

SCHOOL AREA TRANSPORTATION SAFETY GUIDELINES

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Abstract

Schools across Canada need to consider transportation safety, both on-site and in the surrounding community. More children are being driven to school today than in the past. As a result, transportation facilities at and around schools may not be operating as safely as originally planned, and current practices in school site designs may not be reflective of current modal split.

Two specific jurisdictions in Canada, Manitoba Department of Infrastructure and Transportation and the City of Calgary determined that there was a need to prepare a set of guidelines to assist schools with addressing on- and off-site transportation safety concerns. MMM Group was chosen to develop these guidelines for Manitoba and Calgary with the objective of providing schools (in both rural and urban areas) with a step-by-step process to review existing transportation issues, gather information, and work with technical experts to address such issues. Areas of focus common to both studies related to pedestrian safety, parking, both bus and parent pick-up / drop-off areas, and cycling initiatives. The schools reviewed in each jurisdiction included all age groups, and included both the public and, in the case of Calgary, separate school districts.

The first stage of both studies was to identify and review literature and best practices from across North America and internationally. All literature reviewed was specific to school, pedestrian, and bicycle safety.

Subsequently, input was obtained from residents, students, parents, teachers, and others in each jurisdiction to identify the transportation safety concerns both at, and around a number of schools, utilizing innovative engagement techniques. This input included actual and perceived barriers for stakeholders that limited their modal choices. In the City of Calgary assignment, walking tours of 21 sample schools were conducted during peak periods, online engagement was conducted with stakeholders to identify current travel patterns and barriers to other travel behaviours, and open house-style in-person workshops were held for participants to supplement identified issues and provide input on proposed solutions. In Manitoba, workshops were held with stakeholders at the commencement of the study to identify key issues regarding transportation safety at and around both urban and rural schools. A stakeholder workshop was also held towards the end of project which focused on the “trial use” of the guidelines.

The final deliverable in both studies involved a comprehensive report to each jurisdiction which included recommendations to help improve transportation safety and operations for existing school sites, and to identify recommendations that will be useful in developing new school sites.

Part One: Manitoba School Area Transportation Guidelines

A. Introduction

Young pedestrians are a user group that have not necessarily been a major factor in transportation planning/road safety studies. Research has shown that students under the age of 17 are generally inattentive and careless in crossing streets. Those under nine have difficulty in understanding and properly using traffic signals and crosswalks and are more likely to cross mid-block or cross on a red signal.

In Manitoba, it is more common for children to be driven to/from school today than in the past for a number of reasons ranging from safety and security concerns to distance from the school.

This has become a problem for older schools in particular as they were often not designed for large numbers of drop-off/pick-up by private vehicles (or school buses) as they tend to be located on small sites with limited opportunity to upgrade facilities to provide adequate loading zones.

Compounding the matter is the lack of sidewalks around some school sites requiring students to use the side of the road when picked up and/or dropped off. In addition, there is currently no means in place to allow for the sharing of ideas for improving transportation safety among schools.

B. Project Goal

The primary goal of this project was to develop a procedural manual and safety assessment toolkit that provides guidelines for transportation and planning authorities, school divisions, individual schools, and parent groups to effectively and consistently plan the needs for new school sites and address traffic safety concerns within school zones at existing schools.

C. Consultation Process

Ensuring that key stakeholders were involved in the process of developing the guidelines resulted in a product that addresses various interests and improved the implementation process.

Three distinct consultation components were conducted:

- Internal Stakeholders Workshop
Held at the beginning of the project. Key discussion areas included:
 - Concerns and / or questions regarding traffic safety improvements;
 - Functional issues related to the implementation of school area traffic safety improvements;
 - Criteria for evaluating and implementing school area traffic safety improvements;
 - Possible 'roadblocks' to implementation.
- External Stakeholders Workshop
Held at the beginning of the project. Areas covered included:
 - An educational component to inform participants of the project scope, goals, expected outcomes, etc.
 - Topic-based facilitated roundtable discussions focusing on key areas of interest to make effective use of the consultation opportunity.
- Internal and External Stakeholders Workshop

Held at the end of the project. Areas covered included:

- A review of the draft guidelines, procedural manual and safety assessment toolkit.
- A “trial use” of the guidelines by teams at the Workshop

D. Research Tasks

An extensive literature review was undertaken as one of the first stages of the project. Material was gathered on best practices, different aspects of school travel (safe routes to school programs, school zones, school buses, etc.) in North America.

A number of schools, large and small, in both rural and urban (inner city and suburban) Manitoba, were visited to learn about typical issues from school staff and administration.

E. Guidelines

Based on the results of the Stakeholder workshops, the literature review and the on-site visits, guidelines for transportation and planning authorities, school divisions, individual schools, and parent groups were developed for new school sites and existing schools.

a. Guidelines for New School Sites

It is imperative that new schools incorporate features that accommodate school travel in a safe manner, including walking and cycling trips, bus drop-off/pick-up and parent drop-off/pick-up areas.

Transportation should be a consideration in the selection of new school sites. Selecting sites with fewer potential issues from a transportation standpoint eliminates the need for costly retrofit later on, or ongoing safety concerns and problematic operation. To assist in the process of locating a new school, a detailed checklist was developed containing a compilation of transportation-related issues for use when planning a new school site. This three part check list contains three areas:

- Site Selection Considerations,
- Road Network Considerations, and
- Parking/Loading Considerations

The check list is illustrated in Figures 1 to 3.

Figure 1: New School Site Check List – Part One

Site Selection Considerations	Yes/No	Comment
Is the school site adjacent to built or natural barriers, such as railroad tracks, high speed roadways, or rivers/streams?		<i>The presence of these barriers will limit the ability of children to walk or bike to school.</i>
Is the school's catchment area predominantly on one side of an arterial (or higher classification) road?		<i>Such roads act as barriers to walking and biking and there is a need to consider how students will negotiate these safely.</i>
What is the adjacent land use expected to be in the future, or already approved in the area surrounding the school site?		
Commercial?		<i>Generally, commercial, industrial, or agricultural uses are undesirable near a school, in part due to the mix and volume of traffic they create. Lower volumes of traffic near a school are desirable.</i>
➤ Are traffic volumes expected to grow significantly in the future?		
Industrial?		
➤ Are traffic volumes expected to grow significantly in the future?		
➤ Will the traffic mix consist of a high proportion of large vehicles?		
➤ Does the nature of any traffic to and from a nearby industrial development pose significant concerns (i.e., hazardous waste)?		
Agricultural?		
➤ Will adjacent farming operations create any traffic-related concerns (e.g., over-dimension vehicles periodically needing to occupy the entire road surface and obscuring pedestrian/cyclist lines of sight)?		
Residential?		<i>Ideally, a school will be located in a residential area.</i>
➤ Is the site situated in a convenient location to encourage a mix of travel modes to and from school?		<i>A range of potential mode choices is better than limiting choice to a small number of options.</i>
➤ Will headlight glare and other environmental factors (such as noise, vehicle emissions, dust, etc.) associated with drop-off/pick-up and parking operations post a concern to adjacent residents?		<i>Ideally, no; ensure the design of such areas does not create a nuisance for members of the community.</i>

Figure 2: New School Check List – Part Two

Road Network Considerations	Yes/No	Comment
<p><i>Access to and from collector streets in urban areas is generally appropriate for elementary and middle schools. Access solely from a local residential street or cul-de-sac can result in congestion and greater conflicts with pedestrians and cyclists, especially if there are no sidewalks. In rural areas, avoiding sites adjacent to high-speed, high-volume expressways is recommended.</i></p>		
<p>What is the road classification of the adjacent street network? (Check all that apply.)</p>		
<p>➤ Expressway (high-speed/high-volume)?</p>		<p><i>If the answer is YES to either of these two road types, is an alternate site available?</i></p>
<p>➤ Arterial?</p>		
<p>➤ Collector?</p>		<p><i>Lower classification roads generally have slower speeds and lower volumes of traffic.</i></p>
<p>➤ Local?</p>		
<p>Is visibility adequate on the road where school access is located (i.e., not on a curve or a hill)?</p>		<p><i>A YES answer is desirable; a NO will mean a greater potential for traffic safety concerns.</i></p>
<p>Can school driveways be aligned with existing streets to create four-way, right-angle intersections?</p>		<p><i>A YES answer is preferable; it reduces the number of conflict points and non-standard vehicle movements.</i></p>
<p>Is the school site close to existing controlled crossing points (crosswalks)?</p>		<p><i>A YES answer will potentially reduce the need for construction of new controlled crossings (crosswalks).</i></p>
<p>Can on-site pedestrian pathways align and connect with existing sidewalks on the street network?</p>		<p><i>Connected networks are essential to their use.</i></p>
<p>Can access be provided from more than one direction and at least two adjacent streets?</p>		<p><i>More options mean that traffic volumes will be distributed rather than concentrated, which can result in congestion and unsafe operation.</i></p>
<p>Is the school site accessible by public transit (if available)?</p>		<p><i>A YES answer means that public transit can be an option for school users.</i></p>
<p>Consider all modes of travel to and from school and their access points to the site:</p>		
<p>➤ Is there adequate space on-site for bicycle storage?</p>		<p><i>Adequate storage is desirable if cycling is to be an option.</i></p>
<p>➤ Can the separation of travel modes (school buses, private vehicles, bicycles, and pedestrians) occur on the site?</p>		<p><i>Separating modes reduces the potential for conflicts.</i></p>
<p>➤ Can the transportation needs of disabled / physically challenged students be integrated into the site?</p>		<p><i>The needs of these users should be integrated into the design of the school.</i></p>

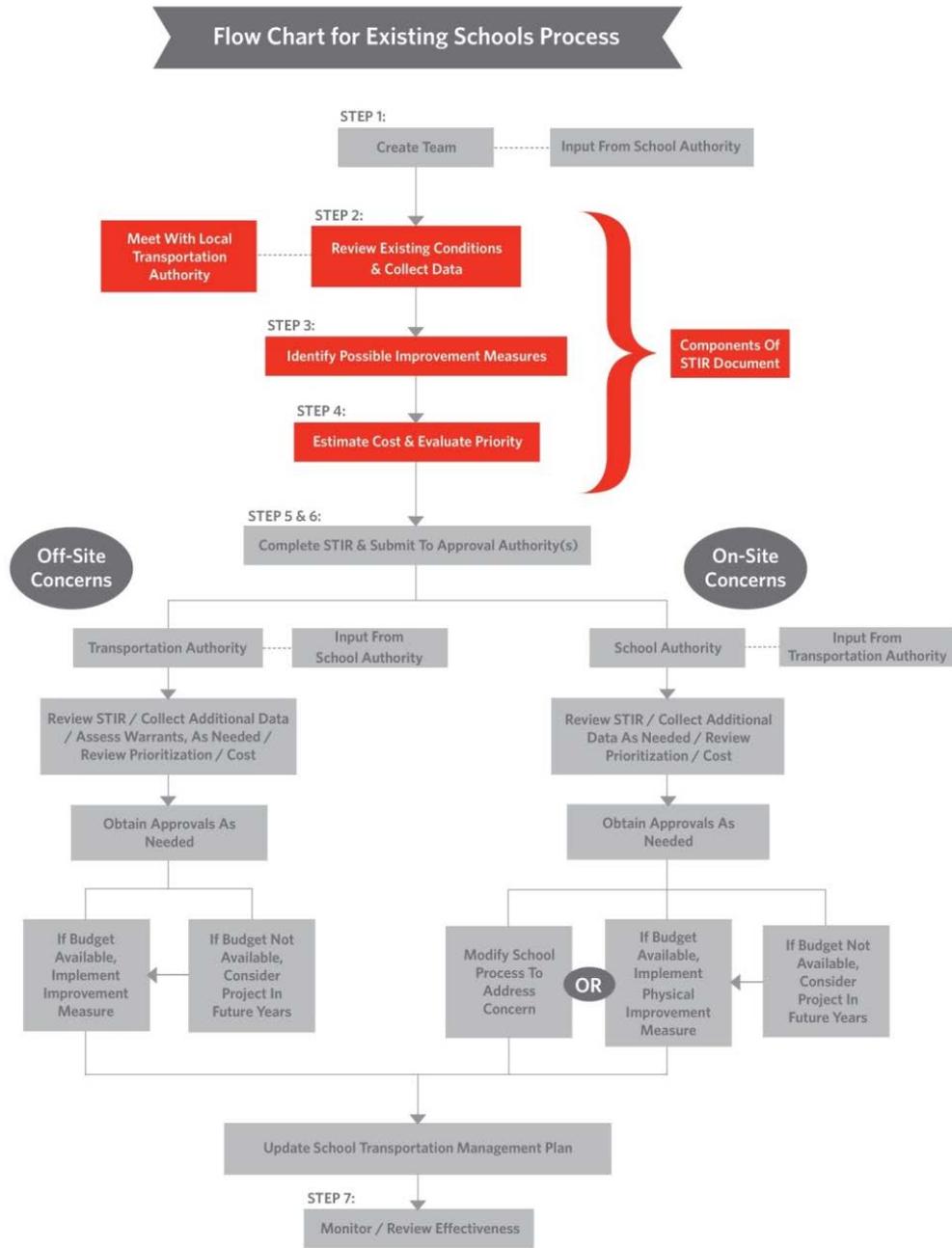
Figure 3: New School Check List – Part Three

Parking/Loading Considerations	Yes/No	Comment
Is there adequate storage space either on the school site or off to park buses?		<i>It is very desirable to have adequate storage space on site, but not always possible. If it is not possible, find alternatives for bus loading/unloading such as on nearby streets, or through agreements with nearby property owners.</i>
If school bus pick-up/drop-off will occur not on the school site but on the adjacent street network, is it possible to install a pull-out lane to prevent buses from sitting in the travel lane of the road?		<i>If buses must block traffic, motorists may become frustrated and try to pass.</i>
Is there adequate storage space for queuing of private vehicles picking up and dropping off students?		<i>This should be carefully considered. Many existing schools have inadequate storage space for these activities. Space requirements may be difficult to estimate and provide. If it is not provided, where will this activity take place?</i>
Is there permanently reserved space for deliveries and/or emergency vehicles?		<i>A space for these activities is essential and may be a by-law requirement.</i>
<u>Are staff</u> parking requirements accommodated on site?		<i>Very desirable and may be a by-law requirement.</i>
Are visitor parking requirements accommodated on site?		<i>Review similar schools to determine adequate visitor requirements. Likely a by-law requirement.</i>
Has the on-site location for garbage collection and other similar activities been considered?		<i>Avoid conflict between garbage vehicle operation and other vehicle movements on site, particularly during peak traffic periods.</i>
Consider the age range of students/users of the school:		
➤ Will students be young enough that parents will park and accompany their child in and out of school?		<i>If YES, then additional parking for this use may be required, where this can safely occur.</i>
➤ Will student parking be provided, in the case of a high school?		<i>If NO, where will this occur off site? Will this be an issue for the surrounding community? If it will, how can this be resolved?</i>
➤ Will the school include an in-house child care facility that will require additional parking supply and a child pick-up/drop-off area?		<i>If YES, then these features should be provided on site.</i>

b. Guidelines for Existing Schools

A step-by-step process of investigation has been developed to address traffic safety concerns at an existing school. A team of individuals consisting of volunteers, including parents, school

staff, and community representatives come together to resolve traffic safety issues at an existing school is put together. The end result of the process is the development of a School Transportation Issues Report (STIR) that can be used by school officials and the transportation authority to plan and implement the recommended solutions. All schools have differing surroundings and circumstances, and a one-size-fits-all strategy will not work. It is for this reason that the creation of a team representing an individual school is the foundation of the process. This process is outlined in the flow chart included on the following page.



To aid the team in preparing the STIR, a Toolkit of possible improvement measures was developed. The purpose of the toolkit is to assist school teams and approval authorities (either jurisdictional traffic personnel or school officials) in selecting the most appropriate measure to address the problem.

Measures fall into one or more of four categories:

- Educating Drivers
- School Processes
- Off the School Site
- On the School Site

The toolkit is summarized in Figure 4.

Figure 4: Improvement Measures Tool Kit

Educating Drivers	School Processes	Off the School Site	On the School Site
Education / Enforcement Campaigns	School Bus Loading Protocols	<u>Pedestrian Network</u> Sidewalks/Pathways Walking School Bus	Fencing
Speed Reader Boards	Private Vehicle Protocols	<u>Crossing the Street</u> Crosswalks Curb Extensions Crossing Guards In-Street Signs Etc.	Signs & Pavement Markings
PACE Car Programs	Staggered Dismissal Times	<u>Cycling Network</u> Bike Lanes Multi-Use Paths Bike Trains	School Driveways & Bus Loading Areas
	Access Protocols	<u>Vehicle Network</u> Stop Signs/Signals Parking/Loading Traffic Calming School Speed Zones	Bicycle & Vehicle Parking Areas

For improvement measures in the STIR that are being suggested for the public right-of-way a review of these measures by the transportation authority will be required. The STIR Team may be asked to do additional follow-up work, or meet with the transportation authority to discuss improvement measures. The transportation authority may have alternative data that supplements what was collected and / or may need to do additional analysis.

It is important for the STIR Team to understand that:

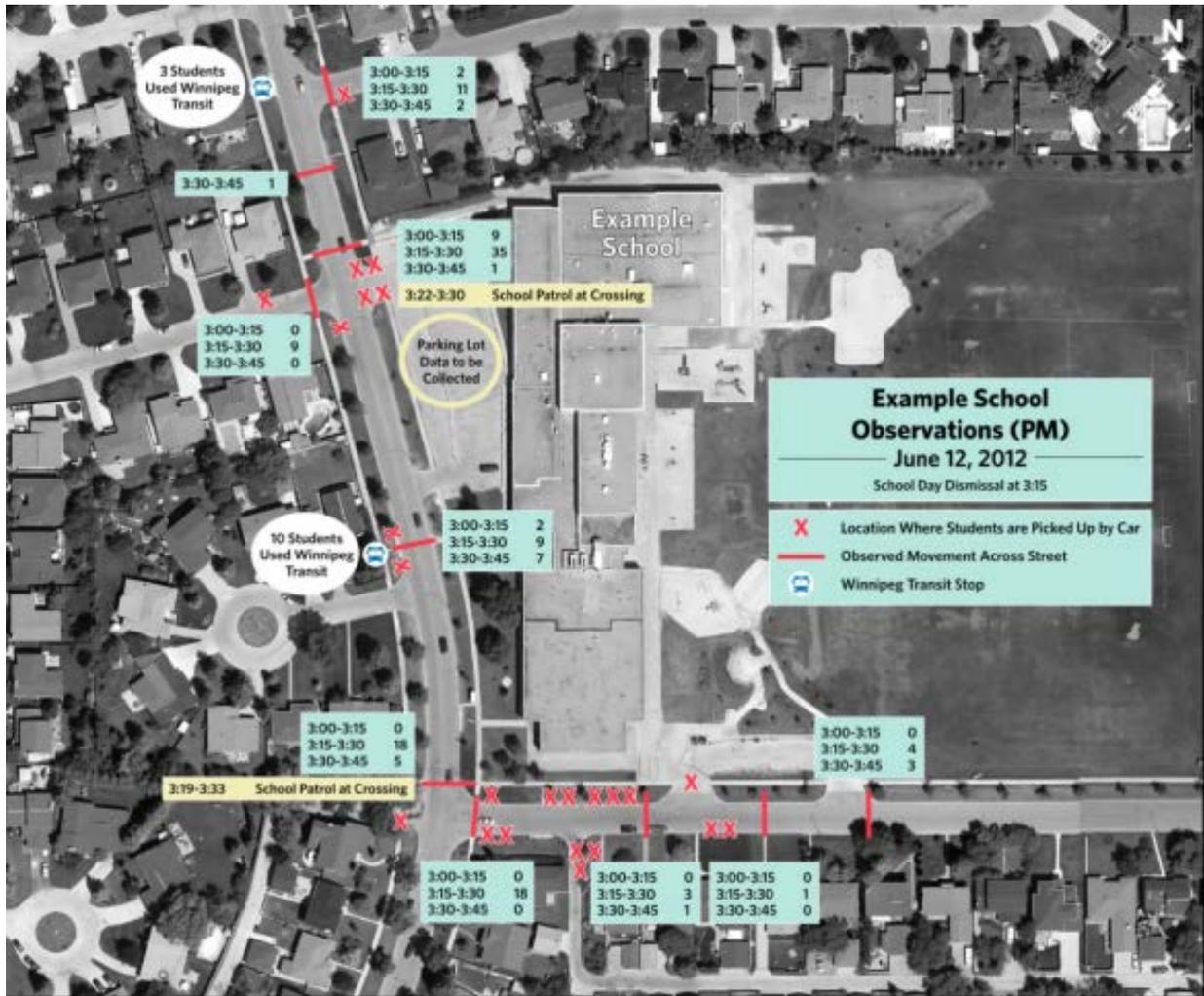
- The decision-making can take time

- Funding of solutions (particularly those off-site) may not be immediate

After improvement measures are implemented, once approved, post-implementation monitoring of the level of improvement achieved will enable the school and / or the transportation authority to evaluate their effectiveness.

F. Pilot Project – Existing School in South East Winnipeg

A pilot project was undertaken utilizing the STIR process to demonstrate the use of this methodology in identifying transportation issues and recommended mitigation measures. The map shows site observations of activity during the weekday p.m. period.



Observations by the STIR Team:

- Most activity takes place between 3:15 and 3:30 p.m.
- West side issues related to parking or crossing the street.
- Most students crossed where the school patrol was located.
- Students are picked-up outside the parking lot area designated for pick-up/drop-off
- Most common pick-up/drop-off location and therefore the largest amount of two-way vehicle activity is south of the school.

- Crossing is also happening midblock and without school patrols
- There were a significant number of parked cars waiting, cars loading, and pedestrians (adults and students) in the parking lot area
- The number of parked waiting vehicles at any point is much higher than the number of vehicles actually loading.
- The lot begins to fill fifteen to twenty minutes before the actual dismissal time for school.
- At 3:15 p.m., when school ends, there were 17 vehicles in the lot.
- Parking lot appeared to be heavily used
- Some issues related to a lack of places to park were occurring

Potential Mitigation Measures Developed Using the STIR Process:

- Make the loading and street crossing activity on the south side safer through the use of the parking area
- A school patrol member could be dedicated to assisting with crossing where the loading is taking place on-street
- The length of time the school patrol is active could be increased
- Students could be encouraged to leave the school more expeditiously

This pilot project successfully demonstrated that the STIR process was effective in identifying the issues and developing mitigation measures to address those issues that had the highest priority.

Part Two: Calgary School Sites Review

A. Introduction

The City of Calgary School Sites Review project consisted of reviewing 21 schools, belonging to both the Calgary Board of Education (CBE) and Calgary Catholic School District (CCSD). The schools ranged in grade levels from K-12, which included elementary, junior high and high-school age children. Also included were some schools with broader catchment areas, serving programs such as French Immersion curriculum. The schools evaluated also ranged in decade of construction, as different schools were designed and developed within the City under varying design criteria.

In reviewing the 21 school sites, issues identified were matched with potential solutions identified at other school sites, data collected from the literature, and best practices utilized both within and outside Canada for addressing these concerns. A key consideration within the solutions development process was integration of the various barriers identified by stakeholders that prevented non-vehicular travel modes from becoming a viable alternative. Another key consideration is context-sensitivity – as few school sites have the same surrounding roadway and land use characteristics, a suite of potential options needed to be identified for addressing any identified issue. This allowed the City to evaluate the merits of each potential solution on a school-by-school basis, and to determine what measure(s) had the highest probability for addressing the identified issue.

In addition, a potential layout for a future “ideal” school was designed and developed, incorporating mitigation measures for commonly occurring issues. Flexibility to adapt this ideal school to include other common issues that may develop in the future was incorporated into the design concept.

B. Issues Identification

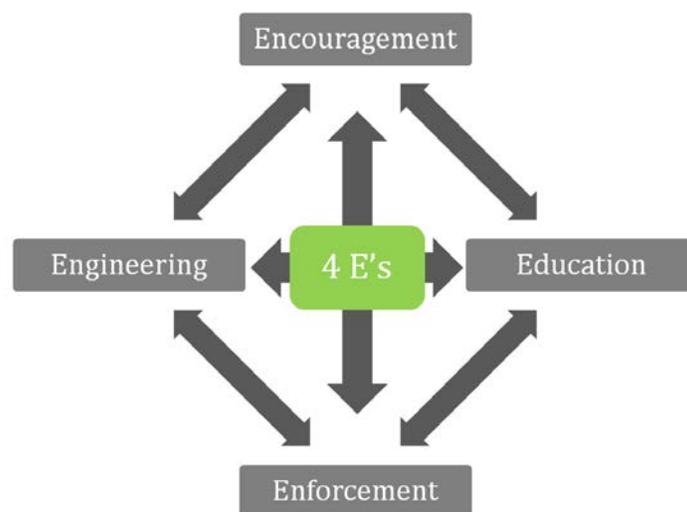
The issues identified at each school site were generally divided into 5 criteria, generally following modal choice:

- Vehicle-Related
- School Bus / Calgary Transit-Related
- Pedestrian-Related
- Bicycle-Related
- Policy-Related

The most commonly observed transportation issues occurring during either or both of the weekday peak periods of the schools consisted of the following, in no particular order:

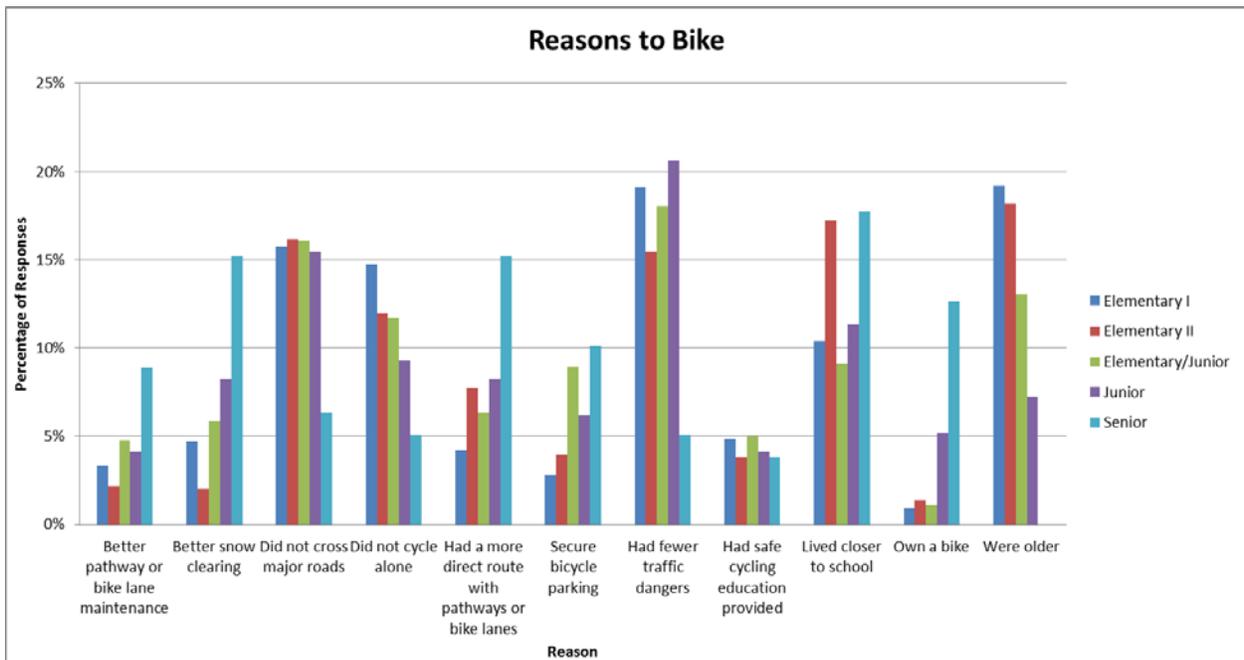
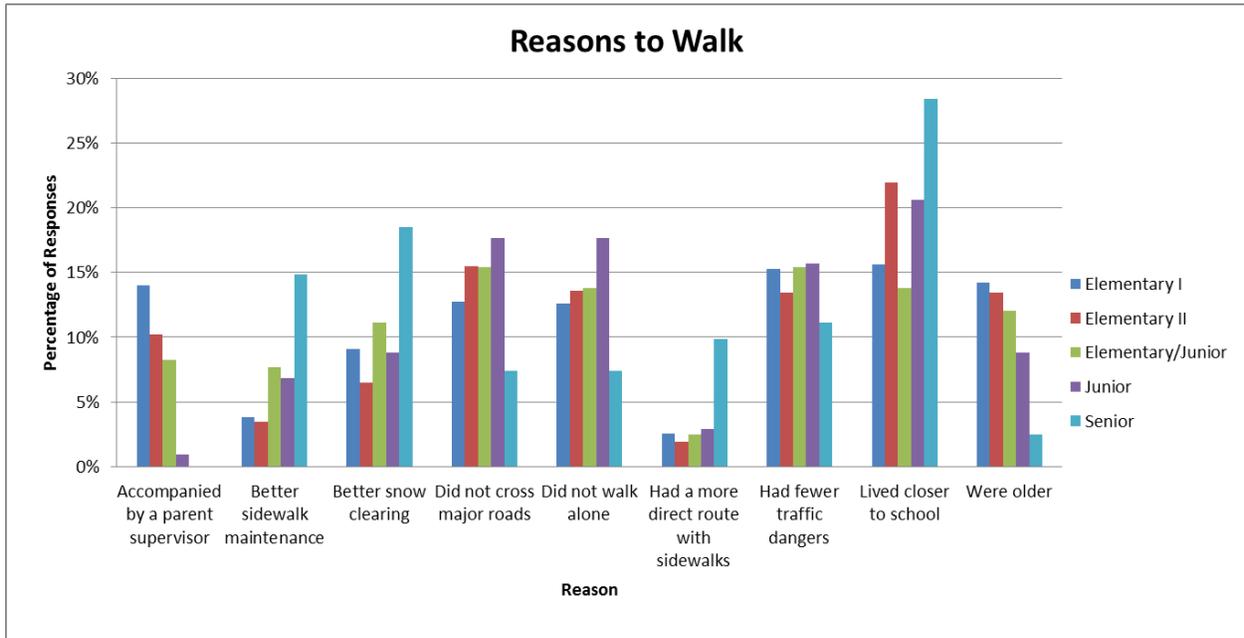
- Traffic Congestion
- U-Turns
- Pedestrian and Cyclist Safety / Accessibility
- Parent Pick-up/Drop-off in undesignated areas such as bus/transit zones, No Parking areas, staff parking lots, neighboring businesses / land uses
- Jaywalking
- Winter Maintenance on Roadways and Sidewalks
- Speeding
- Illegal Parking / Double Parking / Parking on Crosswalks
- Insufficient Parking both on the roadway and on school property
- Residential Driveways / Garages Blocked
- Limited/unreliable School Bus and/or Transit Service
- Disregard for regulatory signage, school patrollers and other designated authorities on site

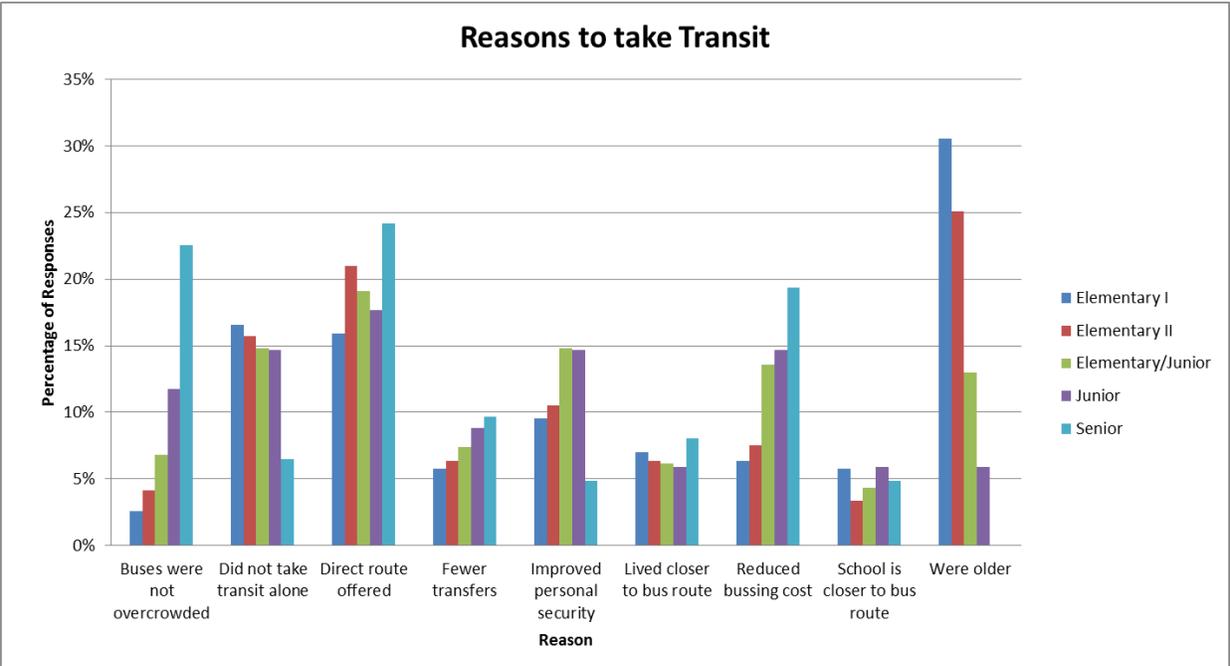
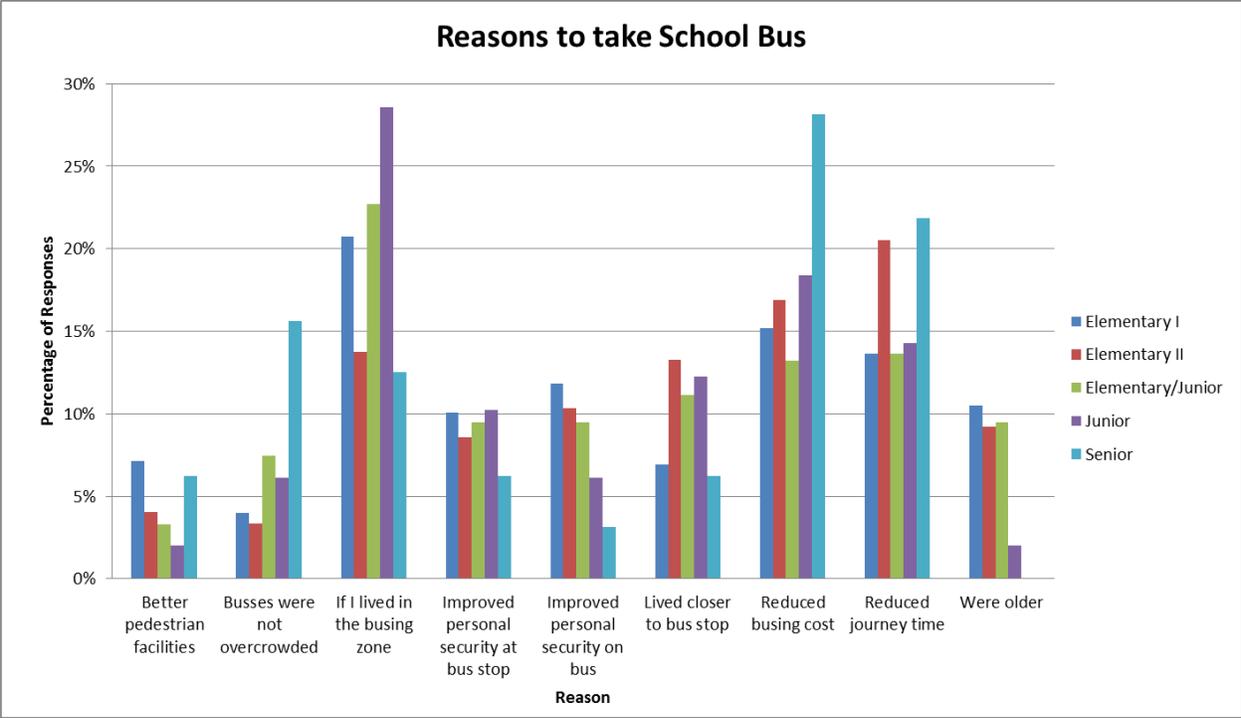
As a matter of best practices, the four E's – Engineering, Education, Encouragement and Enforcement – were followed in the development of potential recommendations. These four E's do not operate in isolation – in many cases, they can influence each other and can be combined to produce a greater compliance rate. As a general rule, any solutions package considered for addressing a school's transportation concerns should include elements from multiple E's.

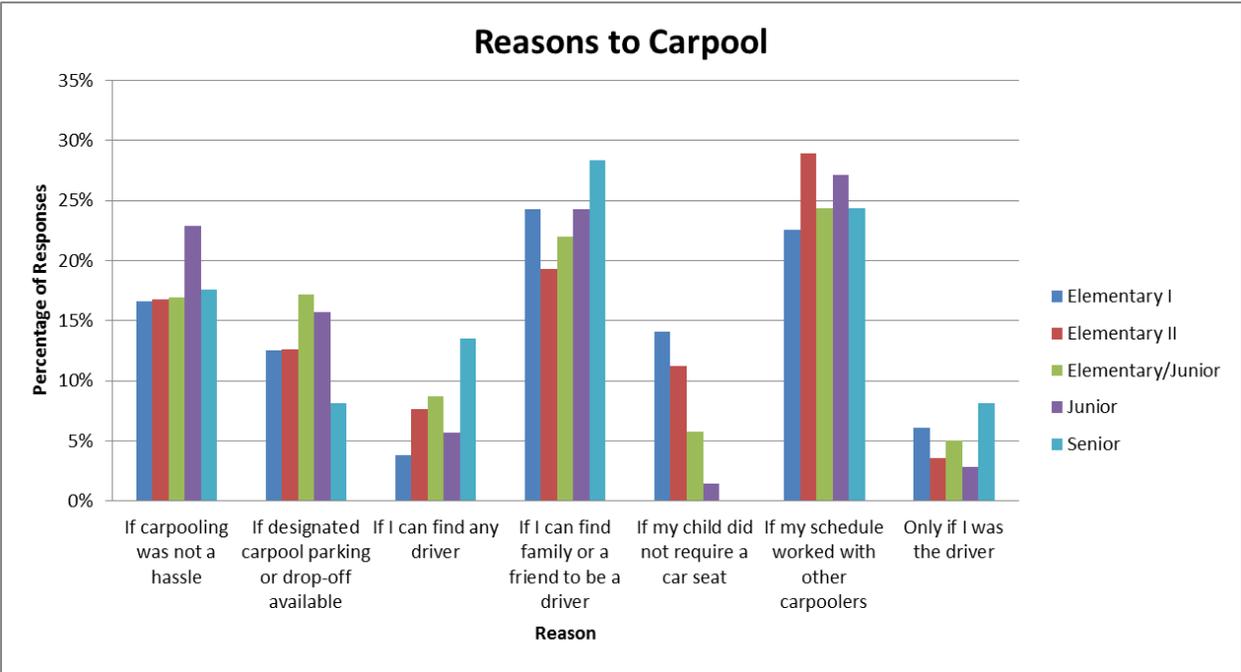
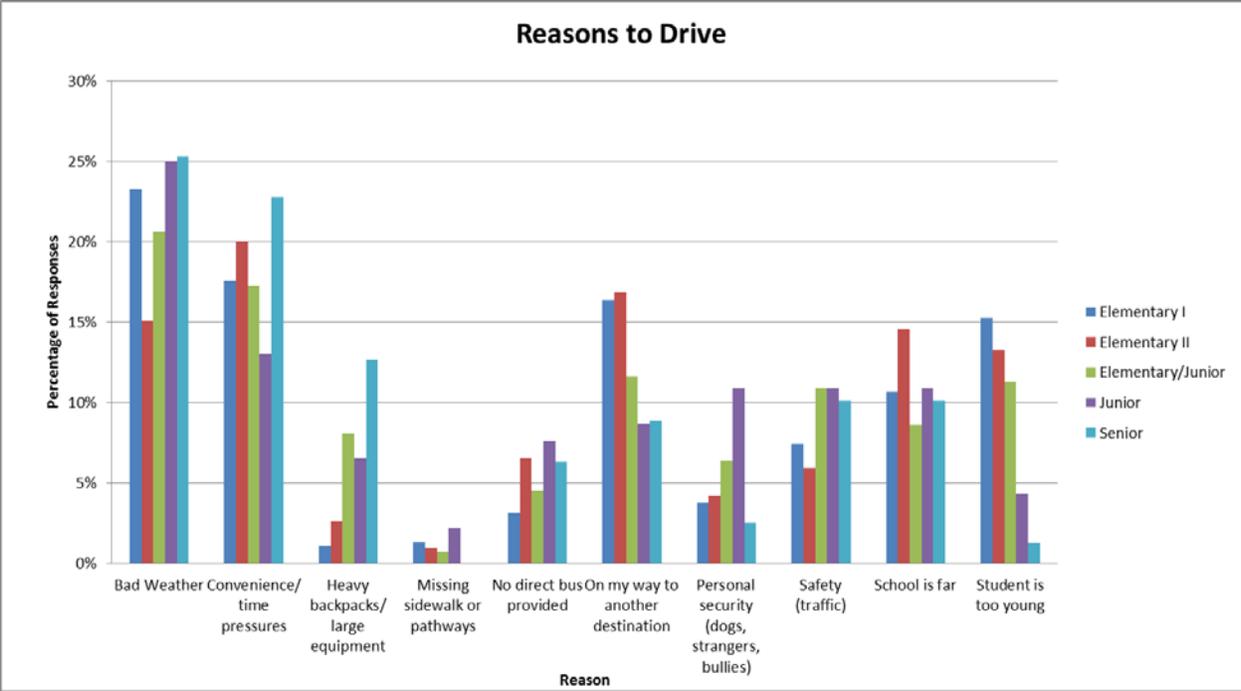


C. Barrier Identification

Based upon the results of the public engagement activities, the following barriers were identified by grade level that limited modal choice:







D. Common Best Practices Identified

Several “best practices” were identified through the course of this project and recommended to the City for implementation at all schools. These holistic measures are expected to provide

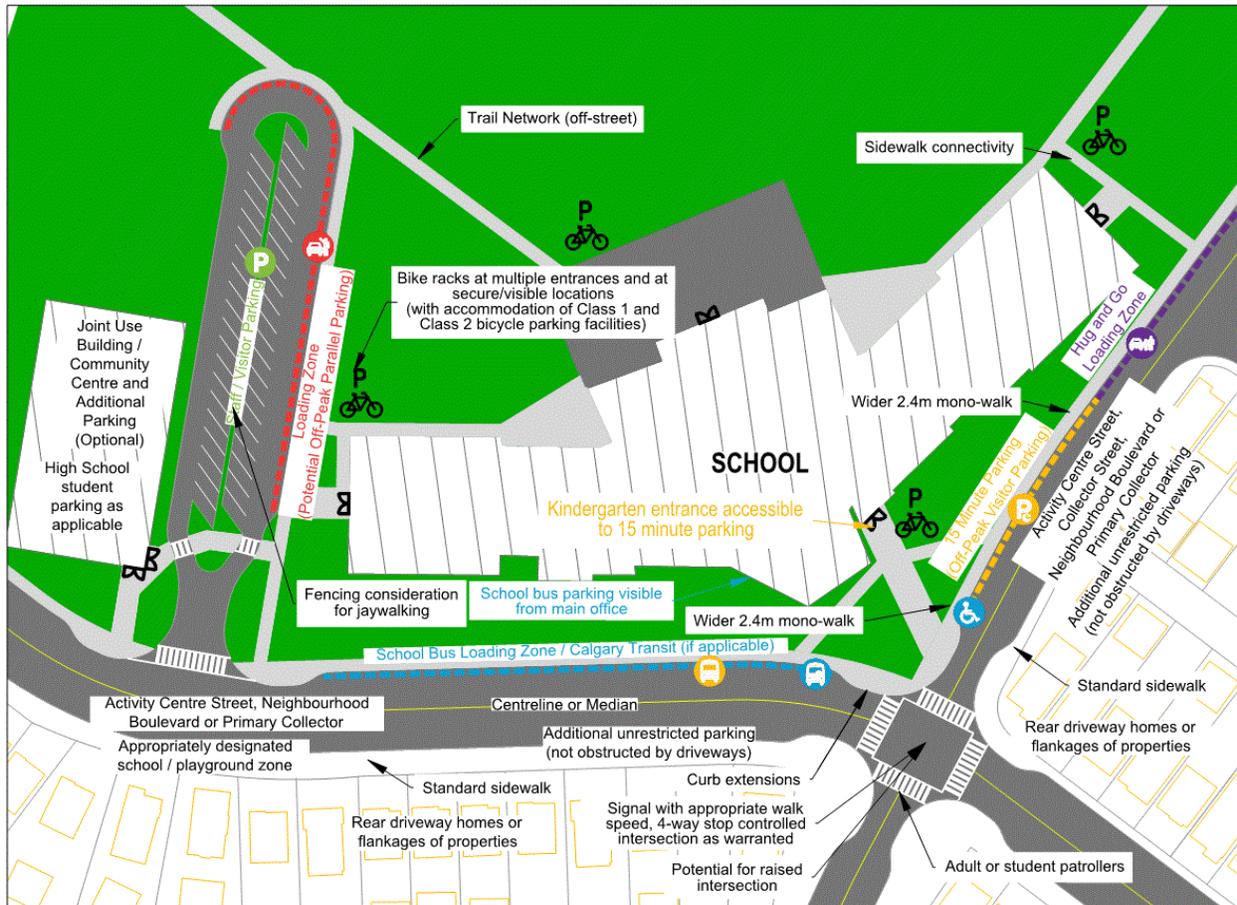
some level of traffic congestion easing regardless of site configuration or other specific characteristics of the school site. These “best practices” include:

- **Adult / Student Patrollers:** Current Alberta policies do not permit student patrollers at K-4 schools or lower. Student patrollers were observed as playing a critical role in supporting pedestrian and cyclist safety as well as mitigating traffic congestion on roadways. Student patrollers cluster pedestrians into larger groups and facilitate their crossing. At crosswalks with no student patrollers present, pedestrians often cross ‘at-will’ and individually, resulting in frustration among drivers unable to cross roadways due to the frequency of these pedestrian crossings. For schools K-4 or lower, the implementation of an adult patroller program is recommended. As an example, in the U.S., several municipalities use off-duty police officers to serve as adult patrollers around schools. The use of volunteer parents and school administration to serve as adult patrollers is specifically not recommended, as they may increase liability concerns for the school district unnecessarily, can be difficult to implement and manage volunteers, and can result in physical or verbal altercations between citizens.
- **Close off Staff Parking:** Parent pick-up / drop-off activities are not recommended for school staff parking lot areas unless a designated “Hug and Go” or pick-up and drop-off area is designated within the parking lot, as it results in students walking between vehicles as well as interacting with vehicles that are backing up and navigating the parking lot.
- **Coordinate Bell Times:** A common observation in Calgary was the placement of schools in close proximity to one another, both within the same school district as well as between school districts. However between school districts, limited coordination / interaction was noted with regards to the schools’ respective bell times. Coordinating bell times with an adequate gap in time reduced the demand placed on the roadways around each school site, and allows space to be shared between the two schools more effectively.
- **Coordinate Joint Use Shared Parking:** Many school sites within Calgary are Joint Use Sites, with a neighbouring community centre. In the site development stage, the two sites were planned jointly with the intent that parking lots and resources will be shared between the two uses so as to complement the other’s needs. However the governing joint use agreement lacks clarity in defining the sites facilities relative to each other, leaving interpretation of the site’s permitted and unpermitted uses in the hands of the site’s primary administrator (a community centre’s president and the school’s principal). By clarifying each site’s intended usage, both school and community centre are expected to function as intended at the development planning stage.
- **Bike Rack Placement:** A common observation at Calgary school sites was that while the number of bike racks was adequately provided on site, improvements could be made to the location and placement of the bike rack on site. In many instances, bike racks were placed far from school entrances, lowering the incentive for students to use them. While sidewalks and roadways were often cleared of snow during the winter months, bike racks areas remained under snow. In many instances, the bike rack area was used as a location to place shoveled snow. While cycling activity during the winter months is not expected to be significant, students were observed using cycling as a travel mode, and the needs of cyclists should be treated equally to pedestrians and roadway users. It was recommended that bike racks be located within a reasonable proximity to student entrances and winter maintenance be conducted as routinely as sidewalk clearing and roadway clearing.

- Completion of Residential Sidewalk Network: Particularly in older communities where older design criteria did not require sidewalks on both sides of the roadway or did not require sidewalks at all, it was recommended that sidewalks and crosswalks be retrofitted to provide active transportation connectivity throughout the school's surrounding area and catchment area.
- Connectivity to Bicycle Network: Opportunities to expand the bicycle network through the trail system should be explored, connecting bikeways into communities and in a manner that limits their interaction with vehicles and roadways. In-roadway bicycle networks may not be appropriate around school sites particularly due to the age and experience level of the child cyclist, parent perceptions around in-roadway cycling safety, vehicle traffic congestion around school sites during peak activity periods, and high volume of schools buses that occur during the peak activity periods. This recommendation proved to be somewhat controversial, as it creates a conflict between some of the principles of Complete Streets that recommends shared facilities and physical spaces, and some of the guiding principles around school site design that recommends limited interaction and maximized space between varying travel modes.
- Widen Sidewalks: School frontages were often observed within Calgary as conforming generally to a typical sidewalk width requirement, but during peak school periods, the high level of pedestrian activity resulted in pedestrian spillover onto adjoining green spaces and onto the roadway. The City's wider sidewalk standard ("mono-walk") of 2.4 metres was recommended along all school frontages to provide a more adequate sidewalk width for students and parents to use.
- Winter Maintenance: While roadways along school sites were generally well cleared during winter seasons, sidewalks and trails were not observed as receiving the same level of treatment. It was recommended that improved winter maintenance be carried out for all sidewalks and trails to the same level of attention as roadways to encourage their use.
- Review Available Public and School Transit Service: As necessary, considerations should be made for adjusting public transit and school transit routes and services based on the school catchment area and observed travel patterns. For Calgary schools without dedicated school transit service, the school district was encouraged to contact Calgary Transit to see if dedicated student-only services could be accommodated.
- Review Signal Timings Within Walking Distances of School: If signalized intersections are located within walking distance of the school, and the issue with drivers not stopping for pedestrians is occurring at that location, walk times for the traffic signal should be re-evaluated. Just as adjustments to appropriate walk speeds are made for the elderly, studies have shown children to have significantly slower walking speeds than adults, warranting a similar adjustment in and around schools.

E. Future School Site Design Concept

A potential school site design was developed bringing together elements of the varying common issues and solutions produced over the course of this project.



This ideal school outlines a new staff parking strategy that incorporates an active loading zone on site to shift some school-related activity off the public roadway network. The site also features:

- separated bus and vehicular activities,
- a trail network connection at the back of the school for cyclists,
- an integrated sidewalk network with adequate marked crosswalks and a wider mono-walk along the school's frontages,
- curb bump outs at the nearby intersection to reduce the physical crossing distance for pedestrians and to discourage vehicles from parking on or blocking crosswalks,
- short-term (15-minute) parking areas near the Kindergarten entrance, as parents were observed as preferring to walk their younger children to the school door rather than just letting them out on the sidewalk,
- rear-located driveways for the homes facing the school's frontages, as a way to reduce conflicts between homeowners and school-related vehicles parking on or blocking residential driveways,
- bike racks placed along expected active transportation facilities and generally near to one of the school entrances,
- adequate control measures at the nearby intersections to provide pedestrians and cyclists a safe crossing,
- potential classifications for the roadways serving as primary frontages for the school site,

- adult or student patrollers at the nearby intersection to facilitate pedestrian crossings, and
- a dedicated Hug and Zone loading area for facilitated loading and unloading of children from vehicles and to discourage unnecessary parking around school sides.

Part Three: Summary

The principal goal of both projects was to develop measures and/or methods to enable the creation of a safer environment in and around schools for young adults of all ages as it relates to transportation.

Both projects achieved this goal through the submission of comprehensive reports that provided recommendations in the form of interactive processes, tools and guidelines to address transportation safety and operations for use at existing school sites, and in developing school sites at new locations.

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