

# Concurrence

## Point 3 Meeting

*LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE (LEDPA)*

**NC 143 Improvements**

**From West Buffalo Creek to NC 143 Business, west of Robbinsville**

**Graham County**

WBS No. 34508.1.1

STIP Project No. R-2822B



March 20, 2019  
North Carolina Department of Transportation  
Structures Design Conference Room C, NCDOT Century Center Building A  
1000 Birch Ridge Drive, Raleigh, NC 27610

Prepared By  
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Raleigh, NC 27606  
919-851-6866



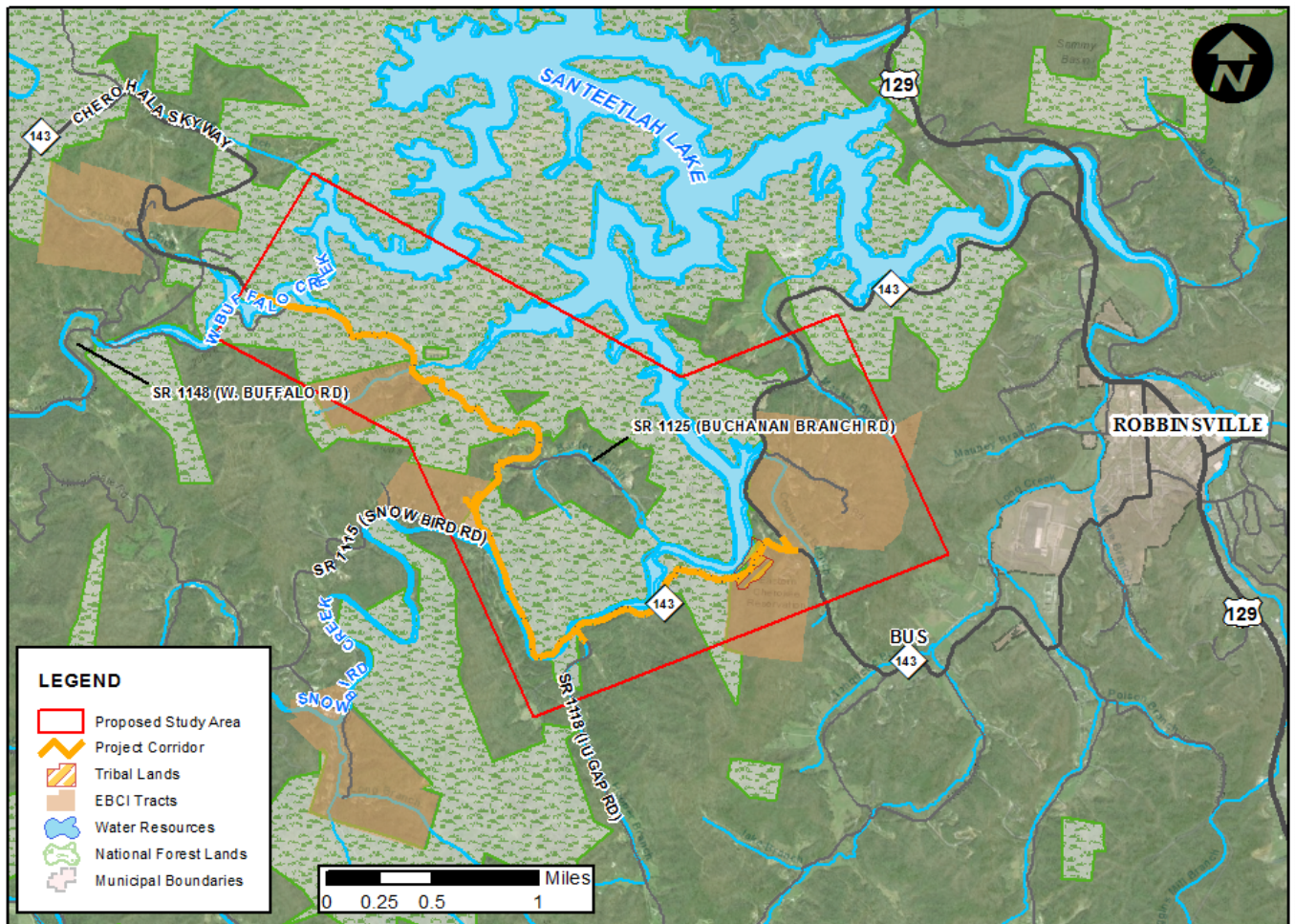
## Purpose of Today's Meeting

The purpose of today's meeting is to discuss the preferred alternative for the project. Impacts of and public comments on the alternatives presented at the public meeting will be discussed. Concurrence on the LEDPA (Concurrence Point 3) will be requested.

## Project Description

The North Carolina Department of Transportation (NCDOT) proposes to make safety improvements along NC 143 from West Buffalo Creek to NC 143 Business, near Robbinsville in Graham County. The project corridor is approximately 4.5 miles long. The project location is shown below in Figure 1. This project is included in the Draft NCDOT 2020 - 2029 State Transportation Improvement Program (STIP) as Project R-2822B.

Figure 1: Project Study Area





**NEPA/ Section 404 Merger Coordination History**

**Table 1: NEPA/Section 404 Merger Coordination History and Upcoming Meetings**

January 23, 2007	Concurrence Point 1 (Purpose and Need) <b><i>“The purpose of this action is to improve safety along NC 143 using context sensitive solutions.”</i></b>
December 16, 2010	Concurrence Point 2 (Detailed Study Alternatives) <ul style="list-style-type: none"> <li>• The project study area was revised to encompass the alignment for Alternative 2, which was the Section 4(f) Avoidance Alternative. This alternative was developed to avoid impacts to the Snowbird Picnic Area.</li> <li>• Alternative 1, 2, and 4 were carried forward for detailed study.</li> </ul>
May 8, 2013	Concurrence Point 2A (Bridging Decisions and Alignment Review)
March 25, 2015	Project Coordination Meeting <ul style="list-style-type: none"> <li>• Informed the Merger Team of the reprioritization of the project which resulted in the project being unfunded.</li> </ul>
July 20, 2017	Merger Update Meeting <ul style="list-style-type: none"> <li>• Project funding shifted from federal to state.</li> <li>• NCDOT requested the introduction of an alternative using 3-R guidelines (requires revisiting CP 2/2A).</li> <li>• USACE (lead agency) recommended revisiting CP 1 to reconstruct the purpose and need statement to [incorporate metrics into the concurrence form] establish safety screening criteria.</li> </ul>
March 22, 2018	Concurrence Points 1,2, and 2A revisited <ul style="list-style-type: none"> <li>• Revise Purpose and Need and introduce Alternative 4A</li> </ul> <b><i>“The purpose of the project is to improve safety by achieving the minimum geometric standards consistent with the facility’s functional classification.”</i></b>
November 2018	Concurrence Point 2A Revisited (see summary below) <ul style="list-style-type: none"> <li>• Replacement of Bridge #13 added to Alternatives 1, 2-Revised, and 4A.</li> </ul>
March 2019	Concurrence Point 3
Fall 2019	Concurrence Point 4

**Concurrence Point 2A Update**

NCDOT is recommending the replacement of Bridge #13 over Snowbird Creek be included as a component of STIP Project # R-2822B due to a bridge recent inspection that resulted in a **sufficiency rating of 63.83** and the bridge being rated **functionally obsolete (Deck Geometry)** due to the following superstructure characteristics:

- Deck Width:
  - ✓ Out to out: 27.3-feet
  - ✓ Between rails: 25.3-feet
  - ✓ Clear roadway width: 25-feet
- Additional Notes:
  - ✓ Span configuration: 4 spans @ 45-feet
  - ✓ Two piers currently in creek bed

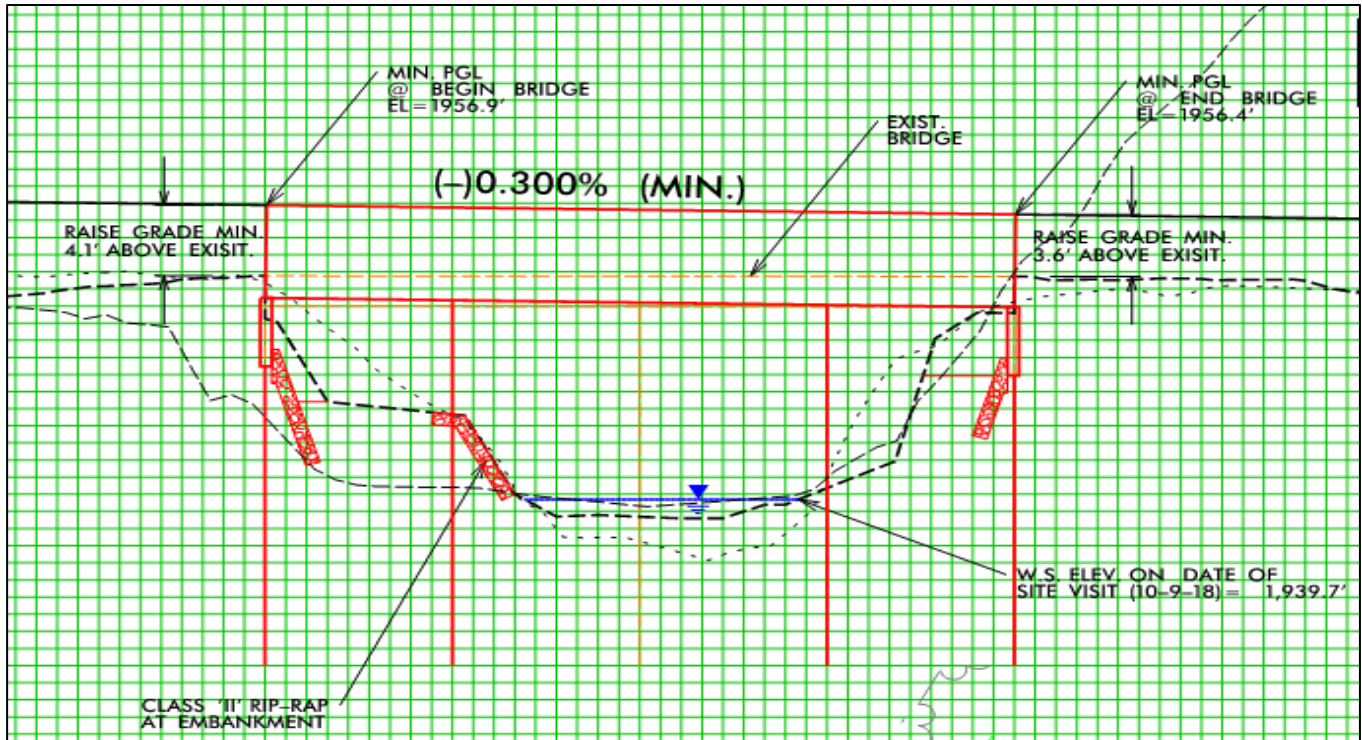
**Preliminary Hydraulic Recommendations**

- Superstructure
  - ✓ Deck width
    - Out to out: 37-feet
    - Clear roadway: 34-feet
- Substructure
  - ✓ Span configuration: 1 @ 45-feet, 1 @ 90-feet, 1 @ 45-feet



- ✓ Replacement structure would remove bridge piers from Snow Bird Creek

Figure 2: Preliminary Hydraulic Recommendation

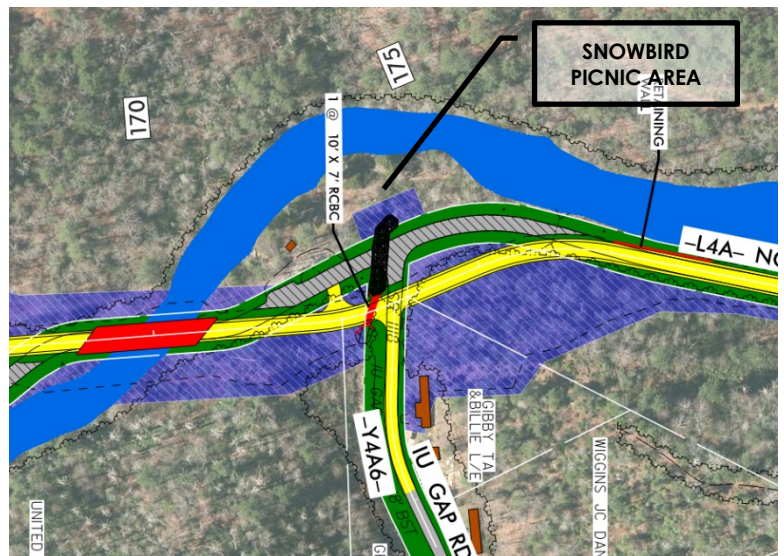


- ✓ Hydraulic modeling recommends raising the elevation of the roadway

**Bridge Replacement Scenarios**

- The new bridge will be built using **staged construction**. This will allow the bridge to be replaced at its current location, while maintaining the flow of traffic along NC 143.
- Other replacement options considered but eliminated:
  - ✓ Using an **offsite detour** was considered. This would allow complete closure of the bridge and demolition of the bridge. The bridge would be replaced at its current location. However, the detour would be approximately 21 miles long and the project team felt this was unreasonable compared to other options.
  - ✓ An **onsite detour** was considered. However, this would require construction of a new alignment roadway either to the north or south of NC 143 and temporary bridges. The northern alignment would have resulted in impacts to the Snowbird Picnic Area. The southern alignment would avoid temporary impacts to the picnic area but would result in additional residential property impacts.

Figure 3: Bridge #13 Realignment / Snowbird Picnic Area



**Additional Notes**

- Hooper Branch: During the March 22, 2018 Combined CP 1, 2, and 2A Meeting, the team agreed that the existing 48-inch corrugated metal pipe (CMP) culvert would be removed and replaced with a 115-foot long, 8-foot x 8-foot reinforced concrete box culvert (RCBC). Due to the staged construction, the modified alignment would require a new approximately 60-foot long hydraulic structure at Hooper Branch instead of the previously recommended 115-foot long 8x8 RCBC. This would also allow for the removal of the existing 48-inch CMP (see Figure 3).
  - ✓ US Fish and Wildlife Service and the US Forest Service requested a bottomless hydraulic structure be evaluated at this location.

**Draft Commitment:**

- ✓ *NCDOT will evaluate the feasibility of a bottomless hydraulic structure at the Hooper Branch crossing. Geotechnical information is required to make a final determination. NCDOT will provide the Merger Team with final hydraulic recommendations once information is available.*
- Snowbird Picnic Area: The proposed replacement of Bridge #13 will realign NC 143 slightly to the south in the vicinity of the Snowbird Picnic Area (see Figure 3). The bridge replacement will also raise the elevation of NC 143. This will also result in the abandonment of a small portion of existing NC 143, requiring a redesign of the access to the Snowbird Picnic Area.
  - ✓ US Forest Service requested the bridge replacement include paving the parking area, moving, or replacing the stone picnic area sign if it is affected, and inclusion of a vegetative planting plan for adjacent disturbed areas.
    - These should be considered mitigative measures to address the impacts from the revised CP2A bridge changes.

**Draft Commitments:**

- ✓ *Replacement of Bridge #13 over Snowbird Creek will require the modification of the driveway access to the Snowbird Picnic Area. NCDOT will coordinate with the Forest Service to develop a revised paved driveway and paved parking. Also, NCDOT will replace any structures (including the stone picnic area sign) that are affected by the bridge replacement or construction.*
- ✓ *NCDOT will add a vegetative planting plan in the scope of the project to mitigate the impacts to disturbed areas.*

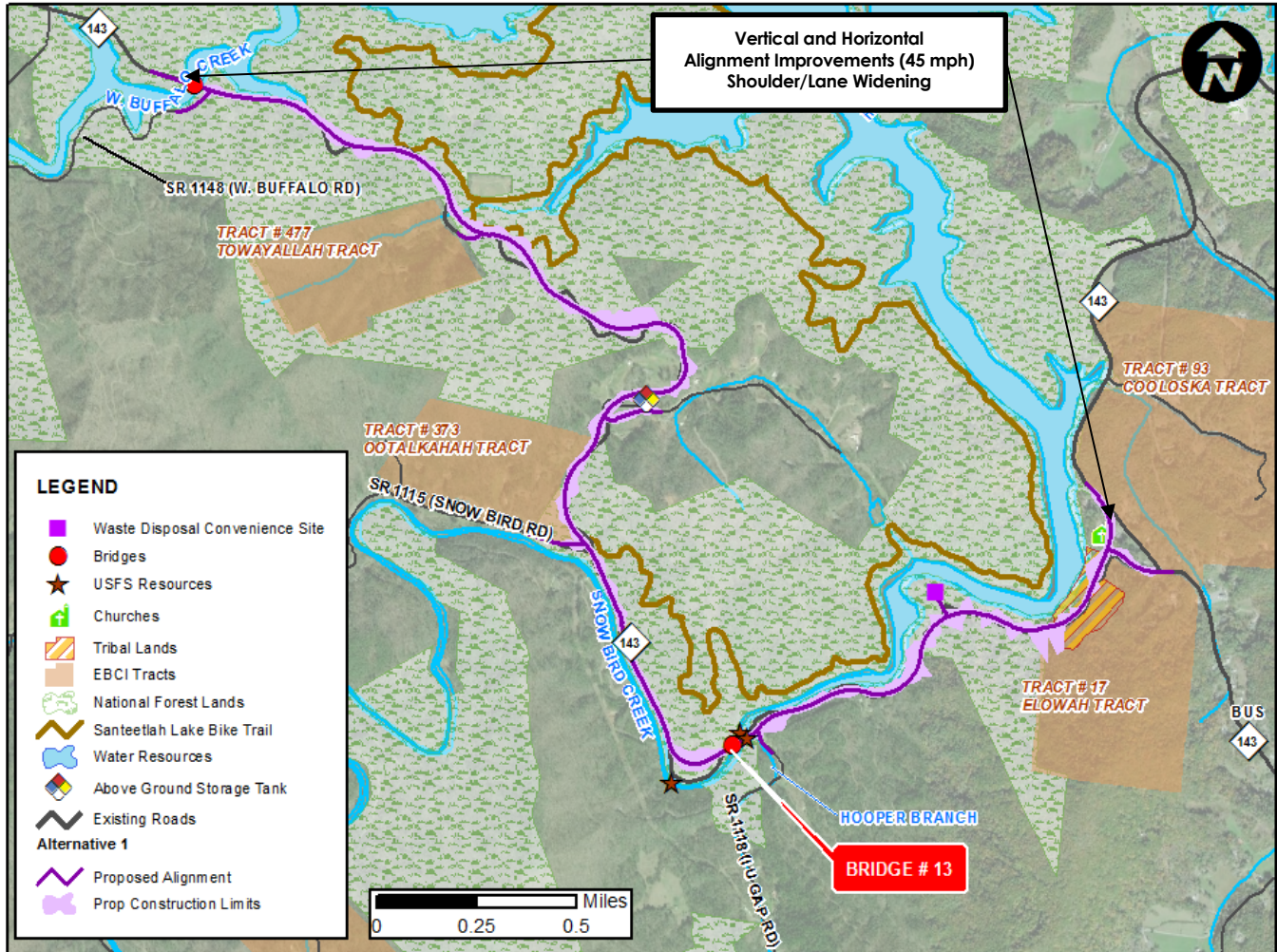


### Alternatives Carried Forward for Detailed Study

Three Build alternatives and a No-Build alternative were carried forward for detailed study and were based off the recommended design criteria stated in the AASHTO Green Book and NCDOT 3-R Design Guide for Rural Collectors. The following subsection is a summary of the Build Alternatives

#### Alternative 1: Improve NC 143 to a 45-mile per hour (mph) Design Speed

Figure 4: Alternative 1

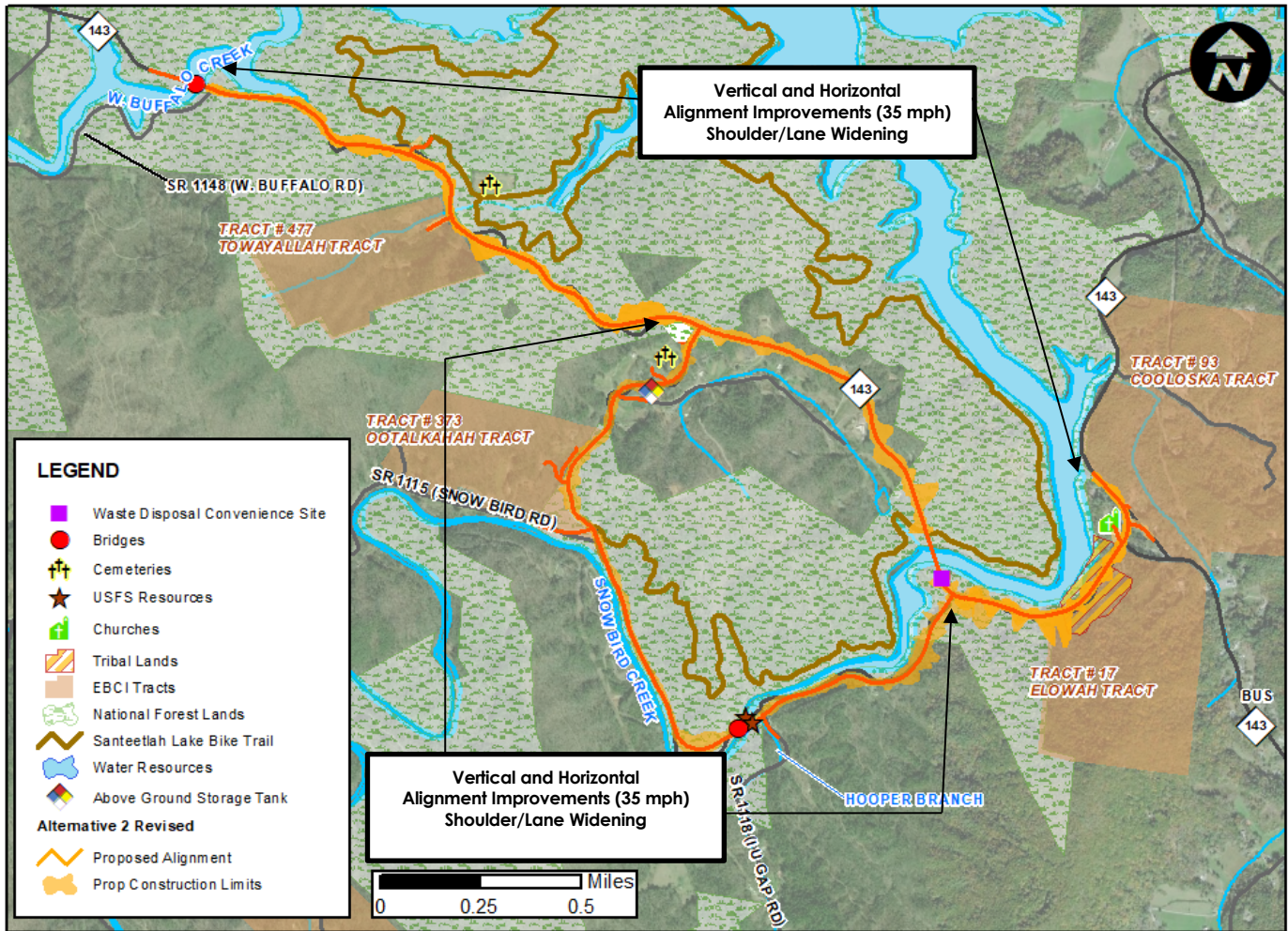


- Upgrade NC 143 by from West Buffalo Creek to NC 143 Business by improving all vertical and horizontal curves to meet a minimum design speed of 45-mph. Improvements are consistent with the minimum recommendations for a rural collector as described in the AASHTO Green Book.
- Includes widening NC 143 to 11-foot travel lanes and 6-foot wide shoulders (4-foot paved) in each direction. The 11-foot travel lanes are consistent with the minimum lane and shoulder width recommended by the NCDOT 3-R Guide.
- The proposed design also reconfigures the NC 143/NC 143 Business intersection by rerouting NC 143 on new location to make it the primary through movement.
  - ✓ Proposes to replace Bridge #13 over Snow Bird Creek in its existing location using staged construction.



**Alternative 2 Revised: Improve NC 143 to a 35-mph Design Speed with a New Alignment**

Figure 5: Alternative 2-Revised

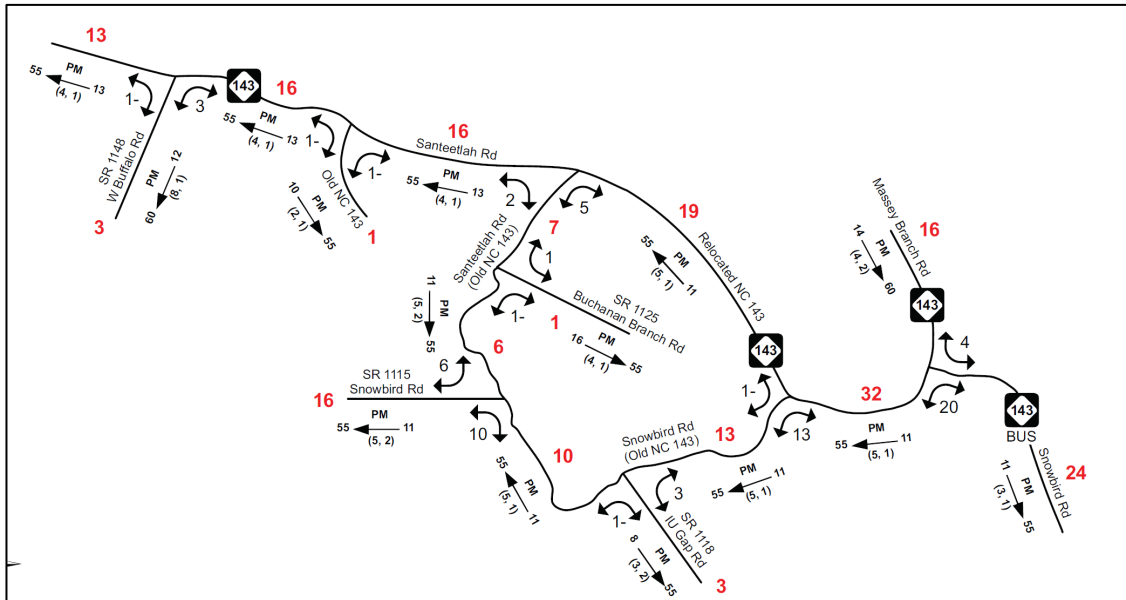


- Upgrade the existing NC 143 alignment from West Buffalo Creek to the NC 143 Business intersection by improving all vertical and horizontal curves to meet a minimum design speed of 35-mph which is consistent with the NCDOT 3-R Design Guide for Rural Collectors.
- Construct a new alignment segment to carry NC 143 to the north and east of the existing NC 143 from north of Buchanan Branch Road to near the Graham County Waste Convenience Site. All the vertical and horizontal curves will have a minimum design speed of 35-mph.
  - ✓ NC 143 will be routed along the new location alignment
  - ✓ Includes new crossing of Santeetlah Lake.
  - ✓ The existing portion of NC 143 between the Chickalee Cemetery and the Graham County Waste Convenience Center will be downgraded to a local route and redesignated with a secondary road (SR) number.
- Includes widening NC 143 to 11-foot travel lanes and 6-foot wide shoulders (4-foot paved) in each direction (see typical section 1 on page 6). The 11-foot travel lanes are consistent with the minimum lane and shoulder width recommended by the NCDOT 3-R Guide for a rural collector.
- Proposes to reconfigure the NC 143/NC 143 Business intersection by rerouting NC 143 on new location to make it the primary through movement.
- Additional Information Supporting Improvements to Bypassed Portion of NC 143 (former NC 143)
  - ✓ Traffic studies show an approximately 60%/40% split between vehicles using the new alignment portion of Alternative 2-Revised and the bypassed portion of NC 143 in 2035.



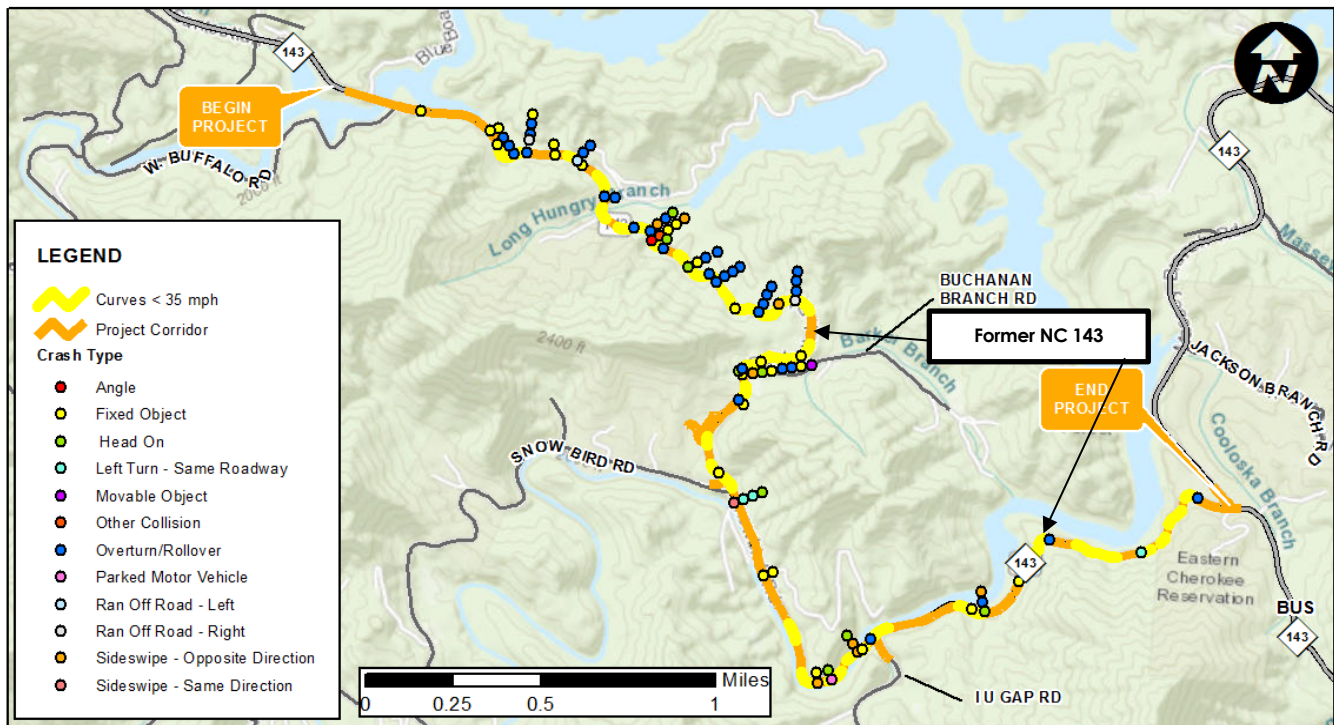
- ✓ 1,900 vehicles per day (vpd) are projected along relocated NC 143. 700 to 1,300 vpd are projected to use former NC 143.

Figure 6: 2035 Build Projected Traffic Volumes



- ✓ Traffic safety studies show that 37 crashes occurred along NC 143 between just north of Buchanan Branch Road and the Graham County Waste Service Center.
- ✓ 23 curves with a design speed of less than 35 mph are located between just north of Buchanan Branch Road and the Graham County Waste Service Center.

Figure 7: Crash Locations and Substandard Curve Locations

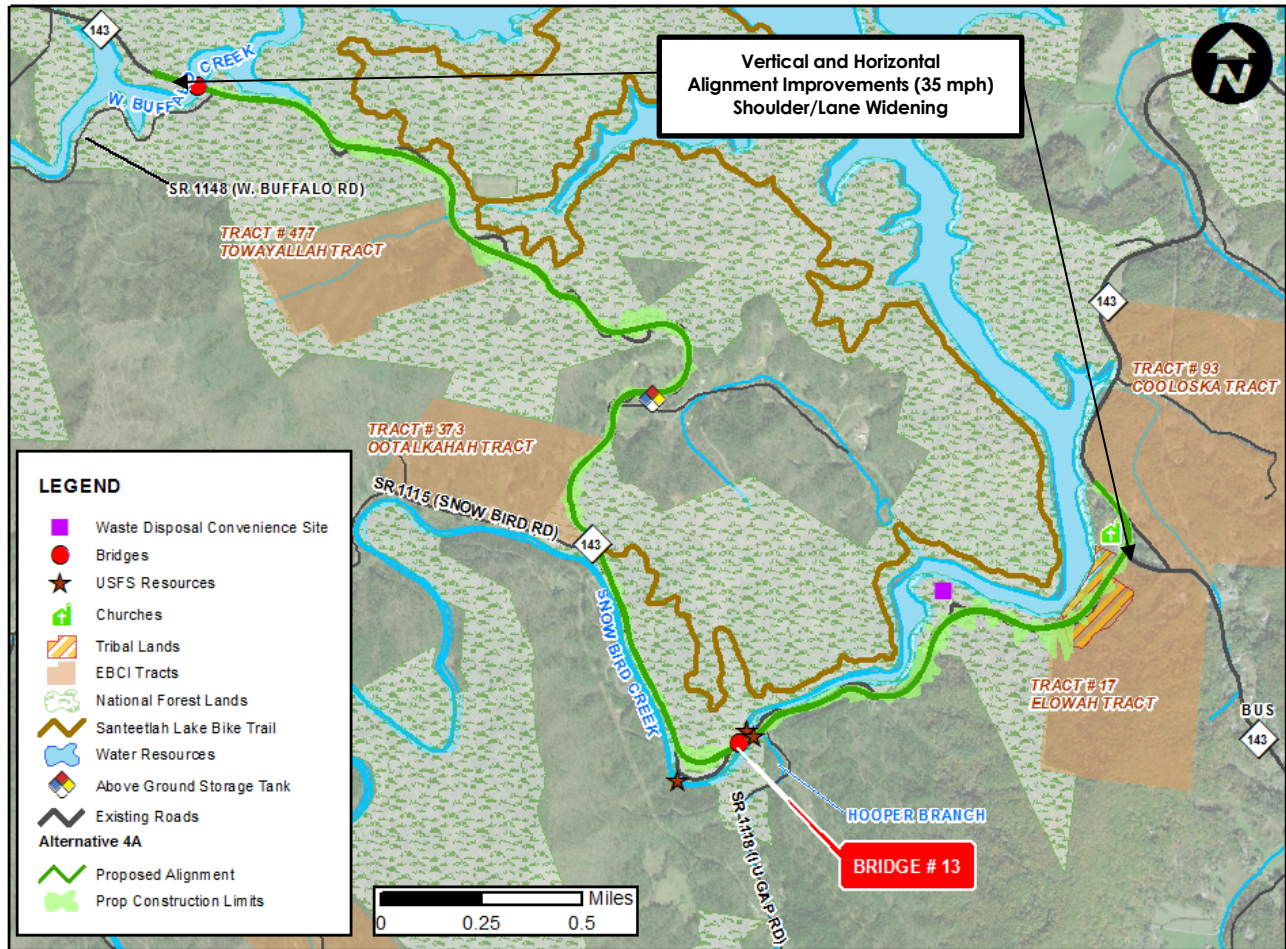






### Alternative 4A

Figure 8: Alternative 4A



- Upgrade NC 143 by from West Buffalo Creek to NC 143 Business by improving all vertical and horizontal curves to meet a minimum design speed of 35-mph. Improvements are consistent with the minimum recommendations for a rural collector as described in the NCDOT 3-R Guidelines.
- Includes widening NC 143 to 11-foot travel lanes and 6-foot wide shoulders (4-foot paved) in each direction. The 11-foot travel lanes are consistent with the minimum lane and shoulder width recommended by the NCDOT 3-R Guide.
- The proposed design also reconfigures the NC 143/NC 143 Business intersection by rerouting NC 143 on new location to make it the primary through movement.
  - ✓ Proposes to replace Bridge #13 over Snow Bird Creek in its existing location using staged construction.



## Detailed Alternative Comparison

### Purpose and Need Performance Measures Crosscheck

- 80% reduction in identified roadway deficiencies  
 The minimum geometric standards are defined as the recommended pavement width and horizontal and vertical curve design speed as it applies to rural major collectors per the AASHTO Green Book and the NCDOT Resurfacing, Restoration, and Rehabilitation (3-R) design standards.
  - ✓ Substandard pavement width: < 11-foot wide travel lanes and 6-foot wide shoulders.
  - ✓ Substandard horizontal and vertical curves: < 35 mph design speed (minimal per NCDOT 3-R) Guidelines.

**Table 2: Summary of Compliance with Purpose and Need Performance Measures**

	Pavement Widened to > 11-foot lanes w/ 6-foot shoulders	Horizontal Curves		Vertical Curves	
		% w/ Design Speed ≥ 35 mph	Meets Performance Criteria	% w/ Design Speed ≥ 35 mph	Meets Performance Criteria
No- Build Existing NC 143	X	55%	X		X
Alternative 1	✓	100%	✓	98%	✓
Alternative 2 Revised	✓	100%	✓	90%	✓
Alternative 4A	✓	100%	✓	96%	✓

- Each alternative improves all horizontal curves along NC 143 within the project corridor to a design speed ≥ 35 mph.
- Each alternative improves least 90% of the vertical curves to a design speed ≥ 35 mph.
- All alternatives carried forward for detailed studies meet the project's purpose and need.



**Detailed Alternative Comparison**

Table 3 provides a summary of the impacts of the Alternatives Carried Forward for Detailed Study.

**LEGEND**

	Least Impact
	Middle Amount of Impacts
	Greatest Impacts

**Table 3: Detailed Study Alternative Comparison**

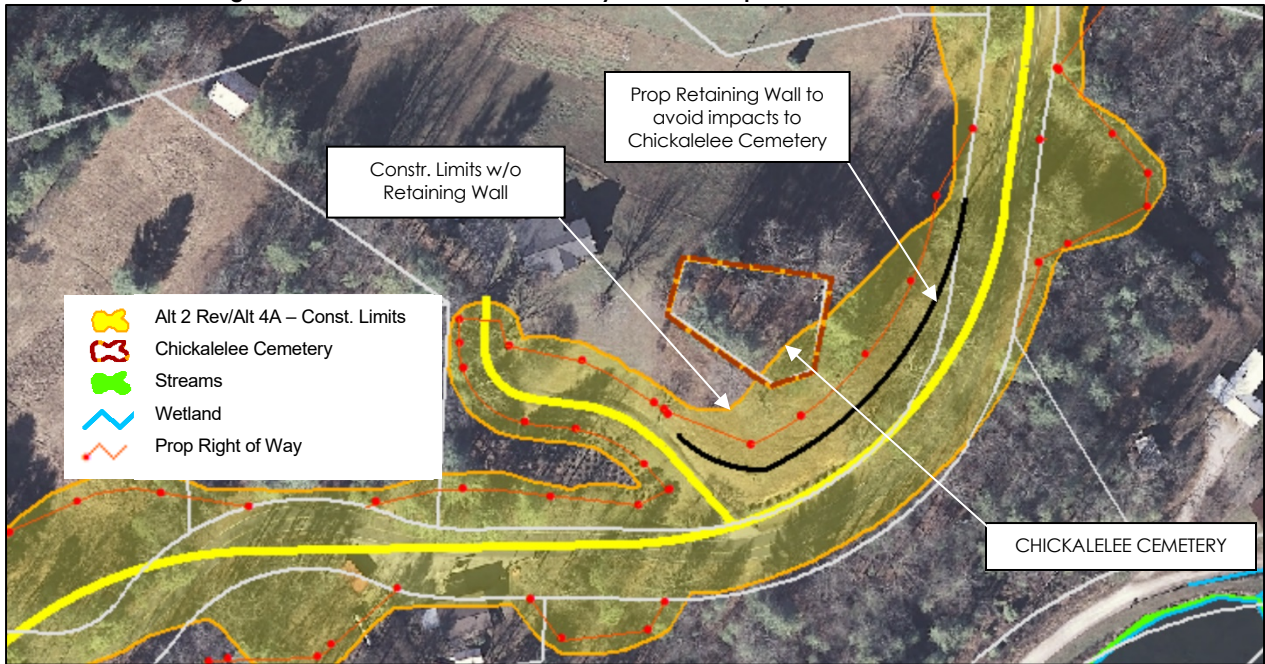
Resource	Alternative 1	Alternative 2 Revised	Alternative 4A
Streams (linear feet)	4,080	3,520	3,200
Wetlands (acres)	0.14	0.14	0.08
Ponds (acres)	0.4	0.4	0.4
Trout Buffers (square feet)	88,720	82,930	82,930
Endangered Species	N	N	N
<b>Cultural Resources</b>			
Eastern Band of Cherokee Indian Tracts			
Towayallah Tract (acres)	1.5	3.0	3.0
Ootakahah Tract (acres)	1.8	2.6	2.6
Elowah Tract (acres)	4.9	5.3	5.3
Collooska Tract (acres)	0.2	0.5	0.5
<b>Total</b>	<b>8.4</b>	<b>11.8</b>	<b>11.8</b>
Tribal lands (acres)	3.6	2.8	2.8
Indian Springs Cultural Washing Site	N	N	N
Origin of Snow Bird Legend Site	N	N	N
Chickalelee Cemetery*	N	N*	N*
NR - Archaeological Sites Impacts*	Y	Y	Y
Other Cemeteries	N	N	N
NRHP- Eligible Historic Structures	0	0	0
<b>Community Resources</b>			
Residential Relocations (Estimated)	0	5	1
Business Relocations (Estimated)	2	2	3
Churches	0	0	0
Hazardous Material Sites	1	0	1
<b>US Forest Service Resources</b>			
Property Impacts (acres)	39.8	39.4	30.2
Santeetlah Bike Trail (linear feet)	1,230	630	480
Long Hungry Road Camping Area	N	N	N
Snowbird Picnic Area	Y	Y	Y
<b>Project Costs</b>			
Right of Way Acquisition	\$1,091,000	\$1,864,000	\$1,101,000
Utility Relocation	\$389,000	\$305,000	\$305,000
Construction	\$23,960,000	\$41,200,000	\$29,100,000
<b>Total</b>	<b>\$25,440,000</b>	<b>\$43,369,000</b>	<b>\$30,506,000</b>



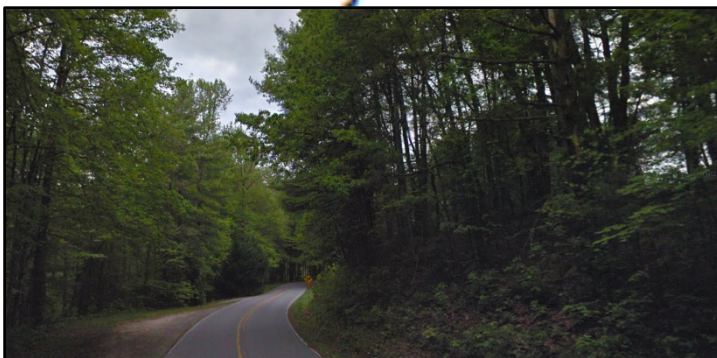
Notes

- Cultural Resources Impacts
  - ✓ Chickalee Cemetery: An approximately 25-foot high retaining wall is proposed as part of Alternatives 2-Revised and 4A to avoid impacts to the cemetery (see Figures 9, 10, and 11).

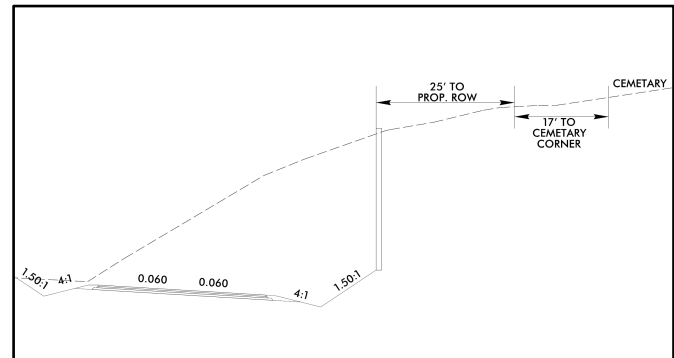
**Figure 9: NC 143 Chickalee Cemetery Location Map**



**Figure 10: NC 143 (facing south) in vicinity of Chickalee Cemetery**



**Figure 11: Proposed Typical Section at Chickalee Cemetery**



- ✓ Archaeological Site Impacts (Site 31GH227): Site will be impacted by all three alternatives. Avoidance and minimization measures will be evaluated prior to CP 4A.
  - There are opportunities to steepen the fill slopes up 1.5:1 for Alternatives 2-Revised and 4A to eliminate impacts to the archaeological site.
  - Retaining walls will not eliminate impacts to the archaeological site.
- ✓ Tribal Lands: All alternatives will result in impacts to the four tribal tracts within the project study area. Alternatives 2-Revised and 4A will result in the greatest impacts to the tribal tracts.



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## Local Officials Meeting / Public Meeting Summary

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A Local Officials Meeting has held at the Graham County Community Building in Robbinsville on December 11, 2018. NCDOT presented maps of the three detailed study alternatives. Graham County leadership reiterated their support for Alternative 4A. This is consistent with the resolution passed by the Graham County Commissioners in January 2017.

The Public Informational Meeting was held following the Local Officials Meeting from 4 – 7 pm. Sixteen citizens attended the meeting. Alternatives 1, 2-Revised, and 4A were presented at the meeting. Each of the meeting attendees was provided a handout summarizing the impacts and costs of each alternative, project mapping and a comment sheet.

Two comment forms were either submitted at the meeting or received via email or mail after the meeting. Both comment forms received noted a preference for Alternative 2 – Revised. The comment forms expressed concerns about the safety issues associated with the NC 143/Buchanan Branch Road intersection and noted they hoped the project would correct the safety concerns at the intersection. Both forms were received from residents of Buchanan Branch Road.

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## NCDOT Recommended Alternative

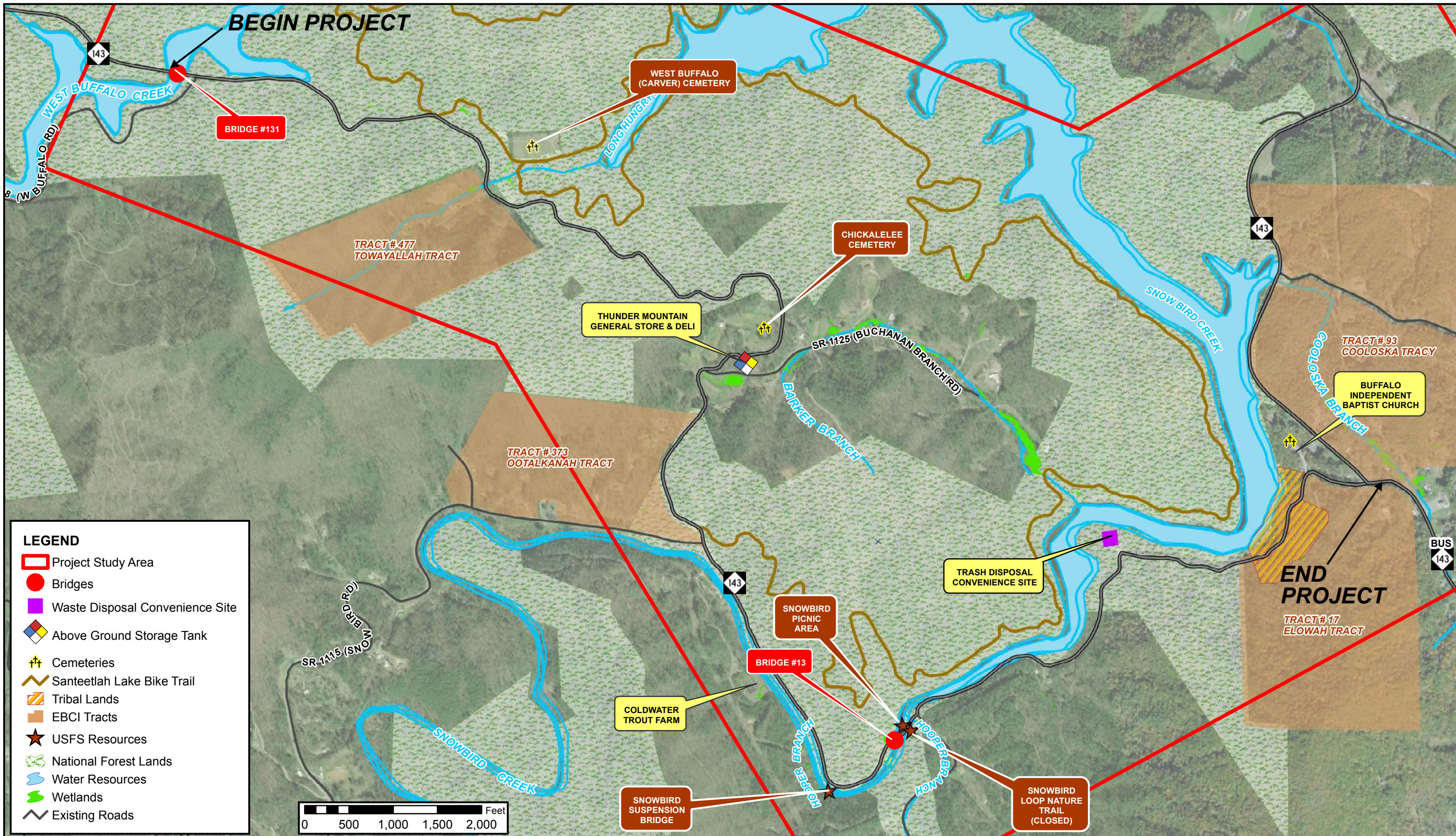
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- ***Alternative 4A has been identified as the preferred alternative by NCDOT because it would best meet the project's purpose and need while balancing environmental concerns with the safety of motor vehicle operators along NC 143.***

Alternative 4A was selected for the following reasons:

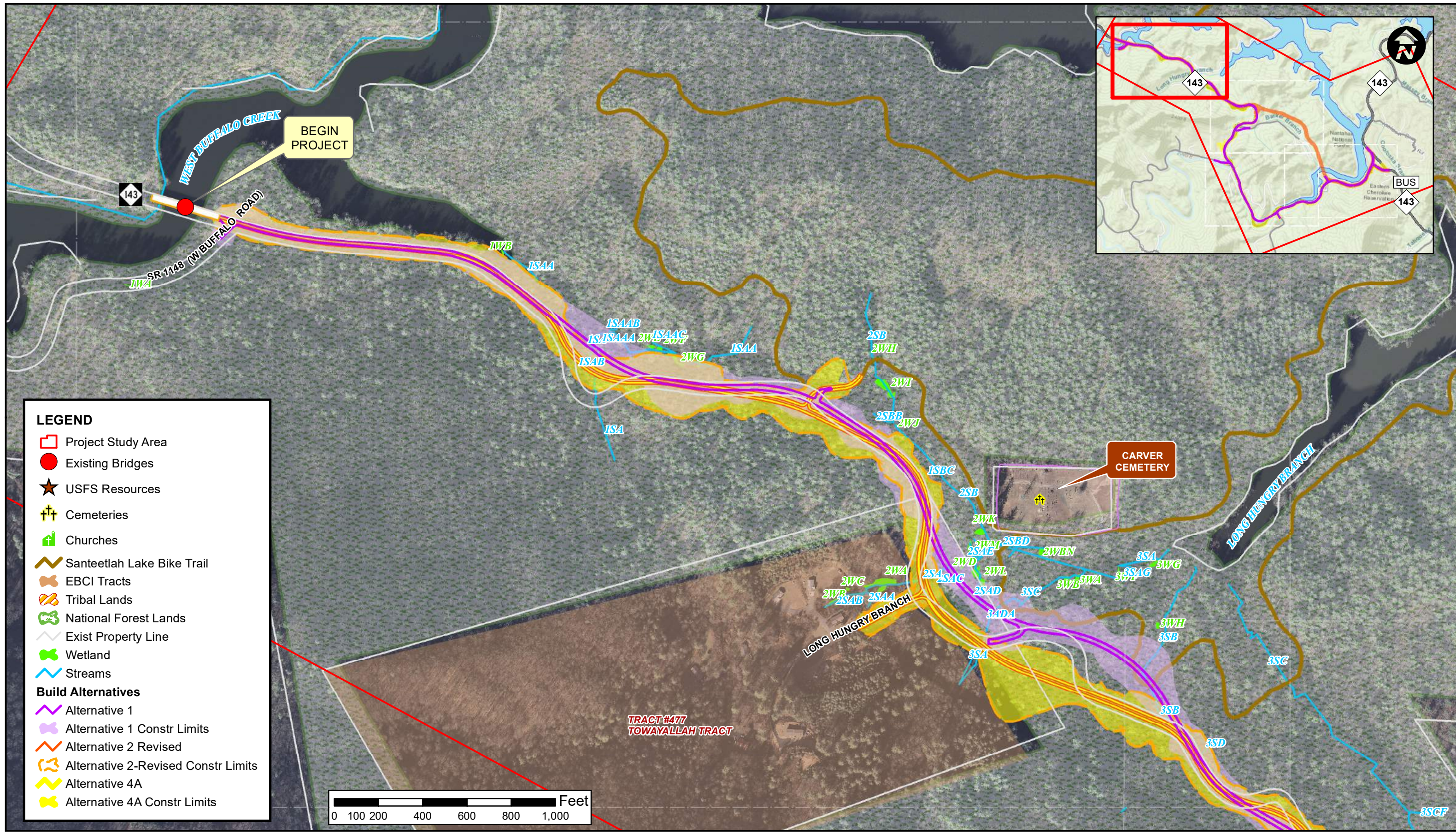
- Alternative 4A has the lowest amount of stream and wetland impacts.
  - ✓ Alternative 1 would impact approximately 880 linear feet more jurisdictional streams than Alternative 4A. Alternative 1 would impact approximately 0.06 acres more wetlands than Alternative 4A.
  - ✓ Alternative 2 revised would impact approximately 300 linear feet more jurisdictional streams than Alternative 4A. Alternative 2-Revised would impact approximately 0.06 acres more wetlands than Alternative 4A.
- Alternative 4A has the least amount of impacts to U.S. Forest Service resources, including property impacts and impacts to the Santeetlah Bike Trail.
- Alternatives 4A and 2-Revised are tied for the least amount of impacts to tribal lands and tribal tracts.
- Graham County Commissioners passed a resolution supporting Alternative 4A in January 2017.





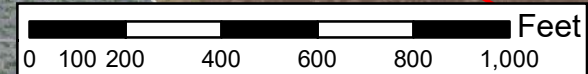
**NC 143 Improvements**  
**From West Buffalo Creek to NC 143 Business in Graham County**  
**TIP R-2822B**

**EXHIBIT 1: ENVIRONMENTAL FEATURES**



**LEGEND**

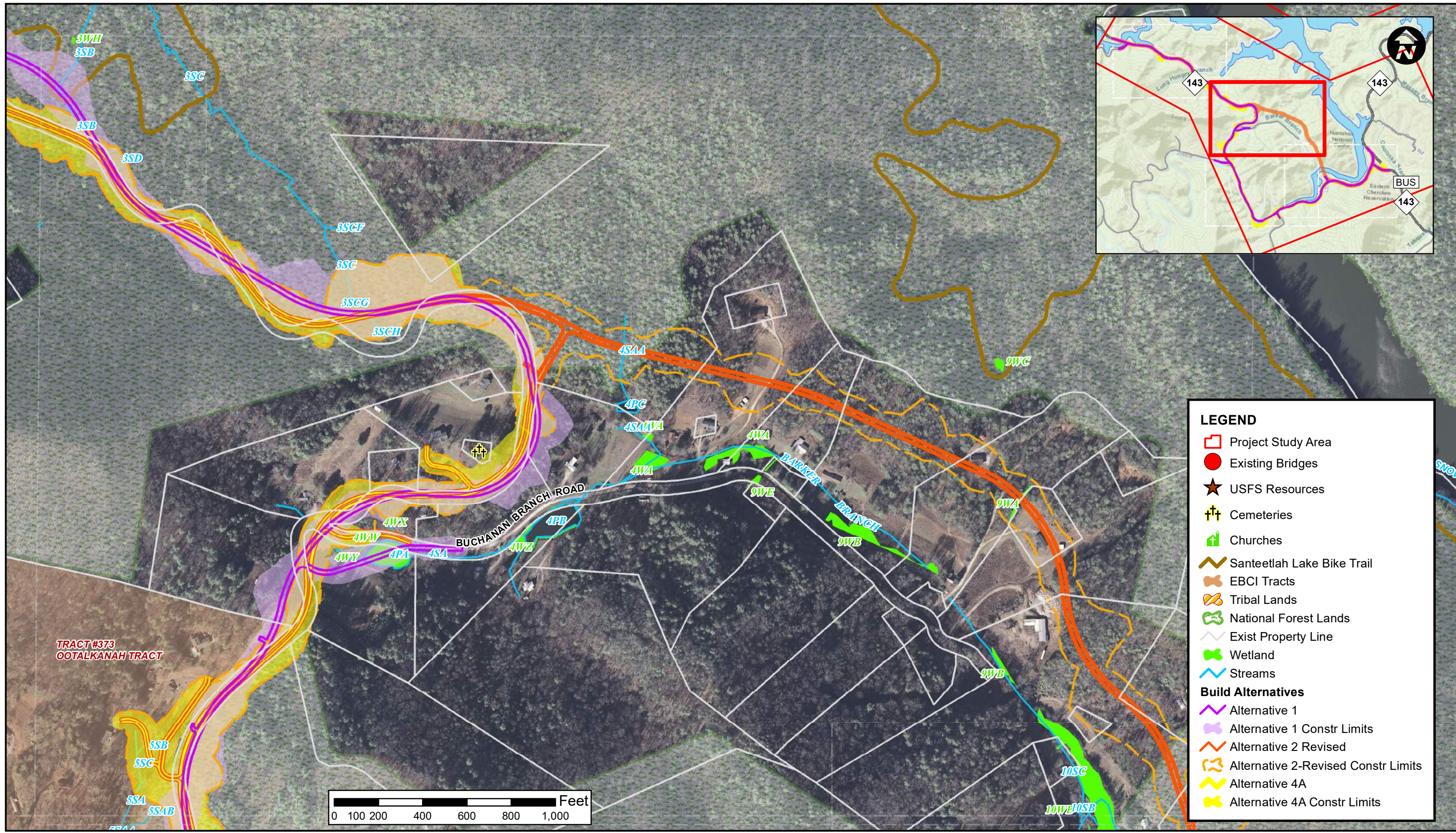
- Project Study Area
- Existing Bridges
- ★ USFS Resources
- †† Cemeteries
- ✚ Churches
- ⚡ Santeetlah Lake Bike Trail
- ⚡ EBCI Tracts
- ⚡ Tribal Lands
- ⚡ National Forest Lands
- Exist Property Line
- ⚡ Wetland
- ⚡ Streams
- Build Alternatives**
- ⚡ Alternative 1
- ⚡ Alternative 1 Constr Limits
- ⚡ Alternative 2 Revised
- ⚡ Alternative 2-Revised Constr Limits
- ⚡ Alternative 4A
- ⚡ Alternative 4A Constr Limits



**NC 143 Improvements**  
**from From West Buffalo Creek to NC 143 Business in Graham County**  
**TIP R-2822B**

**EXHIBIT 2A: COMBINED ALTERNATIVES**





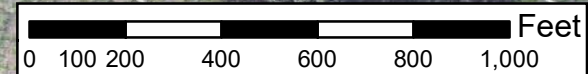
**LEGEND**

- Project Study Area
- Existing Bridges
- ★ USFS Resources
- ✠ Cemeteries
- ✠ Churches
- ~ Santeetlah Lake Bike Trail
- ~ EBCI Tracts
- ~ Tribal Lands
- ~ National Forest Lands
- ~ Exist Property Line
- ~ Wetland
- ~ Streams

**Build Alternatives**

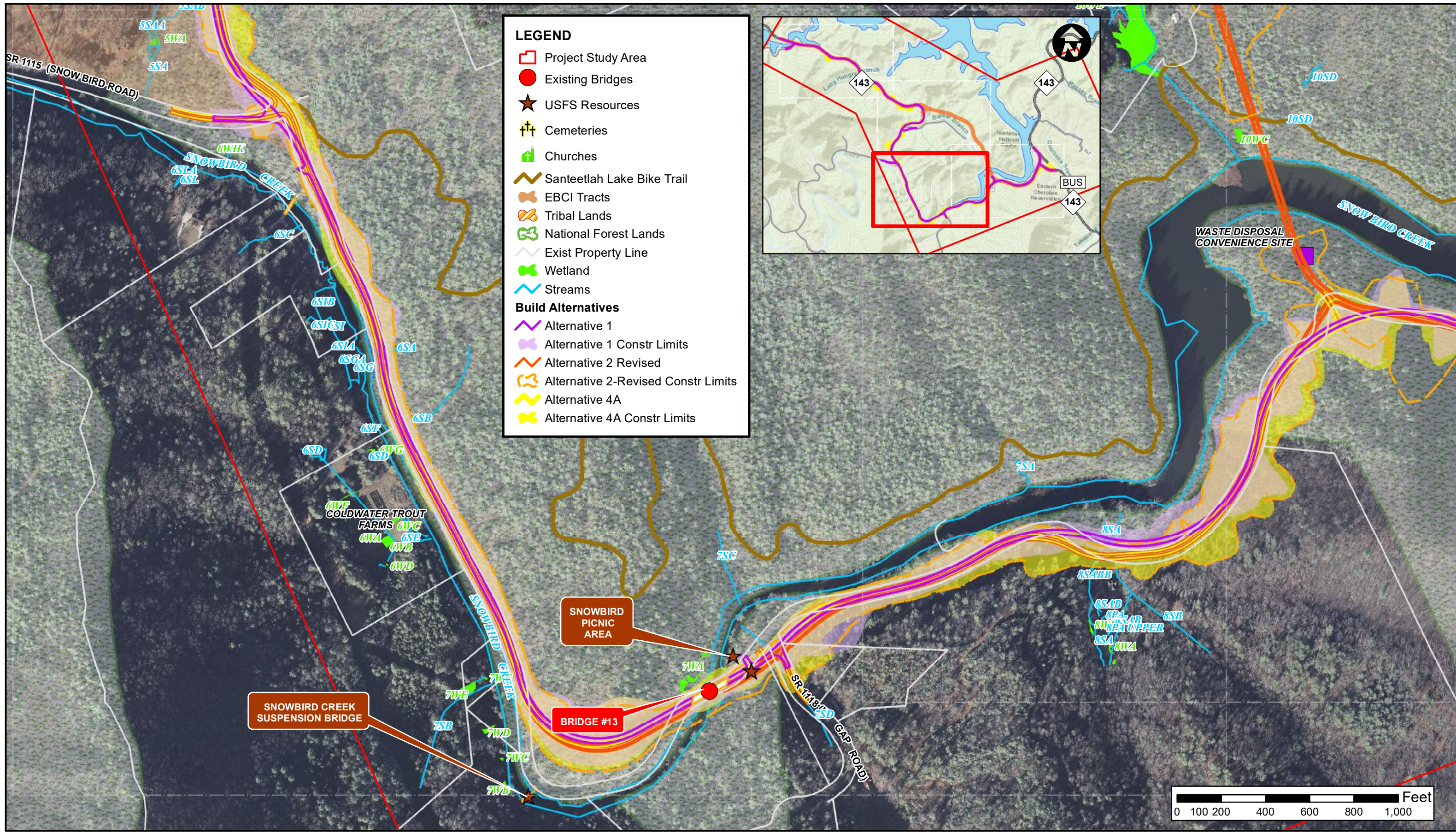
- ~ Alternative 1
- ~ Alternative 1 Constr Limits
- ~ Alternative 2 Revised
- ~ Alternative 2-Revised Constr Limits
- ~ Alternative 4A
- ~ Alternative 4A Constr Limits

TRACT #373  
OOTALKANAH TRACT



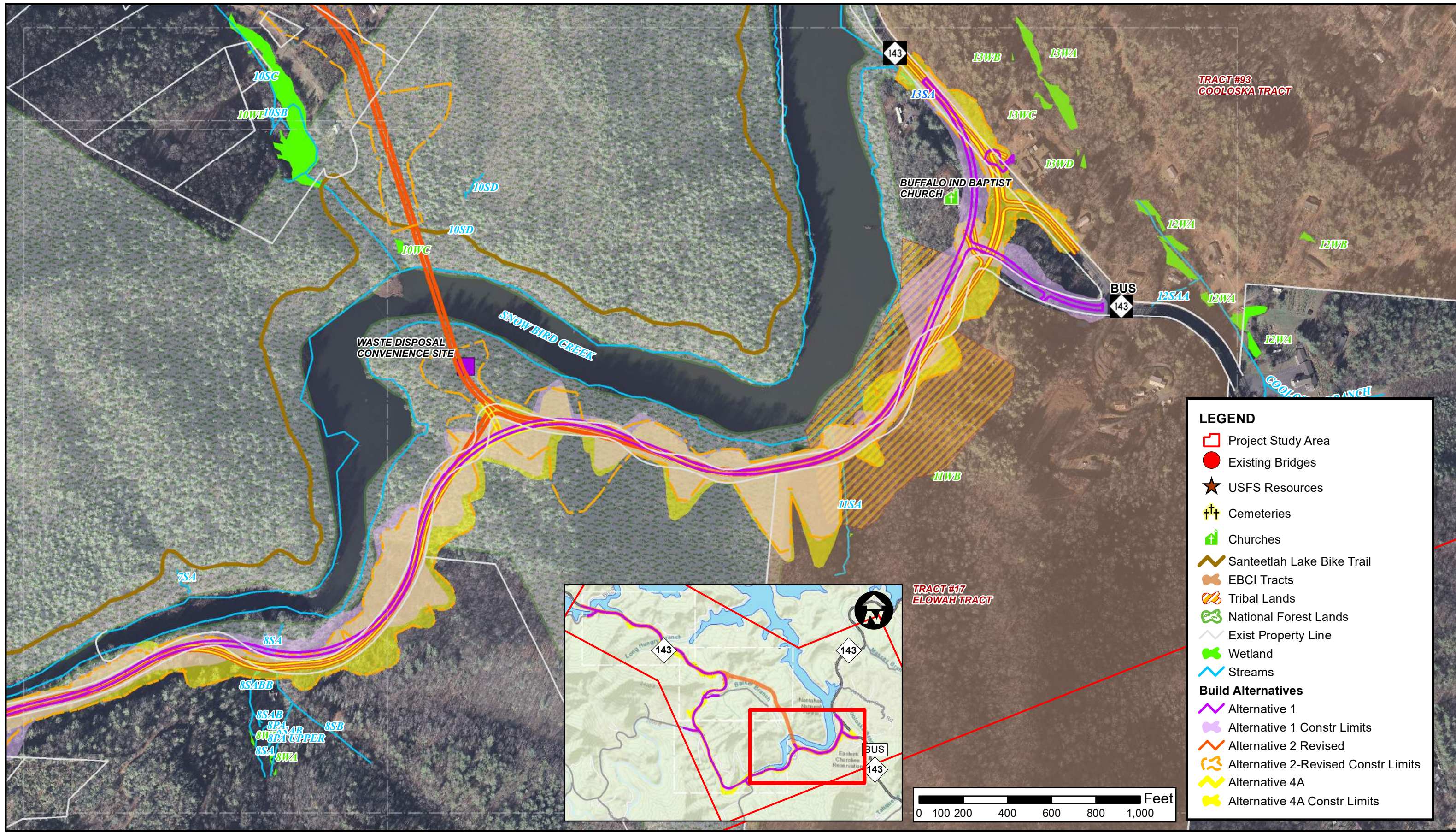
**NC 143 Improvements**  
**from From West Buffalo Creek to NC 143 Business in Graham County**  
**TIP R-2822B**

**EXHIBIT 2B: COMBINED ALTERNATIVES**



**NC 143 Improvements**  
**from From West Buffalo Creek to NC 143 Business in Graham County**  
**TIP R-2822B**

EXHIBIT 2C: COMBINED ALTERNATIVES



**LEGEND**

- Project Study Area
- Existing Bridges
- ★ USFS Resources
- ✚ Cemeteries
- ✚ Churches
- ↶ Santeetlah Lake Bike Trail
- ⊞ EBCI Tracts
- ⊞ Tribal Lands
- ⊞ National Forest Lands
- ⊞ Exist Property Line
- ⊞ Wetland
- ⊞ Streams

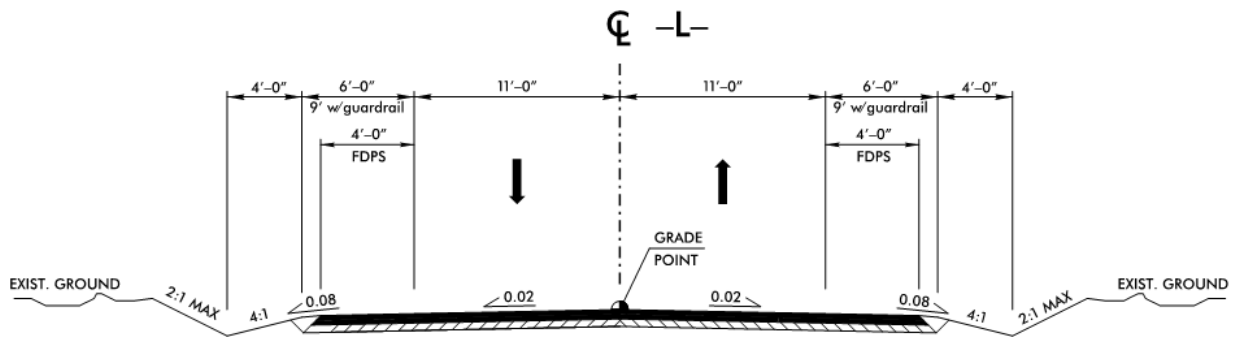
**Build Alternatives**

- ⊞ Alternative 1
- ⊞ Alternative 1 Constr Limits
- ⊞ Alternative 2 Revised
- ⊞ Alternative 2-Revised Constr Limits
- ⊞ Alternative 4A
- ⊞ Alternative 4A Constr Limits



**NC 143 Improvements**  
**from From West Buffalo Creek to NC 143 Business in Graham County**  
**TIP R-2822B**

**EXHIBIT 2D: COMBINED ALTERNATIVES**



TYPICAL SECTION NO. 1



**NC 143 Improvements**  
**From West Buffalo Creek to NC 143 Business in Graham**  
**County**  
**TIP R-2822B**

**EXHIBIT 3: TYPICAL**  
**SECTION**

North Carolina Department of Transportation  
Preliminary Estimate

TIP No. **R-2822B**  
NC-143  
FM: West Buffalo Creek to SR-1127  
(2-Lane Upgrade Exist. Road)

(ALT1)

County: **GRAHAM**

<b>Construction Cost</b>
<b>\$ 23,960,000.00</b>

Priced By: Nidal Albadawi, PE 10/11/18  
Requested By: Jeanie Tyson - Stantec 10/05/18

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Construction Surveying	1	LS	\$ 115,000.00	\$ 115,000.00
			Clearing & Grubbing	40	Acres	\$ 20,000.00	\$ 800,000.00
	<b>Added</b>		Supp. Clearing & Grubbing	3	Acres	\$ 4,000.00	\$ 12,000.00
			Unclassified Excavation	566,000	CY	\$ 8.00	\$ 4,528,000.00
			Borrow Excavation	5,700	CY	\$ 18.00	\$ 102,600.00
	<b>Added</b>		Reinf. Br. App. Fill	1	LS	\$ 23,000.00	\$ 23,000.00
			Fine Grading	67,000	SY	\$ 3.00	\$ 201,000.00
			Drainage (2-Lane shoulder section)	4.17	Miles	\$ 150,000.00	\$ 625,500.00
			Pavement Removal	36,500	SY	\$ 4.50	\$ 164,250.00
			Pavement Resurfacing	26,200	SY	\$ 12.00	\$ 314,400.00
			Pavement Widening	6,800	SY	\$ 65.00	\$ 442,000.00
			New Pavement	54,000	SY	\$ 55.00	\$ 2,970,000.00
			Subgrade Stabilization	74,500	SY	\$ 7.00	\$ 521,500.00
			Guardrail	17,000	LF	\$ 16.00	\$ 272,000.00
			Guardrail (shop curved)	380.0	LF	\$ 20.00	\$ 7,600.00
			GREU, Type 350	58	EA	\$ 3,100.00	\$ 179,800.00
			GREU, Type III	24	EA	\$ 1,800.00	\$ 43,200.00
			GREU, Type AT-1	3	EA	\$ 600.00	\$ 1,800.00
			Additional Guardrail Posts	20	EA	\$ 30.00	\$ 600.00
			Concrete Barrier for Retaining Walls	1,300	LF	\$ 120.00	\$ 156,000.00
			Erosion Control	40.0	Acres	\$ 25,000.00	\$ 1,000,000.00
	<b>Added</b>		Signing	1.0	LS	\$ 25,000.00	\$ 25,000.00
			Traffic Control (2-Lane shoulder section)	4.17	Miles	\$ 40,000.00	\$ 166,800.00
			Thermo & Markers (2-Lane shoulder section)	4.17	Miles	\$ 20,000.00	\$ 83,400.00
			10'x7' RCBC, 125 deg. Skew, 5' fill	60.0	LF	\$ 1,600.00	\$ 96,000.00
			Ret. Wall, 5.5' max. height-fill	900	SF	\$ 150.00	\$ 135,000.00
			Ret. Wall, 4.5' max height- fill	500	SF	\$ 135.00	\$ 67,500.00
			Ret. Wall, 2.2' max height- fill	120	SF	\$ 100.00	\$ 12,000.00
			Ret. Wall, 2.2' max height- fill	450	SF	\$ 100.00	\$ 45,000.00
			Ret. Wall, 2.1' max height - fill	120	SF	\$ 100.00	\$ 12,000.00
			Ret. Wall, 3.4' max height - fill	170	SF	\$ 125.00	\$ 21,250.00
			Ret. Wall, 7.1' max height - fill	800	SF	\$ 150.00	\$ 120,000.00
			Ret. Wall, 17.1' max height - fill	980	SF	\$ 170.00	\$ 166,600.00
			Ret. Wall, 24.4' max height - fill	5,200	SF	\$ 200.00	\$ 1,040,000.00
			Ret. Wall, 28.8' max. height - fill	5,650	SF	\$ 200.00	\$ 1,130,000.00
			Remove Existing Bridge, 180' x 27'	4,860	SF	\$ 25.00	\$ 121,500.00
			New Bridge, 180' x 37'	6,660	SF	\$ 160.00	\$ 1,065,600.00
	<b>Added</b>		Bridge App. Slabs (2@38x25)	1,900	SF	\$ 25.00	\$ 47,500.00
			Msc. & Mob. (10% Str. & Walls)	1	LS		\$ 432,000.00
			Msc. & Mob. (35% Rdwy)	1	LS		\$ 4,464,600.00

Lgth 4.17 Miles

**Revised**

Contract Cost .....	\$ 21,732,000.00
E. & C. (10% State Funded) .....	\$ 2,228,000.00
<b>Construction Cost .....</b>	<b>\$ 23,960,000.00</b>

**Note: Utilities Construction, ROW Utilities and Right of Way Costs  
are not included.**

North Carolina Department of Transportation  
Preliminary Estimate

TIP No. **R-2822B**

County: **GRAHAM**

NC-143

(ALT2REV, -L4A- &-L2-)

FM: West Buffalo Creek to SR-1127  
(2-Lane Partial New Location)

<b>Construction Cost</b>
<b>\$ 41,200,000.00</b>

Priced By: Karen Lovering, PE

02/28/19

Requested By: Jeanie Tyson - Stantec

02/26/19

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Construction Surveying	1	LS	\$ 100,000.00	\$ 100,000.00
			Clearing & Grubbing	60.0	Acres	\$ 20,000.00	\$ 1,200,000.00
	<b>Added</b>		Supp. Clearing & Grubbing	4	Acres	\$ 4,000.00	\$ 16,000.00
			Unclassified Excavation	1,322,000	CY	\$ 6.50	\$ 8,593,000.00
	<b>Added</b>		Reinf. Br. App. Fill	1	LS	\$ 60,000.00	\$ 60,000.00
			Fine Grading	79,000	SY	\$ 3.00	\$ 237,000.00
			Drainage (2-Lane shoulder section) (L4A&L2)	3.21	Miles	\$ 150,000.00	\$ 481,500.00
			Drainage (2-Lane shoulder section) (L4A)	2.00	Miles	\$ 150,000.00	\$ 300,000.00
			Pavement Removal	28,800	SY	\$ 5.00	\$ 144,000.00
			Pavement Resurfacing	36,100	SY	\$ 12.00	\$ 433,200.00
			New Pavement	66,700	SY	\$ 50.00	\$ 3,335,000.00
			Pavement Widening	2,300	SY	\$ 65.00	\$ 149,500.00
			Subgrade Stabilization	86,400	SY	\$ 7.00	\$ 604,800.00
			Guardrail	19,125	LF	\$ 16.00	\$ 306,000.00
			Shop Curved Guardrail	538	LF	\$ 20.00	\$ 10,750.00
			GREU, Type 350	55	EA	\$ 3,100.00	\$ 170,500.00
			GREU, Type III	21	EA	\$ 1,800.00	\$ 37,800.00
			GREU, AT-1	6	EA	\$ 600.00	\$ 3,600.00
			Additional Guardrail Posts	20	EA	\$ 35.00	\$ 700.00
			Concrete Barrier for Retaining Walls	3,100	LF	\$ 120.00	\$ 372,000.00
			Erosion Control	50.0	Acres	\$ 25,000.00	\$ 1,250,000.00
	<b>Added</b>		Signing	1	LS	\$ 32,000.00	\$ 32,000.00
			Traffic Control (L4A & L2)	3.21	Miles	\$ 40,000.00	\$ 128,400.00
			Traffic Control (L4A)	2.00	Miles	\$ 40,000.00	\$ 80,000.00
			Thermo & Markers- two lanes (L4A & L2)	3.21	Miles	\$ 20,000.00	\$ 64,200.00
			Thermo & Markers- two lanes (L4A)	2.00	Miles	\$ 20,000.00	\$ 40,000.00
			Retaining Wall 25.5' max height, fill	9,820	SF	\$ 170.00	\$ 1,669,400.00
			Retaining Wall 8.8' max height, fill	9,680	SF	\$ 160.00	\$ 1,548,800.00
			Retaining Wall 4.4' max height, fill	4,180	SF	\$ 120.00	\$ 501,600.00
			Retaining Wall 3.5' max height, fill	440	SF	\$ 135.00	\$ 59,400.00
			Retaining Wall 29.4' max height, fill	4,410	SF	\$ 200.00	\$ 882,000.00
			Retaining Wall 33' max height, fill	3,300	SF	\$ 225.00	\$ 742,500.00
			Remove Existing Bridge, 180' x 27'	4,860	SF	\$ 20.00	\$ 97,200.00
			New Bridge, 180' x 37'	6,660	SF	\$ 150.00	\$ 999,000.00
			Bridge App. Slabs (2@38x25)	1,900	SF	\$ 25.00	\$ 47,500.00
			New Bridge, 640' x 38' (100' above lake)	24,320	SF	\$ 200.00	\$ 4,864,000.00
	<b>Added</b>		Bridge App. Slabs (2@38x25)	1,900	SF	\$ 25.00	\$ 47,500.00
	<b>Added</b>		C,M & R Temp Access	1	LS	\$ 300,000.00	\$ 300,000.00

North Carolina Department of Transportation  
Preliminary Estimate

Priced By: Karen Lovering, PE 02/28/19  
 Requested By: Jeanie Tyson - Stantec 02/26/19

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Msc. & Mob. (10% Str. & Walls)	1	LS		\$ 1,176,150.00
			Msc. & Mob. (35% Rdwy)	1	LS		\$ 6,353,000.00

Lgth 3.12 Miles

**Revised**

Contract Cost .....	\$ 37,438,000.00
E. & C. (10% State Funded) .....	\$ 3,762,000.00
<b>Construction Cost .....</b>	<b>\$ 41,200,000.00</b>

**Note: Utilities Construction, ROW Utilities and Right of Way Costs are not included.**

TIP No. **R-2822B**

County: **GRAHAM**

NC-143 (ALT4A)

FM: West Buffalo Creek to SR-1127  
(2-Lane Upgrade Exist. Road)

<b>Construction Cost</b>
<b>\$ 29,100,000.00</b>

Prepared By:  
 Requested By: Jeanie Tyson - Stantec 02/26/19  
 Price By: Karen Lovering, PE 2/28/2019

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Construction Surveying	1	LS	\$ 120,000.00	\$ 120,000.00
			Clearing & Grubbing	40.0	Acres	\$ 20,000.00	\$ 800,000.00
	<b>Added</b>		Supp. Clearing & Grubbing	3	Acres	\$ 4,000.00	\$ 12,000.00
			Unclassified Excavation	673,000	CY	\$ 7.50	\$ 5,047,500.00
	<b>Added</b>		Reinf. Br. App. Fill	1	LS	\$ 23,000.00	\$ 23,000.00
			Fine Grading	92,000	SY	\$ 3.00	\$ 276,000.00
			Drainage (2-Lane shoulder section)	4.28	Miles	\$ 150,000.00	\$ 642,000.00
			Pavement Removal	29,000	SY	\$ 4.50	\$ 130,500.00
			Pavement Resurfacing	37,700	SY	\$ 12.00	\$ 452,400.00
			Pavement Widening	2,000	SY	\$ 65.00	\$ 130,000.00
			New Pavement	51,500	SY	\$ 52.00	\$ 2,678,000.00
			Subgrade Stabilization	97,300	SY	\$ 7.00	\$ 681,100.00
			Guardrail	12,075.00	LF	\$ 16.00	\$ 193,200.00
			Guardrail (Shop Curved)	462.50	LF	\$ 20.00	\$ 9,250.00
			GREU, Type 350	48	EA	\$ 3,100.00	\$ 148,800.00
			GREU, Type III	16	EA	\$ 1,800.00	\$ 28,800.00
			GREU, Type AT-1	6	EA	\$ 600.00	\$ 3,600.00
			Additional Guardrail Posts	20	EA	\$ 30.00	\$ 600.00
			Concrete Barrier for Retaining Walls	3,200	LF	\$ 120.00	\$ 384,000.00
			Erosion Control	50.0	Acre	\$ 25,000.00	\$ 1,250,000.00
	<b>Added</b>		Signing	1	LS	\$ 27,000.00	\$ 27,000.00
			Thermo & Markers (2 lanes)	4.28	Miles	\$ 20,000.00	\$ 85,600.00
			Traffic Control	4.28	Miles	\$ 40,000.00	\$ 171,200.00
			10'x7' RCBC, 125 deg. Skew, 5' fill	60	LF	\$ 1,600.00	\$ 96,000.00
			<b>Retaining Walls</b>				
			Retaining Wall 8.8' max height, fill	9,680	SF	\$ 160.00	\$ 1,548,800.00
			Retaining Wall 4.4' max height, fill	4,180	SF	\$ 120.00	\$ 501,600.00
			Retaining Wall 3.5' max height, fill	440	SF	\$ 135.00	\$ 59,400.00
			Retaining Wall 21.8' max height, fill	8,720	SF	\$ 200.00	\$ 1,744,000.00
			Retaining Wall 29.4' max height, fill	4,410	SF	\$ 200.00	\$ 882,000.00
			Retaining Wall 25.5' max height, fill	9,820	SF	\$ 170.00	\$ 1,669,400.00
			Remove Existing Bridge, 180' x 27'	4,860	SF	\$ 25.00	\$ 121,500.00
			New Bridge, 180' x 37'	6,660	SF	\$ 160.00	\$ 1,065,600.00
	<b>Added</b>		Bridge App. Slabs (2@38x25)	1,900	SF	\$ 25.00	\$ 47,500.00



			Msc. & Mob. (10% Str. & Walls)	1	LS		\$ 773,650.00
			Msc. & Mob. (35% Rdwy)	1	LS		\$ 4,654,000.00
Lgth	4.44 Miles		Contract Cost .....				\$ 26,458,000.00
<b>Revised</b>			E. & C. (10% State Funded) .....				\$ 2,642,000.00
			<b>Construction Cost .....</b>				<b>\$ 29,100,000.00</b>

**Note: Utilities Construction, ROW Utilities and Right of Way Costs are not included.**