High-speed Rail Development & Crossing Safety

Frank A. Frey, Gen. Engineer

Office of Safety

Highway-Rail Crossing Div.

Washington, D.C. 20590

U.S. Department of Transportation

Federal Railroad Administration

ADVANCING H.S.R. IN THE U.S.A.

- why high-speed rail
- FRA's Sealed Corridor
- design criteria

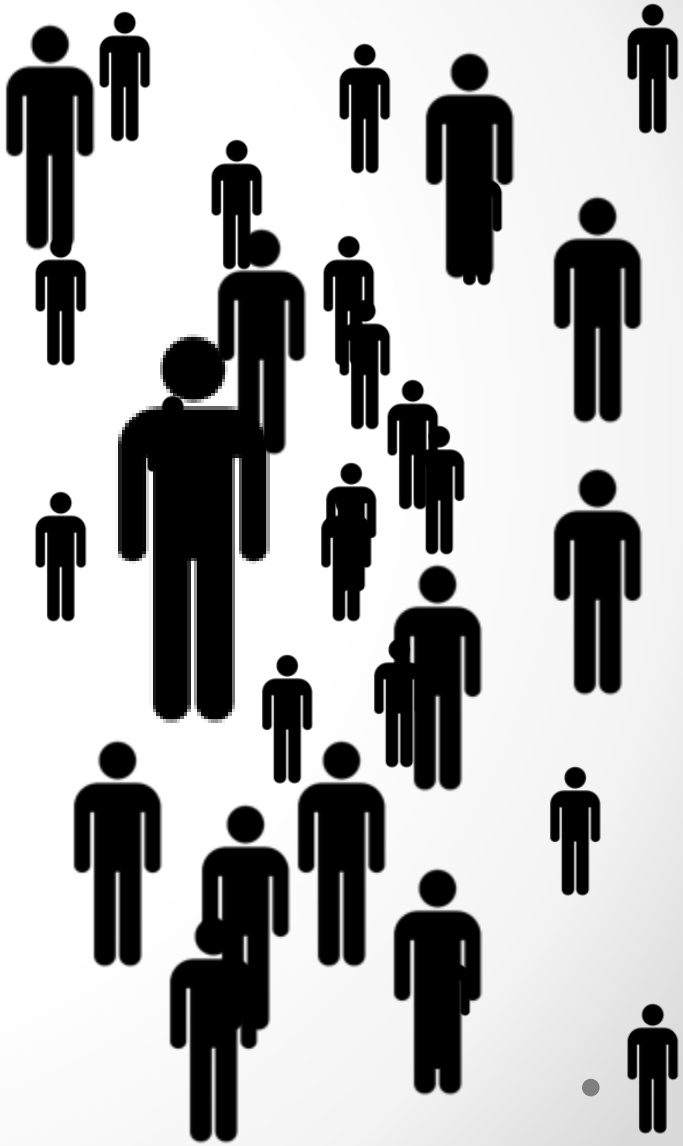
Michigan Central Train Station – Detroit 1913-1988

1 Why HSR in the US?

population growth

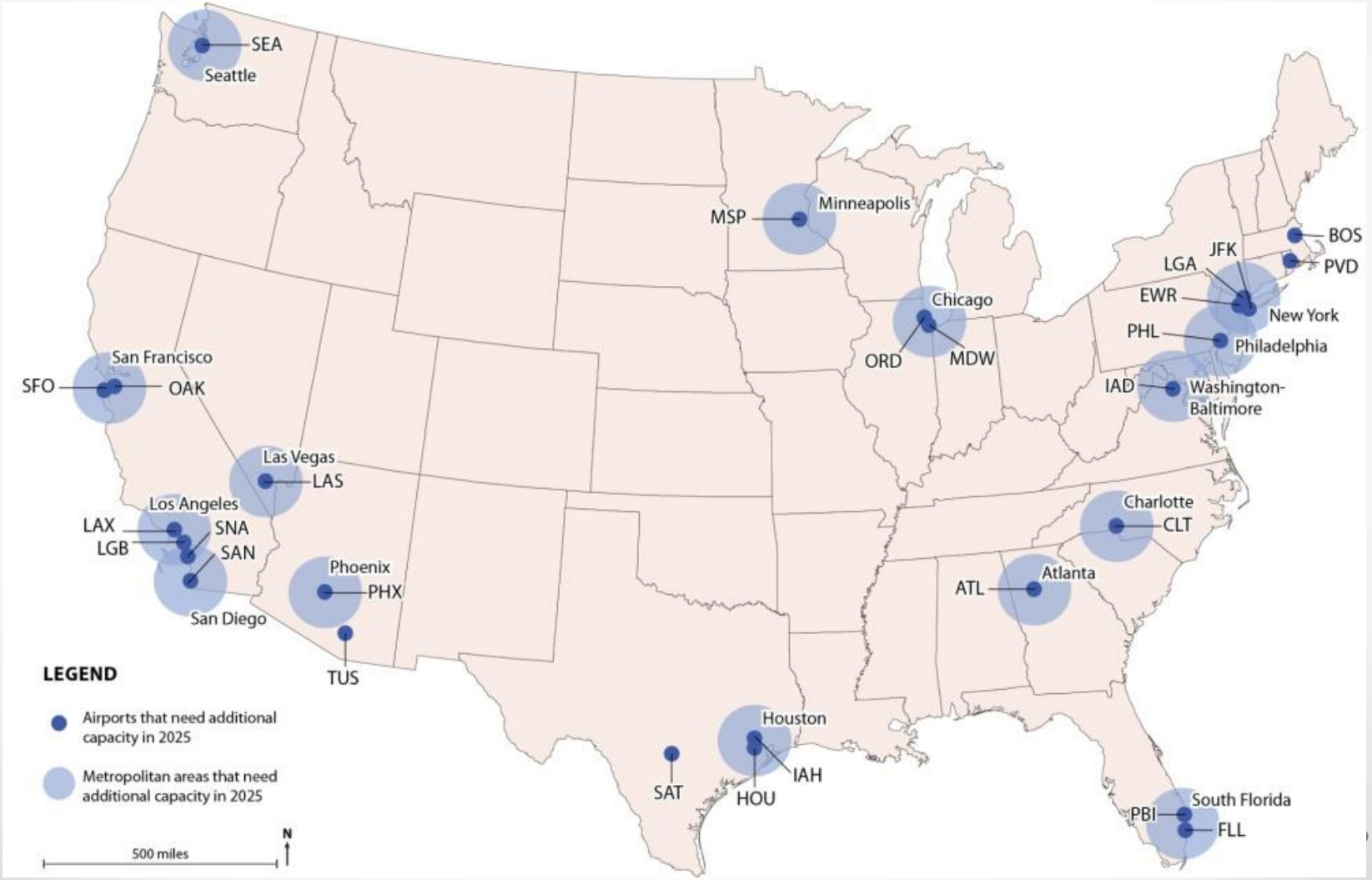
Today – 315 million people

+ 100 million people by 2050



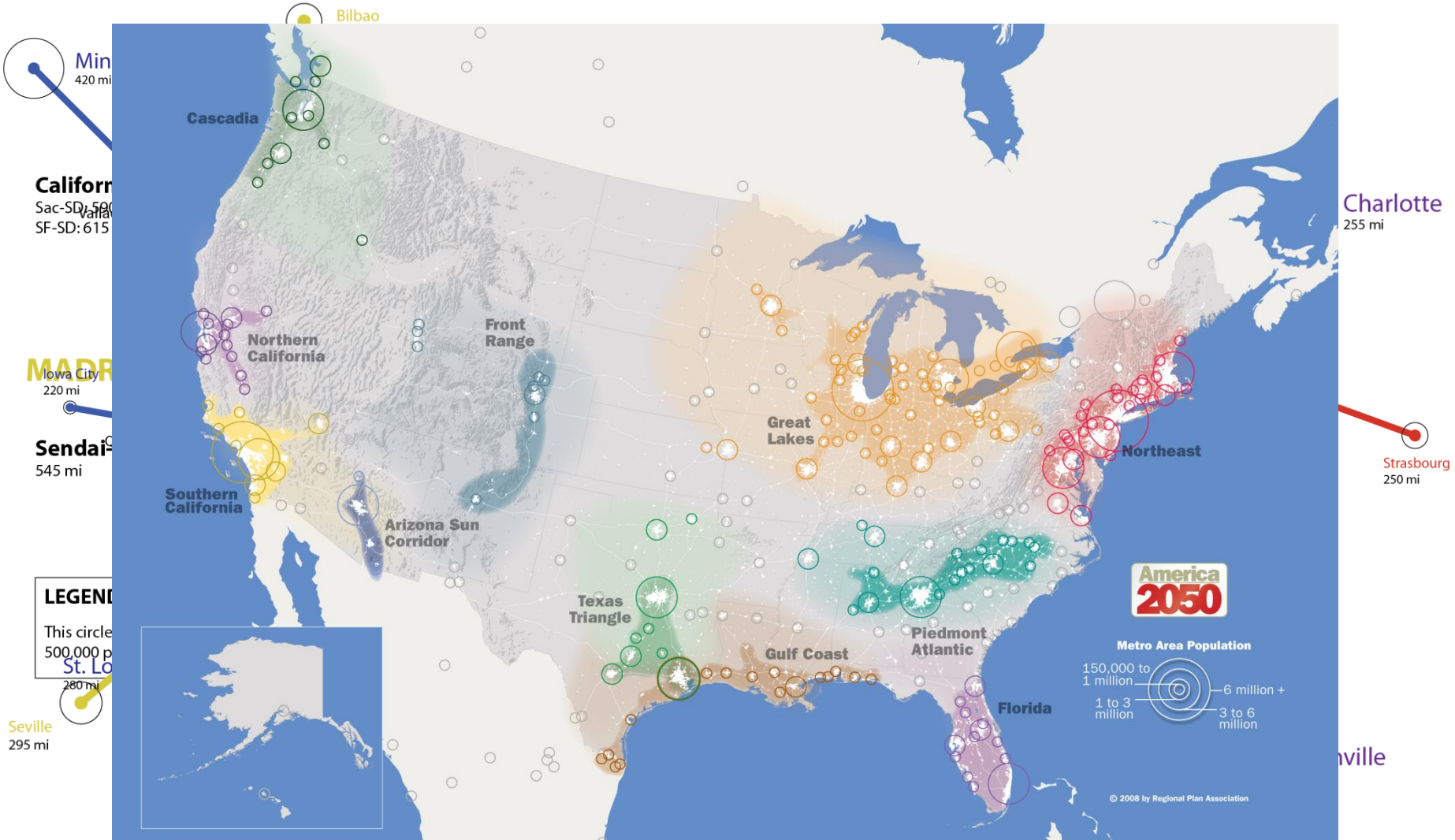
2 Why HSR in the US?

congestion & mobility



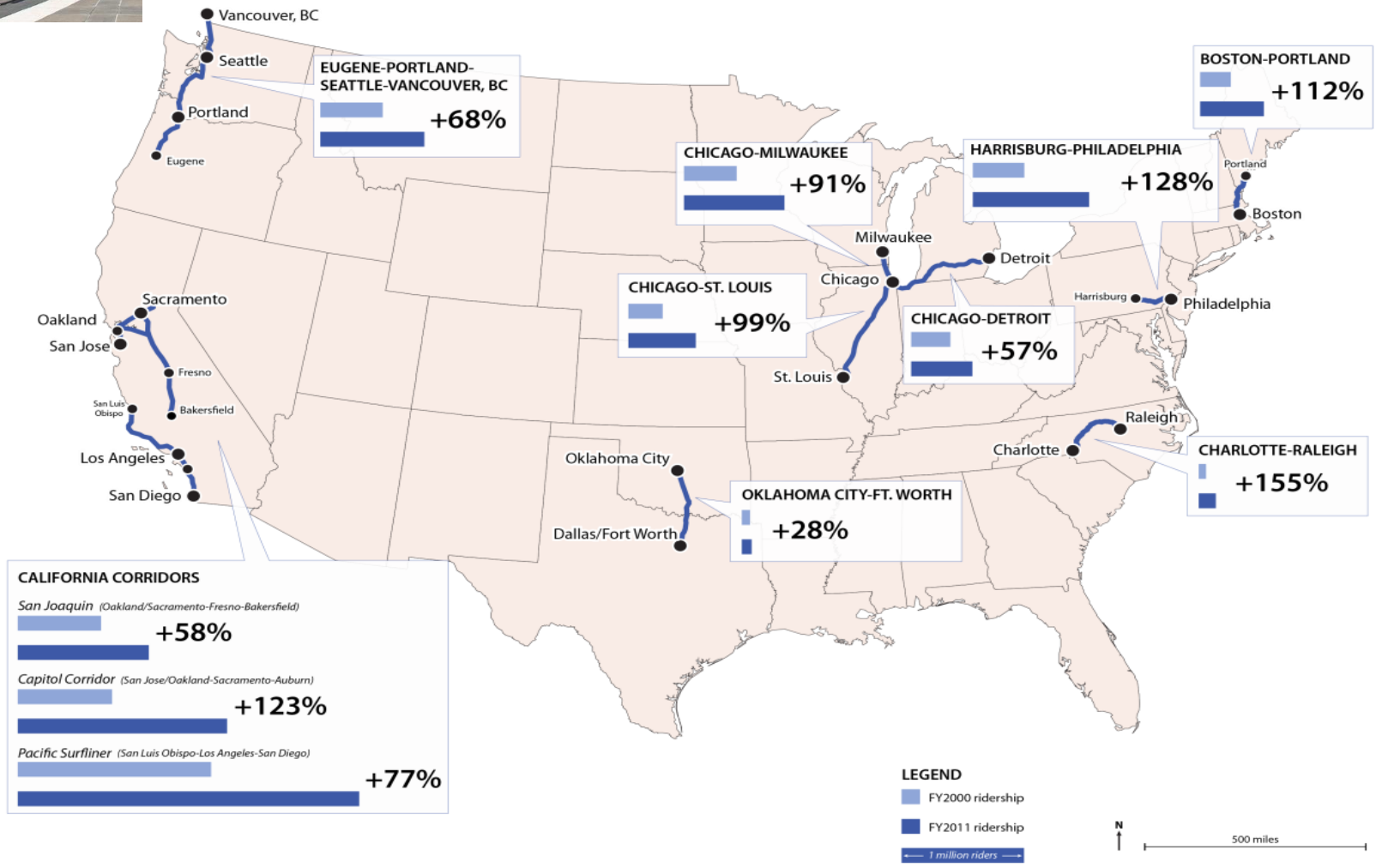
3 Why HSR in the US?

4 Where are the key US markets?



2018 Community of Interest – Peer Exchange

Fort Worth, Texas



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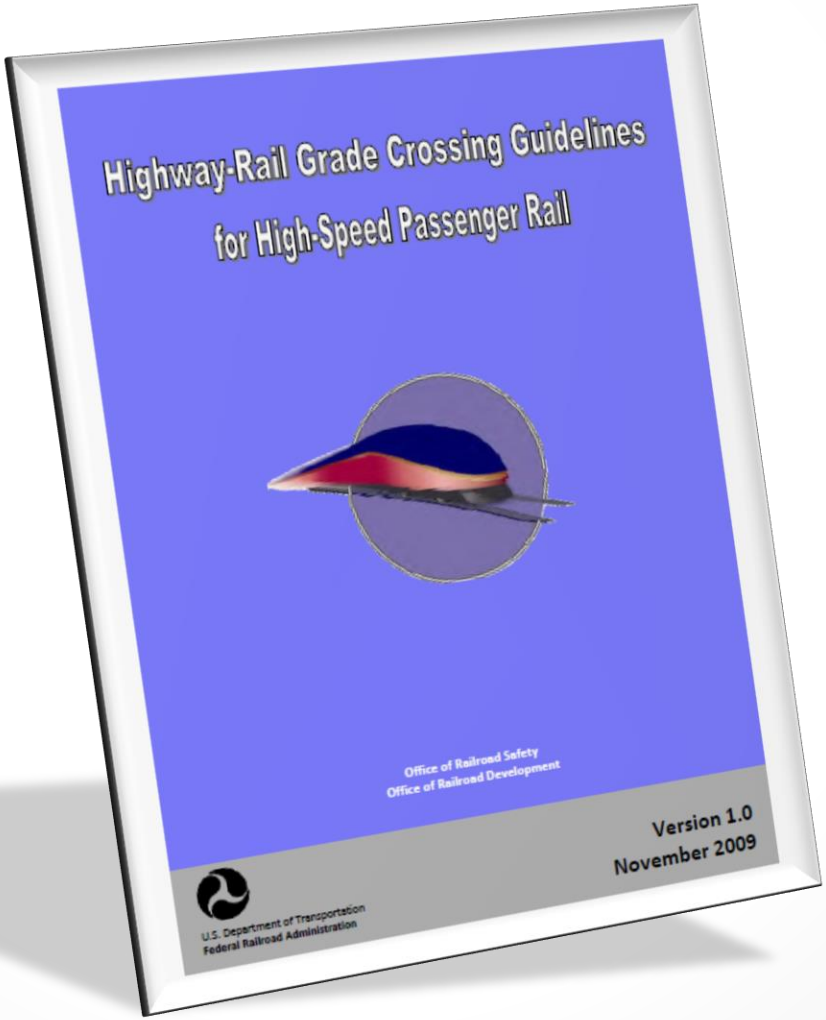


Appendix: Potential Tier Structure for Passenger Systems

Highway-Rail Grade Crossings

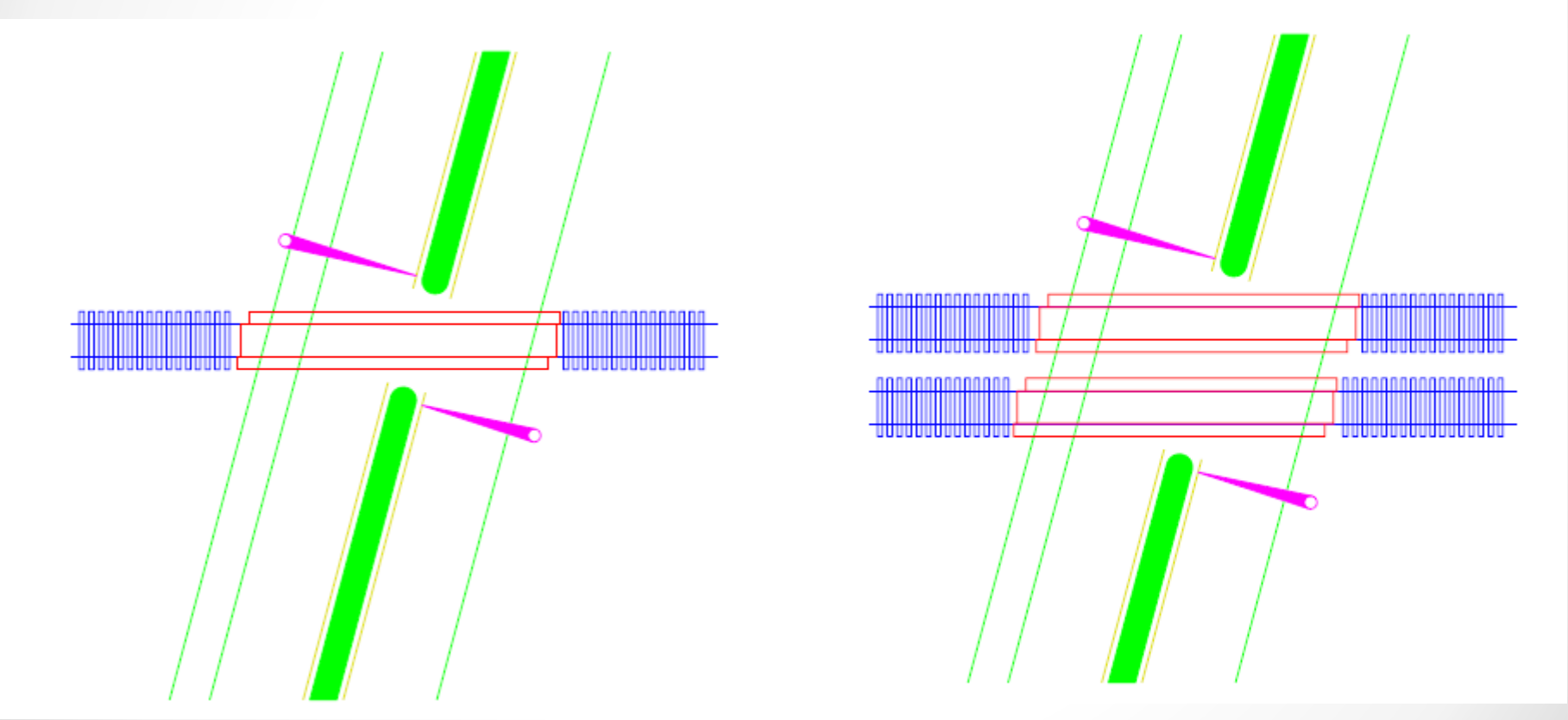
Tier	0	IA	IB	IC	II	III	IV	V
Description	**Regional Rail**	**Conventional**	**Emerging HSR**	**HSR Regional**	**HSR Mixed Operations**	**HSR Mixed Passenger**	**HSR Dedicated**	**HSR Express**
Max. Speed mph	**0-65**	**0-79**	**80-110**	**111-125**	**126-150**	**0-150**	**0-150**	**0-200/220**
Other traffic 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		Demonstrated effort and results required as part of funding process. No crossings above 125 mph				Grade separated – entire corridor	Grade separated – entire corridor
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.		

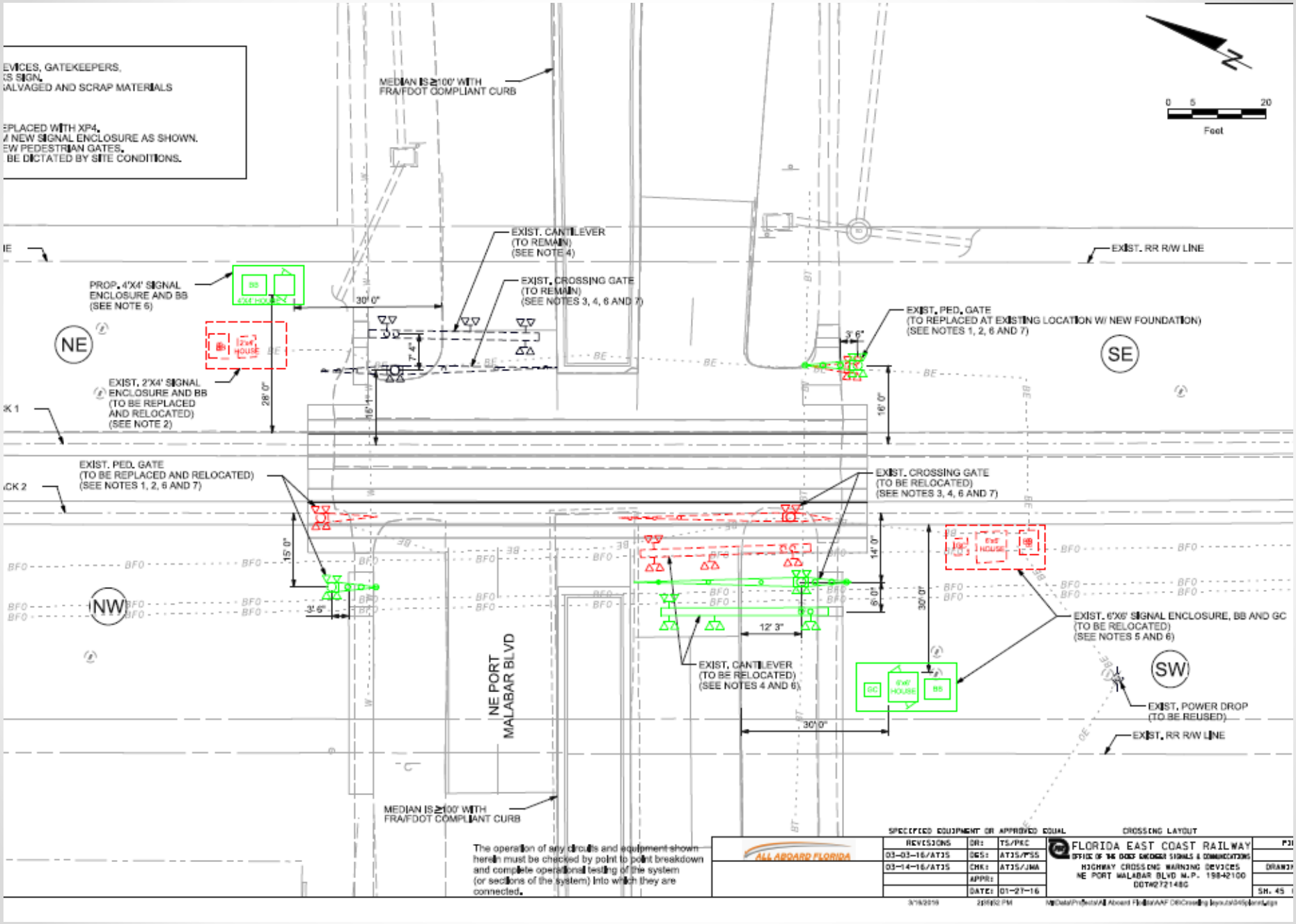
Close As Many Grade Crossings As Possible

What does the FRA look for in crossing design??

- **Non-traversable Medians**
- **3 or 4 Quadrant Gates**
- **Gate orientation**
- **Cantilevers**
- **Preemption (Advanced or Simultaneous)**
- **Technologies (VPD, RHM)**

Gates with 100′ non-traversable medians





The operation of any circuits and equipment shown herein must be checked by point to point breakdown and complete operational testing of the system (or sections of the system) into which they are connected.

SPECIFIED EQUIPMENT OR APPROVED EQUAL

CROSSING LAYOUT

REVISIONS	DR:	TS/PKC
03-03-16/ATJS	DES:	ATJS/PSS
03-14-16/ATJS	CHK:	ATJS/JMA
	APPR:	
	DATE:	01-27-16

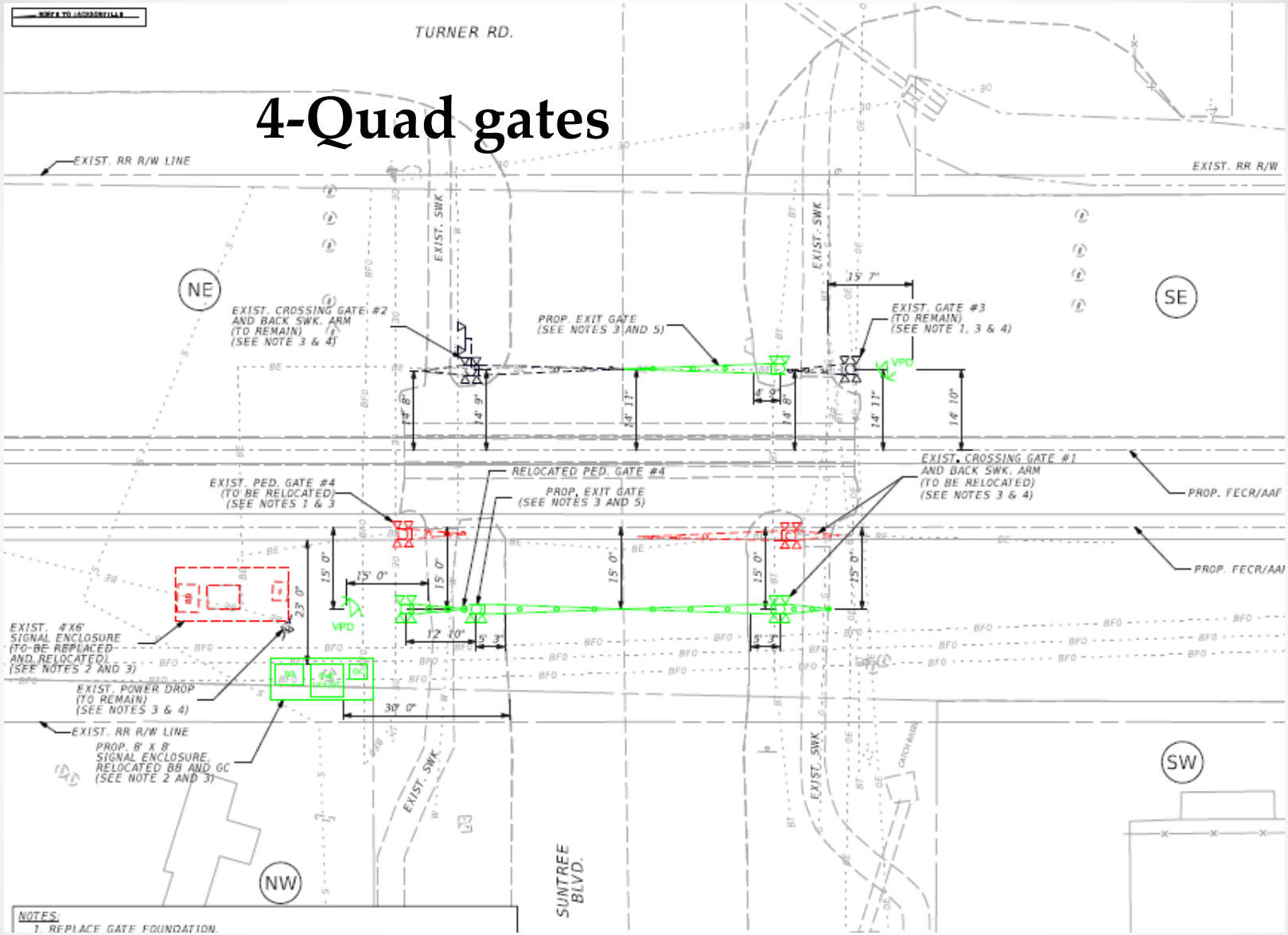
ALL ABOARD FLORIDA

FLORIDA EAST COAST RAILWAY
OFFICE OF THE CHIEF ENGINEER SIGNALS & COMMUNICATIONS
HIGHWAY CROSSING WARNING DEVICES
NE PORT MALABAR BLVD M.P. 198-42100
DOT#272148G

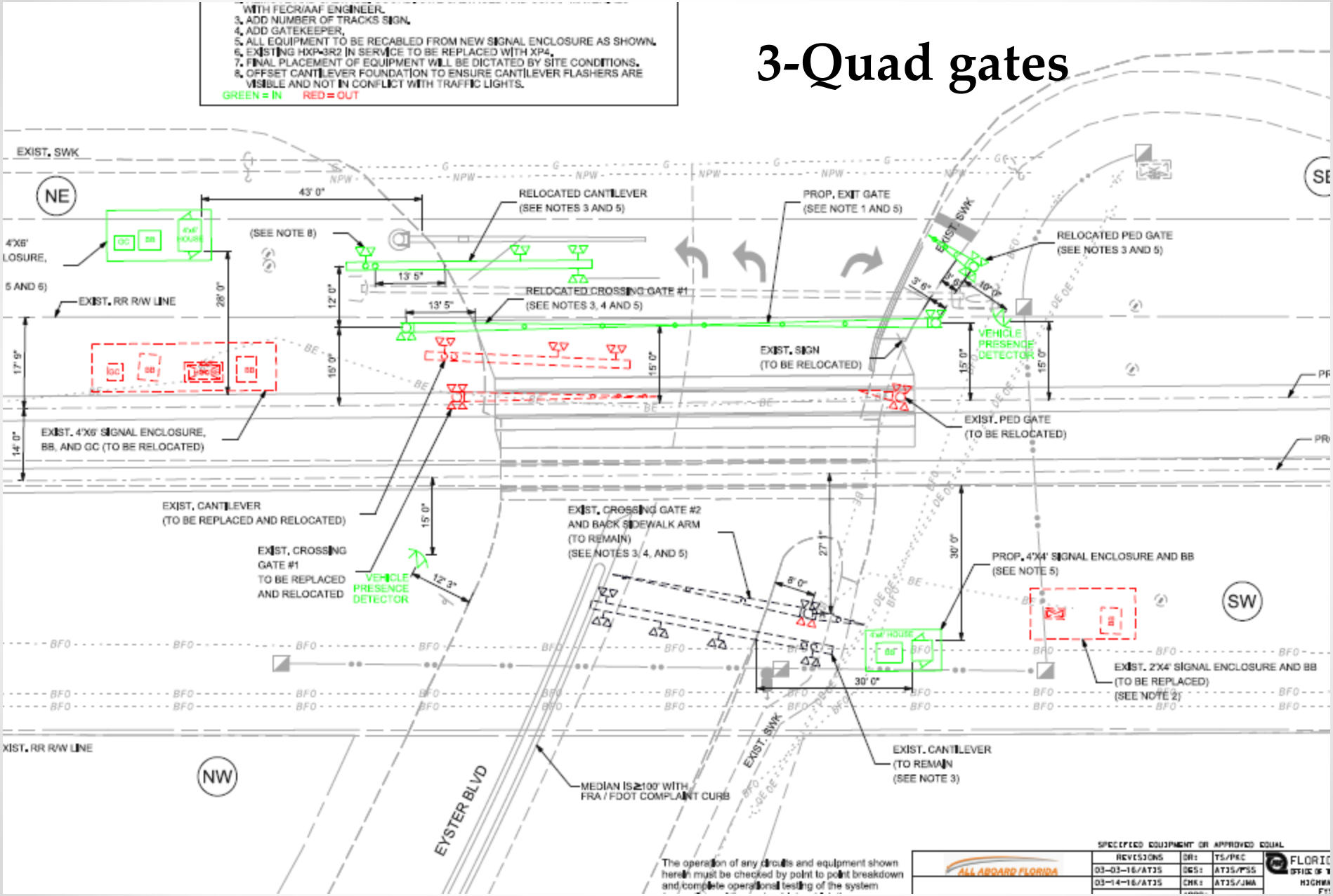
SH. 45

3/15/2016 2:59:02 PM M:\Data\Projects\All Aboard Florida\AAF DB\Crossing layouts\345plans1.dgn

4-Quad gates


TURNER RD.
EXIST. RR R/W LINE
EXIST. RR R/W
EXIST. SWK
NE
SE
SW
NW
EXIST. CROSSING GATE #2
AND BACK SWK. ARM
(TO REMAIN)
(SEE NOTE 3 & 4)
PROP. EXIT GATE
(SEE NOTES 3 AND 5)
EXIST. GATE #3
(TO REMAIN)
(SEE NOTE 1, 3 & 4)
VPD
15' 7"
14' 8"
14' 9"
14' 11"
14' 8"
14' 11"
14' 10"
EXIST. PED. GATE #4
(TO BE RELOCATED)
(SEE NOTES 1 & 3
RELOCATED PED. GATE #4
PROP. EXIT GATE
(SEE NOTES 3 AND 5)
EXIST. CROSSING GATE #1
AND BACK SWK. ARM
(TO BE RELOCATED)
(SEE NOTES 3 & 4)
PROP. FECR/AAF
PROP. FECR/AAI
15' 0"
15' 0"
15' 0"
15' 0"
15' 0"
15' 0"
23' 0"
12' 10"
5' 3"
5' 3"
EXIST. 4'X6'
SIGNAL ENCLOSURE
(TO BE REPLACED
AND RELOCATED)
(SEE NOTES 2 AND 3)
EXIST. POWER DROP
(TO REMAIN)
(SEE NOTES 3 & 4)
30' 0"
EXIST. RR R/W LINE
PROP. 8' X 8'
SIGNAL ENCLOSURE,
RELOCATED BB AND GC
(SEE NOTE 2 AND 3)
SUNTREE
BLVD.
NOTES:
1. REPLACE GATE FOUNDATION.

3-Quad gates


WITH FECR/AAF ENGINEER.
3. ADD NUMBER OF TRACKS SIGN.
4. ADD GATEKEEPER.
5. ALL EQUIPMENT TO BE RECABLED FROM NEW SIGNAL ENCLOSURE AS SHOWN.
6. EXISTING HXP-3R2 IN SERVICE TO BE REPLACED WITH XP4.
7. FINAL PLACEMENT OF EQUIPMENT WILL BE DICTATED BY SITE CONDITIONS.
8. OFFSET CANTILEVER FOUNDATION TO ENSURE CANTILEVER FLASHERS ARE VISIBLE AND NOT IN CONFLICT WITH TRAFFIC LIGHTS.
GREEN = IN RED = OUT
EXIST. SWK
NE
43' 0"
RELOCATED CANTILEVER (SEE NOTES 3 AND 5)
PROP. EXIT GATE (SEE NOTE 1 AND 5)
(SEE NOTE 8)
RELOCATED PED GATE (SEE NOTES 3 AND 5)
EXIST. RR R/W LINE
RELOCATED CROSSING GATE #1 (SEE NOTES 3, 4 AND 5)
EXIST. SIGN (TO BE RELOCATED)
VEHICLE PRESENCE DETECTOR
EXIST. 4'X6' SIGNAL ENCLOSURE, BB, AND GC (TO BE RELOCATED)
EXIST. PED GATE (TO BE RELOCATED)
EXIST. CANTILEVER (TO BE REPLACED AND RELOCATED)
EXIST. CROSSING GATE #2 AND BACK SIDEWALK ARM (TO REMAIN) (SEE NOTES 3, 4, AND 5)
EXIST. CROSSING GATE #1 TO BE REPLACED AND RELOCATED
VEHICLE PRESENCE DETECTOR
PROP. 4'X4' SIGNAL ENCLOSURE AND BB (SEE NOTE 5)
SW
EXIST. 2'X4' SIGNAL ENCLOSURE AND BB (TO BE REPLACED) (SEE NOTE 2)
EXIST. RR R/W LINE
NW
EYSTER BLVD
MEDIAN IS ≥100' WITH FRA / FDOT COMPLAINT CURB
EXIST. CANTILEVER (TO REMAIN (SEE NOTE 3)
EXIST. SWK
The operation of any circuits and equipment shown hereon must be checked by point to point breakdown and complete operational testing of the system
SPECIFIED EQUIPMENT OR APPROVED EQUAL
ALL ABOARD FLORIDA
REVISIONS
03-03-16/ATJS
03-14-16/ATJS
DR: TS/PEC
DES: ATJS/PSS
CHK: ATJS/JMA

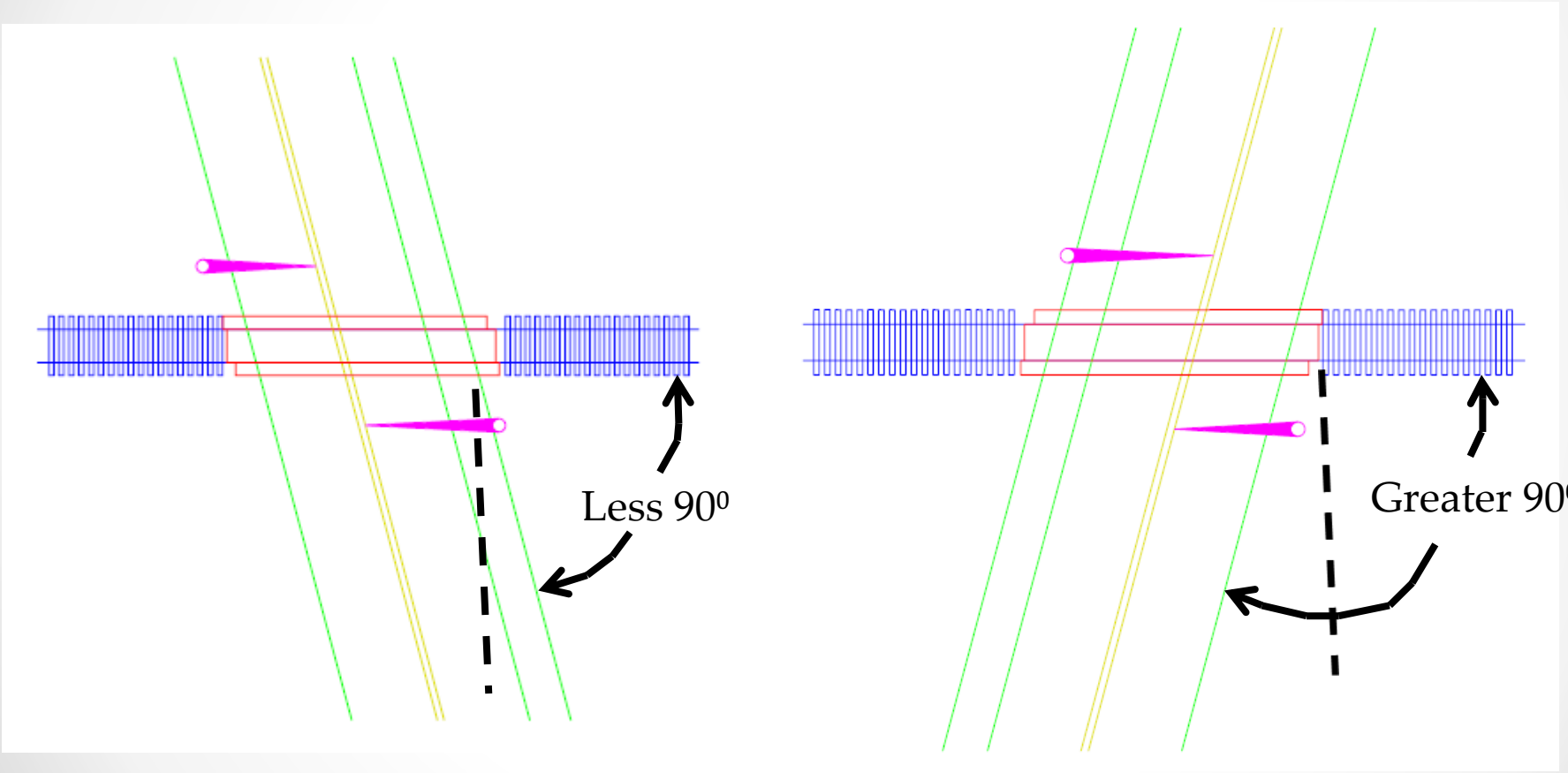
Pedestrian Treatments

Railroad Preemption

Exit Gate Management System

Cantilevers

Skewed Crossings

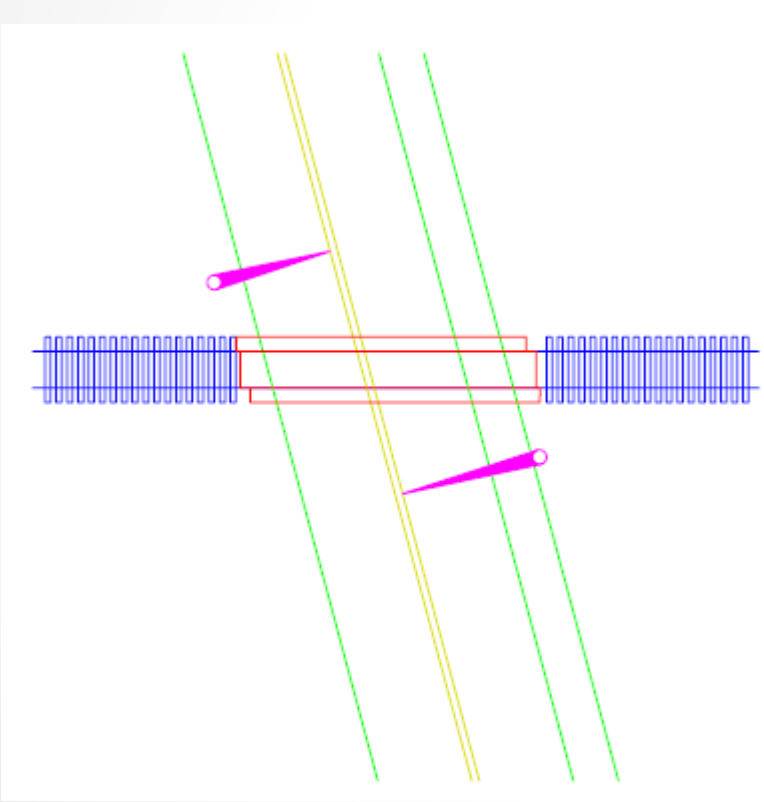


Acute Angled

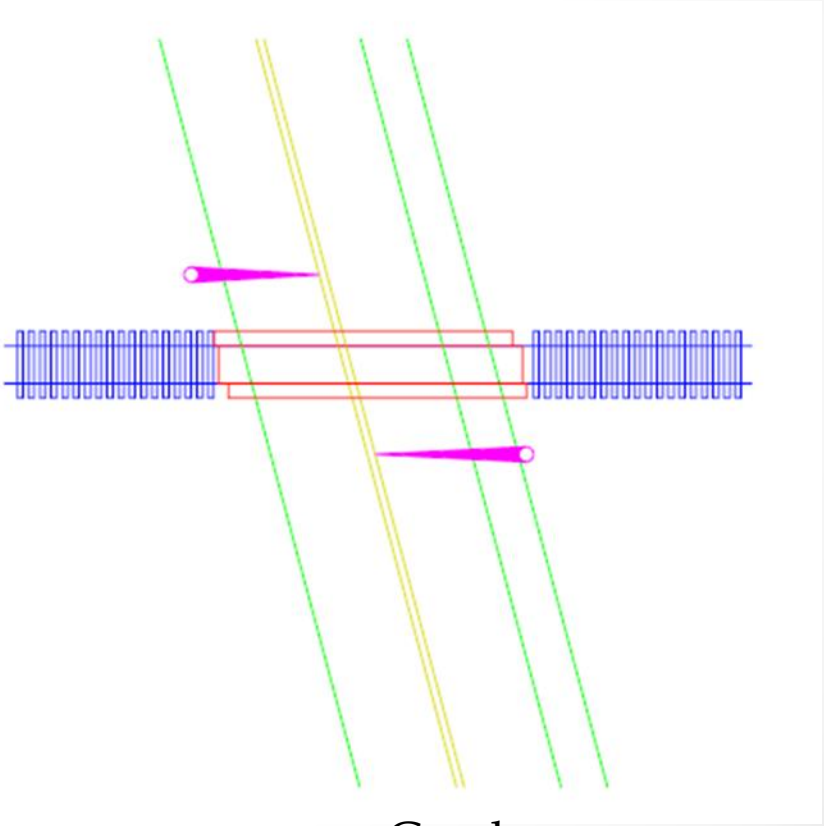
Obtuse Angled

Acute Angled

AREMA Part 3.1.36B

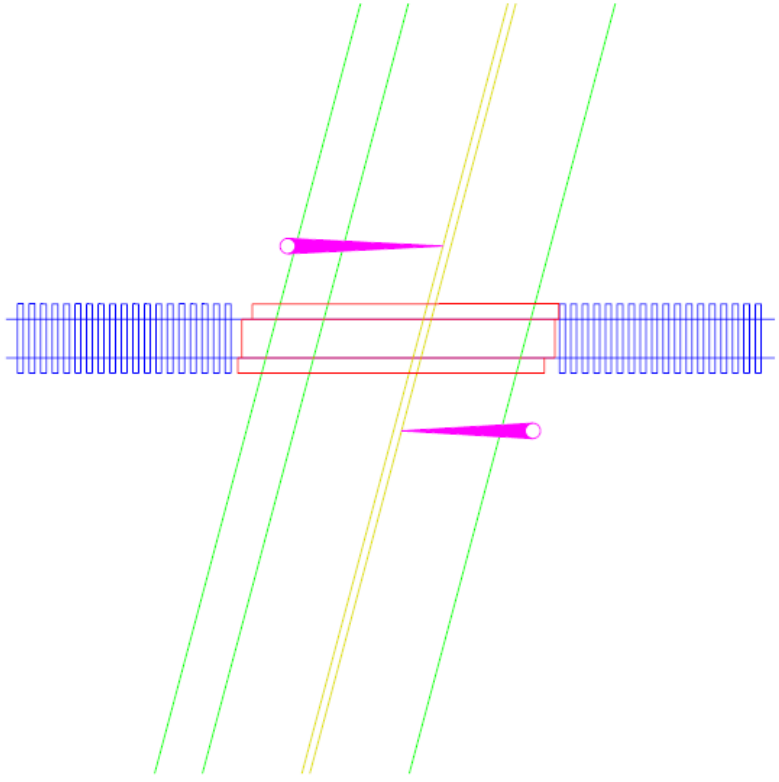


Bad

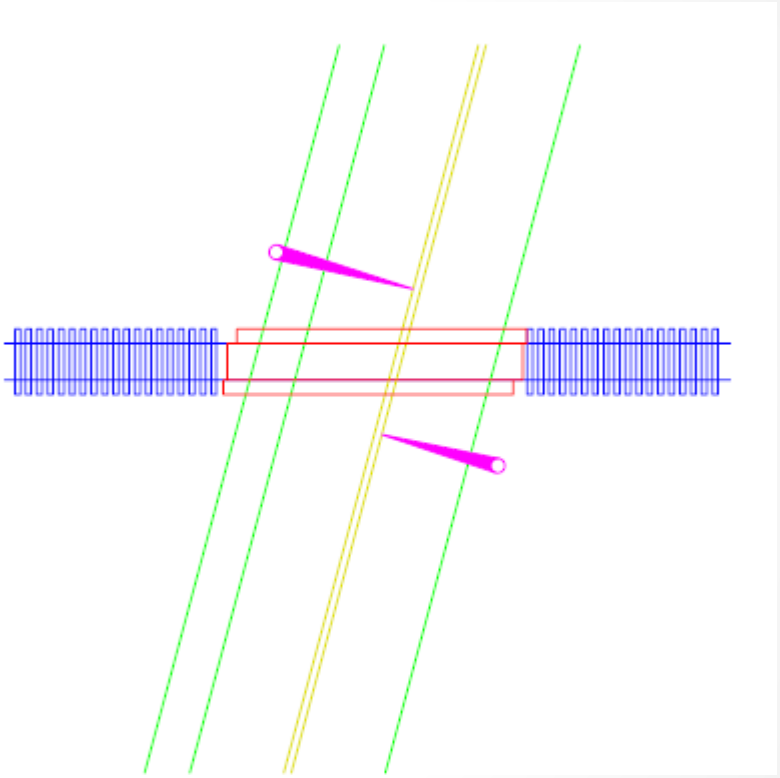


Good

Obtuse Angled



Good



Good

The best grade crossings are…

Thank-you!

frank.frey@dot.gov

(202) 738-2195