Bicycle and Pedestrian School Safety Review Study: Assessment & Implementation Report

Ormond Beach Middle School

Ormond Beach, FL

VOLUSIA TPO
TRANSPORTATION PLANNING ORGANIZATION
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July 14, 2011

Lassiter Transportation Group, Inc.
Engineering and Planning

Volusia County Transportation Planning Organization
Bicycle and Pedestrian School Safety Review Study

Assessment & Implementation Report
Ormond Beach Middle School
Ormond Beach, FL

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EXECUTIVE SUMMARY

Lassiter Transportation Group, Inc. (LTG) was contracted by the Volusia County Transportation Planning Organization (TPO) to prepare an Assessment Report for the Bicycle and Pedestrian School Safety Review Study for 17 Volusia County schools. The Assessment Report for the Bicycle and Pedestrian School Safety Review Study will aid the Volusia County TPO in making recommendations for projects that will improve conditions within the walk zones for these schools, and potentially make walking and biking to school a more attractive mode of transportation for students. The subject of this Assessment Report is Ormond Beach Middle School. Evaluation of the walk zone for Ormond Beach Middle School has resulted in recommendations for sidewalk improvements as follows:

Purpose

The purpose of this study is to improve the environment for students to walk or bicycle to school. The goal for the assessment phase of the Bicycle and Pedestrian School Safety Review Study is to provide the Volusia County TPO with a comprehensive study that will delineate each of the listed school's concerns, document the observed pedestrian and bicycle circulation routes adjacent to the school sites, and then make recommendations for improvements. The assessment examines the walk zone surrounding the school to evaluate safety issues that may affect students walking or bicycling to school.

The U.S. Department of Health and Human Services Center for Disease Control (CDC) and Prevention has determined that students are not as active as they were 10 years ago when physical activity was incorporated into each student's schedule (KidsWalk-to-School, CDC). This has caused the percentage of overweight students from ages six to eleven years to double over the past 30 years. The CDC has determined that the following are benefits associated with students who walk or ride their bicycle to school.

- Increased practice of safe bicycle, pedestrian, and traffic skills
- Knowledge of their environment
- Improved childhood health
- Improved sense of self-image and autonomy
- Reduced childhood obesity
- Conducive to a healthy social and emotional development
- More alert students who do better in school
- Increased likelihood that students will grow up to lead a healthy lifestyle

The Safe Routes to School (SRTS) program and the CDC went on to say that not only does a safe walking and bicycling environment benefit students, but it also benefits the community in the following ways:

- Decline in the congestion on the roads
- Decreased opportunities for traffic accidents
- Improved air quality
- Improved community security
- Reduced fuel consumption
- Enhanced community accessibility
- Increased community involvement
- Improved partnerships among schools, parents, community groups, and the local government leaders

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INTRODUCTION

LTG has been retained to conduct an Assessment Report for Ormond Beach Middle School as part of a Bicycle and Pedestrian School Safety Review Study for the Volusia TPO. Ormond Beach Middle School is located at 151 Domicilio Avenue, in the City of Ormond Beach. A school location map, that also illustrates the walk zone of the school, is presented as Figure 1.

Background on Ormond Beach Middle School

Ormond Beach Middle School is currently undergoing a renovation. As such access to the school will change in the upcoming years. The Principal of Ormond Beach Middle School is Mr. Carl Persis.

The following information on Ormond Beach Middle School has been provided by Principal Persis:

- **Student Population:** 904 Students
- **Percentage of Walkers:** 28 percent (approximately 250 students)
- **Number of Volusia County Buses in Use:** 11
- **Location and Description of Access Points:** The current access points are located on Northbrook Drive. The northern driveway is the parent loop. This driveway will be converted to overflow parking once the construction is complete. The southern driveway is currently operating as the bus loop. This access will convert to the parent loop once the construction is complete. The new bus loop will be located east of the school on Domicillio Avenue. Currently there is no vehicular access on Domicillio Drive. The school is not fenced so there is no dedicated walker's gate. Walkers access the school primarily on Domicillio Drive, opposite Ridgewood Avenue. Bicyclists are required to access the school on Northbrook Drive, just north of the existing bus loop driveway. Figure 2 depicts the location of these current access points. Figure 3 depicts the proposed future site plan.

Illustration 1: Current Parent Loop Entrance on Northbrook Drive

Ormond Beach Middle School

Bicycle and Pedestrian School Safety Review Study

Ormond Beach, FL

School Location and Walk Zone

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Figure: 1

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Ormond Beach Middle School

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Aerial

Figure: 2

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Future Site Plan

Figure: 3

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EXISTING CONDITIONS

Ormond Beach Middle School is located at 151 Domicillio Avenue, in the City of Ormond Beach. Current parent loop, bus loop and bike access to the school is provided via Northbrook Drive. The school is undergoing a renovation which will change the vehicular access points to the school within the next two years.

School Walk Zone

The Ormond Beach Middle School walk zone is primarily bounded by Inglesa Avenue to the north, Yonge Street and US 1 to the west, Granada Boulevard to the south and the Halifax River to the east. Ormond Beach Elementary School is located at the northern edge of the walk zone.

The walk zone consists of an established network of five foot and eight foot wide sidewalks. The walk zone contains primarily residential land use. The small portion of the walk zone that is immediately north of Granada Boulevard and immediately east of US 1 contains commercial land use. The City has converted many five-foot sidewalks to eight-foot sidewalks on the major walk routes to the school.

The school is served by Votran via Route 3. The nearest transit stop is located on Domicillio Avenue in front of the school.

Crash Data

Pedestrian and bicycle crash data for Ormond Beach Middle School's walk zone was obtained from Volusia County and is presented in Table 1. The data in Table 1 was generated based on the following guidelines:

- Data was collected during the timeframes of 8:15 a.m.- 9:15 a.m. and 3:15 p.m.- 4:15 p.m. on Mondays, Tuesdays, Thursdays, and Fridays
- Data was collected during the timeframes of 8:15 a.m.- 9:15 a.m. and 2:15 p.m.- 3:15 p.m. on Wednesdays
- Data was collected within the walk zone of the school
- Crashes occurring within the last three years

Table 1
Bicycle and Pedestrian Crash Data
Ormond Beach Middle School Assessment Study

DATE	ACCIDENT INTERSECTION	BICYCLE/ PEDESTRIAN INVOLVMENT	DAY/NIGHT	AGE OF CYCLIST/ PEDESTRIAN
03/24/2008	SR 5 at Dix Avenue	Collision with Bicycle	Daylight 3:59 p.m.	12
09/02/2008	N Ridgewood Ave at Kimberly Drive	Collision with Bicycle	Daylight 8:50 a.m.	12

Data collected for this table is attached as Appendix A. The crash data shows that within the walk zone, there were two bicycle-related accidents. In both incidents, the vehicle was at fault and stated that they did not see the bicyclist. Figure 4 shows the approximate locations of the other schools within the walk zone, the traffic signals and the bicycle crash locations identified in Table 1.

Ormond Beach Middle School

Bicycle and Pedestrian School Safety Review Study

Ormond Beach, FL

Existing Conditions

Figure: 4

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MEETINGS

A meeting was held at Ormond Beach Middle School on Tuesday, March 29, 2011. In attendance were members of LTG Staff, Volusia TPO Staff, Ormond Beach Middle School Principal Carl Persis, Ormond Beach Middle School Assistant Principal Christine Campanella, and City of Ormond Beach Planning Manager Ric Goss. This meeting, along with questionnaires which were produced by LTG and completed by Principal Persis, assisted in identifying matters of concern within the school walk zone (see questionnaires as well as initial letters sent to establish this meeting in Appendix B).

Meeting Summary

Most prevalent among the concerns discussed in the meeting, as expressed by Principal Persis, is the heavy vehicle and pedestrian traffic at the three way stop at N Ridgewood Avenue and Domicillio Avenue during the afternoon dismissal time. The school has proactively worked with the Ormond Beach Police Department to provide training for staff members in assisting students crossing at this intersection as well as at the corner of Domicillio Avenue and Northbrook Drive. This staff presence allows for greater awareness and visibility of students crossing the street. Other concerns pointed out by Principal Persis are as follows:

- Parents dropping off and picking up students on both sides of Domicillio Avenue, sometimes in the travel lane and not utilizing the parent loop.

- The intersection of Domicillio Avenue and Northbrook Drive is congested in the morning and afternoon with all bus loop traffic and the majority of the parent loop traffic travelling through this intersection. Some drivers tend to rush through this intersection, not looking for students who may be crossing. Staff members are also present at this intersection to allow for greater awareness and visibility of students.

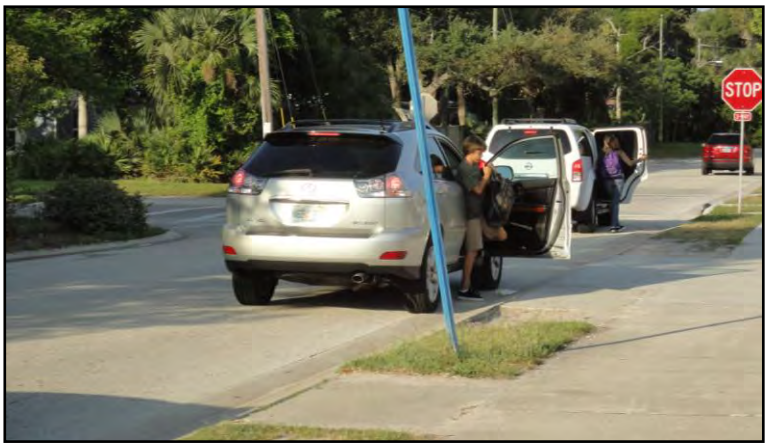

Illustration 2: Parents dropping off students in the travel lanes on Domicillio Avenue

Illustration 3: Cones and decorative rock set up along Domicillio Ave., west of Ridgewood Ave. to discourage parents from parking or dropping off students in this location

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FINDINGS AND RECOMMENDATIONS

The amount of walkers to Ormond Beach Middle, estimated by the Principal is approximately 250 students or 28 percent of the student population. Good and, seemingly, well-maintained sidewalk coverage is already in place serving the collector roadways within the walk zone. A very small area of the school's walk zone lies west of US 1 and south of Granada Boulevard requiring pedestrians and cyclists to cross these state roadways.

This section of the report includes data collected during the on-site and off-site investigative observations of Ormond Beach Middle School and its walk zone. Areas of interest identified in the meeting with Principal Persis and completed questionnaires were investigated, along with a thorough field review of conditions within the walk zone.

LTG evaluated the safety of sidewalk features based on conditions that are deemed hazardous in the *2009 Florida Statutes*, the *Americans with Disabilities Act (ADA) of 1990 Guidelines*, the *Manual on Uniform Traffic Control Devices* (MUTCD), the *Florida Department of Transportation* (FDOT), and the *Federal Highway Administration* (FHWA). The relevant excerpts are included in Appendices C and D.

For a walkway that is parallel to the road, the *2009 Florida Statutes*, Chapter 1006.23 considers the following conditions to be hazardous:

- If there is not an area at least four feet wide adjacent to the road, having a surface upon which students may walk without being required to walk on the road surface

- If the road along which students must walk is uncurbed, has a posted speed limit of 55 miles per hour or greater, and the walk area is not set off the road by at least three feet

For walkways that are perpendicular to the road, the *2009 Florida Statutes,* Chapter 1006.23 considers the following conditions to be hazardous:

- If the traffic volume on the road exceeds the rate of 360 vehicles per hour, per direction (including all lanes), during the time students walk to and from school and if the crossing site is uncontrolled (an "uncontrolled crossing site" is an intersection or other designated crossing site where no crossing guard, traffic enforcement officer, or STOP sign or other traffic control signal is present during the times students walk to and from school)

- If the total traffic volume on the road exceeds 4,000 vehicles per hour through an intersection or other crossing site controlled by a STOP sign or other traffic control signal, unless crossing guards or other traffic enforcement officers are also present during the times students walk to and from school

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On-Site Investigation - A.M. Observations

LTG visited Ormond Beach Middle School on Wednesday, April 24, 2011, during student arrival and dismissal. Both periods were observed for an interval of 25 minutes before and after the bell for a comprehensive view of all queuing, entering, and exiting patterns at different entry/exit points around the school as well as student walking and cycling practices at the crosswalk and along the adjacent roadways. The following general information was gathered:

Observation: Many students were dropped off along the side of Domicillio Avenue, on the sidewalk and at the three way stop sign, without parents utilizing the parent drop off loop.

Recommendations: The parent loop location will change as the construction of the school progresses, which may make its utilization more convenient. The school should continue to send information to the parents regarding the proper procedures and importance of utilizing the parent loop for dropping off their students.

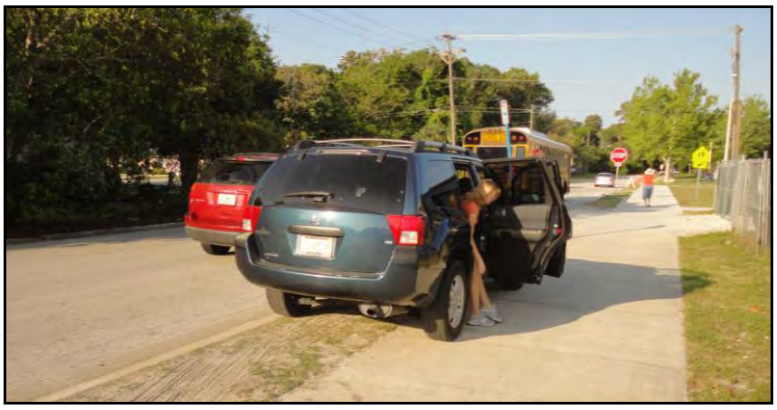


Illustration 5: Vehicle/pedestrian conflict at the corner of Domicillio Ave and Northbrook Dr.

Observation: The intersection of Domicillio Avenue and Northbrook Drive is congested and there is a conflict with students crossing the street and vehicle and bus traffic. The school has a staff member present to help students cross the street in this area.

Recommendations: A special emphasis crosswalk should be installed at this location and "In-Street Ped Crossing" signs R1-6c per Chapter 7 of the Manual on Uniform Traffic Control should be installed. Additionally, the school should continue to have staff presence in this location during both the a.m. arrival and p.m. dismissal periods.

Illustration 4: Parent dropping off students on the sidewalk along Domicillio Avenue

Observation: The current location of the bus loop off Northbrook Drive requires buses to travel through the intersection of Ridgewood Ave./Domicillio Dr. and Domicillio Ave./Northbrook Dr. The buses do not have the proper turning radii at these locations to make these turns without encroaching into the oncoming lanes.

Recommendations: When the bus loop is relocated to Domicillio Avenue this conflict should be eliminated.

Illustration 6: Insufficient turning radius for the school bus at the intersection of Ridgewood Ave. and Domicillio Dr.

On-Site Investigations - P.M. Observations

Observation: The intersection of Domicillio Avenue and Ridgewood Avenue is heavily congested following afternoon dismissal with vehicles traveling on the roadway to and from the parent and bus loops, parents stopping on Domicillio Avenue to pick-up students and students crossing the street at this location.

Recommendation: It is recommended that the existing crosswalks be converted to special emphasis crosswalks at this location and "In-Street Ped Crossing" signs R1-6c per Chapter 7 of the manual on Uniform Traffic Control should be installed. for greater visibility of the crosswalk. Additionally, it is recommended that parents be discouraged from picking students up along the street. To the greatest extent possible, staff should direct students to the parent pick-up loop to wait to be picked-up. Parents should be continued to be notified to utilize the parent loop to pick-up their students. Further, it is recommended that the school continue to utilize staff trained by the Ormond Beach Police Department to assist with the safe crossing of students at this intersection.

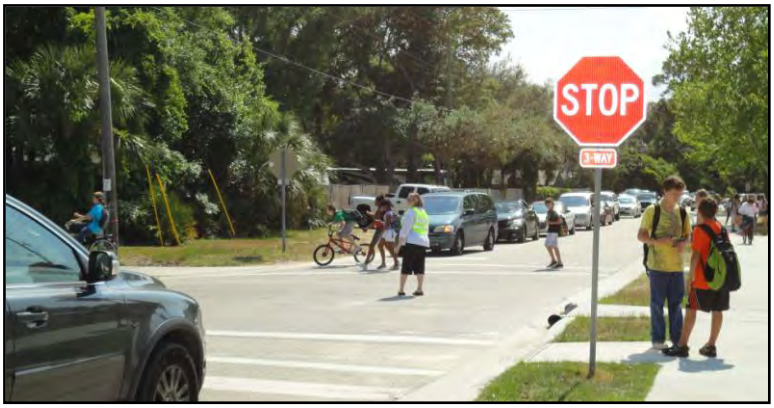
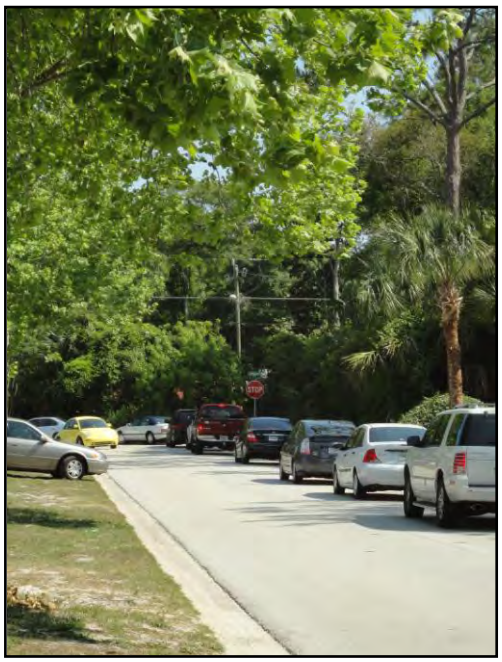


Illustration 7: Intersection of Domicillio Avenue and Ridgewood Avenue following afternoon dismissal

Illustration 8: Parents waiting on sidewalk along Domicillio Avenue prior to afternoon dismissal



Observation: The school had one bike rack area with approximately 40 bicycles. On the day of observation, helmet usage was poor among the observed bikers.

Recommendations: This school may be a good candidate for the receipt of free bicycle helmets through programs headed by the Department of Health or the Sheriff's Office.

Observation: Vehicles exiting both the bus loop and parent loop queue along both Northbrook Drive and Domicillio Avenue.

Recommendation: When the bus loop is relocated to Domicillio Avenue there will be fewer vehicles traveling through these intersections. Additionally, this traffic typically clears within 10-15 minutes following dismissal. It is recommended that this situation be continued to be monitored as the traffic circulation changes with the school construction.

Illustration 9: Vehicles stacking on Northbrook Dr. and around the corner on Domicillio Ave.

Off-Site Investigation

Observation: The walk zone consists of an established sidewalk network. The City has converted many of the five foot sidewalks to eight feet along the main travel routes.

Recommendation: The City should continue its program to convert five-foot sidewalks to eight-foot sidewalks, where feasible on heavy pedestrian routes.

Observation: Crosswalk is missing at the intersection of Sanchez Avenue and N. Yonge Street.

Recommendation: Install **s**pecial emphasis crosswalk at this locations.

Observation: At the intersection of Northbrook Drive and Beach Street, there are two westbound lanes, one on each side of the median and one eastbound lane. This roadway geometry may cause confusion to drivers.

Recommendation: It is recommended that the City of Ormond Beach investigate this intersection and convert the operation of the intersection to two eastbound lanes on the south side of the median and one westbound lane on the north side of the median.

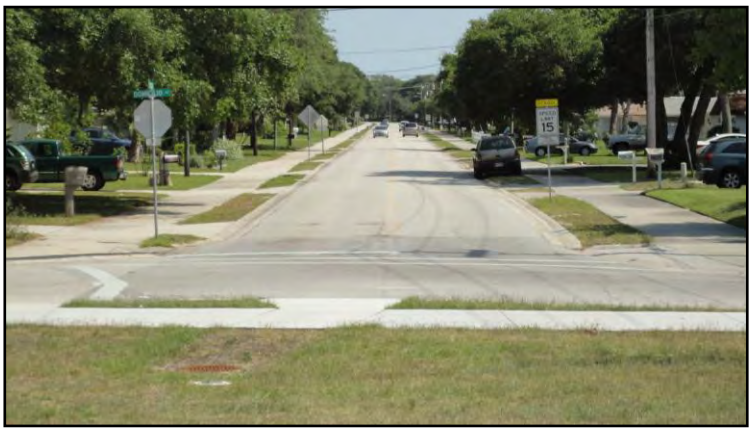


Illustration 10: Eight foot sidewalks on both sides of Ridgewood Avenue, approaching the school.

Illustration 11: Intersection of Northbrook Drive and Beach Street, looking east.

Illustration 12: Intersection of Northbrook Drive and Beach Street, looking west.

Parallel and Perpendicular Sidewalk Inventory

An inventory of sidewalk coverage within the walk zone was taken. The focus of this inventory was the east/west and north/south urban collectors within the walk-zone. This was to verify whether there are routes of continuous sidewalk coverage that can be taken to and from the school and whether or not any of these routes are considered hazardous based on the parallel criteria listed above. There are no streets within the walk zone with a posted speed limit of 55 miles per hour or greater. The parallel sidewalk coverage on these urban collector roads is summarized in Tables 2 and 3.

The perpendicular sidewalk conditions are summarized in Table 4. Peak-hour, directional volumes were estimated using the Volusia County Traffic Counts (see Appendix E) for collector and arterial roadways within the school walk zone by applying a peak-hour factor of 0.0977 and a directional factor of 0.55. Crossing conditions are deemed to be hazardous if they meet the criteria listed above for walkways perpendicular to the roadway.

Table 2
East/West Parallel Collector Sidewalk Inventory
Ormond Beach Middle School Assessment Study

East/West Roadway	Segment	Sidewalk Details				Hazardous Condition?
		Sidewalk Coverage	Side of Road			
			North	South	Exceptions/Comments	
Wilmette Avenue	US 1 to N Yonge St	✓	✓			No
	N Yonge St to McIntosh Rd	✓	✓			No
	McIntosh Rd to Ridgewood Ave	✓	✓			No
	Ridgewood Ave to Beach St	✓	✓			No
Sanchez Avenue	Sanchez Park to N Yonge St	✓		✓	8-foot sidewalk	No
	N Yonge St to McIntosh Rd	✓	✓		8-foot sidewalk	No
	McIntosh Rd to Ridgewood Ave	✓	✓		8-foot sidewalk	No
	Ridgewood Ave to Beach St	✓		✓	8-foot sidewalk	No
Domicillio Avenue	Northbrook Dr to Ridgewood Ave	✓	✓		8-foot sidewalk	No
	Ridgewood Ave to Beach St	✓	✓		8-foot sidewalk	No
Northbrook Drive	Overbrook Dr to Beach St	✓		✓		No

Table 3
North/South Parallel Collector Sidewalk Inventory
Ormond Beach Middle School Assessment Study

North/ South Roadway	Segment	Sidewalk Details				Hazardous Condition?
		Sidewalk Coverage	Side of Road			
			East	West	Exceptions/Comments	
N Yonge Street	Hernandez Ave to Wilmette Ave	✓		✓		No
	Wilmette Ave to Sanchez Ave	✓		✓		No
McIntosh Road	Hernandez Ave to Wilmette Ave				Parallel sidewalk routes available on N Yonge St and Ridgewood Ave	No
	Wilmette Ave to Sanchez Ave				Parallel sidewalk routes available on N Yonge St and Ridgewood Ave	No
Northbrook Drive	Domicillio Ave to Overbrook Dr	✓	✓			No
Ridgewood Avenue	Granada Blvd to Wilmette Ave	✓	✓	✓	Sidewalk only on eastside of street from Lincoln Ave to Hernandez Ave	No
	Wilmette Ave to Sanchez Ave	✓	✓	✓		No
	Sanchez Ave to Domicillio Ave	✓	✓	✓	8-foot sidewalk	No
N Beach Street	Granada Blvd to WilmetteAve	✓		✓		No
	Wilmette Ave to Sanchez Ave	✓		✓		No
	Sanchez Ave to Domicillio Ave	✓		✓		No
	Domicillio Ave to Northbrook Dr	✓		✓		No
	Northbrook Dr to Inglesa Ave	✓		✓		No

Table 4
Perpendicular Sidewalk Evaluation
Ormond Beach Middle School Assessment Study

Roadway	Perpendicular Street	Daily Traffic Volume	Peak-Hour Directional Traffic Volume	Exceed Volume Threshold	Traffic Signal or Stop Sign	Hazardous Condition
Granada Boulevard	Ridgewood Ave	33,250	1,797	Yes	Yes	No
US 1	Selden Ave/Highland Ave	17,000	913	Yes	No	Yes

Based on the criteria for hazardous conditions identified above, there are no parallel sidewalks along collector roadways with hazardous conditions identified in the walk zone. McIntosh Road currently does not have sidewalks, however, it is not classified as a collector roadway and there are parallel sidewalk routes along Ridgewood Avenue and N. Yonge Street. The perpendicular sidewalk inventory identifies one crossing deemed hazardous based on predicted walk routes; US 1 at Selden Avenue/Highland Avenue.

It should be noted that while there is no crosswalk at US 1 at Selden Avenue/Highland Avenue, there is a signal controlled crossing of US 1 at Granada Boulevard to the south and Wilmette Avenue to the north to accommodate pedestrians needing to cross US 1 from the small portion of the walk zone on the Westside of US 1.

Florida Highway Administration (FHWA) guidelines indicate that urban collector roadways should have sidewalk coverage on both sides of the roadway where there is commercial development, and on at least one side of the road where there is residential development. The following sidewalk and crosswalk improvements are recommended to improve connectivity within the walk zone:

- Convert exiting crosswalks at the intersection of Ridgewood Avenue and Domicilio Avenue, immediately in front of the school to special emphasis crosswalks.
- Install “In-Street Ped Crossing” signs on all approaches of the intersection of Ridgewood Avenue and Domicilio Avenue.
- Install special emphasis crosswalk at the intersection of Domicillio Avenue and Northbrook Drive.
- Install “In-Street Ped Crossing” at the intersection of Domicillio Avenue and Northbrook Drive.
- Install special emphasis crosswalk at the intersection of Sanchez Avenue and N Yonge Street.

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SUMMARY

Table 5 summarizes all recommendations that have been made within this report. These recommendations and existing conditions are also illustrated on Figure 4. It should be noted that Volusia County has identified $1,000,000 for the purpose of constructing sidewalks at not-yet determined locations in its 2010/2011-2014/2015 Transportation Improvement Program. Therefore, it is recommended that the City of Ormond Beach and the County collaborate to implement the recommendations of highest priority.

Table 5
Summary of Recommended Improvements
Ormond Beach Middle School Assessment Study

Location	Observations	Recommendations
Off-Campus		
Ridgewood Avenue and Domicillio Avenue	This intersection is heavily congested with pedestrian and vehicular traffic during the arrival and dismissal periods.	Convert the exiting crosswalks at this intersection to special emphasis crosswalks. Install “In-Street Ped Crossing” signs.
Domicillio Avenue and Northbrook Drive.	The intersection of Domicillio Avenue and Northbrook Drive is congested and there is a conflict with students crossing the street and vehicle and bus traffic.	Install a special emphasis crosswalk at this location, extend the sidewalk and a sidewalk ramp. Install “In-Street Ped Crossing” signs.
Sanchez Avenue and N Yonge Street	Crosswalk partially removed at this location when utility construction was done.	Install a special emphasis crosswalk at this location.
General	Poor helmet usage.	School should work with programs that provide free helmets to school students such as those offered through the Sheriff's office and Department of Health

Ormond Beach Middle School

Bicycle and Pedestrian School Safety Review Study

Ormond Beach, FL

Recommended Improvements

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Figure: 5

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EXECUTIVE SUMMARY – IMPLEMENTATION REPORT

Lassiter Transportation Group, Inc. (LTG) was retained by the Volusia Transportation Planning Organization (VTPO) to prepare an Implementation Report for the Bicycle and Pedestrian School Safety Review Study for 17 Volusia County schools. The Implementation Report for the Pedestrian and Bicycle School Safety Review Study is based on observations and recommendations of the Assessment Report and includes cost data, ranking criterion for the recommended improvements, and the best practices to follow on old and new developments. The subject of this Implementation Report is Ormond Beach Middle School. Recommendations for sidewalk improvements within this report have an associated total cost of $ 3,927.61.

Assessment of Existing Conditions

Conditions within the walk zone of Ormond Beach Middle School have been presented and assessed within the Assessment Report contained in the previous sections. Recommendations were also made within those sections to improve observed conditions. These recommendations are evaluated within the following sections, based on these factors:

- Safety severity
    - Distance from the school
    - Crashes
    - Traffic flow (how it affects walkers and bicyclists)
- Benefits associated with improvement
    - Walker and bicyclist traffic
    - Walking and bicycling network/connectivity
- Constructability
- Cost

Each safety issue was rated, ranked, and placed on a prioritized list. A preliminary cost estimate was completed using the FDOT's *2010 Basis of Estimates Manual*. Actual construction costs may vary based on detailed engineering. It is noted that an in-depth engineering constructability analysis of the project should be conducted to determine if the recommendation can be constructed at the suggested estimated cost since recommendations are based on field observations.

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BEST PRACTICES

This section of the report will address the best practices which make walking and bicycling a safer mode of transportation for students. These practices are not only applicable to the walk zone but to any new or old development that supports walking and bicycling. The data gathered for this section of the report comes from the Federal Highway Administration (FHWA), Americans with Disabilities Act of 1990 (ADA), and other documents that are supported by the Florida Department of Transportation (FDOT) and the Volusia County School District.

Sidewalk Design for New Roadways and Developments

Findings

Sidewalk design for new roadways and developments are usually based on anticipated pedestrian demand, the type of development, whether residential, industrial, or commercial, and the jurisdiction. Developers may not want to construct sidewalks because the adjoining properties may not have sidewalks. In some cases, development requirements did not address sidewalk construction or connectivity. These conditions have led to developments that do not include sidewalk connectivity.

Best Practices

When planning a development which is located within the walk zone of a school, safe, connected networks of sidewalks that can be easily navigated by students should be required. If it is not possible to have safe sidewalks then multi-use trails should be considered.

All sidewalks should provide for disabled pedestrians and ought to be incorporated into the planning process for all new roadways and developments. The FHWA has established the following guidelines to assist local jurisdiction with determining when and where pedestrian facilities are needed.

- Develop sidewalks as integral parts of all city streets
- If land use plans anticipate pedestrian activity then sidewalks should be constructed as part of the street development
- Sidewalks should connect nearby urban communities
- Provide sidewalks in rural and suburban areas at schools, local businesses, and industrial plants that result in pedestrian concentrations
- Provide sidewalks whenever the roadside and land development conditions are such that pedestrians regularly move along a main or high-speed highway
- Incorporate sidewalks in rural areas with higher traffic speeds and the general absence of lighting
- Construct sidewalks along any street or highway without shoulders, even if there is light pedestrian traffic

The FHWA went on to say that to initiate the sidewalk installation guidelines above and to promote accessible sidewalk facilities, municipalities should consider the following recommendations:

- Agencies should accept bids from contractors who understand and construct accessible facilities
- Require employees and contractors to demonstrate their knowledge of accessibility topics. If, at any stage of the development process (i.e., planning, design, or installation) accessibility is not addressed, hold the responsible party accountable and make improvements.

- Engineering, transportation, and public policy decision makers should partner with transit providers on projects and programs, and require that transit systems include accessible pedestrian facilities
- Consult with representatives from disability agencies and organizations during all phases of project development
- Include persons with disabilities in the first phases of programming, planning, designing, operating, and constructing pedestrian facilities
- Agencies should ensure that accessibility guidelines are followed throughout planning, project development, and construction of pedestrian facilities

Other local agencies, such as the school board within which the development falls, and the city or county planner, should make sure that the sidewalks are within the minimum set requirements, have good connectivity between residential and commercial developments, increases the allowable densities near major intersections (wider sidewalks), are near major shopping areas and transit lines, and ensure pedestrian friendly sidewalk designs. However, specific design principles must be in place before these options can be exercised. Planning for pedestrian sidewalk usage should be one of the primary goals for developers and should be an integral part of planning for walkable communities.

Appendix G presents the FHWA's guidelines of best practices for the installation of new sidewalks. New developments should consider the following sidewalk safety features to plan for walkers and bicyclists:

- Sidewalks should be constructed on both sides of the road
- Wide pathways
- Acceptable lighting
- No obstacles within walkway
- Sidewalk connectivity
- Sidewalk network
- ADA compliant
- Pedestrian facilities (e.g., shaded benches)
- Changes in grade and slope should be moderate

Sidewalk Retrofit

Findings

Cities, counties, and states have codes and regulations that determine how wide a sidewalk must be and how much shoulder should exist between the sidewalk and pavement. The cities and counties must also follow regulations, set by the ADA, to aid disabled pedestrians. These codes have changed as a result of society working towards consuming less energy and promoting safety and healthier lifestyles. In some older neighborhoods, sidewalks are not up to standards since ADA guidelines were not developed and implemented until the 1990s. If the roadway is retrofitted in the future, then existing sidewalks must be brought into compliance with current ADA standards.

Issues with retrofitting sidewalks may include right-of-way costs, conflicting drainage features or swales in the right-of-way, and steep grades. Some sidewalks may have all the aforementioned issues but insufficient right-of-way for retrofitting.

Best Practices

It is best to create developments with school routes, pedestrian transit routes, and amenities within close walking distances. However, retrofitting sidewalks should be considered in older, noncompliant developments. Additional right-of-way may be required to implement retrofit recommendations.

Projects aimed at retrofitting older sidewalks should research data pertaining to what type of right-of-way exists, a cost analysis of the right-of-way purchase, cost of construction, the condition of existing sidewalks, and the benefits associated with the project. The right-of-way acquisitions process is detailed in *The Real Estate Acquisition Handbook* and is produced by the FDOT.

Existing Substandard Sidewalk

Findings

Older neighborhoods and developments that did not plan for pedestrians may have existing substandard sidewalks. Substandard sidewalk issues include the following (Pedestrian and Bicycle Information Center):

- Sidewalks are buckled, lifted, or cracked due to tree roots or other causes
- Sidewalks are blocked due to the placement of utility poles, sign posts, potholes, fire hydrants, bus benches, newspaper racks, parked cars, or other obstructions
- Sidewalks are blocked by bushes or low tree branches
- Sidewalks lack curb ramps at street corners, crosswalks, and driveways
- The driveway side slopes are steep and hard to cross
- Sidewalk shoulders and adjacent drop-offs are excessive

Any of these existing conditions may make walking and bicycling difficult. When sidewalks are obstructed or do not have curb ramps, it is difficult for walkers and bicyclists to get off the sidewalk and on to the pavement to walk around the obstruction. Driveways with steep side slopes may cause walkers to trip or bicyclists to lose balance.

Best Practices

It is important to determine what sidewalks are substandard and those sidewalks should be placed on a prioritized list to be repaired or brought up to current standards. Maintaining existing sidewalks is paramount to providing a safe walking and bicycling environment.

The restriction of heavy vehicles on the sidewalk, installing root barriers if trees are planted too close to a sidewalk, and removing obstacles will keep sidewalks safe for students who are walking or bicycling to school. Depending on the average width of tree root spread, there should be rules that determine what species, and how far, trees must be planted from the sidewalk to prevent cracks and buckling. Trees and bushes should be kept trimmed to avoid blocking the sidewalk and to maximize the mobility of pedestrians. For obstacles that cannot be moved, regulations should be developed that prevent future installations affecting the sidewalk.

Driveways that have steep slopes should be re-graded to conform to ADA approved practices. This will allow for an easy transition between the sidewalk and the driveway for all pedestrians and bicyclists.

Curb ramps should be installed at all crossings, wherever applicable, such as at an intersection or at a mid-block crossing. Sidewalks should end at a detectable warning strip or whenever the sidewalk changes, such as at a mid-block crossing, and should conform to standards approved by the ADA. Standards set by the ADA include the width, length, slope, and texture of curb ramps and the width and length of landings, if they are needed.

Sidewalk Maintenance

Findings

A sidewalk that clearly has maintenance issues may inhibit pedestrian and bicyclist usage. Existing sidewalks may be hazardous to pedestrians and bicyclists if the following issues exist (FHWA):

- Step separation - a vertical displacement of 13 mm (0.5 in) or greater that could cause pedestrians to trip or prevent the wheels of a wheelchair or stroller from rolling smoothly
- Badly cracked concrete - holes and rough spots ranging from hairline cracks to indentations wider than 13 mm (0.5 in)
- Spalled areas - fragments of concrete or other building material detached from larger structures
- Settled areas that trap water - sidewalk segments with depressions, reverse cross slopes, or other indentations that make the sidewalk path lower than the curb; these depressions trap silt and water on the sidewalk and reduce the slip resistant nature of the surface.
- Tree root damage - roots from trees growing in adjacent landscaping that cause the walkway surface to buckle and crack
- Vegetation overgrowth - ground cover, trees, or shrubs on properties or setbacks adjacent to the path that have not been pruned can encroach onto the path and create obstacles
- Obstacles - objects located on the sidewalk, in setbacks, or on properties adjacent to the sidewalk that obstruct the passage space or the visibility of sidewalk users; obstacles commonly include trash receptacles, utility poles, newspaper vending machines, and mailboxes
- Blocked or inadequately protected drainage inlets and inadequate flow planning
- Temporary construction interruptions
- Inadequate patching after utility installation

Sidewalks are typically in the public right-of-ways and are the sole responsibility of the City or County, depending on who has jurisdiction over that roadway. In some cases, sidewalks are provided along privately maintained roads and common spaces and are the responsibility of a Homeowners Association (HOA) or other property management entity.

Best Practices

- A division of the City or County should be solely dedicated to sidewalk maintenance or, if in the case of privately maintained sidewalks, should be addressed through code enforcement procedures.
- Sidewalk maintenance issues should be placed on a prioritized list of sidewalk projects to be completed.
- Maintenance issues should be solved by using strategies standard to road maintenance. This will minimize the risk of walkers and bicyclists on their way to and from school; and all maintenance issues should be handled consistently throughout the jurisdiction.

Improving Existing Roadway Conditions

Findings

Existing roadway conditions may not offer enough safety for walkers and bicyclists. Motorists may speed within school walk zones and not pay attention to their surroundings. Motorists pulling out of driveways may look for oncoming vehicles but may not look for walkers and bicyclists crossing the driveway.

Best Practices

Roadway conditions can be improved to maintain safety and accessibility for walkers and students who may want to ride their bicycles to school. The following are best practices that improve existing roadway conditions for walkers and students who choose to ride their bicycles to school.

- Signage and pavement markings should be highly visible and current
- Traffic calming devices should be considered to reduce speeds
- Speed studies should be conducted to lower speed limits year-round
- ADA standards should be adhered to
- Consider one-way streets if traffic is too congested during the arrival and dismissal times

- Strict police enforcement should be imposed to deter illegal and unsafe parking practices as well as moving violations within the school zone

Pavement Markings

Findings

Pavement markings are essential to the transportation system to communicate and enhance the messages of roadway operational conditions by augmenting other traffic control devices. School pavement markings and crosswalk markings are especially important since they alert the motorist of walkers and bicyclists entering the pavement at crosswalks and intersections. Pavement markings can easily fade or become obliterated over time. It was observed that SCHOOL markings, which warn motorists that they will soon enter into a school zone, are often faded, cracked, or chipped.

Best Practices

The following best practices are recommended to improve the safety, life, and effectiveness of pavement markings.

- SCHOOL pavement markings and crosswalk markings should be clear and visible in order to warn motorists that they are entering a school zone and/or children are crossing.
- The FDOT's current standard (Index No. 17346) uses a special emphasis crosswalk that lengthens the life of the crosswalk marking.
- Thermoplastic paint should be used for all pavement and school markings to enhance the visibility of walkers and bicyclists. Thermoplastic paint should be used since it is durable, retro-reflective.
- The crosswalk should align with the sidewalk ramps.
- Crosswalks should be installed where walkers and bicyclists are in the pavement for the shortest distance and time possible.
- Pavement markings should be accompanied by the proper signage.
- Pedestrian median refuges should be installed for long crosswalks with interim medians.
- Walkers and bicyclists should be dissuaded from crossing at intersections or mid-block crossings where heavy traffic exists unless accompanied by crossing guards.

Traffic Signal Control

Findings

Traffic signalization has an important role in promoting safety for students who walk or bicycle to school. Drivers at busy intersections can easily overlook students trying to cross a street; consequently, signals allow students the necessary time to safely cross busy intersections.

School flashing beacons (Illustration 11) also play an important role in safety. Flashing beacons alert drivers that they are entering a school zone and indicate that the displayed speed limit is in effect. It was observed that school flashing beacons can be

Illustration 11: Flashing beacon traffic signal control

operated manually or can be pre-set to turn off/on during pre-programmed timeframes. Manually run school flashing beacons are usually operated by school crossing guards, who are primarily assigned to cross elementary school students. Unfortunately, this does not address the needs of middle school students.

Best Practices

- Pedestrian signal heads should be considered at all intersections that utilize traffic control signals for motor vehicles within the school walk zones.
- Pedestrian signal buttons should be placed such that it is obvious to elementary and middle school students which buttons to press to access the desired sidewalk.
- Pedestrian signal heads should employ the countdown display which exhibits the symbols of the WALKING MAN beside the numerical countdown. This will help students to decide if they have enough time to cross or if they should wait for the next pedestrian signal phase.
- Students should be educated on the proper ways to cross an intersection when using a pedestrian signal head.
- For students who must cross more than two lanes of traffic, the assignment of crossing guards or overhead pedestrian bridges should be considered.
- U-turns and Right-on-Reds should be prohibited at intersections where students utilize pedestrian crossings.
- School attendance zones that have crossings at heavily congested intersections should have their walk zones re-evaluated so that students can either walk to another school or transportation could be provided.

Enforcement and Education

Findings

Walkers and bicyclists do not always follow proper crossing procedures. Students may dart through traffic to access the school in the mornings or access a vehicle parked across the road from the school in the afternoons. Students may also cross streets at mid-block without the aid of a crosswalk or an adult. When crosswalks do exist, students do not always follow proper crossing procedures.

Regulations are not always followed by adults dropping off/picking up students. Motorists were observed to park in No Parking areas and make prohibited vehicular movements, including U-turns. Some motorists were observed to be speeding within the reduced-speed zone.

Students who choose to ride their bicycles to school do not always wear helmets.

Illustration 12: Parent parking in no parking area prior to afternoon dismissal

Best Practices

- Students and parents should be educated on proper crossing procedures. Parents, crossing guards, and School Resource Officers (SRO) should be the main resources for safety.

- Parents should receive flyers or recorded messages on a school-wide basis to inform them of the proper drop-off/pick-up procedures. Strict enforcement of these procedures should eventually deter parents from practicing unsafe drop-off/pick-up actions.
- Prohibited vehicular movements should be strictly handled and higher fines could be considered, where allowable by law, during the arrival and dismissal times of school.
- Helmets should always be worn by bicycling students. Parents, school staff, crossing guards, and SROs should encourage helmet usage. Non-compliant helmet users should be dealt with consistently and strictly.
- Encourage walking and bicycling by providing free helmets, stickers, reflective gear, or create an incentive program.
- Schools should provide a safe and secure bicycle storage facility for students who choose to ride their bicycles to school (Illustration 12)
- Parents should be informed about the different walking and bicycling programs available and the school and its volunteers should assist in planning and implementing those programs.
- Students who are regular walkers and bicyclists should be paired with other walkers and bicyclists who live in the same area.

Illustration 13: secure bicycle racks provided at the school

- Crossing guards should be involved in the re-zoning of walk zones since they have a better understanding of the distribution of the walker and bicyclist population.

School Board Considerations

Findings

School districts generally employ the two-mile walk route to determine the walk zone. This is not always the best option to promote safety. Students may have to cross congested intersections, too many intersections, and/or busy driveways.

Sidewalks are not always located on both sides of the road. This may encourage unsafe crossings where no crosswalks exist. Walk zones can also include sidewalks that end at an unsignalized intersection with no safe alternative to gain access to the sidewalk on the opposite side of the roadway.

It was noted that schools prefer to have one controlled point of entry that is monitored by school staff. In these cases, students who walk or ride their bicycles to school may have to cross busy driveways including drop-off/pick-up loops, bus loops, and even parent and teacher parking lots, to enter/exit the controlled point of entry.

Best Practices

- As defined in F.S. 1006.23, the School District staff collaborates with the Sheriff's crossing guards, City and County Public Works and FDOT to evaluate a school's walk zone and its hazardous walking conditions as defined.
- In effort to avoid the inter-mingling of elementary, middle, and high school traffic, school arrival and dismissal, Volusia County School District has a three-tiered bell schedule. Further, each school separates bus traffic from parent pick-up drop-off traffic.
- It is necessary to review all new development plans within the school walk zone to ensure that developers are providing sidewalks on either side of the road and maintaining sidewalk connectivity and networking to the school. Volusia County School District is a member of city and county development review teams and reviews new site plans and subdivisions to ensure adequate area is designated for school bus stops and sidewalks. City and County land development regulations require sidewalks.
- All new schools should be planned with good sidewalk connectivity/network to all neighborhoods and developments within its walk zone.
- As required by F.S. 1006.23, Volusia County School District provides bus service to students who do not have access to safe routes to school.
- There are certain programs which promote walking and bicycling to school. Volusia County School District currently participates in such programs (e.g. Walking School Bus, SAFE KIDS Walk This Way, and International Walk to School Day). Bicycle and pedestrian safety is part of the existing elementary physical education curriculum.
- A No Backpack policy should be considered to encourage walking and bicycling to school and consideration to the following is recommended:
    - All textbooks should be accessible on-line
    - A set of textbooks should be available at the local library
    - Provide students with a set of textbooks to keep at home
- Each school should enforce bicycle safety, helmet usage should be closely monitored for compliance, and PTA meetings to ensure parent support and compliance with these policies should be promoted.
- All teachers assisting during arrival/dismissal should wear safety vests when they are crossing students or interacting with vehicular traffic.

9

MASTER IMPROVEMENT PLAN

Refer to Figure 4 of the Assessment Section for the recommendations. It highlights the locations of existing conditions as well as the proposed improvements. The following sections will provide more details on the recommendations shown in Figure 4.

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CONSTRUCTABILITY MATRIX

The matrix in Table 5 shows the estimated cost of sidewalk-related projects that are recommended for improvement. FDOT's *2010 Basis of Estimates* manual was used to develop the Constructability Matrix. The estimated construction costs for these recommendations are $3,927.61. The costs shown in the Constructability Matrix includes material and labor fees. As mentioned before, these improvements are based on field observations and should be verified by a contractor prior to construction.

Table 6
Constructability Matrix
Ormond Beach Middle School Implementation Report

PRIORITY #	PROJECT NAME	DESCRIPTION		PAY ITEM NUMBER	PAY ITEM DESCRIPTION	PLAN QTY	UNIT MEASURE	UNIT PRICE	ESTIMATED COST
		LOCATION	RECOMMENDATION						
1	Pavement Markings	Ridgewood Avenue at Domicilio Avenue	Convert the exiting crosswalks at this intersection to special emphasis crosswalks	711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	85.00	LF	$3.53	$300.05
				711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	85.00	LF	$3.53	$300.05
				711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	63.00	LF	$3.53	$222.39
	Pedestrian Crossing Signs		Install "In-Street Ped Crossing" signs R1-6 per Chapter 7 of the Manual on Uniform Traffic Control should be installed.	700-20-11	SINGLE POST SIGN, F&I, LESS THAN 12 SF	1.00	AS	$242.86	$242.86
				700-20-11	SINGLE POST SIGN, F&I, LESS THAN 12 SF	1.00	AS	$242.86	$242.86
				700-20-11	SINGLE POST SIGN, F&I, LESS THAN 12 SF	1.00	AS	$242.86	$242.86
								Subtotal:	**$1,551.07**
2	Sidewalk Installation	Domicilio Avenue at Northbrook Drive	Extend sidewalk to intersection	522-1	SIDEWALK CONC, 4" THICK	13.00	SY	$45.22	$587.86
			Install sidewalk ramp according to Std. Index No. 310	522-1	SIDEWALK CONC, 4" THICK	1.00	SY	$45.22	$45.22
	Pavement Markings		Special emphasis crosswalk should be installed	711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	75.00	LF	$3.53	$264.75
				711-11-123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	60.00	LF	$1.84	$110.40
	Pedestrian Crossing Signs		Install "In-Street Ped Crossing" signs R1-6 per Chapter 7 of the Manual on Uniform Traffic Control should be installed.	700-20-11	SINGLE POST SIGN, F&I, LESS THAN 12 SF	1.00	AS	$242.86	$242.86
								Subtotal:	**$1,251.09**
3	Pavement Markings	Sanchez Avenue at N Yonge Street	Special emphasis crosswalk should be installed	711-11-125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	85.00	LF	$3.53	$300.05
				711-11-123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	68.00	LF	$1.84	$125.12
								Subtotal:	**$425.17**
								Total:	**$ 3,927.61**

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RECOMMENDED PRIORITY PROJECTS

This section of the report provides additional information about each project in ranking order.

Background: The VTPO is continuing in its capacity to improve the safety of the school walk zone for walkers and bicyclists who live within the school walk zone. The safety issues addressed within this report will be reviewed by the TPO for potential funding to implement the recommended changes and, thereby, improve the safety of the school walk zone, where possible. The safety issues which produce the following five sidewalk recommendations are that gaps in sidewalk coverage along major school routes may force students to walk or bicycle within the travelled way. Provision of well connected sidewalks dictates exactly where students should walk.

Project No. 1:	**Ridgewood Avenue and Domicilio Avenue**
Submitting Agency:	City of Ormond Beach
Project Location:	Intersection of Ridgewood Avenue and Domicilio Avenue
School Served:	Ormond Beach Middle School
Project Description:	Special emphasis pavement markings and ped crossing signs
LAP Coordinator:	City of Ormond Beach
Maintaining Agency:	City of Ormond Beach
Project Description:	This project includes converting the three existing crosswalks at the intersection of Ridgewood Avenue and Domicilio Avenue to special emphasis crosswalks and installing “In-Street Ped Crossing” signs R1-6c.
Estimated Cost:	The estimated cost for this project is $1,551.07.
Project No. 2:	**Domicilio Avenue and Northbrook Drive**
Submitting Agency:	City of Ormond Beach
Project Location:	Intersection of Domicilio Avenue and Northbrook Drive
School Served:	Ormond Beach Middle School
Project Description:	Sidewalk installation and special emphasis pavement markings and ped crossing signs
LAP Coordinator:	City of Ormond Beach
Maintaining Agency:	City of Ormond Beach
Project Description:	This project includes extending the existing eight foot sidewalk 15 feet to the intersection, installing a sidewalk ramp and special emphasis crosswalk at the intersection and installiing “In-Street Ped Crossing” signs R1-6c.

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Estimated Cost:	The estimated cost for this project is $1,251.09.

Project No. 3:	**Sanchez Avenue at N Yonge Street**
Submitting Agency:	City of Ormond Beach
Project Location:	Intersection of Sanchez Avenue and N Yonge Street
School Served:	Ormond Beach Middle School
Project Description:	Special emphasis Pavement Markings
LAP Coordinator:	City of Ormond Beach
Maintaining Agency:	City of Ormond Beach

Project Description: This project includes installing a special emphasis crosswalk at the intersection of Sanchez Avenue and N Yonge Street.

Estimated Cost: The estimated cost for this project is $425.17.