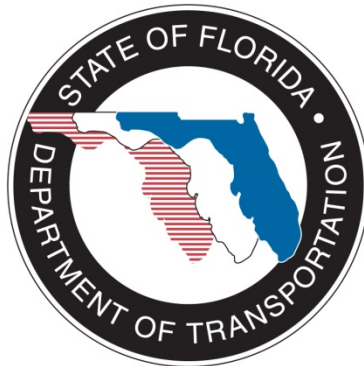


Highway-Rail Grade Crossing Safety Action Plan



Florida Department of Transportation

August 26, 2011



Table of Contents

I. INTRODUCTION	1
A. FLORIDA	1
B. FLORIDA RAIL SYSTEM	1
C. FLORIDA RAILROAD CROSSINGS	2
II. STATISTICS	3
III. CHALLENGES	7
IV. FLORIDA’S HIGHWAY-RAILROAD IMPROVEMENT PROGRAM	9
A. HISTORY	9
B. FUNDING	10
C. FLORIDA’S STRATEGIC HIGHWAY SAFETY PLAN	10
D. CROSSING STATISTICS	11
E. INCIDENT STATISTICS	13
V. ACTION PLAN STRATEGIES	19
A. GRADE CROSSING CLOSURES / CONSOLIDATIONS	19
B. SIGNAL SAFETY PROGRAM	21
1. WARNING DEVICE UPGRADES	22
2. INTERCONNECTION	22
3. MULTI-INCIDENT LOCATIONS	23
C. GRADE SEPARATIONS - NEW AND RECONSTRUCTION	27
D. CORRIDORS	31
E. PEDESTRIAN ISSUES AND AMERICAN WITH DISABILITIES ACT (ADA)	32
F. RESEARCH AND ANALYSIS THROUGH DATA IMPROVEMENTS	34
G. PUBLIC EDUCATION AND AWARENESS PROGRAMS: OPERATION LIFESAVER.....	34
H. LAW ENFORCEMENT.....	35

List of Figures

FIGURE 1. UNITED STATES OF AMERICA HIGHWAY-RAIL GRADE CROSSING STATISTICS.....	3
FIGURE 2. FLORIDA HIGHWAY-RAIL GRADE CROSSING STATISTICS.....	4
FIGURE 3. UNITED STATES OF AMERICA RAILROAD TRESPASS STATISTICS.....	5
FIGURE 4. FLORIDA TRESPASS STATISTICS	6
FIGURE 5. POPULATION DENSITY BY COUNTY MAP, 2009; SOURCE: BEBR, POPULATION ESTIMATES 2009	7
FIGURE 6. FLORIDA INCIDENTS BY COUNTY (JANUARY 2005 TO DECEMBER 2009); SOURCE: FEDERAL RAILROAD ADMINISTRATION	8
FIGURE 7. HIGHWAY-RAIL GRADE CROSSING LOCATIONS, 2011	12
FIGURE 8. PERCENTAGE OF INCIDENTS AT CROSSINGS WITH ACTIVE WARNING DEVICES	18

List of Tables

TABLE 1. FLORIDA HIGHWAY-RAIL CROSSINGS ⁶	12
TABLE 2. FLORIDA CROSSING INCIDENTS - PUBLIC AND PRIVATE CROSSINGS.....	13
TABLE 3. TYPE OF CROSSING – ALL INCIDENTS (FLORIDA, 2005 TO 2009).....	14
TABLE 4. TYPE OF INCIDENT – ALL INCIDENTS (FLORIDA, 2005 TO 2009).....	14
TABLE 5. TYPE OF WARNING DEVICE AT CROSSING – ALL INCIDENTS (FLORIDA, 2005 TO 2009)	15
TABLE 6. TYPE OF CROSSING – MULTI-INCIDENT LOCATIONS (FLORIDA, 2005 TO 2009).....	16
TABLE 7. TYPE OF INCIDENT – MULTI-INCIDENT LOCATIONS (FLORIDA, 2005 TO 2009).....	16
TABLE 8. TYPE OF WARNING DEVICE AT CROSSING – MULTI-INCIDENT LOCATIONS (FLORIDA, 2005 TO 2009)	17
TABLE 9. TYPE OF AREA – MULTI-INCIDENT LOCATIONS (FLORIDA, 2005 TO 2009)	17
TABLE 10. FLORIDA CROSSING CLOSURES (2002 - 2011).....	19
TABLE 11. MULTI-INCIDENT LOCATIONS EVALUATED FOR REMEDIAL MEASURES	23
TABLE 12. RAILROAD CROSSINGS WITH MULTIPLE COLLISIONS - REMEDIAL MEASURES FOR GIVEN DRIVER CONTRIBUTING CAUSES	25
TABLE 13. RAILROAD CROSSINGS WITH MULTIPLE COLLISIONS - REMEDIAL MEASURES FOR GIVEN PHYSICAL CONTRIBUTING CAUSES	26
TABLE 14. GRADE SEPARATION PROJECTS (2005 TO 2011).....	27
TABLE 15. GRADE SEPARATION PROJECTS (MID-TERM).....	28
TABLE 16. GRADE SEPARATION PROJECTS (MID-TO-LONG TERM)	29
TABLE 17. GRADE SEPARATION PROJECTS (LONG TERM)	29
TABLE 18. GRADE SEPARATION PROJECTS (TO BE DETERMINED TERM)	31
TABLE 19. LIST OF RECENT CORRIDOR REVIEWS	31
TABLE 20. LIST OF POTENTIAL CORRIDOR PROJECTS	32

I. INTRODUCTION

It is the goal of the State of Florida to carry out a highway-rail safety program that promotes a safe, economical and efficient transportation system in the public interest. This goal is accomplished through the cooperation of the Florida Department of Transportation (FDOT) and our transportation partners. These efforts include furthering rail safety education, enforcement and engineering in compliance with all applicable state laws, federal laws, and current practices.

The size of the rail safety challenge in Florida is underscored by noting:

A. Florida¹²

- Florida, now the fourth most populous state, has grown steadily throughout the past several decades with a 2009 population of over 18.5 million people.
- Throughout the 1990's, Florida's population grew at an average rate of 2.2 percent annually, while growth rates from 2000 to 2009 averaged 1.8 percent annually.
- From 2000 to 2009, Florida was estimated to have added 316,900 new residents annually. Forecasts of population from the Bureau of Economic and Business Research (BEBR) at the University of Florida indicate that Florida is expected to reach over 25.1 million people by 2035, an increase of 57 percent from 2000.
- For 2003 to 2006, the Center for Urban Transportation Research estimated that Florida's visitors account for about 8.0 to 8.4 percent of all vehicle travel in the state.
- The estimated annual number of visits to Florida by non-state residents increased from 73.8 million in 2002 to 83.8 million in 2006. This is an increase of about 14 percent during this 5-year period. In 2009, total visitors dropped to 80.9 million; however, 2010 statistics show that numbers are rebounding with a total of 82.3 million visitors.³

B. Florida Rail System⁴

- The Florida rail system is comprised of 2,786 miles of track routes owned by 15 line-haul railroads and terminal or switching companies, as well as 81 miles owned by the State of Florida.

- Railroad companies operating within Florida include two (2) Class I Railroads (CSX Transportation and Norfolk Southern Corporation), one (1) Class II (Florida East Coast Railway), 11 Class III (Alabama and Gulf Coast Railway, Apalachicola Northern Railway, Bay Line Railroad, First Coast Railroad, Florida West Coast Railroad, Florida Central Railroad, Florida Midland Railroad, Florida Northern Railroad, Georgia and Florida Railway, Seminole Gulf Railway, and South Central Florida Express) and one (1) railroad specializing in switching and terminals (Talleyrand Terminal).
- These railroads carried about 1.6 million carloads, over 83 million tons of freight, and paid \$364 million in wages to 5,600 workers in 2007.
- Florida's rail system serves 14 deep water seaports spread throughout the state through which over 114 million tons of commodities passed in 2008.⁵

C. Florida Railroad Crossings⁶

- As of July 2011, there are 3549 (79%) public and 954 (21%) private active at-grade highway-rail grade crossings in Florida.
- Of the state's 4,503 at-grade highway-rail crossings, approximately 65 percent have active warning devices and 35 percent have passive warning devices. For public at-grade highway-rail crossings, approximately 80 percent have active warning devices and 20 percent have passive warning devices.
- Between 1980 and 2009, collisions at public highway-rail grade crossings declined by 82 percent, injuries by 82 percent and fatalities by 70 percent, while vehicle miles of highway travel increased by over 80 percent.⁷

II. Statistics

Since 1974, approximately \$3.8 billion has been obligated for highway-rail grade crossing improvements in the United States through Federal transportation funding, including the Federal Highway Administration Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) program (formerly known as “Section 130”). Evaluations of safety improvements made under this program indicate that it has helped prevent over 10,500 fatalities and 51,000 nonfatal injuries.⁸

In the 1970s, there were approximately 12,000 collisions between trains and motor vehicles annually in the United States. By 2009, the number of train/motor vehicle collisions had been reduced by approximately 84 percent to 1,896.

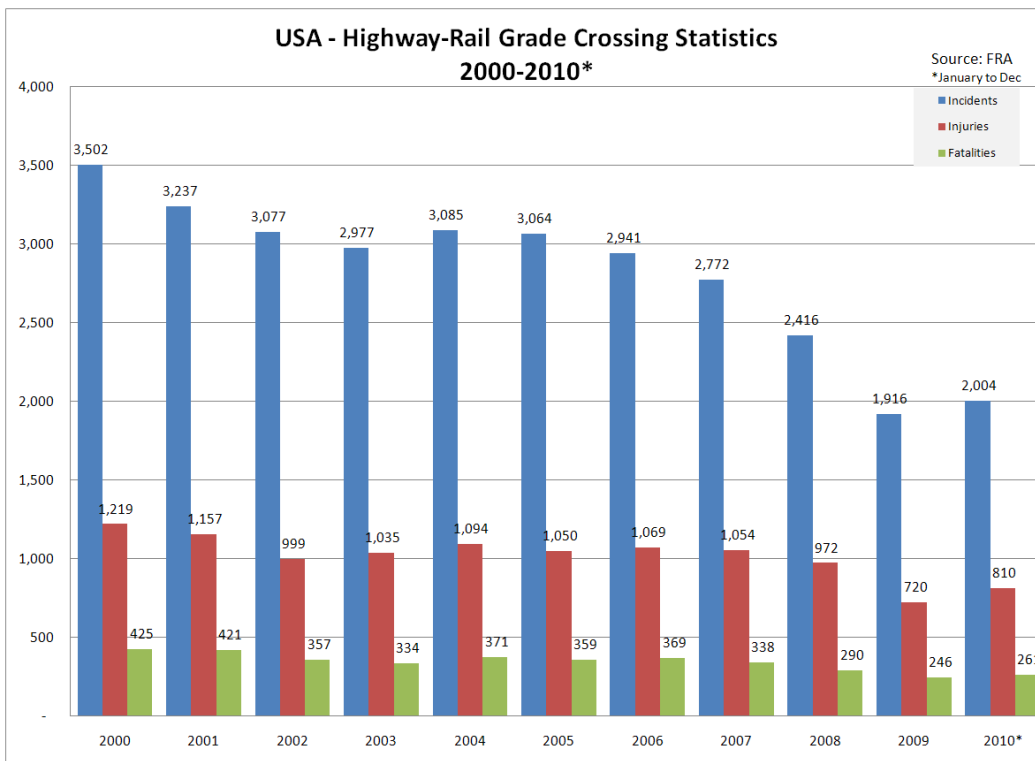


Figure 1. United States of America Highway-Rail Grade Crossing Statistics

With more than 250,000 public and private highway-rail grade crossings in the United States, improving grade crossing safety is an enormous challenge. According to a U.S. Department of Transportation report, 94 percent of all grade crossing and 87% of grade crossing fatalities⁸ incidents are caused by risky driver behavior, which are difficult to reduce through physical improvements alone. The remaining 6 percent resulted from vehicles stuck, stalled, or abandoned at crossings.

According to Florida Statutes 335.141 *Regulation of public railroad-highway grade crossings; reduction of hazards* – the Florida Department of Transportation has regulatory authority over all public railroad-highway grade crossings in the state, including the authority to issue permits which are required prior to the opening and closing of such crossings.⁹ The Department, in cooperation with railroad companies operating in the state, develops and adopts a program for the expenditure of funds available for the implementation of remedial projects for the reduction of the hazards at public railroad-highway grade crossings.

From 2000 to 2007, Florida’s crossing incidents held relatively steady with around 100 incidents per year and fatalities ranging from 10 to 25 annually. Beginning in 2008, the number of incidents significantly decreased. The direct cause of this decrease can be attributed to many factors including: improved crossing warning devices, increased outreach and education, safer driving behavior, and changes in travel trends. During 2007 and 2008, fuel prices increased dramatically, which has contributed to declining annual total miles traveled in Florida since 2007. It will take several years to fully understand the adjustments in travel behavior related to travel costs increases and the impact of safety improvements to highway-rail grade crossings safety in Florida.

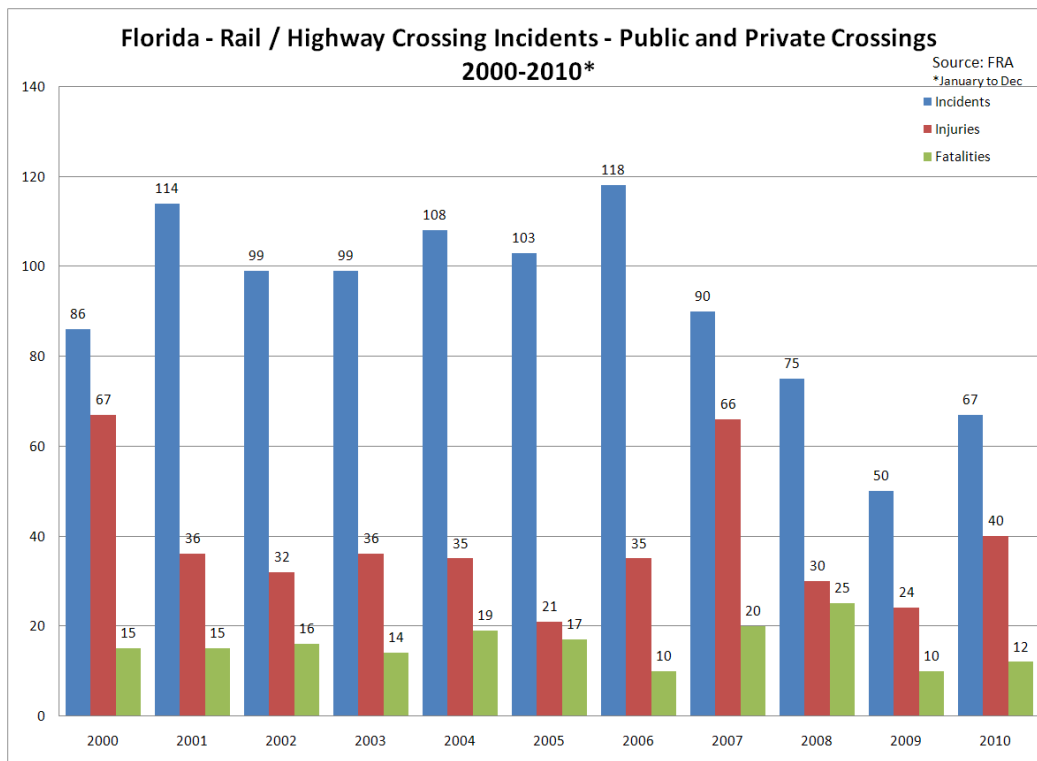


Figure 2. Florida Highway-Rail Grade Crossing Statistics

Since 1973, the Florida Department of Transportation has worked to reduce incidents at highway-rail grade crossings. The Florida Department of Transportation has developed the Strategic

Highway Safety Plan (SHSP) to focus funding and other resources strategically on those problem areas where the opportunity for improvement is greatest, measured by reductions in fatalities and serious injuries. Improving the safety of Florida’s surface transportation system for residents and visitors is the unifying goal of Florida’s safety community and the overarching goal of SHSP. The SHSP identifies strategic safety priorities in both public and private agencies and organizations at the national, state, regional, and local levels.

Results of the SHSP, revealed in Figure 2, show that highway/rail crossing incidents have reduced from a three year average of 110 per year prior to 2007 to a three year average of 64 per year after 2007, a 42% reduction. Although, the number of collisions at highway-rail grade crossings in Florida has dropped significantly, too many collisions and fatalities still occur.

In addition to highway-rail grade crossings incidents, the Department understands the need to also address trespass incidents along Florida’s rail corridors.

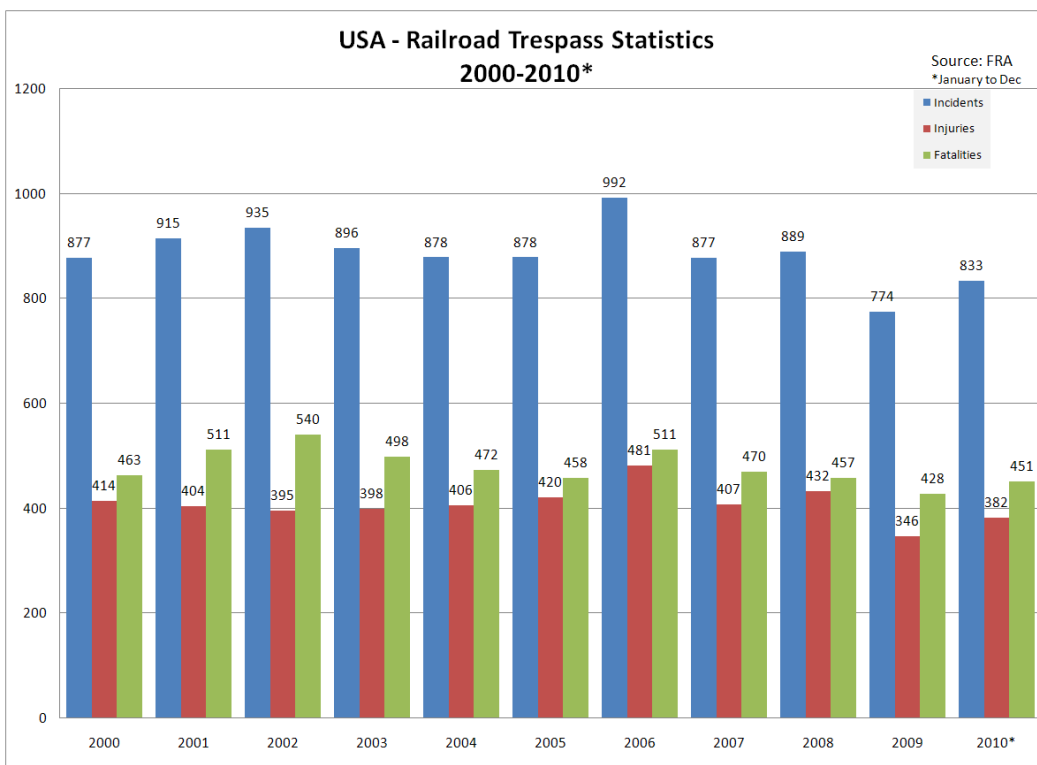


Figure 3. United States of America Railroad Trespass Statistics

Deaths among trespassers on railroad rights-of-way (2,326 in the 5-year period 2005-2009) are the leading cause of fatalities attributable to railroad operations in the United States. In 1990, the number of trespassers who died on rail rights-of-way exceeded 500 for the first time. Since 1997, trespasser fatalities have exceeded fatalities at grade crossings as the largest category of rail-

related deaths. Figure 4 shows that the reduction in trespass incidents has not matched the overall reduction of incidents in Florida.

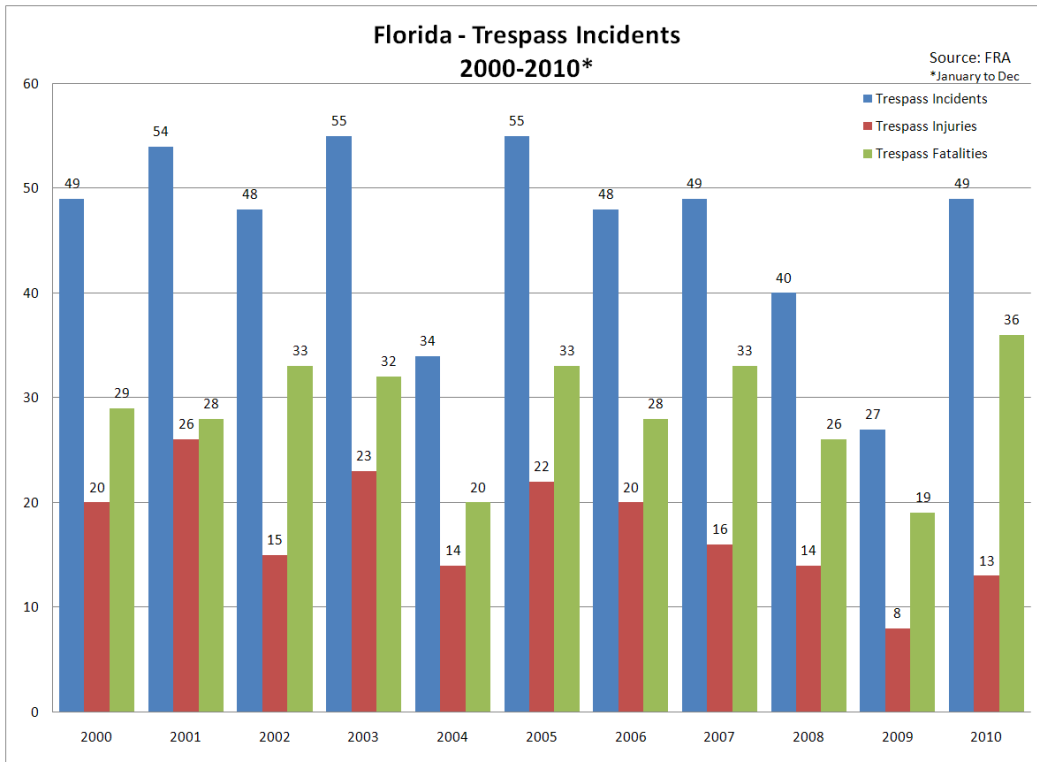


Figure 4. Florida Trespass Statistics

Operation Lifesaver, a non-profit organization providing public education programs to prevent collisions, injuries and fatalities on and around railroad tracks and highway-rail grade crossings is a key partner to the Florida Department of Transportation. Together our objective is to raise awareness of the amount of trespassing on railroad right-of-way and the dangers involved. Addressing these issues is complicated by the fact that trespassers are not a single, consistent group. Operation Lifesaver is Florida’s, as well as the nation’s, most important educational tool to inform people of the tragic results that can occur in entering railroad right-of-way illegally.

The goal of Operation Lifesaver is to continuously improve safety within the railroad right-of-way and at highway-rail grade crossings through education, engineering and enforcement. Partnerships between local, state, and federal governments, railroads, transit agencies, law enforcement, safety organizations, and the public is essential to reducing grade crossing and trespass incidents.

III. Challenges

As a peninsula, Florida has a unique geography, with most of its vehicle trips having an origin and destination within the state. Florida is an urbanized state with a high population density as demonstrated by the following facts:

- Florida is the fourth most populous state and the 22nd largest state in the United States. This contributes to significant traffic congestion, which is evidenced with Florida having the 11th highest (third highest in southeast US) average commute time to work at 25.9 minutes. The urbanized nature of the state, as well as the high number of at-grade crossings in urban areas contributes to significant traffic congestion near railroad crossings.¹⁰

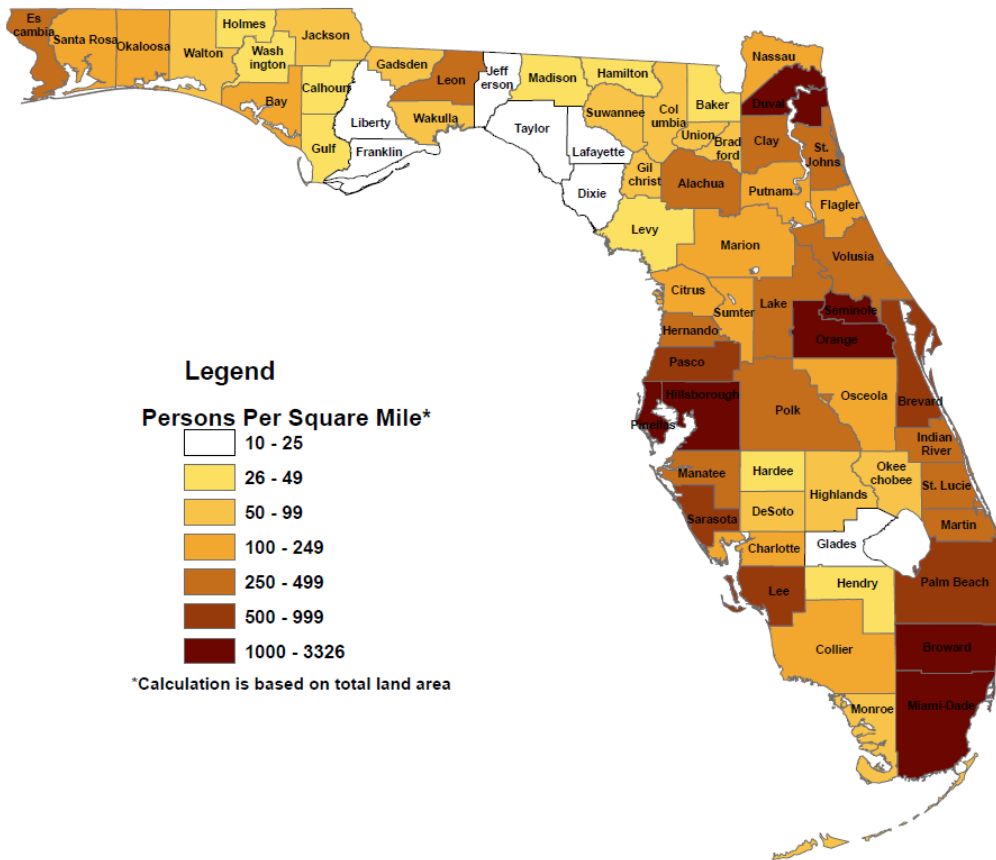


Figure 5. Population Density by County Map, 2009; Source: BEBR, Population Estimates 2009

- Florida’s high population on an averaged sized land mass results in a population density of 343.8 persons/sq mi, which is the 8th highest rate of the United States and the highest in the Southeast US.
- Florida’s high density and the fact that it has the third highest number of highway-vehicle miles traveled at 198.6 trillion¹¹ are indicators of the urbanized nature of the state, which contributes to increased collisions overall and not just at highway-rail crossings.

- This observation is further reflected by where in Florida most highway-rail crossing collisions have occurred. During the Rail Safety Improvement Act of 2008 (RSIA) period from 2006 to 2008, Florida’s highway-rail collisions primarily occurred in the most urbanized areas, with 70% occurring in the 10 largest counties. From 2000 to 2010, the percentage of grade-crossing collisions occurring in the 10 largest counties was over 65%.¹² Comparing the number of collisions by county, shown in Figure 6, to population density, shown in Figure 5, shows a close correlation to urbanization and increased highway-rail crossing collisions.
- Florida’s urbanized counties also have a high density of crossings per rail mile. In addition, these areas experience high amounts of freight and passenger rail traffic.

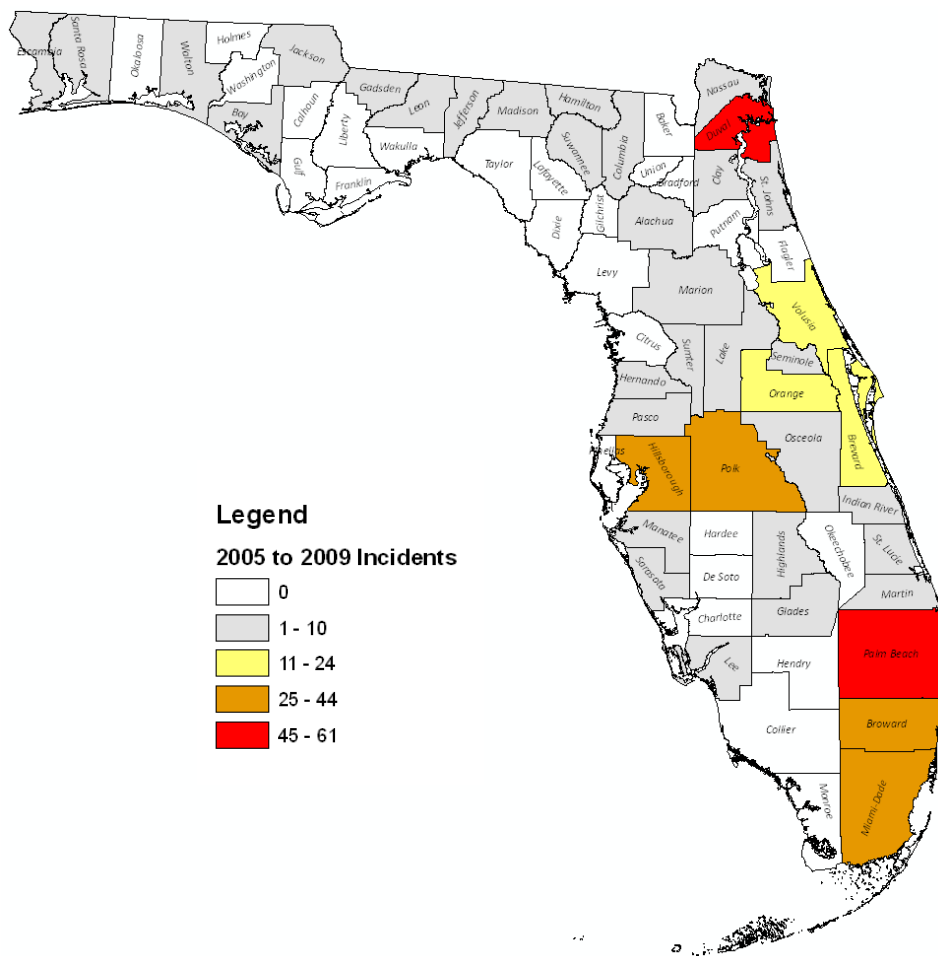


Figure 6. Florida Incidents by County (January 2005 to December 2009); Source: Federal Railroad Administration

IV. Florida's Highway-Railroad Improvement Program

A. History

On December 7, 1973 the Federal Highway Administration issued instructions to the State of Florida to implement a Railroad-Highway Improvement Program. The Department of Transportation's Central Safety Office was assigned to manage this program for the state. The program was required to:

- develop an inventory of all crossings (maintained by the Department's Statistics Office until Rail Office acquired the responsibility);
- assign U.S. Department of Transportation (USDOT) inventory number to each crossing; and,
- establish a formula to prioritize the most hazardous crossings to receive Federal Funding.

The Central Utility/Rail Office supported the Department's Safety Office by establishing a District Railroad Coordinator position in each geographic area of the state to inventory crossings within their District boundaries. This information was then submitted to the FRA to create a database of crossings nationwide. Districts furnish installation agreements to the Central Utility/Rail Office in order to negotiate and fund candidate projects with each individual railroad company.

The Central Safety Office along with a federal grant to Florida State University initially designed a safety index formula to prioritize these crossings that included certain variables at each crossing to indicate which crossings were the most hazardous within the state. Some of the variables included: number of incidents, train traffic, vehicular traffic, and train/vehicle speeds. A reevaluation of the formula was performed in 2005 to include better data, additional parameters, and a sensitivity analysis on all parameters.

Once the initial crossing inventory was completed and the priority formula finalized, the Central Safety Office along with the District Railroad Coordinators began diagnostic field reviews and made recommendations for signal upgrades. Initially, it was agreed for crossings off the State Highway System, cities and counties must participate in the annual signal maintenance costs and fund 10% of the cost to install safety improvements. Later, local governments were not required to assist in the funding of safety improvements; however, they still contribute to the cost of maintaining the equipment.

In the mid 1990's, the Department transitioned the program functions from the Central Safety Office to the Central Rail Office to keep all rail activities under one office and to better reflect Federal Highway Administration policies and regulations. This organizational modification also expanded the use of other safety applications at crossings. Crossing surfaces were upgraded so vehicular traffic would pay more attention to approaching trains than rough crossing surfaces. The

Central Rail Office implemented a constant warning time program at selective crossings that had variable train speeds and funded a low cost gate mechanism replacement program at crossings that had antiquated gates to prolong the life of the gate system. Other low cost programs that were implemented include:

- replacement of aged passive signs with new signs and reflective strips on each side of the sign support;
- new pavement markings on and off the State Highway System;
- median barrier systems;
- replacement of existing 8 inch lens with 12 inch lens; and
- replacement of incandescent lights with light emitting diode (LED) lights for east/west approach crossings.

B. Funding

At the beginning of the program, funding allotments were \$4.2 million and would support a candidate crossing program of 70 to 80 crossings. Today, there is an allotment of \$7.5 million which allows approximately 35 to 45 crossings to be improved. The lesser number of projects implemented each year reflects the increased costs of signal installation parts and labor. The Department's annual *Before and After Report*, submitted to the Federal Highway Administration each year, still reflects the down trend of fatalities at improved crossings around the state.

C. Florida's Strategic Highway Safety Plan

The Florida Strategic Highway Safety Plan was developed by the Florida Department of Transportation in late 2005 to provide a safer surface transportation system for residents, businesses, and visitors. It is included as an element of the 2060 Florida Transportation Plan (FTP) to address the State's historically high traffic fatality rates with a special emphasis on high-fatality areas, including intersection, pedestrian, and bicycle fatalities. The plan utilizes the 4-E approach (engineering, enforcement, education, and emergency management) to focus resources where opportunities for safety improvements are the greatest based on best available data and trends.

The Florida Strategic Highway Safety Plan is managed by an executive committee made up of agencies and organizations involved with transportation facilities and safety, law enforcement, community health, and community education. The members of the executive committee are listed as follows:

- Florida Department of Highway Safety and Motor Vehicles
- Florida Department of Education
- Florida Department of Health

- Florida Department of Transportation
- Florida Highway Patrol
- Florida Operation Lifesaver
- Motor Carrier Compliance
- Metropolitan Planning Organization Advisory Council
- Florida Police Chiefs Association
- Florida Sheriffs Association
- Federal Highway Administration
- Federal Motor Carrier Safety Administration

The recently completed 2060 Florida Transportation Plan recommends the State of Florida continue with updating and implementing the Florida Strategic Highway Safety Plan as an implementation strategy for providing a safe and secure transportation system for all users. The 2060 FTP recognizes the progress that has been made to reduce roadway fatalities in Florida, which in 2009 was 1.3 fatalities per 100 million vehicle miles traveled – the lowest rate in the 40 years this statistic has been recorded.

The four main areas of emphasis and the percentage of Florida fatalities in 2005 attributable to them are: aggressive driving (34.8%), intersection crashes (41.2%), vulnerable road users (19.8%), and lane departure crashes (63.6%). The measures adopted to reduce these factors that contribute to fatalities in the State are increased law enforcement, increased education efforts, and identifying roadway features that contribute to crashes and develop mitigation plans for them. Highway-rail grade crossing projects focus on improving conditions to address each of these four main areas of emphasis.

D. Crossing Statistics

Within the state, the Department has the statutory responsibility to improve safety at public highway-rail crossings. As of July 2011, there are 4,503 at-grade highway-rail crossings in Florida, of which 3,549 are on public roads and 954 are on private roads. Florida also has 22 pedestrian crossings in the state with 15 at-grade crossings and 7 as grade separated crossings. The Department has no jurisdiction over pedestrian crossings in the state. Agreements and improvements to pedestrian crossings are handled by the local government agency and the railroad partner.

The table below summarizes the quantity of open highway-rail crossings by type.

Table 1. Florida Highway-Rail Crossings⁶

Crossing Type	Location	Crossings	Percent
Public	At-Grade	3,549	73.4%
Public	Railroad Over	49	1.0%
Public	Railroad Under	280	5.8%
Public Total		3,878	80.2%
Private	At-Grade	954	19.7%
Private	Railroad Over	2	0.0%
Private	Railroad Under	0	0.0%
Private Total		1,012	19.8%
Grand Total		4,905	100.00%

The figure below shows the locations of open highway-rail crossings by type.



Figure 7. Highway-Rail Grade Crossing Locations, 2011

For safety improvements at crossings located on public roads, the Department pays the majority of the costs utilizing federal funds.

E. Incident Statistics

From 2000 to 2009, 942 highway-rail grade crossing incidents occurred in Florida. These incidents mostly occurred in the state’s urban areas. As mentioned before, the top 10 counties in numbers of incidents during the period accounted for nearly two thirds (63%) of the state’s population. In total, fifty-three (53) of Florida’s sixty-seven (67) counties recorded incidents; however, only sixty (60) of Florida’s counties have any highway-rail grade crossings at all. The five counties that have highway-rail grade crossings but had no incidents in the period 2000 to 2009 have a total of 70 open, active highway-rail grade crossings as follows: Okaloosa (20 crossings), Holmes (21 crossings), Franklin (15 crossings), Hendry (23 crossings), and Hardee (24 crossings). These are also some of the most rural counties in the state, have less rail traffic, and have a greater number of grade separations due to terrain.

Table 2. Florida Crossing Incidents - Public and Private Crossings

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*
Incidents	86	114	99	99	108	103	118	90	75	50	67
Fatalities	15	15	16	14	19	17	10	20	25	10	12
Injuries	67	36	32	36	35	21	35	66	30	24	40

* Note: 2010 values through December 31, 2010

The majority of collisions and fatalities in Florida occur at crossings equipped with train activated warning devices, such as automatic flashing light signals or automatic flashing light signals and gates. During the 2000’s, almost half of the collisions (45%) occurred at a crossing that had a previous collision in the period. However, since substantial improvements to the Florida system have occurred over the decade, the detailed review will focus on the five-year period from 2005 to 2009.

During 2005 to 2009, 436 highway-rail grade crossing incidents occurred in Florida. According to the FRA Office of Safety Analysis data, 434 of these incidents have detailed incident reports available for review from the FRA Office of Safety Analysis dataset. According to the analysis of the data for the five-year period, it was determined the majority of incidents:

- occur at public crossings,
- are a result of risky driver behavior,
- involve motor vehicles, and
- occur at locations with active warning devices.

The detailed analysis of the crossing incidents and the basis of these conclusions can be seen in Table 3, Table 4, and Table 5. The tables below and the records from the FRA Office of Safety Analysis contain some incidents listed as suicides. The FRA doesn't collect recorded suicides; however, the cause of these records might have been initially entered and then the cause modified.

Table 3. Type of Crossing – All Incidents (Florida, 2005 to 2009)

Type of crossing	Incidents	Percentage
Public	379	87%
Private	55	13%

Table 4. Type of Incident – All Incidents (Florida, 2005 to 2009)

Type of Incident – Vehicle	Incidents	Percentage
Stopped on	87	20.0%
Around gate	118	27.2%
Did not stop/yield	90	20.7%
Stalled	27	6.2%
Vehicle Abandon	10	2.3%
Car Crash	13	3.0%
Onto to Tracks	19	4.4%
Traffic	12	2.8%
Distracted	10	2.3%
Low Ground Clearance	3	0.7%
Suicide	2	0.5%
Device Malfunction	1	0.2%
<i>Sub Total</i>	392	90.3%
Type of Incident – Non vehicle	Incidents	Percentage
Pedestrian	30	6.9%
Pedestrian - Suicide	6	1.4%
Bicycle	6	1.4%
<i>Sub Total</i>	42	9.7%
Total	434	100.0%

Table 5. Type of Warning Device at Crossing – All Incidents (Florida, 2005 to 2009)

Type of Crossing	Incidents	Percentage
Passive Crossings		
Crossbuck	75	17.3%
None	6	1.4%
<i>Sub Total</i>	<i>81</i>	<i>19%</i>
Active Crossings without Gates		
Flashing Lights	12	2.8%
Cantilever Flashing Lights	8	1.8%
Traffic Signal	2	0.5%
<i>Sub Total</i>	<i>22</i>	<i>5%</i>
Active Crossings with Gates		
Flashing Lights and Gates	146	33.6%
Cantilever Flashing Lights and Gates	181	41.7%
<i>Sub Total</i>	<i>327</i>	<i>75%</i>
Other Crossings		
Flagged by Crew	4	0.9%
Total	434	100.0%

Of the 434 total incidents, 135 are multiple incident locations (31% of total incidents). The following tables provide additional information regarding the multi-incident crossings. According to the analysis of the data for the five-year period for just the multi-incident crossings, the same conclusions as noted above still hold. It was determined the majority of incidents:

- occur at public crossings (greater percentage than data from all incidents),
- are a result of risky driver behavior (equivalent percentage to data from all incidents),
- involve motor vehicles (lower percentage than data from all incidents), and
- occur at locations with active warning devices (greater percentage than data from all incidents).

The detailed analysis of the crossing incidents and the basis of these conclusions can be seen in Table 6, Table 7, and Table 8. Each detailed incident report collected by the FRA and available on the FRA website was reviewed to understand the nature of the incident for all multi-incident crossings.

The private crossing incidents occurred at four (4) locations with three (3) of the locations having crossbucks and the fourth location having flashing lights. For all these incidents at private

crossings the driver did not yield to the train. The determination and funding of improvements to these locations are the responsibility of the private crossing owner(s).

Table 6. Type of Crossing – Multi-Incident Locations (Florida, 2005 to 2009)

Type of crossing	Incidents	Percentage
Public	127	94%
Private	8	6%

Table 7. Type of Incident – Multi-Incident Locations (Florida, 2005 to 2009)

Type of Incident – Vehicle	Incidents	Percentage
Stopped on	39	28.9%
Around gate	28	20.7%
Did not stop/yield	16	11.1%
Stalled	9	6.7%
Vehicle Abandon	7	5.2%
Car Crash	6	4.4%
Onto to Tracks	4	3.0%
Traffic	3	2.2%
Distracted	3	2.2%
Low Ground Clearance	2	1.5%
Suicide	1	0.7%
<i>Sub Total</i>	<i>117</i>	<i>86.7%</i>
Type of Incident – Non vehicle	Incidents	Percentage
Pedestrian	12	8.9%
Pedestrian - Suicide	2	1.5%
Bicycle	4	3.0%
<i>Sub Total</i>	<i>18</i>	<i>13.3%</i>
Total	135	100.0%

Table 8. Type of Warning Device at Crossing – Multi-Incident Locations (Florida, 2005 to 2009)

Type of Crossing	Incidents	Percentage
Passive Crossings		
Crossbuck	6	4.4%
Active Crossings without Gates		
Flashing Lights	5	3.7%
Cantilever Flashing Lights	2	1.5%
<i>Sub Total</i>	7	5.2%
Active Crossings With Gates		
Flashing Lights and Gates	39	28.9%
Cantilever Flashing Lights and Gates	83	61.5%
<i>Sub Total</i>	122	90.4%
Total	135	100.0%

In addition, the type of the area (Urban/Rural) was also reviewed for the multi-incident locations as seen in Table 9. It was determined 84% of the incidents occur at urban crossings. This result is expected as the majority of Florida’s rail miles and crossings are located in urban areas and the risk of exposure in these areas is higher.

Table 9. Type of Area – Multi-Incident Locations (Florida, 2005 to 2009)

Type of Area	Incidents	Percentage
Urban	114	84%
Rural	21	16%

In addition, Figure 8 shows the percent of incidents at public crossings that occurred at locations that had active warning devices at the time of the incident. In the review period from 2005 to 2009, the percentages ranged from 85% to 95% of incidents occurred at active crossings. In cases where active devices are provided, often driver inattention or risky driver behavior contributes significantly to incidents. More detailed analysis of multi-incident locations follows in the Action Plan Strategies section of this document.

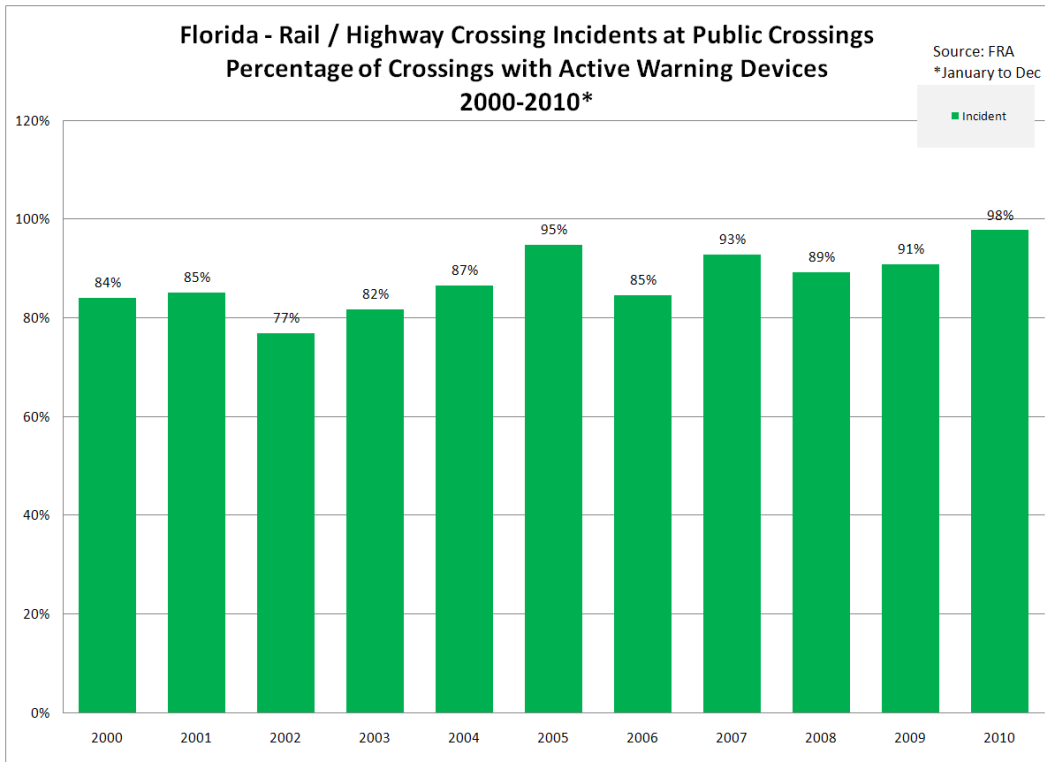


Figure 8. Percentage of Incidents at Crossings with Active Warning Devices

V. ACTION PLAN STRATEGIES

A. Grade Crossing Closures / Consolidations

The Federal Highway Administration’s August 2007 *Railroad-Highway Grade Crossing Handbook* specifically states: “The first alternative that should always be considered for a highway-rail at-grade crossing is elimination. Elimination can be accomplished by grade separating the crossing, closing the crossing to highway traffic, or closing the crossing to railroad traffic through the abandonment or relocation of the rail line. The major benefits of crossing elimination include reductions in collision, highway vehicle delay, rail traffic delay, and maintenance costs of crossing surfaces and traffic control devices.” The Department has regulatory authority over all public highway-rail grade crossings in the state, including the authority to issue permits which shall be required prior to the opening and closing of highway-rail grade crossings. With an emphasis on identifying and eliminating hazardous and redundant crossings, the Department manages the process in conjunction with railroad companies, local governments, and citizens. The risk of collisions is reduced by the elimination of redundant crossings; therefore, it is in the best interest of all parties involved to eliminate unnecessary crossings. Since 2002, the Department has fostered the closure of 85 public at-grade crossings and significantly decreased the percentage of remaining crossings that are equipped with passive warning devices.

Table 10. Florida Crossing Closures (2002 - 2011)

Crossing #	County	Location	RR
624283 A	Polk	E. Boulevard St, Bartow	CSX
623488 P	Lee	Alico Road, Lee County	Sem. Gulf
621409 U	Lee	Alico Road, Lee County	Sem. Gulf
623280 B	Lee	Market St, Ft. Myers	Sem. Gulf
927709 G	Polk	Bella Vista St., Lakeland	CSX
627573 T	Highlands	W. Canfield St, Avon Park	CSX
627582 S	Highlands	W. Canfield St, Avon Park	CSX
23045 D	Polk	W. Bay Avenue, Eagle Lake	FL Midland
620823 E	Nassau	Harts Road, Yulee, Nassau County	CSX
713304 L	Hamilton	Georgia Street, Jennings	Norfolk Southern
627869 S	Duval	Franklin St, Jacksonville	Tallyrand Terminal RR
620933 P	Clay	SR 16, Green Cove Springs, Clay County	Unknown
713552 K	Duval	Soutel Rd., Jacksonville	Norfolk Southern
620721 L	Baker	College St., Macclenny	CSX
621068 D	Duval	58th St, Jacksonville	USG
621067 W	Duval	Evergreen Ave, Jacksonville	USG
623365 D	Suwannee	Scriven Avenue, Live Oak	CSX
623366 K	Suwannee	Irvin Avenue, Live Oak	CSX
271815 X	Duval	Landon Avenue, Jacksonville	FEC
713509 E	Madison	SW Overton St (3rd St), Greenville	GA-FL Railnet
643314 X	Nassau	Clyatt Circle, Hilliard, Nassau County	CSX
621097 N	Duval	Acorn St., Jacksonville	CSX

622812 Y	Baker	Sam Griffis Rd., Olustee, Baker County	CSX
271806 Y	Duval	Flagler Avenue, Jacksonville	FEC
622805 N	Baker	Cypress St., Sanderson, Baker County	CSX
627486 P	Duval	State Road 228/ Maxville Blvd, Duval Co.	CSX
625514 J	Madison	Church St, Greenville	CSX
622815 U	Baker	Ocean St., Olustee	CSX
627497 C	Bradford	Middleburg Rd, Lawtey	CSX
713557 U	Duval	20th St, Jacksonville	Norfolk Southern
663347 P	Escambia	Texar Dr/SR 752, Escambia County	AL-Gulf Railway
663345 B	Escambia	Fairfield Dr/SR 292, Escambia County	AL-Gulf Railway
838266 C	Gulf	US98/ SR 30, Port St. Joe	AN
838265 V	Gulf	US98/ SR 30, Port St. Joe	AN
625688 F	Gadsden	Joyner Rd, Midway	CSX
339905 R	Holmes	1st Street (City St), Ponce de Leon	CSX
002773 Y	Bay	11th St, Panama City	The Bay Line Railroad
272428 J	Palm Beach	Iris Street, City of W. Palm Beach	FEC
272464 E	Palm Beach	4th Avenue S., City of Lake Worth	FEC
628131 S	Palm Beach	Boyd St., W. Palm Bch.	CSX
625070 T	Marion	W. Fort King Street, Ocala	CSX
622199 K	Orange	Hughey Ave, Orlando	CSX
625065 W	Marion	NW 4th Ave, Ocala	CSX
272098 F	Brevard	Stone Street, City of Cocoa Beach	FEC
643841 S	Orange	Ferris Ave, Orlando	CSX
643842 Y	Orange	Virginia Dr., Orlando	CSX
643878 G	Orange	Lake Highland Dr., Orlando	CSX
625078 X	Marion	SR 464/SW 17th St., Ocala	CSX
625319 J	Sumter	SR 44, Wildwood, Sumter County	CSX
622194 B	Orange	Garland Avenue, City of Orlando	CSX
12627184 M	Marion	N.W. 12th Ave. Ocala	FL Northern Railroad
621790 X	Lake	SR 46, Mount Dora	FI Central
N/A	Orange	Ringhaver Drive, Taft	CSX
625277 A	Orange	Sandy Lane, Orange Co.	FL Central
915144 J	Dade	Fuel Tank Rd, Miami-Dade	CSX
NA	Dade	Service Access Rd, Miami-Dade	CSX
631136 E	Dade	SW 172 nd Avenue, Miami-Dade	CSX
913482 T	Hillsborough	CR 39 S, Hillsborough County	Mosaic Fertilizer
626348 X	Hillsborough	Church Avenue, Tampa	CSX
626513 F	Hillsborough	Bougainvillea Avenue, Tampa	CSX
624881 N	Hernando	CR 476/ Lake Lindsey Road	CSX
626514 M	Hillsborough	McKinley Dr, Tampa	CSX
624373 Y	Hillsborough	35th Street, Tampa	CSX
624422 T	Hillsborough	Martin Luther King Blvd., Plant City	CSX
624880 G	Hernando	SR 700/US 98, Hernando County	CSX
626916 U	Hillsborough	5th Avenue	CSX
624468 G	Hillsborough	35th Street, Tampa	CSX
621442 U	Hillsborough	Riga Blvd., Hillsborough County	Industrial Park
621445 P	Hillsborough	Sabal Industrial Blvd., Hillsborough County	Industrial Park
624567E	Hillsborough	Coronet Rd., Hillsborough County	Coronet Industries, Inc.
621430 A	Hillsborough	Savarese Circle, Tampa	Republic National Distributing Co., LLC
626959 M	Hillsborough	26th Street, Tampa	American Can Spur sold to Ikea
626958 F	Hillsborough	28th Street, Tampa	American Can Spur sold to Ikea
626717 S	Pinellas	State Road 595 / 5th Ave., St. Petersburg	CSX

N/A	Hillsborough	Jersey Ave, Port Sutton, Hillsborough County	Exide Technologies
626874 K	Hillsborough	Anderson Road, Hillsborough County	CSX
626875 S	Hillsborough	Anderson Road, Hillsborough County	CSX
626882 C	Hillsborough	Anderson Road, Hillsborough County	CSX
626718 Y	Pinellas	16th Street North, St. Petersburg	CSX
626719 F	Pinellas	Burlington Ave N, St. Petersburg	CSX
626720 A	Pinellas	2nd Ave N, St. Petersburg	CSX
626721 G	Pinellas	1st Ave N, St. Petersburg	CSX
626722 N	Pinellas	Central Ave, St. Petersburg	CSX
626723 V	Pinellas	13th St S, St. Petersburg	CSX
626724 C	Pinellas	1st Ave S, St. Petersburg	CSX

The Department is committed to continuing the crossing consolidation effort. In fact, during Diagnostic Field Reviews each year, crossings are identified for potential closure. The Department also conducts a corridor analysis each year which provides notice of potential closures to stakeholders. The Department participates in this effort with incentive funds of \$7,500 per crossing closure.

B. Signal Safety Program

In the continuing effort to improve warning devices at public highway-rail grade crossings, the Department works to identify crossings where certain improvements could potentially increase safety, with the goal of reducing fatalities and injuries. Florida uses an inventory of rail system data to produce the annual Safety Index, in which crossings are ranked in order of potential risk. The rankings are made based on safety considerations, such as; incidents, vehicular traffic, posted vehicle speed, number of trains per day, maximum timetable train speed, and type of existing warning devices. The Safety Index systematically identifies crossings with higher risk. Priority crossings are reviewed and selected crossings undergo Diagnostic Field Reviews performed by the Department’s review teams. Some higher priority crossings do not undergo field reviews as improvements require a grade separation, improvements are awaiting implementation, or improvements are part of a construction project.

Projects are reviewed statewide and project selection occurs based on a number of factors including: safety index, project cost, incident history, corridor emphasis, and input from local governments and transportation partners. In the interest of maximizing the impact of limited funding, low cost improvements are also considered. One low cost application the Department works to implement is to install light-emitting diode (LEDs) on east/west crossings to improve warning visibility for the motoring public.

The Department coordinates with local highway agencies and railroads regarding priority crossings and utilizes the federal Highway-Rail Safety Program to fund safety improvements at grade

crossings on state, county, and city roads. Occasionally state safety and state maintenance funds are also available for funding improvements. When using state funds, the Department identifies, prioritizes, and implements surface improvement projects at grade crossings only on state maintained roads.

1. Warning Device Upgrades

The Department continues to use the Safety Index rankings to identify crossings for consideration by the Diagnostic Field Review teams. Field inspections will be used to identify upgrades such as:

- Installation of new, more reflective crossbuck warning signs at crossings that do not require automatic warning devices;
- installation of other warning signs (Do not stop on tracks, Advanced warning signs, Quiet zone signs) and pavement markings/treatments;
- installation of automatic flashing light signals and gates at public grade crossings currently not equipped with automatic warning devices;
- installation of automatic flashing light signals and gates at public grade crossings currently equipped only with automatic flashing light signals;
- signal circuitry improvements at public grade crossings currently equipped with automatic warning devices; and
- replacement of outdated bulbs with brighter LEDs, allowing for greater visibility.

2. Interconnection

The Department upgrades the circuitry at grade crossings where warning signals are connected to the adjacent traffic signals so that the two systems operate in a synchronized manner. The Department is currently in the process of updating the state's inventory data which will assist in the review of existing locations that are interconnected. Once the correct database information is available, the Department will review interconnections as part of standard Diagnostic Field Reviews to ensure the interconnection is correctly functioning.

The Department also would benefit from research on coordinated pre-emption for urbanized areas with a significant amount of crossings in close proximity. The coordinated pre-emption will allow communication between traffic signals in a given corridor as a system-wide approach rather than by individual crossing. The coordinated pre-emption concept will allow traffic signals in close proximity to crossings to be pre-empted earlier than the current operation. The coordinated

pre-emption will create more time for downstream vehicles to clear the railroad crossing and reduce conflicting vehicular movements that may occur at an intersection. Some challenges for this concept will be the presence of differing train speeds and types, commuter train stations located between crossings, and passenger service that stops at certain crossings. The Department wants to increase safety by removing queues; however, the impact to the vehicular traffic and the remaining transportation grid must be evaluated.

3. Multi-Incident locations

The Department has reviewed each of the multiple incident locations where the vehicle was stopped on the tracks, drove around the gates, drove onto the tracks, or was obstructed by traffic. Research and analysis of each location was used to determine:

- if the location has a nearby traffic signal,
- if the traffic signal is interconnected with the railroad warning devices,
- if there are parallel streets or driveways that cause confusion, and
- the level of traffic in the proximity of the crossing.

Based on the analysis, it has been determined that the Department will review these multiple incident locations over the next several years to determine if cost/effective improvements can be implemented.

Table 11. Multi-Incident Locations Evaluated for Remedial Measures

Type of Incident – Vehicle	Incidents	Percentage
Stopped on	39	28.9%
Around gate	28	20.7%
Onto to Tracks	4	3.0%
Traffic	3	2.2%
Total	74	

The following two (2) tables present the different factors to consider when recommending improvements to remediate incident prone grade crossing locations. Recommended remedial actions are based on detailed analysis of the 74 locations indicated in Table 11. Each of these locations was reviewed with aerial photography and using the Department’s Rail Highway Crossing

Inventory data. A variety of improvement strategies were assembled from the US Department of Transportation Federal Highway Administration *Railroad-Highway Grade Crossing Handbook*. The Department developed this improvement matrix so the findings can be applied to historical incidents and can be used to help evaluate future incidents and potential improvement strategies as well.

The first improvement matrix evaluates driver behavior as indicated in the FRA Office of Safety Analysis incident reports. The results of these analyses are shown in Table 12. Clearly the different driver behaviors results in a variety of approaches some being more effective than others.

The second improvement matrix shown in Table 13 evaluates the physical characteristics of the crossing area as determined by aerial photography and data resources. The physical characteristics evaluated included the presence of a signalized or unsignalized intersection and the control conditions at that intersection as well as the conditions in the immediate vicinity of the crossing.

The indentified improvements evaluated in both tables include: improved active warning devices, signalization improvements, intersection improvements, signage and pavement marking improvements, education, and enforcement.

In all cases, the Department will need to weigh the cost of the improvements along with the effectiveness of the potential improvement project.

Table 12. Railroad Crossings with Multiple Collisions - Remedial Measures for Given Driver Contributing Causes

	Number of Incidents	Gates / Systems Improvements			Grade Crossing Signs / Signal Improvements							Adjacent Intersection Signs / Signals Improvements					Education	Enforcement		
		Install Automatic Gates	Install Crossing Cantilevers (> 2 Lanes)	Full-Quad Gate System	Interconnect with Simul. Preemption	Advanced Preempt Sequence	Install Pre-Signals	Install Co-Locate Signal Heads	Install Queue-Cutter Signal	Install Median Raised Curb Island	Install Crossing Edge Striping	Warrant 9 Signalization	Install NO TURN ON RED signs	Turn / Storage Lane Additions	Relocate Stop / Pavement tinting	Blank Out Signs on Parallel Str.	Remove Vegetation	Operation Lifesaver Education	Video Surveillance	Police Enforcement
Driving off Road onto Tracks	4	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Yellow	Green	Red	Red	Red	Red	Red	Yellow	Red	Green	Red
Driving around Gates	3	Red	Red	Yellow	Red	Red	Yellow	Yellow	Red	Green	Red	Red	Yellow	Red	Yellow	Yellow	Red	Green	Yellow	Green
Stopped on Crossing; Auto (Occupied)	32	Yellow	Yellow	Yellow	Green	Yellow	Green	Green	Green	Red	Red	Green	Red	Green	Green	Red	Red	Green	Green	Green
Stopped on Crossing; Auto (Unoccupied)	5	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green	Yellow
Vehicle Collides with Side of Train	1	Green	Green	Yellow	Red	Red	Green	Green	Red	Yellow	Red	Red	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Red	Red

Legend for Table 12 and Table 13




-  Indicates a solution that will have a beneficial effect on the given contributing cause for collision
-  Indicates a solution that will have a marginal effect on the given contributing cause for collision
-  Indicates a solution that will have no effect on the given contributing cause for collision

Table 13. Railroad Crossings with Multiple Collisions - Remedial Measures for Given Physical Contributing Causes

	Number of Incidents	Gates / Systems Improvements			Grade Crossing Signs / Signal Improvements							Adjacent Intersection Signs / Signals Improvements					Education	Enforcement				
		Install Automatic Gates	Install Crossing Cantilevers (> 2 Lanes)	Full-Quad Gate System	Interconnect with Simul. Preemption	Advanced Preempt Sequence	Install Pre-Signals	Install Co-Locate Signal Heads	Install Queue-Cutter Signal	Install Median Raised Curb Island	Install Crossing Edge Striping	Warrant 9 Signalization	Install NO TURN ON RED signs	Turn / Storage Lane Additions	Relocate Stop / Pavement tinting	Blank Out Signs on Parallel Str.	Remove Vegetation	Operation Lifesaver Education	Video Surveillance	Police Enforcement		
Distance between Crossing & Adjacent Signalized Intersection	< 50' or < 75' for (High Truck Traffic)	4	Green	Green	Red	Green	Red	Yellow	Green	Red	Green	Red	Red	Green	Green	Yellow	Green	Yellow	Yellow	Green	Green	
	50' - 200' or 75' - 200' (Truck)	6	Yellow	Yellow	Red	Green	Yellow	Green	Green	Yellow	Green	Red	Red	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Red	Red	
	200' - 500'	3	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Red	Green	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Yellow	Red	Red
	> 500'	4	Yellow	Yellow	Red	Yellow	Red	Red	Red	Red	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Yellow	Red
Distance between Crossing & Unsignalized Intersection	< 50' or < 75' for (High Truck Traffic)	5	Green	Green	Red	Red	Red	Red	Red	Red	Green	Red	Green	Red	Yellow	Red	Red	Yellow	Yellow	Green	Green	
	50' - 140' or 75' - 140' (Truck)	3	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Green	Red	Yellow	Red	Red	Red	Red	Red	Red	Yellow	Red	Red
	> 140'	2	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Yellow	Red	Yellow	Red	Red	Red	Red	Red	Red	Yellow	Red	Red
Grade Crossing Conditions	No Active Warning Devices (Gates)	2	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red	Yellow	Red	Red	Yellow	Yellow	Yellow	Red	Red	
	Adjacent Driveways	2	Yellow	Yellow	Yellow	Red	Red	Yellow	Red	Red	Red	Red	Red	Red	Green	Red	Red	Yellow	Yellow	Red	Red	
	Vegetation or Other Obstructions	13	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Yellow	Red	Red	Yellow	Green	Yellow	Red	Red	
Intersection Conditions	Intersection Traffic Queues on Crossing	13	Green	Green	Yellow	Green	Yellow	Green	Green	Green	Yellow	Red	Green	Red	Red	Yellow	Red	Red	Yellow	Red	Green	
	Parallel Street Traffic Blockage	2	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green	Red	Green	Red	Yellow	Green	Green	
	Parallel Street Pedestrian Phase	2	Red	Red	Red	Green	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red

C. Grade Separations - New and Reconstruction

The Department actively pursues the construction, reconstruction, and repair of bridges carrying roadways over railroad tracks. However, Florida has generally flat terrain meaning that it is more difficult to construct grade-separated highway-rail crossings in Florida than in other states where the natural terrain provides vertical grades. Key locations where grade separations would be beneficial are often located in highly urbanized environments where costs of right of way and business damages exceed costs of a conventional structure. The cost is even higher when a major arterial/interstate is adjacent to the railroad right-of-way (I-95 and South Florida Rail Corridor; US 301 and CSX, US1 and FEC). The vast majority (91.5%) of the state’s crossings are at-grade while only 331 crossings (8.5%) are grade-separated.

Since 2005, the Department has widened or constructed 39 grade separation projects in the state.

Table 14. Grade Separation Projects (2005 to 2011)

Road Name	Owner	Milepost	County	Project Type
SR 26 @ US 301	CSXT	S695.54	Alauchua	New Construction
CR 811/ Dixie Hwy - Fly Over	FEC	K326.71	Broward	New Construction
SR 8/I-10	CSXT	K658.890	Escambia	New Construction
SR 400/Xtown Connector Ramp C	CSXT	SY843.94	Hillsborough	New Construction
SR 400/Xtown Connector Ramp B	CSXT	SY843.88	Hillsborough	New Construction
SR 400/Xtown Connector Ramps E,S & B	CSXT	A880.30	Hillsborough	New Construction
SR 400/Xtown Connector Ramps D,F,N,S,& B	CSXT	S843.28	Hillsborough	New Construction
SR 400/Xtown Connector Ramps E, K,S,F,N & B	CSXT	S843.24	Hillsborough	New Construction
SR 400/Xtown Connector Ramsp E & K	CSXT	S843.33	Hillsborough	New Construction
SR 400/Xtown Connector Ramp F	CSXT	S843.33	Hillsborough	New Construction
SR 400/Xtown Connector Ramps E & S	CSXT	S843.33	Hillsborough	New Construction
SR 400/Xtown Connector Ramp J	CSXT	S843.33	Hillsborough	New Construction
SR 400/Xtown Connector Ramp K	CSXT	S843.78	Hillsborough	New Construction
Lafayette Street Ped. Underpass	CSXT	SP798.14	Leon	Widening
SR 464/SW 17th Street	CSXT	S737.09	Marion	New Construction
CR 484 Extension	CSXT	S749.68	Marion	New Construction
SR 826 Palmetto Expwy Ramp 4	CSXT	SXH1045.18	Miami - Dade	New Construction
SR 826 Palmetto Expwy Br. 5	CSXT	SXH1045.20	Miami - Dade	New Construction
SR 826 Palmetto Expwy Br.6	CSXT	SXH1045.23	Miami - Dade	New Construction
SR 826 Palmetto Expwy Ramp C6A	CSXT	SXH1045.25	Miami - Dade	New Construction
SR 826 Palmetto Expwy Ramp L7	CSXT	SXH1045.27	Miami - Dade	New Construction
SR 826 Palmetto Expwy	CSXT	SXH1045.16	Miami - Dade	Widening
SR 826 Palmetto Expwy Br. II	CSXT	SXH1042.47	Miami - Dade	New Construction

SR 826 Palmetto Expwy Br. 29B	CSXT	SXH1042.48	Miami - Dade	New Construction
SR 826 Palmetto Expwy Br. 29A	CSXT	SXH1042.50	Miami - Dade	Replacement and Widen
SR 826 Palmetto Expwy Ramp S-E	CSXT	SXH1042.53	Miami - Dade	New Construction
SR 836 Dolphin Expwy	CSXT	SXH1040.95	Miami - Dade	Widening
NW 25th Street	FEC	LR10.51	Miami - Dade	New Construction
NW 25th Street	FEC	LR10.74	Miami - Dade	New Construction
NW 25th Street	FEC	LR11.22	Miami - Dade	New Construction
SR 9A/I-95 & 91/Turnpike	CSXT	SX1026.95	Miami - Dade	Widening
SR 400/I-4, Ramp D-1	CSXT	A790.70	Orange	New Construction
SR 400/I-4 @ SR 408 E/W Expwy	CSXT	A790.63	Orange	New Construction
Lakeland In-Town Bypass	CSXT	AR856.25	Polk	New Construction
SR 559	CSXT	SX821.25	Polk	New Construction
SR 281	CSXT	K664.20	Santa Rosa	New Construction
SR 400/I-4 EB OFF Ramp B-1	CSXT	A763.72	Seminole	New Construction
SR 35/ US 301	CSXT	S760.61	Sumter	New Construction
SR 44	CSXT	S762.55	Sumter	New Construction

Florida's Rail System Plan is one of several key statewide modal planning efforts conducted by the Department. The plan provides an effective tool to identify capital improvements and to prioritize funding needs to ensure the efficient movement of people and goods by rail. This statewide plan identifies goals, objectives, and strategies to guide transportation investment decisions in Florida over a 20-year period.

The plan includes an inventory of rail needs, including capital investments for track upgrades, new facilities, capacity expansion, safety improvements, and industrial access. The 2010 Florida Rail Needs Assessment³ was developed based on input from a variety of stakeholders, including freight and passenger railroads, metropolitan planning organizations, counties, regional planning organizations, ports, advocacy and interest groups, as well as private citizens. The grade separations identified in the plan are shown in the following tables with costs in 2009 dollars.

Table 15. Grade Separation Projects (Mid-Term)

Project Name	Owner	Cost Estimate	Timeframe
US 41/Rockport - 624802A	CSX	\$ 48M	Mid-term (6-10 years)
SR 200 (U.S. 301)/Baldwin Crossing	CSX	\$ 47M	Mid-term (6-10 years)
SR 15 (Reid Street)/Palatka Crossing	CSX	\$ 45M	Mid-term (6-10 years)
SR 50 Ridge Manor - 625307P	CSX	\$ 22M	Mid-term (6-10 years)
Causeway Boulevard Crossing - East of US 41	CSX	\$ 22M	Mid-term (6-10 years)
SE 144th Street (Mullins Grade)/Starke Crossing	CSX	\$ 20M	Mid-term (6-10 years)
US 41 Crossing - South of Causeway Blvd	CSX	\$ 18M	Mid-term (6-10 years)

Table 16. Grade Separation Projects (Mid-to-Long Term)

Project Name	Owner	Cost Estimate	Timeframe
West Granada Avenue (SR 40) Crossing	CSX	\$ 45M	Mid-to-long (11-20 years)
West Colonial Drive (SR 50) Crossing	CSX	\$ 50M	Mid-to-long (11-20 years)
SFRC Rail/Arterial Grade Separations	SFRTA	\$ 240M	Mid-to-long (11-20 years)
Park Road - 6243139	CSX	\$ 90M	Mid-to-long (11-20 years)
US 41/50th Street - 624368C	CSX	\$ 90M	Mid-to-long (11-20 years)
SR 200 (A1A)/Yulee Crossing	CSX	\$ 60M	Mid-to-long (11-20 years)
SR 60, W Lake Wales	CSX	\$ 55M	Mid-to-long (11-20 years)
CR 28 (Wells Road)/Orange Park Crossing	CSX	\$ 50M	Mid-to-long (11-20 years)
SR 224 (Kingsley Ave)/Orange Park Crossing	CSX	\$ 50M	Mid-to-long (11-20 years)
Nine Mile Road (SR 10) Crossing	CSX	\$ 45M	Mid-to-long (11-20 years)
SR 60, W of Mulberry	CSX	\$ 40M	Mid-to-long (11-20 years)
SR 676/Causeway Blvd. - 624815B	CSX	\$ 38M	Mid-to-long (11-20 years)
Indiantown Road (SR 706) Crossing	FEC	\$ 30M	Mid-to-long (11-20 years)
Okeechobee Boulevard (SR 704) Crossing	CSX	\$ 30M	Mid-to-long (11-20 years)
Forest Hill Boulevard (SR 882) Crossing	CSX	\$ 30M	Mid-to-long (11-20 years)
Atlantic Avenue (SR 806) Crossing	CSX	\$ 30M	Mid-to-long (11-20 years)
SE Yamato Road (SR 794) Crossing	CSX	\$ 30M	Mid-to-long (11-20 years)
Commercial Boulevard (SR 870) Crossing	CSX	\$ 30M	Mid-to-long (11-20 years)
Hollywood Boulevard (SR 820) Crossing	CSX	\$ 30M	Mid-to-long (11-20 years)
NW 36th Street/Sample R (SR 834) Crossing	CSX	\$ 24M	Mid-to-long (11-20 years)
NW 62nd/Cypress C Crossing	CSX	\$ 23M	Mid-to-long (11-20 years)
Copans Road Crossing	CSX	\$ 20M	Mid-to-long (11-20 years)
Atlantic Boulevard (SR 814) Crossing	CSX	\$ 18M	Mid-to-long (11-20 years)

Table 17. Grade Separation Projects (Long term)

Project Name	Owner	Cost Estimate	Timeframe
West Lake Mary B. (CR 4220) Crossing	CSX	\$ 45M	More than 20 years
SR 434 Crossing	CSX	\$ 45M	More than 20 years
SR 436/Altamonte Crossing	CSX	\$ 45M	More than 20 years
East Maitland Avenue (CR 427) Crossing	CSX	\$ 45M	More than 20 years
West Lyman Avenue Crossing	CSX	\$ 45M	More than 20 years
South Orlando Avenue (SR 15) Crossing	CSX	\$ 45M	More than 20 years
CR 54 (CR 54) Crossing - 622845L	CSX	\$ 40M	More than 20 years
CR 54 (CR 54) Crossing - 622851P	CSX	\$ 40M	More than 20 years
Alexander Street (CR 39A) Crossing	CSX	\$ 40M	More than 20 years
Parsons Avenue Crossing	CSX	\$ 40M	More than 20 years
SR 599/50th Street (SR 599) Crossing	CSX	\$ 40M	More than 20 years
Hillsborough Avenue (SR 600) Crossing	CSX	\$ 40M	More than 20 years
SR 60/Adamo Drive - 624820X	CSX	\$ 100M	More than 20 years

SR 60/Brandon Boulevard - 624551H	CSX	\$ 94M	More than 20 years
Faulkenburg Road - 624359D	CSX	\$ 90M	More than 20 years
Faulkenburg Road - 624462R	CSX	\$ 90M	More than 20 years
SR 104 (Busch Drive)/ Jacksonville Crossing	CSX	\$ 80M	More than 20 years
S Main Street (SR 85) Crossing	CSX	\$ 40M	More than 20 years
SR 60/Hopewell - 624572H	CSX	\$ 35M	More than 20 years
Magnolia Avenue Crossing	CSX	\$ 30M	More than 20 years
Northlake Boulevard (CR 809) Crossing	FEC	\$ 30M	More than 20 years
Belvedere Road Crossing	FEC	\$ 30M	More than 20 years
Woolbright Road Crossing	FEC	\$ 30M	More than 20 years
Linton Boulevard Crossing	FEC	\$ 30M	More than 20 years
Yamato Road (SR 794) Crossing	FEC	\$ 30M	More than 20 years
Palmetto Park (SR 811) Crossing	FEC	\$ 30M	More than 20 years
Hillsboro Boulevard (SR 810) Crossing	FEC	\$ 30M	More than 20 years
Sample Road (SR 834) Crossing	FEC	\$ 30M	More than 20 years
Atlantic Boulevard (SR 814) Crossing	FEC	\$ 30M	More than 20 years
Commercial Boulevard (SR 870) Crossing	FEC	\$ 30M	More than 20 years
Oakland Park Boulevard (SR 816) Crossing	FEC	\$ 30M	More than 20 years
Sunrise Boulevard (SR 838) Crossing	FEC	\$ 30M	More than 20 years
W Broward Boulevard (SR 842) Crossing	FEC	\$ 30M	More than 20 years
SW 24th Street/SR 84 (SR 84) Crossing	FEC	\$ 30M	More than 20 years
Miramar Parkway (SR 858) Crossing	FEC	\$ 30M	More than 20 years
Glades Road (SR 808) Crossing	FEC	\$ 30M	More than 20 years
McNab Road Crossing	CSX	\$ 30M	More than 20 years
NW 33rd Street Crossing	CSX	\$ 30M	More than 20 years
North Lake Boulevard (CR 809A) Crossing	CSX	\$ 30M	More than 20 years
Palm Beach Lake Boulevard Crossing	CSX	\$ 30M	More than 20 years
Belvedere Road Crossing	CSX	\$ 30M	More than 20 years
Linton Boulevard Crossing	CSX	\$ 30M	More than 20 years
Palmetto Park (CR 798) Crossing	CSX	\$ 30M	More than 20 years
Oakland Park Boulevard (SR 816) Crossing	CSX	\$ 30M	More than 20 years
New Griffin Road (SR 818) Crossing	CSX	\$ 30M	More than 20 years
Stirling Road (SR 848) Crossing	CSX	\$ 30M	More than 20 years
Pembroke Road (SR 824) Crossing	CSX	\$ 30M	More than 20 years
Hallandale Beach (SR 858) Crossing	CSX	\$ 30M	More than 20 years
Hillsboro Boulevard (SR 810) Crossing	CSX	\$ 21M	More than 20 years

Table 18. Grade Separation Projects (To be determined Term)

Project Name	Owner	Cost Estimate	Timeframe
E 8th Avenue (SR 953) Crossing	FEC	\$ 30M	TBD
Palm Avenue Crossing	FEC	\$ 30M	TBD
Okeechobee Road (SR 25) Crossing	FEC	\$ 30M	TBD
NE 203th Street Crossing	FEC	\$ 30M	TBD
Miami Gardens Drive (SR 860) Crossing	FEC	\$ 30M	TBD
NE 163rd Street (SR 826) Crossing	FEC	\$ 30M	TBD
NE 125th Street (SR 922) Crossing	FEC	\$ 30M	TBD
NW 27th Avenue (SR 9) Crossing - 272717K	FEC	\$ 30M	TBD
NW 72nd Avenue Crossing - 272756B	FEC	\$ 30M	TBD
NW 72nd Avenue Crossing - 272757H	FEC	\$ 30M	TBD
NW 22nd Avenue Crossing	CSX	\$ 30M	TBD
NW 27th Avenue (SR 817) Crossing - 628321V	CSX	\$ 30M	TBD

D. Corridors

The Department will work with Florida’s railroads to identify corridors where train volumes have increased, train speeds have increased, low-cost improvements can be implemented, and/or crossing consolidations are possible. These corridors will be considered for safety improvements including LED upgrades, upgrades to antiquated equipment, relocation of devices to meet standards, and consolidation or closures of existing grade crossings.

Table 19. List of Recent Corridor Reviews

Review Dates	Location	Railroad	Begin Milepost	End Milepost	Miles	Crossings
June 2010	Escambia County	Alabama Gulf Railroad	AGR 914.65	AGR 865.80	49	44
November 2010	Ocala to Wildwood	CSX Transportation	S 728.17	S 762.52	34	40
May 2011	Baker, Nassau, Duval (G-Line)	Norfolk Southern	221.5	260	38	20
May 2011	St. John’s River Terminal	Norfolk Southern	0	5.2	5	20

Table 20. List of Potential Corridor Projects

Location	Railroad	Begin Milepost	End Milepost	Miles	Crossings
Gadsden County to Liberty County	Apalachicola Northern	AN 88.80	AN 40.50	48	34
Jackson County	BayLine	M 65.48	M 35.08	30	30
Clearwater, Pinellas County	CSX Transportation	SY 871.26	ARE 898.10	27	59
Dade City, Sumter County to Hernando County	CSX Transportation	S 769.72	S 791.82	22	18
Dade Co., South Miami to Homestead	CSX Transportation	SXH 1044.30	SXH 1066.55	22	32
Ybor City, Hillsborough County	CSX Transportation	A 866.52	A 889.90	23	10
Lake Co., Tavares to Mt. Dora	Florida Central	ATA 822.20	ATA 786.85	35	25
Polk Co., Lake Wales to Frostproof	Florida Midland	AVC 843.59	AVC 857.89	14	30
Alachua County	Florida Northern	AR 716.88	AR 741.36	24	21
Marcy ,Martin Co. to Belle Glade ,Palm Bch Co.	South Central Florida Express	BY 26.49	BY 58.97	32	12

E. Pedestrian Issues and American with Disabilities Act (ADA)

During Diagnostic Field Reviews in 2009, the Department surveyed thirty crossings for ADA accessibility issues along with the standard highway-rail review items. Five areas of improvement were identified and reviewed with the Federal Highway Administration – Florida Division:

1. Sidewalk ends near the crossing with sidewalk connecting to the roadway
2. Sidewalk passes through the crossing but connection outside the railroad right-of-way is incomplete/impassible
3. Sidewalk ends abruptly short of the crossing often at the railroad right-of-way
4. Large gap greater than 3” ADA standard for freight rail within the crossing surface
5. Confusing pedestrian crossings occurring with multiple crossings in close proximity at different angles can also include substantial grade changes

In December 2009, the Federal Railroad Administration, the Federal Highway Administration – Florida Division, and the Department met to field review pedestrian issues and discuss possible solutions. Possible solutions to each issue are as follows:

1. Connection to the roadway is an acceptable application in a rural area as the ADA allows the pedestrian way to be the roadway as confirmed by the US Access Board. To be effective, signage should be placed where there is an alternate route available.

2. Work with local governments to improve connections outside the railroad right-of-way.
3. Completion of the missing segment will require cooperation from the local agency and the railroad. The railroad will likely perform the improvements with the funding coming from the local government.
4. The gap between the rail and crossing panel can be filled as long as the crossing maintains a permissible change in level.
5. Advanced signage some distance back that might reroute pedestrians away from inadequate highway-rail grade crossings.

The Department continues to include ADA accessibility reviews as part of diagnostic field reviews. In addition, the Department is considering identifying a section of rail and performing a comprehensive review of all crossings within a jurisdiction for ADA issues. This way, the Department could ensure that all issues in an area are identified and then issues can be ranked in order of importance (pedestrian traffic, area characteristics, travel pattern). This process will allow local funding to be efficiently spent on the most important issues first.

In case of a complaint in the state, the Federal Highway Administration – Florida Division has developed a Calling Tree that can be activated in the event of an issue in order to contact the correct people for action, follow-up, and information. If the crossing is only for private or for pedestrian access, the Department has no jurisdiction because the crossing does not involve a public roadway.

The Department has solid relationships with Florida’s rail companies. The Department would like FRA/AASHTO to develop national standards for railroad companies related to ADA issues, stressing that local or state requests for improved pedestrian access at crossings be more easily implemented.

The Federal Highway Administration – Florida Division will continue to educate local governments (sub-recipients) on:

- the responsibilities for monitoring facilities and rights of way;
- the responsibilities under ADA;
- the decision to end sidewalks before a railroad crossing does not provide acceptable access and turning pathways into the roadway may be unsafe and unreasonable;
- the importance of full inspection; and
- the importance of the Department reviewing roadway improvement plans.

F. Research And Analysis Through Data Improvements

The Department works on a continuous basis to improve the state's highway-rail crossing inventory. Starting in August 2010, the Department initiated a new consultant contract to assist collecting new data related to the state's rail crossings. The initial effort focused on the use of Geographic Information Systems (GIS) to verify and correct the rail line network data. Next highway-rail grade crossing locations were mapped and verified using information from aerial photography, Departmental data, railroad partner data, and the FRA. In addition, efforts will be made to reconcile any differences in the grade crossing inventory databases of the FRA, the Department and the railroads.

The Department will then collect as many data elements as possible using available resources in the office environment before finally collecting the remaining data through field data collection. The Department is also creating a new user website interface for the state's database which will allow railroad partners to review information, provide updates, and connect to other information systems (data, maps, agreements, and photos).

The Department continues to research and implement new innovations and technologies whenever available and cost effective. Some of these promising technologies (Texas Modified Median Barrier Curb/Florida's 6 inch barrier curb, Four Quadrant Gate Systems, Video Monitoring) require additional research and/or funding.

G. Public Education And Awareness Programs: Operation Lifesaver

The Department will continue to focus on public education through the Operation Lifesaver program. Florida Operation Lifesaver seeks to continue and expand its public education efforts through the following:

- Developing and airing public service announcements, directed toward target audiences;
- Continuing to educate and expand volunteer recruitment through the Florida Operation Lifesaver website and social networking tools such as Facebook and Twitter;
- Expanding educational events during Train Safety Awareness Week (TSAW) and International Level Crossing Awareness Day;
- Promoting active enforcement of traffic laws related to highway-rail grade crossings and on railroad right of way; and
- Improving driver and pedestrian behavior at railroad crossings by encouraging compliance with traffic laws relating to crossing signs and signals.

H. Law Enforcement

The Department will continue to support Florida's law enforcement agencies as they enforce laws related to highway-rail grade crossings and railroad right of way. Each year, Florida Operation Lifesaver partners with agencies throughout the state to raise the level of awareness of rail safety.

The Department's law enforcement branch (Motor Carrier Compliance) which recently transitioned to the Florida Highway Patrol, has helped spread the message of railroad safety through traffic blitzes. In April 2011, Florida Operation Lifesaver partnered with 34 law enforcement agencies throughout Florida during Train Safety Awareness Week to spread the message of public rail safety at highway-rail grade crossings and on railroad property.



In addition, Florida Operation Lifesaver provides training opportunities to law enforcement officers around the state through Grade Crossing Collision Investigation classes which ensure that officers who respond to highway-rail and trespass collisions are able to investigate safely.

¹ The Office of Policy Planning of the Florida Department of Transportation and the Center for Urban Transportation Research at the University of South Florida, *TRAVEL DEMAND: Population Growth and Characteristics* (August 2010), 1-30.

² The Office of Policy Planning of the Florida Department of Transportation and the Center for Urban Transportation Research at the University of South Florida, *TRAVEL DEMAND: Visitors and Tourists* (November 2008), 1.

³ VISIT FLORIDA®, VISIT FLORIDA Research, <http://media.visitflorida.org/research.php>

⁴ Florida Department of Transportation, *The Florida Rail System Plan: Investment Element* (December 2010).

⁵ Florida Department of Transportation Seaport Office and Florida Ports Council, *A Five-Year Plan to Achieve the Mission of Florida's Seaports: 2007/2008-2011/2012* (2008).

⁶ Florida Department of Transportation, *Rail Highway Crossing Inventory* (as of July 2011).

⁷ Association of American Railroads, *Raise the Grade on Grade Crossing Safety* (April 2010).

⁸ Federal Railroad Administration, *Highway-Rail Crossing Program Summary* (as of December 2, 2010), <http://www.fra.dot.gov/Pages/86.shtml>

⁹ The Florida Legislature, 2010 Florida Statutes, http://www.leg.state.fl.us/STATUTES/index.cfm?App_mode=Display_Statute&URL=0300-0399/0335/0335ContentsIndex.html

¹⁰ United States Census, *Summary: 2000 – 2000 Census of Population and Housing* (April 2004), , Table 17. Area Measurements: 2000; and Population and Housing Unit Density: 1980 to 2000.

¹¹ United States Department of Transportation, Bureau of Transportation Statistics, *State Transportation Statistics – 2009* (2008), *Table 5-3: Highway Vehicle-Miles Traveled (VMT):2003*.

¹² Federal Railroad Administration, Office of Safety Analysis, *Highway-Rail Crossing Accident/Incident data* (current through the end of September 30, 2010), <http://safetydata.fra.dot.gov/officeofsafety/>