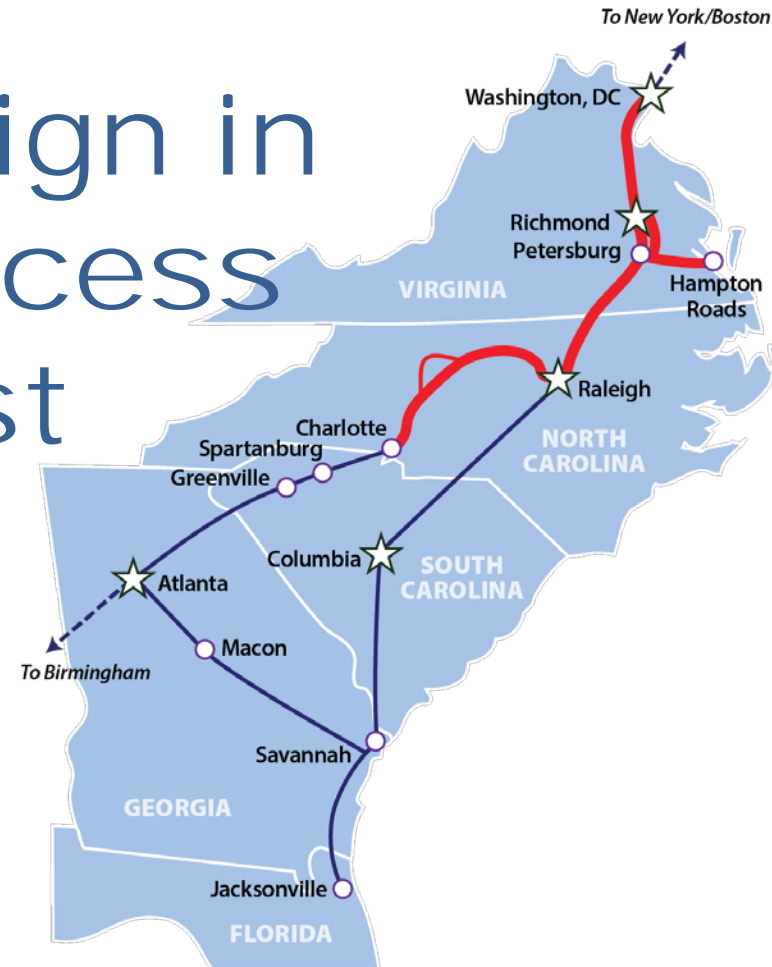


2015 FRA Rail Program Delivery



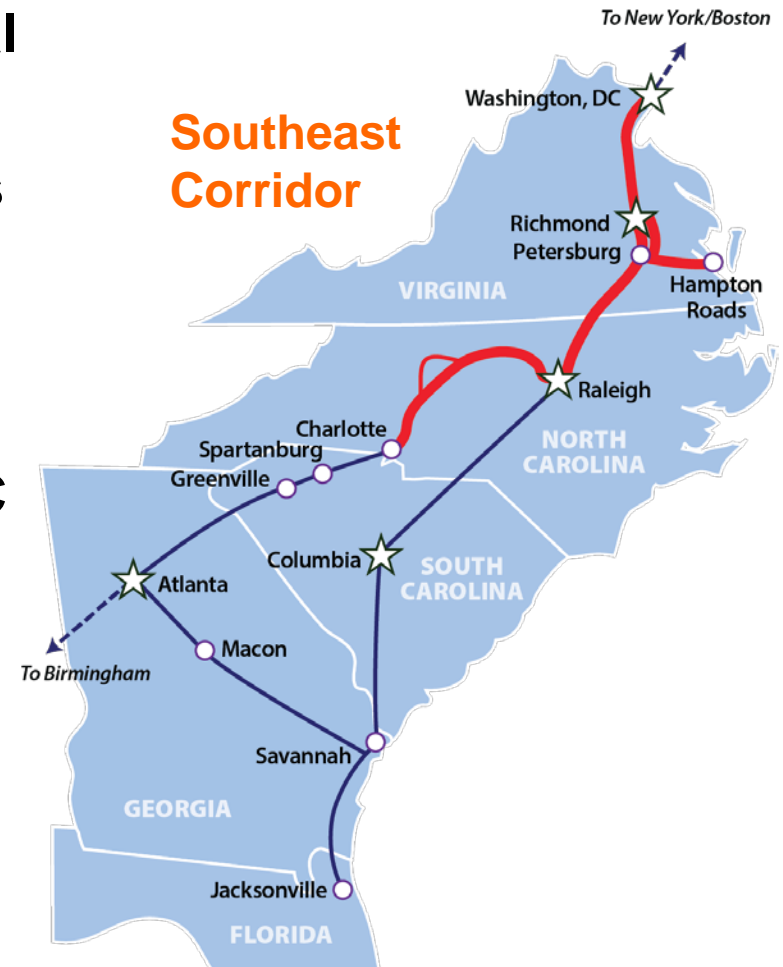
Engineering Design in Tiered NEPA Process (NC/VA Southeast Corridor)

Matthew Simmons, PE
NCDOT Rail Division



Overview of Southeast Corridor

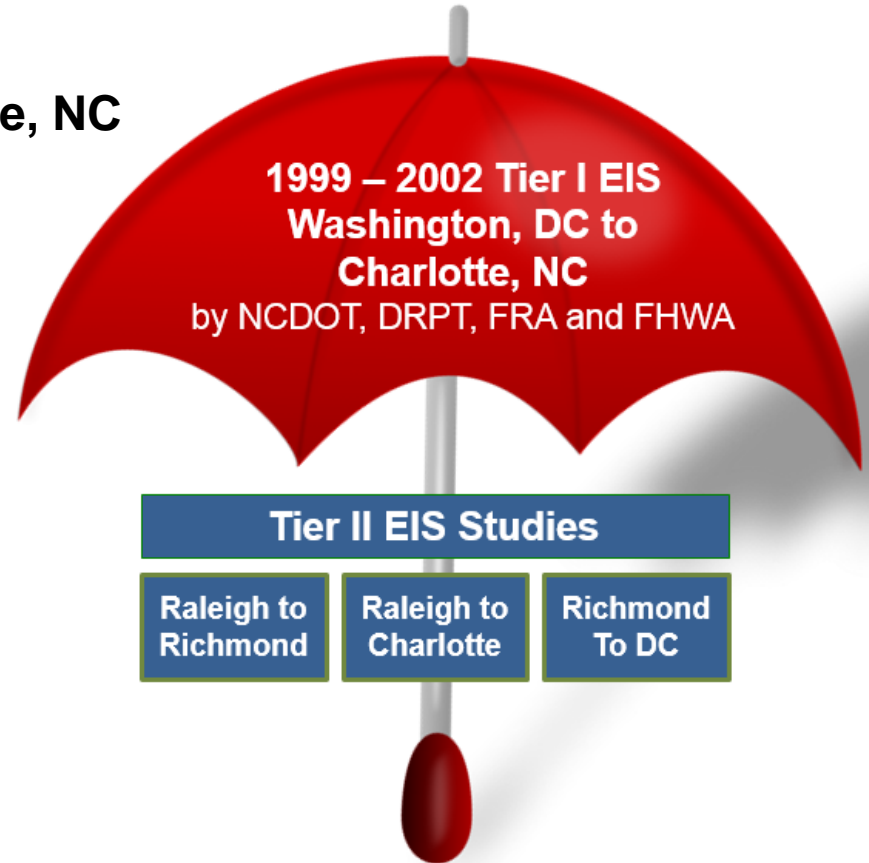
- 1992 – FRA designated the Federal Southeast Corridor
- 1998 – Extended with connections to South Carolina, Georgia and Florida
- NC and VA have collaborated on the segment from Washington, DC to Charlotte via Richmond and Raleigh



Overview of NEPA Complete to Date

History of Documents

- Tier I – Washington, DC -> Charlotte, NC
- Tier II
 - Richmond -> Raleigh = EIS
 - Raleigh -> Charlotte = Smaller Documents for Projects with independent utility



Tier I EIS – Washington, DC to Charlotte

Tier I – Engineering

- Over 1200 miles of rail corridors
- Concept level alignments
- GIS Based analysis for many factors
- “Mile” wide corridors
 - Actually varies from 200 ft to 6 miles depending on resource
- Ridership / revenue
- Modal choice
- Avoid fatal flaws



Tier I EIS – Richmond to Charlotte

Tier I Rail Alignments Analyzed

- Washington -> Petersburg
 - RF&P / A-Line
- Petersburg -> Raleigh
 - A-Line
 - A-Line, SA-Line, S-Line
 - S-Line
- Raleigh -> Charlotte
 - NCRR
 - NCRR, K-Line, WSSB
 - S-Line, CF-Line, ACWR



Alternative A
S-Line + NCRR



Alternative B
S-Line + NCRR + WS



Alternative C
S-Line + ACWR



Alternative D
SA-Line + NCRR



Alternative E
SA-Line + NCRR + WS



Alternative F
SA-Line + ACWR



Alternative G
A-Line + NCRR



Alternative H
A-Line + NCRR + WS



Alternative J
A-Line + ACWR

Tier I EIS – Richmond to Charlotte

**Table ES-3
Summary of Potential Human/Natural Impacts and Benefits of the Study Area Alternatives**

Environmental Information	Buffer width for review	A	B	C	D	E	F	G	H	J
Water Supply Watersheds	6 mi.	27	33	19	28	35	21	27	34	21
Major Rivers (potential crossings)	n/a	29	28	29	31	30	33	29	28	31
Wetlands (NWI & hydric soils in acres)	300 ft.	117.3	115.8	117.0	124.0	122.5	123.7	190.7	189.2	190.4
FEMA 100-year Floodplain crossings	n/a	83	76	44	89	82	50	97	90	58
Mineral Resources (Mines)	0.5 mi	36	37	40	37	38	41	33	34	37
Hazardous Materials Sites	0.5 mi.	412	441	252	427	456	267	454	483	294
Air Quality-Net reduction in NOx emissions (lbs/yr)	n/a	554,889	530,895	279,065	547,392	517,065	269,540	589,505	553,099	298,179
Annual 2025 Trip Diversions	n/a									
-From auto to rail		865,349	841,840	595,092	858,004	828,290	585,761	899,266	863,596	613,822
-From air to rail		320,061	311,365	220,103	242,001	233,620	165,215	171,289	164,494	116,918
Estimated Relocations										
-Residential dwellings (each)	n/a	365	371	220	405	411	260	301	307	156
-Business (square footage)	n/a	65,145	110,920	57,374	62,191	107,966	54,420	70,344	116,119	62,573
Noise & Vibration Category 9 sensitive receptors	300 ft.	333	342	259	371	371	287	369	372	284
Prime farmland (acres)	6 mi.	37,219	39,360	26,523	45,137	46,992	34,308	57,345	59,134	46,670
Protected Species - # of known populations identified	6 mi.	33	35	45	44	46	56	43	49	51
National Rivers Inventory	6 mi.	11	11	13	10	11	13	12	13	14
Estimated Relocations										
-Residential dwellings (each)	n/a	365	371	220	405	411	260	301	307	156
-Business (square footage)	n/a	65,145	110,920	57,374	62,191	107,966	54,420	70,344	116,119	62,573
Historic Sites										
-National Register Sites	1500 ft.	333	333	304	333	333	304	320	320	211
-Study List Sites	1500 ft.	102	102	58	165	165	121	168	168	124
Parks	500 ft.	14	15	11	14	15	11	15	16	12
Gamelands/Public lands (ac.)	500 ft.	5.7	5.7	14	5.7	15.7	15.3	5.7	5.7	15.3
Areas of Environmental Complexity (high)*	n/a	6	8	4	5	7	3	7	9	5

Tier I EIS – Washington, DC to Charlotte

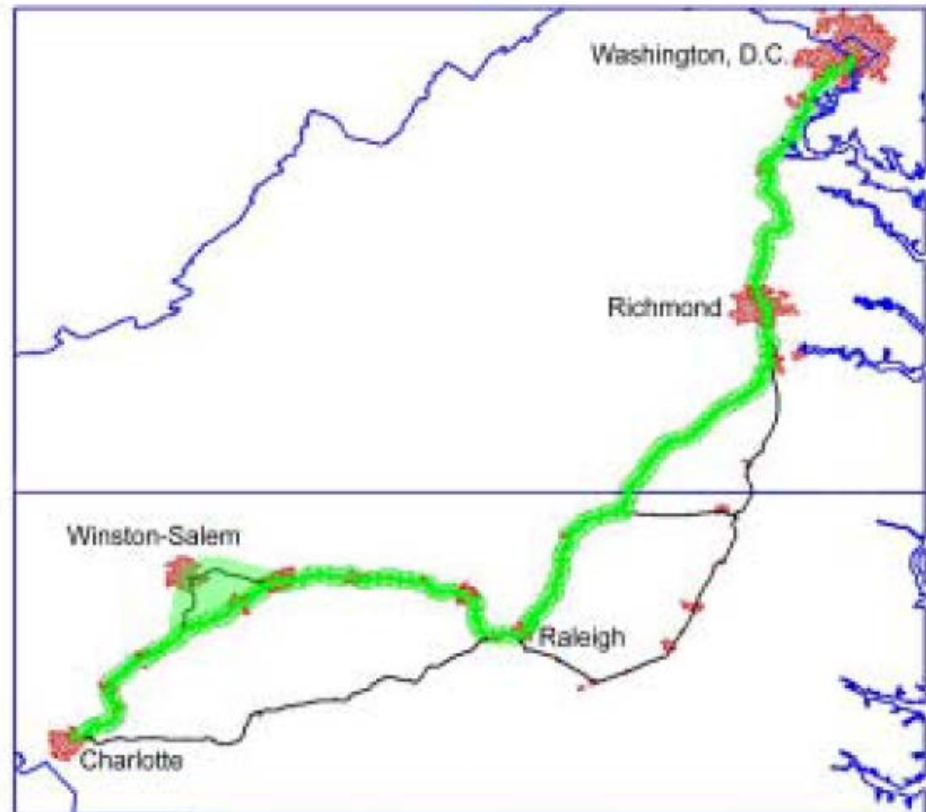
Tier I – Three Outputs

- **Purpose and Need**
- **Selected Corridor**
- **Modal Choice**

Other factors:

- **Conceptual alignment to be refined**
- **Basic design criteria**
- **Ability to move forward with either Tier II EIS for corridor project or smaller documents for specific improvements**

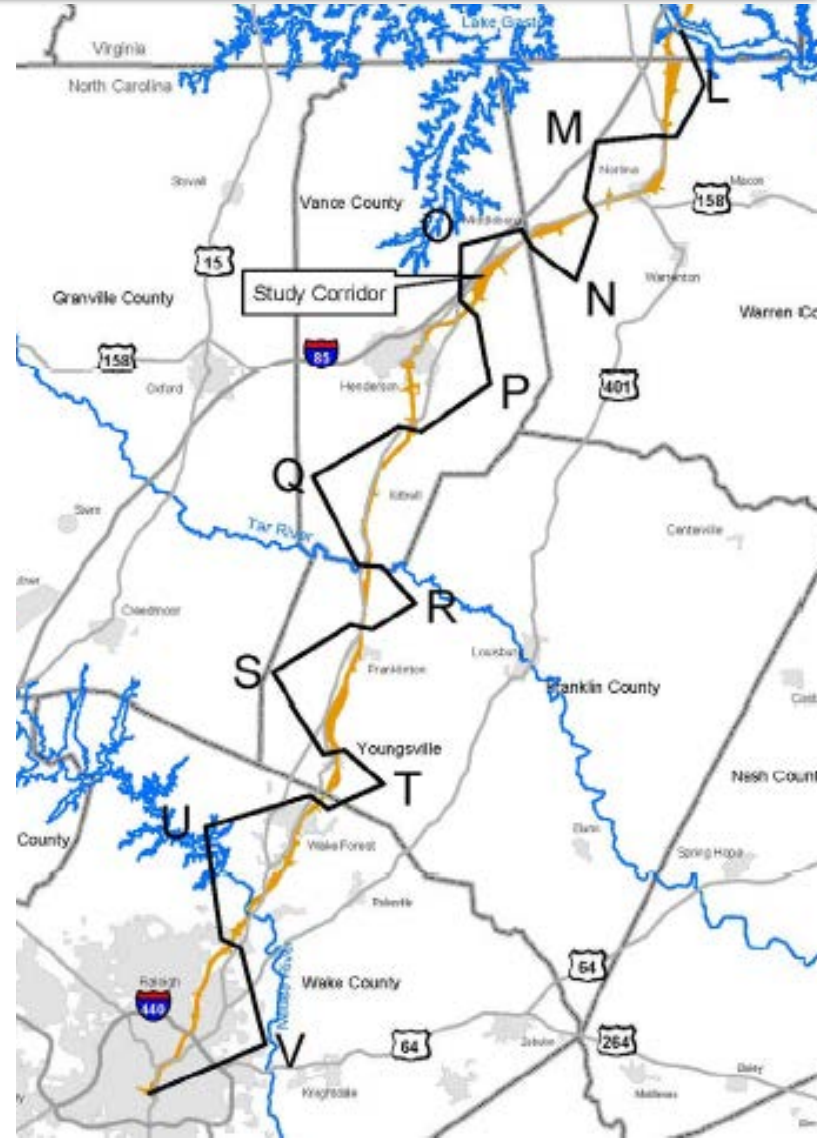
Figure 1.11
Recommended Alternative: Alt. A + Alt. B.



Tier II EIS – Richmond to Raleigh

Tier II Engineering

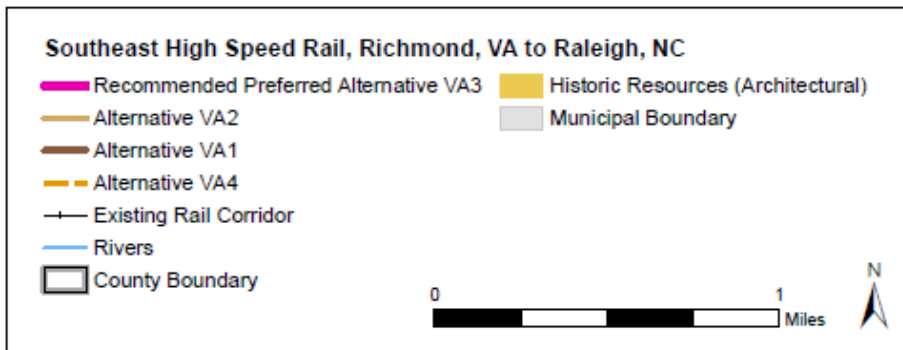
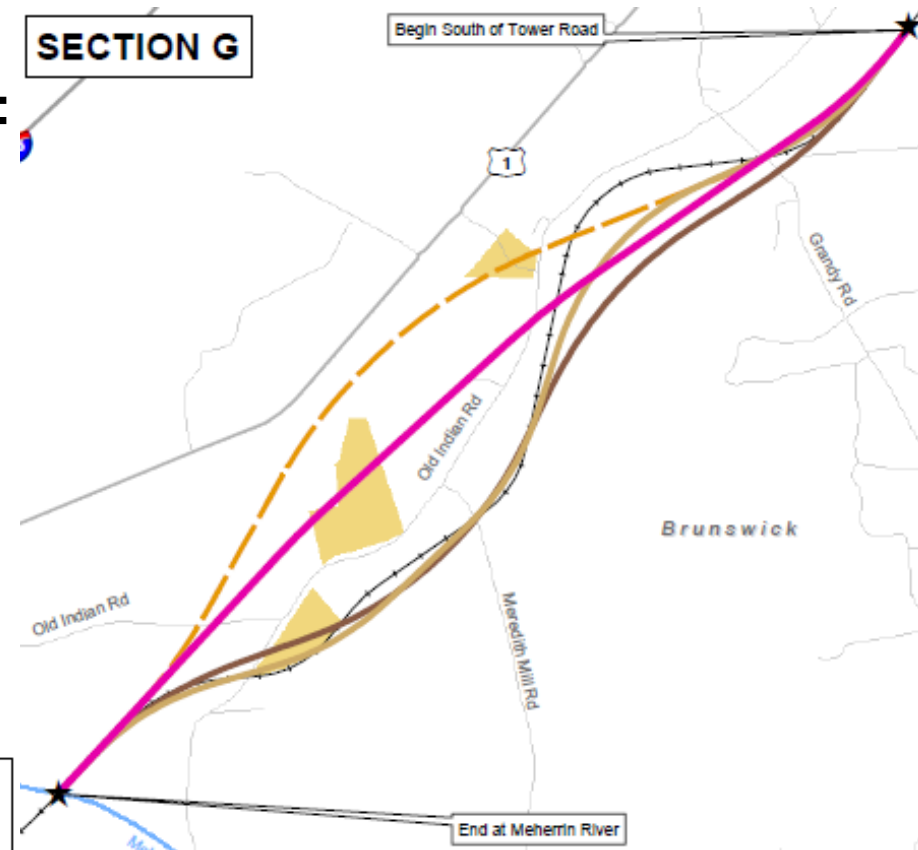
- **Develop corridor into alignments**
 - **Develop conceptual alignments**
 - **Avoidance alignments as resources identified / delineated**
 - **Detailed design (over 321 miles of track designed)**
- **Highway designs (90 miles)**
- **Impacts based on sections plus buffer (generally 25')**
- **Broken into 26 sections for comparison (generally 1-2 alternates, but some with 3 or even 4)**



Tier II EIS – Richmond to Raleigh

Analysis of Alternatives Based on:

- Speed
- Operational Characteristics
- Resource Impacts, such as:
 - Historic
 - T&E Species
 - Water Resources
- Property Impacts
- Public Input



Tier II EIS – Richmond to Raleigh

Design Limitations:

- **Design still based on functional level survey**
- **Limited structural / hydro analysis for fatal flaws only**
- **Limited railroad feedback**

Outcome:

- **A buildable project ready to go to final design**

Tier II – EA/FONSI – Bowers to Lake Double Track

Overview of Project:

- 4 mile double track project
- Working with NS and NCRR on project
- 3 existing railroad bridges
- 3 public at-grade highway crossings

Decision to proceed with EA / FONSI based on

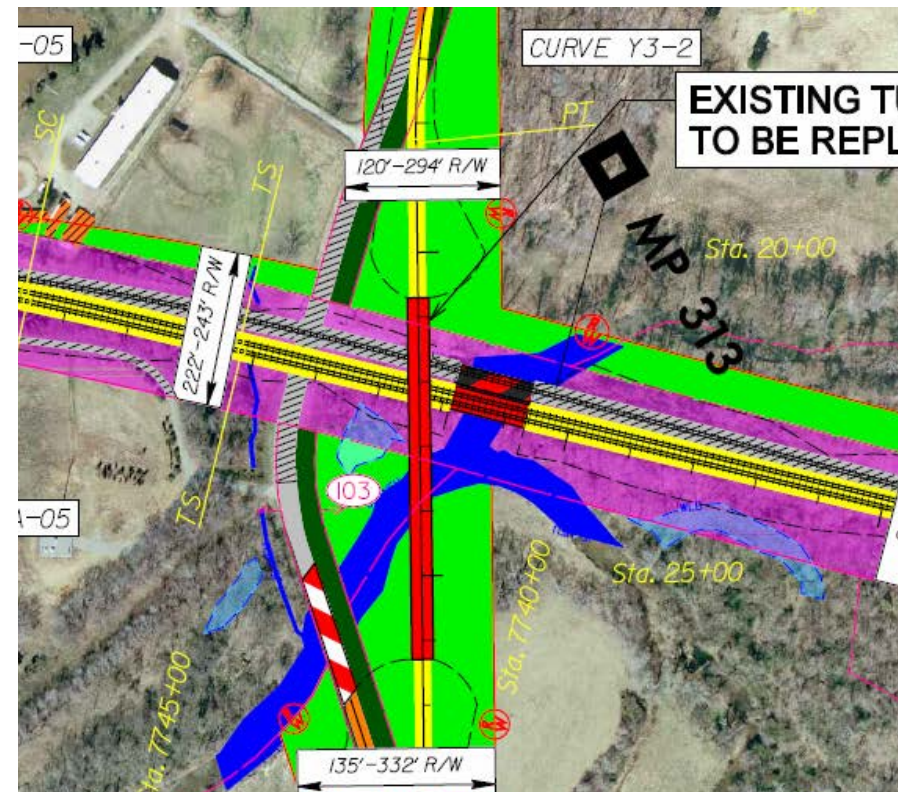
- ROW acquisition
- Level of changes to road network
- Impacts



Tier II – EA/FONSI – Bowers to Lake Double Track

Engineering

- Develop single alignment using avoidance and minimization
- Functional highway design
- Impacts still based on sections plus buffer
- Detailed structure analysis / proof of concept
- Where not sure of outcome, include **WORST CASE** in document
- 15%-25% plans level generally using final design level of survey data
- Heavy railroad coordination



Summary

Tier I Study

- **Engineering “from a mile high”**
- **Determining mode, overall corridor, and Purpose & Need**
- **Also design criteria for future study**

Tier II Study

- **Functional design with detailed field environmental**
- **Prepares for final design, permitting, right of way acquisition, and construction**

Thank you

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