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School Safety Study for Phoenix Elementary, Lake Agassiz Elementary, and South Middle Schools

Final Report

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Prepared for:

**Grand Forks-East Grand Forks
Metropolitan Planning Organization**

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1.0 INTRODUCTION

The City of Grand Forks and the Grand Forks School District have seen an increase in safety concerns at area schools. The Advanced Traffic Analysis Center (ATAC) was contacted to conduct pedestrian safety and traffic circulation evaluations at three schools: Phoenix Elementary School, Lake Agassiz Elementary School, and South Middle School. These evaluations were conducted in coordination with a study by Ulteig Engineers, Inc., which looked at city-wide traffic control devices at schools.

2.0 OBJECTIVES

The main objectives are to evaluate pedestrian safety and traffic circulation at each of the three schools and provide short and long-term improvements. Areas of analysis include, traffic control (pavement markings, signage), pedestrian activity, parking issues, and pick-up/drop-off areas. Each school's existing conditions were documented based on site visits, so recommendations could be made regarding any potential improvements. As part of the evaluation process, site visits were conducted at Phoenix Elementary School and South Middle School to observe school dismissal and the resulting traffic/pedestrian movements.

The Lake Agassiz Elementary School is in the process of reviewing proposed construction plans and proposed changes to the parking facilities around the school. A request was made for ATAC to evaluate the plans proposed by ICON Architectural Group, and to make recommendations regarding any additional changes that could improve safety and traffic circulation. Due to the construction that will occur, ATAC did not observe the dismissal period at this school, as current issues will become irrelevant in the near future.

3.0 DESCRIPTION OF STUDY AREAS

This study will analyze the vehicle and pedestrian movements in and around the three schools. The following sections provide a description of the school locations and the surrounding areas. The criteria observed for each school include the roadway characteristics, traffic control and pavement markings, parking characteristics, and pedestrian activity.

3.1 Phoenix Elementary School

Phoenix Elementary School is located in a developed residential area near the downtown area. The school is bordered by 4th Ave. S. to the north, Belmont Rd. to the east, and Chestnut St. to the west (Figure 3.1). The school has an enrollment of approximately 210 students (kindergarten to 5th grade) and employs approximately 50 faculty and staff.

3.1.1 Roadway Characteristics

Phoenix Elementary School is bordered by roads on three sides, and has a small parking lot and driveway on the south side. Fourth Ave. S., which runs along the north side of the school, is a two-lane minor arterial road with an average daily traffic (ADT) of 4,050 vehicles (2005 traffic counts). Belmont Rd., which is located on the east side of the school, is also a two-lane minor arterial having an ADT of 4,200 vehicles. Chestnut St., located to the west of the school is a two-lane, northbound, one-way street with an ADT of 975 vehicles. A turn-out lane exists on the school's west side which serves as a loading/unloading zone. On the south side of the school, a small parking lot is reserved for parents/visitors and part-time teaching staff. This parking lot is primarily accessed from Belmont Rd., because the driveway at the west end of the parking lot becomes a one-way access to Chestnut St. A narrow alley is located directly south of the school, which provides limited access to the parking lot.

Posted speed limits around the school vary from 15 mph to 25 mph. Fourth Ave. S. has a posted speed limit of 25 mph, which is reduced to 15 mph at the intersection of 4th Ave. S. and Chestnut St. when an overhead flashing assembly is activated during school arrival and dismissal times. It should be noted that there is no posted speed limit for westbound traffic until the intersection of 4th Ave S. and Chestnut St., which is past the school. Belmont Rd. and Chestnut St. have speed limits of 25 mph which are reduced to 20 mph in the school zone.

On-street parking is not permitted on any road around the school. However, loading/unloading is allowed at certain areas. Parking is restricted along the north side of 4th Ave. S., but the south side (on the near side of the school) is designated as a loading/unloading zone. Similar restrictions are in place along Belmont Rd., with no parking permitted on the east side of the road. The west side of Belmont Rd. (next to the school) is signed as a loading/unloading zone. Parking on Chestnut St. is restricted on the west side, but there is a turn-out lane next to the school which is signed as a loading/unloading zone.

3.1.2 Traffic Control and Pavement Markings

The vicinity of Phoenix Elementary contains several types of traffic control devices. The intersection of 4th Ave. S. and Belmont Rd. is a signalized intersection. The intersection of 4th Ave. S. and Chestnut St. is controlled by a stop sign for the northbound traffic. The access to Chestnut St. via the one-way road from the parking lot on the south side of the school is also controlled by a stop sign. Additional traffic control adjacent to the school consists of a flashing overhead assembly on 4th Ave. S.

Several crosswalks are located adjacent to the school, all of which are delineated in some fashion. The crosswalks located at both intersections on 4th Ave. S. (Chestnut St. and Belmont Rd.) consist of transverse lines (continental). Crosswalks are delineated for all four approaches at the surrounding intersections. Two pedestrian crossing locations exist on the south side of the school at the intersections of the driveway and the sidewalks (on the east and west side) which are painted with two yellow lines. All of the crosswalks showed significant signs of wear.

3.1.3 Parking Characteristics

Two parking lots are located within the school area. A parking lot is located on the south side of the school, having a capacity of 16 vehicles (3 are reserved for handicapped parking). This parking lot is meant for short-term use by parents/visitors, and part-time faculty and staff. A parking lot also exists across 4th Ave. S., to the north of the school, which provides parking for all full-time faculty and staff (approximately 50).

3.1.4 Pedestrian Activity

Students at Phoenix Elementary School are dismissed primarily on the east side of the school (into the playground) and to the south parking lot. School staff serve as crossing guards at all four corners of the school during dismissal, by monitoring vehicle and pedestrian interactions at these locations.



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Phoenix Elementary: Existing Conditions

Figure 3.1

3.2 South Middle School

South Middle School is located in the southern part of Grand Forks, which is currently under development (Figure 3.2). The school is located on the south side of 47th Ave. S. and the east side of 20th St. S. Approximately 550 students are currently enrolled in 6th grade through 8th grade, and 106 faculty and staff are employed at South Middle School.

The school is bordered by Grand Forks Parks Department property, with a baseball complex to the west and soccer fields to the south. In addition, a parking lot and garages are located to the west of the school (across 20th St. S.) which is owned by the Grand Forks Parks Department.

3.2.1 Roadway Characteristics

Forty-Seventh Ave. S., which is the only roadway providing access to the school, is a two-lane minor arterial road with an ADT of 3,300 vehicles (2005 traffic counts). Access is provided to 47th Ave. S. via 20th St. S. Two driveways serve the school: one provides access to a parking lot on the north side of the school, and the second provides access to a parking lot on the south side of the school. Between the two driveways is a northbound, one-way frontage road.

Traffic circulation on the south side of the school occurs primarily around the parking lot. Upon entering the south parking lot, vehicles are directed in a counter-clockwise direction. The driveway access is a 2-way road, with exiting vehicles having the option to go northbound on the frontage road or 20th St. S.

The parking lot on the north side of the school can be accessed from 20th St. S. and the northbound frontage road. Two-way traffic flow is allowed in the north parking lot until vehicles reach the northeast corner. At this location, it becomes a one way (two lanes) out to 47th Ave. S.

The only speed limits posted in the vicinity of the school are on 47th Ave. S., which is posted at 40 mph. It should be noted that there are no speed limit signs on 20th St. S. Eastbound traffic speeds are reduced to 15 mph via a flashing school crosswalk/speed limit sign assembly at the intersection of 47th Ave. S. and 20th St. S. Immediately past the intersection, there is a 20 mph speed limit sign (when children are present). Once past the northeast approach, which exits from the north parking lot, there is a 40 mph speed limit sign. Westbound traffic is reduced from 40 mph to 20 mph at the northeast approach (when children are present), and reduced to 15 mph at the intersection of 47th Ave S. and 20th St. S. via a flashing assembly.

3.2.2 Traffic Control and Pavement Markings

Intersections in and around school grounds are primarily controlled by stop signs. Traffic on 47th Ave. S. has the right-of-way, and all entering approaches have stop

signs. The intersection at the southwest corner of the north parking lot is a two-way stop, having south/north vehicles yielding to east/west traffic. Westbound traffic exiting the north parking lot has a stop sign at 20th St. S. The traffic exiting the south parking lot has two stop signs, one at the frontage road and one at 20th St. S.

Eight crosswalks are located around the school, however, the type of delineation varies significantly. Most of the crosswalks are in good condition, except for the one located at the entrance to the south parking lot. Pavement markings are also used on the near-side curb around the school, which is painted red. The paint condition is good for the most part, but there are a couple of locations where the paint has faded or flaked off.

3.2.3 Parking Characteristics

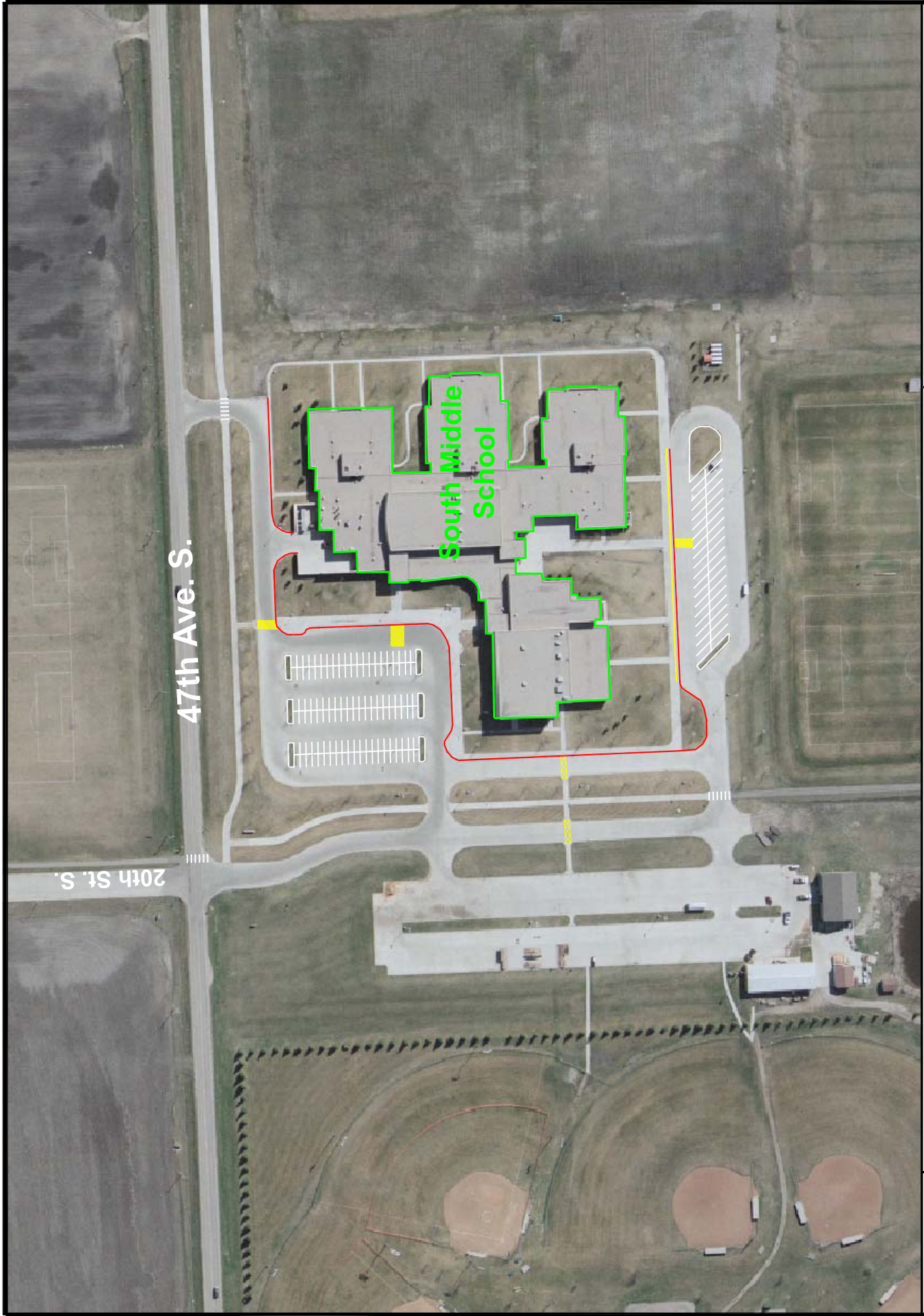
Three large parking lots are in the vicinity of the school. However, only two are located on school property. The parking lot on the north side of the school is used primarily for faculty and staff parking with a few stalls signed for visitors. The north parking lot is typically three-fourths full, with the remaining stalls being used during dismissal by parents picking up children.

The south parking lot utilizes diagonal parking and a median which directs traffic into a counter-clockwise direction. This parking lot is generally half full during dismissal and is used primarily by parents picking up children. There is no parking allowed around the perimeter of the parking lot. It should be noted that the parking stalls are aligned against the flow of traffic in this parking lot.

Curb-side parking is generally prohibited along the near side of the school. With the exception of two signs, the entire curb along the school is signed as a fire lane, with no parking permitted. The two signs referred to are 'loading zone' signs located at the southwest corner, and northeast corner of the north parking lot.

3.2.4 Pedestrian Activity

Students are dismissed from the main entrance into the north parking lot, and to the south into the south parking lot. Teachers serve as crossing guards/monitors at both locations to direct children safely into the parking lots.



3.3 Lake Agassiz Elementary School

Lake Agassiz Elementary School is located in the northwest quadrant of the intersection of 6th Ave. N. and Stanford Rd. (Figure 3.3). Approximately 350 students are enrolled in grades 1-5 and approximately 80 faculty/staff are employed at the school. The school is bordered to the west and the north by a park/playground facility. There are two other roadways providing access to the school, which are 7th Ave. N. to the east, and State St. to the south.

3.3.1 Roadway Characteristics

Sixth Ave. N. has an ADT of 5,900 vehicles, while Stanford Rd. has an ADT of 4,600 vehicles (both are classified as collector roadways). Seventh Ave. N. and State St., which has an ADT of 1,775 vehicles, are both classified as local roads.

The school has several access points. One access is available to Stanford Rd., adjacent to the 7th Ave. N. approach on the north side of the school. Three access points exist on the south side of the school.

The posted speed limit for 6th Ave. N. is 25 mph. Vehicle speeds approaching from the east and west are reduced to 15 mph via an overhead flashing assembly at the intersection of 6th Ave. N. and State St. The speed limit for Stanford Rd. is 25 mph, except for the intersection with 7th Ave. N., where it is reduced to 15 mph via overhead flashing assemblies in both directions.

3.3.2 Traffic Control and Pavement Markings

All of the intersections around the school are controlled by stop signs. The intersection of 6th Ave. N. and Stanford Rd. is an all-way-stop controlled intersection, and the two local roads (State St. and 7th Ave. N.) are one-way stop controlled intersections with vehicles yielding to traffic on 6th Ave. N. and Stanford Rd., respectively.

Crosswalks are located at each intersection adjacent to the school. All of the crosswalk markings are in fairly good condition, and include reminders for children to look both ways before crossing the street. Sidewalk markings, which consist of two yellow lines, cross the driveways to the parking lots on the south side of the school.

3.3.3 Parking Characteristics

Three parking lots are located around Lake Agassiz Elementary School: one on the north, and two on the south. The parking lot on the north side of the school is for staff, and has one driveway accessing Stanford Rd. The southeast parking lot is signed for staff only and has one driveway which provides an outlet to 6th Ave. N., just west of the intersection with Stanford Rd. The southwest parking lot is used primarily for the Head Start facility, which is located in the west part of the building. This parking lot has two driveways which both access 6th Ave. N. The east approach is adjacent to State St., and serves as the entry point to the parking lot. The west driveway is dedicated as a

parking lot exit, so traffic flows in a counter-clockwise direction. In addition, the southwest parking lot serves as the bus loading area for the school.

Parking is prohibited on both sides of 6th Ave. N. in the vicinity of the school, but is permitted on the south side of 6th Ave. N., across from the park (except for Thurs 8AM-4PM). Parking on Stanford Rd. is prohibited, but the west side (adjacent to the school) is signed as a loading/unloading zone.

3.3.4 Pedestrian Activity

Students at Lake Agassiz Elementary School are dismissed out the main doors to the east. There are two to four school staff members who serve as crossing guards at the intersection of 6th Ave. N. and Stanford Rd., as well as the crossing at State St.

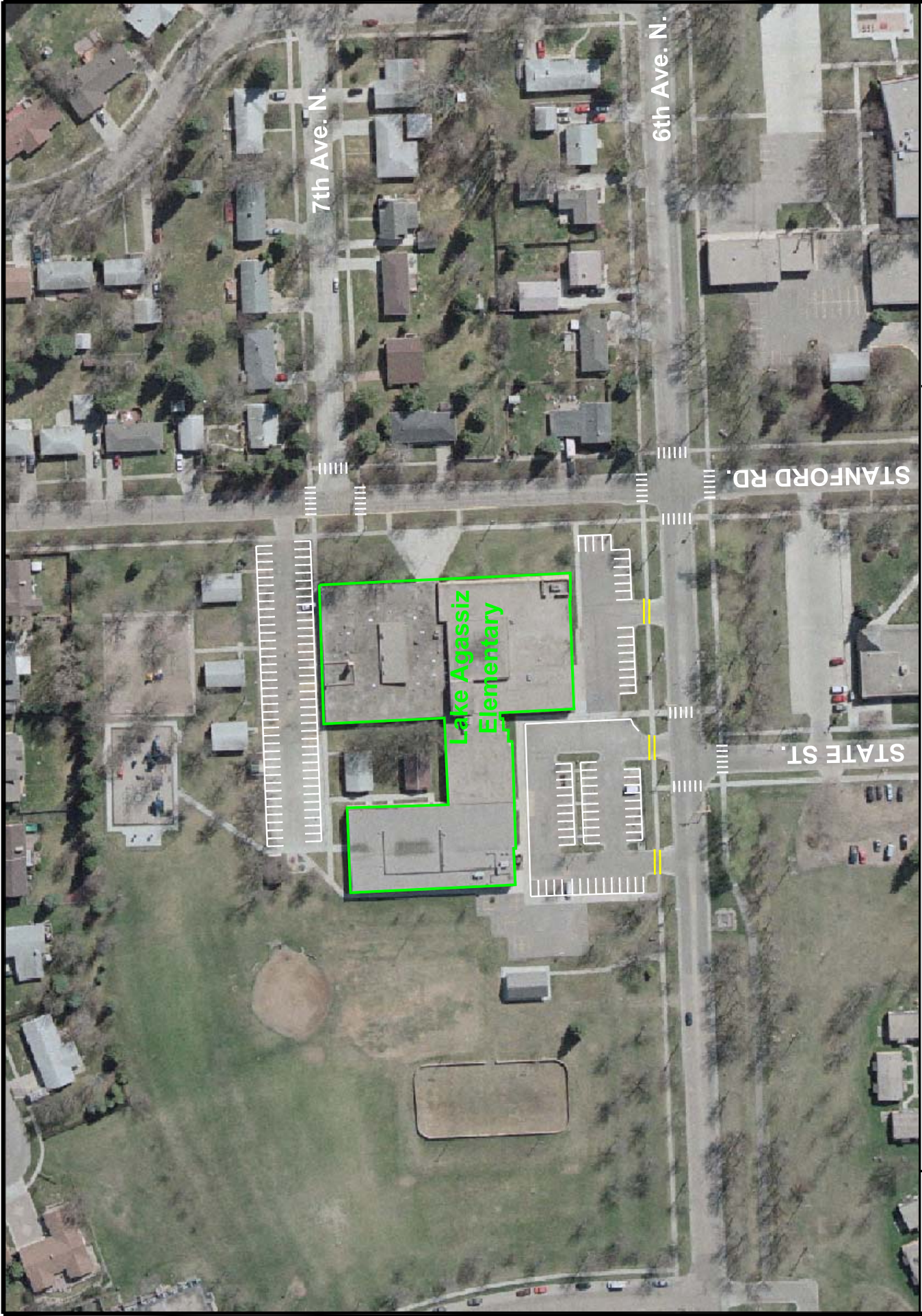


Figure 3.3

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4.0 OPERATIONAL CHARACTERISTICS

This section discusses the operational characteristics observed at Phoenix Elementary School, South Middle School, and Lake Agassiz Elementary School. On February 7, 2008, ATAC staff conducted site visits at the schools to document existing signs, pavement markings, and roadway and parking characteristics. In addition, ATAC staff monitored the school dismissal process at Phoenix Elementary School and South Middle School to observe the dismissal procedure, vehicle parking characteristics, pedestrian/vehicle interactions, and potential safety issues. The following sections will discuss the characteristics of each school and the preliminary observations that were noted.

4.1 Phoenix Elementary School

Since students are dismissed primarily to the east of the school (into the playground), parents were observed parking on the west side of Belmont Rd., and in the south parking lot. The parking lot was full approximately 15 minutes prior to dismissal, with vehicles also parking on the south side of the lot (Figure 4.1). In addition, several vehicles were parked on Belmont Rd. adjacent to the school grounds on either side of the parking lot driveway (Figure 4.2).



Figure 4.1. South Parking Lot Prior to Dismissal



Figure 4.2. Parking on Belmont Rd. Prior to Dismissal

Traffic flow through the south parking lot was impeded due to the number of vehicles parked, and the congestion at the west end of the parking lot which narrows to only one exiting lane (Figures 4.3 – 4.5). A school staff member monitored the parking lot driveway/sidewalk area, which was extremely beneficial in providing a level of safety for the students crossing the driveway.



Figure 4.3. South Parking Lot During Dismissal



Figure 4.4. Vehicles Entering the South Parking Lot



Figure 4.5. Vehicles Entering the South Parking Lot

In addition to the congestion observed in the south parking lot, the vehicles parked along Belmont Rd. created a potential safety issue with passing vehicles. Parents parking on the side of the road impeded traffic when walking back to their vehicles after picking up their children, as illustrated in Figures 4.6 and 4.7. Traffic speeds, particularly on Belmont Rd., appeared to be much slower than the posted speed limit due to the vehicles parked on the west side of the road and entering the parking lot.



Figure 4.6. Pedestrian Traffic on Belmont Rd.



Figure 4.7. Vehicles Parked on Belmont Rd.

Several vehicles were parked on the west side of the school in the turnout area of Chestnut St. There were no observed issues with parking at this location; however, all of the vehicles exiting the parking lot were channeled to the north due to the one-way designation of Chestnut St. No students were dismissed from the north side of the school; however, two vehicles were observed parking along the south side of 4th Ave. S. One of the vehicles was a handicapped bus, and the other was a preschool/head-start bus. Both of these vehicles impeded vehicles traveling eastbound, which also had an impact on westbound vehicles (Figure 4.8).



Figure 4.8. Parking on 4th Ave. S.

Several students were also observed using the crossing at the intersection of 4th Ave. S. and Chestnut St. A school staff member monitored the crossings on both roadways, which helped to ensure student safety at this location. Vehicle speeds along 4th Ave. S. and Chestnut St. appeared to be at the posted speed limit.

4.2 South Middle School

Students at South Middle School were dismissed from two locations: 1) the main entrance on the north side of the school (into the north parking lot), and 2) the south side of the school into the south parking lot. Dismissing students to two distinct locations helps to expedite the dismissal process, and serves to alleviate potential congestion due to parents picking up children.

The dismissal process on the south side of the school was efficient, and no obvious issues were observed. Parents parked in the parking spaces facing the school while waiting to pick up students. Once students were picked up, the vehicles departed using the south entrance to 20th St. The south parking lot was approximately half full during dismissal, and no issues were observed with either vehicle parking or movement through the parking lot (Figure 4.9).



Figure 4.9. Vehicles Parked in the South Parking Lot

The north side of the south parking lot also serves as a bus loading zone. A total of five large busses parked along the north curb where students were loaded. Due to its location, the crosswalk that enters the parking lot was located between two busses. Two staff members were present at the south side of the school, to direct students to their designated bus and monitor the students using the crosswalk into the parking lot (Figure 4.10).



Figure 4.10. Pedestrian Crossing in the South Parking Lot

The operational characteristics of the north parking lot were also observed. This lot was found to be somewhat deficient in comparison to the south parking lot. Parents were observed parking in the loading zone/fire lane along the near-side curb (Figure 4.11), and on the north edge of the north parking lot (Figure 4.12) approximately 15 minutes before school was dismissed.



Figure 4.11. Parking Prior to Dismissal in the North Parking Lot



Figure 4.12. Parking on the North Side of the North Parking Lot

During school dismissal, vehicles were parked three-abreast in the driveway/fire lane in front of the main entrance (Figure 4.13). Other popular parking locations included both

sides of the frontage road to the west (Figure 4.14), and in the aisles of the parking lot (Figure 4.15).



Figure 4.13. Vehicle Parking at the Main Entrance



Figure 4.14. Vehicles Parked on the Frontage Road



Figure 4.15. Vehicles Parking in the Parking Lot Aisles

4.3 Lake Agassiz Elementary School

The dismissal process at Lake Agassiz Elementary School was not observed due to impending changes of the school facilities, but characteristics of the surrounding area were documented to determine if any additional changes may improve pedestrian safety and traffic circulation. The recommendations on the proposed changes will be discussed in the following section.

5.0 IMPROVEMENT STRATEGIES

To improve safety around the schools, three main criteria need to be addressed: education, enforcement, and engineering enhancements. Based on previous experience, a critical aspect is educating both pedestrians (school children) and drivers (parents) on practicing safety and awareness in and around school property. Enforcement strategies primarily use a police presence to deter unsafe driving behavior. Engineering enhancements assist in improving the safety and efficiency of pedestrian and vehicle traffic, and provide a means of organizing the operational characteristics at schools. A combination of education, enforcement, and engineering enhancements is essential for long-lasting school safety.

Educational strategies for improving safety around schools need to be focused on both students and parents. Students need to be informed of safe practices when crossing streets and parking lots. However, the majority of the education needs to be directed at the parents who pick up/drop off children. It may be beneficial to discuss the issues with parents during parent-teacher meetings. Parents need to be aware of the issues observed at the schools, as well as the traffic control devices which are implemented as a result of this study.

The enforcement strategies should place an emphasis on communication with parents when issues are observed. If recurring issues occur, requests can be made to law enforcement officials. Although it may be difficult for police to provide an increased presence, they will at least be made aware of the issues. All of the schools which were included in this study have been taking a pro-active approach to enforcement and safety awareness through the implementation of crossing guards/monitors. The continuation of this practice is highly recommended as it provides additional awareness to drivers during school dismissal. It is also advised that staff members monitoring the crossings wear fluorescent safety vests to improve visibility.

Engineering enhancements include the pavement markings, traffic control signs, and geometrical changes which can be implemented at each of the schools. Although education and enforcement strategies are important, the recommendations provided in this study focus on engineering enhancements.

Based on data collected during the initial meeting with the project's stakeholders and subsequent site visits, ATAC staff has developed improvement strategies for each of the schools in this study. The improvement strategies can be categorized into two groups: short/medium-term improvements and long-term improvements. In addition, the recommended improvements for each school coincide with a study completed by Ulteig Engineers, Inc., which looked at the application of school traffic control strategies (pavement markings, traffic control signs, and flashing beacons) for the City of Grand Forks.

The Grand Forks School Traffic Control Device Strategy Study, completed by Ulteig Engineers, Inc., contained several recommendations for improving pavement markings, traffic control signs, and flashing beacons around school locations [1]. The following

recommended changes, which are in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) 2003 Edition, apply to at least one of the three schools [2]:

- Pavement Markings
 - The major street should only be crossed once and the minor street may be crossed once or twice.
 - Existing crossings will have to be analyzed based on the ADT of the roadway and the number of pedestrians using the crossing.
- Traffic Control Signs
 - All 15 mph school speed limit signs located within a 20 mph school speed limit zone must be removed.
 - Out-dated School Crossing signs need to be replaced (by 2011).
 - School Crosswalk Warning Assembly must be used in conjunction with a School Advance Warning Assembly.
 - Speed limit signs should be used to indicate the end of a school speed limit zone.
- Flashing Beacons
 - All existing flashing beacons should be analyzed to determine if they are warranted based on several pre-determined factors.

In addition to the changes recommended by the Ulteig study, several other issues were observed related to the traffic control devices at each of the three schools. The main issue was not having consistency among the types of signs being used (parking, speed limits, pedestrian crossings). In some cases, no speed limit signs were posted to designate either the start or end of the school speed limit zone. Also, several instances occurred in which a crosswalk was marked without the use of a sign.

The following sections will discuss the characteristics of each school along with proposed recommendations. The short/medium-term recommendations will discuss proposed changes to the signage and pavement markings at each of the schools. The long-term recommendation will provide geometric enhancements to improve the operations at each school. Approximate cost data for each of the alternatives will also be provided. The cost estimates were taken from the *RS Means Building and Construction Cost Data Book* [3].

5.1 Phoenix Elementary School

In addition to maintaining compliance with the Grand Forks School Traffic Control Device Strategy Study, several recommendations were made based on discussions with city and school officials, as well as observations made during site visits.

5.1.1 Short/Medium-Term Strategies

A few issues were observed at the intersection of 4th Ave. S. and Belmont Rd. The 'WALK' indication on the signal is green (Figure 5.1). According to the 2003 MUTCD, the pedestrian 'WALK' indication should be white. In addition, the 'No Turn On Red'

sign is significantly faded. Also, this type of sign is no longer used in the current edition of the MUTCD. The updated sign is shown in Figure 5.2.



Figure 5.1. Green 'WALK' Indication/Faded Sign at 4th Ave. S. and Belmont Rd.



Figure 5.2. Sign Change Recommendation at 4th Ave. S. and Belmont Rd.

A site obstruction was observed at the exit of the south parking lot when turning on to Chestnut St. (Figure 5.3). There is a fence and shrub on the property to the south of the driveway which extends to the sidewalk. This obstructs the view of oncoming vehicles and pedestrians, and vehicles exiting the parking lot need to pull onto the crosswalk to see oncoming traffic. A short-term improvement would be to remove or lower the fence/bush to improve the sight distance at this intersection.



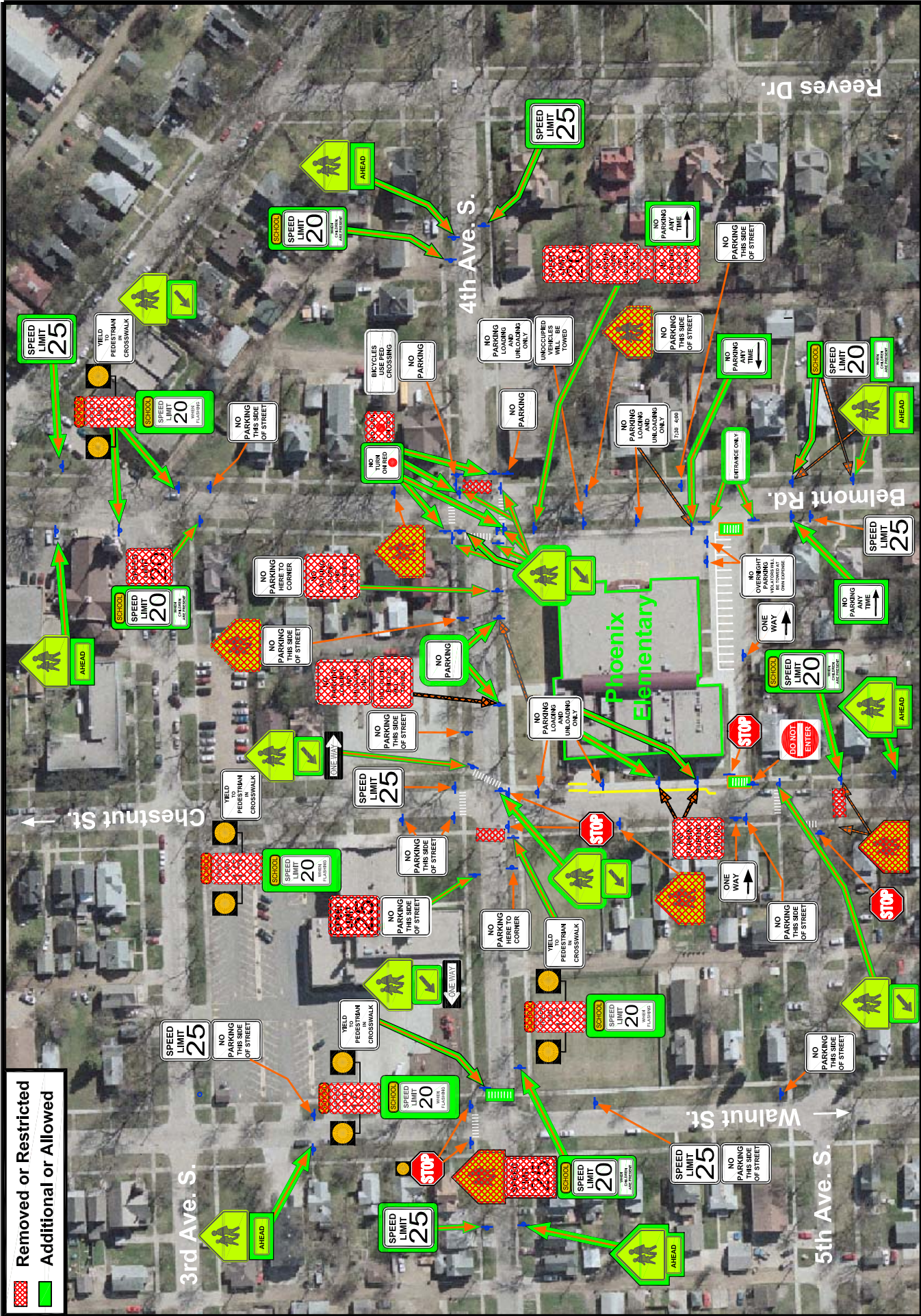
Figure 5.3. Sight Obstruction at the West Exit of the South Parking Lot

Several signs in proximity to the school need to be removed/replaced, as shown in Figure 5.4. The main focus of the sign analysis involved school speed limit zones, advanced school warning assemblies, school crosswalk assemblies, and parking/no parking zones.

The correct orientation/placement of school warning signs, speed limit signs, and school crosswalk warning signs in relation to each other are illustrated in Figure 7B-3 in the 2003 MUTCD. The specified sign sequence is as follows:

1. Advanced warning assembly
2. School speed limit
3. School crossing assembly
4. End school zone/standard speed limit sign

A few issues were observed with the 'No Parking' signs around the school, and suggested changes can be seen in Figure 5.4. The current 'loading and unloading' zone on the south side of 4th Ave. S. should be removed, and all daycare/handicapped busses should pick up students on Chestnut St. to the west of the school. This will eliminate any potential safety issues with traffic blockage on 4th Ave. S. and will better utilize the loading/unloading facilities on the west side of the school. In addition, an effort should be made to ensure that the sign posts are straight and the heights are uniform. According to the *RS Means Building and Construction Cost Data Book, 66th Edition*, the approximate cost for updating the signs around Phoenix Elementary School is \$3,500.00.



Removed or Restricted
 Additional or Allowed

5.1.2 Long-Term Strategies

Due to its location, the options for making geometric changes at the school are relatively limited. Three proposed changes were developed to help improve the operational characteristics at Phoenix Elementary School (Figure 5.5). The first change would be to add a turn-out lane on the west side of Belmont Rd. (adjacent to the school). This would provide a safer parking option for parents during the dismissal period, and help to reduce blockage of passing vehicles. The second proposed change adjusts the angle of the parking in the south parking lot from 90° to 60°. This would encourage a one-way flow in the parking lot, and improve the sight of drivers when backing out. The final geometric proposal is to add an additional lane exiting the south parking lot to the west (Chestnut St.), and create a double-right-turn at the intersection. Due to the one-way operation of Chestnut St. it may be difficult for vehicles to exit the south parking lot. However, a two-way operation could improve traffic flow exiting the school. The cost estimates for the long-term strategies at Phoenix Elementary School are illustrated in the following table:

Table 5.1. Cost Estimates for Long-Term Strategies

Turn-out Lane on Belmont Rd.	
Asphalt	\$8,800
Concrete	\$13,200
Parking Lot Extension	
Asphalt	\$27,000
Concrete	\$31,400



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Figure 5.5



5.2 South Middle School

Similar to Phoenix Elementary School, several issues were observed during school dismissal. The issues observed were primarily located in the north parking lot, and were a result of the high number of vehicles at that location. The following sections will discuss the proposed changes.

5.2.1 Short/Medium-Term Strategies

Based on discussions with school administrators at South Middle School, it was noted that several pro-active attempts are being made to alleviate the congestion and safety issues in the north parking lot of the school. During the first week of classes, the South Middle School Parent-Teacher Organization and the Safe Kids Coalition of Grand Forks directed traffic during arrival and dismissal times. In addition, a letter was sent by the school to all of the parents which specified the following:

- Do not park on crosswalks,
- Maintain one line of cars along the curb in front of the main entrance,
- Encouraged parents to use the south parking lot due to the 'ample space' provided

The site visit observed that a majority of the issues caused at dismissal are a result of parents picking up children, and performing the issues identified in the instructional letter sent to them by the school. One possible solution to the congestion problem in the north parking lot is to dismiss 6th grade to the north parking lot, and 7th and 8th grade to the south parking lot. Also, any 6th grade siblings of 7th or 8th grade students should also be dismissed to the south. This should force more parents to use the south parking lot, which would improve the operation of the north parking lot.

Several changes to traffic control signs and pavement markings are recommended, as shown in Figure 5.6. As with the other two schools in this study, an effort should be made to increase the uniformity of the signage and pavement markings used at South Middle School. Two types of 'No Parking' signs are used in the vicinity of the main entrance which could potentially be confusing to parents. Also, speed limits and school warning/crossing signs need to be added/changed along 47th Ave. S. to meet compliance with the 2003 MUTCD.

Three different types of crosswalk delineation are used at South Middle School (Figure 5.7). It is recommended that these be changed to reflect uniform markings throughout school grounds. This will also help to reduce any driver confusion in regard to the validity of the crossings.

The approximate cost for updating the signs and pavement markings is \$1,400.00. The cost for the sign updates is estimated at \$1,100.00, and the cost for the pavement marking updates (in the south parking lot) is estimated at \$300.00.

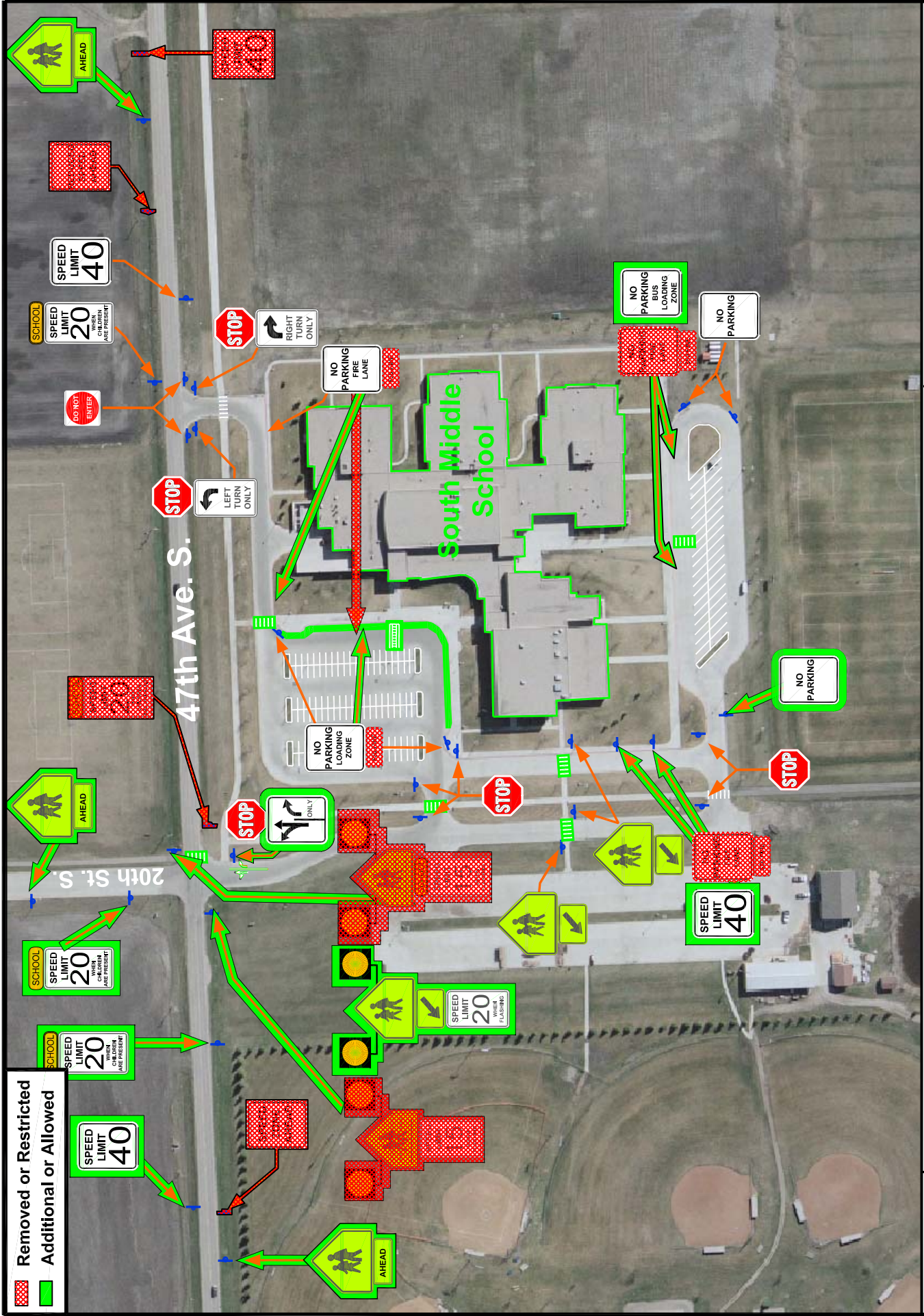




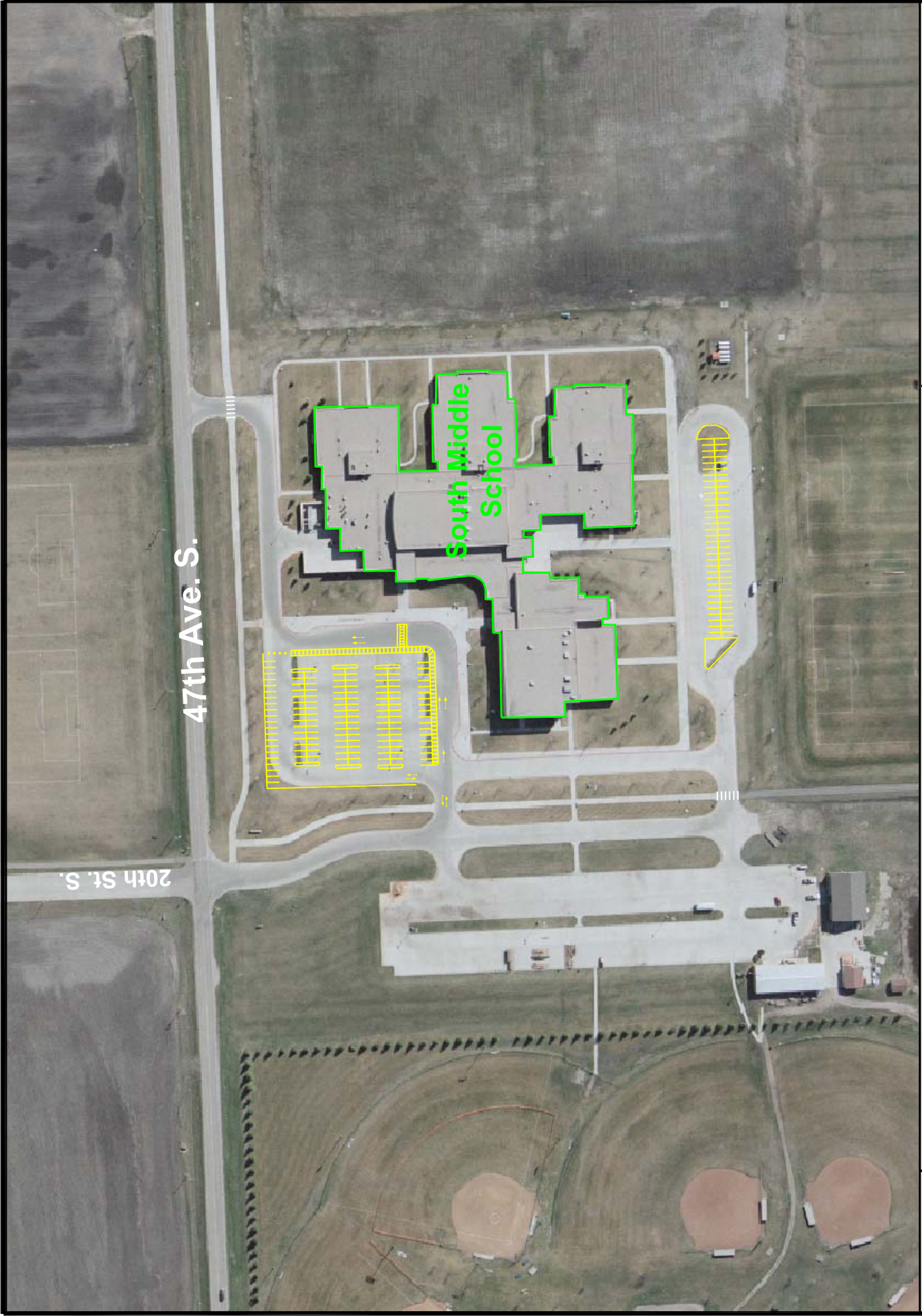
Figure 5.7. Crosswalk Markings at South Elementary School

5.2.2 Long-Term Strategies

Possible geometrical enhancements to South Middle School primarily relate to traffic circulation and pedestrian crossing (Figure 5.8). The first option is to add a curb/border and sidewalk to the north parking lot to channelize traffic flow. In addition, a raised crosswalk could be added to provide a more visible crossing into the parking lot, and discourage parking on the crosswalk. This will potentially increase the number of parents willing to park in the parking lot, after which they can exit to the west. Bollards can be placed at the northeast corner of the parking lot which can be removed during special events or snow removal. The third option is to re-paint the south parking lot so drivers can access the parking stalls easier, but still maintain the channelized flow around the parking lot. The costs for the long term strategies at South Middle School are illustrated in Table 5.2.

Table 5.2. Cost Estimates for Long-Term Strategies

North Parking Lot	
Asphalt	\$24,800
Concrete	\$29,300
South Parking Lot	
Asphalt	\$9,200
Concrete	\$12,400



20th St. S.

47th Ave. S.

South Middle School



5.3 Lake Agassiz Elementary School

Although a site visit was not conducted at Lake Agassiz Elementary School, data were collected regarding the existing traffic control signs, pavement markings and geometrical characteristics in and around school grounds. As with the other two schools in this study, several changes are recommended regarding school warning signs, speed limits, and parking/no parking signs (Figure 5.9). The estimated cost for updating the signs around Lake Agassiz Elementary School is \$1,600.00.

ATAC was requested to review proposed geometrical enhancements to Lake Agassiz Elementary School. The changes were proposed by ICON Architectural Group, and include removing a majority of the parking in the south lots, and replacing them with a one-way bus lane spanning the length of the school. In addition, a two-lane access road is proposed for the west side of the school with a curb-side parking lane along the school. This strategy provides off-street parking, and provides better traffic circulation around the school. The final addition is the expansion of the north parking lot from approximately 64 parking spaces to 109 parking spaces.

City and school officials expressed some concerns about the proposed design during the initial stakeholder meeting, primarily due to the driveway access on 6th Ave. N. Information was provided by the City of Grand Forks on access control road classification and access control specifications. The road classification of 6th Ave. N. is specified as having Level 5 access controls, which means that access points (driveways) must be spaced at a distance of 150 feet. In addition, access to 6th Ave. N. is restricted within 300 feet of an intersection. According to the city specifications, the design proposed by ICON Architectural Group is not in compliance due to the driveway access of the bus lane. The entrance, which is at the existing driveway of the southeast parking lot, no longer meets criteria specified by the access control guidelines as it is well within the 300 foot distance. The exit of the one-way bus lane is on the southwest side of the parking lot, but is located approximately 20 feet from the driveway of the proposed access road along the west side of the school.

After reviewing the changes proposed by ICON Architectural Group and the city specifications regarding access control, ATAC has provided some design alternatives to maintain compliance with city codes as well as efficient traffic flow around the school.

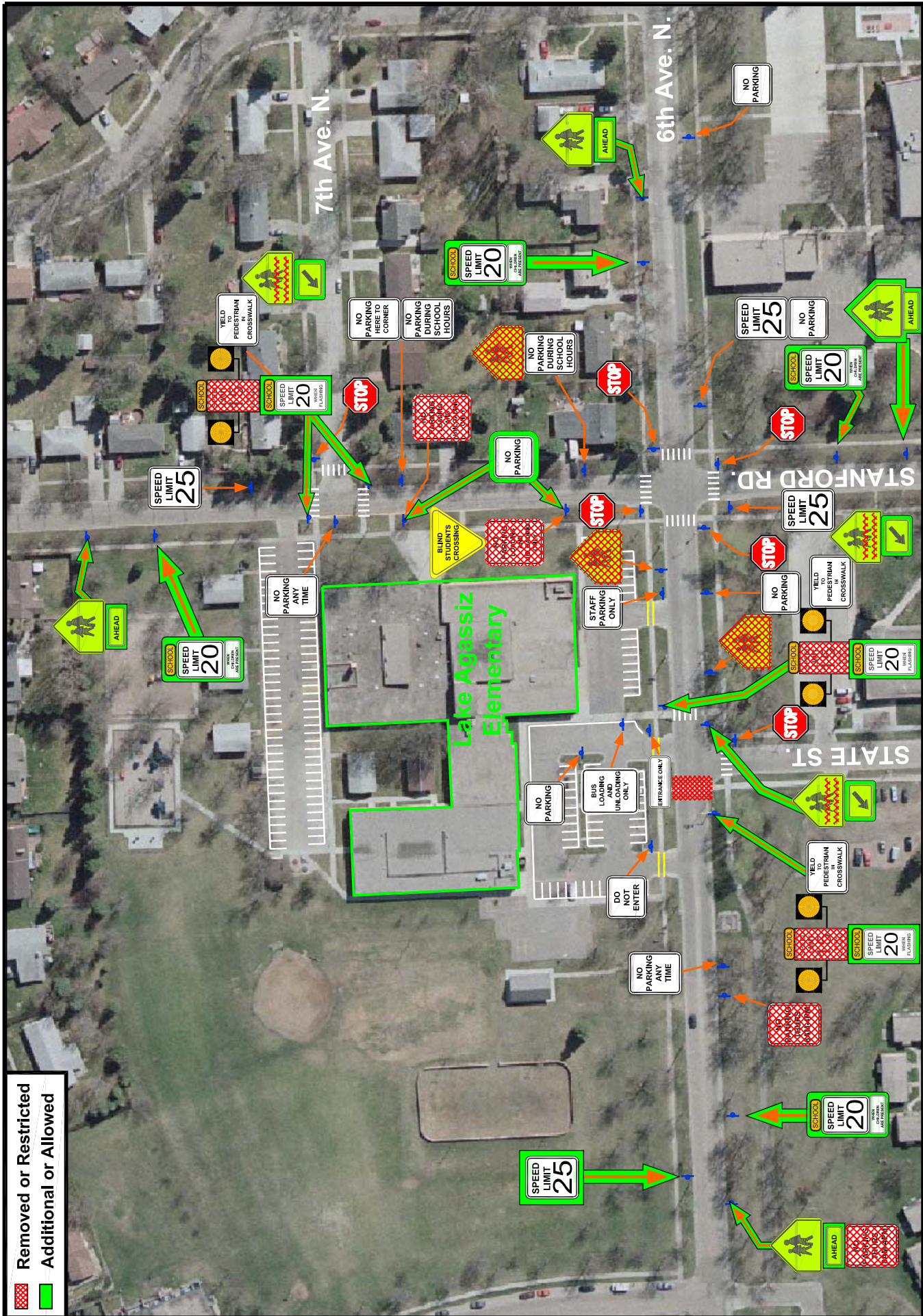
The first change reduces the size of the bus lane, moves the driveway farther away from the intersection of 6th Ave. N. and Stanford Rd., and joins the bus lane with the access road to the west (Figure 5.10). Also, the access road is changed to a northbound one-way to reduce any potential vehicle conflicts. A turn-out lane is also added to Stanford Rd. on the near side of the school to provide a safer loading and unloading zone for students. The approximate cost of this alternative is \$67,200 (using asphalt), and \$88,300 (using concrete).

A second alternative is removing the bus lane on the south side of the school, since a loading zone is already provided along the access road (Figure 5.11). The southeast parking lot is also removed, but the capacity of the southwest parking lot is increased.

Again, a turn-out lane is added to Stanford Rd. The cost of this alternative is estimated at \$45,900 (using asphalt), and \$56,400 (using concrete).

The third alternative joins both of the south parking lots and removes the east driveway to be in compliance with the city specifications (Figure 5.12). A turn-out lane is also added to Stanford Rd. This option provides the most parking capacity while still maintaining traffic flow around the school. This alternative will cost approximately \$34,700 (using asphalt), and \$45,900 (using concrete).

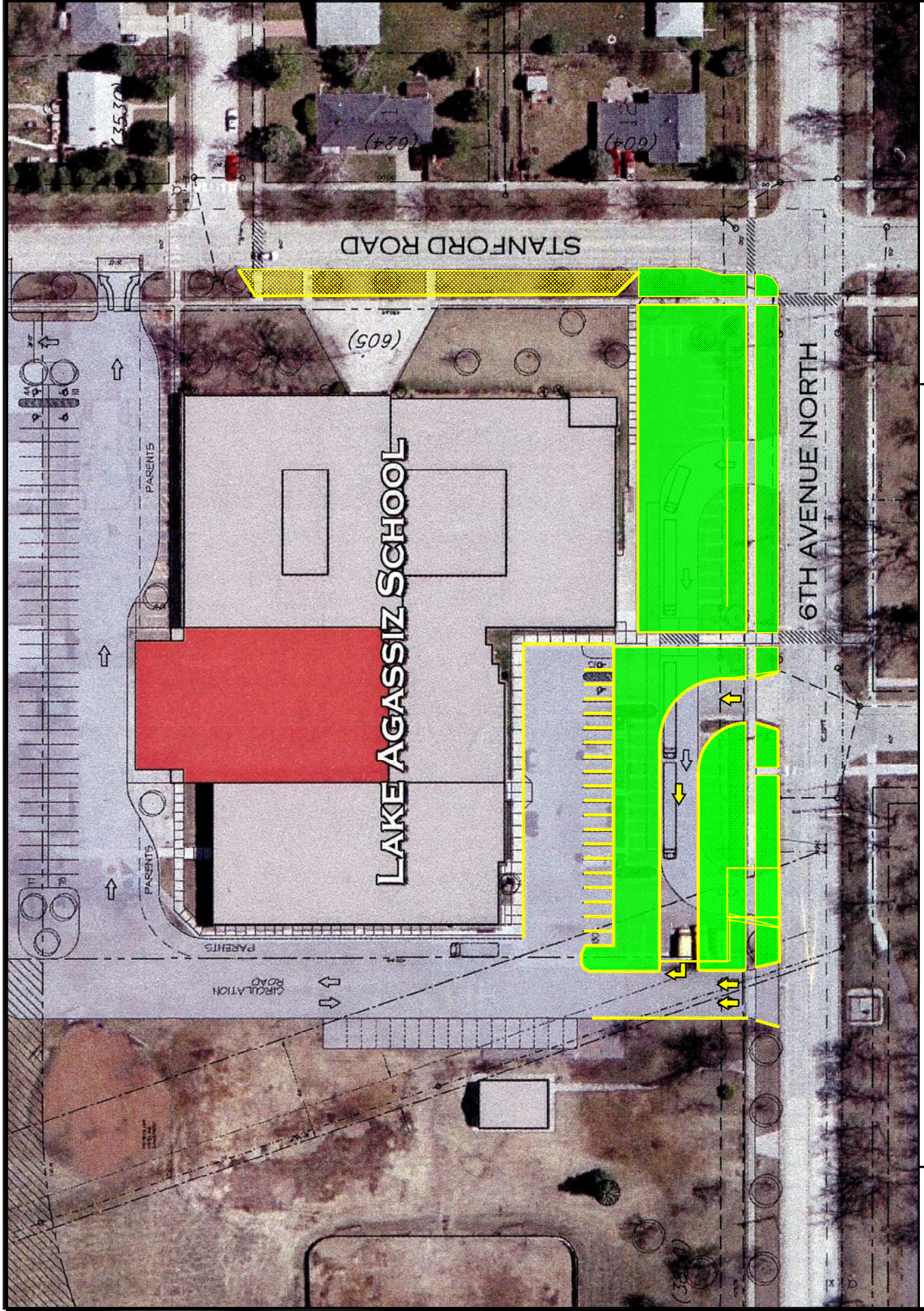
After reviewing the alternatives, Grand Forks city and school officials decided on an additional alternative provided by ICON Architectural Group. This alternative, which can be seen in Figure 5.13, utilizes a bus lane on the south side of the school, which is situated to account for access control issues. It also provides a one-way movement on the access road to the west of the school, and combines the two approaches in the north parking lot.



Removed or Restricted
 Additional or Allowed

School Safety Study for South, Lake Agassiz, and Phoenix

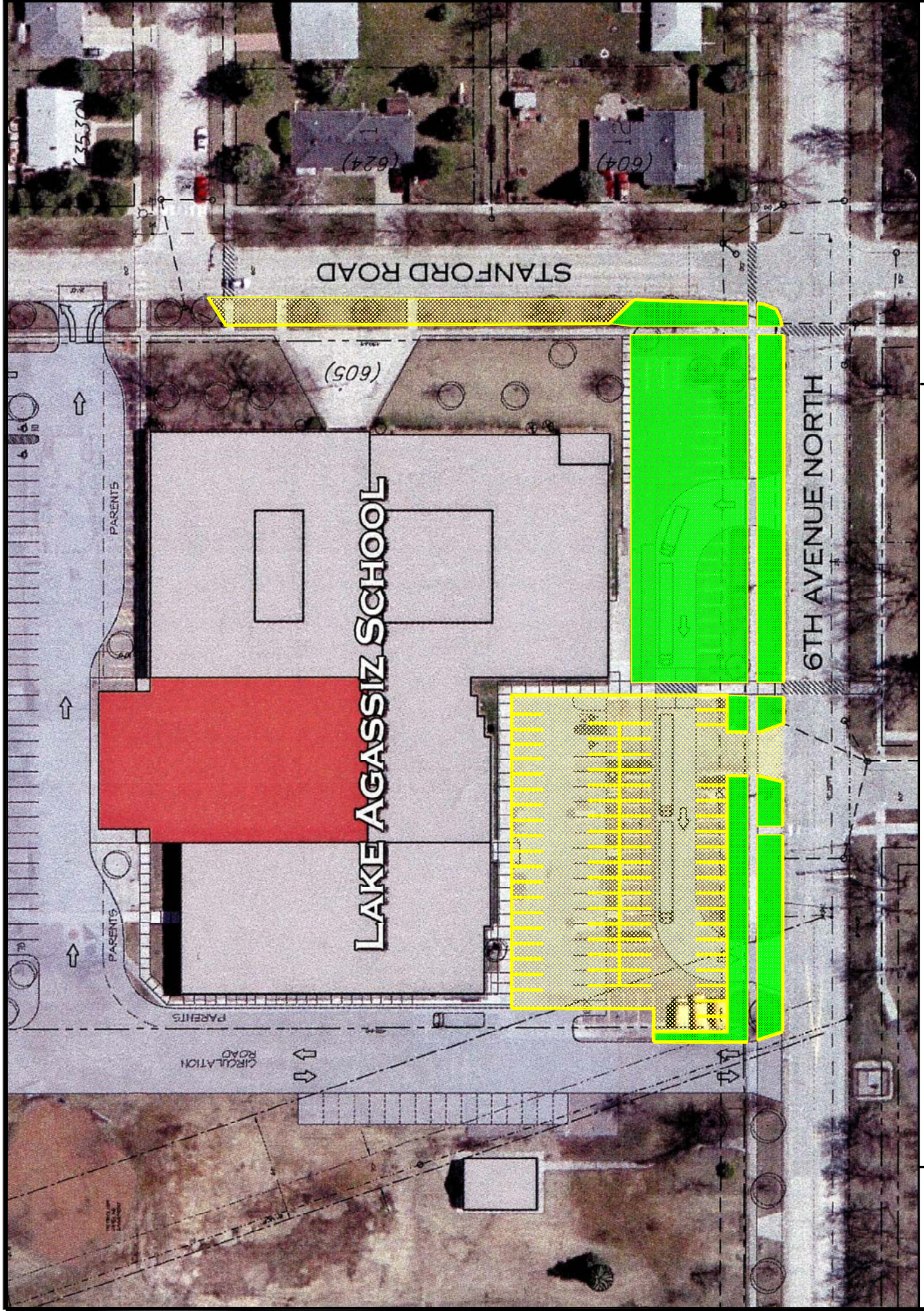




School Safety Study for South, Lake Agassiz, and Phoenix

Figure 5.10

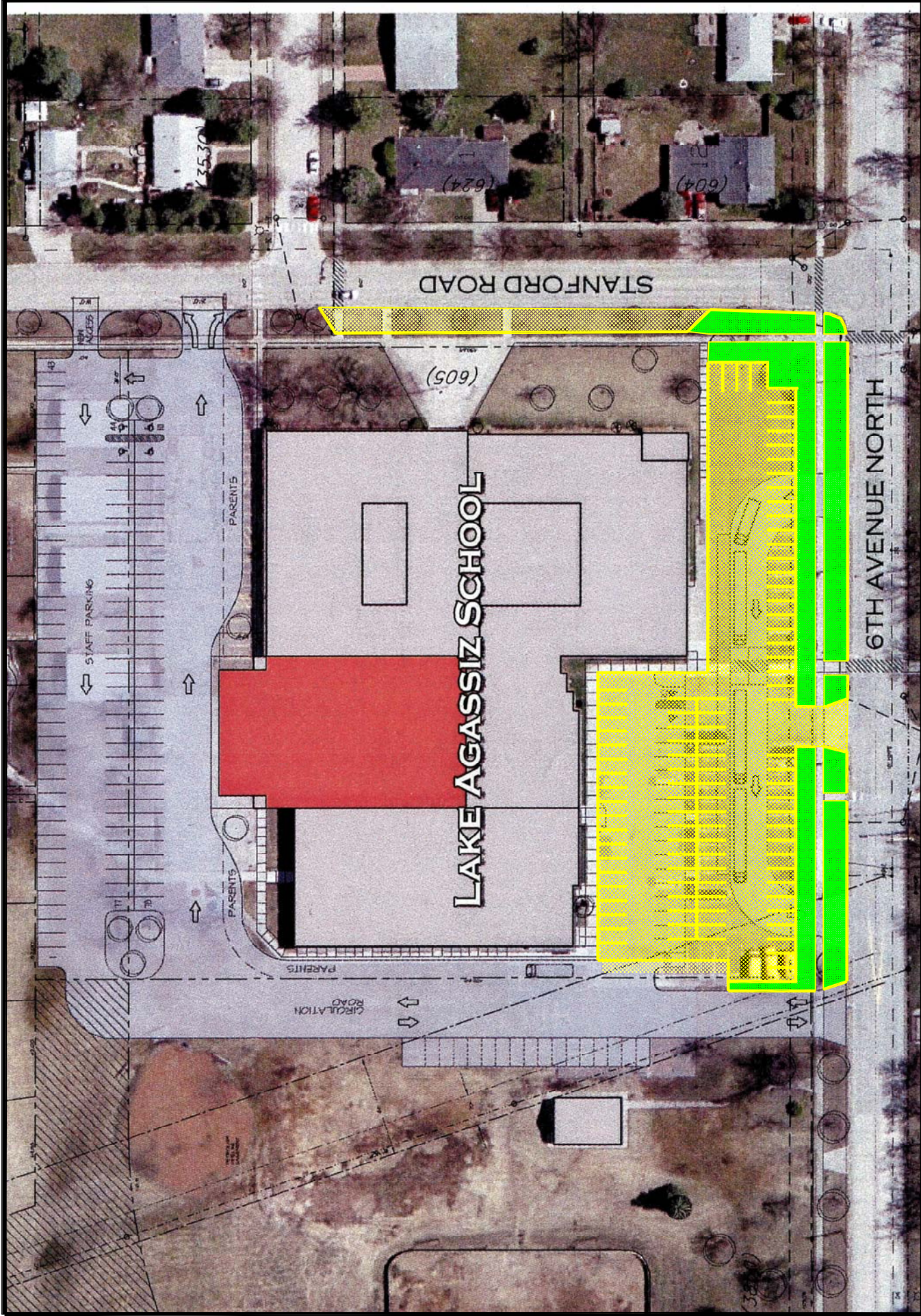




School Safety Study for South, Lake Agassiz, and Phoenix

Figure 5.11

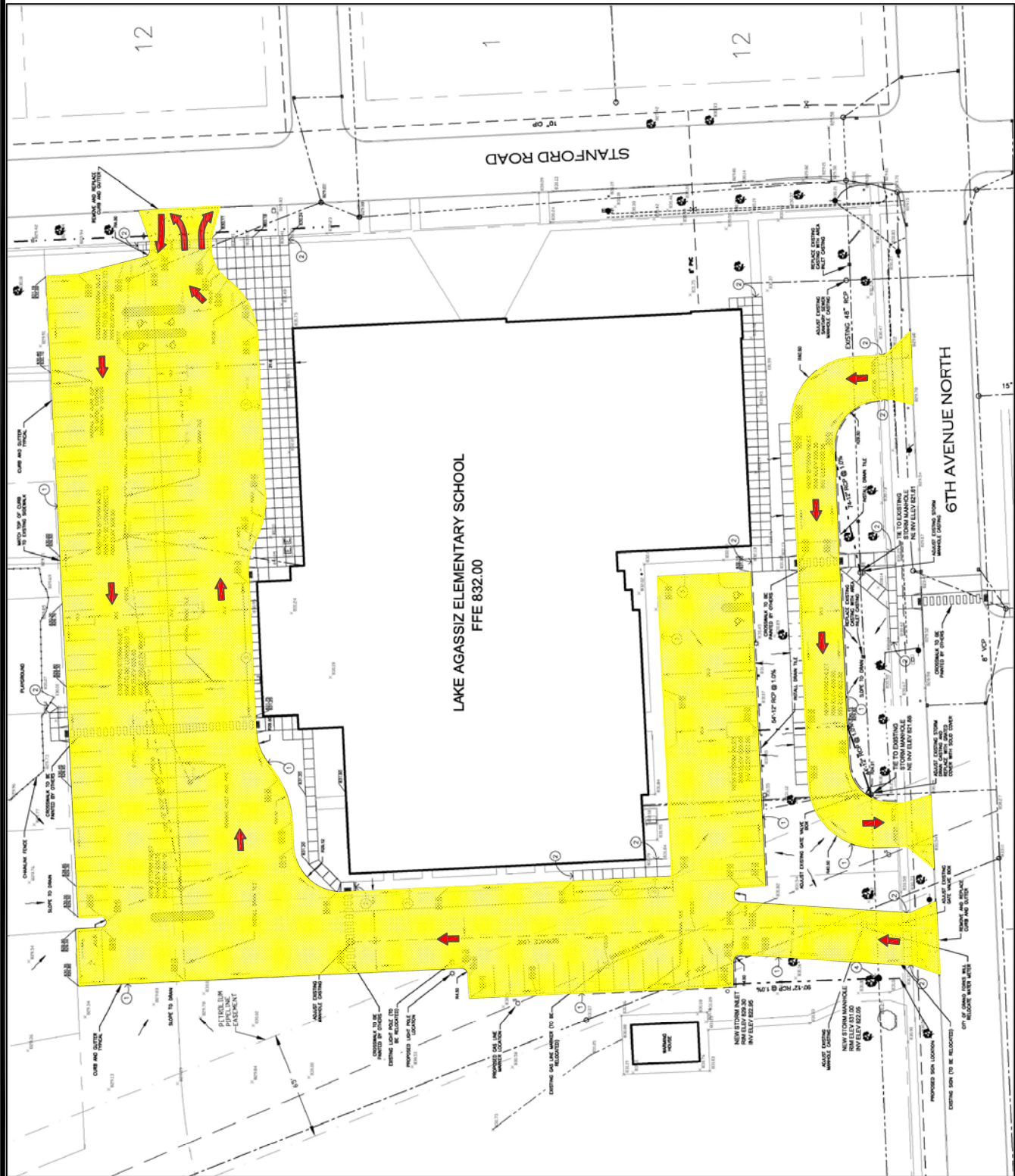




School Safety Study for South, Lake Agassiz, and Phoenix

Figure 5.12





School Safety Study for South, Lake Agassiz, and Phoenix

Figure 5.13

6.0 SUMMARY AND CONCLUSION

This study focused on pedestrian safety and traffic circulation for Phoenix Elementary School, South Middle School, and Lake Agassiz Elementary School. The stakeholders for this study include school administrators from each of the three schools, as well as parent-teacher organizations, the City of Grand Forks, the Grand Forks-East Grand Forks Metropolitan Planning Organization (MPO), the Grand Forks Public School District, and Safe Kids Grand Forks. Data regarding the three schools were obtained at an initial stakeholder meeting and at subsequent site visits, which were conducted by ATAC staff.

This study primarily focused on proposed engineering improvements to the three schools. The engineering improvements outlined in this study must be supplemented with education and enforcement initiatives. A summary of the changes along with the cost estimates proposed in this study are shown below.

6.1 Phoenix Elementary School

- Update signs and pavement markings as specified (short-term, \$3,500)
- Change the orientation of the parking stalls in the south parking lot (short-term)
- Add a turn-out lane on Belmont Rd. next to the school (medium/long-term, \$8,800 - \$13,200)
- Add an additional lane to the driveway exiting the south parking lot onto Chestnut St. (medium/long-term, \$27,000 - \$31,400)

6.2 South Middle School

- Update signs and pavement markings as specified (short-term, \$1,100)
- Dismiss grade 6 to the north (main entrance) of the school, and dismiss grades 7 and 8 to the south side of the school (short-term)
- Add a curb/sidewalk and border to the north parking lot along with a raised crosswalk from the main entrance, and change the vehicle flow to a one-way along the entire north side of the school (medium/long-term, \$24,800 - \$29,300)
- Change the orientation of the south parking lot to a 90° alignment (medium/long-term, \$9,500 – \$12,700)

6.3 Lake Agassiz Elementary School

- Update signs and pavement markings as specified (short-term, \$1,600)
- Add a turn-out lane on Stanford Rd. next to the school (medium/long-term)
- Reduce the size of the bus lane and join with the (one-way) access road on the west side of the school (medium/long-term, \$67,200 – \$88,300)
- Remove the bus lane and increase the capacity of the southwest parking lot (medium/long-term, \$45,900 - \$56,400)
- Remove the bus lane and join both parking lots on the south side (medium/long-term, \$34,700 - \$45,900)
- Make the access road a one-way operation and combine the north approaches

7.0 REFERENCES

1. Ulteig Engineers, Inc., *Grand Forks School Traffic Safety Device Strategy Study – Draft Report*, February 2008.
2. Federal Highway Administration, *Manual on Uniform Traffic Control Devices 2003 Edition*, November 2003.
3. Babbit, et. all, *Building Construction Cost Data 66th Annual Edition*, RS Means, September 2007.