



**KEYSTONE WEST**  
High Speed Rail Study

# Menu of Options



*Prepared for:*



**pennsylvania**  
DEPARTMENT OF TRANSPORTATION

*and*



Federal Railroad Administration (FRA)

*Prepared by:*



*and*



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## MENU OF OPTIONS

### What is the Keystone West High Speed Rail Study (Study)?

#### **Keystone West High-Speed Rail Study Goals**

- *Extend higher speed rail service from Harrisburg to Pittsburgh.*
- *Increase ridership on Keystone West.*
- *Stimulate regional economic development.*

- A conceptual Feasibility Study and Preliminary Service Development Plan for Amtrak's Keystone West portion (Harrisburg – Pittsburgh) of the Pennsylvanian service between New York City and Pittsburgh. **See Figure 1: Project Area Map.**

- The Study conceptually evaluated how to increase speeds of passenger trains while still providing the capacity for additional passenger train frequencies and minimizing impacts to current Norfolk Southern operations and future opportunities.

- The Pennsylvania Department of Transportation (PennDOT), in cooperation with the Federal Railroad Administration (FRA), Amtrak, and Norfolk Southern (NS), conducted the Study.

### What data was the study and analysis based on?

- Information gleaned from prior studies and reports;
- Secondary sources of readily-available data; and,
- Planning-level techniques for engineering assessments, cost estimation, rail operations analyses, demand estimation, and impact assessment.

### What needs were identified to support potential improvements

- There is currently only inconvenient, limited, once-daily passenger rail service
- A lengthy (5½-hour) travel time
- Lack of convenient multimodal travel options for underserved populations
- Lack of amenities and intermodal connections at existing stations
- No connecting service to State College—an area of high commuter population.

### What conceptual alternatives were identified?

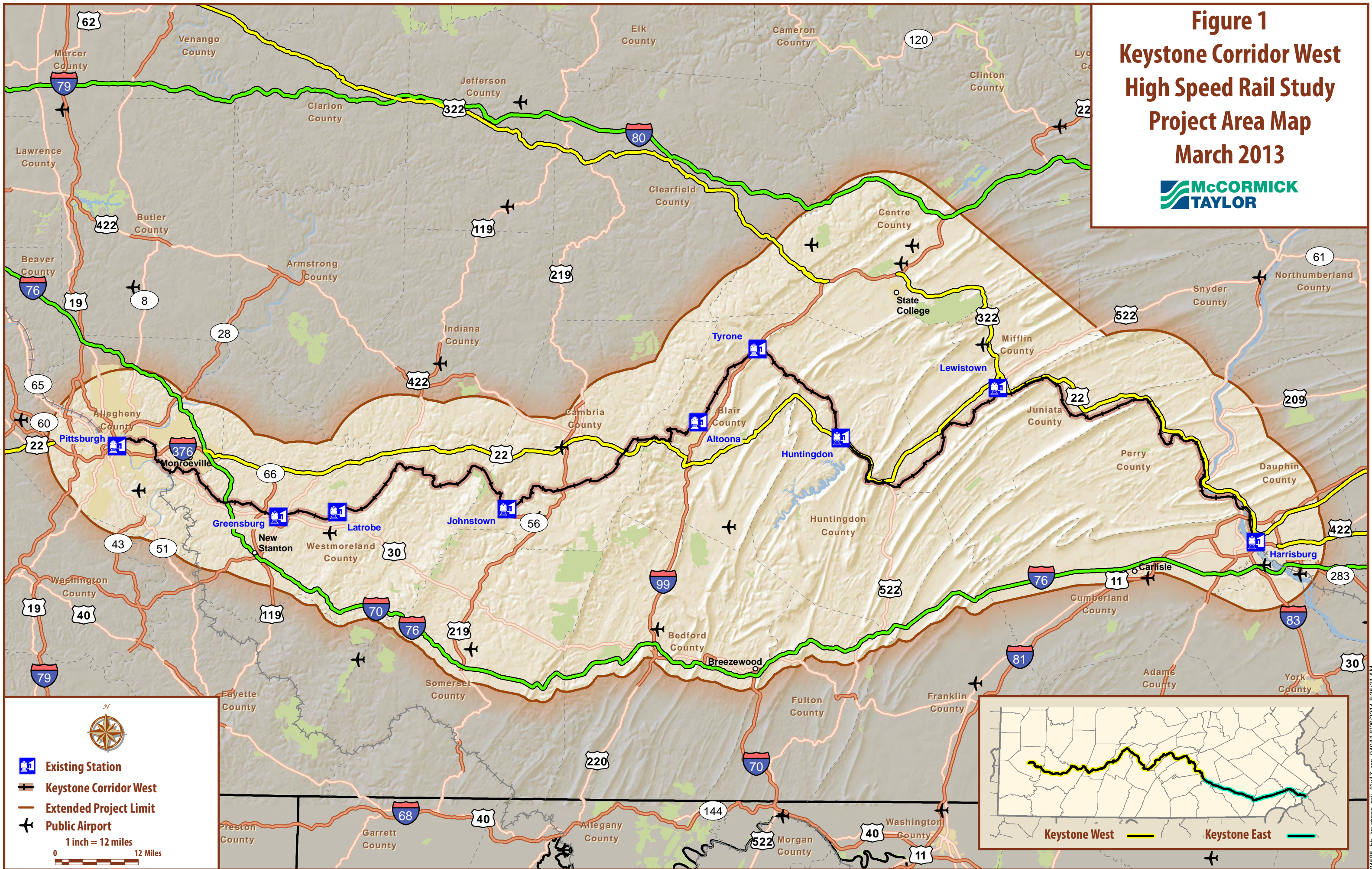
- No-Build Alternative and four build alternatives, as presented in **Table 1**.
- The types of improvements considered included:
  - curve modifications and curve straightening
  - off-line alignments to bypass slow/circuitous sections
  - adding tracks to increase capacity
  - switch upgrades to allow higher speeds through transitions from one track to another
  - addition of platforms to eliminate the need for trains travelling in opposing directions to share the tracks through station areas
  - a rail spur connection or connecting bus service from the mainline to State College
  - connecting bus service to other off-line communities
  - more frequent passenger train service

#### **Alternatives Early Screening**

- a. Screening Metrics, including:
  - Purpose & Need
  - Public / Stakeholder feedback
  - Physical, financial, and institutional feasibility
- b. Metrics ranked with 1 being least favorable & 5 most favorable



**Figure 1**  
**Keystone Corridor West**  
**High Speed Rail Study**  
**Project Area Map**  
**March 2013**





- All alternatives, except the No-Build, include either a rail connection from the Tyrone Amtrak Station to State College, or bus connection(s) from one or more existing rail stations to State College.
- The No-Build Alternative, with a metrics ranking of “2,” and Alternative 4 (metrics ranking of “1”) were eliminated from further consideration during the initial screening of alternatives.

Table 1: Summary of Screening Alternatives						
Alternative	General Improvement Types	Right-of-Way Costs	Infrastructure Construction Cost	Metrics Screen Score*	Carried to Detailed Analysis?	Reason Not Carried Forward
<b>No-Build (Base Case)</b>	None	\$0	\$0	2	No	Does not meet need.
<b>1</b>	Curve modifications in existing right-of-way	\$400,000	\$1.5 Billion	5	Yes	N/A – carried
<b>2</b>	Alternative 1 improvements PLUS curve straightening and some new alignment at slow points	\$14 Million	\$9.9 Billion	5	Yes	N/A – carried
<b>3</b>	Alternatives 1 and 2 improvements PLUS addition of a continuous third track	\$16 Million	\$13.1 Billion	3	Yes	N/A – carried
<b>4</b>	All new electrified, two-track, passenger train only, high speed alignment on southerly route similar to PA Turnpike	\$50 Million	\$38.3 Billion	1	No	Extensive impacts, cost, and lowest metric ranking

\* 5 indicates the highest or best score and 1 indicates the lowest or worst score.

### What are the benefits of the conceptual alternatives/individual improvements?

- Alternatives 1, 2, & 3 provide performance (time savings) improvements, as presented in **Table 2**.
- The expected benefits by individual improvement option are presented in the Menu of Options table at the end of this report.

Table 2: Time Savings by Alternative			
	Alternative 1	Alternative 2	Alternative 3
<b>Eastbound</b>	9 minutes 13 seconds	35 minutes, 27 seconds	Alternative 2 time savings plus additional time savings due to fewer conflicts between passenger and freight trains; plus additional capacity and reliability due to continuous third track*
<b>Westbound</b>	4 minutes, 54 seconds	29 minutes 22 seconds	

\* The additional time savings due to the addition of a third continuous track could not be quantified using the tools applied as part of this study.

### What additional supporting analyses were completed?

- Ridership forecasts
- Operations analysis
- Equipment considerations
- Financial plan
- Impact assessment
- Benefits assessment
- Phased implementation

### What are the next steps?

- Realizing that it is unlikely that a program of improvements along the lines of Alternative 2 could be implemented all at once, potential improvements were developed in a manner that would allow them to be completed incrementally, based on need, expected benefits and funding availability.
- Incremental improvements along the corridor would offer a fiscally constrained approach to the long-term implementation of a full and complete alternative; and allow ridership to increase systematically in support of future improvements.
- This Study was carried out at a conceptual level; therefore, a more detailed evaluation of demand, anticipated benefits, and funding availability will ensure that the most reasonable and prudent improvements, or combinations thereof, are advanced to construction.
- The information on the following pages can be used to program potential projects through the State Transportation Improvement Program (STIP) development process. Each of Pennsylvania's metropolitan and rural planning organizations (MPOs and RPOs) develops a long-range transportation plan. PennDOT will work with the MPOs/RPOs in the Keystone West corridor to evaluate the potential for funding the proposed Keystone West improvements.
- The itemized list also provides a general idea of the anticipated difficulty of implementation of each improvement, as explained in **Table 3**.

#### ***Future Considerations***

- Should improvements be constructed individually or in some combination?
- Improvement options (or combinations thereof) must be prioritized.
- Is there sufficient demand to justify cost of individual or combined improvements?

**Table 3: Implementation Difficulty Levels**

Level 1 Projects	Level 2 Projects	Level 3 Projects
<ul style="list-style-type: none"> <li>lower cost</li> <li>mostly within existing right-of-way</li> <li>typically non-complex</li> <li>limited or no adverse environmental impacts</li> <li>relatively straightforward to implement</li> </ul>	<ul style="list-style-type: none"> <li>higher cost</li> <li>may require some, but not extensive, amounts of additional right-of-way</li> <li>moderately complex</li> <li>may have adverse environmental impacts</li> <li>present a greater level of difficulty to implement</li> </ul>	<ul style="list-style-type: none"> <li>generally the costliest improvements</li> <li>require additional right-of-way</li> <li>complex projects</li> <li>greater impacts upon the built and natural environments</li> <li>present the greatest challenges in terms of design and construction</li> </ul>

### Lower Cost Option A (LCA)

Following completion of this Feasibility Report / Preliminary Service Development Plan (FR/PSDP), it was decided that it was necessary to develop an improvement option with a cost of less than \$500M. The option (Lower Cost Option A [LCA]) is not a preferred alternative nor a suggestion on what should be built first. The option was developed simply as one of multiple options to a systematic approach at corridor improvements and, predominately, to provide an option costing less than \$500M. Individual improvement components were selected from the Keystone West Menu of Options (February 2014) report in order to develop an option that costs under \$500M. Improvement types were chosen to be lower costs, have minimal requirements for additional right-of-way, have fewer environmental impacts, and be easier to implement, but also with the intent of improving travel times on the Keystone West. Selected project types include predominantly platform/station improvements and curve modifications. The following table shows which improvements would be included in the LCA (see the Alternative Reference Numbers column).

MENU OF OPTIONS: PITTSBURGH – LATROBE



Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits			Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementation (3 = most difficult 2 = moderate 1 = least difficult)
				Time (h:m:s)		Purpose				Stream Crossings # / LF	Wetland Impacts # / Acres	T&E Species #	Historic Resources #	Hazardous Waste Y / N	
				East	West										
104 / 204 / 310 / LCA	Freight Bypass Track	Pittsburgh Station	1.1 miles new track, turnouts, and related C&S improvements	NA	NA	Capacity	8,170	-	Existing	0 / 0	0 / 0	0	0	N	1
110 / 210	Additional Passing Siding and Renew Existing Passing Siding	Rade – Traff MPs 325.0 – 336.5	11.5 miles new siding, 11.5-mile access road, 3.2 miles rehab existing siding, 6 new bridges, 17 rail/highway grade separations, retaining walls, turnouts, C&S	NA	NA	Capacity	265,323	-	Mostly new	22 / 593	0 / 0	1	1	Y	3
307	Add Continuous Third Track	Latrobe – Greensburg	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Extensive cut/fill, new bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A		Additional Capacity/Time Savings	212,152	-	Mostly new	10 / 255	0 / 0	0	0	N	3
308	Add Continuous Third Track	Greensburg – Pittsburgh	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Extensive cut/fill, new bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A		Additional Capacity/Time Savings	494,535	-	Mostly new	27 / 586	0 / 0	0	0	N	3
111.7 / 211.7 / 311.7 / LCA	Curve Modifications	Latrobe – Greensburg	Modified superelevation and/or straightening of curves	0:00:00	0:00:00	Speed	203	-	Mostly existing	0 / 0	0 / 0	0	0	N	1
111.8 / 211.8 / 311.8 / LCA	Curve Modifications	Greensburg – Pittsburgh	Modified superelevation and/or straightening of curves	0:00:36	0:00:18	Speed	1,534	28	Mostly existing	0 / 0	0 / 0	0	0	N	1

Footnotes provided at end of table.



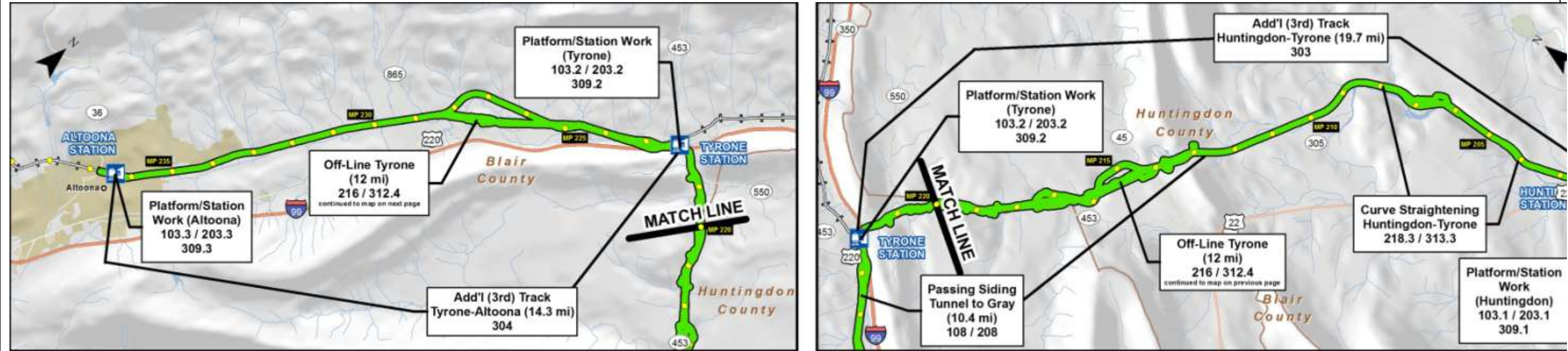
MENU OF OPTIONS: LATROBE – ALTOONA



Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits		Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementation (3 = most difficult 2 = moderate 1 = least difficult)	
				Time (h:m:s)					Purpose	Stream Crossings	Wetland Impacts	T&E Species	Historic Resources		Hazardous Waste
				East	West	# / LF	# / Acres			#	#	Y / N			
101 / 201 / LCA	Additional Track	Cresson – Johnstown	24 miles of new track and related improvements (1 new bridge, rehab 14 bridges, turnouts, C&S, etc.)	See Note A		Capacity / Speed	97,901	-	Existing	25 / 595	0 / 0	0	0	N	3
109 / 209	New Passing Siding	Pack – Trobe MPs 300.5 – 312.7	12.2 miles new siding, 12-mile access road, 2 new bridges, 7 rail/highway grade separations, 4 grade crossing upgrades, turnouts, C&S	NA	NA	Capacity	158,105	-	Mostly existing	17 / 381	1 / 0.57	5	1	Y	2
217 / 312.5	Off-line Alignment, double track, passenger-only due to grades	Horseshoe Curve Bypass MP 237.2 – MP 244.3	9.3 miles new double track, 1 new rail/rail grade separation, 1 rail highway grade separation (\$216.1M), extensive cut/fill (\$42.4M), extensive C&S and turnouts	0:08:36	0:06:01	Speed / Capacity	334,769	382	Approx. 4.5 miles new	6 / 1,560	0 / 0	0	1	Y	3
218.4 / 313.4 / LCA	Curve Straightening	Altoona – Johnstown	New track, track relocation, extensive cut/fill (\$55.0M), and retaining walls (\$23.9M), 4.9-mile access road, 2 new bridges (\$61.4M), 1 highway grade separation, C&S	0:00:58	0:01:10	Speed	175,086	1,386	Some new at each curve	4 / 1,313	1 / 5.66	2	1	N	3
218.5 / 313.5 / LCA	Curve Straightening	Johnstown – Latrobe	New track, track relocation, cut/fill, 1 highway grade separation, access road, retaining walls, C&S	0:00:03	0:00:07	Speed	25,221	2,522	Some new at each curve	0 / 0	1 / 0.87	0	1	N	2
305	Add Continuous Third Track	Altoona – Johnstown	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Reopen Gallitzin Tunnel, extensive cut/fill, new/rehab bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A		Additional Capacity / Time Savings	801,400	-	Mostly new	40 / 1,472	0 / 0	0	0	N	3
306	Add Continuous Third Track	Johnstown – Latrobe	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Extensive cut/fill, new/rehab bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A		Additional Capacity / Time Savings	798,277	-	Mostly new	30 / 1,320	0 / 0	0	0	N	3
111.5 / 211.5 / 311.5 / LCA	Curve Modifications	Altoona – Johnstown	Modified superelevation and/or straightening of curves	0:00:27	0:00:26	Speed	3,043	57	Mostly existing	0 / 0	0 / 0	0	0	N	1
111.6 / 211.6 / 311.6 / LCA	Curve Modifications	Johnstown – Latrobe	Modified superelevation and/or straightening of curves	0:00:14	0:00:14	Speed	4,054	145	Mostly existing	0 / 0	0 / 0	0	0	N	1



MENU OF OPTIONS: ALTOONA – HUNTINGDON



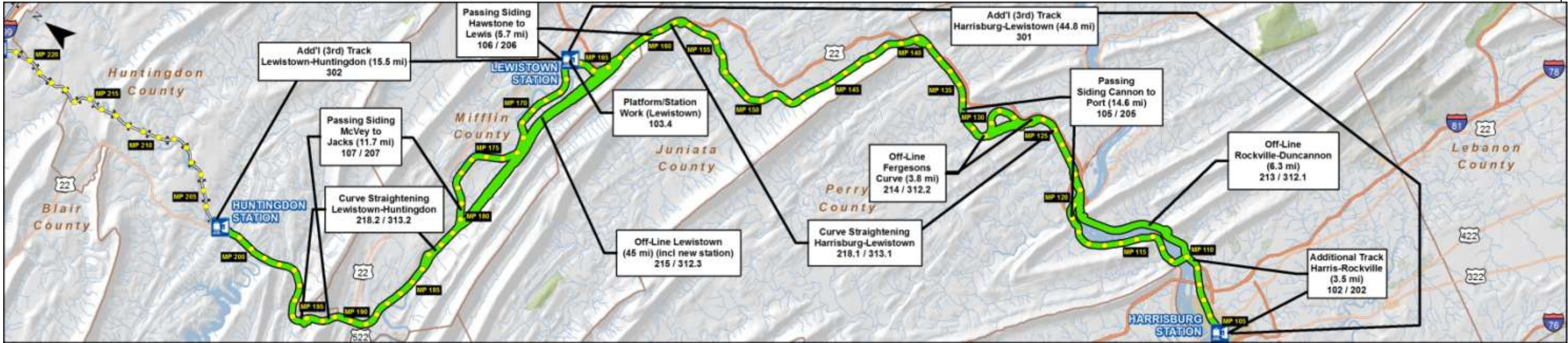
Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits		Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementation (3 = most difficult 2 = moderate 1 = least difficult)	
				Time (h:m:s)					Purpose	Stream Crossings	Wetland Impacts	T&E Species	Historic Resources		Hazardous Waste
				East	West					# / LF	# / Acres	#	#		Y / N
103.3 / 203.3	Station Improvements	Altoona	Add 1 high platform, new pedestrian bridge, garage modifications, elevators, 1 gauntlet track, signal improvements	See Note B		Capacity / Time Savings	11,432	-	Existing	0 / 0	0 / 0	4	3	Y	1
309.3 / LCA	Alt 3 Station Improvements	Altoona Station	New gauntlet tracks & signal upgrades, 2 new high platforms, new pedestrian bridge, 3 elevators, garage modifications, misc. improvements	See Note B		Capacity / Time Savings	15,669	-	Mostly existing	0 / 0	0 / 0	4	3	Y	2
103.1 / 203.1	Station Improvements	Huntingdon	Add second low-level platform, parking	See Note B		Capacity / Time Savings	950	-	Existing	0 / 0	1 / 0.88	1	1	Y	1
309.1 / LCA	Alt 3 Station Improvements	Huntingdon Station	New gauntlet tracks & signal upgrades, 1 new high platform, misc. improvements	See Note B		Capacity / Time Savings	14,416	-	Mostly existing	0 / 0	1 / 0.88	1	1	Y	1
108 / 208	Additional Passing Siding and Renew Existing Passing Siding	Tunnel – Gray MPs 212.9 – 223.3	Reopen Spruce Creek Tunnel (\$27.5M), 10.4 miles new siding track and shift existing track, 4 grade crossing modifications, 10-mile access road, 14 new bridges, 5 rail/highway grade separations, retaining walls, turnouts, C&S	NA	NA	Capacity	380,084 (108) / 371,576 (208)	-	Mostly existing	19 / 2,768	7 / 3.97	6	8	N	3
216 / 312.4	Off-line Alignment, double track	Tyrone vicinity MP 213.17 – MP 230.55	12 miles new double track, 15 miles track relocation, 12 new grade crossings, extensive excavation along Juniata River (\$520.5M), 13.7-mile access road, 3.4 miles roadway separation, 12 new RR bridges, 2 grade separation structures, retaining walls, turnouts, C&S	0:09:06	0:08:21	Speed / Capacity	1,037,357 (216) / 1,037,030 (312.4)	990	18 miles of new	20 / 1,783	6 / 0.24	6	6	Y	3



MENU OF OPTIONS:    ALTOONA – HUNTINGDON															
Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits		Purpose	Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementation (3 = most difficult 2 = moderate 1 = least difficult)
				Time (h:m:s)						Stream Crossings	Wetland Impacts	T&E Species	Historic Resources	Hazardous Waste	
				East	West										
218.3 / 313.3 / LCA	Curve Straightening	Huntingdon – Tyrone	New track, track relocation, extensive cut/fill (\$59.1M) and retaining walls (\$11.1M), access road, highway relocation, C&S	0:00:13	0:00:13	Speed	77,383	2,976	Some new at each curve	1 / 10	1 / 1.32	5	1	N	2
303	Add Continuous Third Track	Huntingdon – Tyrone	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Reopen Spruce Creek Tunnel, extensive cut/fill, new/rehab bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A		Additional Capacity / Time Savings	461,913	-	Mostly new	24 / 2,946	0 / 0	0	0	N	3
304	Add Continuous Third Track	Tyrone – Altoona	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Extensive cut/fill, new/rehab bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A		Additional Capacity / Time Savings	320,655	-	Mostly new	21 / 557	0 / 0	0	0	N	3
103.2 / 203.2	Station Improvements	Tyrone	Add second low-level platform, waiting room and shelters, parking	0:00:00	0:00:00	Capacity / Time Savings	925	0	Existing	0 / 0	0 / 0	4	1	N	1
309.2 / LCA	Alt 3 Station Improvements	Tyrone Station	New gauntlet tracks & signal upgrades, 2 new high platforms, new waiting room & shelters, misc. improvements	See Note B		Capacity / Time Savings	13,655	-	Mostly existing	0 / 0	0 / 0	4	1	N	1
111.4 / 211.4 / 311.4 / LCA	Curve Modifications	Tyrone – Altoona	Modified superelevation and/or straightening of curves	0:00:05	0:00:06	Speed	359	33	Mostly existing	0 / 0	0 / 0	0	0	N	1
111.3 / 211.3 / 311.3 / LCA	Curve Modifications	Huntingdon – Tyrone	Modified superelevation and/or straightening of curves	0:00:18	0:00:17	Speed	2,433	70	Mostly existing	0 / 0	0 / 0	0	0	N	1

Footnotes provided at end of table.

MENU OF OPTIONS: HUNTINGDON – HARRISBURG



Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits		Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementation (3 = most difficult 2 = moderate 1 = least difficult)	
				Time (h:m:s)					Purpose	Stream Crossings	Wetland Impacts	T&E Species	Historic Resources		Hazardous Waste
				East	West										
102 / 202 / LCA	Additional Track	Harris – Rockville	3.5 miles new track and related improvements (turnouts, 1 bridge rehab, C&S, etc.)	See Note A		Capacity / Speed	12,899	-	Existing	0 / 0	0 / 0	0	0	N	1
103.4 / LCA	Station Improvements	Lewistown Station	Low-Level Platforms	See Note B		Capacity / Speed	660	-	Existing	0 / 0	0 / 0	0	0	N	1
105 / 205	Additional Passing Siding and Renew Existing Passing Siding	Cannon – Port MPs 113.2 – 133.5	14.6 miles new siding, 5.7 miles renew existing siding, 5 grade crossings, relocate industrial side track, rehab 7 bridges, 6 new bridges, 14.6-mile rail access road, 3 rail/highway grade separations, turnouts, C&S	NA	NA	Capacity	179,285	-	Mostly existing	15 / 465	6 / 1.68	7	3	Y	2
106 / 206	Additional Passing Siding and Renew Existing Passing Siding	Hawstone – Lewis MPs 160.0 – 165.7	5.7 miles new siding track and shift existing track, 6.3 miles renew existing siding, 3 rail/highway grade separations, turnouts, C&S	NA	NA	Capacity	79,618	-	Mostly existing	11 / 110	0 / 0	5	2	N	2
107 / 207	Additional Passing Siding and Renew Existing Passing Siding	McVey – Jacks MPs 179.6 – 191.3	11.7 miles new siding track and shift existing track, 12-mile access road, 2 new bridges, 1 private road crossing, 2 new bridges, 4 rail/highway grade separations, retaining walls, turnouts, C&S	NA	NA	Capacity	190,834	-	Mostly existing	11 / 1,075	6 / 4.81	4	1	Y	2
213 / 312.1	Off-line Alignment, double track	Rockville – Duncannon MP 209 (Buffalo Line ) – MP 121.6 (Pgh Line)	6.3 miles new track, 3.4 miles upgrade existing track, 1 new bridge (\$304.5M), 10-mile access road, 1 major new interlocking, 4 new timber/asphalt crossings, retaining walls, turnouts, extensive C&S	0:00:53	0:02:09	Speed / Capacity	394,424	2,167	Extensive new	9 / 3,553	5 / 1.92	5	6	Y	3



MENU OF OPTIONS:     HUNTINGDON – HARRISBURG (continued)															
Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits			Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementat ion (3 = most difficult 2 = moderate 1 = least difficult)
				Time (h:m:s)		Purpose				Stream Crossings	Wetland Impacts	T&E Species	Historic Resources	Hazardous Waste	
				East	West					# / LF	# / Acres	#	#	Y / N	
214 / 312.2	Off-line Alignment, double track	Ferguson's Curve MP 128 – MP 131.8	Extensive cut/fill (\$394.2M), 3.8 miles new double-track RR, 3.0-mile access road, 1 rail/highway grade separation, 1 new interlocking, turnouts, C&S, utilities	0:00:00	0:00:16	Speed / Capacity	435,356	27,210	Extensive new	3 / 590	1 / 0.02	3	1	Y	3
215 / 312.3	Off-line Alignment, double track, concrete tie	Bypass of Lewistown, Granville, McVeytown MP 160.0 – MP182.5	Extensive cut/fill (\$5,337M), 22.5 miles new double-track rail, 15-mile access road, relocate Lewistown Station with 2 platforms & amenities, 1 new RR bridge, 3 rail/highway grade separations, 5 grade crossings, turnouts, C&S	0:07:38	0:07:41	Speed / Capacity	5,624,683	6,120	Extensive new	26 / 5,225	1 / 0	4	1	N	3
218.1 / 313.1	Curve Straightening	Harrisburg – Lewistown	New track, relocation, extensive cut/fill (\$141.3M), 6.3-mile access road, retaining walls, C&S	0:00:55	0:00:57	Speed	174,777	1,560	Some new at each curve	8 / 93	2 / 2.72	9	1	N	3
218.2 / 313.2	Curve Straightening	Lewistown – Huntingdon	New track, track relocation, extensive cut/fill (\$45.8M), 2 new bridges (\$144.9M), C&S	0:00:48	0:00:44	Speed	195,752	2,128	Some new at each curve	4 / 719	2 / 7.77	4	1	N	3
301	Add Continuous Third Track	Harrisburg – Lewistown	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Extensive cut/fill, new/rehab bridges, new track, C&S, grade crossings, grade separations, access roads, retaining walls, etc.	See Note A	-	Additional Capacity / Time Savings	995,135	-	Mostly new	51 / 4,986	0 / 0	0	0	N	3
302	Add Continuous Third Track	Lewistown – Huntingdon	Incremental costs (above all Alt 2 improvements) to achieve continuous third track. Extensive cut/fill, new/rehab bridges, new track, C&S, grade crossings, 20 grade separations, access roads, retaining walls, etc.	See Note A	-	Additional Capacity/ Time Savings	369,683	-	Mostly new	49 / 2,470	0 / 0	0	0	N	3
111.1 / 211.1 / 311.1 / LCA	Curve Modifications	Harrisburg – Lewistown	Modified superelevation and/or straightening of curves	0:00:11	0:00:13	Speed	2,788	116	Mostly existing	0 / 0	0 / 0	0	0	N	1
111.2 / 211.2 / 311.2 / LCA	Curve Modifications	Lewistown – Huntingdon	Modified superelevation and/or straightening of curves	0:00:09	0:00:07	Speed	1,454	91	Mostly existing	0 / 0	0 / 0	0	0	N	1

Footnotes provided at end of table.

MENU OF OPTIONS: RAIL SPUR TO STATE COLLEGE



Alternative Reference Numbers <sup>1</sup>	Type of Improvement	Location	Summary Description	Expected Benefits		Loaded Costs – except ROW <sup>2</sup> (\$000s)	Cost / Benefit (\$000s / second) <sup>3</sup>	ROW	Environmental Considerations <sup>4</sup>					Implementation (3 = most difficult 2 = moderate 1 = least difficult)	
				Time (h:m:s)					Purpose	Stream Crossings # / LF	Wetland Impacts # / Acres	T&E Species #	Historic Resources #		Hazardous Waste Y / N
				East	West										
112 / 212 / 314	Rail Spur to State College	Tyrone (MP 313) – Lemont	10,000 wood tie replacement, 5 miles of new rail on curves, 8 new RR bridges, rehab 4 bridges, renew 31 timber/asphalt crossings and 10 full-depth rubber crossings, line and surface 45 track miles, 1 high-level platform, shelter, parking, C&S	N/A	N/A	Access/New Market	71,887	-	Mostly on private railroad property	54 / 834	0 / 0	0	0	N	2

NOTES:

- <sup>1</sup> Reference numbers (column 1): 100 = Alternative 1; 200 = Alternative 2; 300 = Alternative 3.
- <sup>2</sup> ROW = Right-of-Way.
- <sup>3</sup> Based on the total time savings in both directions.
- <sup>4</sup> Based on available background and secondary source data and mapping.
- A Time savings would be expected, but exact time savings are not known based on this conceptual feasibility study.
- B The primary purpose of the station improvement projects is to reduce the occurrence of unplanned delays to both passenger and freight trains that arise due to the need for eastbound passenger trains to make crossover moves and run on the primary westbound track to access platforms for loading/unloading. A related and equally important benefit is that the project(s) will also add capacity that will support additional passenger train frequencies.



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