

TREASURE COAST REGIONAL PLANNING COUNCIL

MEMORANDUM

To: Council Members

AGENDA ITEM 11

From: Staff

Date: May 16, 2014 Council Meeting

Subject: All Aboard Florida Update

Introduction

The purpose of this item is to provide an update regarding activities related to the Florida East Coast Industries' (FECI) proposed All Aboard Florida (AAF) project. The project is intended to provide new high-speed intercity express service between Miami and Orlando on the Florida East Coast (FEC) rail corridor. Pursuant to the company's application for a Railroad Rehabilitation and Improvement Financing (RRIF) loan, the Federal Railroad Administration (FRA) is developing a draft Environmental Impact Statement (EIS), which is anticipated in mid-2014.

Background

In 2012, FECI introduced the AAF project, which proposes new intercity express rail service between downtown Miami and Orlando, with additional stations in downtown Fort Lauderdale and downtown West Palm Beach. The project has been the subject of extensive Council, local government, and public discussion since its announcement. As currently proposed, the project would provide sixteen daily round-trip trains, totaling 32 additional trains on the corridor with maximum speeds of 79 MPH south of West Palm Beach, 110 MPH between West Palm Beach and Cocoa, and 125 MPH from Cocoa to Orlando. The company has indicated the FEC rail corridor will continue to carry freight service, which is projected to increase over time. Although the rail corridor is privately owned, it is included in the Florida Department of Transportation (FDOT) Strategic Intermodal System, which prioritizes it for statewide transportation funding to advance economic competitiveness and quality of life.

Based on Council's discussion at its April 18, 2014 meeting, Council meeting agendas will include an update to the AAF project as the project advances. Two categories of activities are summarized below: 1) Action Items, for which Council action is requested, and 2) General Project Updates, which generally summarize relevant activities related to the project.

## Action Items

### **Request to FECI Regarding Corporate Structure, Engineering, Financial and Economic Details related to the AAF Project**

As discussed at the April 18, 2014 Council meeting, recent Indian River County correspondence to FECI requests the company provide certain information related to engineering as well as corporate structure, financial, and economic details of the AAF project (Exhibit 1). Indian River County has requested Council consider transmitting similar correspondence to FECI. In Council staff's public outreach activities regarding the AAF project as well as Council discussions, similar questions have been raised by local governments and the public.

The County's engineering questions are focused on quiet zones, track and signal communications, and cost estimates. Regarding the quiet zone questions, FRA staff has indicated that additional safety measures necessary for the designation of quiet zones are determined on a case-by-case basis (e.g., physical "supplemental safety measures," programmatic "alternative safety measures"). FRA staff has provided information related to the establishment of quiet zones, which is posted on Council's website along with a link to the relevant FRA staff. FRA staff has also indicated that safety ratings for individual grade crossings are established in part by the speed and volume of trains, and higher-speed train service can require more extensive safety measures. Other factors related to safety ratings of grade crossings include vehicular volumes and speeds, existing safety equipment, and history of accidents. FRA is the appropriate source for this information, and these questions appear to be sufficiently addressed with the data in hand. However, the County also requested data regarding signal warning time and communications on the FEC rail corridor. Council staff is unaware of existing data addressing the County's questions, and FECI would appear to be the appropriate source for this information.

The County also posed questions regarding FECI's planned grade crossing improvements as well as corresponding cost estimates. Diagnostic field reviews to determine safety improvements have been completed from Miami-Dade to St. Lucie counties, and FRA staff has indicated reviews in Indian River and Brevard Counties are scheduled to be completed in July 2014. Council staff is unaware of any FECI documents released to-date that indicate the company's proposed grade crossing improvements or cost estimates. The only related document is the On-Site Engineering Field Report, Part 1, released by the FRA in March 2014, which indicates the FRA recommendations for safety infrastructure in the high-speed rail portion of the AAF project from West Palm Beach to the St. Lucie County line. Additional data from FECI regarding proposed grade crossing improvements would be helpful to address questions raised by local governments and the public.

In addition to engineering issues, the County posed a series of questions related to FECI's corporate structure and financial and market aspects of the proposed AAF project. Council staff is unaware of any existing data that addresses these issues. Further, Council staff has requested copies of any financial documents submitted in support of the AAF RRIF loan application; however, FRA staff has indicated documents related to the application are and will remain confidential and are therefore not available for public review. Consequently, direct

correspondence with FECI would appear to be the only remaining avenue to acquire this additional data to address local government and public questions regarding these matters. ***Council should send correspondence to FECI requesting data related to corporate structure, engineering, financial, and economic details similar to those raised by Indian River County in its correspondence dated April 10, 2014.***

### **Request to Local Governments Regarding Extension of Public Comment Period for Draft EIS from 45 to 90 Days**

Pursuant to Council direction at its March 18, 2014 meeting, Council has transmitted correspondence to the FRA requesting an extension of the public comment period for the draft EIS from 45 to 90 days. The proposed AAF project is an expansive project, traversing nearly 200 miles of Florida's east coast. Council's correspondence also includes an extensive list of potential impacts identified through public outreach along with possible mitigating measures. FRA staff has indicated it is reviewing Council's request for the time extension along with the other requests detailed in that correspondence. On May 6, 2014, AAF released a statement indicating their willingness to extend the public comment period from 45 to 75 days. Also, AAF has agreed to increase the number of previously announced public forums from six to eight to allow one public forum in each county traversed by the project.

To further emphasize the need for a longer public comment period, additional requests for the time extension could be transmitted by other concerned parties, including all affected local governments in the region. Indian River County and others have also suggested Governor Scott be asked to request this public comment time extension as well. These additional requests for the time extension would underscore the strong desire across the region for this additional time and potentially encourage the FRA to accommodate this request. ***Council should send correspondence to Governor Scott and local governments in the region requesting they appeal to the FRA to extend the public comment period for the draft EIS from 45 to 90 days.***

### **Request FDOT Follow FRA Sealed Corridor Safety Recommendations**

The diagnostic field reviews to identify AAF safety improvements have been completed from Miami-Dade to St. Lucie counties. Following the completion of these reviews, the FRA's Highway Rail Crossing and Trespasser Program Division published an On-Site Engineering Field Report, Part I (Exhibit 2). This report focuses on the high-speed rail portion of the proposed AAF route from West Palm Beach to St. Lucie County. The FRA report recommends the AAF project follow the principles outlined in Highway-Rail Grade Crossing Guidelines for High-Speed Passenger Rail published by the FRA in November 2009 (Exhibit 3). The report contains recommendations regarding the installation of pedestrian infrastructure at grade crossings, vehicle presence detection to improve the railroad's awareness of vehicles within grade crossings, and sealed corridor treatments throughout the corridor. Both FRA and FDOT will ultimately determine required safety infrastructure for the project.

Extensive safety concerns have been raised by local governments and the public, especially regarding the high-speed service proposed by the AAF project. The corridor is highly urbanized, with clear evidence of pedestrian trespassing, a concern highlighted in the FRA report as well.

The FRA's sealed corridor guidelines for high-speed corridors address grade crossings infrastructure, warning systems such as vehicle presence detection, barrier systems, and pedestrian and trespass considerations. These guidelines enable consideration of local government design preferences to address these factors while maintaining the highest possible safety standards for the corridor.

Discussions with FDOT have continued to confirm that safety is the highest priority for the Department regarding the introduction of passenger rail service of any speed. FDOT indicated it is currently evaluating the FRA's guidelines to determine the potential need for state policy revisions regarding high-speed rail. ***Council should send correspondence to FDOT requesting implementation of the safety recommendations as described in the FRA On-Site Engineering Field Report, Part I (Exhibit 2).***

### **Request Public Workshop with FRA and Federal Agencies Following Publication of Draft EIS and Development of Public Comments by Council, Local Governments, and Agencies**

It is anticipated the FRA will publish a draft EIS for the AAF project in mid-2014, with the latest estimate being in May or June. The FRA has indicated it will arrange a series of general public workshops designed for public review of the draft EIS and the collection of public comments. Due to the magnitude of the AAF project, Council has requested the public comment period be extended from 45 to 90 days. Several local governments have requested Council arrange additional local government-focused public workshops with FRA and relevant public agencies to promote the local/federal dialogue on the project and assist local governments in the drafting of public comments. ***Council should coordinate a regional workshop, following initial local government reviews of the draft EIS, with FRA and relevant federal agencies.***

### **Amended Request to FRA Regarding Reduction of Double-Tracking to Reduce Impacts in St. Lucie Village**

In Council's April 10, 2014 correspondence to FRA, the agency was requested to consider mitigation measures for a series of impacts identified through Council's outreach activities related to the AAF project. Subsequently, Council became aware of the extensive impacts to the Town of St. Lucie Village due to AAF's proposal to install three tracks through the center of the community, apparently for the intermittent storage of trains. This could cause significant safety concerns for residents of the Town, potentially eliminating the ability for ingress/egress when trains are stored in those tracks. To mitigate this impact, the third track could be located either north or south of the Town. This possibility should be raised for FRA's consideration as it completes the draft EIS for the project. ***Council should send correspondence to the FRA as an addendum to Council's previous April 10, 2014 correspondence, highlighting the proposed impacts to St. Lucie Village and identifying potential mitigation measures.***

### General Project Updates

- The Palm Beach and Broward Metropolitan Planning Organizations (MPOs) submitted a joint Transportation Investment Generating Economic Recovery grant application on April 28, 2014 requesting \$20,275,000 to fund up to 50 percent of the cost of "crossing safety

improvements” in those counties. Additional sponsoring agencies include FDOT and FEC Railway.

- The Florida Legislature has included \$10 Million in the recommended state budget for the creation of an FDOT grant program to fund up to 50 percent of the local cost of quiet zone along the AAF project corridor.
- Since the last Council meeting, Council staff has continued to provide project updates as requested by local governments and others. These have included the Indian River County Board of County Commissioners, Sebastian City Council, Lake Worth City Commission, Palm Beach Gardens homeowners’ associations, Sebastian Chamber of Commerce, Northern Palm Beach County Intergovernmental Committee, and a Stuart-based community forum focused on potential impacts on the St. Lucie River railroad bridge, which was organized by Martin County.
- In April 2014, the Martin MPO, St. Lucie TPO, and Indian River MPO organized a tour of the FEC corridor for their legislative delegation through the respective counties.
- Email correspondence from FRA staff indicates the agency is developing a response to Council’s requests transmitted on April 10, 2014 related to the consideration of key issues in the draft EIS, the extension of the public comment period from 45 to 90 days, and the FRA’s participation in a regional workshop to describe the EIS process and role of local governments.
- Council’s website now includes a section dedicated to information regarding the AAF project. Posted information includes a project summary; overview of the permit process; timeline for the EIS process; project history; permits and reports released by public agencies; local government and agency comments; Council presentations; and contact information for agencies relevant to the EIS process as well as Governor Scott and the Congressional and Legislative delegations. Council staff will continue to update the website as new information becomes available.

### Conclusion

The proposed AAF service represents a unique opportunity to expand the utilization of a private freight corridor for economic benefit and mobility. However, the project as currently designed provides only one station in the region, which is located in the City of West Palm Beach. The AAF project does not have stops in the remainder of the region. There is also an increasing level of concern being raised by local governments and the public regarding a range of issues. Council staff will continue to respond to requests for public information and outreach in an effort to expand Council’s and the public’s knowledge of project-related issues and concerns.

## Recommendation

Council should direct staff to:

- 1) Prepare correspondence to Florida East Coast Industries requesting data related to corporate structure, engineering, financial, and economic details similar to those raised by Indian River County in its correspondence dated April 10, 2014;
- 2) Prepare correspondence to Governor Scott and local governments in the region requesting appeals to the Federal Railroad Administration to extend the public comment period for the draft Environmental Impact Statement from 45 to 90 days;
- 3) Prepare correspondence to Florida Department of Transportation requesting implementation of the safety recommendations as described in the Federal Railroad Administration On-Site Engineering Field Report, Part I;
- 4) Coordinate a regional workshop, following initial local government reviews of the draft Environmental Impact Statement, with the Federal Railroad Administration and relevant federal agencies; and
- 5) Prepare correspondence to the Federal Railroad Administration as an addendum to Council's previous correspondence, highlighting the proposed impacts to the Town of St. Lucie Village and identifying potential mitigation measures.

Attachments

# Exhibit 1

## BOARD OF COUNTY COMMISSIONERS

*Peter D. O'Bryan*  
Chairman  
District 4

*Wesley S. Davis*  
Vice Chairman  
District 1



April 10, 2014

*Joseph E. Flescher*  
District 2

*Tim Zorc*  
District 3

*Bob Solari*  
District 5

Russell Roberts, Vice President  
Florida East Coast Industries  
8427 South Park Circle, Suite 140  
Orlando, FL 32819

Dear Mr. Roberts:

On Sunday April 6<sup>th</sup>, I had a meeting with Mr. Matt Mohler concerning All Aboard Florida. At that meeting, I pointed out one of the problems at this time was the lack of clear information about the proposed All Aboard Florida passenger rail service, its plans and its finances. At the moment, there is a lot of speculation, with none of the type of information necessary for an elected official to fulfill his fiduciary duty to his constituents, for a project that will draw so heavily on government resources and which, given the information available to date, will have such a negative impact on our communities.

It is my understanding the purpose of our meeting today is to open up a dialogue that will give elected officials in Indian River County the type and quality of information necessary for good decision-making. It is my belief, all the questions below are fair and reasonable, given the type of community support All Aboard Florida is requesting from Indian River County.

Important to note is at my initial meeting with an All Aboard Florida representative, I was told this was to be a private project, on private property, with no government support. As the project unfolds, the reality is, at least based on the scarcity of information available; this proposed project is seeking substantial government support on the Federal, State, and local levels.

Additionally, at that initial meeting, no mention of the negative impacts the project would have were provided. Granted, I should have realized, and probably looked harder at the negatives of the project, but All Aboard Florida should have, if it were interested in being a good corporate citizen, been more forthcoming. "Buyer Beware" is not an appropriate position to take with a project like All Aboard Florida.

1801 27<sup>th</sup> Street, Building A  
Vero Beach, FL 32960  
(772) 226-1490

Russell Roberts, Vice President  
April 10, 2014  
Page Two

It did not help All Aboard Florida when Mr. Gonzalez, at the March 21<sup>st</sup> meeting of the Treasure Coast Regional Planning Council, was unresponsive to almost all of the substantive questions put to him. On the one hand, he said All Aboard Florida had a lot of studies to show the benefits of All Aboard Florida to our region. On the other hand, he refused to share the studies because All Aboard Florida was a private company. The reality is All Aboard Florida and a set of companies owned or managed by Fortress Investment Group, LLC, are asking for significant assistance from the governments and the communities through which the All Aboard passenger trains will travel.

I say all this because our community is now solidly against this project. If it is the goal of All Aboard Florida to gain our community's support or at least decrease the opposition to the project, I believe it will necessary for All Aboard Florida to be forthcoming with as much information as possible.

To help facilitate this process, I have the following list of questions, which I believe will help us begin an appropriate dialogue. Providing full and complete answers to as many of the questions as possible will be very much appreciated by everyone, not only in Indian River County and in the Treasure Coast region.

Corporate Structure:

1. There is a lot of misinformation with regards to the various companies that are affiliated with Fortress Investment Group, LLC. This has only fueled the public's apprehension and distrust of All Aboard Florida. Therefore, please provide the following information:
  - a. A clear corporate organization chart, which will allow one to trace All Aboard Florida – Operations, LLC, to what I understand is its ultimate owner, Fortress Investment Group, LLC. On the chart please show any related Fortress Companies, which are necessary for the ultimate success of the All Aboard Florida passenger rail project.
  - b. A list of all companies now owned, directly and indirectly, by Florida East Coast Industries, LLC.
  - c. A list of all companies now owned, directly and indirectly, by Florida East Coast Rail, LLC
  - d. A list of all companies now owned, directly and indirectly, by Florida East Coast Holding Corporation.
  - e. What entity owns Florida East Coast Rail, LLC?
  - f. What entity owns Florida East Coast Industries, LLC?

Russell Roberts, Vice President  
April 10, 2014  
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2. Please provide any and all documentation that shows All Aboard Florida – Operations, LLC’s authority and/or right to develop and operate a passenger train on the existing tracks in Indian River County.
3. Attached is a copy of a proposed “Crossing Agreement” between Florida East Coast Railway, LLC, and Indian River County. Please tell us why it was sent? What is its purpose?
4. What is All Aboard Florida, TOD, LLC? What is its purpose?
5. What is All Aboard Florida New Sixth Street, LLC? What is its purpose?
6. What is All Aboard Florida Operations LLC? What is its purpose?
7. What is All Aboard Florida – Stations, LLC? What is its purpose?
8. If there are any other All Aboard Florida companies, please give their legal names, a description of the company and its purpose.

Engineering:

1. As far as railroad-crossing improvements are concerned, exactly what constitutes a Quiet Zone? Indian River County has heard some, or all of the following improvements, may need to be constructed before a Quiet Zone can be implemented . . .
  - 4-quadrant gates
  - Concrete median extensions
  - advance warning signs
  - Barrier-style fencing along rail corridor
2. Does the level of Quiet Zone improvements change with the train speed? In other words, do higher train speeds necessitate a higher level of Quiet Zone improvements, i.e. 0-79 mph, 79-110 mph, 110+?
3. Existing railroad gates and train sensors are connected to nearby traffic signals at most crossings, and offer advance warning times for as little as 20 seconds before the train reaches the crossing. Will the All Aboard Florida trains be set up in the same manner?
4. What are the actual rail crossing improvements you have planned in Martin, St. Lucie, and Indian River Counties and what are your best cost estimates for these crossings?

Russell Roberts, Vice President  
April 10, 2014  
Page Four

Financial and Economic:

1. Mr. Gonzalez, at the March 21<sup>st</sup> meeting of the Treasure Coast Regional Planning Council referred to "studies," which indicated the All Aboard Florida passenger rail service would have benefits for our region. Please provide copies of all "studies" related to the proposed All Aboard Florida passenger rail service.
2. Please provide the most recent audited financial statements for All Aboard Florida Operations and Florida East Coast Industries, LLC.
3. Please list all loans related to the All Aboard Florida passenger rail service being sought or already received, from any government entity, the name of the entity and the amount of the loan and the proposed interest rate of the loan.
4. Please list any other form of economic assistance the All Aboard passenger rail service has received or is seeking, the name of the government agency providing the support and your best estimate of the dollar value of the support.

I understand this request is asking for a lot of information, but I would expect at this stage of the project, almost all of the information requested is readily available to you and mostly, a matter of compilation. If it would assist you in getting the information to me, electronic copies of the available information would be fine. Please simply send the information to [bsolari@ircgov.com](mailto:bsolari@ircgov.com).

Thank you very much for your time and assistance with this. I look forward to working with you as we develop the body of information necessary for me to fulfill my fiduciary duty to my constituents and for our community to fully understand the pros and cons of the proposed All Aboard Florida passenger rail service.

Sincerely,



Bob Solari  
District 5

BS:mlp

## **Dylan Reingold**

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**From:** Martinez Miguez, Margarita [mmmiguez@feci.com]  
**Sent:** Wednesday, January 15, 2014 3:31 PM  
**To:** Chris Mora; Dylan Reingold  
**Cc:** Ledoux, Robert (FEER.GPRK)  
**Subject:** FEER Crossings - Draft Letter Agreement for Discussion  
**Attachments:** FEER Crossings - Draft Letter Agreement for Review.docx

Thank you for participating on today's call with us. It was great to speak with both of you.

As requested, here is the draft letter agreement in MS Word.

Please advise if we may help in any other way.

Regards,

Margie

**Margarita Martinez Miguez | Florida East Coast Industries, Inc.**

305.520.2458 | [mmmiguez@feci.com](mailto:mmmiguez@feci.com) | [www.feci.com](http://www.feci.com)

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[FECR LETTERHEAD]

VIA FEDEX

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Re: **Agreement between Florida East Coast Railway, L.L.C. ("FECR") and \_\_\_\_\_ (the "Licensee") with regard to the Crossings located at \_\_\_\_\_, as amended to date (the "Crossing Agreement")**

Dear \_\_\_\_\_:

This letter shall serve to memorialize the agreement reached between Licensee, FECR and All Aboard Florida – Operations LLC ("AAF") relating to the Crossing Agreement in existence that governs one or more Crossings (as such Crossings are more particularly defined in the Crossing Agreement) and terms relating to the construction, maintenance and safety of such Crossings. Specifically, and without modification to any other term, obligation or condition set forth in the Crossing Agreement, Licensee, FECR and AAF hereby agree to the following terms and conditions, in exchange for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the parties:

AAF is developing an intercity passenger rail service from Miami to Orlando (the "Project").

AAF shall incur the necessary and reasonable capital investments to complete the initial installation of crossing improvements to the extent required for the Project to comply with currently applicable laws regarding safety at public crossings and commence passenger rail service (the "Initial Development Cost"). It is acknowledged and agreed, however, that the AAF's commitment to cover the Initial Development Cost for the installation of crossings improvements for the Project shall not encompass the cost of any other improvements to the Crossings, including any improvements required or desired by Licensee such as those related to the establishment of quiet zones. The Initial Development Cost expressly excludes any and all costs related to such other improvements.

In consideration of the foregoing, Licensee confirms the following:

- The Crossings, as improved for the Project, shall continue to be governed by the Crossing Agreement.
- The Licensee shall not be responsible for the Initial Development Cost, but shall be liable for any and all other costs due under the Crossing Agreement with respect to the Crossings as improved.
- AAF is an intended third-party beneficiary of the Crossing Agreement, with the right to enforce the terms and conditions thereof.
- Except as expressly provided herein with regard to the planned improvements to the Crossing, the Initial Development Cost and AAF's beneficiary status, all of the terms, conditions, covenants, agreements and understandings contained in the Crossing Agreement shall remain unchanged and in full force and effect, and the same are hereby

expressly ratified and confirmed by the Licensee. This includes, without limitation, the Licensee's continuing obligations related to construction, maintenance, safety, future changes and upgrades to the Crossings and the reimbursement of costs, all of which would continue to be governed by the Crossing Agreement.

If these terms are acceptable, please sign this letter in the space provided at the end of this signature page and return that signed document to us. To facilitate this process, it is agreed that this letter will be executed in counterparts, each of which will be deemed to be an original copy of this letter and all of which, when taken together, will be deemed to constitute one and the same agreement. It is also agreed that signed counterparts may be transmitted electronically (as an Adobe PDF file) or by facsimile, and that delivery in that way shall have the same force and effect as the delivery of original signatures. Also, this letter will be construed in accordance with the laws of the State of Florida, without regard to conflict of laws principles. Please understand, however, that the terms of this letter and any offer presented herein will expire and shall be null and void on the date that is 60 days of the date hereof if it has not been executed and returned to us by then. Further, if the Project is not complete by \_\_\_\_\_, the terms of this letter and any offer presented herein will expire and will be null and void.

We do hope to hear from you soon and look forward to working together. If you should have any questions, please contact our team at your convenience.

Sincerely,  
**Florida East Coast Railway, L.L.C.**

By: \_\_\_\_\_

Print Name: \_\_\_\_\_

Print Title: \_\_\_\_\_

**All Aboard Florida – Operations LLC**

By: \_\_\_\_\_

Print Name: \_\_\_\_\_

Print Title: \_\_\_\_\_

**AGREED, ACKNOWLEDGED  
AND CONFIRMED:**

\_\_\_\_\_

By: \_\_\_\_\_

Print Name: \_\_\_\_\_

Print Title: \_\_\_\_\_

Cc: Robert Ledoux, FECR  
Margarita Martinez Miguez, AAF

RESOLUTION NO. 2014- 033

**A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF INDIAN RIVER COUNTY, FLORIDA, URGING ALL POTENTIAL DONOR AGENCIES TO REQUIRE ALL ABOARD FLORIDA TO PAY FOR ALL COSTS OF ALL ABOARD FLORIDA, AND THAT ANY GOVERNMENTAL ASSISTANCE SHALL BE PROVIDED AT NO LESS THAN MARKET RATES; AND DIRECTING CERTIFIED COPIES OF THIS RESOLUTION TO BE PROVIDED TO ANY APPLICABLE DONOR AGENCIES.**

**WHEREAS**, All Aboard Florida, a subsidiary of Florida East Coast Industries, is proposing to provide passenger rail service between Miami and Orlando that will run through populated areas of Indian River County, including Vero Beach, Sebastian, and the communities of Gifford, Roseland, Wabasso and Winter Beach; and

**WHEREAS**, at first, such passenger rail service was touted as being provided by a private company, using solely private resources; and

**WHEREAS**, it is now understood that the passenger rail service is being proposed to be funded by a Railroad Rehabilitation & Improvement Financing (RRIF) Program loan of up to potentially \$1.5 billion from the Federal Rail Administration an agency of the United States federal government; and

**WHEREAS**, it is now also understood that the State of Florida is proposing to spend \$215 million for a new rail station at the Orlando International Airport which will benefit All Aboard Florida; and

**WHEREAS**, there are a total of 32 railroad crossings within Indian River County and 352 rail crossings in the region, and local governments, such as Indian River County, will bear the maintenance costs of upgraded railroad crossings and the costs of installing and maintaining any quiet zones; and

**WHEREAS**, instead of being a passenger rail service provided by a private company, using solely private resources, it is now clear that a significant portion of the financial burden of this passenger rail service is actually going to be borne by the taxpayers through assistance from the federal, state and local governments; and

**WHEREAS**, the Board of County Commissioners of Indian River County implores any donor agency, including the Federal Rail Administration and any other federal agency and the State of Florida and its agencies, to require All Aboard Florida to pay for the costs of All Aboard Florida, including quiet zones and corridor improvements, and that there shall be no governmental assistance, be it in the form of loans, infrastructure or right-of-way at less than

RESOLUTION NO. 2014- 033

market rates, as such support would put the risk of the passenger rail service on the backs of the taxpayers.

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF INDIAN RIVER COUNTY, FLORIDA, THAT:**

**Section 1.** The above "WHEREAS" clauses are true and correct, and are hereby adopted as findings of the Board.

**Section 2.** The Board of County Commissioners of Indian River County urges any donor agency, including the Federal Rail Administration and any other federal agency and the State of Florida and its agencies, to require All Aboard Florida to pay for the costs of All Aboard Florida, including quiet zones and corridor improvements, and that there shall be no governmental assistance, be it in the form of loans, infrastructure or right-of-way at less than market rates. as such support would put the risk of the passenger rail service on the backs of the taxpayers.

**Section 3.** A certified copy of this resolution shall be provided to the Governor Rick Scott, the Federal Rail Administration and any other state, local or federal agency which intends to offer support for All Aboard Florida.

The foregoing resolution was moved for adoption by Commissioner Solari, and seconded by Commissioner Davis, and, upon being put to a vote, the vote was as follows:

Chairman Peter D. O'Bryan	<u>  Aye  </u>
Vice Chairman Wesley S. Davis	<u>  Aye  </u>
Commissioner Joseph E. Flescher	<u>  Aye  </u>
Commissioner Bob Solari	<u>  Aye  </u>
Commissioner Tim Zorc	<u>  Aye  </u>

The Chairman thereupon declared the resolution duly passed and adopted this 8th day of April, 2014.

ATTEST: Jeffrey R. Smith, Clerk of Court and Comptroller

By: [Signature]  
Deputy Clerk

BOARD OF COUNTY COMMISSIONERS OF INDIAN RIVER COUNTY, FLORIDA

By: [Signature]  
Peter D. O'Bryan, Chairman



BCC approval date: April 8, 2014

Approved as to form and legal sufficiency:

By: [Signature]  
Dylan Reingold, County Attorney

# Exhibit 2



U.S. Department of Transportation  
Federal Railroad Administration

Office of Safety RRS-23  
Highway Rail Crossing and Trespasser Program Division

## ON-SITE ENGINEERING FIELD REPORT – Part 1

### — All Aboard Florida —

#### **Background:**

FRA Headquarters, in conjunction with the Region 3 office, assisted in the diagnostic safety review of the Florida East Coast (FEC) Railway grade crossings between Miami-Dade to St. Lucie counties. This is due to High Speed Passenger Rail service being planned between Miami and Orlando, known as "All Aboard Florida". Beginning February 4, 2014 and ending on March 7, 2014, a total of 263 public and private grade crossings were assessed. Participants included officials from Florida Department of Transportation (FDOT), FEC, All Aboard Florida (AAF); including local city and county officials at some locations.

For the purposes of this report, Part 1 represents the diagnostic review taken place from Miami-Dade to St. Lucie Counties. Part 2 designates the diagnostic review from Indian River County to Cocoa Beach, which is expected to occur in mid-to-late June 2014. There are approximately 90 grade crossings in Part 2. The segment between Cocoa Beach and Orlando will be designed for 125 MPH, however, AAF will not be traversing over any at-grade crossings along that rail corridor.

#### **Scope:**

Crossing locations between Miami to north of West Palm Beach are being designed for a maximum authorized speed of 79 MPH. The 110 MPH segment begins/ends at 30<sup>th</sup> Street in West Palm Beach (milepost 297.40), and continues through the Private Road Crossing in Indrio (milepost 233.90). Within the 110 MPH segment, train speeds are lowered to conventional rail limits where civil constraints exist; such as curves or draw bridges, which are noted on the accompanying field design plans.

Currently the design plans are at 30%. The next reiteration will be at 90%. Therefore, the decisions for the grade crossing signaling equipment and warning devices will be determined fairly soon.

The existing crossing signaling equipment contain a mix of signal cases and relay houses, equipped with either Phase Motion Detectors (PMD-1) or HXP 3R2's highway crossing processors.

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Each crossing location will eventually consist of relay houses equipped with GE Transportation's ElectroLogIXS XP4 for constant warning time as part of this project. For 110 MPH, the crossing circuits beyond the 79 MPH standard will utilize a GE device linked through the PTC system for the advanced crossing starts. The technology will diagnose a health check to determine whether or not all roadway/pedestrian gates are in the down position.

**Results:**

Of the 263 grade crossings in Part 1, there are 57 crossing locations affected for Sealed Corridor treatments within the 110 MPH territory. Officials from All Aboard Florida passenger rail project (herein the "Project") have openly expressed that the proposed 110 MPH segment will NOT incorporate the "Sealed Corridor" concept as outlined in FRA's Highway-Rail Grade Crossing Guidelines for High-Speed Passenger Rail, Version 1.0 (*November 2009*). They stated that since these are "guidelines, not regulations" as quoted on page *iii*, in which they are not obligated to incorporate any of the described crossing treatments as illustrated in the document. The Project estimates that in doing so would incur an additional financial burden of about \$47 mil.

In my professional opinion, I respectfully disagree with the Project's approach in that they are not exercising appropriate safety practices and reasonable care when designing for High Speed Passenger Rail service. I explained to the entire diagnostic team how important it was to adopt the principles of the Sealed Corridor approach. However, it was clearly evident that the Project was not pursuing such concept.

As a result, the Project has directed their signaling engineering consultants to design crossings to ONLY accommodate for the additional track while complying with the MUTCD - but not to incorporate any of the Sealed Corridor treatments. Furthermore, since there is a completely different philosophical view towards safety between the Project and I, the accompanying marked-up design plans and field notes are notably different from the Project's design plans; particularly along the 110 MPH segment. The Project has been maintaining a running log noting my Sealed Corridor recommendations.

Officials from FDOT's Rail Office are not taking a position, one way or the other, at this time.

### **Safety Recommendations:**

The following are recommendations made to the Project based upon my on-site field assessments during the diagnostic safety review:

- A. Pedestrian gates** – there are certain locations along the corridor in which sidewalks are present on both sides of the railroad right-of-way, but do not follow through. Some of these sidewalks do not comply with today’s ADA’s standards, however pedestrian travel is evident due to the worn foot path on the surface, and general witnessing of usage. Typically the roadway gate covers the entrance side of the adjacent sidewalk, but there are no pedestrian gates on the opposite quadrants. The Project stated if there is no agreement with the city or county for the service and maintenance of a pedestrian gate assembly, they will not install them.

Trespassing is an epidemic along this corridor. Rather than encourage it, it is recommended per my field notes at those particular locations to equip sidewalk approaches with a visual and gated barrier. This is to provide safe passage of pedestrians through a very active rail line and prevents those from walking into an open railway corridor; or directing them onto the street – irrespective if there is an agreement or not.

- B. Vehicle Presence Detection** – for those public and private crossings between 80-110 MPH in Part 1 to be equipped with a Vehicle Presence Detection (“VPD”) system. The entire FEC corridor is equipped with Cab Signaling control. Presence detection will serve as a long term obstacle system, where the presence of a vehicle within the crossing area for a fixed length of time would be reported as an alarm through the remote monitoring system, irrespective of the approach of a train. Subsequently, for those 3-Quadrant and 4-Quadrant gated grade crossings between 80-110 MPH (as identified further below), it is recommended that either through the activation of a loop detector and/or a vertical exit gate (indicating a roadway vehicle is occupying the crossing) that a vehicle is detected by the train as a “feedback loop” of information; resulting in a loss of cab-signals, thus placing the train in an automatic speed restriction.

Motor vehicles stalled, or trapped on a crossing due to queuing, present a derailment hazard; and in multiple track territory or where freight equipment is standing on adjacent sidings or industry tracks, derailments can result in catastrophic secondary collisions. Therefore, presence detection providing feedback to the train control system to high speed

trains traveling along this FEC corridor be active in order to minimize the possibility of derailments as well.

Recommending a VPD system is due to the following safety reasons:

1. Field observations with vehicular traffic stopping on tracks
2. Safety concerns expressed by city, county and FDOT officials
3. Several crossings with reduced or no vehicle clearance at roadway T-intersections
4. Vehicles yielding to oncoming traffic while on tracks at non-signalized T-intersections
5. Motorists / Commercial Vehicles queuing over tracks due to 4-way stop intersection, and vehicles entering adjacent driveways and parking lots
6. The multiple track surfaces enables motorists to make U-turns or cut thru's easier
7. Severely skewed crossings
8. Acute-angled crossings with main gates perpendicular to the vehicular roadway

C. **Sealed Corridor Treatments** - the following grade crossing locations are the recommended Sealed Corridor Treatments required by the Project to install:

<b>Four-Quadrant Gates (also referred as exit gates) (41)</b>			
<b>Street Name</b>	<b>City/Town</b>	<b>Milepost</b>	<b>DOT #</b>
30 <sup>th</sup> Street	West Palm Beach	297.40	272 406 J
Inlet Blvd.	Rivera Beach	295.45	272 400 T
Flagler Street	Rivera Beach	295.15	272 399 B
Silver Beach Road	Lake Park	293.75	272 389 V
Park Ave	Lake Park	293.30	272 387 G
Richard Road	Palm Beach Gardens	292.20	272 385 T
Lighthouse Drive	Palm Beach Gardens	291.70	272 384 L
RCA Blvd.	Palm Beach Gardens	290.30	272 382 X
Fred Small Road	Jupiter	286.20	273 020 P
Toney Penna Dr. *	Jupiter	284.20	272 378 H
Gleason Street	Hobe Sound	274.50	272 367 V
Bridge Road	Hobe Sound	274.10	272 366 N
Pettway Street	Hobe Sound	272.70	272 365 G
Crossrip Street	Salerno	271.40	272 362 L
Osprey Street	Salerno	270.90	272 934 K
Cove Road	Salerno	267.14	272 359 D
Broward Street	Salerno	266.80	272 358 W
Salerno Road	Salerno	266.60	272 357 P
Seaward Street **	Salerno	266.50	272 356 H

Monterey Road	Stuart	263.30	272 353 M
SR A1A	Stuart	262.50	272 350 S
Florida Street	Stuart	262.30	272 349 X
Palmetto Drive	Rio	257.40	272 342 A
Jenson Beach Blvd.	Rio	256.80	272 340 L
Pitchford Land***	Rio	256.20	272 338 K
Skyline Drive	Rio	255.50	272 337 D
County Line Road	Rio	255.30	272 336 W
Walton Road	Walton	252.50	272 332 U
Midway Road	Walton	246.30	272 331 M
Savannah Road	Fort Pierce	243.80	272 330 F
No. Bch. Causeway	Indrio	239.80	272 218 U
Shimoner Ln. ***	Indrio	239.50	272 217 M
Tarmac Road***	Indrio	239.20	272 215 Y
St. Lucie Lane	Indrio	238.80	272 214 S
Chamberlain Blvd.	Indrio	238.40	272 213 K
Milton Road	Indrio	237.80	272 211 W
Torpey Road	Indrio	237.10	272 210 P
Rouse Road	Indrio	236.70	272 209 V
Michigan Street	Indrio	236.10	272 208 N
Wilcox Road	Indrio	235.60	272 207 G
Harbor Branch Rd	Indrio	235.10	272 206 A

\* - Last crossing location (northbound) for proposed Tri-Rail service

\*\* - Recommend to be CLOSED

\*\*\* - Private Crossing

100-foot Non-traversable Medians * (7)			
Street Name	City/Town	Milepost	DOT #
36 <sup>th</sup> Street	West Palm Beach	297.10	272 405 C
45 <sup>th</sup> Street	West Palm Beach	296.65	272 403 N
49 <sup>th</sup> Street	West Palm Beach	296.30	272 240 G
County Line Road	Hobe Sound	280.90	272 372 S
Park Road	Hobe Sound	277.70	272 370 D
SR A1A **	Salerno	268.65	272 360 X
Avenue A	Fort Pierce	241.30	272 238 F

\* **Please note:** if for any reason the Project and the respective municipality cannot agree on the median treatment, then those location(s) be equipped with exit gates.

\*\* Medians to be at least 150-feet each approach due to severe roadway skew.

<b>Three-Quadrant Gates</b> (due to a median present on the opposite side) (6)			
<b>Street Name</b>	<b>City/Town</b>	<b>Milepost</b>	<b>DOT #</b>
Blue Heron Blvd.	Rivera Beach	294.90	272 390 P
Burns Road	Palm Beach Gardens	290.80	272 383 E
Hood Road	Palm Beach Gardens	288.50	272 380 J
Donald Ross Road	Palm Beach Gardens	287.20	272 379 P
Indiantown Road	Jupiter	283.60	272 377 B
Orange Avenue	Fort Pierce	241.50	272 239 M

<b>Private</b> (6 locations within 110 MPH)			
<b>Street Name</b>	<b>City/Town</b>	<b>Milepost</b>	<b>DOT #</b>
Miracle Way *	Rio	257.10	272 341 T
Pitchford Lnd **	Rio	256.20	272 338 K
Shimoner Ln **	Indrio	239.50	272 217 M
Tarmac Road **	Indrio	239.20	272 215 Y
Private Road *	Indrio	234.50	272 205 T
Private Road *	Indrio	233.90	272 204 L

\* - Recommend locked gate with procedures seeking permission from R.R. dispatch to cross.

\*\* - Recommend the Project to equip with Four-Quadrant Gates (including VPD)

<b>Closed</b> (17) <i>Please note: Officials from the city or county are not taking a position, one way or the other, at this time.</i>			
<b>Street Name</b>	<b>City/Town</b>	<b>Milepost</b>	<b>DOT #</b>
179 <sup>th</sup> Street	Aventura	353.60	272 602 R
141 <sup>st</sup> Street *	North Miami Beach	356.12	272 609 N
Third Street	Hallandale	350.30	272 591 F
Monroe Street	Hollywood	349.03	272 588 X
Fillmore Street	Hollywood	348.52	272 585 C
Garfield Street	Hollywood	348.07	272 582 G
Dania Blvd *	Dania Beach	345.94	272 574 P
First Street *	Dania Beach	345.81	272 573 H
22 <sup>nd</sup> Street	Fort Lauderdale	342.96	272 566 X
9 <sup>th</sup> Street	Fort Lauderdale	341.80	272 661 N
6 <sup>th</sup> Street *	Fort Lauderdale	341.56	272 559 M
5 <sup>th</sup> Street *	Fort Lauderdale	341.45	272 558 F
2 <sup>nd</sup> Street	Pompano Beach	333.31	272 534 S
4 <sup>th</sup> Street	Deerfield Beach	327.41	272 513 Y
2 <sup>nd</sup> Street	Deerfield Beach	326.81	272 511 K
Hunter Street	West Palm Beach	303.18	272 450 W
Seaward Street **	Salerno	266.50	272 356 H

\* - or possible one-way

\*\* - only crossing to be closed along 110 MPH segment

**Conclusion:**

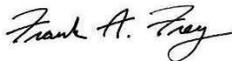
Based upon my professional background and experience in regards to grade crossing safety, I strongly recommend officials from All Aboard Florida to adhere to the principles as outlined in the FRA's guidelines for Emerging High-Speed Rail (80-110 MPH). In doing so incorporates the optimum safety practices in the engineering and design of their crossing locations for the following reasons:

- I. The operating dynamics are significantly changing within the existing environment of the grade crossings, along with an already an active freight operation that will include:
  - The addition of 16 round-trip trains (32 total) at 110 MPH
  - The eventual inclusion of Tri-rail Commuter Rail service, which will add 74 trains.
  - Changing from single track to multiple track configurations.
- II. Densely settled neighborhoods with congested roadways
- III. As many as 5 traffic lanes in the oncoming direction at T-intersections

In summary, as the travelling public begins to assimilate to a substantial increase in railroad operations – by incorporating enhanced railroad signaling technology and increased active highway warning devices are paramount to ensuring safety awareness as both entities interact with one another. Therefore, equipping crossing locations with the recommended actions, as outlined above in this report, will dramatically reduce potential safety hazards and catastrophic events.

**Report Respectfully Submitted By:**

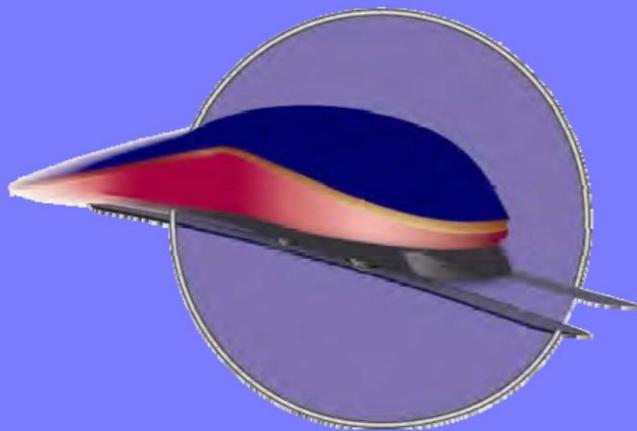
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**March 20, 2014**

## Exhibit 3

# Highway-Rail Grade Crossing Guidelines for High-Speed Passenger Rail



Office of Railroad Safety  
Office of Railroad Development



U.S. Department of Transportation  
Federal Railroad Administration

**Version 1.0**  
**November 2009**

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## Preface to Version 1.0

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On July 28, 2009, FRA distributed for comment, through the Railroad Safety Advisory Committee (RSAC) and its member organizations, an initial draft of these Highway-Rail Grade Crossing Guidelines (Guidelines). Comments were requested through August 28, 2009, and a report on the comments was provided to the RSAC at its meeting on September 10, 2009. Subsequently, FRA published a notice concerning the establishment of a public docket (FRA Docket No. 2009-0095) which will remain open indefinitely to receive comments on the High-Speed Rail (HSR) Safety Strategy and this document (74 FR 50270; Sept. 30, 2009).

In preparing these Guidelines, FRA has taken into consideration all of the comments that touched on the issue of highway-rail grade crossings in high-speed territory, as well a comment on the Notice of Proposed Rulemaking for Positive Train Control Systems (74 FR 35950; July 21, 2009)(FRA Docket No. 2008-0132). In general, there was continued strong support for consolidating both public and private highway-rail grade crossings. Beyond that, FRA encountered a wide range of views in these comments, from strong support for aggressive engineering that would include integration of highway-rail warning systems with train control to concerns that excessive expectations could arrest progress toward new rail service.

Any discussion of rail passenger service and safety draws notable comments regarding costs, funding, and liability. Likewise, host or tenant freight railroads conducting operations on lines used for Emerging HSR are concerned that provisions for safety might disrupt or unduly burden freight service. Responses to the draft Guidelines were replete with such comments.

FRA has attempted to take into account issues of cost and practicability in adopting these initial Guidelines. FRA has also taken into account the compelling reality that HSR service will succeed only if it is very safe. Exposure at highway-rail grade crossings is the area of risk over which it is most difficult to establish reasonable control, specifically because two independent modes of transportation are involved. Accordingly, FRA offers Guidelines that attempt to advance safety and take advantage of techniques successfully implemented on one or more existing high-speed corridors.

Two observations are crucial: First, these are guidelines, not regulations. They do not establish a standard of care, and no court should view any departure from these guidelines as suggesting a failure to exercise reasonable care. Second, they should be taken seriously by those who are planning high-speed service. They will be used, with other relevant factors, in determining the relative merit of applications for Federal assistance, and they will be used by FRA as grant agreements are negotiated. Of course, as guidelines, they will be weighed in the particular context along with other considerations advanced by the applicant. FRA is aware that very safe HSR service has been provided under conditions not wholly aligned with the guidelines, so they should not be applied reflexively or arbitrarily. At the same time, applicants should keep in mind that serious rail passenger accidents are

rare events, and that abating risk can make them even less frequent. Waiting for the first event to happen is a sure formula for failure.

One commenter suggested that elements of the Guidelines should “rise to the level of regulation.” FRA has a completely full regulatory agenda for the time being; however, the agency remains open to including additional standards development in the High-Speed Rail Safety Strategy as resources permit.

Finally, FRA notes that these Guidelines will remain a work in progress. The dialogue that has been possible over the past months has been severely constrained by the demands imposed on FRA and its colleagues by the Rail Safety Improvement Act of 2008, the Passenger Rail Investment and Improvement Act of 2008, and the American Recovery and Reinvestment Act of 2009. Together, these legislative actions present substantial opportunities supporting growth in passenger rail service and improvements in railroad safety. FRA will maintain an active dialogue with all of those participating in this historic process and refine safety strategies to address these opportunities.

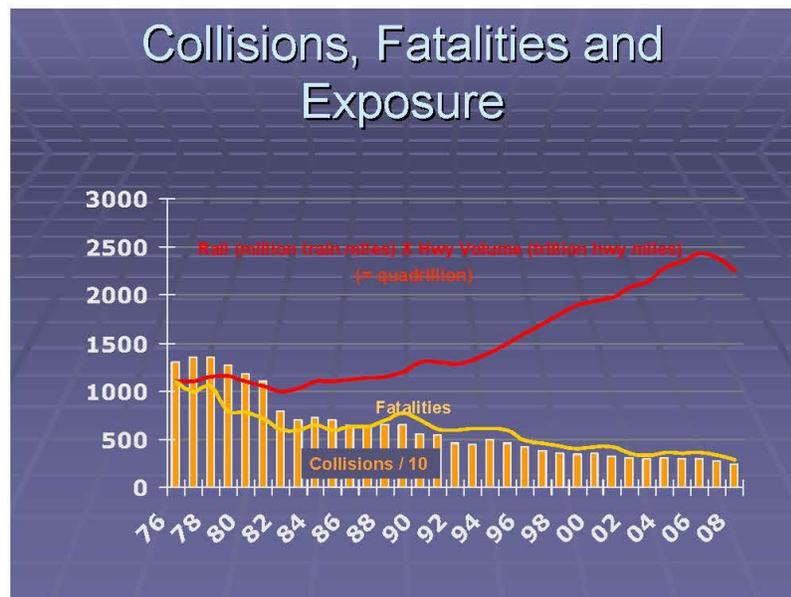
## Introduction

Highway-rail grade crossings pose inherent hazards to train operations, as they do to motor vehicles, non-motorized vehicles, and pedestrians. Since the issuance of the Secretary's Highway-Rail Grade Crossing Action Plan in 1994, U.S. Department of Transportation (DOT) policy has supported consolidation of crossings on active rail lines. Where an at-grade crossing cannot be eliminated, provisions must be made to ensure that the roadway approaches and crossing surface are suitable for all traffic, that sufficient warning is provided of the approach of trains, and that management of the highway-rail intersection is coordinated with other intersections involving nearby roads. In addition to the consolidation of crossings and engineering improvements at crossings that remain, DOT policy has stressed—

- Education and awareness to prepare drivers for challenges at highway-rail grade crossings; and
- Enforcement of traffic laws at crossings.

In addition, the Federal Railroad Administration (FRA) has taken actions to better ensure the conspicuity of rail equipment and to provide for effective audible warnings or compensating safety measures.

The national grade crossing partnership—consisting of DOT agencies, States, Operation Lifesaver Inc., railroads, suppliers, and the research community—has been very effective in reducing collisions and casualties at grade crossings even in the face of rising exposure (which may be measured by motor vehicle miles and train miles).



This general approach is equally relevant without regard to the type or speed of rail traffic. However, where rail lines carry high-speed passenger trains, special care must be observed to ensure that road traffic does not present an obstruction that could result in a collision and subsequent derailment. The presence of both high-speed passenger trains and slower-moving trains creates another dimension of risk, warranting<sup>1</sup> additional attention to governance of all traffic over the highway-rail intersection. Under these circumstances, exclusive reliance on sight distance or audible warnings to judge the arrival of trains is not practical. Particularly where there are two or more tracks, the potential for an event involving more than the single train initially impacting a road user adds to the potential for additional risk.

Accordingly, at crossings with high-speed passenger trains, special care must be taken to follow existing guidance concerning a systems approach to highway-rail grade crossing safety. This includes the use of diagnostic teams to plan improvements, elimination of redundant crossings and those that cannot be re-engineered to provide reasonable safety, the use of automated warning devices including constant warning time circuitry where feasible, and other sound safety approaches as set forth in the Manual on Uniform Traffic Control Devices (MUTCD) and Railroad-Highway Grade Crossing Handbook, both published by the Federal Highway Administration.

In addition, FRA requirements for approved barrier systems where train speeds exceed 110 mph and the prohibition of at-grade crossings where train speeds exceed 125 mph must be observed as provided in the Track Safety Standards.

Although these fundamentals are very important, they will not be sufficient to meet the safety challenges associated with high-speed passenger rail going forward. Accordingly, the purpose of this document is to provide supplementary guidance useful to those planning high-speed passenger service and to FRA as guidance for the negotiation of funding agreements and for the administration of the Track Safety Standards (i.e., with respect to the characteristics of barrier systems suitable for approval). This guidance restates and supplements preexisting guidance, building on experience gained through projects initiated under the Intermodal Surface Transportation Efficiency Act and subsequent surface transportation legislation, engineering options proven during development of the Train Horn Rule, and continuing research. This experience shows that the safety challenges associated with high-speed rail (HSR) can be effectively met.

The primary purpose of this guidance is to support the highest level of safety that is practical, given the necessity associated with those highway-rail crossings that remain after efforts toward consolidation are complete. However, it must also be recognized that collisions at highway-rail grade crossings disrupt rail passenger service and local road use. Accordingly, in addition to saving lives, preventing injuries, and avoiding property damage, actions that effectively reduce risk at these locations will pay dividends in more reliable service that will enjoy a reputation for quality as well as safety. Good planning that

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<sup>1</sup> Variants of the term “warrant” as used in the Guidelines are intended to have their common meaning. This document does not prescribe “warrants” as the term is used in highway engineering.

consolidates crossings and substitutes grade separations for at-grade crossings will significantly enhance mobility and contribute to livable communities.

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# Guidance for Highway-Rail Grade Crossings

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## 1. Consolidation and Grade Separation

As emphasized in the Secretary of Transportation's 2004 *Action Plan for Highway-Rail Grade Crossing Safety and Trespass Prevention*: "The Department supports efforts to close crossings and limit the creation of new highway-rail crossings except where the public interest clearly provides justification."<sup>2</sup> Regardless of anticipated train speeds, any new or enhanced passenger service should begin with an aggressive effort to close redundant crossings and those that cannot be re-engineered to provide a reasonable level of safety (e.g., because of geometry, proximity of road intersections).<sup>3</sup> Consolidation of at-grade crossings requires significant effort, but pays off in real results and reduced costs. Accordingly, crossing consolidation is the cornerstone of effective planning for high-speed passenger rail.

Effort and results in minimizing the number of highway-rail grade crossings will be considered favorably when evaluating competing funding requests, given the finite resources that are available for transportation improvements, and given the fact that crossing closures are typically very cost-effective when compared to the alternatives (upgrading warning devices, maintaining warning devices and crossing surface through the program lifecycle, additional expense associated with maintenance of track structure at crossing location, etc.).<sup>4</sup> Clearly, consolidation planning must consider the need for crossings adjoining those that are closed to be equipped with high-quality warning systems so that safety is advanced.<sup>5</sup>

Multi-track crossings pose special problems, especially where some trains are expected to move slowly in approach to yards or stations while others proceed at higher speeds on an adjacent track. Where there are more than three tracks, or where frequent low-speed movements are expected, strong consideration should be given to closure or grade separation. Mobility and safety will demand it. By involving road authorities and metropolitan planning agencies early on, opportunities for cooperative efforts toward grade separations can be identified and built into project plans.

## 2. Safety Improvements at Private Crossings

Private highway-rail crossings constitute a significant part of the crossing safety problem in the United States, and in most States, there is no public regulation of this issue. On average, movements over private crossings are a greater risk to persons on trains because of the

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<sup>2</sup> *Secretary's Action Plan, Highway-Rail Crossing Safety and Trespass Prevention*, DOT (June 2004), (available at <http://www.fra.dot.gov/us/content/1752>), page 7.

<sup>3</sup> See *Highway-Rail Grade Crossings – A Guide to Crossing Consolidation and Closure*, FRA and FHWA (June 1994), (available at <http://www.fra.dot.gov/us/content/1752>).

<sup>4</sup> In this setting, demonstrated effort would include making application to a state agency having authority to order closure (where such authority exists).

<sup>5</sup> Some have suggested that FRA specify a maximum number of crossings per mile. Although FRA is hesitant to specify a number (e.g., 2) given the agency's inability to enforce such a limitation, FRA recognizes that the number—apart from grade separated crossings—should be very small.

prevalence of heavy trucks and agricultural equipment.<sup>6</sup> Closing private crossings should be an integral part of the crossing safety strategy for any HSR corridor. Cost-effective access can often be provided to the crossing holder by establishing an alternative route as part of the HSR improvements even though such alternatives are not currently present. Where a private crossing cannot be closed, the crossing should be evaluated according to its use and appropriately treated.

***a. Public Access Crossings***

Very often, private roads are open to public use, such as where the public is invited to enter a shopping mall or entertainment venue. In general, these “public access crossings” should be treated in the same manner as any public grade crossing, and their inclusion in crossing consolidation programs is similarly desirable.

***b. Industrial Crossings***

Industrial crossings often pose special threats to trains because competing roadway traffic consists of heavy trucks that may also be transporting hazardous commodities. Typical locations include gravel pits, chemical and energy plants, steel and aluminum production facilities, warehouses, intermodal transfer facilities, and many others. Each of these crossings should be evaluated individually to ensure proper advance signage, adequate active warning, suitability of roadway approaches (including elimination of “hump” crossings capable of hanging up low-profile vehicles), adequate storage distance for longer combination vehicles between tracks and nearby traffic intersections, presence of traffic-calming devices approaching the crossing that are compatible with the road traffic, and effective barrier systems where required (see below).

Ongoing training and awareness efforts for drivers regularly using the crossing will also be important to ensure familiarity with the crossing safety system and the importance of observing warnings.

***c. Residential Crossings***

Private roads used to access individual residences and residential developments inevitably draw business guests (mail delivery persons, repair personnel, gardeners, etc.) as well as personal guests and the residents themselves. Although it may be impractical to treat every such location as a public access crossing, crossings providing access to multiple residences should be so considered. One commenter on these guidelines suggested a rule of thumb of 5 or more residences constituting public access for a single crossing location, which appears to be a reasonable compromise.

There is also precedent for using gate arrangements at the crossing to control access to residential developments. In one approach, gates are normally down at the crossing and access is provided by an electronic card system or frequently changed code. The gate rises

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<sup>6</sup> See *Private Highway-Rail Grade Crossing Safety Research and Inquiry*, Office of Research and Development and Office of Safety, FRA (May 2008)(available at <http://www.fra.dot.gov/us/content/1712>).

and provides access to the development only if there is no train on the approach circuit. The suitability of this arrangement would depend on assignment of responsibility for maintenance and proper control of the means of entry (e.g., cards, tags, codes). The design of the system should ensure that gates will close behind the authorized user to prevent later unauthorized access. Another approach is to treat the crossing in the same manner as a public crossing, which would include the use of flashing lights and gates, plus any other appropriate treatment.

If it is not financially feasible to provide automated warning devices at a crossing providing entry to one or two residences, special care should be taken to ensure that the crossing is well marked with a crossbuck and either a yield or stop sign, and that sight distances are adequate for all types of vehicles expected to use the crossing. Appropriate attention should be afforded to the crossing surface, including adequate width. If train speeds exceed 90 mph at the location, flashing lights and gates should be provided in each case. High-speed trains present elusive visual targets and will close on a crossing too rapidly for audible warnings to be effective.

#### ***d. Agricultural Crossings***

Thousands of agricultural crossings will remain on Emerging HSR corridors in the coming years as they are necessary to provide access to fields in season and for other legitimate purposes. However, as operating speeds increase, the danger of a catastrophic incident involving heavy agricultural machinery and a passenger train will also rise. Casual and unauthorized users (moving over the crossing to hunt, fish, or engage in other recreation) pose a special risk to themselves and others because of the potential lack of familiarity with rail traffic on the line and because of crossing approaches, sight lines, and surface that may be less than optimal.

For Emerging HSR, the most rudimentary approach to agricultural crossings that cannot be permanently closed is to require that they be closed *when not in use* by employing a locking device within the control of the crossing holder. A simple padlock on a fence gate may be sufficient in many cases. However, experience shows that getting manual locks re-secured after passage of the authorized user can be a problem. Further, limited sight distances or the relatively long clearance time required for heavy agricultural machinery will often indicate a more aggressive approach.

As passenger rail speeds increase, systems that provide active warning, controlled opening of the crossing, and provide feedback when it is secured are very desirable. This is particularly true when sight distances are limited (as would be true where track curvature or multiple tracks, vegetation (including seasonal issues involving tall crops), topography or other factors block sight distance for any period of time). The potential for adverse weather (e.g., heavy rain, snow, or fog) should also be considered. For many locations, an electronic lock with a timed release controlled through the signal or train control system may be more cost-effective and appropriate than a traditional arrangement with flashing lights and gates. These arrangements could take into consideration the maximum time typically required to move equipment over the specific crossing and could provide

feedback through the train control system if the crossing remains open beyond the specified period.

### 3. “Sealed Corridors”

In guidance provided through the 1990s, the DOT advocated for a minimum of active warning systems with gates, controlled by constant warning time circuitry, on rail lines with speeds of 80 mph and greater.<sup>7</sup> Gates provide an unequivocal indication to the motorist regarding the behavior expected. This continues to be a good foundation for crossing safety on HSR lines, but developments since that time point the way to additional strategies.<sup>8</sup>

The State of North Carolina has pioneered many of the subsequent advances on the North Carolina Railroad under the concept of a “Sealed Corridor.”<sup>9</sup> NCDOT defines the concept as follows:

An extended rail corridor or segment thereof on which all public at-grade crossings are evaluated through an engineering diagnostic process to determine the appropriate level of safety improvement needed to decrease or eliminate violations. Safety improvements include closure/consolidation, enhanced warning devices, medians, and grade separation. The end result is that redundant and/or unsafe crossings are consolidated through closure and/or grade separation and all remaining public crossings are equipped as appropriate with four quadrant gates, median separators, and longer gate arms. Private crossings are also evaluated for closure, signal treatment and/or special signage.

In keeping with that concept, public crossing treatments for Emerging HSR lines should provide an additional level of safety by blocking all lanes of travel. These types of arrangements add safety by preventing left turns from parallel roadways that inadvertently result in driving around the tip of the gate arm. They also discourage those who might attempt to go around the lowered gate. This can be accomplished using one or more of the following—

- Four-quadrant gates
- Median arrangements
- Paired one-way streets with gate arms extending across all lanes of travel<sup>10</sup>

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<sup>7</sup> *High-Speed Track and Equipment Safety Standards* (Report to the Committees on Appropriations, May 1997), page 7.

<sup>8</sup> Constant warning time circuitry may not be practical on electrified rail lines under some conditions (including the nature of the legacy train control system). If that is the case, special care should be given to ensuring that warning system traffic control at the crossing is observed.

<sup>9</sup> Reports and other information on North Carolina’s Sealed Corridor can be accessed online at <http://www.bytrain.org/safety/sealed.html> and <http://www.fra.dot.gov/downloads/Research/rr0807.pdf>.

<sup>10</sup> NCDOT has also found long gate arms to be effective on two-lane roads with travel in both directions. However, they have also found them to require significant maintenance.

These types of improvements have been accepted by the highway engineering community and the railroads in connection with programs for enhanced passenger rail service and in connection with quiet zones.<sup>11</sup> They can be paired with selective use of barrier gates at particularly troublesome crossings.

FRA expects that funding proposals will reflect sealed corridor treatments for all highway-rail grade crossings at locations where train speeds exceed 79 mph. FRA will look favorably on proposals for locations within the limits of developing high-speed corridors that include sealed corridor treatments at crossings with maximum authorized train speeds below that threshold.

It should be noted that sealed corridor treatments are also appropriate at crossings with more than two tracks, regardless of speed, and particularly near passenger stations. These are cases where “second train” concerns can be particularly acute. Additional warning time will be required at these locations to ensure that all road traffic clears the crossing. Pedestrian gates and effective channelization should be provided.

#### 4. Warning Systems and Other Highway Traffic Control Devices

Automatic warning devices at crossings (such as flashing lights and gates) provide valuable information to the motorists that are approaching the crossing. These devices may be supplemented by additional systems and traffic control devices to enhance the effectiveness of the warning systems. These additional systems should be carefully considered at crossings on HSR lines.

##### ***a. Interconnection and Supplementary Traffic Control***

Warning systems in HSR lines must conform to the MUTCD and other Federal Highway Administration guidance. Special attention should be given to the interconnection of grade crossing warning systems with other traffic control systems in the vicinity of the crossing, and periodic verification that timing is adequate to avoid “storage” of vehicles on the crossing (i.e., vehicles that are stopped on the crossing due to traffic that is queued because of the highway traffic signal). Actual conditions may indicate the necessity of interconnection even though the nominal MUTCD threshold is not met.

In some cases, heavy highway traffic volume may defy reasonable attempts to use timing of the highway traffic signal as the means of preventing storage. Since storage of a large truck or bus could pose a hazard to persons on and off the train, consideration should be given, where appropriate, to the use of interconnected traffic signals prior to the crossing and placed specifically to prevent storage. A traffic engineering study should be conducted to determine the appropriate timing for the interconnection and whether the interconnection

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<sup>11</sup> Title 49 Code of Federal Regulations (CFR) Part 222.

should be simultaneous or advanced preemption. The use of pre-signals and queue-cutter signals should also be explored where warranted.<sup>12</sup>

***b. Presence Detection***

Accepted design for four-quadrant gates includes a delay on the descent of exit gates to permit traffic on the crossing to clear before arrival of the train. Where a four-quadrant gate system is employed and storage is a potential issue, consideration should be given to using vehicle presence detection to maintain the exit gates in the raised position until traffic within the crossing clears.<sup>13</sup>

Storage may also be an issue where conventional gates and channelization through use of medians is employed. For crossings where storage is a known possibility, and in the case of crossings on segments with train speeds above 100 mph, regardless of a prior history of storage, presence detection should be provided in connection with operation of the train control system (see below). Motor vehicles stalled or trapped on a crossing present a derailment hazard; and in multiple track territory or where freight equipment is standing on adjacent sidings or industry tracks, derailments can result in catastrophic secondary collisions.

***c. Remote Health Monitoring***

Warning systems are designed to be fail-safe. However, the potential for continuous operation (eroding the credibility of the warning), intermittent malfunction, or even total failure is always present. Confidence in warning system performance is acquired through many means, including periodic inspections and tests,<sup>14</sup> emergency notification systems, constant attention by train crews. In recent years, the additional option of remote health monitoring has been added. Grade crossing controllers and simple sensors together can diagnose developing problems and failures (including failure of commercial power and system unresponsiveness caused by lightning strikes and other factors). By using cellular phone links and other communication paths, crossing warning systems can report problems to a central location, leading to responsive action by dispatchers, train crews, and signal maintainers. Use of remote health monitoring on HSR lines is clearly indicated. Typically, exceptions are reported to a signal trouble desk for review and action. However, unless the signal trouble desk is continuously monitored, critical exception data from health monitoring should also be presented to dispatchers for acknowledgment and appropriate action.

FRA will include consideration of these issues in its review of grant applications and in negotiation of grant agreements.

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<sup>12</sup> See *Railroad-Highway Grade Crossing Handbook*, FHWA (August 2007), (available at <http://www.fra.dot.gov/us/content/1752>), pages 114-115, 129, and 134.

<sup>13</sup> NCDOT advises that decisions on presence detection and whether gates are designed to fail up or down should be entrusted to the crossing safety engineer in charge or to the diagnostic team.

<sup>14</sup> See 49 CFR Part 234.

## 5. Train Control Integration

One of the potential functions of a train control system is to provide the locomotive engineer with information concerning route conditions ahead. FRA has in place existing train control requirements for operations above 79 mph.<sup>15</sup> On July 21, 2009, FRA published a proposed rule on Implementation of Positive Train Control (PTC) systems as required by the Rail Safety Improvement Act of 2008.<sup>16</sup> PTC will be required by law on all intercity and commuter passenger lines by December 31, 2015.

The question arises whether the train control system can be engaged as a means of preventing certain low-frequency, high-severity collisions involving vehicles that linger on grade crossings as a result of being stored, disabled, or deliberately placed there.

The following examples illustrate recent experiences:

- One of the primary objectives of Federal and local investment in the Northeast Corridor (NEC) from the 1970s through the 1990s was the elimination of highway-rail grade crossings. In fact, all crossings were eliminated south of New York City, and only a half dozen (mostly lightly used) crossings remain north of New York City. Anticipating the enhancement of HSR service between New Haven and Boston, FRA acted through an Order of Particular Applicability for the Advanced Train Control and Advanced Civil Speed Enforcement System (affecting certain NEC railroads) to address residual grade crossing risk on that territory.<sup>17</sup> The Order limited speeds to 80 mph with conventional crossing treatments, and to 95 mph where four-quadrant gates were present with presence detection and a feedback loop to the train control system that would cause the cab signals to display the most restrictive signal aspect if a vehicle was stored on the crossing after the exit gates timed out. (Amtrak ultimately elected to take a more conservative approach than required, equipping additional crossings with four-quadrant gate systems tied into the train control system.) FRA's justification for the requirements was directly related to the specifics of the NEC operation.
- In Michigan, Amtrak's line (which is part of the Detroit-Chicago corridor) is equipped with the Incremental Train Control System. This system functions to provide pre-starts for highway-rail grade crossings, avoiding the expense and complexity of extending approach circuits to provide proper warning for high-speed trains. Using a radio data link, each train establishes a "session" with each of the crossings along the line. The system verifies warning system health and operation as the train approaches the crossing. If proper functioning cannot be verified, the crossing becomes a target for the train control system and the train's speed is reduced to the extent possible.

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<sup>15</sup> 49 CFR § 236.0 and §§ 501 et seq.

<sup>16</sup> 74 FR 35950, July 21, 2009.

<sup>17</sup> 63 FR 39343; July 22, 1998.

- FRA understands that the State of Illinois is also considering a feedback loop to the train control system that will verify that the four-quadrant gates on the Chicago-St. Louis designated HSR corridor are operating properly and that crossings are clear.

It should be noted that there is significant opposition within the rail community to the use of any technology that seeks to determine the presence of obstacles on highway-rail grade crossings and create any sort of feedback loop to the train. The opposition arises in part from the reality that today, motor vehicles often clear crossings only a few seconds before the arrival of the train. In order to be effective in providing warning to the train, the traffic control devices at the crossing would need to operate well ahead of the train's arrival, lengthening road-user dwell time significantly—which itself can erode compliance with the crossing warning system. Further, delivery of repeated false warnings to freight trains could lead to additional train handling challenges as well as significant fuel and emission costs.

However, where HSR passenger trains are present, it will be important for each crossing to be equipped with sealed corridor treatments. In most cases, there will be some portion of the crossing where presence detection is necessary to execute the sealed corridor strategy or is properly elected to deal with special challenges. Crossings with presence detection should be monitored by the train control system, and continued presence of obstacles following the expiration of the expected clearance timing should be communicated to high-speed passenger trains for action by the crew and the train control technology. FRA would not expect freight trains to be governed by this information unless route conditions indicate and the freight railroad so elects. Accordingly, this would be a function independent of the wayside signal system.

FRA will consider appropriate use of the train control system in reviewing grant applications, negotiating grant agreements, and reviewing filings under the PTC regulations. FRA will insist on integration of train control technology if any crossings are retained at speeds exceeding 110 mph.

Planners should note the potential project efficiencies that may be possible with effective train control integration. In addition to secure warning system pre-starts at higher speeds, train control might be configured to permit acceleration on approach circuits equipped with constant warning time circuitry (leaving stations and departing curves) to aid trip time.

## 6. Barrier Systems

The Track Safety Standards require that, at speeds exceeding 110 mph, “the railroad shall submit for FRA’s approval a complete description of the proposed barrier/warning system to address the protection of highway traffic and high-speed trains.”<sup>18</sup> The system must be approved and implemented before high-speed train operations may begin.

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<sup>18</sup> 49 CFR § 213.347.

As speeds increase, there is a heightened concern with any condition that could result in a derailment. At times, mere warning to highway users is insufficient. Slick road surfaces, brake failures, stalled vehicles, motorist misperceptions, and other factors can result in vehicles going through gates just ahead of a train's arrival or vehicles becoming disabled on the crossing. Barrier systems, where required, need to meet the following tests to be effective:

- Barrier systems must operate in concert with the crossing warning system, and the combined system must provide critical information concerning system health and status to the train control system in real time.
- Barriers must be capable of stopping short of the crossing the heaviest motor vehicle operated on that roadway, taking into consideration the posted speed limit on the roadway.
- Barrier systems must include the capability to detect any object of significant obstruction (car, truck) that remains on the crossing after the barriers go into place.
- Barrier systems must communicate to approaching high-speed trains the presence of any significant obstruction in time for the train to reduce speed (i.e., to approximately 20 mph) or stop before reaching the crossing.

Through research and demonstration, FRA sought during the 1990s to determine the practicality and effectiveness of energy-absorbing barrier systems at highway-rail grade crossings. Those efforts were generally considered unsuccessful. FRA remains open to appropriate technology that is shown to be effective and reliable.

FRA is aware that barrier gates are in use at a small number of highway-rail grade crossings in the United States. These arrangements are suitable for low-speed roads and— together with presence detection—can add to the options available for improvement of HSR lines at speeds up to 110 mph. Under these circumstances, barrier gates deter violations and contribute to public awareness. However, presently marketed barrier gates do not address heavier motor vehicles and would therefore not be suitable without modification for protection of a rail line carrying trains above 110 mph.

## 7. Pedestrian and Trespass Considerations

High-speed passenger trains are difficult to detect visually and can be virtually silent until their arrival at any given location. Pedestrian treatments at vehicular crossings and associated sidewalks, including pedestrian pathways, are an essential safety element. Active warning directed at pedestrians should be provided, and warning system timing and the nature of the warning given should take into consideration special needs road users (e.g., the visually impaired or motorized wheelchair users). Channelization of pedestrian traffic is recommended to ensure that warning is effectively delivered and pedestrian behaviors are adequately cabined. Intercity and commuter railroads have implemented

many innovative techniques that can significantly reduce hazards to pedestrians.<sup>19</sup> FRA is working with industry representatives and through the RSAC to refine strategies for controlling pedestrian movements in and around stations.

Crossings near stations pose special issues for persons with disabilities. Attention should be given to control of the flangeway gap in accordance with applicable standards.

Trespassing on railroad property is the single largest cause of deaths associated with railroad operations. HSR lines should be clearly posted against entry, and consideration should be given to use of tamper-resistant fencing, video surveillance, and similar measures in high-traffic areas. Control of trespassing is also essential to the reliability and security of HSR service.

## 8. Systems Approach

The Federal Highway Administration's *Railroad-Highway Grade Crossing Handbook* has long emphasized the importance of the systems approach to crossing safety. Although FRA regulations and this guidance document provide certain categorical requirements based on train speed, many areas of judgment remain. Planners should use the Handbook, the Technical Working Group report,<sup>20</sup> FRA's Collision Hazard Analysis Guide,<sup>21</sup> and reports from diagnostic team studies of conditions at individual crossings to make sound engineering judgments that may go well beyond the categorical criteria provided herein.

Crossing safety and trespass prevention should be further integrated in support of system planning and operation by its inclusion in System Safety Programs for HSR.

Project planning should incorporate strategies for: (1) educating road users concerning the onset of HSR service and making them aware of the inherent risks, and (2) gaining the support of law enforcement and the judiciary for strict application of traffic laws governing behavior at remaining highway-rail grade crossings. Public information and safety blitzes should be carried out at crossings and in communities prior to raising speeds by significant margins. Ongoing awareness efforts, including those directly addressed to commercial drivers serving facilities in the vicinity of the rail line, can help ensure familiarity with the crossing safety system and the importance of observing warnings.

The "system," of course, includes the railroad as well as the roadway. It should be emphasized that limiting train speed may be an available option to deal with a particularly difficult crossing. Hazard analyses should take into consideration the potential for second-

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<sup>19</sup> See, e.g., resources gathered at <http://www.fra.dot.gov/us/content/1752>; *ROW Fatality and Trespass Reduction Workshop 2008: Summary of Results* (DOT/FRA/ORS-09-001 February 2009) (available at <http://www.fra.dot.gov/us/content/2232>).

<sup>20</sup> *Guidance on Traffic Control Devices at Highway-Rail Grade Crossings* (report of the Highway-Rail Crossing Technical Working Group), FHWA (November 2002)(available at <http://safety.fhwa.dot.gov/xings/collision/twgreport/>).

<sup>21</sup> *Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service*, Office of Safety, FRA (October 2007) (available at <http://www.fra.dot.gov/us/content/1785>).

train collisions and for blocking crossings in a manner likely to present other challenges in the community (e.g., interfering with emergency response). Most often, these kinds of issues are best addressed at the design stage (i.e., initially as the project is planned or when a new facility, such as a passing track, is added). When safety is considered in project planning, capital can be used wisely to foster the best outcomes.

The Appendix provides a potential tier structure for passenger systems that have highway-rail grade crossings, and will provide a quick overview of issues to be considered in a systems approach.

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## Conclusion

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The safety of high-speed passenger systems is achieved only through proper planning, investment, operations and maintenance. Highway-rail grade crossings present major risks for train operations as well as for road users. As speeds increase, measures designed to reduce the frequency of crossing collisions must be strongly emphasized. Although FRA regulations provide minimum criteria for grade crossings on high-speed lines, including a prohibition of any at-grade crossings at speeds above 125 mph, responsible rail planners and railroads have gone well beyond those minimums, and technology has been demonstrated that has broader application. This document describes additional steps that should be taken to reduce risk and enhance the quality of HSR service.

Safety is FRA's paramount goal. In reviewing requests for funding for HSR FRA will actively apply this guidance.

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## Appendix: Potential Tier Structure for Passenger Systems

### Highway-Rail Grade Crossings

Tier	0	IA	IB	IC	II	III	IV	V
<b>Description</b>	Regional Rail	Conventional	Emerging HSR	HSR Regional	HSR Mixed Operations	HSR Mixed Passenger	HSR Dedicated	HSR Express
<b>Max. Speed mph</b>	0-65	0-79	80-110	111-125	126-150	0-150	0-150	0-200/220
Other traffic on same track	None (or temporally separated)	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Conventional passenger only	None	None
Closures	Consolidation encouraged in regional and conventional service; funding condition if part of HSR corridor	Automated warning; supplementary measures where warranted	Automated warning with gates; or locked gate preferred; cross-buck and stop or yield sign where conditions permit	Automated warning; supplementary measures where warranted	Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit	Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit	Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit	Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit
Public highway-rail grade crossings, generally	Automated warning; supplementary measures where warranted	Automated warning; supplementary measures where warranted	Sealed corridor; evaluate need for presence detection and PTC feedback	Barriers above 110, see §213.247 Presence detection tied to PTC above 110 mph	See IC None above 125 mph	See IC None above 125 mph	None at any speed	None at any speed
Private highway-rail grade crossings, generally	Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit	Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit	Automated warning with gates; or locked gate (interlocked with signal system at higher speeds)	None or as above	None above 125 mph	None above 125 mph	None at any speed	None at any speed
System Safety Programs	Crossing safety and trespass prevention issues included in SSP process. Plus FRA reviews management decisions and may disapprove.							