U.S. Department of Transportation
Federal Railroad Administration

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

ON-SITE ENGINEERING FIELD REPORT – Part 2

All Aboard Florida

Background:

This diagnostic safety review of the Florida East Coast (FEC) Railway corridor, in Brevard and Indian River counties, is the second segment that completes the territory of at-grade crossing locations for this high-speed passenger rail project known as "All Aboard Florida". This report is a subsequent to that of Part 1, dated March 20, 2014.

The onsite assessment began on July 15, 2014 and concluded on July 18, 2014. A total of eighty-six (86) public and private grade crossings were evaluated. Participants included officials from Florida Department of Transportation (FDOT), FEC, All Aboard Florida (AAF), and local city and county officials.

As the AAF passenger rail service route traverses through its grade crossing locations, it will begin/end at the Michigan Avenue grade crossing (milepost 170.56) in Cocoa[1]. As the route heads northward, it splits from the FEC corridor and veers along Route 528 towards Orlando on a dedicated railroad right-of-way yet to be built. On the existing FEC corridor, there are four additional grade crossings north of the split that will be part of the signaling enhancement program for this project.

Scope:

Train speeds through Brevard and Indian River counties are being designed for 110 MPH. Beginning/ending at Dixon Boulevard[2] in Cocoa (milepost 171.52), the 110 MPH segment continues through Highland Drive SE in Vero Beach (milepost 232.86). There are two areas along this segment where train speeds are lowered to conventional rail limits due to civil constraints of railroad bridge structures.

As in previous onsite assessments, all of the existing crossing signaling equipment along this segment will be upgraded to the newest technology as described in the Part 1 Report.

[1] The Part 1 report incorrectly references "Cocoa Beach", where it should have stated **Cocoa** instead. Cocoa and Cocoa Beach are two separate municipalities. The FEC corridor traverses through Cocoa, not Cocoa Beach.
[2] Although Michigan Ave is the last grade crossing along the AAF route, its maximum speed is 60 MPH due to the train slowing down and transitioning to and from the Route 528 corridor.

Currently the engineering design plans are at 30%. The next iteration for this segment will be at 90%, which is anticipated to be furnished within six months. Accordingly, FRA looks forward to reviewing the revised design plans at that time.

Results:

Of all the 86 grade crossings assessed in Brevard and Indian River counties, there are 64 crossing locations affected for Sealed Corridor treatments within the 110 MPH territory. The remaining crossings already have Sealed Corridor design elements in place; such as existing one-way streets, divided roadways, or have medians. In addition to accommodations for the second track, the remaining crossings would require their medians to be adjusted in length and be equipped with a minimum of 100-feet of non-traversable curbing for each approach.

As mentioned in the Part 1 Report, officials from All Aboard Florida passenger rail project (herein the "Project") did not initially adopt the "Sealed Corridor" concept as outlined in FRA's Highway-Rail Grade Crossing Guidelines for High-Speed Passenger Rail, Version 1.0 (*November 2009*). However, in a letter dated June 4, 2014 to the Treasure Coast Regional Planning Council, Florida Secretary of Transportation Ananth Prasad, P.E., stated that AAF will be required "*to comply with the Federal Railroad Administration's guidelines for rail crossing safety as specified for higher speed passenger rail services*." As a result of Secretary Prasad's letter, the Project has since directed its signals consultants to incorporate all of the Sealed Corridor design treatments where applicable along the entire AAF service route. The diagnostic team may have to re-visit the previous 57 grade crossings identified in the Part 1 Report to validate and verify compliance.

Safety Recommendations:

The following are recommendations made to the Project as a result of the on-site field assessments during the diagnostic safety review:

A. Pedestrian gates – there are several locations along the corridor at which sidewalks are present on both sides of the railroad right-of-way, but do not continue through the grade crossing. However, there is active collaboration between the Project and the respective municipality within Brevard and Indian River counties to correct the sidewalk continuity problems. There is a commitment on both sides to equip the existing sidewalks with pedestrian gate assemblies. Their partnership will also target existing and planned roadway

enhancement projects with adjacent sidewalks, including to pre-wire quadrants for roadway projects commencing at a later date.

FRA suggests that consideration be given to the installation of pedestrian swing gates. This would enable pedestrians on the crossing a means of egress to exit the crossing. In order to increase the effectiveness of pedestrian gates, the installation of fencing or other means of channelization should also be considered to deter pedestrians from circumventing the gates. At Four-Quadrant Gate locations, utilizing the vehicular exiting gate as a pedestrian function for sidewalks is not recommended. Separate pedestrian gates should be installed at those respective quadrants, and lowered simultaneously with the entrance gates.

B. Vehicle Presence Detection – as referenced in the Part 1 Report, Vehicle Presence Detection ("VPD") is a critical safety component for those Three-Quadrant and Four-Quadrant gated grade crossings for train speeds between 80-110 MPH. Recommending the installation of a VPD system along the FEC Railway corridor in Brevard and Indian River counties is necessary for the same safety reasons as outlined in the Part 1 Report.

C. Traffic Signal Preemption – throughout the entire diagnostic safety review for this corridor, it has been noted that Traffic Signal Preemption (*herein* "Preemption") will require extensive study prior to finalization of the railroad's signal plans for this project. Preemption has become an issue of significant concern to FRA resulting in the publication of Safety Advisory SA-2010-02 and Technical Bulletin S-12-01. The following is quoted from the Technical Bulletin:

"Highway traffic signal pre-emption interconnections play a critical role in the overall proper functioning of a highway-rail grade crossing active warning system where such interconnections exist. There are two basic types of preemption: ***Simultaneous*** *and* ***Advanced****.* ***Simultaneous Preemption*** *is that which results in the initiation of the traffic signal cycle at the same time the highway-rail grade crossing warning system is activated.* ***Advanced Preemption*** *results in initiation of the traffic signal cycle prior to the grade crossing warning system being activated. The type of pre-emption installed, and any additional time required for pre-emption operation, will be determined and specified by the public agency responsible for the highway traffic signal in accordance with Section 8C.09 of the Manual on Uniform Traffic Control Devices."*

In addition to the requisite for the proper design of both the crossing warning signal system and the traffic signal in terms of Preemption provisions, the FRA Safety Advisory states the need for on-going monitoring and review of grade crossings with Preemption. The Safety Advisory is grounded by two recommendations made by the National Transportation Safety Board, identified as I-96-10 and I-96-11, regarding a collision between a commuter train and a school bus in Fox River Grove, IL in 1995. The Safety Advisory makes four specific recommendations to provide for safety at Preempted locations, which can be found accompanying this report.

Due to the fact that a number of grade crossings along the corridor are proposed to be equipped with Four-Quadrant Gate warning systems, it is important to point out that the Manual on Uniform Traffic Control Devices (MUTCD) sets forth additional requirements for Preemption where Four-Quadrant Gates are installed. As outlined in Part 8C.06 of the MUTCD, it states the following:

"If a Four-Quadrant Gate system is used at a location that is adjacent to an intersection that could cause highway vehicles to queue within the minimum track clearance distance, the Dynamic Exit Gate Operating Mode should be used unless an engineering study indicates otherwise."

"If a Four-Quadrant Gate system is interconnected with a highway traffic signal, backup or standby power should be considered for the highway traffic signal. Also, circuitry should be installed to prevent the highway traffic signal from leaving the track clearance green interval until all of the gates are lowered."

"Four-Quadrant Gate systems should include remote health (status) monitoring capable of automatically notifying railroad or LRT signal maintenance personnel when anomalies have occurred within the system."

FRA encourages reference to Part 3.1.10 of the American Railway Engineering and Maintenance-of-Way Association (AREMA) guidelines. The information provides recommended design practices of interconnection between highway traffic signals and grade crossing warning systems. This is especially important where station stops or railroad interlockings exist within the approaches to Preempted locations.

FRA recognizes that the design and operation of preemption interconnections, from a traffic signal perspective, are outside the scope of the railroad's direct responsibility. Yet, the safety of the railroad, its employees, and the public both on the roadway and on the train are directly impacted by these systems and their potential failure to provide sufficient time to permit a vehicle or pedestrian to clear the path of an approaching train. Therefore, FRA recommends that thorough coordination take place between the public authority responsible for the operation of the traffic signals and the railroad (which in this case is FEC/AAF).

In summary, due to the inclusion of additional tracks, increase in train speeds, station stops and restarts from sidings within approaches to traffic signal interconnected grade crossings; it is recommended that a thorough evaluation be made of the Preemption needs to determine whether Simultaneous or Advanced Preemption is required at each grade crossing location along the entire AAF service route (Miami through Cocoa). FRA also recommends that an independent consulting firm with extensive expertise in the field of Preemption be part of the assessment in all of the Preempted grade crossing locations. The consultant should have expertise in both traffic signal design and operation, as well as grade crossing signal design and operation. The consultant must also be knowledgeable in the evolving changes to both the MUTCD, and the AREMA Communication & Signal Manual of Recommended Practice.

D. 100-foot Non-traversable Medians – for the purposes of the overall diagnostic assessment, non-traversable medians are also referred as FDOT'S "non-mountable traffic separators". In particular, there are two State design standards; Type F which channelizes storm water runoff, and Type D which has no gutter function. Either design is acceptable as long as the curb meets the State's minimum 6" vertical profile design to prevent motorists from driving over the median. The 100-foot minimum length is measured from the tip of the railroad gate arm and extends along the vehicular travel lane. It is recommended that "no left turn" signs (or other means of notification) are posted to advise motorists that are exiting driveways, parking lots or streets within 100 feet of the gate arm not to travel against the flow of traffic to circumvent the purpose of the median and drive around lowered gates.

E. Sealed Corridor Treatments - the following grade crossing recommended Sealed Corridor treatments were collectively agreed upon by the Diagnostic Team. Please note that further engineering may require a Four-Quadrant location become a Three-Quadrant layout with a median (and *vice-versa*); however, the Sealed Corridor design element will remain.

Four-Quadrant Gates (*also referred as exit gates*) (22)			
Street Name	**City/Town**	**Milepost**	**DOT #**
4th Street	Vero Beach	229.75	272 198 K
Glendale Road	Vero Beach	229.19	272 197 D
12th Street	Vero Beach	228.66	272 196 W
23rd Street	Vero Beach	227.31	272 191 M
26th Street	Vero Beach	227.06	272 189 L
43rd Street	Vero Beach	225.12	272 179 F
49th Street	Vero Beach	224.42	272 177 S
69th Street	Winter Beach	221.80	272 172 H
Hobart Road	Winter Beach	220.70	272 170 U
Old Dixie Hwy	Sebastian	216.00	272 163 J
Malabar Road	Malabar	199.94	272 149 N
Palm Bay Road	Palm Bay	197.46	272 147 A
Lincoln Avenue *	Melbourne	194.07	272 136 M
Silver Palm Ave	Melbourne	193.83	272 133 S
Eau Galle Blvd.	Melbourne	190.10	272 112 T
Creel Street **	Melbourne	189.92	272 123 L
Aurora Road	Melbourne	189.68	272 122 E
Masterson Street	Melbourne	189.32	272 121 X
Lake Washington	Melbourne	188.70	272 926 T
Post Road	Pineda	186.86	272 117 H
Eyster Blvd.	Rockledge	175.57	272 908 V
Peachtree Street	Cocoa	172.90	272 096 S

***** - *Possible one-way street, to be determined by the city's re-evaluation of a traffic study.*

****** - *Possible Closure*

100-foot Non-traversable Medians * (15)			
Street Name	**City/Town**	**Milepost**	**DOT #**
Highlands Drive SE	Vero Beach	232.86	272 201 R
Oslo Road	Vero Beach	231.31	272 200 J
16th Street	Vero Beach	228.02	272 195 P
Barber Street	Sebastian	218.03	272 974 H
Senne Road	Grant Valkaria	208.13	272 154 K
Valkaria Road	Grant Valkaria	203.00	272 151 P
Jordan Blvd.	Malabar	201.50	272 150 H

University Blvd.	Melbourne	195.34	272 144 E
Strawbridge Ave	Melbourne	194.19	272 138 B
Palmetto Ave	Melbourne	194.13	272 137 U
Hibiscus Ave	Melbourne	193.75	272 132 K
So. Babcock St.	Melbourne	192.39	272 128 V
Parkway Avenue	Melbourne	187.91	272 118 P
Suntree Blvd.	Pineda	182.65	272 115 U
Rosa Jones Blvd.	Cocoa	173.51	272 099 M

*** *Please note***: if for any reason the Project and the respective municipality cannot agree on the median treatment, then those location(s) are to be equipped with either a Three-Quadrant Gate with Median or a Four Quadrant Gate system.

Three-Quadrant Gates (*due to a median present on the opposite side*) (26)			
Street Name	**City/Town**	**Milepost**	**DOT #**
1st Street	Vero Beach	230.15	272 199 S
21st Street *****	Vero Beach	227.48	272 192 U
32nd Street	Vero Beach	226.65	273 047 Y
41st Street	Vero Beach	225.46	272 180 A
45th Street	Vero Beach	224.94	272 178 Y
53rd Street	Vero Beach	223.90	273 108 M
Winter Beach Rd.	Winter Beach	222.32	272 173 P
Wabasso Road	Winter Beach	219.58	272 168 T
99th Street	Sebastian	217.61	272 165 X
Schumann Drive	Sebastian	216.59	272 164 R
Main Street	Sebastian	214.42	272 161 V
Micco Road	Micco	209.23	272 156 Y
Barefoot Blvd.	Micco	208.99	272 155 S
Shell Pit Road	Grant Valkaria	207.13	272 153 D
1st Street	Grant Valkaria	205.61	272 152 W
Hessey Avenue *****	Palm Bay	197.36	272 146 T
East Fee Avenue	Melbourne	194.00	272 135 F
Seminole Ave ******	Melbourne	193.89	272 134 Y
Sarno Road	Melbourne	190.58	272 125 A
Viera Blvd.	Bonaventure	180.28	272 976 W
Ansin Road	Bonaventure	179.40	272 110 K
Carver Road	Bonaventure	179.14	272 109 R
Gus Hipp Blvd	Rockledge	177.13	272 926 T
Barton Blvd.	Rockledge	175.02	272 101 L
Highland Drive	Cocoa	172.45	272 866 L
Dixon Blvd.	Cocoa	171.52	272 095 K

****** - Possible Closure*

******** *- Possible one-way street, to be determined by the city's re-evaluation of a traffic study.*

Closed (5) ***Please note*:** *Officials from the city and county are considering closure.*			
Street Name	**City/Town**	**Milepost**	**DOT #**
21st Street *	Vero Beach	227.48	272 192 U
14th Avenue	Vero Beach	227.14	272 190 F
Hessey Avenue *	Palm Bay	197.36	272 146 T
Jernigan Avenue	Melbourne	195.02	272 143 X
Creel Street **	Melbourne	189.92	272 123 L

* - Three-Quadrant Gate with Median if unable to close
** - Four-Quadrant Gate layout if unable to close

Private (2 locations within 110 MPH)			
Street Name	**City/Town**	**Milepost**	**DOT #**
Hawks Nest	Vero Beach	223.18	272 175 D
Rinker Way *	Rockledge	176.10	272 908 V

* - Recommend locked gate with procedures seeking permission from the railroad's Operations Dispatcher to enter.

Conclusion:

Once the construction of the grade crossings are completed, FEC and FDOT must immediately update the existing U.S. DOT Crossing Inventory record for each location to reflect the updated train counts, increased train speeds, additional signage, new ADDT numbers, etc., where applicable. FRA will continue to provide ongoing support and guidance while the Project looks towards achieving its goals relating to safe and reliable high-speed passenger rail service.

Report Respectfully Submitted By:

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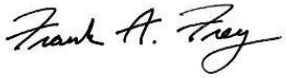

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