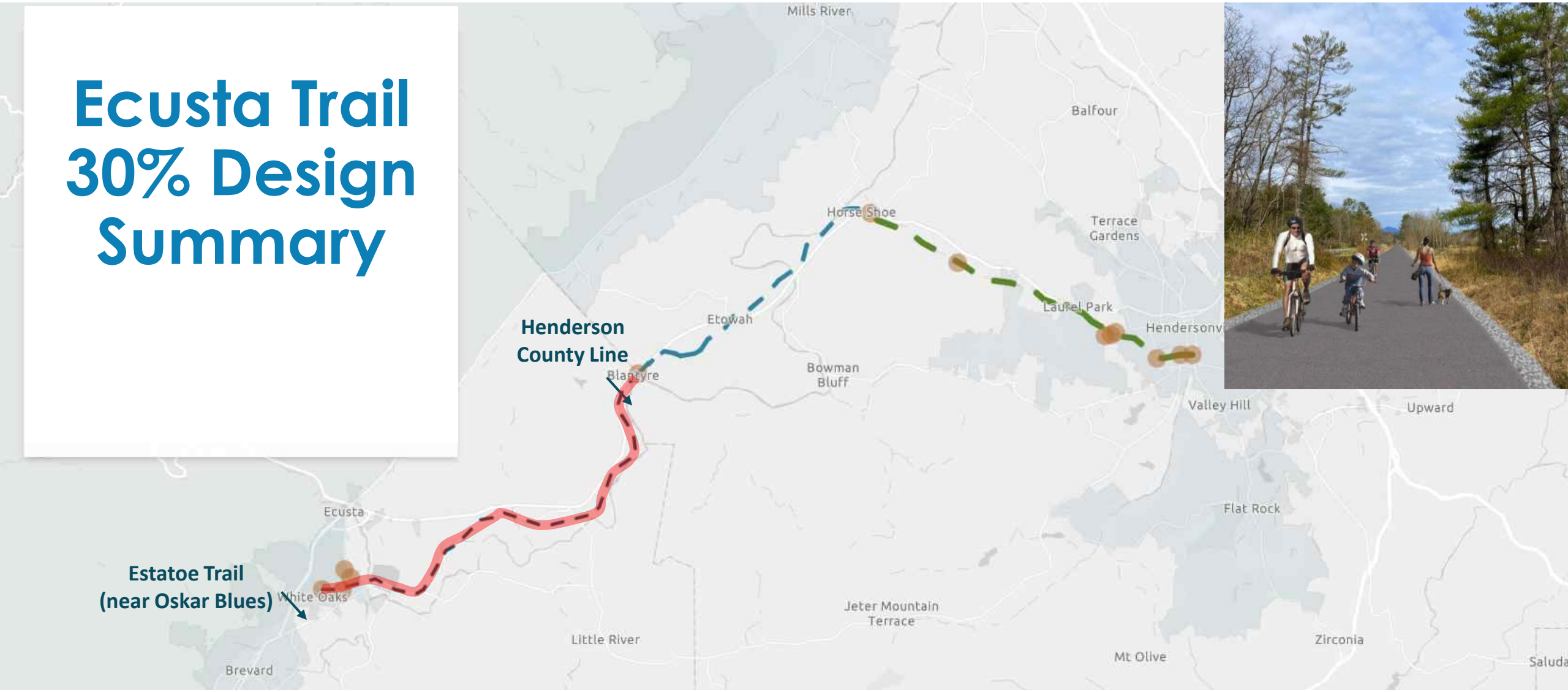
Ecusta Trail 30% Design Summary



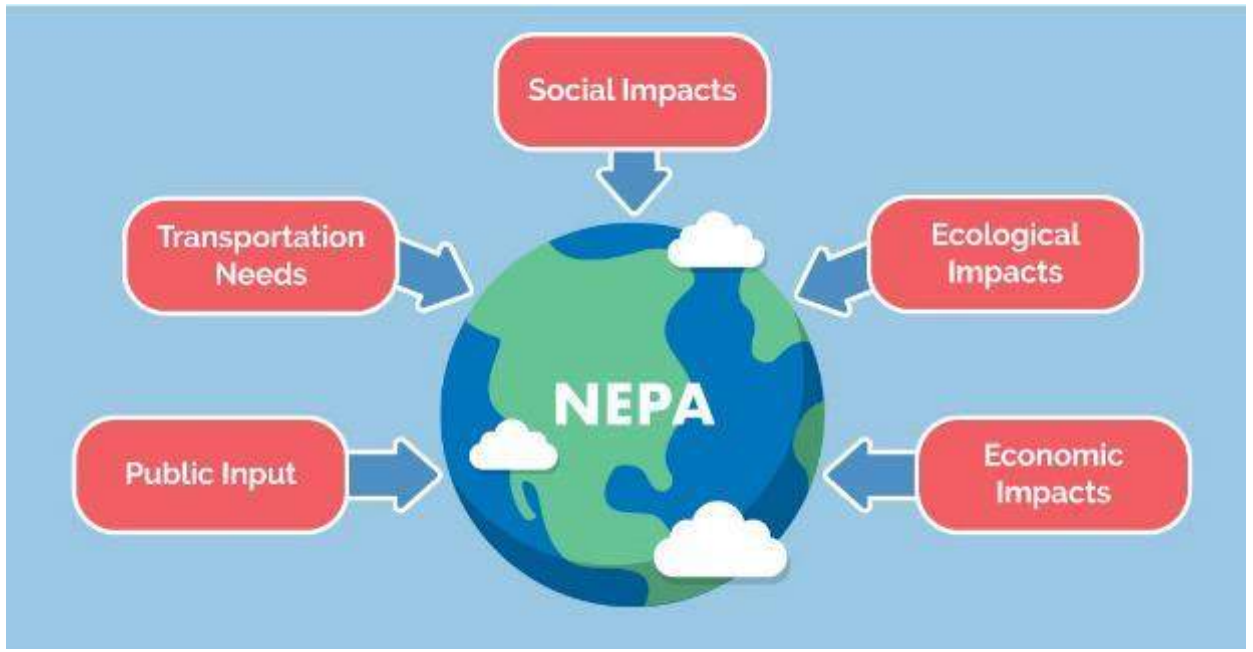
NCDOT Division 14 On-Call Consultant Team

NCDOT	**Lonnie Watkins, Project Manager**
TRAFFIC PLANNING AND DESIGN, INC.	Trail Design, Structures and Hydraulics
JMT	Survey, Utilities, Environmental
EQUINOX	Environmental
Public Participation Partners	Public Engagement for Environmental Document
Terracon	Geotechnical Investigations
WATERMARK LANDSCAPE ARCHITECTURE AND PLANNING CONSULTING	Landscape Architecture and Public Engagement Support

Federal Funding = Federal Requirements



We are here

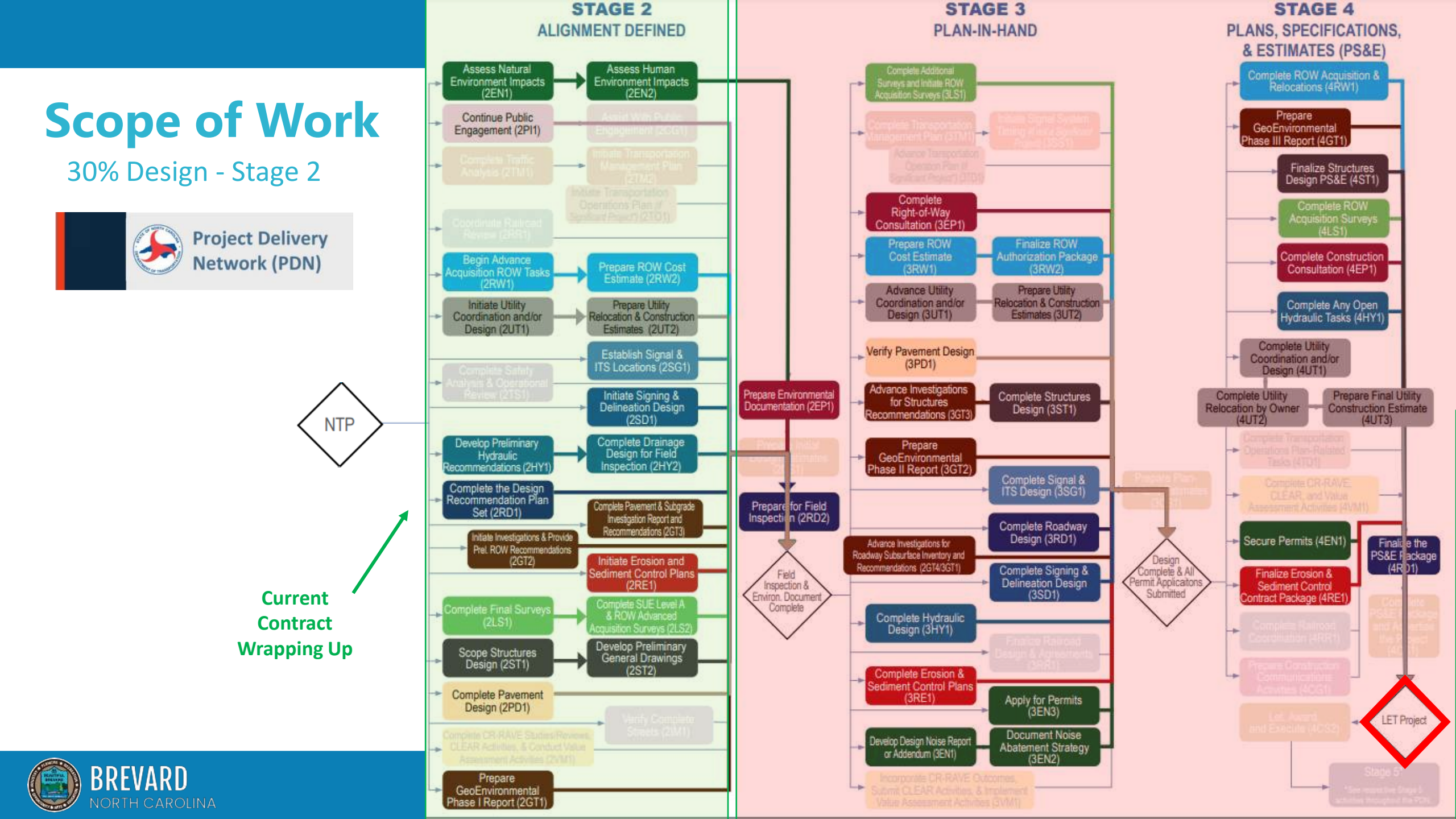


NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions.

Scope of Work

30% Design - Stage 2

Project Delivery Network (PDN)



BREVARD
NORTH CAROLINA

30% Design Status

June (this week)

- Finish 30% Design Plans – Design Model Converted to Plans w/ Labels in PDF Form
- Upload to NCDOT Website
- Submit Cost Estimate Request to NCDOT
- **All Preliminary Until NCDOT Reviews**



July

- **NCDOT Review**
- **NCDOT Cost Estimates**
- **Final Design Scoping Submission**

Additional Ongoing Tasks

Brownfield Environmental Management Plan

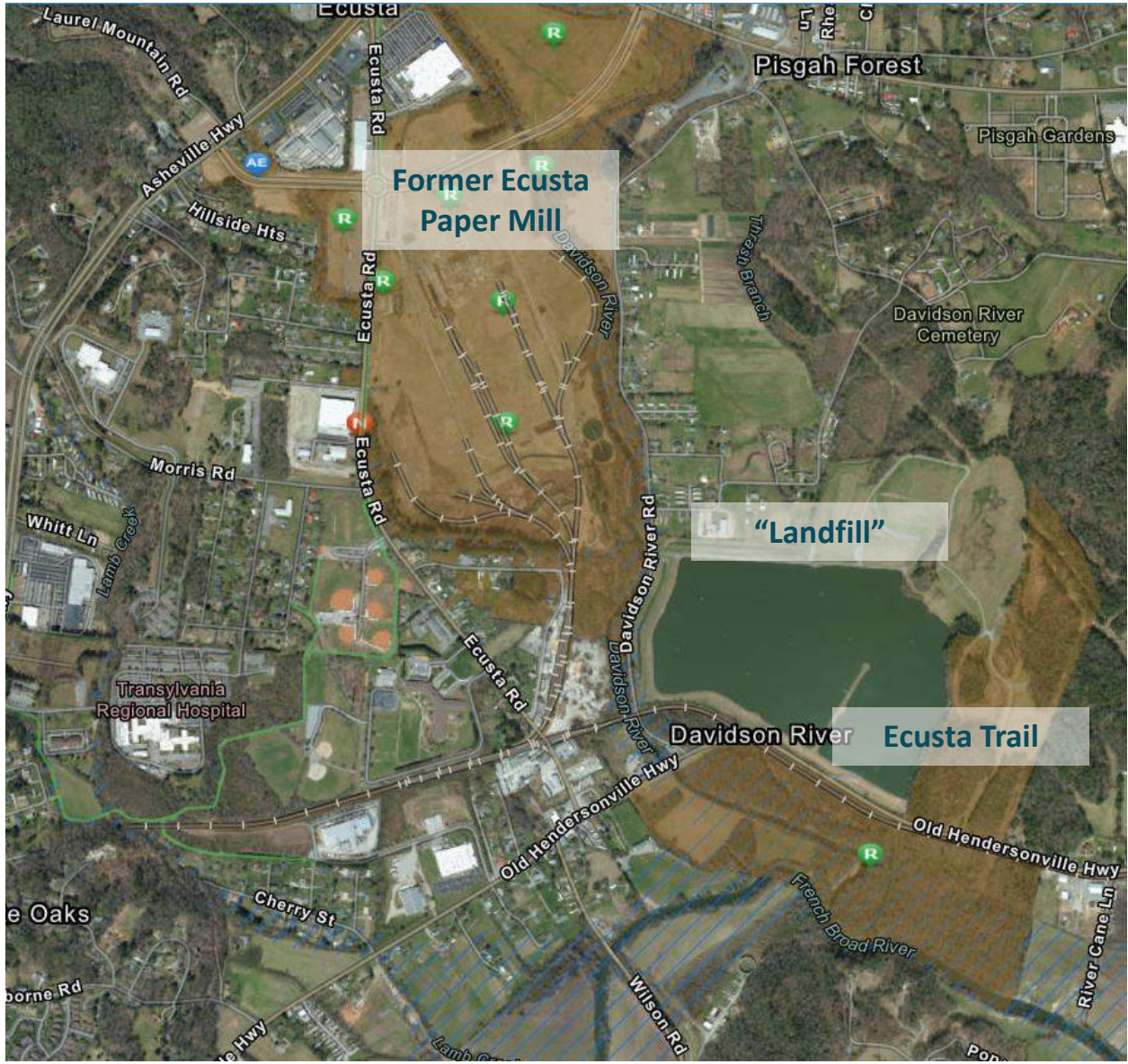
Environmental Documents – Archaeology and Natural Resources

Public Engagement

- July: Prepare Meeting Graphics and Website
- August: NCDOT Review
- Aug/Sept: Public Meeting Late Summer

Trail Amenities Work

- Field Visit this Week



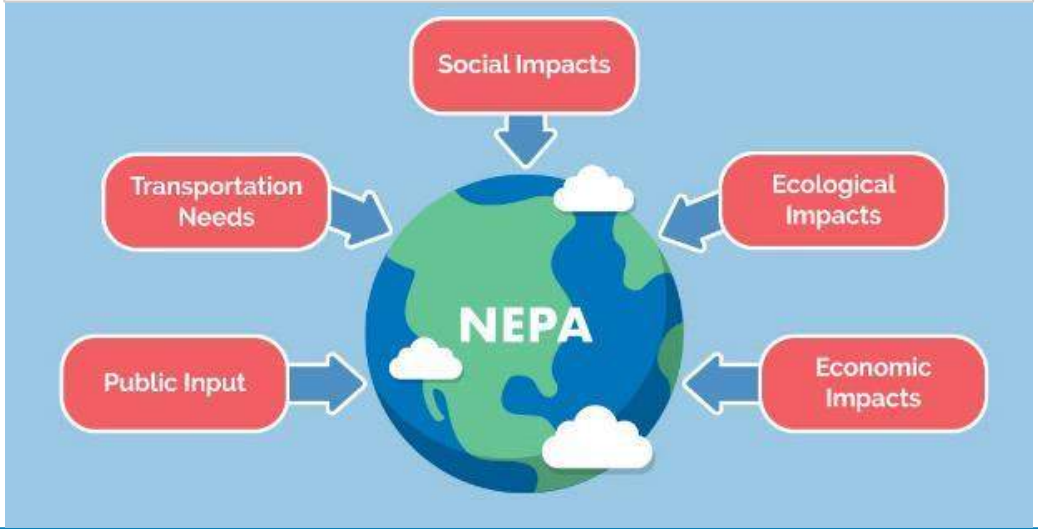
So what have we been up to?

30% Design Tasks Completed

- ✓ Set Design Standards (Width, Grades, Edge Conditions)
- ✓ Determine How to Fit the Trail on Existing Rail Bed
- ✓ Delineate Wetlands
- ✓ Screen for Environmental Impacts (NEPA)
- ✓ Investigate Ways to Minimize Impacts to the Surrounding Area (Homes, Driveways, Utilities, Streams, Wetlands, etc)
- ✓ Identify Elements for Final Design (Pipe Replacements, Retaining Walls, Grading Extents, Utility Relocations etc)
- ✓ Ensure Water Can Drain and Flood Levels Not Impacted
- ✓ Road Crossing Recommendations
- ✓ Bridge Inspection and Replacement Recommendations
- ✓ **Construction Cost Estimate (Led by NCDOT) - July**

These Tasks Determine Final Design Scope of Work





Setting Design Criteria

- **Trail Paved Width:** 12 feet
- **Graded shoulder:** 5 feet desired (3 feet min)
- **Running grade:** ≤ 5%
- **Cross-slope:** ≤ 2%
- **Typical shoulder grade:** 1V:12H (8%)
- **Trailside obstructions:** 2 foot offset (bushes/rocks/abutments/poles/signs)
- **Steep Slopes (≥1V:3H):** 5 foot minimum to top of slope
- **Possible barrier / fence:** Depending on height of drop
  - Slopes ≥ 1V:3H, ≥ 6 foot drop
  - Slopes ≥ 1V:3H, adjacent body of water/obstacle
  - Slopes ≥ 1V:2H, ≥ 4 foot drop
  - Slopes ≥ 1V:1H, ≥ 1 foot drop
- **Design Vehicle:** Ambulance

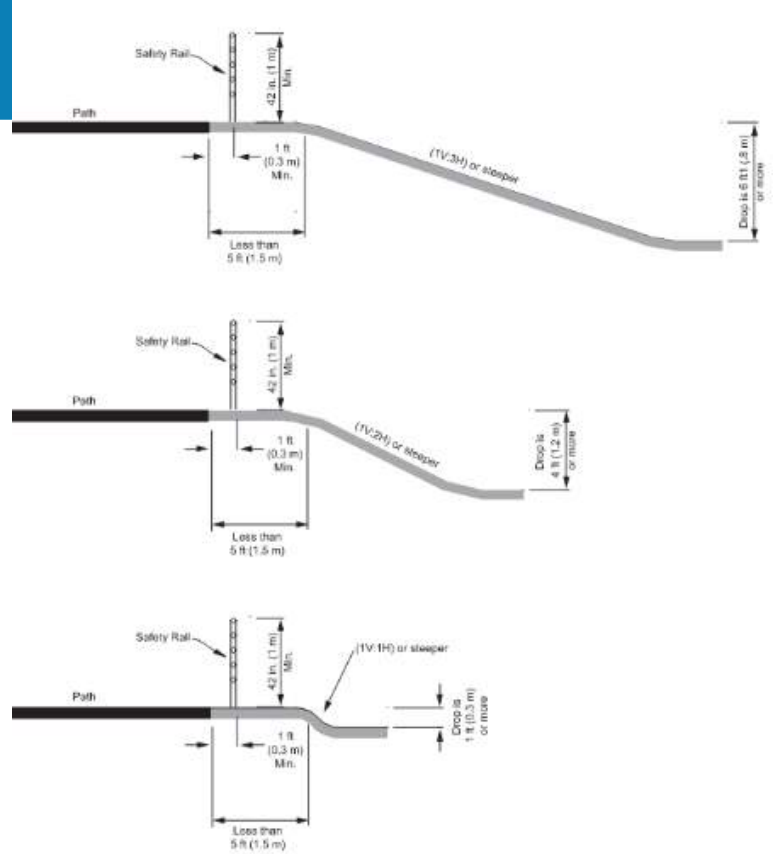
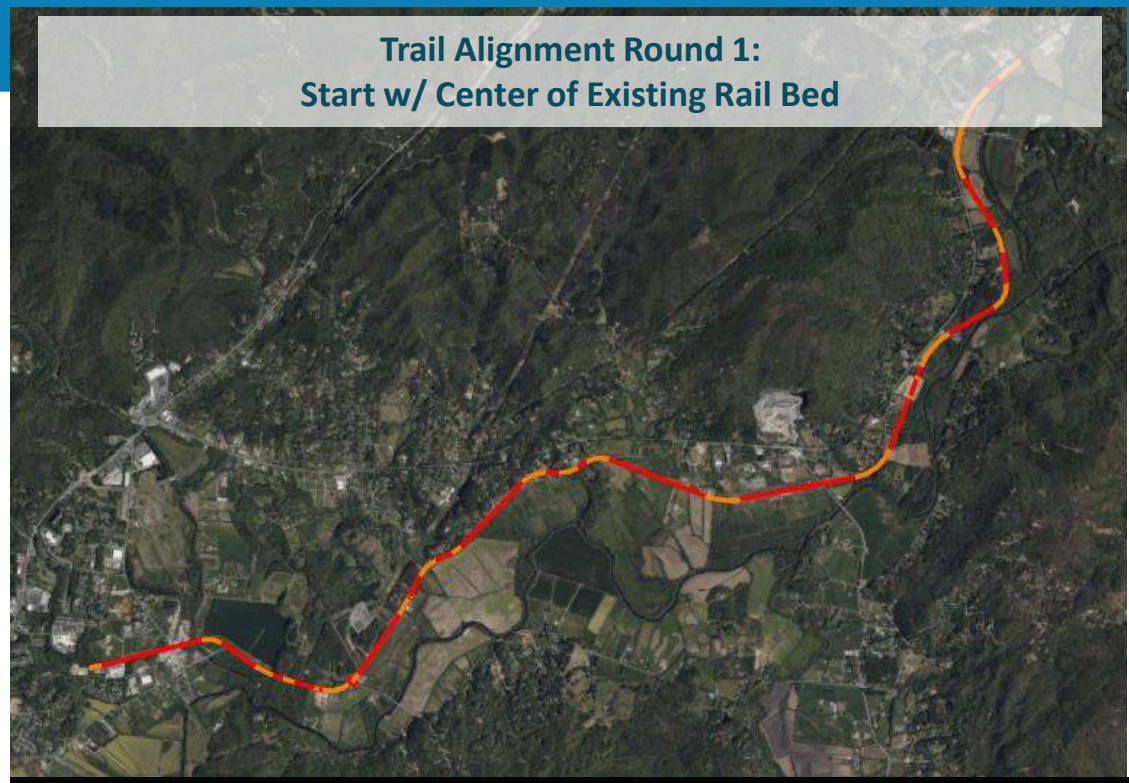


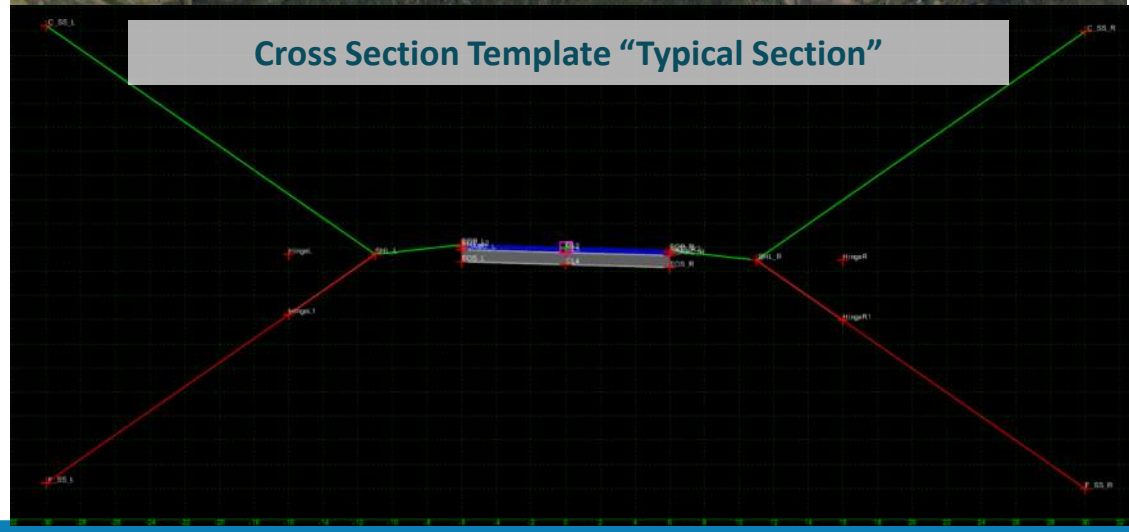
Figure 5-3. Safety Rail Between Path and Adjacent Slope



Design Model Overview

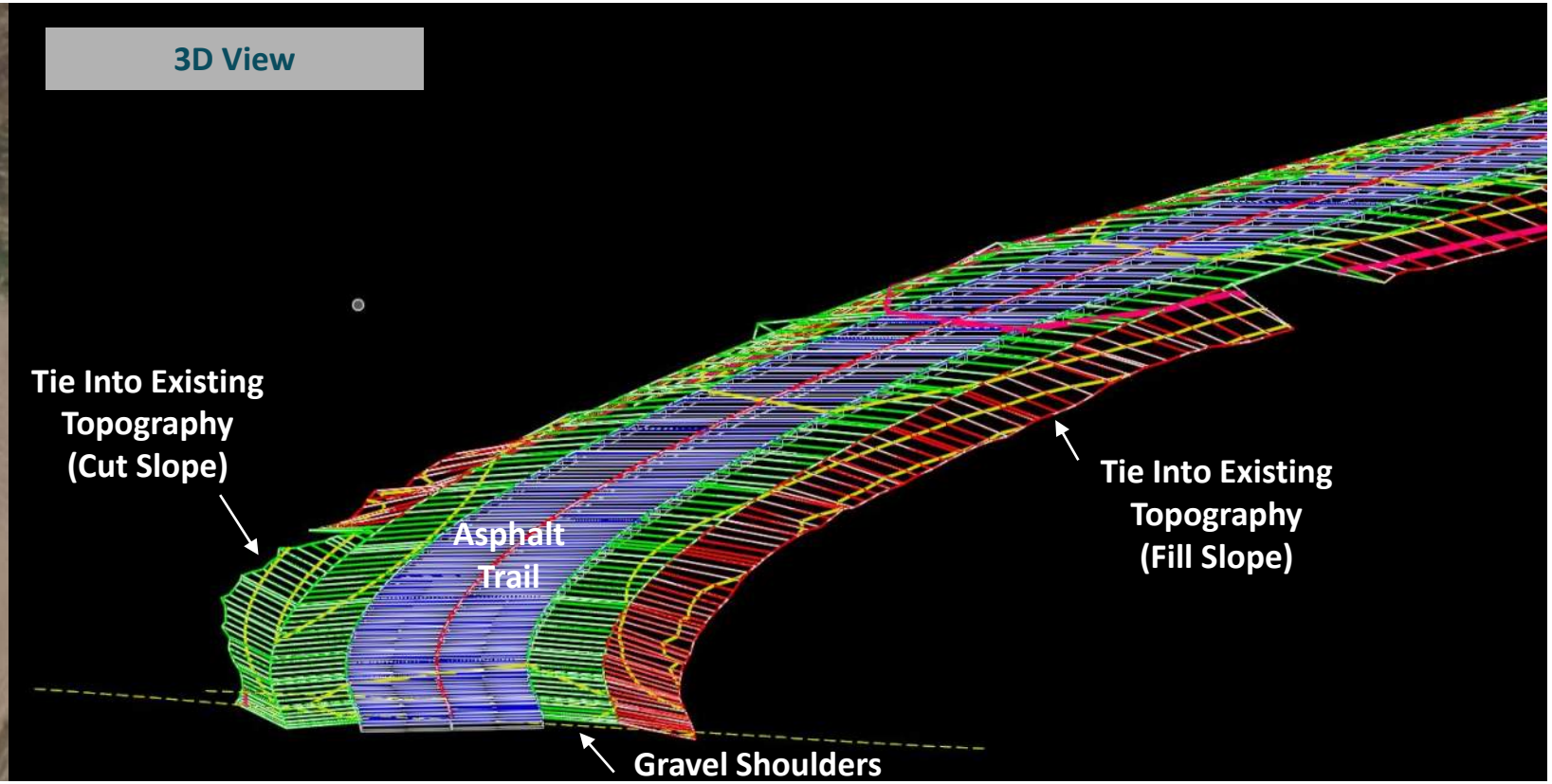
1. **Start with Existing Rail Bed Centerline**
2. **Apply a Cross Section Templates w/ Design Parameters**
   - 12’ Wide Asphalt Trail (Cross slope max 2% varies to left/right)
   - Set Depth of Pavement
   - 5’ Wide Gravel Shoulders @ 8% Cross slope
   - Set Tie In Parameters Beyond Shoulders (Defines cut and fill grading)





Resulting Surface Model

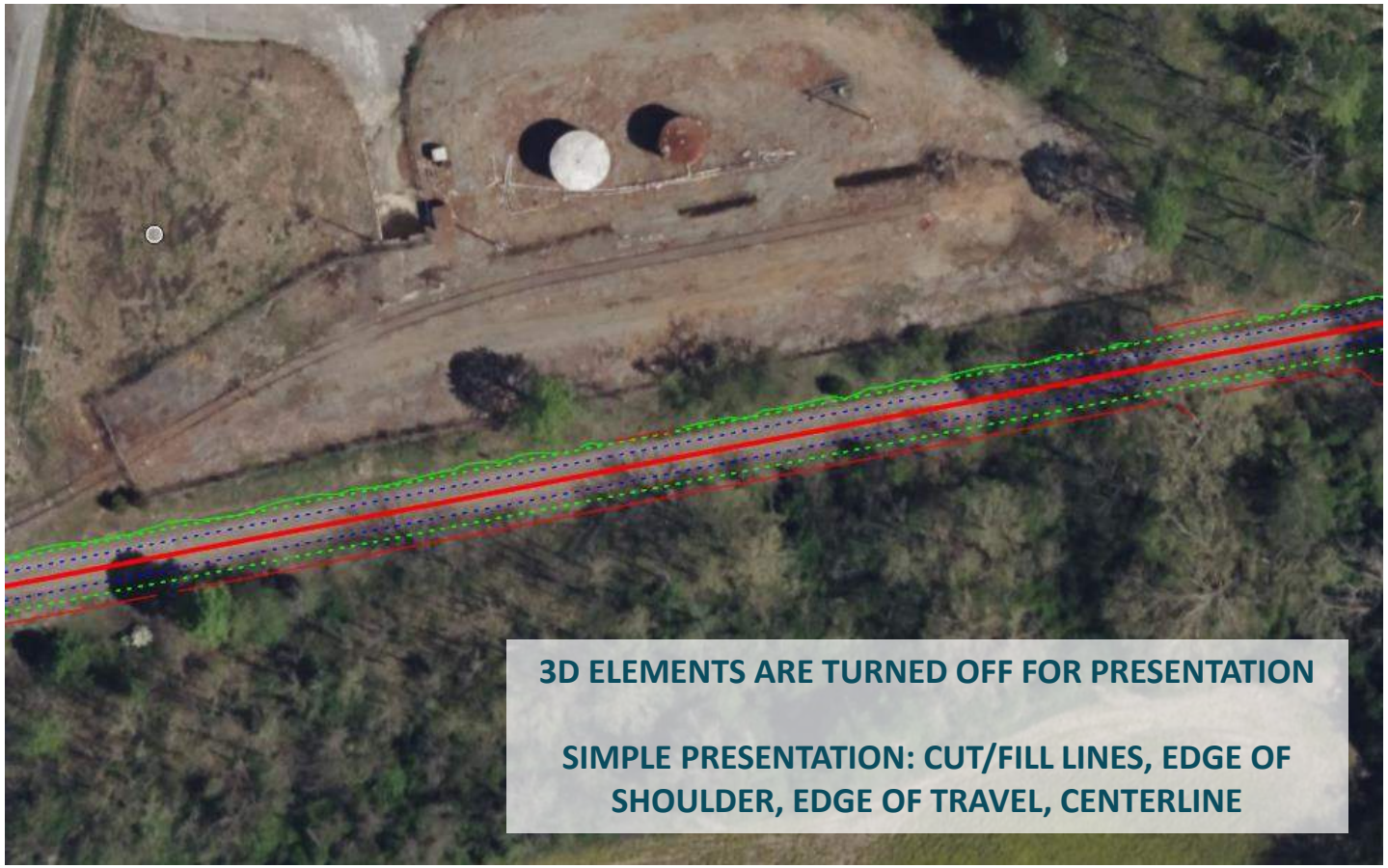




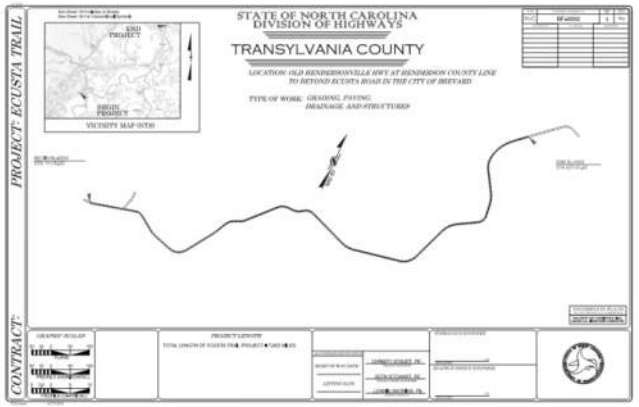
Refine Alignments and Plan Creation

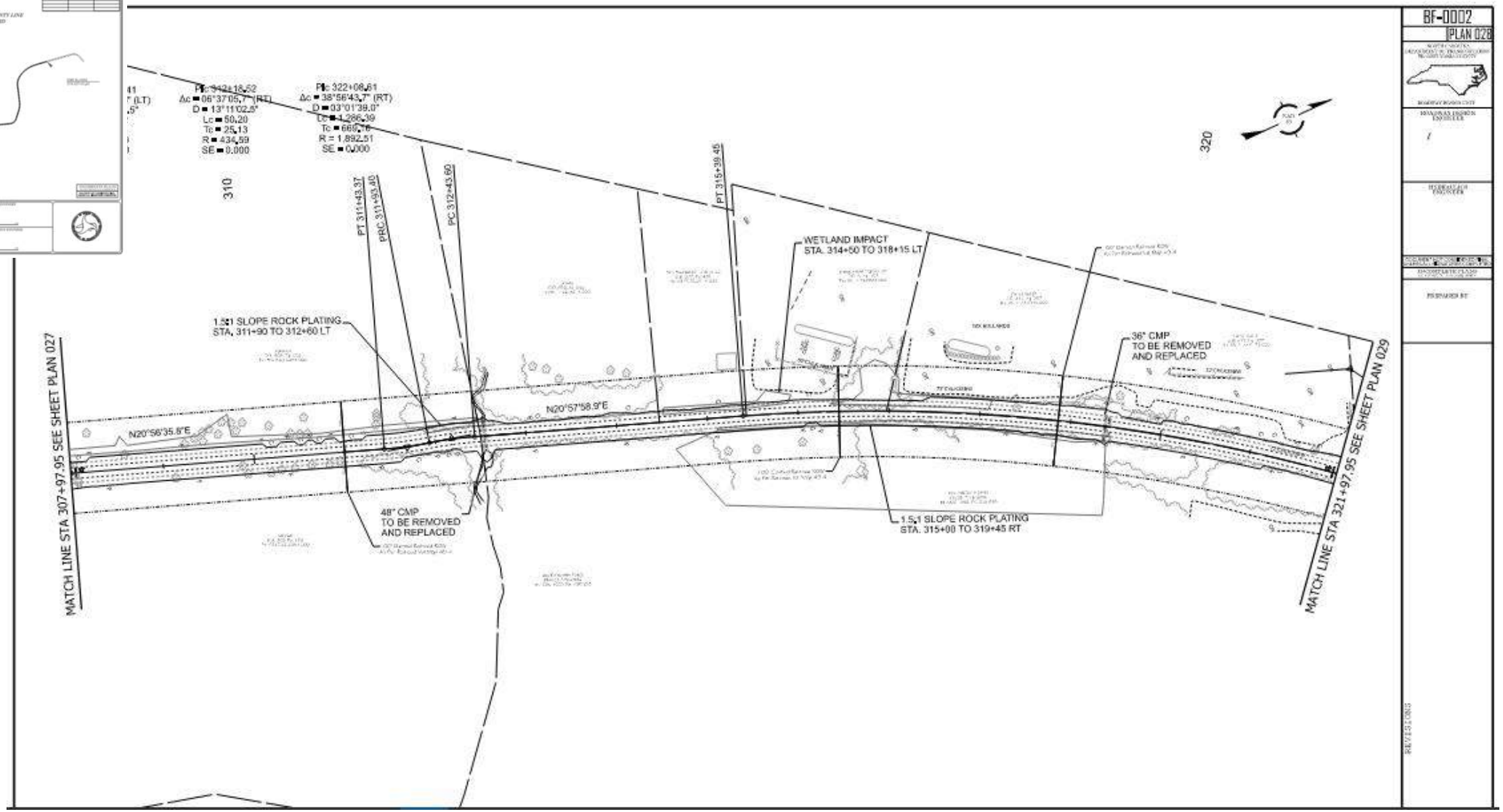
Detailed Review of 8 Miles of Trail

1. Alter vertical and horizonal alignment to avoid elements such as wetlands, streams, utilities and homes etc.
2. Identify walls, pipe headwalls etc.
3. Bridge tie in points modeled
4. Plan preparation (notes/labels)

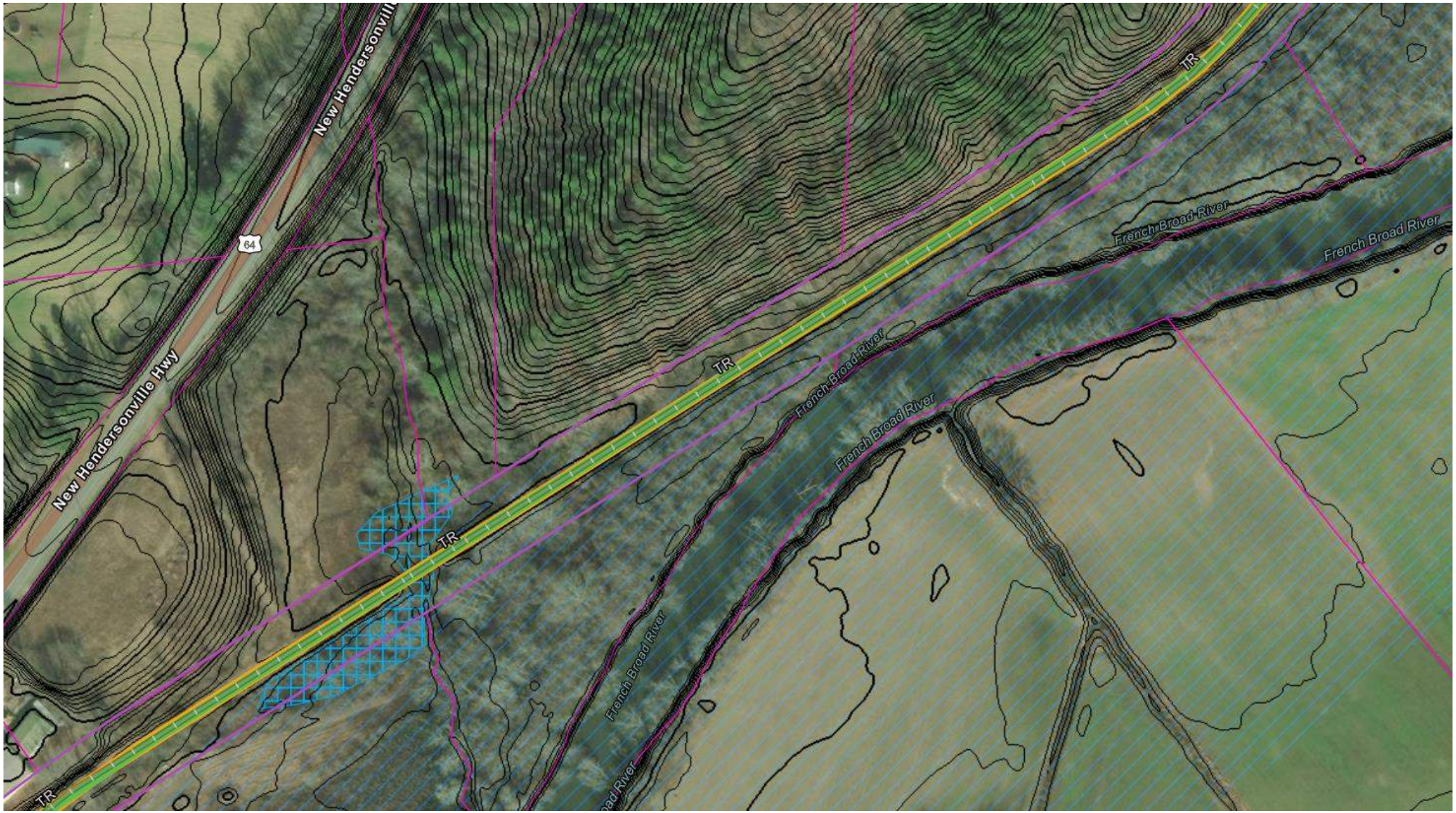


Example: Draft 30% Plan View





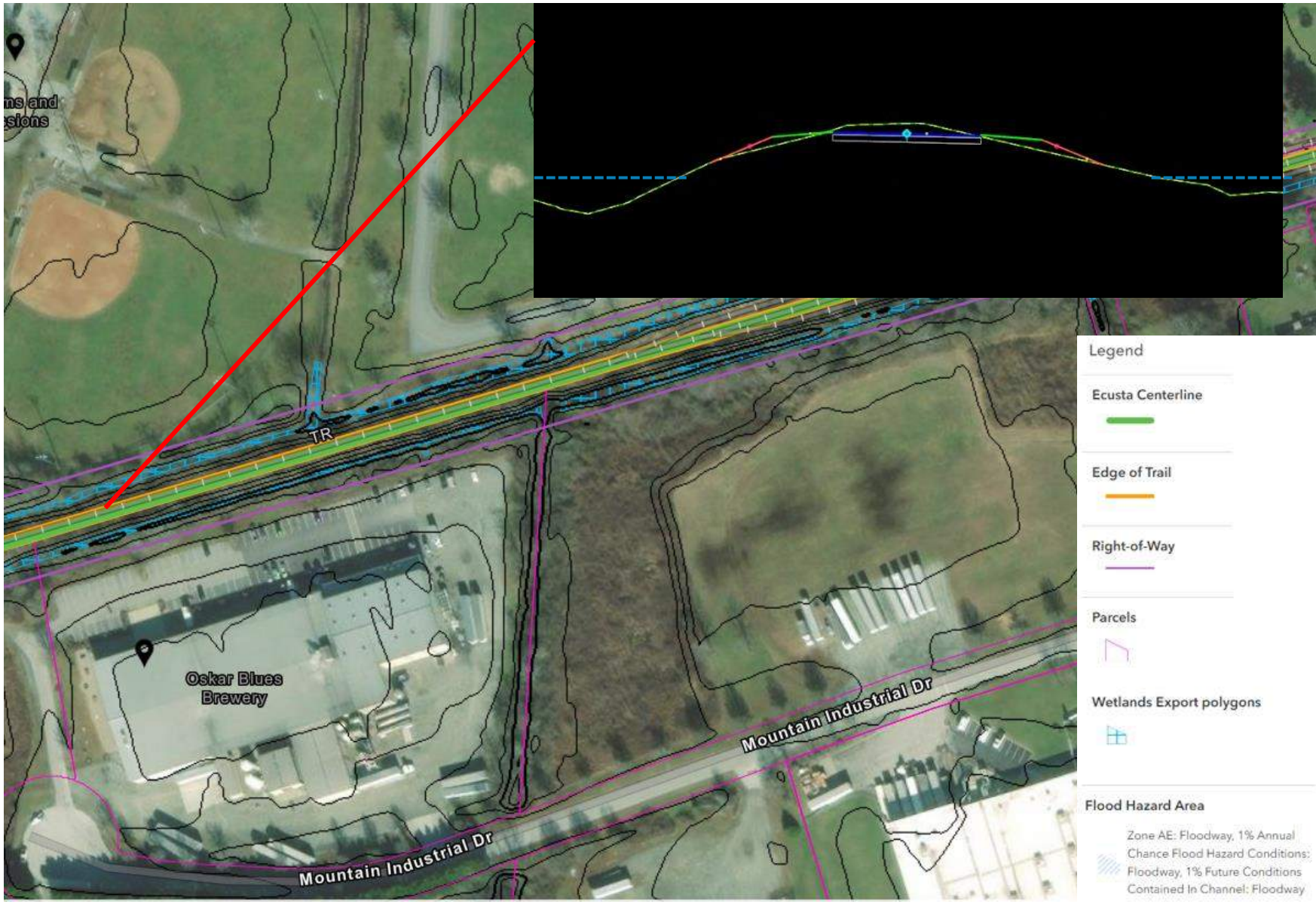
Public Meeting Materials – Will Be Easier to Read



Avoid Wetlands

Behind Oskar Blues

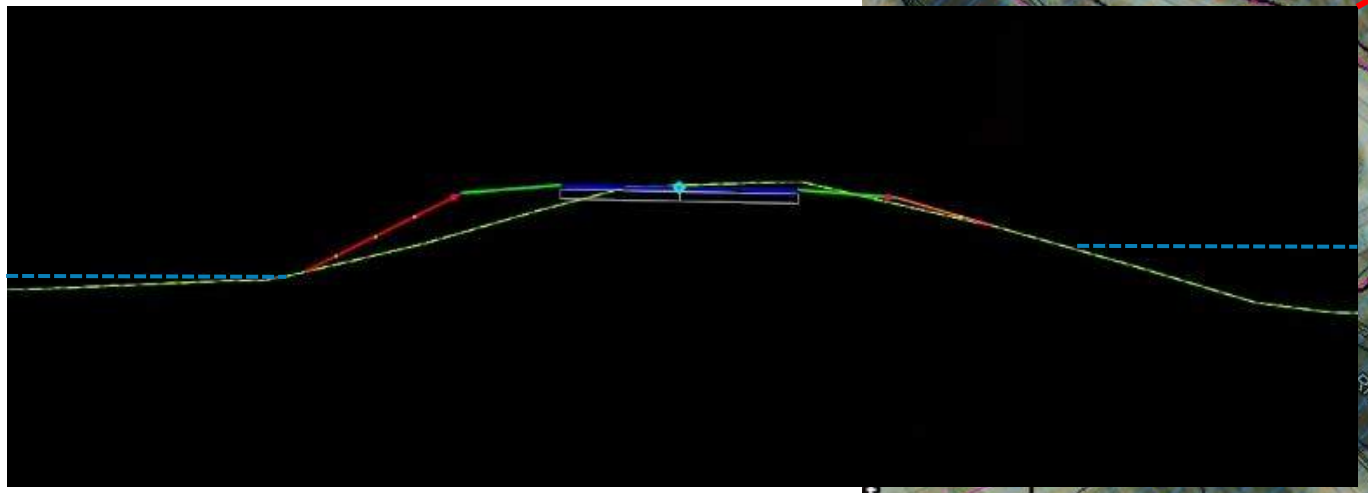
» Avoided with Horizontal and Vertical Trail Shifts

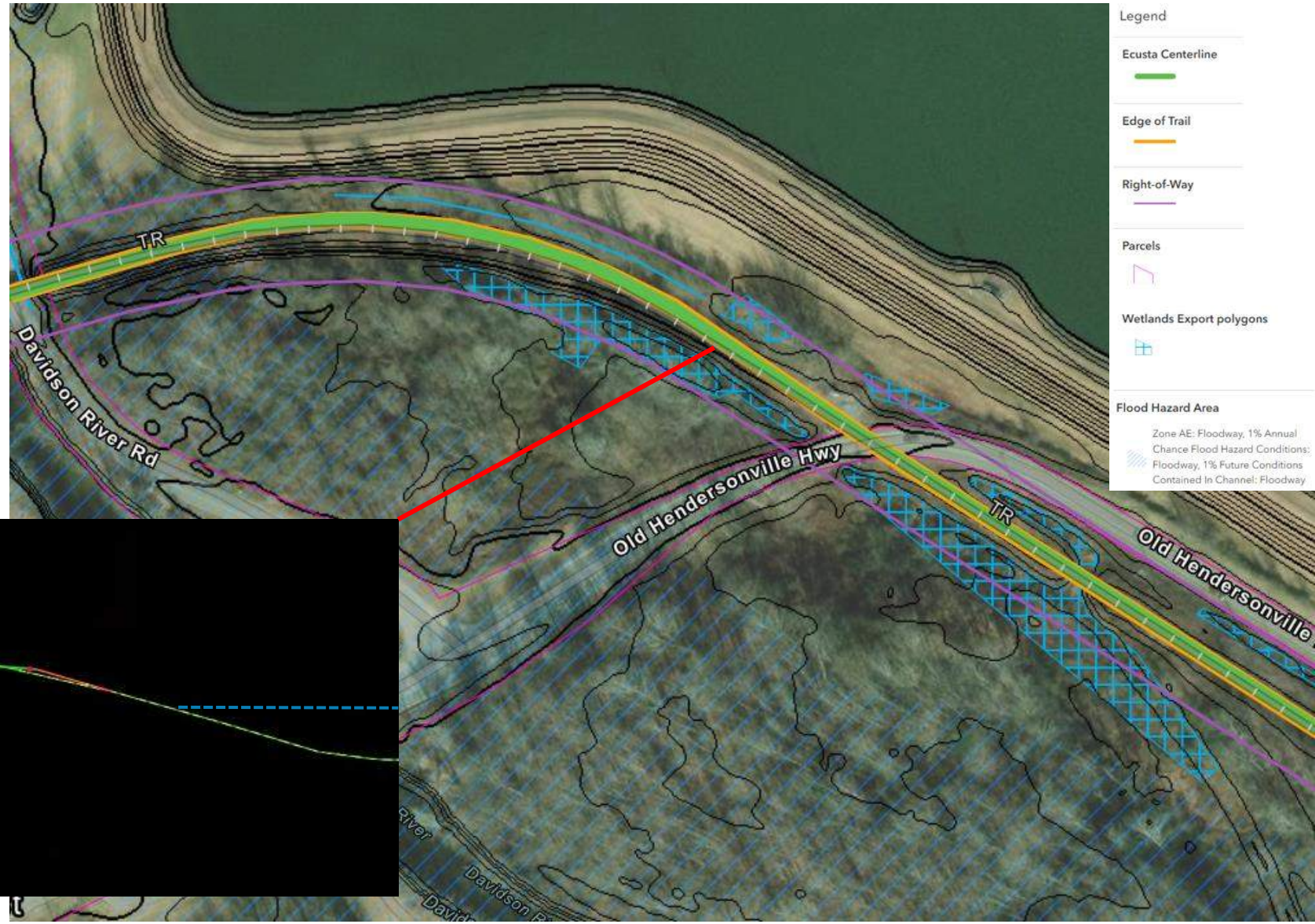


Avoid Wetlands

Crossing Old Hendersonville Highway

- Complicated by Crossing and Utilities
- Need to raise trail over Davidson River Road w/o filling wetlands





Other Impacts & Tradeoffs

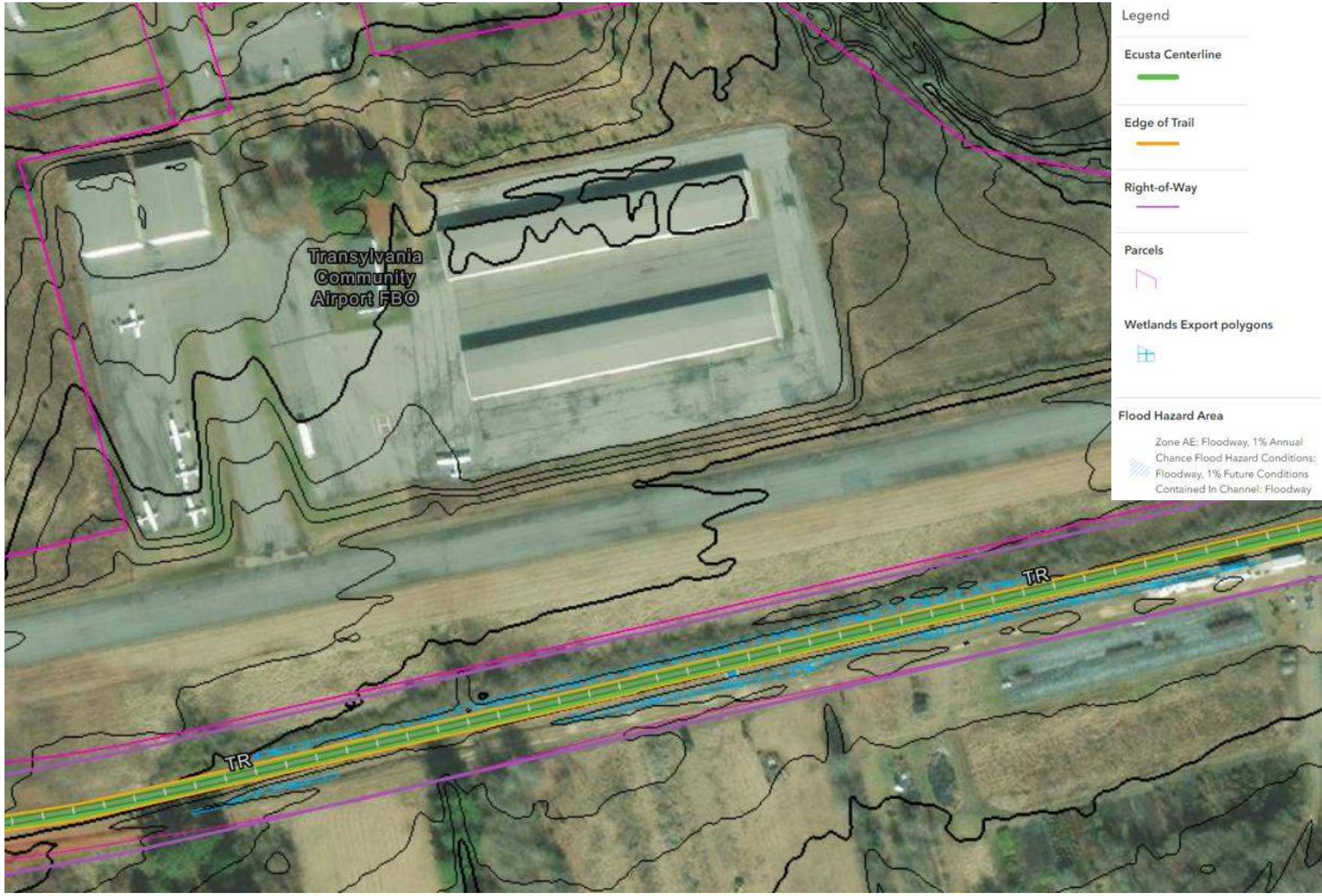




Calculate Wetlands Impacts

Example Behind Airport

- Impact Unavoidable
- Impact Lower Quality Wetlands
- Coordination with Airport (Fencing – Keep out of Wetlands)



Avoid Property Impacts

Near Everett Road

- Private Property/Driveways
- Utilities and Road
- Wetlands
- Drainage





Solutions – Final Design Tasks

- Horizontal Shift - North
- Separate Driveway with Grass and Fence or Landscaping
- Drainage Improvements



Drainage Needs and Utilities



Ecusta Centerline

Edge of Trail

Right-of-Way

Parcels

Wetlands Export points

Wetlands Export polylines

Wetlands Export polygons

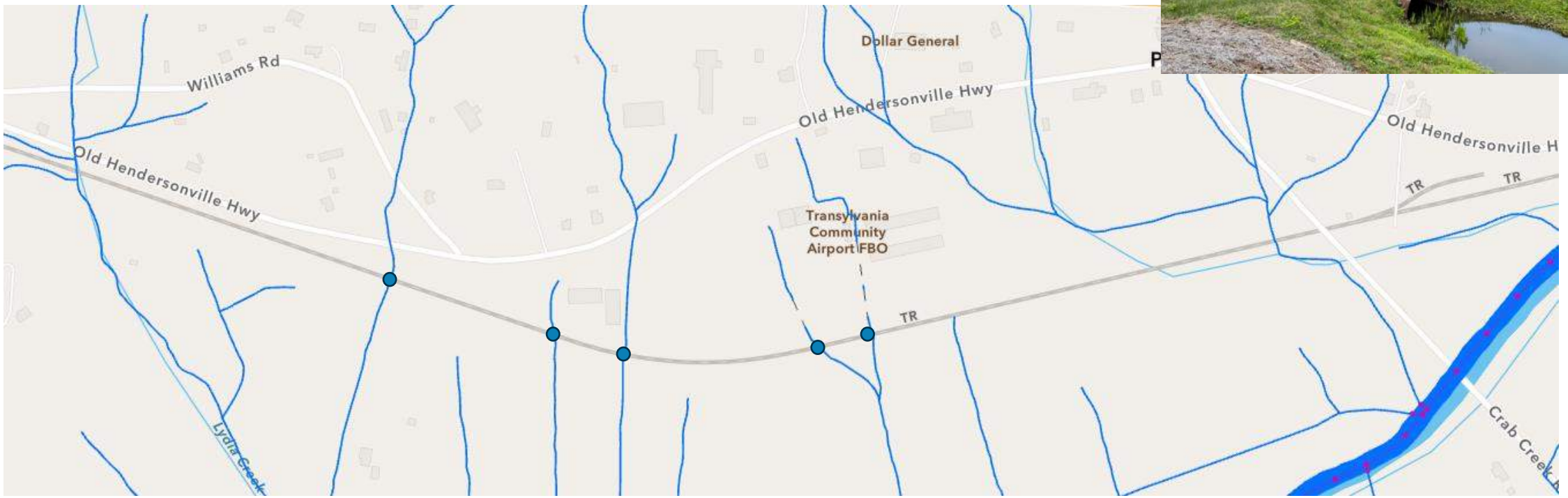
Flood Hazard Area

Zone AE: Floodway, 1% Annual Chance Flood Hazard Conditions: Floodway, 1% Future Conditions Contained In Channel: Floodway

Ensuring Water Drains

- Preliminary drainage design to ensure greenway alignment is set
- Analysis to determine preliminary hydraulic opening requirement
- Additional pipe replacements identified and included
- Review 8 miles of topography and grading (42 pipe crossings)





42 Pipes Evaluated

Most Corrugated Metal and in Poor Condition

30 Pipes to Replace with Reinforced Concrete Pipe (RCP)

Better for Trail Maintenance

Reduce Need to Disturb Trail to Replace Later

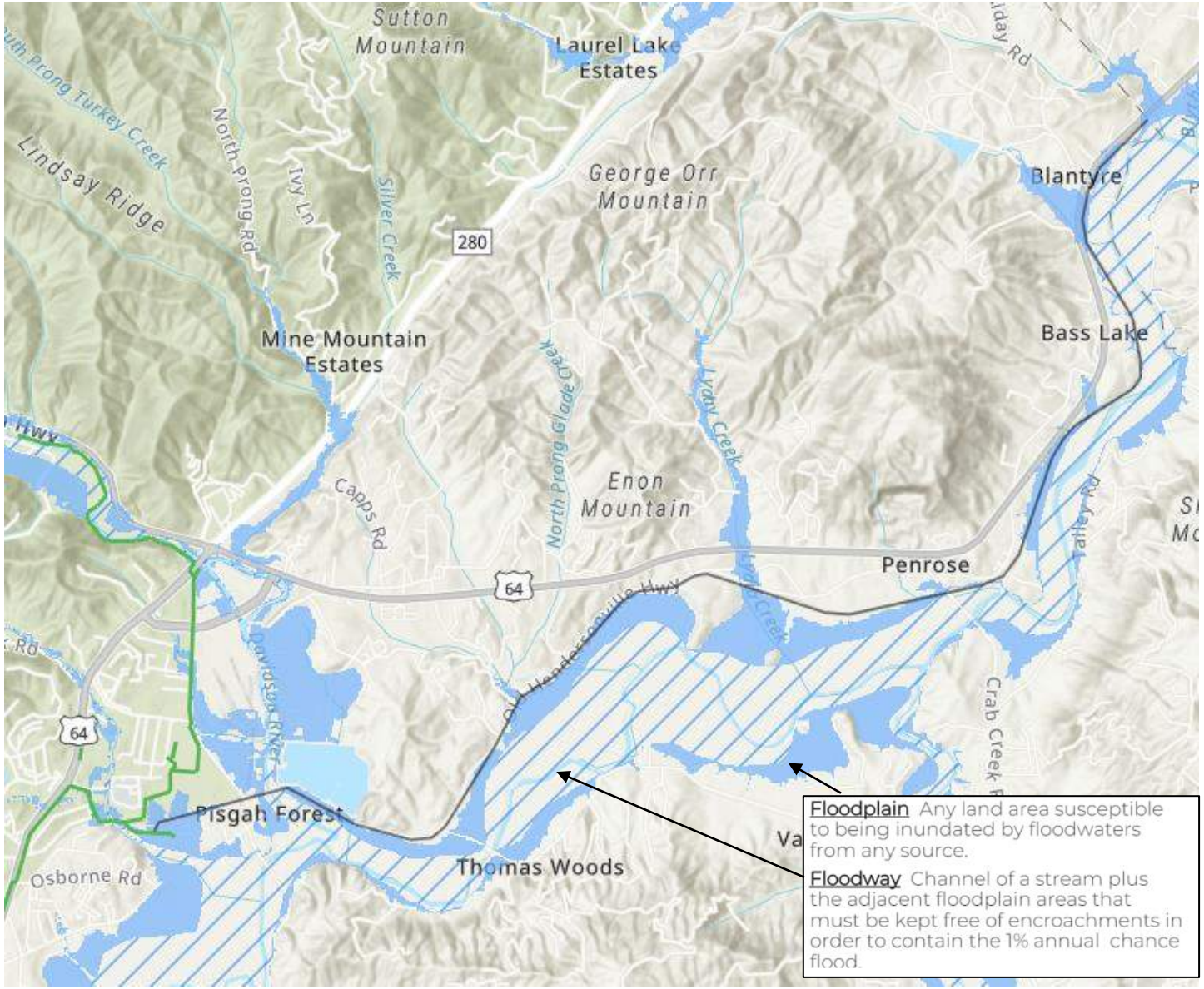
Number	Location	Pipe Type	Pipe Size (in)	Pipe Length (ft)	Invert Inlet	Invert Outlet	Treatment	Replace Type	Replace Size (in)	Replace Length (ft)	Inlet Treatment	Outlet Treatment
1	2618.77	CMP	60	42	2098.75	2098.28	Retain					838.28 Endwall
2	2627.69	CMP	60	42	2098.63	2098.27	Retain					838.28 Endwall
3	5591.36	CMP	36	45	2095.45	2095.23	Retain					
4	7132.06	CMP	72	38	2089.81	2087.18	Retain				Rock Plating Fill	838.39 or 838.80 Endwall
5	7582.47	CMP	24	27	2098.42	2097.84	Replace	RCP	24	38	840.31 Junction Box	CL I Rip-Rap
6	8031.14	CMP	24	20	2096.63	2096.43	Replace	RCP	24	30	840.14 Inlet w 840.29 Grate	CL I Rip-Rap
7	11143.58	CMP	36	30	2090.02	2088.14	Replace	RCP	30	32	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
8	11550	WOOD	N/A	N/A		2088.02	2088.2	Replace	RCP	36	38	838.80 Endwall
9	11696.11	RCP	36	36	2085.44	2084.8	Retain					838.80 Endwall w CL I Rip-Rap
10	12741.47	CMP	36	36	2090.72	2090.1	Retain					CL I Rip-Rap
11	14931.78	CMP	36	30	2094.32	2093.02	Replace	RCP	36	45	838.80 Endwall	CL I Rip-Rap
12	15579.84	CMP	18	24	2100.64	2099.75	Replace	RCP	24	30	840.14 Inlet w 840.29 Grate	CL I Rip-Rap
13	15834.93	CMP	24	24	2094.84	2092.42	Replace	RCP	24	35		CL I Rip-Rap
14	16235.35	CMP	30	30	2086.27	2085.51	Replace	RCP	36	35		CL I Rip-Rap
15	16662.22	RCP	24	37	2083.39	2081.5	Retain					
16	17040.4	RCP	36	24	2084	2084.07	Replace	RCP	36	40	838.80 Endwall	CL I Rip-Rap
17	17441.28	CMP	18	28	2089.37	2087.31	Replace	RCP	18	30		CL I Rip-Rap
18	17981.03	CMP	36	40	2090.7	2089.02	Retain				HW Built into retaining structure	
19	18386.53	RCP	24	80	2098.51	2091.99	Retain					
20	18866.16	CMP	36	30	2117.28	2114.16	Replace	RCP	36	45	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
21	21340.29	CMP	30	54	2087.57	2086.26	Replace	RCP	30	55	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
22	22335.5	RCP	30	25	2096.22	2094.71	Retain					
23	22612.51	CMP	36	30	2098.07	2097.83	Replace	RCP	36	30		CL I Rip-Rap
24	23113	CMP	24	22	2097.92	2097.55	Replace	RCP	24	28	840.14 Inlet w 840.29 Grate	840.14 Inlet w 840.29 Grate
25	23430.38	HDPE	24	27	2094.65	2094.17	Retain					
26	24469.27	RCP	18	17	2095.13	2094.33	Replace	RCP	24	30	840.14 Inlet w 840.29 Grate	CL I Rip-Rap
27	24544.49	CMP	24	19	2094.12	2093.52	Replace	RCP	24	30	840.14 Inlet w 840.29 Grate	CL I Rip-Rap
28	26692.85	CMP	24	52	2082.77	2081.78	Replace	RCP	24	60	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
29	27453.29	RCP	18	39	2083.14	2081.23	Retain					
30	29403.78	CMP	40	30	2085.77	2085.53	Replace	RCP	48	35	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
31	30122.05	CMP	36	30	2079.37	2078.11	Replace	RCP	36	30	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
32	30548	WOOD	N/A		30	2078.12	2077	Replace	RCP	36	30	838.80 Endwall w CL I Rip-Rap
33	31253.97	CMP	48	30	2078.7	2078.26	Replace	RCP	48	30	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
34	31937.5	CMP	36	28	2078.17	2078.04	Replace	RCP	36	30		CL I Rip-Rap
35	32418.83	CMP	36	30	2080.71	2080.05	Replace	RCP	36	35		838.80 Endwall w CL I Rip-Rap
36	34317..49	CMP	24	26	2080.96	2080.49	Replace	RCP	24	35		CL I Rip-Rap
37	35052.11	CMP	24	24	2085.39	2084.2	Replace	RCP	24	35		CL I Rip-Rap
38	36166.86	CMP	36	30	2076.24	2075.69	Replace	RCP	36	35	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
39	36786.9	CMP	24	22	2072.68	2072.28	Replace	RCP	24	35	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
40	37490.12	CMP	36	30	2075.17	2074.96	Replace	RCP	36	35	838.80 Endwall	838.80 Endwall w CL I Rip-Rap
41	40845.61	CMP	36	36	2080.5	2078.61	Replace	RCP	36	40	838.80 Endwall	840.14 Inlet w 840.29 Grate
42	41254.82	CMP	36	30	2073.49	2072.88	Replace	RCP	36	32	838.80 Endwall	838.80 Endwall w CL I Rip-Rap

Floodway Modelling Scope of Work

FEMA Detailed Study Areas Included

- Davidson River – Multiple Scenarios for Bridge Replacement
- French Broad River – Multiple Scenarios for Trail Alignment

Flood Modeling for Bridge Crossings (Includes Several FEMA Detailed Study Areas)



Why?

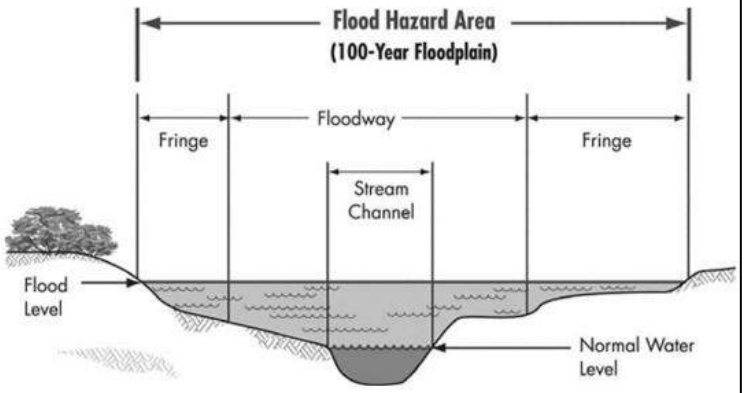
National Flood Insurance Program (NFIP)

Goal - reduce the impact of flooding on private and public structures.

- Study area streams are designated as being in a FEMA Flood Hazard Area.
- Any work within a designated Flood Hazard Area must be in compliance with the National Flood Insurance Program (NFIP).
- **No road or structure shall be constructed, improved, or removed within a designated regulatory floodway or non-encroachment area without a regulatory review and approval**.

Special Flood Hazard Area (SFHA) Definitions

- Special Flood Hazard Area (SFHA) is the land in the floodplain subject to a one percent (1%) or greater chance of being flooded in any given year.
- Floodplain Any land area susceptible to being inundated by floodwaters from any source.
- Floodway Channel of a stream plus the adjacent floodplain areas that must be kept free of encroachments in order to contain the 1% annual chance flood.



- Non-Encroachment Area (not shown on the maps) serve the same function as a floodway in *Limited Detailed Studies*. Construction, placement of fill, or similar alteration of topography may be prohibited by a community due to the effects such development would have on the conveyance of discharge.

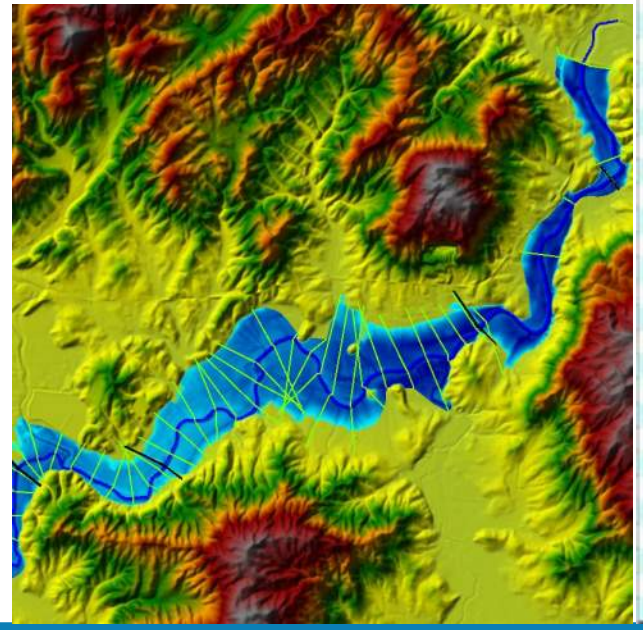
Hydraulic Modeling Results

Current Design Goal - No Rise in Floodway Study Areas

Preliminary Runs Completed – No Significant Impacts

Next Steps

- Revise with Final Design Files
- Floodway Study Required for Permitting – No Rise Documentation



Example Findings for Davidson River

TPD - Traffic Planning & Design

Job No: NCCO 07 | Computed By: BAD | Date: 6/24/24
Description: Davidson River | Checked By: | Date:

FEMA Model 100-Year Floodplain Water Surface Comparison for Davidson River

Note: All elevations below are based on the 100 year floodplain.

Transylvania County FEMA FIRM and FIS Label	FEMA HEC-RAS River Station Label	Effective HEC-RAS Model WSEL NAVD88 (ft.)	HEC-RAS River Station	FIRM & FIS	Duplicate Effective Model Difference from Effective		Corrected Effective		Proposed Conditions	
				WSEL NAVD88 (ft.)	WSEL NAVD88 (ft.)	Difference from Eff (ft.)	WSEL NAVD88 (ft.)	Difference from Dup Eff (ft.)	WSEL NAVD88 (ft.)	Difference from Corr Eff (ft.)
104	10366	2129.05	10365.7	2129.00	2128.98	-0.07	2128.98	0.00	2128.98	0.00
-	9906.354	2127.68	9906.354	-	2127.66	-0.02	2127.66	0.00	2127.66	0.00
099	9857.291	2127.59	9857.291	2127.60	2127.59	0.00	2127.59	0.00	2127.59	0.00
-	9795.8	-	9795.8	-	-	-	-	-	-	-
-	9734.26	2127.41	9734.26	-	2127.41	0.00	2127.41	0.00	2127.41	0.00
-	9542.421	2126.46	9542.421	-	2126.46	0.00	2126.46	0.00	2126.46	0.00
091	9079.542	2124.64	9079.542	2124.60	2124.65	0.01	2124.65	0.00	2124.65	0.00
-	8619.56	2121.3	8619.56	-	2121.33	0.03	2121.33	0.00	2121.33	0.00
-	8151.772	2120.1	8151.772	-	2120.15	0.05	2120.15	0.00	2120.15	0.00
081	8118.554	2119.61	8118.554	2119.60	2119.66	0.05	2119.66	0.00	2119.66	0.00
-	8102.5	-	8102.5	-	-	-	-	-	-	-
-	8086.426	2118.91	8086.426	-	2118.90	-0.01	2118.90	0.00	2118.90	0.00
080	8011.382	2118.59	8011.382	2118.60	2118.59	0.00	2118.59	0.00	2118.59	0.00
-	7816.033	2117.53	7816.033	-	2117.52	-0.01	2117.52	0.00	2117.52	0.00
078	7756.203	2117.4	7756.203	2117.40	2117.39	0.0	2117.39	0.00	2117.39	0.00
-	7738.15	-	7738.15	-	-	-	-	-	-	-
-	7720.109	2117.22	7720.109	-	2117.22	0.00	2117.22	0.00	2117.22	0.00
-	7614.347	2116.58	7614.347	-	2116.58	0.00	2116.58	0.00	2116.58	0.00
067	6674.658	2114.61	6674.658	2114.60	2114.61	0.00	2114.61	0.00	2114.61	0.00
056	5647.164	2110.94	5647.164	2110.90	2110.94	0.00	2111.00	0.06	2110.88	-0.12
047	4651.753	2108.92	4651.753	2108.90	2108.92	0.00	2109.08	0.16	2108.74	-0.34
-	3676.459	2107.35	3676.459	-	2107.36	0.01	2107.72	0.36	2106.70	-1.02
-	2973.526	2106.89	2973.526	-	2106.90	0.01	2107.34	0.44	2106.02	-1.32
029	2935.268	2106.49	2935.268	2106.50	2106.50	0.01	2107.04	0.54	2104.69	-2.35
-	2917.25	-	2917.25	-	-	-	-	-	-	-
-	2899.182	2104.13	2899.182	-	2104.13	0.00	2104.13	0.00	2104.13	0.00
-	2822.206	2103.91	2822.206	-	2103.91	0.00	2103.91	0.00	2103.91	0.00
-	2484.036	2103.55	2484.036	-	2103.55	0.00	2103.55	0.00	2103.55	0.00
024	2434.04	2102.41	2434.04	2103.30	2102.41	0.00	2102.41	0.00	2102.41	0.00
-	2412.98	-	2412.98	-	-	-	-	-	-	-
-	2391.914	2101.22	2391.914	-	2101.20	-0.02	2101.20	0.00	2101.20	0.00
-	2296.401	2100.33	2296.401	-	2100.35	0.02	2100.35	0.00	2100.35	0.00
-	1598.483	2098.9	1598.483	-	2098.90	0.00	2098.90	0.00	2098.90	0.00
-	776.319	2098.08	776.319	-	2098.08	0.00	2098.08	0.00	2098.08	0.00

Roadway Crossings/Safety

Various Types of Crossings in Study Area

- Farm Access
- Low Volume Driveways
- T Intersections with Stop Signs
- Uncontrolled Crossing of Roads
  - ✓ Analysis completed – Federal Standards



Pending DOT Review

FHWA Tables

Countermeasure Factors

- Traffic Volume Per Day
- Speed Limit
- Number of Travel Lanes / Crossing Distance

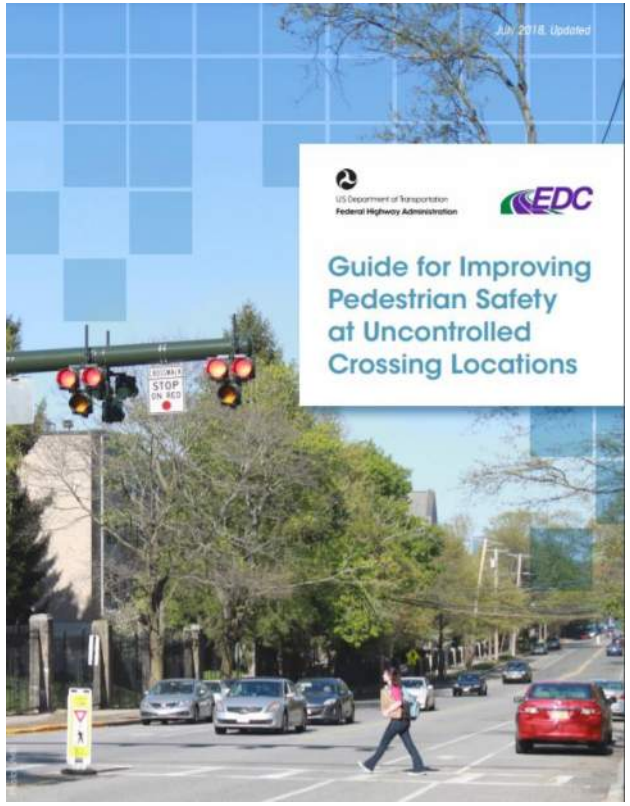


Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	● 2 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6	● 5 6 7 9	○ 5 6 ● 9	● 4 5 6 7 9	○ 5 6 7 9	○ 5 6 ● 9
3 lanes with raised median (1 lane in each direction)	● 2 3 4 5 ● 7 9	● 3 5 7 9	○ 3 5 ● 9	○ 3 4 5 7 9	○ 3 5 ● 9	○ 3 5 ● 9	○ 3 4 5 7 9	○ 3 5 7 9	○ 3 5 ● 9
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	● 2 3 4 5 6 7 9	● 3 5 6 7 9	○ 3 5 6 ● 9	○ 3 4 5 6 7 9	○ 3 5 6 ● 9	○ 3 5 6 ● 9	○ 3 4 5 6 7 9	○ 3 5 6 7 9	○ 3 5 6 ● 9
4+ lanes with raised median (2 or more lanes in each direction)	● 3 5 7 8 9	● 3 5 7 8 9	○ 3 5 8 ● 9	○ 3 5 7 8 9	○ 3 5 ● 8 9	○ 3 5 8 ● 9	○ 3 5 ● 7 8 9	○ 3 5 7 8 9	○ 3 5 8 ● 9
4+ lanes w/o raised median (2 or more lanes in each direction)	● 3 5 6 7 8 9	○ 3 5 6 7 8 9	○ 3 5 6 8 ● 9	○ 3 5 6 7 8 9	○ 3 5 6 ● 8 9	○ 3 5 6 8 ● 9	○ 3 5 6 ● 7 8 9	○ 3 5 6 7 8 9	○ 3 5 6 8 ● 9

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

*Refer to Chapter 4, 'Using Table 1 and Table 2 to Select Countermeasures,' for more information about using multiple countermeasures.

**It should be noted that the PHB and RRFB are not both installed at the same crossing location.

This table was developed using information from: Zegeer, C.V., J.R. Stewart, H.H. Huang, P.A. Lagerwey, J. Feaganes, and B.J. Campbell. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines. FHWA, No. FHWA-HRT-04-100. Washington, D.C.; FHWA. Manual on Uniform Traffic Control Devices, 2009 Edition, (revised 2012). Chapter 4F, Pedestrian Hybrid Beacons. FHWA, Washington, D.C.; FHWA. Crash Modification Factors (CMF) Clearinghouse. http://www.cmfclearinghouse.org/; FHWA. Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE). http://www.pedbikesafe.org/PEDSAFE/; Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.; Thomas, Thirsk, and Zegeer. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington, D.C.; and personal interviews with selected pedestrian safety practitioners.

Countermeasure Examples

High Visibility Crossing

w/ Advanced Signage/Markings
(+ Supplemental Left Side Signs)



Example – Swamp Rabbit
Old Buncombe Road
(S. of Travelers Rest)

Countermeasure Examples

Rectangular Rapid Flashing Beacon (RRFB)

High Visibility Crossing Including Advanced Signage/Markings (+ Supplemental Left Side Signs)



Example:
Roe Ford Road

Countermeasure Examples

Full Signal

High Visibility Crossing

Optional Advanced Signage/Markings (+ Supplemental Left Side Signs)



Example:
Sulphur Springs Road

Countermeasure Examples

Supplemental Signs

e.g. Signal Ahead Signage

Advanced Flashing Warning Device

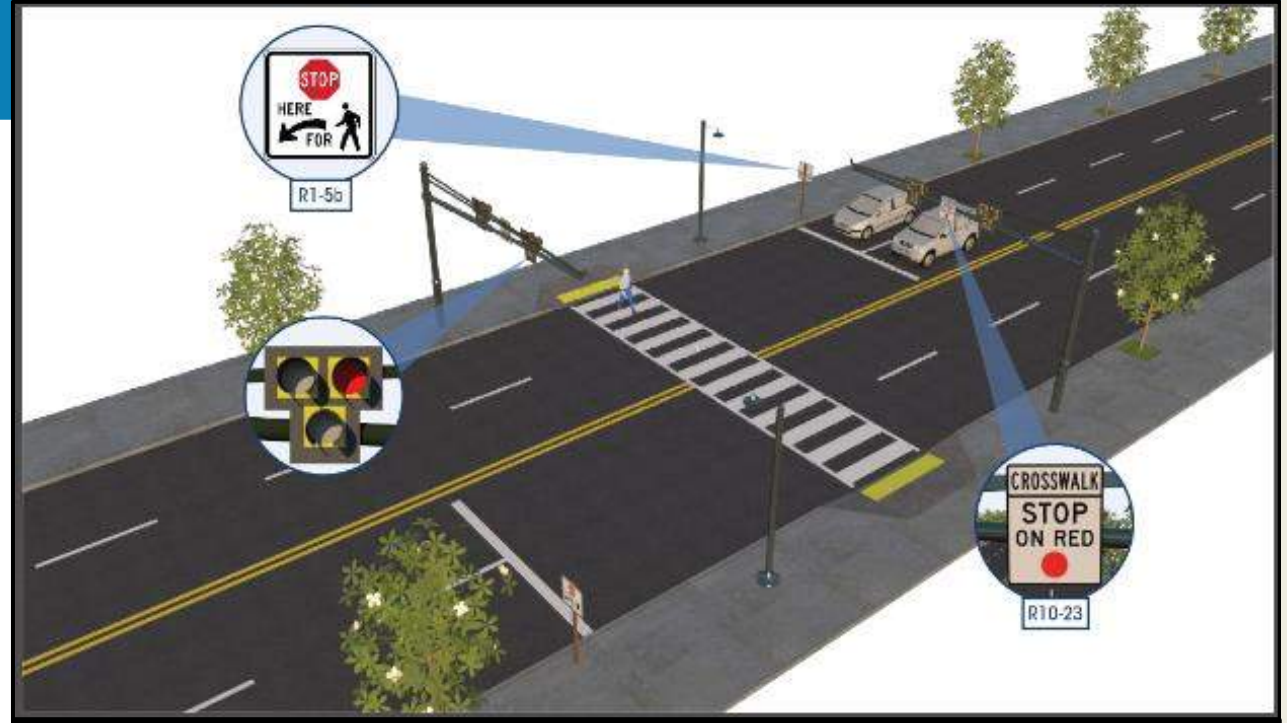
(Activated by Signal Detection)



Countermeasure Examples

Pedestrian Hybrid Beacon (PHB)

Type of Red Traffic Signal





Signal Interval	Vehicle Signal	Pedestrian Signal
1	Blank for Drivers	Steady Hand
2	Flashing Yellow	Steady Hand
3	Steady Yellow	Steady Hand
4	Steady Red	Steady "Walk"
5	Wig-Wag	Flashing Hand and Countdown
6	Return to Blank	Steady Hand

Example Recommendations

High Speed Road

Example:
Old Hendersonville Hwy

- Crash History
- Speed
- Sight Line Constraints
- Volume Growth

PHB or Traffic Signal

High Visibility Crossing Including Advanced Signage/Markings

(+ Supplemental Left Side and Advanced Signs)

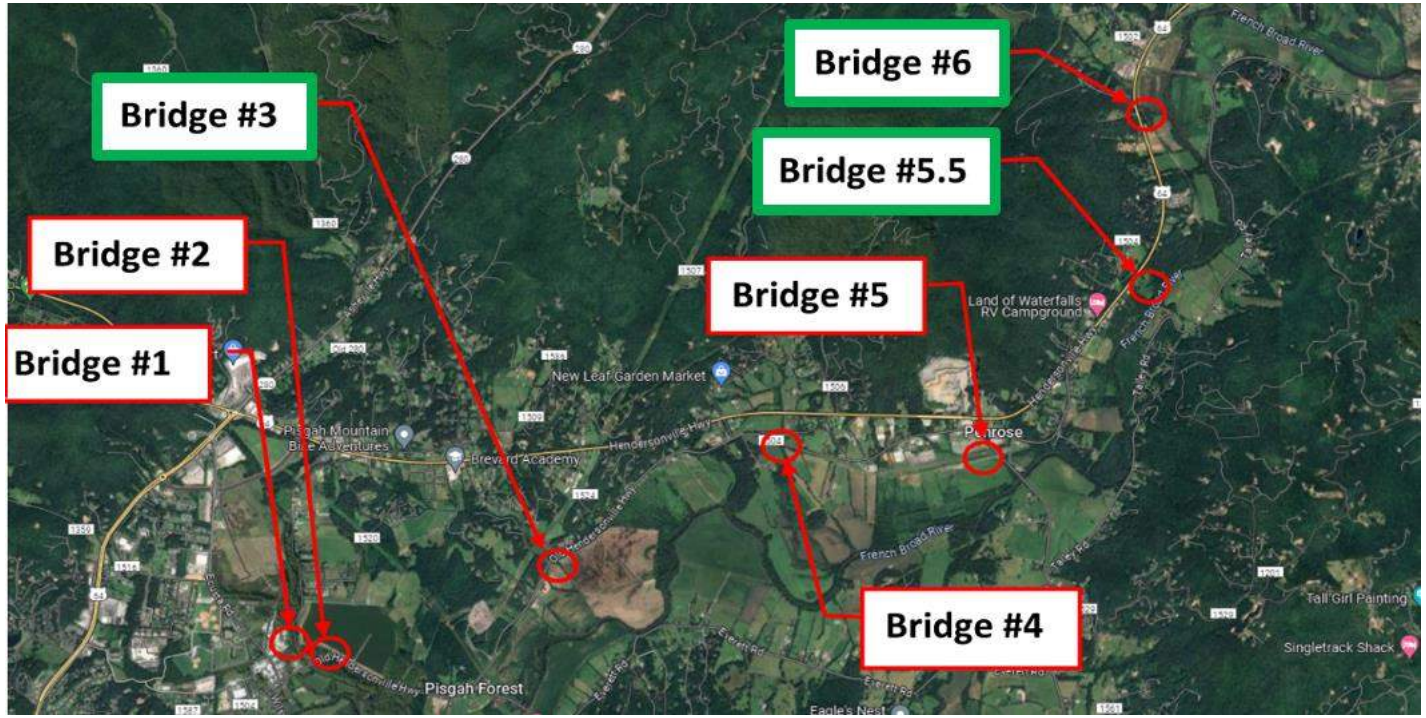
Graphics For Public Meeting

Pending NCDOT Approval



Bridge Evaluation

- 8 Total
- 7 Bridges for Trail
  - Davidson River – Already Removed
  - 6 Others Investigated for Repair vs Replacement Options
- 1 Private Driveway Over Trail





Key Decision - Impacts Final Design Tasks

Bridge 1: Davidson River

Structure Removed

- Flood Damage
- Road Clearance (was low @ 9’3”)

Kept Masonry Piers/Bents and Steel Girder

Replace & Raise











Bridge 2: Unnamed Tributary *(East of Old Hendersonville Highway Crossing)*

Existing Structure

- 2-span timber – Approx 24’ feet long
- Substructure is severely rotted

Replace w/ 1-span prefabricated superstructure with concrete abutments

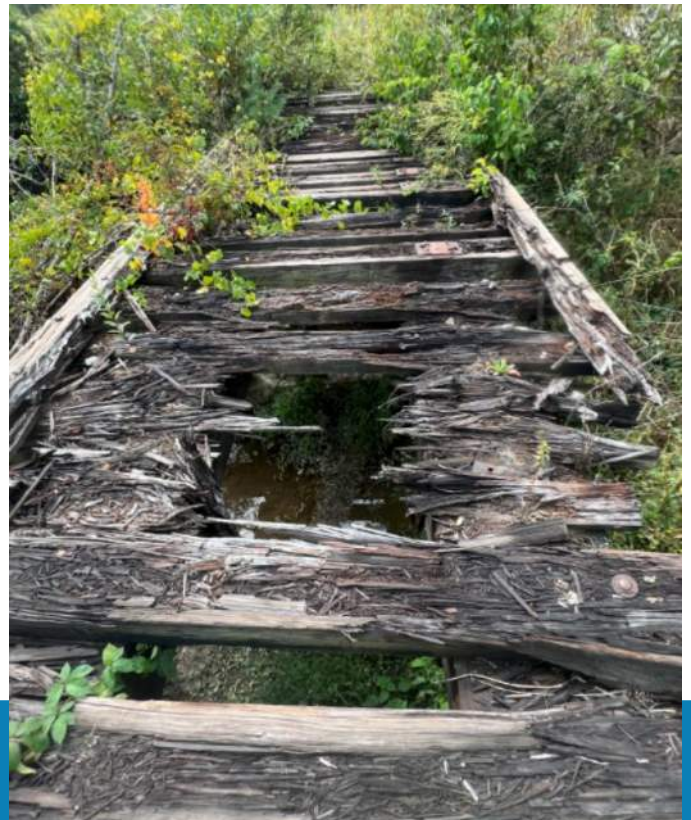




Bridge 3: Glade Creek

Existing Structure

- 4-span timber – Approx 53’-3” long
- Abutments and piles have minimal rot
- Beams are in good condition
- Substructure is in good condition
- **Viable to Repair**







Bridge 4: Lyday Creek

Existing Structure

- 5-span timber – Approx 67’-2” long
- Multiple piles and some timber sheeting is severely rotted
- Erosion issues due to steep grade (west abutment)
- Beams are crushing

Replace w/ 1-span prefabricated superstructure with concrete abutments





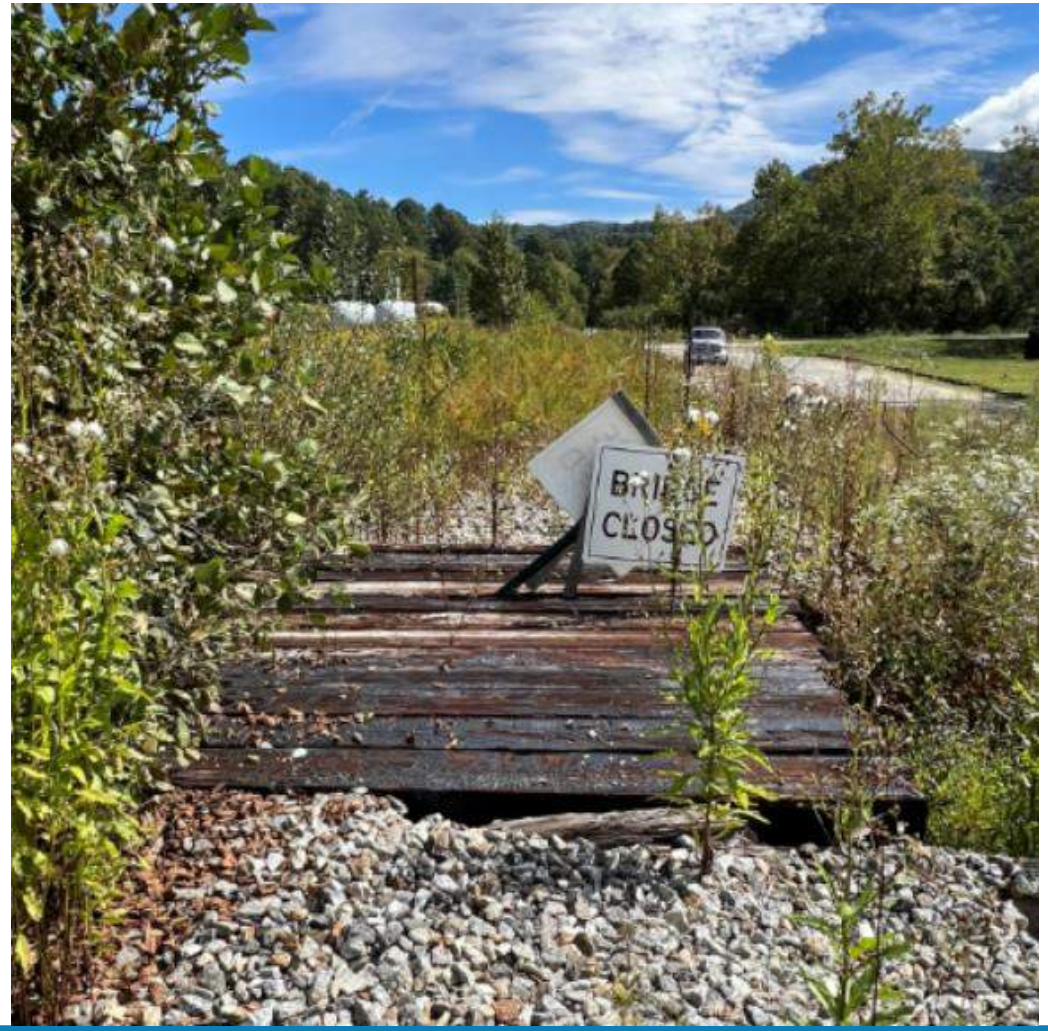
Bridge 5: Unnamed Tributary *(West of Crab Creek Road)*

Existing Structure

- 1-span timber – Approx 12’ long
- Severe rot, shallow abutments
- Sediment build up restricting water flow

Replace w/ 1-span timber bridge on timber sills





Bridge 5.5: King Creek

Existing Structure

- 5-span timber – Approx 65’-6” long
- Abutments have rot in timber sheeting
- Pier 1-3 are in good condition (some rot in Pier 4 piles)
- Beams are in good condition
- **Viable to Repair**



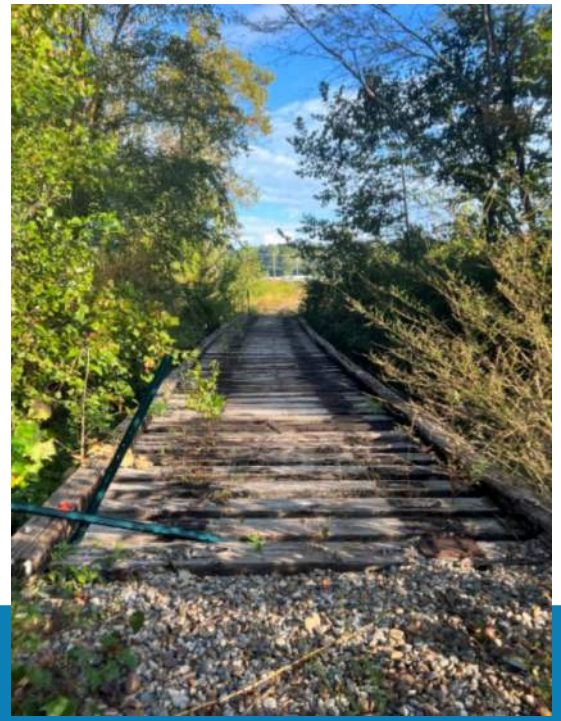


Bridge 6: Gash Creek

Existing Structure

- 7-span timber – Approx 92′-3″ long
- Abutments have significant rot in timber sheeting
- Substantial rot in some piers/piles
- Beams are in good condition
- **Viable to Repair**





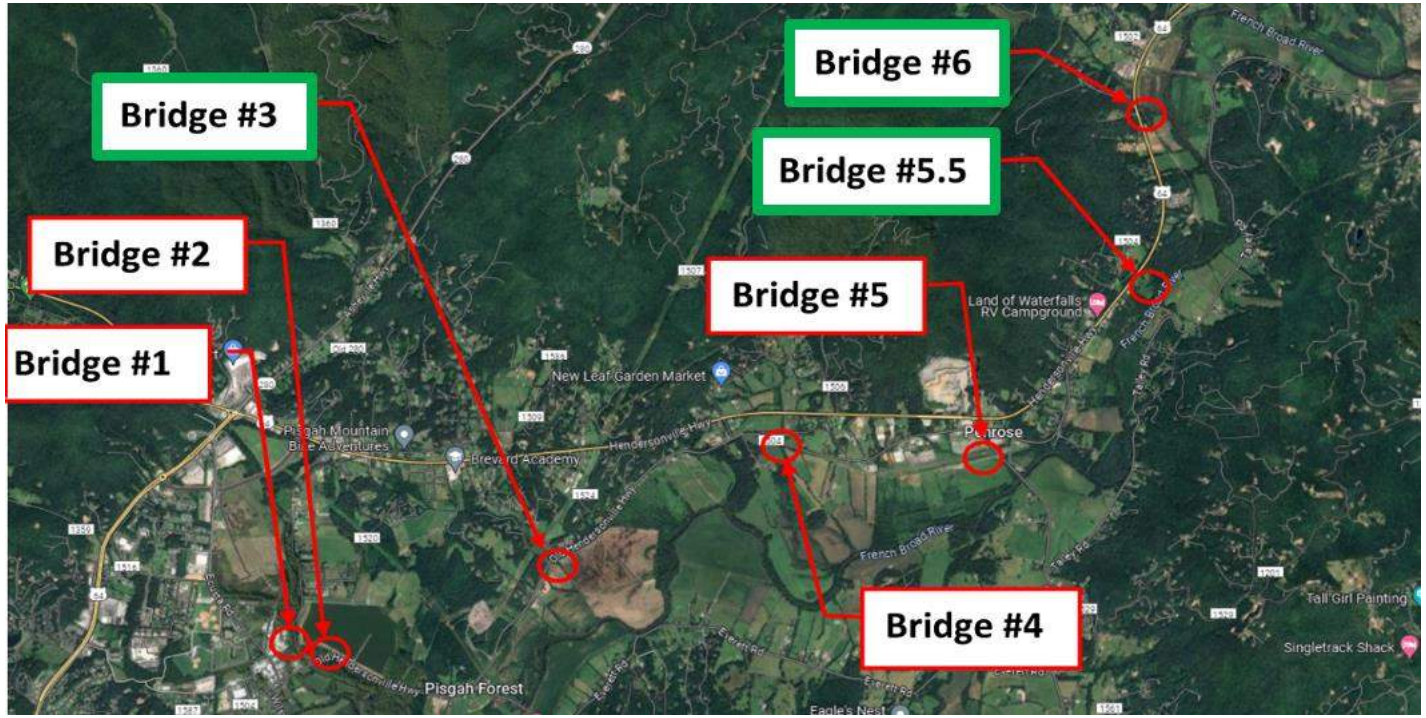


Repair vs Replace

- Saving Potential *(Rounded)*

Bridge 3:	$294,000
Bridge 5.5:	$293,000
Bridge 6:	$403,000
Total:	$990,000

- Maintenance Requirements
  - Repair:
    - 4-year inspection cycle
  - Replace:
    - 2-year inspection cycle
- Design, Permitting, Construction Implications
  - Wetlands Impacts/Stream Disturbance Less w/ Repair Option
  - Aesthetics and Rail History (Matter of Opinion)
  - Life Span of Facility – Similar





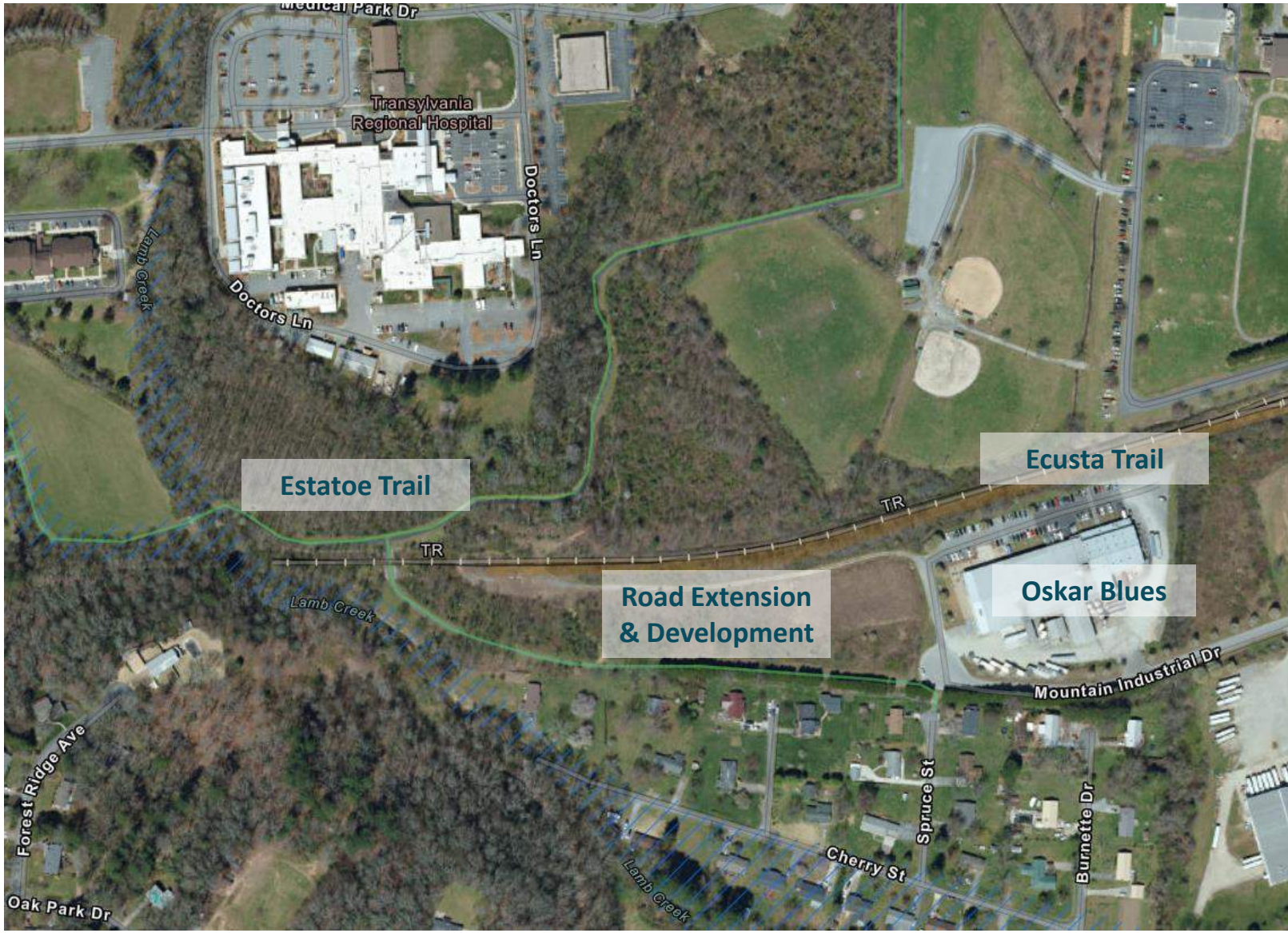
Decisions to Make

Critical Path

1. Bridges – Impacts Design Scope of Work
2. ROW Related
   - Estatoe Trail Tie In – Oskar Blues
   - Trailhead Locations (Parking and Bathrooms - Elements Beyond Rail ROW)
   - Driveway Relocation – Bridge Removal

Not Critical Path -> Other Amenities

- Elements/Locations/Design
- Expect Amenities Conversations in July



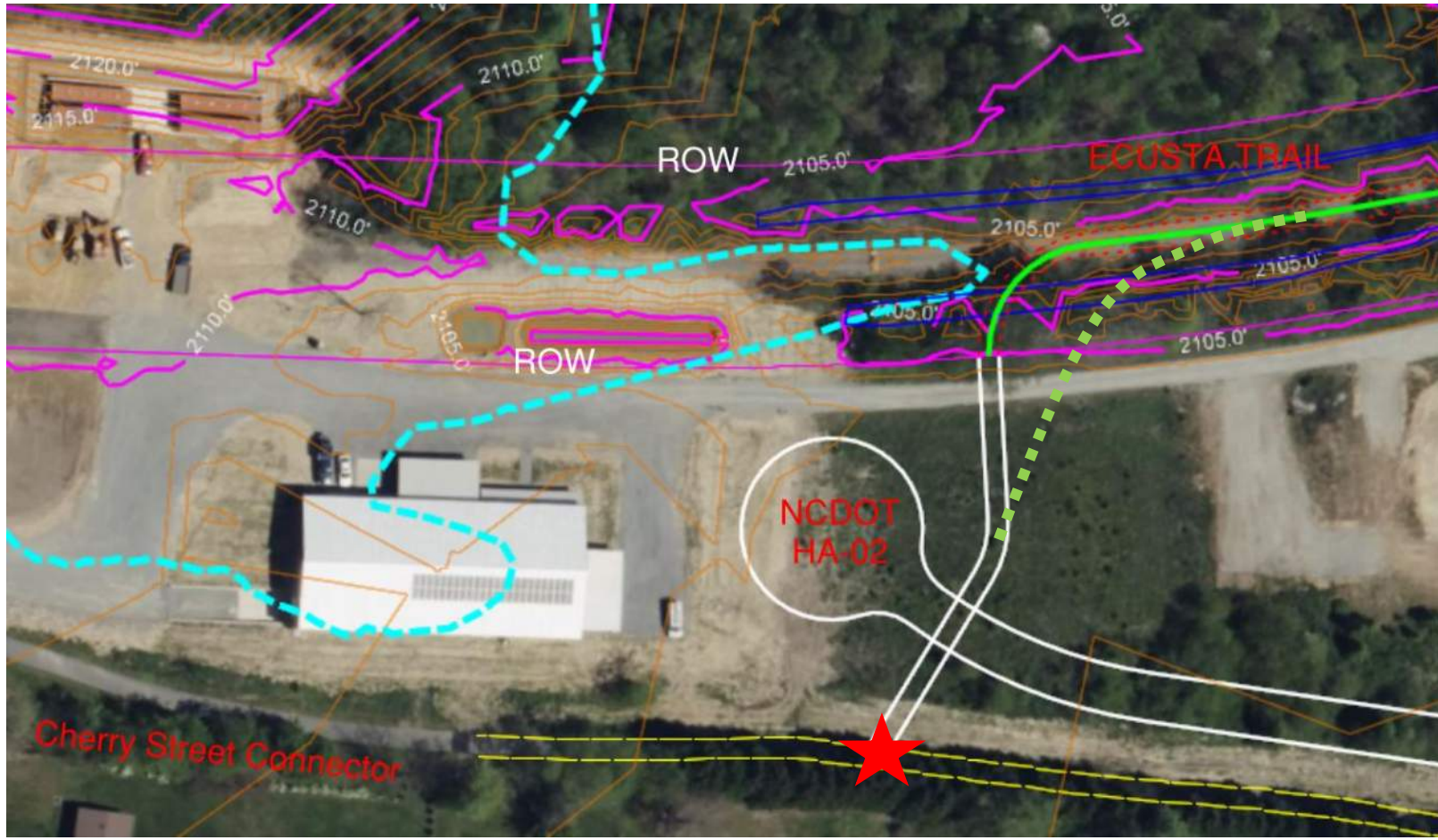
More on Western Terminus Decisions

Why Did we Look at Options?

- Sharper Radius
- T intersection with Cherry Street Connector Greenway
- Reduces from 12’ to 10’ Wide
- May Feel Like the End of the Trail

Continuation to Downtown Brevard

Connections to Pisgah Forest
(Funding Source Requirement)



Next Steps Near Term

June - This Week

- 30% Design Plans - Upload to NCDOT Website for Review

July

- NCDOT Plan Review and Cost Estimate
- **Consultants Submit Final Design Scope for NCDOT Review**
- Public Meeting Prep
- Amenities Meetings

August

- Consultants Submit Final Design Fee for NCDOT Review
- Public Meeting / Planning

September

- Public Meeting
- Begin Final Design by 9/15





Final Design & Construction

Sept 2024 – May 2026

Final Design & Permitting

Design, Permitting & Construction Documents

Federal Clearances – NEPA, Utilities, ROW

May 2026 - June of 2026

Construction Letting

July 2026 – End of 2027

ESTIMATED Construction Timeline



The Vision

Connecting Communities

Once complete, this nearly 20-mile, multi-use trail will connect the City of Hendersonville, Town of Laurel Park, Horse Shoe, Etowah, Pisgah National Forest, and the City of Brevard.

