parents to encourage children to walk or bike, but also to recruit parents to serve as volunteers to "pick-up" children on the way to school. During the first few days of school, all children should attend training from RCPD officers, local bike advocates, and City staff. This bike rodeo will allow kids to learn the rules of the road, safe commuting guidelines, and the benefits of active transit. Additionally, children should be required to teach their parents about the benefits of active commuting. Parents should be required to review material regarding pick-up and drop-off of children at the school. This encourages children to increase physical activity and self-efficacy, while also creating a safe environment for children walking and biking to school. Lastly, parents should be able to give feedback and receive education on any other concerns that they might have regarding allowing their child to walk or bike to school.

During the site council visits, one issue highlighted was the safety concerns of the vehicular transportation. Parents should be educated on local laws (e.g. three feet passing law for bicyclists) and ways to be safe around the schools. The SRTS Coordinator will develop material (print, social media, video, etc) that educates motorists on appropriate motor vehicle use near children.

Goal 3: Encourage children to walk and bike to school

Reward programs are often cited as one of the reasons that individuals begin to change physical activity behaviors. Initiation of physical activity is well studied and research shows that individuals, especially children, engage in a behavior that is positively reinforced. The SRTS Coordinator could develop a "Mileage Club," "Walk Off" or other program that provides reinforcement by creating a positive social environment that facilitates that behavior. Additionally, awards could be given to individuals and groups in various categories, to be defined by the organizers.

Organizers could reinforce the beginning of the year programming by celebrating when an individual or group reaches benchmarks. Additionally, events like International Walk to School Day should be recognized by walking to places that provide additional learning opportunities: schools in the ward districts can walk to the Sunset Zoo; Northview Elementary could walk to Northeast Community Park to see the birding trail and Big Blue River; et cetera. This is also an opportunity for RCPD to educate motorists on appropriate driving behavior near students that are walking and biking.

Safe walking/riding programs should be initiated to mitigate safety concerns. These programs can be walking school busses or bike trains. Each school leader should organize volunteers to help walk or bike students to school. After school, an adult would meet the students at the school and walk or bike with them back to their homes. While this takes considerable volunteer resources, it mitigates most concerns of safety. If the design of the neighborhood allows, a neighborhood watch program could be started during the hours before and after school when students are commuting. By providing a point of contact

at the school, parents and local residents are much more likely to call with concerns about suspicious behavior.

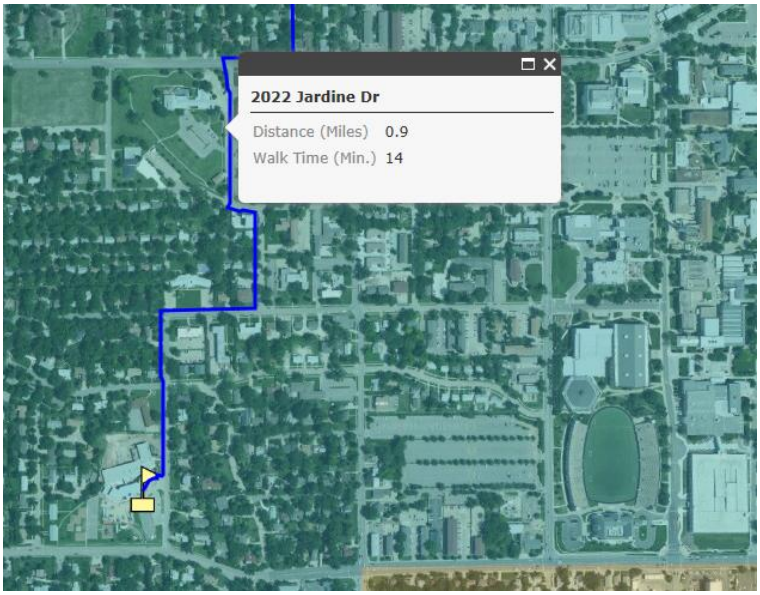
A large-scale community driving awareness campaign could be facilitated to encourage safety. The City of Manhattan currently has a hands-free policy creating restrictions on cell phone usage while driving within city limits. RCPD should strictly enforce this ordinance near schools and at typical commuting times. Additionally, public service announcements regarding safe driving behaviors should be presented on the local television station. The mayor of Manhattan and administration of USD 383 could host Safe Commuting Month in September, which should highlight safe behaviors for all modes of traffic.

During site council meetings, multiple education and encouragement strategies were discussed. A few of them included: walking school buses, interclass and district-wide competition, recess or other incentives, buddy systems, bike rodeos, safety classes, and issuing bike licenses to students passing safety courses to provide a sense of ownership. These ideas may not be as effective at some schools due to geographic restraints, but they are recommended at every school.

Evaluation of the education and encouragement sections of this plan will be conducted by process, as well as outcome evaluation. The SRTS Coordinator will write a yearly report outlining the process of the program and the current outcomes. The SRTS committee should review this report and develop an action plan for the following year. Additionally, a strategic plan outlining five year goals and objectives should be conducted at appropriate intervals. While the overarching goal of increasing walking and biking to school will remain the same, the strategy will respond to changing social, political, and physical environments.

Further Encouragement Tools

Along with the site council meetings, meetings were also held with the City of Manhattan and Riley County Police Department. The City of Manhattan has already begun creating an interactive webmap that could be used for SRTS. This application would allow schools, parents, and students to open the webmap, type in their home address and then see a “recommended” route to school. In addition to a line showing the route, a pop-up window provides the distance (to the tenth of a mile) as well as the estimated walk time (@ 18 minutes a mile). All addresses within a two-mile radius of each school would be included in the data. The webmap builds on the City of Manhattan’s GIS data and web services, and would be updatable yearly to allow changes in school attendance boundaries, new addresses, and new pedestrian/bike infrastructure. Routing is determined by variables including pedestrian infrastructure (sidewalks, crosswalks, crossing guards, traffic signals, etc.), high traffic areas, and geographic restrictions. The value of this application is that anyone, anywhere, on any device can find their home or location, and then end point. The prototype of the webmap can be seen in the figure on this page.



In addition to the online mapping application, hard copy maps would be available for each school, and if desired, any home address (derived from same GIS datasets as the online map). The City of Manhattan GIS staff has researched many different hard copy SRTS maps used throughout the country and developed their own hardcopy maps based upon their research.

Beyond the mapping of data, the City's GIS data should be used in the following ways: 1) Managing infrastructure gaps & issues, as well as areas to focus improvement. 2) The routing analysis for SRTS should be used to find key locations for walking school bus gathering points & routes. 3) Collection & analysis of current & future walking/biking counts, as well as how infrastructure & programs effect change.

Education and Encouragement Budget

Education and Encouragement Budget					
Item	**Description**	**Bid Quantity**	**Units**	**Unit Price**	**Total**
1	Conference and Seminar SRTS Team Training				
	Conference	2	EA	$300.00	$600.00
	Airfare	2	EA	$600.00	$1,200.00
	Lodging	2	EA	$500.00	$1,000.00
	Meals	1	LS	$500.00	$500.00
2	GIS Software Development	80	Hrs	$25.00	$2,000.00
	GIS Yearly Update	40	Hrs	By City	$0.00
3	Start Up Marketing Material(Brochures, Banners, Bike Licenses etc.)	1	LS	$1,000.00	$1,000.00
	TOTAL ESTIMATED COST OF SRTS START UP				**$6,300.00**

ENFORCEMENT

ENFORCEMENT

During the safe routes to school phase one planning, Riley County Police Department (RCPD) attended site council meetings and expressed their concerns and offered guidance and support for the SRTS plan. A few meetings within the SRTS team took place to discuss the current conditions and ideas to create a safer environment.

Existing Conditions

Currently, USD 383 has a good relationship with RCPD. At the request of the schools, RCPD attends numerous speaking engagements throughout the school year.. In previous years, RCPD also provided crossing guards at some of the schools but have ended this program due to budget restraints. When traffic complaints are received they will patrol the area to alleviate the concerns.

RCPD uses an innovative Laser Point Initiative (LPI) when patrolling. LPI is an attempt to prevent crime before it has been committed. By using sophisticated crime and data statistical analysis, officers can move to locations based on pattern analysis to prevent and respond immediately to potential criminal activity. It has been very effective in reducing crime in Manhattan and been shown to reduce RCPD expenditures. This novel technology is currently being used to prevent criminal activity across the city.

USD 383 is also currently subscribed to a Mass Notification service known as the NE KANSAS Notification system. When a call comes in that is determined as an immediate potential danger to the schools or nearby locations, RCPD immediately puts out an alert through the NE KANSAS Notification system. The school and everyone subscribed are immediately contacted and appropriate measures are taken. Anyone in the community may sign up for this safety procedure.

One concern highlighted is the shift rotation for RCPD. The rotation occurs every morning around 7:20 AM and every afternoon around 2:45 PM, similar to commuting patterns for school-aged children. Generally the shift change may take 30 minutes due to the fact all of the officers do not change shifts at the exact same time. Overall, the impact may be minimal but there is concern on the ability to monitor the schools on a consistent basis. It was determined due to the number of schools within Manhattan that assigning patrols to each school every day would be unfeasible and an unneeded resource. It was also determined that due to the minimal amount of crime within the city, RCPD could respond instantly if needed.

As briefly discussed in the education and encouragement sections, enforcement is a crucial part of the SRTS program. The school district should continue its partnership with RCPD.

Goal 1: Reduce the incidence of vehicular violations near schools

RCPD should work to actively prevent vehicular violations near schools. To alleviate traffic violations and speeders, a number of mitigation tools could be used. These tools include: increased traffic patrols near schools, mobile speed cameras, environmental change, speed indication signs, and other potential alternatives. Other SRTS programs across the nation have used excess funds from citations to further support additional components of their SRTS program.

City of Manhattan currently has a hands-free policy creating restrictions on cell phone usage while driving within city limits. RCPD should strictly enforce this ordinance near schools and at typical commuting times. Speed indication signs and appropriate point-of-decision prompts should be installed to remind busy parents to drive safely. These point-of-decision prompts should include clever, yet appropriate techniques to elicit behavior change and should be changed often according to the current research.

To elicit behavior change near all schools a “school patrol program” should be set up across the district. For each elementary school, a set patrol would be coordinated a couple of times during the school year. Notice of the patrol would be published in the school newsletters and local paper as suggested. Multiple officers would be in the vicinity of the school and specifically target drivers for vehicular citations for cell phone usage, speeding, seat belts, and other potential moving violations. In order to evaluate the success of this program the evaluation will include additional pre- and post-auditing of the school environment. Prior to releasing the program publicly, surveys around the school will be conducted to tally people seen using phones, seat belts, etc. The same post-auditing will happen after the program is conducted.

Goal 2: Reduce the perception of crime near schools

One of the largest parental concerns is potential child abduction. RCPD, USD 383, and the community should work together to educate the public on crime in Manhattan. One resource currently underutilized is a system RCPD uses called Raids Online. Raids Online is a public database used by many police departments across the nation where community members can see every report filed across the city, from violent crimes to traffic incidents. Anyone can also sign up with an email address to be notified if a particular crime occurs within a specific distance from an inputted address. Raids Online is updated daily by RCPD.

The LPI technology has been statistically proven to prevent crime across the city in a more effective manner than traditional random patrolling. Modifying the LPI calculation to weight the areas where children walk and bike around elementary schools higher than other areas in Manhattan was considered, to ensure that officers are available and respond faster to crime near schools. However, as Manhattan is one of the safer communities in the country, it was determined that the RCPD has the resources to be present at multiple calls in a timely manner.

Crime prevention can also be enhanced through environmental design. Training is available for professionals in community development, design, planning, and law enforcement. The program is called "SafeGrowth" and is a course in safe design and crime prevention through environmental design (CPTED). The participants learn CPTED principles and team-building as they learn to tackle real-life problems in their community. Participants gain skills at implementing and sustaining community safety initiatives in the field. The program discusses resource limitations, policy issues, political resistance, and other obstacles.

Enforcement Budget

Enforcement Budget					
Item	**Description**	**Bid Quantity**	**Units**	**Unit Price**	**Total**
1	Traffic Violation Mitigation				
	Speed Indication Signs	4	EA	$5,000.00	$20,000.00
	Point-of-Decision Prompts	16	EA	$200.00	$3,200.00
2	Patrol Program				
	4 Officers	60	Hrs	$150.00	$9,000.00
3	Safegrowth				
	On Site Training				
		1	LS	$20,000.00	$20,000.00
	TOTAL ESTIMATED COST OF SRTS START UP				**$52,200.00**

Education, Encouragement, and Enforcement Summary

To successfully implement the most effective SRTS program, coordination and district-wide policy is necessary to create a structured foundation. It is suggested that an individual from a local agency be tasked with leading the SRTS program, while member from USD 383, the City of Manhattan and/or the Bicycle & Pedestrian Advisory Committee, RCPD, Riley County Health Department, and Kansas State University be appointed to the SRTS committee. These representatives will become the SRTS team, providing a foundation for community and district-wide coordination.

Each individual school is different due to geographic constraints, local infrastructure, parent involvement, and other variables. Therefore, the structured approach below provides necessary stepping blocks and initiatives that each school should implement initially and modify accordingly to assess needs at each school. The table that follows includes initiatives for 4 of the 5 E's (Education, Encouragement, Enforcement, and Evaluation) at the eight schools studied. The table chronologically presents items that should be conducted as this plan is implemented. It also suggests a timeframe for implementation and identifies the federal outcome addressed. The initiates of the final "E," (Engineering) are discussed in the engineering section, Phase I Engineering Study.

CURRENT CONDITION	ACTIVITY	TARGET POPULATION	IMPLEMENTATION DATE	PERSONS RESPONSIBLE	BUDGET	*5 E's	FEDERAL OUTCOME ADDRESSED
Limited District Wide Coordination	Appoint a Health & Wellness Representative for each school for coordination and policy implementation.	USD 383 & Parents	April 2016	USD 383 School Board	USD 383 In-Kind	ED EN EF	Organized policies to Encourage, Educate, and Enforce SRTS
Limited knowledge, training and ideas to provide guidance and leadership for SRTS	Bring in an experienced speaker that helps communities successfully implement SRTS programs	USD 383 Health and Wellness Members & Community	July 2016	USD 383 & Health and Wellness Committee	USD 383 In-Kind	ED EN	How to successfully implement a SRTS program
Limited parent participation	Health and Wellness Representative attend PTO, Site Council meeting to encourage and provide methods to increase walking and biking.	Parents	September 2016 and March 2017	Health and Wellness Committee & PTO, Site Council	USD 383 In-Kind	ED EN	Get parents and community involved and increase walking and biking
Students walk home after school in fall and spring	Parent Orientation at beginning of year. Encourage walking and biking. Share Safe Routes	Parents	August 2016	Principal	USD 383 In-Kind	ED EN	More Children walking and biking to school
Students walk home after school in fall and spring	Site Council Meeting to get parents involved. Set up Walking School Buses, buddy systems, and incentives to walk and bike.	Parents	August 2016	Health & Wellness Committee	USD 383 In-Kind	ED EN	Get parents and community involved and increase walking and biking

Students walk home after school in fall and spring	Beginning of year school assembly sharing the safe routes to school program	K-5 Students	August 2016	Principal	USD 383 In-Kind	ED EN	Increased bike, pedestrian and traffic safety
Students walk home after school in fall and spring	Newsletter article about safe routes	K-5 Students & Parents	August 2016 & April 2017	Principal	USD 383 In-Kind	ED EN	Encouragement of healthy and active lifestyles
Unsafe student walking and biking behaviors	RCPD visits school to educate safety and danger concerns. Issue "bike licensees" after completion of a short test	K-5 Students	2016-2017 School Year	Principal	USD 383 In-Kind	ED EN EF	Improved community security, awareness, personal ownership
Local traffic speeding through school zones.	Purchase a speed indication sign that can be utilized between schools.	Local Community	2016-2017 School Year	USD 383 City of Manhattan RCPD	USD 383 City of Manhattan RCPD	EF	Decrease localized speeding
Limited information on recommended safe routes	Develop interactive GIS website that shows recommended routes from any location based on safety and infrastructure.	Parents & K-5 Students & Community	2016-2017 School Year	USD 383 City of Manhattan	USD 383 City of Manhattan In-Kind	ED EN	Provide and recommend safe routes to increase walking and biking
Limited community and district events	Coordinate with the City during bike week and hold city wide "bike rodeos" to increase public awareness and pedestrian safety.	Community	2016-2017 School Year	USD 383 City of Manhattan RCPD Bicycle & Ped Advisory Committee	USD 383 City of Manhattan RCPD In-Kind	ED EN EF	Provide community awareness and interaction
Need for 2016-2017 data.	Conduct SRTS Surveys	K-5 Students	Fall 2016 Spring 2016	Classroom Teachers	USD 383 In-Kind	EV	Increased community involvement

Plans to Successfully Implement the SRTS program using the "5 E's Initiatives"

ED-Education | EN-Encouragement | EF-Enforcement | EV-Evaluation

ENGINEERING

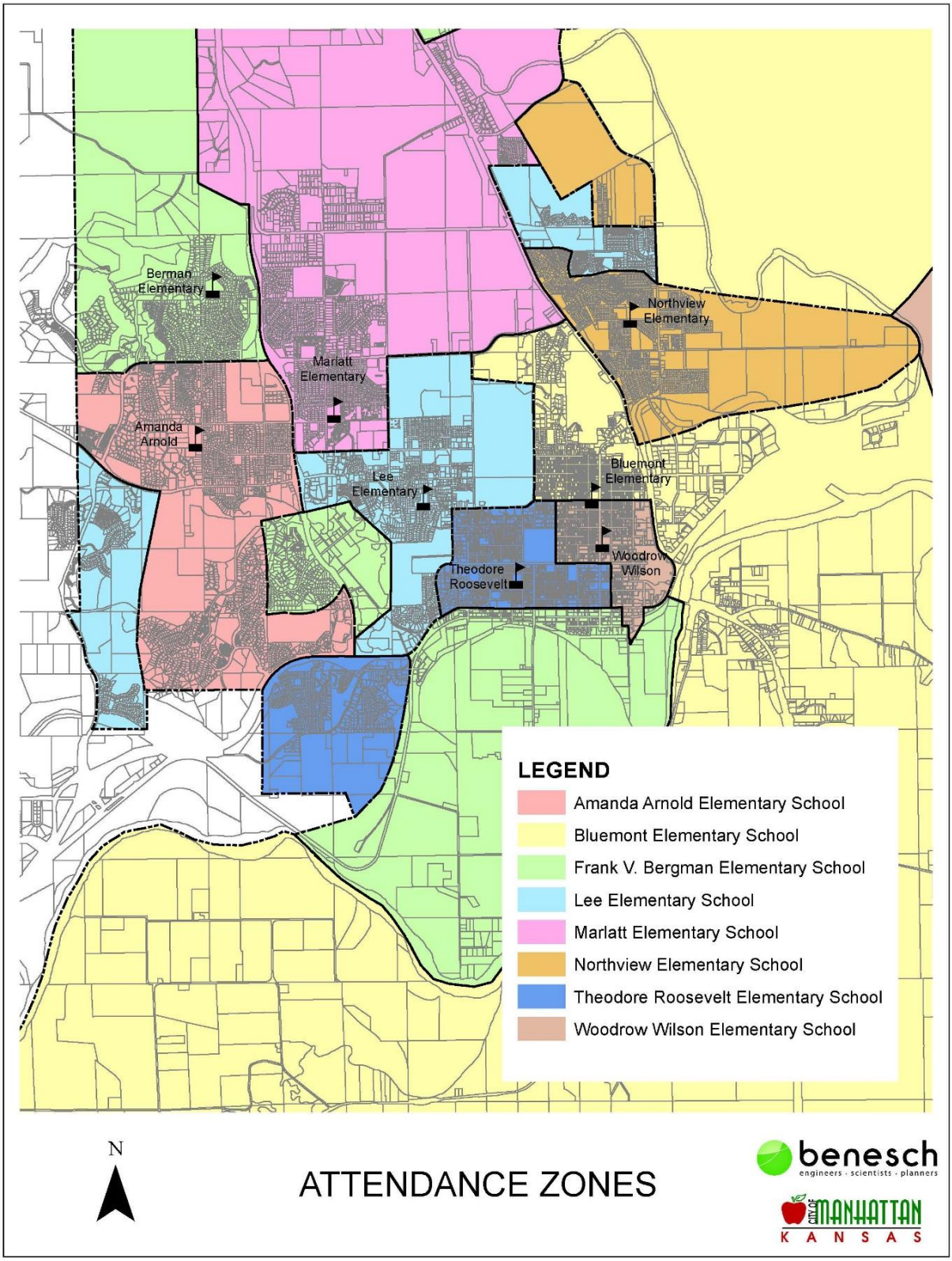
USD 383 INFORMATION/BACKGROUND

The City of Manhattan has eight elementary schools within its city limits. All are within Manhattan-Ogden USD 383 and serve 3,195 students from kindergarten through sixth grade. USD 383 has been successful in maintaining traditional, neighborhood schools. The eight neighborhood schools listed below will clearly benefit from the establishment of a SRTS program:

- Amanda Arnold Elementary School
- Bluemont Elementary School
- Frank V. Bergman Elementary School
- Lee Elementary School
- Marlatt Elementary School
- Northview Elementary School
- Theodore Roosevelt Elementary School
- Woodrow Wilson Elementary School

The City of Manhattan and USD 383 are working together to address walkability and biking opportunities within the City. They have incrementally improved areas around some elementary schools over the past few years by installing pedestrian-activated flashing beacons at major crosswalks. A city-wide crossing guard program, once active, was run by the Riley County Police Department. Due to budget constraints, the school district assumed this function and the number of guard locations has been reduced to only a few schools. The City of Manhattan also has a sidewalk program in which it utilizes Community Development Block Grants to fill sidewalk gaps around the city each year. Despite the best efforts of the City and School District, much work still needs to be done to create safer walking and bicycling environments.

By cataloging issues, prioritizing issues and improvements, and facilitating education and encouragement within schools to mitigate issues, a Safe Routes to School program is likely to be highly effective in Manhattan. On average, 71% of children live within two miles of their school. Parents largely report environmental concerns that can be mitigated with engineering as the primary concern to allowing their child to actively commute to school. Additionally, health and wellness is a major concern for Manhattan residents. Manhattan is the home to numerous walks, runs, bike races and other events that stimulate healthy living and physical activity. For residents in Manhattan, physical activity is a lifestyle that a Safe Routes to School program will facilitate. The map that follows shows targeted schools and district zoning.



Overview Map

AMANDA ARNOLD ELEMENTARY SCHOOL

The enrollment at Amanda Arnold is 519 students, of which 80 percent live within two miles (according to the most recent voluntary parent survey). Parent surveys indicate that only 14 percent of those students walk or bike to school and 29 percent walk or bike home on a standard day. This school faces Hudson Ave. which has been identified as a major collector by KDOT (June 2013). Hudson is the primary route that traffic and pedestrians use to access the school. Anderson Avenue, approximately three tenths of a mile south of Amanda Arnold, is a four-lane arterial with an Average Daily Traffic (ADT) of 12,750 vehicles per day (KDOT 2010). This creates an obstacle for students living south of the street. To the west of Amanda Arnold is a densely wooded area with a winding creek. Local developers have built a wooden pedestrian bridge and trail to provide access from west neighborhoods to the school. Along the North side is a pedestrian sidewalk which extends to the edge of the school property tying into an existing crosswalk near the intersection of Plymouth Road and Dickens Avenue.

Existing Circulation and Conditions

A field investigation was conducted in May of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to provide existing circulation patterns. Faculty parking is provided on the south and east side of the school. The pick-up and drop off area is located on the west side of Amanda Arnold. It is a one way lot with the entrance on the north and an exit on the south. Cars exiting the lot are only allowed to turn south on Hudson. There is a separate bus lane between the pick-up, drop off area and Hudson Avenue that is restricted to buses only. The main routes observed for pedestrians are Hudson Avenue, Claflin Road, Dickens Avenue and Plymouth Road. A crossing guard is on site for Hudson directly west of the school. Students that live south of Anderson are currently bused to school to prevent students from crossing this arterial roadway.

Students leaving school to the north have to cross Dickens Avenue at the crosswalk to reach the sidewalk on the north side of the road. Currently the crosswalk is in a location which provides limited site distance for drivers heading south down Plymouth Road. Local homeowners directly adjacent to the crosswalk on the west were outside the day of the site investigation. They mentioned that students have created a new path through yards as they travel down Plymouth Road on the west side of the street rather than the east, which is where the sidewalk currently exists. Concerns over speeding cars in this location were also brought up on site and in the site council meeting.

Several students live west of Wreath Avenue and north of Dickens in multiple apartment complexes north of the Manhattan Area Technical College (MATC). These students travel down Wreath Avenue, turn west on Dickens and then use Hudson Avenue to get to school. Currently there is no sidewalk along the east side of Wreath Avenue to provide access at a crosswalk to cross Wreath Avenue.

Multiple Students use Claflin Road as a primary route to school. Students collect from both sides of the street from local neighborhoods to get to the sidewalk that leads to school. Currently Claflin has no sidewalk on the south side from Meadowbrook Lane to K-113. Students south of this location either

cross Claflin at multiple locations with no crosswalk or walk through yards until they get to the existing sidewalk near Meadowbrook.

The route that connects the school to the west neighborhoods is a privately owned trail and bridge. The trail is severely eroded and the bridge that crosses Little Kitten Creek is not in compliance with the Americans with Disabilities Act (ADA) and is in need of maintenance.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All signs shall have a fluorescent yellow-green background with a black legend and border. Many existing signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the signs to S1-1 expired in 2011. These signs should be updated. Recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.
- With Hudson, Plymouth, Dickens, and Claflin identified as primary routes for pedestrians, it is recommended that each crossing along the routes be signed accordingly at all crossing locations.

Pavement Markings

- It is recommended that at each signed crossing location pavement markings be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- A sidewalk is recommended along the west side of Plymouth Road from Little Kitten Avenue to the existing path on the north side of the school. This will prevent students on the west side of Plymouth Avenue from crossing Plymouth. This will also mitigate the number of crossings at the existing crosswalk along Plymouth and Dickens.
- A sidewalk is recommended along the east side of Wreath Ave. from Heritage Lane to directly south of the entrance to the Manhattan Area Technical School parking lot. Signage, ADA compliant ramps, and existing crosswalk should be removed and relocated farther south. The new crosswalk will include a refuge island and new signage will benefit the elementary school as well as MATC. This can be seen in the following figure.

- A sidewalk is recommended along the south side of Claflin from west of Meadowbrook Lane to Brighton Road. This will prevent crossings on Claflin for students living south of Claflin.

Other

- To improve visibility and speeding concerns, the existing crosswalk at Plymouth and Dickens should be modified to include a speed table and bulb-outs. This can be seen on the next page.

- Due to deterioration and a non ADA compliant pedestrian bridge crossing Little Kitten Creek on the West side of the school, it is recommended that the City of Manhattan acquire permanent easements in order to replace or repair the existing bridge and trails. At this time the path is not a recommended safe route due to erosion and safety concerns.
- All routes should be updated with ADA compliant ramps and crossings.

See Sign Inventory and Improvements Map

BLUEMONT ELEMENTARY SCHOOL

Bluemont Elementary has an enrollment of 321 students. This school has recently been re-opened due to an increase in students living in USD 383. Thirty-six percent of students at this school live within two miles. Of those that live within the two mile radius, few walk or bicycle. This school is located in a section of town that is predominately college rental houses and apartments. Directly to the south of the school is Bluemont Avenue which is a principle arterial through the city. Because of district zoning, Bluemont has no students south of the arterial. On the east property line is Juliette Avenue. This is classified as a minor arterial. Nearly every street within the area has a sidewalk on both sides.

Existing Circulation

A field investigation was conducted in May of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to identify existing circulation patterns. Limited faculty parking is provided on the north side of the school. The remaining parking is on street. The pick-up and drop-off area is located on the west side of Bluemont on 8th street. The bus zone is located on the east side of 8th street. Parents park along side streets in any area designated for parking during pick-up/drop-off. Students walking to the east either cross at 8th and Bluemont or 8th and Vattier.

Students traveling west cross at Vattier and Juliette or Juliette and Bluemont. Based on KDOT 2013 traffic counts Juliette has an ADT of 4,460 Veh/day. During site investigations it was observed that the crosswalks at Vattier and 8th street were inundated with water. The nearest storm sewer is located on Bluemont or Juliette.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All signs shall have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the signs to S1-1 expired in 2011. These signs should be updated. The recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

- It is recommended that pavement markings at each signed crossing location be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain

pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- There is very good sidewalk connectivity in this area, therefore no sidewalk construction is proposed.

Other

- Curb inlets at the intersection of Vattier and 8th street are needed to provide proper drainage. The current crosswalk is within a valley gutter and is avoided during rain events. Storm sewer will need to be installed along Vattier Street to the east and connect into the existing storm sewer on Juliette Avenue.
- All routes should be updated with ADA compliant ramps and crossings.

See Sign Inventory and Improvements Map

FRANK V. BERGMAN ELEMENTARY SCHOOL

Bergman Elementary has 77 percent of its 481 students living within two miles of the school. Of these, about 25 percent are walking or bicycling. The main concern of parents at this school is safety near the school. Issues include parking too close to corners, limited sight distances, few crosswalks and discontinuity of sidewalks through the neighborhoods. The neighborhood directly west of this school was recently developed and current sidewalk connectivity is insufficient.

Existing Circulation

A field investigation was conducted in April of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to identify existing circulation patterns. Faculty parking is provided on the south side of the school and along local streets. The pick-up and drop-off area is located on the south side of Bergman. It is a one way lot with the entrance on the east and the exit on the west. Bus loading zones are located along Westbaker Street along the east side of the school property. The main routes observed for pedestrians is the crosswalk west of the school that crosses Gary Avenue and connects to Hudson Trail, Lombard Drive to Newbury Street, and Gary Avenue to Effingham. There are some students coming to school from the northwest. These students originate from a new subdivision and generally use Churchill Road.

Recently the school and City have collaborated to install no parking signs along the east side of Gary Avenue directly west of the school. Cars were parking along the street directly adjacent to the crosswalk limiting site distance and the ability to see students crossing. Currently there is still confusion on where cars can and cannot park. Parents park along the north side of Lombard Drive during pick-up while buses park along Westbaker Street. A few buses and parents also utilize the pick-up/drop-off lot on the south side of the school. There are two separate lanes; one for buses, and one for other vehicles.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All signs should have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the signs to S1-1 expired in 2011. These signs should be updated. The recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

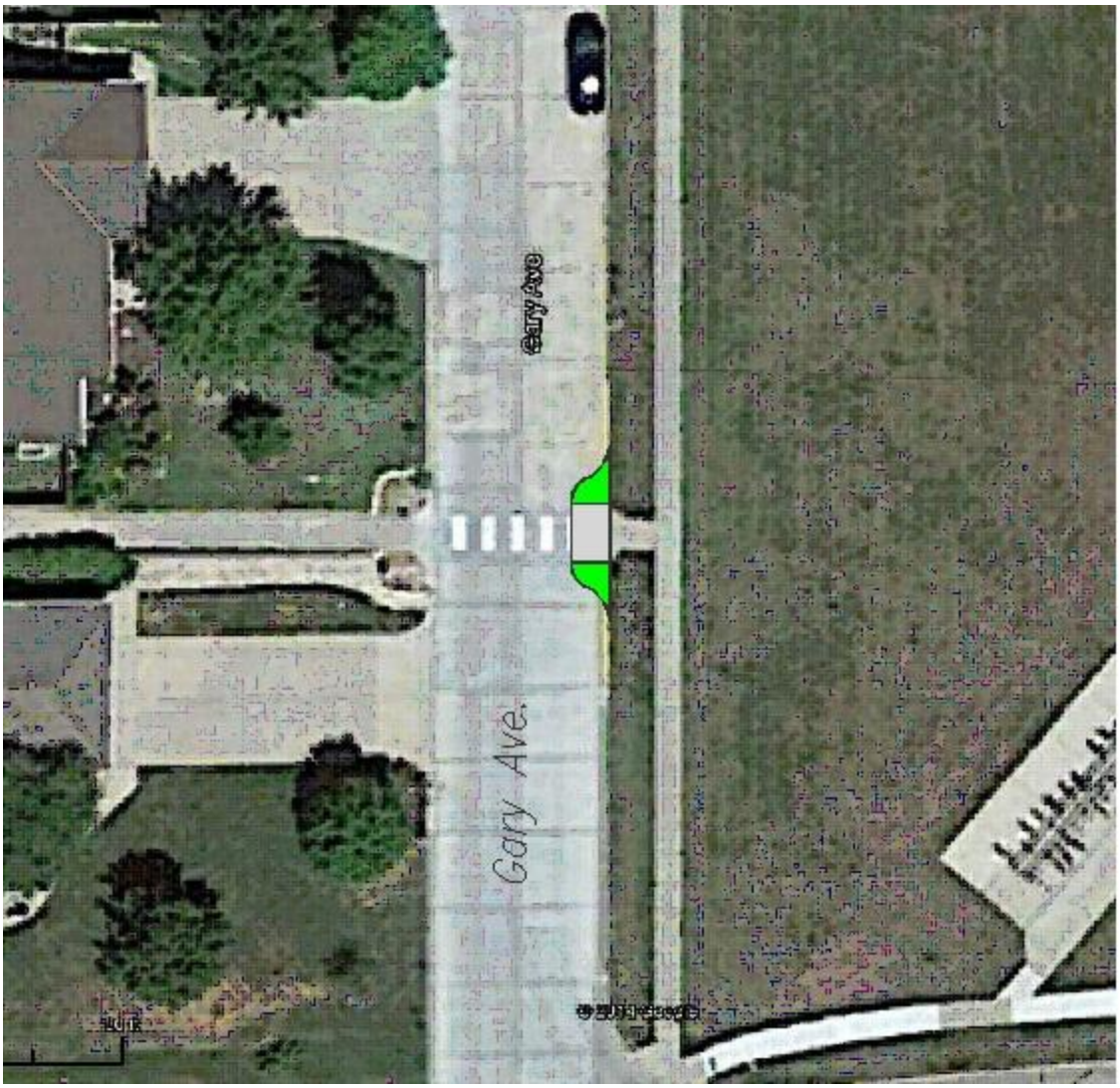
- It is recommended that pavement markings at each signed crossing location be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- With Gary Avenue being a highly traveled route by students and traffic, it is recommended to construct a sidewalk from Churchill Street to Effingham Road along the west and south side of Gary Ave. This will allow students living to the northwest and the south to travel along Gary without crossing at various locations. All students can be funneled to the crosswalk directly west of the school on Gary Avenue. This will also prevent students living directly on Gary from crossing the street in multiple locations
- A sidewalk is recommended on Churchill Street from Gary Ave to Hudson Trail, to serve students walking from the north and west.
- A sidewalk is recommended along the east side of Westbaker Street. This will encourage students living along Westbaker to cross at the crosswalks at the intersection of Lombard and Westbaker or Churchill and Westbaker. This will prevent students from crossing at multiple locations along the street which is lined with buses and cars during pick-up and drop-off.
- A sidewalk is recommended along the south side of Lombard to eliminate any unwanted crossings from students living directly on Lombard. This will prevent multiple crossings along Lombard Dr.

Other

- To increase safety, maximize parking, and prevent confusion, modifications are recommended to the crosswalk directly west of the school that connects to Hudson Trail and the proposed sidewalk along the west side of Gary. A bulb-out, approximately eight feet in length, should be constructed on the east side of the road to narrow the crossing from the existing span of thirty-two feet down to twenty four feet. A speed table was analyzed but due to no existing storm sewer in the area it was determined not feasible. No parking signs should be placed along the west side of the road to prevent any unwanted parking. Due to the bulb-out, parking can be allowed along the entire west side of Gary (with the exception of the appropriate distance from corners and crosswalks). This is shown on the next page
- All routes should be updated with ADA compliant ramps and crossings.


Gary Ave.
Gary Ave

See Sign Inventory and Improvements Map

LEE ELEMENTARY SCHOOL

Of Lee Elementary's 321 students, 63 percent live within two miles and only about 20 percent walk or bike to school. Lee Elementary is located adjacent to Anderson Avenue which is a major four-lane arterial running through Manhattan. At the school, the ADT on Anderson is an astonishingly high 18,155 vehicles per day. This is the main obstacle for this school as nearly half of the students live south of Anderson according to the school districting map. Currently a crossing guard and pedestrian activated traffic signal assists students crossing Anderson, but stairs at the school side of the street creates accessibility issues as well as a bottleneck for pedestrians. This signal is also located on a curve at the top of the hill. If a driver isn't familiar with the area, it can be difficult to see.

Existing Circulation

A field investigation was conducted in May of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to provide the existing circulation patterns. Faculty parking is provided on the south and north side of the school and along local streets. The pick-up and drop-off is located on the east side of Lee. It is a one way lot with the entrance on the north and an exit on the south. Bus loading zones are located along Lee Street on the east side of the school. Parking is allowed on the east side of Lee Street which is utilized by local residents. During pick-up/drop-off Lee Street is restricted to only one lane of traffic.

The main routes observed for pedestrians includes the crosswalk south of the school crossing Anderson Avenue. The crossing on Anderson has a crossing guard and a pedestal mounted signal on each side of the road. The crossing guard on site stated that some cars do not see the signal poles and fail to stop. Along the north side of the crosswalk are concrete stairs that lead to the school yard. Students living south of Anderson all walk down local streets to reach the sidewalk along the south side of Anderson. There are very limited sidewalks in the neighborhoods. Students were observed walking north on Lee street and crossing at College Heights Road. Students traveling west cut thru the cul-de-sacs on Jay Court and Cornelia Court to connect to the sidewalk along Canfield Drive. Multiple students crossed Lee Street at the intersection of Lee and Hunting Avenue. The current crosswalk leads to a dead end and vegetation therefore students were walking down the middle of Hunting Avenue.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All of the signs shall have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the

signs to S1-1 expired in 2011. These signs should be updated. Recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

- It is recommended that pavement markings at each signed crossing location be in accordance to the MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

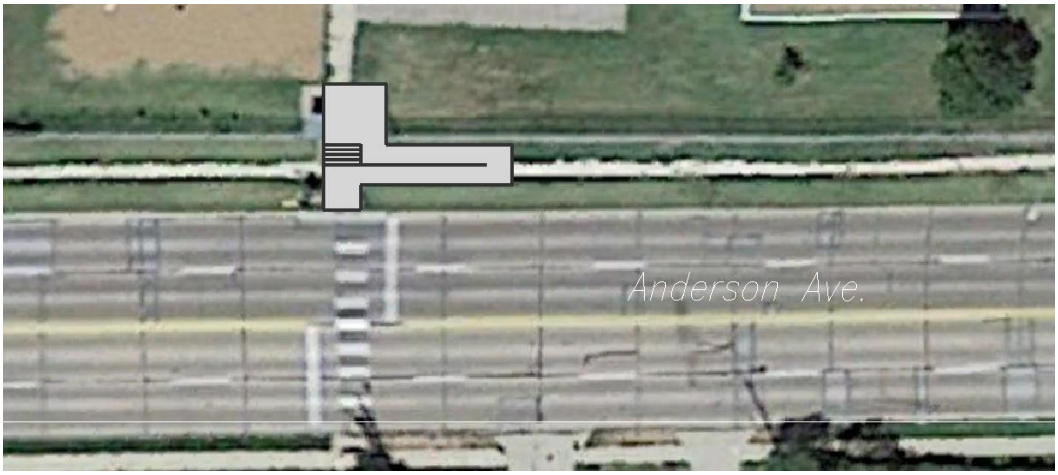
Sidewalks

- A sidewalk is recommended on the south side of Hunting Avenue from Lee Street to Harris Avenue. A sidewalk in this location will allow students crossing at the crosswalk to utilize a sidewalk rather than walking down the street. It will connect to the existing sidewalk along Harris Avenue.
- To serve neighborhoods along the south side of Anderson, sidewalks are recommended along Westview Drive and Wickman Road from Anderson to Grandview Drive. This will allow students to walk down sidewalks to Anderson and stay out of the local streets
- A sidewalk is recommended along Grandview Drive. This will span from Oakdale Drive to the east past Wickman to tie into the existing sidewalk along Grandview.
- Currently students living northwest of Lee along Anderson Avenue have no way to walk to school. Their options are to either cross through yards or run across Anderson at random locations. A sidewalk is recommended on the north side of Anderson from Rebecca Road to Midland Avenue which will connect to existing sidewalk.
- The sidewalk along the north side of College Heights currently dead ends at Goodnow Avenue. A sidewalk is recommended to continue from Goodnow to Anderson. This will provide access to the remaining students along College Heights.
- The existing sidewalk along College Heights from Goodnow to Lee Street is narrow and in poor condition. This sidewalk should be removed and reconstructed.
- A sidewalk is recommended along the north side of Anderson from Sunset Avenue to Lee Street. This will allow access for any students living directly east of the school. Currently pedestrians are crossing Anderson at Lee and Anderson which is unsafe due to traffic and limited site distance. The current sidewalk on Lee Street at Anderson will need to be modified to include ADA ramps.

Other

- To improve visibility and reduce speeding concerns, the existing crosswalks at College Heights and Lee Street should be modified to include a speed table and flashing beacons. This is shown below.

- The existing crosswalk signals along Anderson Avenue should be modified and mounted on a mast arm. This will provide increased site distance and awareness.
- The route crossing Anderson at the crosswalk south of the school is the most utilized route. It is recommended to bring this route up to ADA accessibility requirements. The retaining wall in front of the crosswalk should be cut back and an ADA accessible switchback ramp should be constructed. This will facilitate students on bicycles and handicapped students' ability to walk to school. Currently their only options are to carry their bicycle, take another route, or get a ride from a parent. This is shown below.
- All routes should be updated with ADA compliant ramps and crossings.



See Sign Inventory and Improvements Map

MARLATT ELEMENTARY SCHOOL

Marlatt Elementary has 415 students with 90 percent living within two miles of the school. About 25 percent of these students walk or bike to and from school. The main concern for parents is the busy intersection of Kimball Avenue and Browning Avenue. Kimball is a major four-lane arterial roadway. At this location, there is a traffic signal and a 20 mph school zone with flashing beacons. Directly west of the school is Browning Avenue which has an ADT of 4,500 vehicles per day and is classified as a major collector. To the south of the school is Dickens Avenue. South of Dickens are businesses and apartment complexes. No students currently live in these areas.

Existing Circulation

A field investigation was conducted in April of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to identify existing circulation patterns. Faculty parking is provided along the north side of the school and along local streets. The pick-up and drop-off area is located on the north side. It is a one way lot with an entrance on the west and an exit on the east. Bus loading zones are located along Browning Avenue along the west side of the school property. Generally parents drive south on Cassell and leave north on Vaughn.

The main routes observed for pedestrians is Browning Avenue and Hobbs Drive. The crosswalk at the intersection of Browning and Hobbs is currently signalized with obsolete signals. The current signals do not include a pedestrian phase, therefore students are walking at the same time that cars are turning. There is also no protected left turn for cars wanting to turn left onto Hobbs from Browning. With high traffic volumes this creates impatient drivers trying to make left turns as quickly as possible creating dangerous situations. Several cyclists and pedestrians travel along Browning and that intersection is the most utilized.

Students coming from local neighborhoods to the north walk down local streets to reach Hobbs. There is a crosswalk north of the school and the school provides a crossing guard in the afternoons. Students that live to the west of Browning Avenue all travel down local streets until they reach sidewalks along Browning. Students to the far north are all forced to cross Kimball Avenue at Browning, which is a principle arterial through the city with over 14,000 vehicles per day.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All signs shall have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the

signs to S1-1 expired in 2011. These signs should be updated. Recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

- It is recommended that pavement markings at each signed crossing location be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- To mitigate the number of crossings at the intersection of Browning and Hobbs a sidewalk is recommended on the north side of Hobbs from Browning to the east to tie into the existing sidewalk. This route will make use of the crossing guard already in place.
- A sidewalk is recommended along the north side of Hobbs from Vaughn Drive to Winne Drive. This will eliminate students from crossing Hobbs at multiple locations as they travel from neighborhoods to the north.
- A sidewalk is recommended along Vaughn Drive from Hobbs to Kenmar Drive. With narrow streets and parking on both sides, this will allow students to stay on the sidewalk as they walk to and from school. This sidewalk will tie into the proposed sidewalk on the north side of Hobbs.
- A sidewalk is recommended along Kenmar Drive from Hobbs to Vaughn Drive. With narrow streets and parking on both sides, this will allow students to stay on the sidewalk as they walk to and from school. This sidewalk will tie into the proposed sidewalk on the north side of Hobbs.
- A sidewalk is recommended on the north side of Illinois Lane from Virginia Drive to Browning Avenue. This route will collect students traveling from Alabama, Oregon, and Virginia Drive.
- Due to the number of bicyclists utilizing Browning Avenue, a multi-use path is proposed on the west side of Browning from Dickens Avenue to Kimball. This path can eventually be extended farther north to tie into Susan B. Anthony Middle school and local neighborhood trails.

Other

- The signal at Browning and Hobbs should be replaced with two mast arms for north/south traffic. The new signal should include a pedestrian phase and a protected left turn onto Hobbs should be evaluated.
- All routes should be updated with ADA compliant ramps and crossings.

See Sign Inventory and Improvements Map

NORTHVIEW ELEMENTARY SCHOOL

Northview Elementary has about 95 percent of its 519 students living within two miles of the school. Twenty-two percent arrive by walking and biking and 41 percent depart in the same way. The main obstacles for students actively commuting to and from school are Casement Road and Griffith Drive. Casement Road is a two-lane road that has an ADT of 5325 vehicles per day. Griffith it is known to have occasional speeders as it is a straight road without any signals.

Existing Circulation

A field investigation was conducted in April of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to identify existing circulation patterns. Faculty parking is provided along the southwest side of the school and the parking lot for Northview Park is utilized. The pick-up and drop-off is located on the south side. It is a one way lot with the entrance on the east and an exit on the west. Bus loading zones are located along Griffith Drive directly east of the pick-up/drop-off entrance. Parents park along Griffith, on local streets south of Griffith, and at Northview Park.

The main routes observed for pedestrians are Griffith Drive, Casement Road, and the sidewalks directly south of the school leading to Prairie Glen Properties, a cooperative family community. Students that live north of the school utilize sidewalks owned by the homeowners association and walk down local roads to reach the sidewalk on the north side of Butterfield Road.

Students that live west of the school and south of Griffith Drive walk along Griffith until they get to their local street. Therefore Griffith is crossed at multiple locations without crosswalks. The only crosswalk located on Griffith is directly south of the school. This crosswalk has a crossing guard. Students living east and northeast of the school and east across Casement currently have no sidewalks or crosswalks to connect them. The only sidewalk on Casement heading north currently dead ends adjacent to school property. The other alternative to traveling north, is the narrow winding trails privately owned by the home owners association. These sidewalks are deteriorated in several locations.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All of the signs shall have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the signs to S1-1 expired in 2011. These signs should be updated. The recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

- It is recommended that pavement markings at each signed crossing location be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- A sidewalk is recommended along the south side of Griffith from Northview Drive to Brockman St. This will prevent students from crossing at multiple locations along Griffith. With a sidewalk on the south side, the only location necessary to cross Griffith is the crosswalk south of the school. This would better utilize the existing crossing guard.
- Easements should be acquired along the north side of the school so that the City can update and maintain existing, deteriorated sidewalks.
- A sidewalk is recommended on Galloway Drive to Butterfield and Charolais Lane to Butterfield. This will connect the private sidewalks to Butterfield, which provides an alternate route beside Casement Road.
- A sidewalk is recommended on Hanly Street from Sloan Street to the existing sidewalks owned by Cooperative Family Community. This will provide access for students south of Hanly Street.
- A sidewalk is recommended from Lincoln Dr to the intersection of Gross St and Green Ave. This will provide access for students on Lincoln Drive.
- A flashing beacon should be installed at the existing crosswalk at the intersection of Casement and Griffith to improve pedestrian visibility, and a sidewalk is recommended along the east side of Casement Road from E. Butterfield to Parker.
- Casement Road is in need of multiple sidewalks along both sides of the street. The City has plans to fund the design of a new urban type roadway with sidewalks and storm sewers (date to be determined). This will provide connectivity for neighborhoods to the north and east.

Other

- To calm traffic in the area, the crossing on Griffith directly south of the school could be modified. Currently it crosses Griffith at a diagonal and is located directly next to curb inlets. The existing entrance to the school parking lot could be relocated and a new speed table and crosswalk should be located directly perpendicular to Griffith Drive. This is shown on the next page.
- All routes should be updated with ADA compliant ramps and crossings.

Griffith Drive

See Sign Inventory and Improvements Map

THEODORE ROOSEVELT ELEMENTARY SCHOOL

Theodore Roosevelt Elementary is the smallest of the elementary schools with 264 students. About 88 percent of these students live within two miles of the school with a high percentage (approximately 50 percent) walking to and from school. Poyntz Avenue which has an ADT of 10,770 vehicles per day is one block north of the school. The surrounding area is all residential housing. South Manhattan Avenue is one block to the east and has an ADT of 1940 vehicles per day

Existing Circulation

A field investigation was conducted in April of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to identify existing circulation patterns. Faculty parking is provided along the northwest side of the school and along local streets. The pick-up and drop-off is located on Houston Street directly north of the school. Bus loading zones are located along 14th Street on the east side of the school.

The main routes observed for pedestrians are 15th Street, Pierre St, and South Manhattan Avenue. Students that live north of Poyntz generally cross at 15th Street rather than walking to the controlled intersection on 14th Street. Students coming from the west have to cross 17th Street. The only controlled crossings on 17th are at 17th and Poyntz and 17th and Yuma.

There is no sidewalk on 14th Street south of the school. Students have to either walk in the street or through yards. Many students utilize South Manhattan as a collector from their local neighborhoods. There are no sidewalks along the west side of South Manhattan leaving some residents without pedestrian access facilities. The sidewalk along the north side of Houston Street is brick construction and in poor condition. The sidewalk includes grass, uneven transitions and ponding during storm events.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All of the signs shall have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten-year compliance period for upgrading the signs to S1-1 expired in 2011. These signs should be updated. The recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

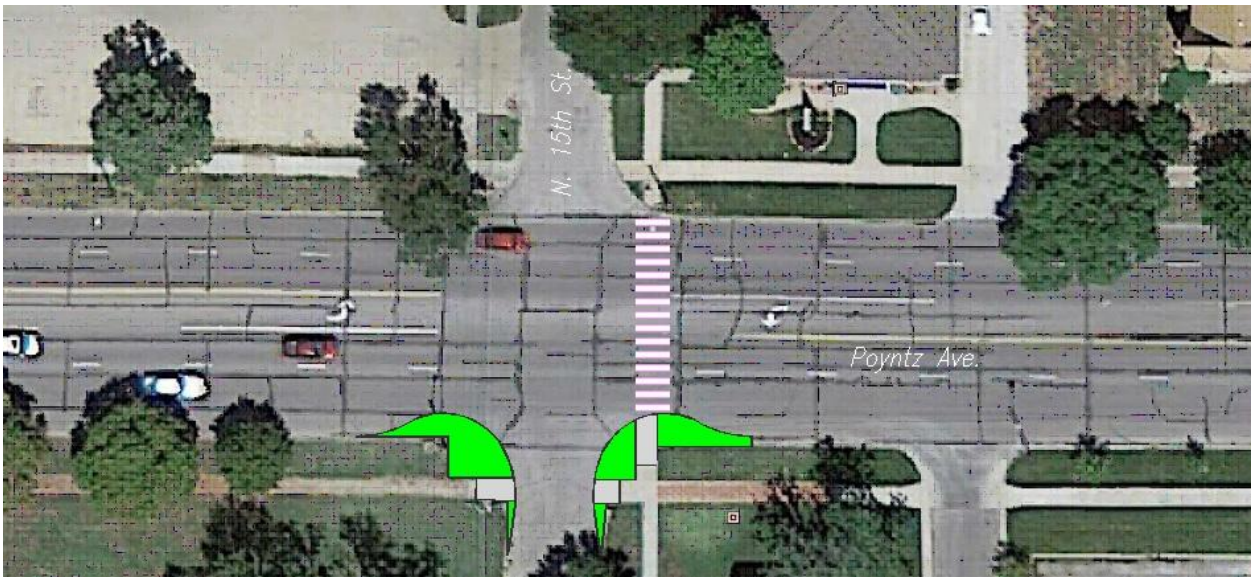
- It is recommended that pavement markings at each signed crossing location be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- A sidewalk is recommended on the west side of South Manhattan Avenue from Fort Riley Boulevard to Pierre Street. This will prevent any unwanted crossings along South Manhattan except at the designated crosswalk on South Manhattan and Pierre.
- A sidewalk is recommended on the east side of 14th Street from Pierre to Yuma Street. This will provide a route for students coming from the south.

Other

- Recommended bulb-outs could be constructed on the south side of Poyntz at 15th Street along with crosswalks. The bulb-outs will have a traffic calming effect and shorten the exposure for the pedestrian. Crosswalk signage will be installed. This is shown below



- All routes should be updated with ADA compliant ramps and crossings.

See Sign Inventory and Improvements Map

WOODROW WILSON ELEMENTARY SCHOOL

Woodrow Wilson Elementary has 355 students with most of them, 82 percent, living further than two miles from the school. The majority of students are bussed to and from school. Of the 18 percent that live near the school, a high percentage (14 percent) walk and bike as reported by the preliminary parent survey. This suggests that for Woodrow Wilson Elementary the majority of students within walking distance, walk as their primary means of transportation. Some students in this district have to cross Poyntz Avenue and travel through the Central Business District of Manhattan. The amount of traffic in this district and the vehicle speeds around the school are the main concerns for parents. As this school is also in the older part of town, there are brick sidewalks that are starting to become uneven which creates tripping hazards and ADA compliance issues.

Existing Circulation

A field investigation was conducted in May of 2014 to observe pedestrian and traffic movements. This data was included with anecdotal data provided during site council meetings to identify existing circulation patterns. Faculty parking is provided along the north side of the school and along local streets. The pick-up and drop-off area is located on Osage Street directly north of the school. Bus loading zones are located along Juliette Avenue on the west side of the school.

The main routes observed for pedestrians are from the west, following Leavenworth Street and then north along Juliette Avenue. There is a crossing guard for the four way stop at Juliette and Leavenworth. The sidewalks along Juliette are several feet away from the road, therefore cars tend to pull up into the crosswalks to turn causing students to walk around the crosswalks. No students travel from the southeast side of the school because this area is all commercial properties. Many of the sidewalks in the areas adjacent to the school are brick. Many of these are uneven which cause ponding and vegetation in some areas. Students traveling from the northwest utilize crosswalks on Juliette and Osage and students traveling from the northeast utilize the crosswalks along Osage and 6th Street. There were very few pedestrians observed during the site investigation.

Recommendations

Signage

- Additional crosswalk warning signs are required. Each crosswalk should have advanced warning signs and signs directly at the crosswalk, complying with the Manual of Uniform Traffic Control Devices (MUTCD). All of the signs shall have a fluorescent yellow-green background with a black legend and border. Many signs have lost their retro reflective treatment. Many crosswalks have the older S2-1 signs (Crossing warning sign with lines under the children's feet) which was effectively deleted from the MUTCD in 2000. The ten year compliance period for upgrading the signs to S1-1 expired in 2011. These signs should be updated. The recommended signage is shown in the sign inventory map. All signage shall conform to the most current version of the MUTCD.

Pavement Markings

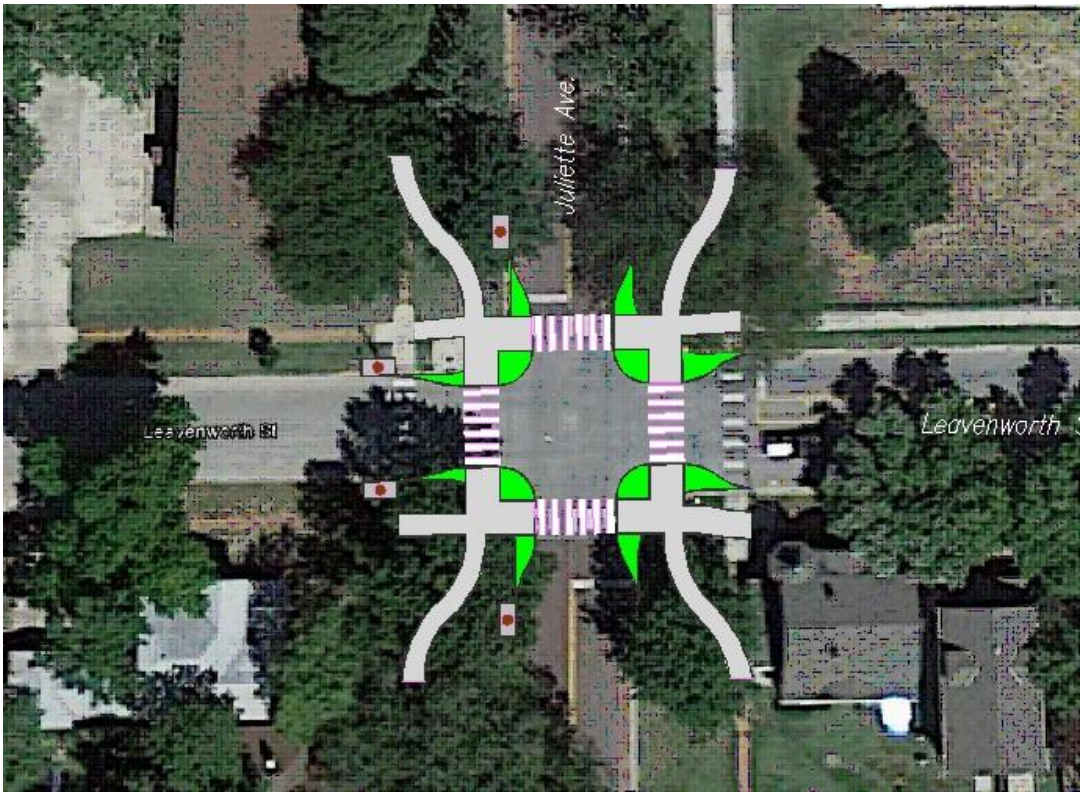
- It is recommended that pavement markings at each signed crossing location be in accordance with MUTCD. The City of Manhattan should continue to routinely inspect and maintain pavement markings at all signed crosswalks. Any new crosswalks should be marked accordingly during construction.

Sidewalks

- There is very good sidewalk connectivity in the area therefore no sidewalk construction is proposed, however some of the sidewalks are brick and need to be observed and maintained as necessary.

Other

- It is recommended that the intersection of Juliette and Leavenworth be reconfigured to include bulb-outs on every quadrant of the intersection. Currently Juliette is approximately 34’ to back to back of curb and Leavenworth is 40’. The length of the crossings can be reduced to 28’ back to back. Sidewalk along Juliette can be installed at the bulb-outs and tie back into the existing sidewalks. This will decrease the green space between the road and the sidewalks which allows cars to pull up to the intersection without blocking the crosswalks. This is shown below.
- All routes should be updated with ADA compliant ramps and crossings.



See Sign Inventory and Improvements Map

EVALUATION

EVALUATION

The Evaluation process is described in the following section. It has been written by Hyung Jin Kim, Ph.D. and Katie Heinrich, Ph.D., assistant professors at Kansas State University. After receiving the University Small Research Grant from Kansas State University in 2013, they conducted the proposed Phase 1 study and completed data collection. This study demonstrates support from the University, the City of Manhattan, the State, and the school district for the SRTS program in Manhattan, Kansas.

Background and Significance

Although a growing number of studies have examined or highlighted the effects of the SRTS projects on walking-to-school (WTS) empirical evidence based on different population characteristics and environmental settings, the research is insufficient to accurately quantify the efficiency of the SRTS program. Also, few investigations capture associations between children's WTS behaviors and infrastructural changes of micro- level school environments (e.g., school grounds or streets around/nearby school), and efforts identifying children's WTS behaviors in multi-level systems (personal, social and physical environments) with a pre- and post-intervention setting have also been limited.

In Kansas, only a small number of elementary schools (24.7%) support or promote walking/biking to and from school. However, few studies have identified the barriers and facilitators of WTS using tailored settings for the Kansas communities which have urban-rural dynamics and unique natural surroundings. MHK's SRTS projects can be used as a natural experimental setting for matching pairs of control/comparison schools; a research design using such a setting has rarely been utilized across the nation.

Research Plan

In Phase 1, a cross-sectional study examined the association between school environments and children's WTS behaviors. This study included both objective and subjective measures of the school/neighborhood environment and the behavioral outcome variables. Subjective measures included a parental self-report survey of children's WTS behaviors. Objective measures included audits for school environment and safety, count/observation data on students WTS, and secondary, socio-demographic data and Geographic Information System (GIS) data. Data were collected from October 2013 through November 2013, and the summary descriptive statistics of surveys were reported to the City of Manhattan and USD 383 in 2014.

For Phase 2 (not proposed at this time), when the SRTS projects are completed by the City of Manhattan, the quasi-experimental studies with pre-post and intervention-control comparisons will be performed to identify significant differences between schools with SRTS infrastructure funding (intervention schools) and no funding (control schools).

A Logic framework used as a conceptual model guiding this study describes the overall research design (Figure 1).

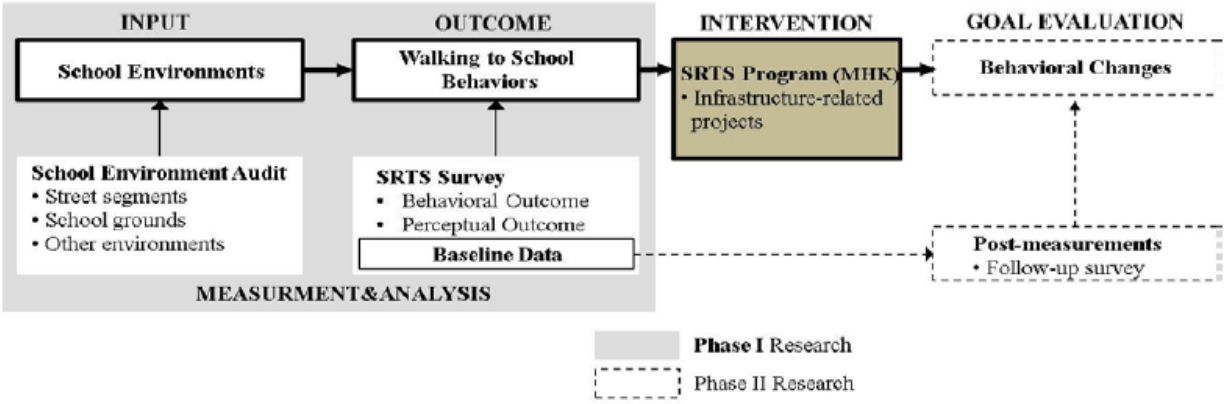


Figure 1. A Logical Framework for the Study

Specific Aims

The primary aims of this study were:

P1: To identify the environmental and safety barriers of the school environments to school aged children's WTS behaviors.

P2: To examine the association between the school environmental barriers identified by P1 and children's WTS behaviors.

The secondary aims of this study were:

S1: To compare the similarities and differences of the school environments and WTS behaviors between 11 study schools. In the future phase (Phase 2), quasi-experimental studies will involve the baseline data of this proposed research (P1 and P2) and follow-up assessments with SRTS infrastructure funding (intervention schools) and no funding (control schools).

S2: To assess if there are disparities in the neighborhood environments where walkers vs. non- walkers live and commute.

Methodology (Study setting and population; Phase 1)

The study setting included 9 elementary schools within the City of Manhattan, which are eligible for the federal SRTS grants. The target population was 4th grade students who were representative of the student populations from the study setting. Study variables were constructed to reflect items related to WTS behaviors and SRTS infrastructure projects, and identified based on previous literature and measurements:

Construct		Variables		Type	Data Sources
Outcome Variables					
Children's WTS behaviors	Pedestrian count	- # of students walking/bicycling to school (in street level)		Continuous	Pedestrian counts
	Walking/biking	- school travel modes (self-reported student behaviors)		Categorical (binary)	SRTS survey
Explanatory Variables					
School Environments	Street segments	Objective - Land uses - School zone - Street inventory & traffic condition - Safety facility - Amenities - Unattractive item	Subjective - Surveillance - Maintenance - Visual quality - Safety in walking/ bicycling - Attractiveness in walking/ bicycling	Categorical Ordinal Continuous	School environment audit tool A (street segment)
	School site	- # of frontage street - # of vehicle entry - # of school bus stop - Adjacent land uses	- Amenity - Sidewalk connects - Drop-off & pick-up - On-site facility	Categorical Continuous	School environment audit tool B (school site)
Personal / Social Environments	Perceived environments (parents)	- Barriers/facilitators - Sidewalk conditions - Neighborhood environments	- Safety concerns - Preferences of WTS - Willingness of WTS	Categorical Ordinal (5pt-Likert)	SRTS survey
	Social environments/ SES (parents)	- Social cohesion - Volunteerism	- Income - Economic status	Categorical Ordinal (5pt-Likert)	SRTS survey
	Personal / health factors (child's)	- Weight/height - Physical activity time	- Health condition - Other child's info.	Continuous Categorical	SRTS survey
Other confounding Factors		- % of economically disadvantaged - School size	- Racial distribution	Continuous Categorical	KSDE/ NCES data
Spatial Environments		- Home-to-school distance - Land use/density	- Crime - School location - Street infrastructure	Spatial Data	GIS Data

Measurement and Data Collection

(a) Parental self-report surveys captured children's travel mode and time, as well as personal, social, and perceived physical environmental factors related to parental decision of children's WTS. Previously validated instruments were used for developing the questionnaire due to time-sensitivity. Data were collected among parents of 4th grade students from the study schools in collaboration with the City of Manhattan and USD 383.

(b) School environment audit tool assessed environmental and safety barriers of the school environments. This field assessment included three sub-components: street segment audit, school site audit and map audit. The validated tool was used for auditing.

(c) Pedestrian counts assessed the amount of WTS children on each school segment during the appropriate time period before starting school. The count audit captured additional information of school transportation such as crossing guard locations, vehicle traffic or safety concerns. Although the Percentage of Children Using Active Transport to/from School has been introduced and used as the SRTS method (http://www.saferoutesinfo.org/data-central/data- collection-forms), it is difficult to capture the street-level activity by using this classroom tally method. Pedestrian counts collected more accurate data of walking activities on each school street.

(d) School-level demographic information was collected through Kansas State Department of Education (KSDE) and the National Center for Education Statistics (NCES) database. This included school-level socio-demographic data such as percent of economically disadvantaged children, enrollment size, and ethnic distribution.

(e) GIS environmental data was collected and used for assessing the neighborhood-level or city-level environmental aspects around school sites. The dataset includes land use, density, street infrastructure, crime, school location and school attendance zones.

Data analysis

For the primary aims (P1 & P2) and a secondary aim (S2), after describing variables and identifying key variables for multivariate modeling through descriptive statistics and bivariate analyses (ANOVAs and Chi-square tests), multivariate analyses will be performed using hierarchical linear models. For the comparison study (S1), ANOVAs and t tests will be used to examine pre- vs. post-, and control vs. intervention settings. Also, structural equation modeling will be performed for examining the direct and indirect impacts of key variables. Standard diagnostics will be performed to ensure the validity of the statistical model being used.

Phase 1 Results

Parent surveys were sent home with all 4th grade students, and 171 parents participated for a 41.3% response rate. The following descriptive statistics summarize the study findings:

School Travel

- For the trip to school, most children were driven in a private car (51.5%), followed by riding a school bus (24%), walking with a parent or adult (10.5%), or walking with friends (8.2%).
- Most children traveled home from school by similar modes to the trip to school: by private car (45.6%), school bus (24.6%), walk with a parent or adult (12.3%), or walk with friends (9.9%).
- It took 9.2 minutes on average to get to school.
- The majority of parents (53.8%) felt their children lived close enough to walk to school, although this percentage was substantially lower for Bluemont (15.4%) and Lee (27.6%) Elementary Schools.

- The school bus service was not provided for the majority of children (59.8%).
- The majority of parents had volunteered at their child's school (51.5%).

Environmental Barrier

- The most common land uses located along the way to school included a walking path or trail (32.2%), small retail/business (30.4%), playground (28.1%), gas station (28.1%), none (24.6), convenience store (24.0%), or large parking lot (21.6%).
- Children were most likely to face roads with busy traffic, intersections without crosswalks, and non-signaled intersections on their trip to school.
- All schools except Woodrow Wilson had sidewalks on some, most, or all streets.

Health and Physical Activity

- The most frequently reported health condition was asthma (12.3%) followed by ADHD (5.2%), obesity (3.2%), and others (3.2%).
- During a usual weekday, the majority of children (61.4%) spent less than 60 minutes per day in sedentary/screen time: Screen time is one type of sedentary behavior and includes watching television, using a computer, or playing video games, when not working or studying. The American Academy of Pediatrics recommends limiting screen time to no more than two hours a day.
- Most parents (68.9%) reported that their child spend less than 60 minutes playing outdoors on a usual weekday: National guidelines require children to complete 60 minutes of physical activity each day (U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans.* Atlanta, GA: Centers for Disease Control and Prevention; 2008).
- Parents indicated that their children were most likely to play outside at least once a week in their yards at home (45.6%, n=78) or at school (31.6%, n=54).

Participants' Socioeconomic Status and Characteristics

- Parents were asked to provide basic demographic information for the child who brought the survey home. The overall sample was relatively even by gender (50.9% female), but parents at Amanda Arnold were more likely to have received the survey from a female child (75%).
- The majority of children were white, non-Hispanic (69.7%, n=115).
- Free and reduced-price lunches are often used as an indicator of lower socioeconomic status (SES). The majority of parents reported that their child did not qualify for these school lunch programs (67.6%, n=115), except for Northview, where 26.1% (n=6) qualified for reduced price and 34.8% (n=8) qualified for free lunches.

- Adults living in the household with the child included mothers (93%, n=159), fathers (74.9%, n=128), grandmothers (7.0%, n=12), grandfathers (5.8%, n=10), and others (15.2%, n=26).
- At least one of those adults was available to walk their child to or from school in over 50% of respondents from five of the eight schools.
- The key reasons for choosing their neighborhood included quality of neighborhood (52%, n=89), housing price (48%, n=82), quality of school (33.3%, n=57), and close to child's school (32.7%, n=56).
- The majority of households own more than one car (97.7%) and 80.7% of households have more than two cars.

Future Study

- Almost half of participants indicated that they were interested in participating in similar studies/activities in the future (54.1%, n=92).

Evaluation Budget

Evaluation Budget					
Item	Description	Bid Quantity	Units	Unit Price	Total
	General				
1	Personnel (Student Workers)				
	Survey Delivery and Collecting	8	Hrs	$12.00	$96.00
	School Environment Field Auditing	16	Hrs	$12.00	$192.00
	Pedestrian Counts	48	Hrs	$12.00	$576.00
	Data Entry & Cleanup	140	Hrs	$12.00	$1,680.00
2	Surveys (Incentives, Printing, and Mailing)	1	LS	$624.00	$624.00
3	Other Printing and Supplies (Audit Tools, Ped Counting Forms, etc.)	1	LS	$400.00	$400.00
	TOTAL ESTIMATED COST OF SRTS FOLLOW-UP EVALUATION				***$3,568.00***

Acknowledgements

The evaluation team acknowledges Dr. Chanam Lee, Professor of Landscape Architecture and Urban Planning at Texas A&M University, for providing the SRTS parental survey instrument and valuable advice. The development of the SRTS parental survey was supported by a grant from the Robert Wood Johnson Foundation's Active Living Research program (Grant ID: 65539).

They also acknowledge Katelyn Gilmore, Master of Public Health student at Kansas State University, for helping data collection and analysis for the study.

Description of the Evaluation Team

Hyung Jin Kim, PhD, Principal Investigator, from Kansas State University's Department of Landscape Architecture / Regional and Community Planning, is responsible for administration and direction of this project. Dr. Kim has expertise in measurements and analyses of the built environment related to physical activity, active transportation and social cohesion of community. His doctoral dissertation, entitled "School-Community Relations, Social Capital, and Children's Walking-to-School Behaviors," was funded by the Robert Wood Johnson Foundation (RWJF) Active Living Research Program.

Katie Heinrich, PhD, Co-Investigator, from Kansas State University's Department of Kinesiology, provides her experience in assessing children's physical activity behaviors and the SRTS policies. Dr. Heinrich successfully completed a SRTS intervention study in Hawaii County that collected baseline data on active transportation and the built environment around schools (Heinrich et al., 2011), implemented SRTS small planning grants in 8 schools (5 additional schools served as controls), and then collected follow-up active transportation and built environment assessments one year later. Dr. Heinrich serves as a mentor for this research project and assisted in data collection and analysis for the school environmental audit and SRTS survey.

Citations

Alexander, L. M., Inchley, J., Todd, J., Currie, D., Cooper, A. R., et al. 2005. The broader impact of walking to school among adolescents: Seven day accelerometry based study. British Medical Journal, 331, 1061-1062.

Boarnet, M., Anderson, C., Day, K., Mcmillan, T. & Alfonzo, M. 2005. Evaluation of the california safe routes to school legislation: Urban form changes and children's active transportation to school. American Journal of Preventive Medicine, 28, 134-140.

Cooper, A. R., Andersen, L. B., Wedderkopp, N., Page, A. S. & Froberg, K. 2005. Physical activity levels of children who walk, cycle, or are driven to school. American Journal of Preventive Medicine, 29, 179-184.

Dannenberg, A. L., Jackson, R. J., Frumkin, H., Schieber, R. A., Pratt, M., et al. 2003. The impact of community design and land-use choices on public health: A scientific research agenda. American Journal of Public Health, 93, 1500-1508.

Davison, K. & Lawson, C. T. 2006. Do attributes in the physical environment influence children's physical activity? A review of the literature. International Journal of Behaviroal Nutrition and Physical Activity, 3, 1-17.

Fulton, J. E., Shisler, J. L., Yore, M. M. & Caspersen, C. J. 2005. Active transportation to school: Findings from a national survey. Research Quarterly for Exercise and Sport, 76, 352-357.

Heinrich, K. M., Dierenfield, L., Alexander, D. A., Prose, M., Peterson, A. C. 2011. Hawai'i's opportunity for active living advancement (HO'ĀLA): Addressing childhood obesity through safe routes to school. Hawaii Medical Journal, 15, 12-18.

Jackson, L. 2003. The relationship of urban design to human health and condition. Landscape and Urban Planning, 64, 191-200.

Kimminau, K.S., Murphy, K.C., and Huang, C., 2006. Kansas Public School Health: Nutrition, Physical Education and Physical Activity Policies and Practices. Kansas Health Institute. Lee, C., Kim, H., Ory, M.G., Hoelscher, D., & Dowdy, D. 2012 (accepted). School environmental audit tool: Assessing safety and walkability of school environments. Journal of Physical Activity and Health.

McDonald, N. C., Brown, A. L., Marchetti, L. M. & Pedroso, M. S. 2011. Us school travel, 2009: An assessment of trends. American Journal of Preventive Medicine, 41, 146-151.

McDonald, N.C. & Aalborg, A.E. 2009. Why parents drive children to school: Implications for Safe Routes to School Programs. Journal of the American Planning Association. 75(3), 331-342.

Ogden, C., Flegal, K., Carroll, M. & Johnson, C. 2002. Prevalence and trends in overweight among us children and adolescents, 1999-2000. The Journal of American Medical Association, 288, 1728-1732.

Watson M, Dannenberg AL. (2008). Investment in Safe Routes to School projects: public health benefits for the larger community. Preventing Chronic Disease, 5(3). Retrieved from: www.cdc.gov/pcd/issues/2008/jul/07_0087.htm

Alfred Benesch & Company
785.539.2200

City of Manhattan Kansas

benesch
engineers · scientists · planners