

Sam's Branch Multi-use Path Crossing Transportation Improvement Feasibility & Impact Analysis Town of Clayton, NC

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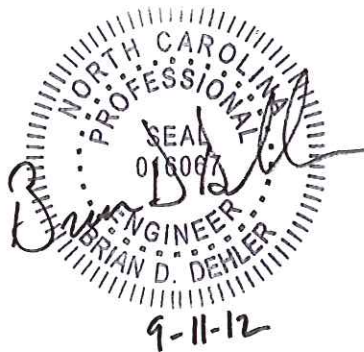


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1. EXECUTIVE SUMMARY

The Sam's Branch Greenway is a major pedestrian and cyclist user facility serving the northern sector of the Clayton area. The multi-use paved greenway facility parallels a named tributary of the Neuse River, and will ultimately extend some 5.5 miles, connecting both the river and Mountains-to-Sea Trail (MST) with Clemmons State Forest (Figure 1). The greenway trail system will be completed in phases. Phase I is complete.

Phase I of the greenway trail ends abruptly at N. O'Neil Street due to a significant grade change. This grade change presents both a challenge and an opportunity to continuing with Phase II to complete the greenway trail. This report will evaluate the feasibility, safety, traffic, environmental impacts, and estimated costs of options for continuing the multi-use facility across O'Neil Street, evaluating both grade-separated and at-grade crossing opportunities.

Existing topography in the project vicinity can be considered "rolling". N. O'Neil Street is a two-lane state maintained facility that runs in a north-south direction and has a posted speed limit of 45 MPH at the Trailhead entrance. Average Daily Traffic Volume is estimated to be 7550 vehicles per day on the facility. There is a 12" water line running parallel to N. O'Neil Street on the west side. There are also overhead utilities on the west side. Sam's Branch flows west to east under N. O'Neil Street just south of the greenway trail and Trailhead. An 8-inch sanitary sewer line runs parallel to Sam's Branch.

Land uses consist of a mix of residential and agricultural uses plus the recreational use associated with the Sam's Branch Multi-use Path (greenway trail). Ashcroft, an approved residential subdivision, is proposed on the east side of N. O'Neil Street immediately north of the Sam's Branch Multi-use Path – Phase I. The existing Trailhead entrance and parking will be re-configured with the construction of Ashcroft.

Jurisdictional Waters of the US are present in the project area and include Sam's Branch, unnamed tributaries, a farm pond, and wetlands associated with Sam's Branch. Neuse River Buffer rules will apply.

There are five Threatened and Endangered (T&E) species listed for Johnston County. A preliminary investigation determined habitat may be present for two of the species. Additional investigations/surveys will be required to assess the presence of T&E species.

WSP SELLS sent a letter to the North Carolina State Historic Preservation Office (SHPO), dated April 23, 2012, requesting information concerning the presence or known existence of historic, archaeological or cultural resources in the project vicinity. SHPO responded in a letter dated May 9, 2012 (see Appendix B), writing:

"There are no known recorded archaeological sites within the project boundaries. However, the project area has never been systematically surveyed to determine the location or significance of archaeological resources. We recommend that a

comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project. Potential effects on unknown resources must be assessed prior to the initiation of construction activities...We have determined that the project as proposed will not have an effect on any historic structures.”

SHPO should be contacted again prior to construction to request comment on the project area.

N. O'Neil Street acts as a physical barrier to fulfilling the vision for Sam's Branch Multi-use Path and proceeding with Phase II to complete the path from MTS to the Clemmons State Forest. Several alternatives were identified including both at-grade crossings and grade-separated options. The alternatives are:

- **Alternative A** – On existing location, grade separate N. O'Neil Street and the Multi-use Path using a 10-ft high by 14-ft wide reinforced concrete box culvert (RCBC). This involves raising N. O'Neil Street and holding the existing elevation of the Multi-use Path.
- **Alternative B** – On new location at the entrance of the proposed Ashcroft Subdivision, cross N. O'Neil Street at-grade using a high visibility crosswalk and advanced warning signs/beacons.
- **Alternative C** – On existing location, raise the elevation of the Multi-use Path to cross N. O'Neil Street at-grade using a high visibility crosswalk and advanced warning signs/beacons.
- **Alternative D** – On existing location, grade separate N. O'Neil Street and the Multi-use Path using a 10-ft high by 14-ft wide reinforced concrete box culvert (RCBC). This involves holding the elevation of N. O'Neil Street and lowering the existing elevation of the Multi-use Path.

The alternatives range in cost from around \$100,000 to just over \$1.1 million. While the grade separated configuration is the safest, the cost of the least expensive grade separation alternative is nearly 5 times the cost of the least expensive at-grade alternative.

Environmental impacts are greater for the grade separation alternatives and will require more intensive permitting efforts (Individual permit vs. a Nationwide Permit) with the Army Corps of Engineers (COE). A Division of Water Quality (DWQ) 401 Water Quality Certification will also be required for all alternatives. In addition to the environmental permits, an NCDOT driveway permit and Encroachment Agreement will permit construction within the NCDOT right-of-way.

The grade separation alternatives will be more of an inconvenience to motorists who regularly use N. O'Neil Street to commute or travel to Clayton or other destinations for jobs, shopping and entertainment. N. O'Neil Street will be closed to through traffic for extended periods of time during grading, paving, and culvert construction operations. During construction of the at-grade alternatives, at least one lane of N. O'Neil Street will be open to traffic at all times. It is anticipated that the facility would be returned to two-lane/two-way traffic at the end of each work day.

Minor right-of-way, permanent greenway easement and/or temporary construction easements will be required for both at-grade and grade separated alternatives.

The purpose of this study is to assess the feasibility, safety, traffic, environmental impacts, and estimated costs of options for continuing the multi-use facility across N. O'Neil Street. The alternatives presented in this report, including both at-grade and grade separation options, are considered feasible based on engineering design, environmental impacts, and costs. More detailed studies are recommended to refine the alternatives, address citizen and stakeholder input, identify potential funding resources, and develop an implementation strategy for Sam's Branch Multi-use Path crossing and Phase II.

2. INTRODUCTION

The Sam's Branch Greenway is a major pedestrian and cyclist user facility serving the northern sector of the Clayton area. The multi-use paved greenway facility parallels a named tributary of the Neuse River, and will ultimately extend some 5.5 miles, connecting both the river and Mountains-to-Sea Trail (MST) with Clemmons State Forest (Figure 1). The greenway trail system will be completed in phases.

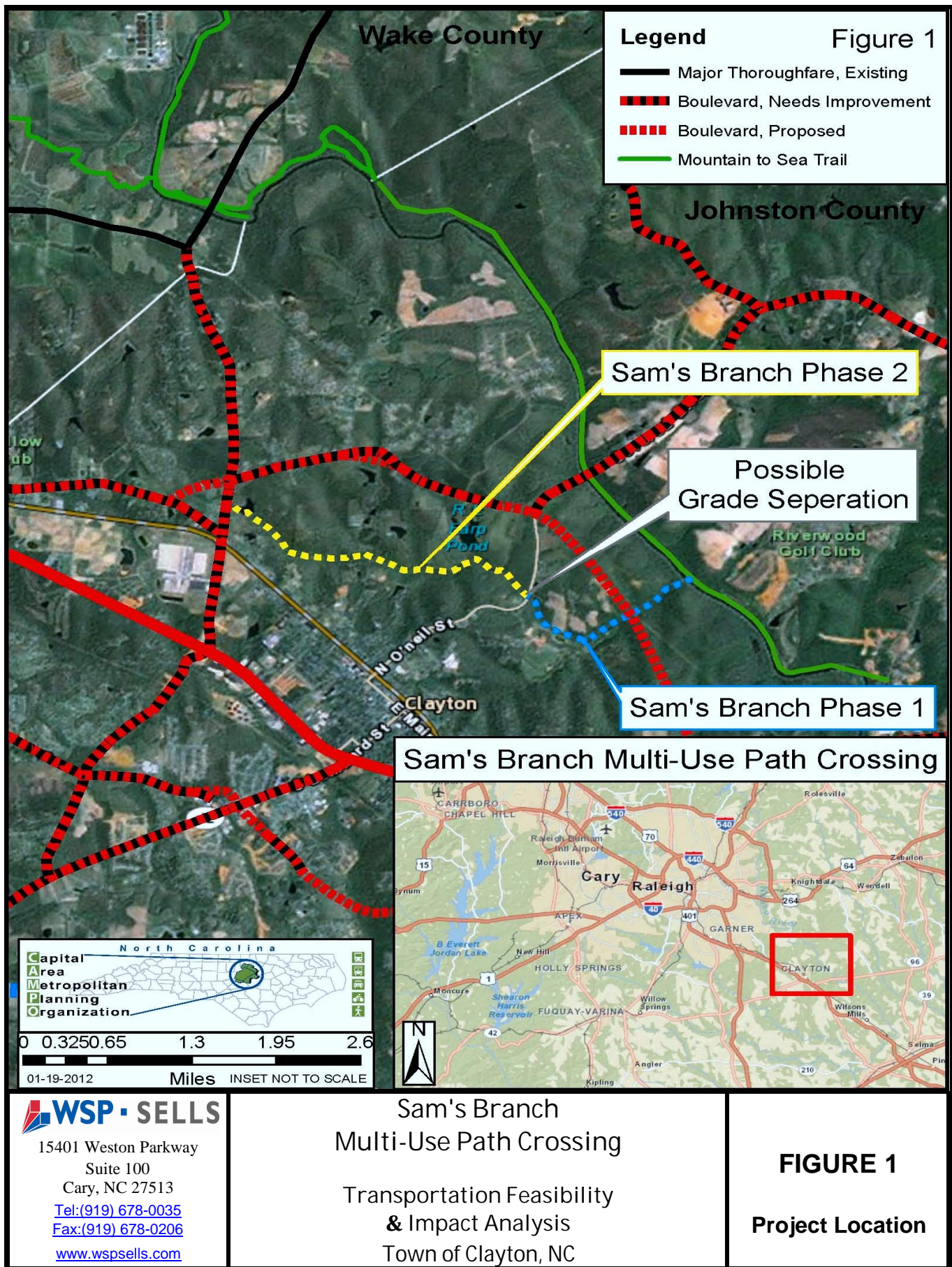
Phase I is approximately 1.2 miles in length and runs from the Neuse River (and paralleling MST) to a point just east of North O'Neil Street (SR 1708), a state-maintained facility listed as a minor thoroughfare in the Draft Johnston County Comprehensive Transportation Plan (CTP). Phase I of the greenway has been constructed through the North Carolina Department of Transportation (NCDOT) Transportation Improvement Program (TIP) funding and Town of Clayton supportive effort.



Sam's Branch Multi-use Trail Phase I terminating at N. O'Neil Street

The greenway is interrupted at N. O'Neil Street due to a significant grade change (see picture to right). This grade change presents both a challenge and an opportunity. The current speed limit on O'Neil Street in the vicinity of Sam's Branch is 45 miles per hour (MPH). Just to the north of the entrance to the Trailhead, the speed limit is posted at 55 MPH. This report will evaluate the feasibility, safety, traffic, environmental impacts, and estimated costs of options for continuing the multi-use facility across O'Neil Street, evaluating both grade-separated and at-grade crossing opportunities.





3. EXISTING CONDITIONS

Topography

Topography in the project vicinity can be considered “rolling”. Based on existing GIS information available on the Johnston County website, the low point elevation of 182 feet on N. O’Neil Street occurs over the Sam’s Branch crossing (Figure 2). To the south of Sam’s Branch, the grade on N. O’Neil Street ascends steeply to elevation 308 feet with grades up to 11%. North of Sam’s Branch on N. O’Neil Street, the elevation gently rises with a grade of 3%. Adjacent to N. O’Neil Street, the natural contours of the existing ground follow the grades along N. O’Neil Street and drain towards Sam’s Branch. N. O’Neil Street is constructed on an embankment through the project area. Stormwater runoff is conveyed by roadside ditches that eventually lead to Sam’s Branch.

Existing Infrastructure

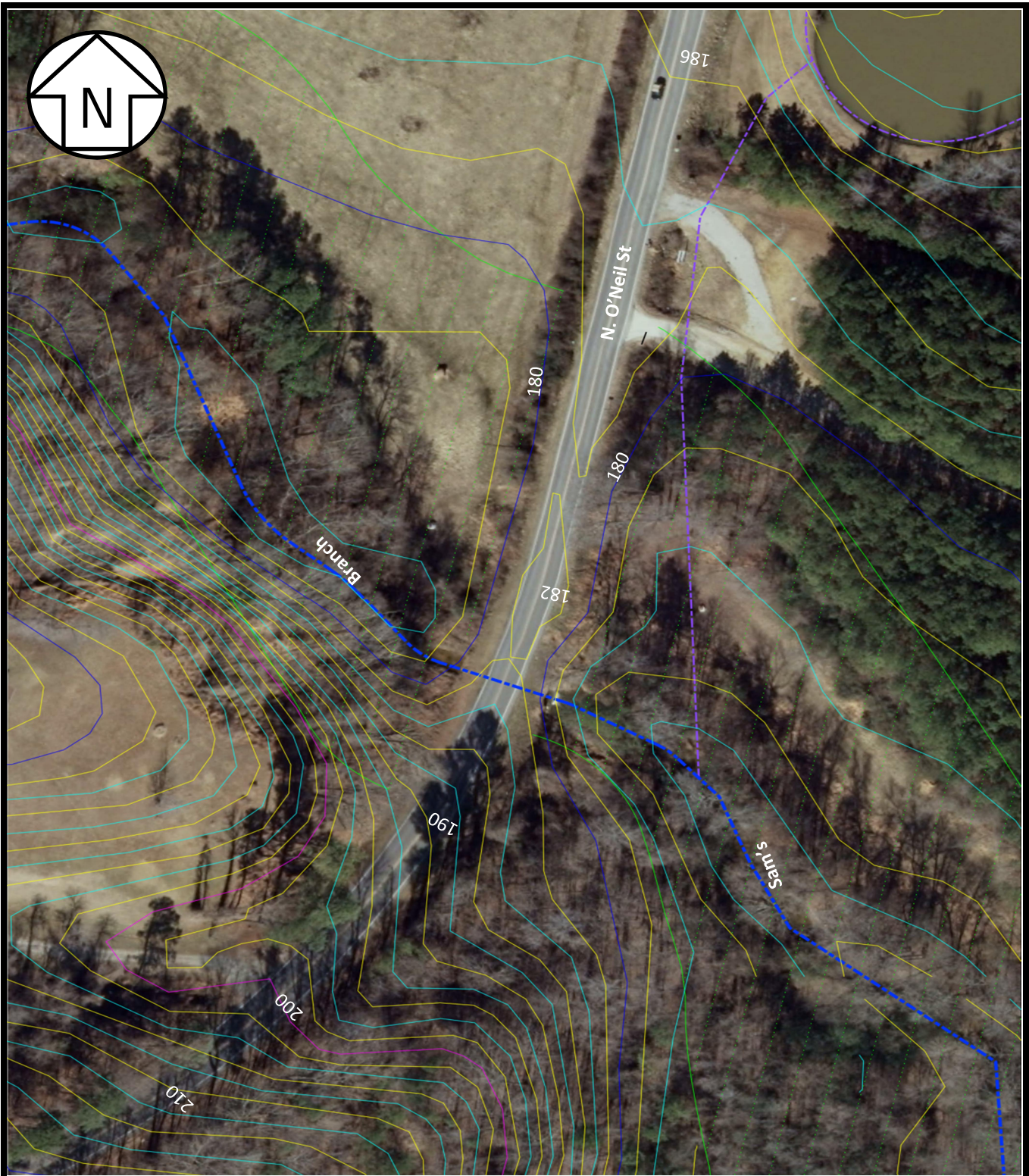
N. O’Neil Street (SR 1708) is a two-lane roadway in 60-foot right-of-way. It begins at E. Main Street (SR 1004) in downtown Clayton and generally runs in a northeasterly direction terminating at the intersection of Covered Bridge Road (SR 1700), a distance of just over two miles. N. O’Neil Street crosses Sam’s Branch approximately two-thirds of the way along this length. The alignment consists of several curves and the elevation change between downtown Clayton and Sam’s Branch is significant. The lowest elevation along N. O’Neil Street is located at the Sam’s Branch crossing. The speed limit ranges from 25 MPH out of downtown Clayton to 55 MPH just north of Sam’s Branch.

Within the project area, N. O’Neil Street runs in a north-south direction and consists of approximately 24 feet of pavement and has a posted speed limit of 45 MPH. Sam’s Branch flows in a southeasterly direction under N. O’Neil Street through a concrete arch culvert.



Sam's Branch crossing under N. O'Neil Street - downstream side.

Vehicular traffic along N. O’Neil Street is estimated to be 7,550 vehicles per day (vpd) in 2012. No current traffic count data is available for the project area, however, traffic count data conducted by the NCDOT is available from their website for years 2003, 2005, and 2009. Using this historical data, an annual traffic growth rate of 3.92% is derived using linear regression analysis (Figure 3). This value can be used to determine Annual Average Daily Traffic (AADT) volumes beyond 2012.



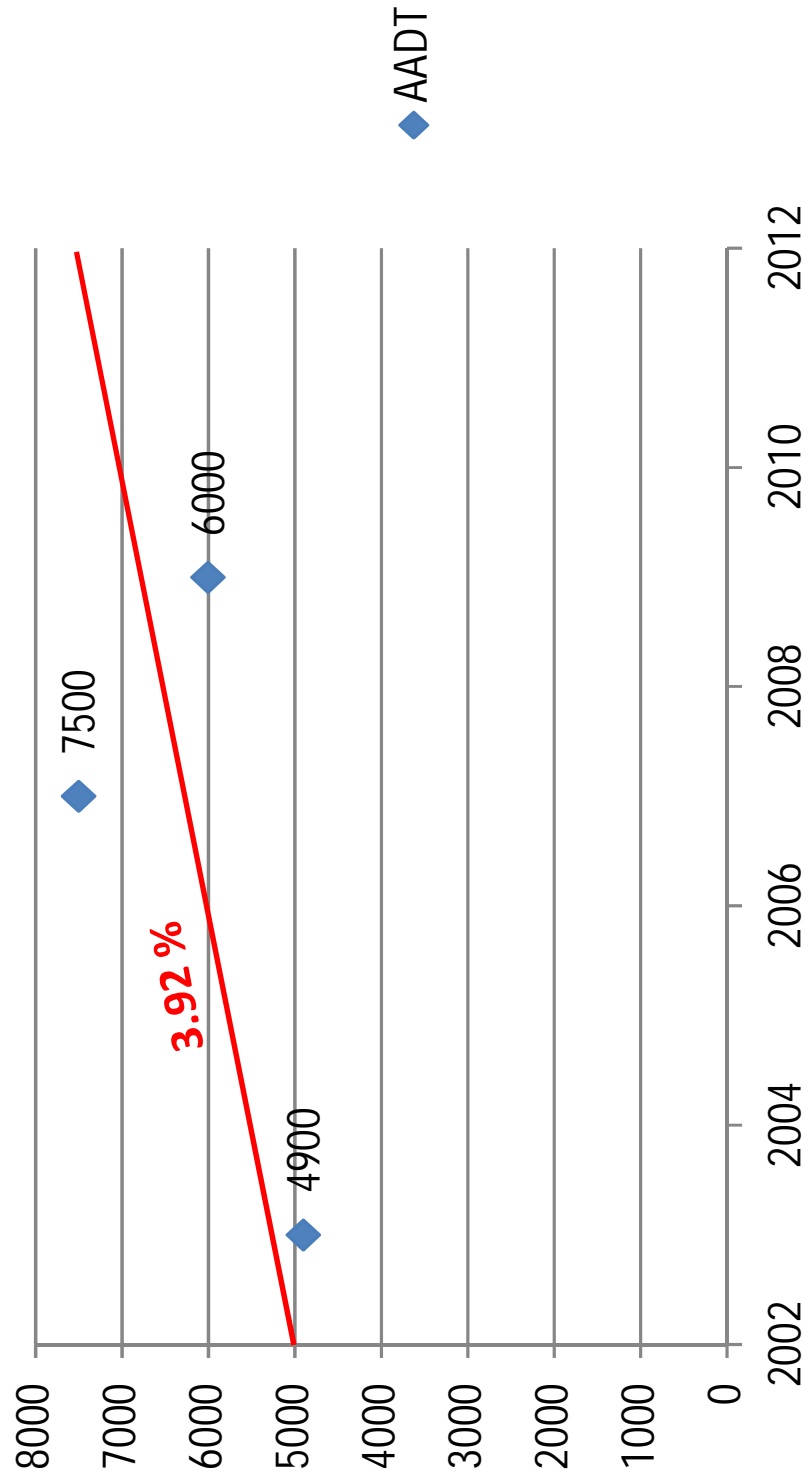
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FIGURE 2
Existing
Topography

AADT



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FIGURE 3
Traffic Volulmes

An existing 12-inch water main runs along the west side of N. O'Neil Street through the project area. A sanitary sewer main runs parallel to Sam's Branch in a 20-foot utility easement crossing N. O'Neil Street immediately north of the Sam's Branch crossing. Overhead utilities exist on the west side of N. O'Neil Street and cross over to the east side in the curve to the south of the Sam's Branch crossing.

Sam's Branch Multi-use Path Phase I follows the sanitary sewer line and Sam's Branch on the east side of N. O'Neil Street. It consists of a 10-foot paved surface with 2-foot gravel shoulders in a 30-foot greenway easement.

Land Use and Local Zoning

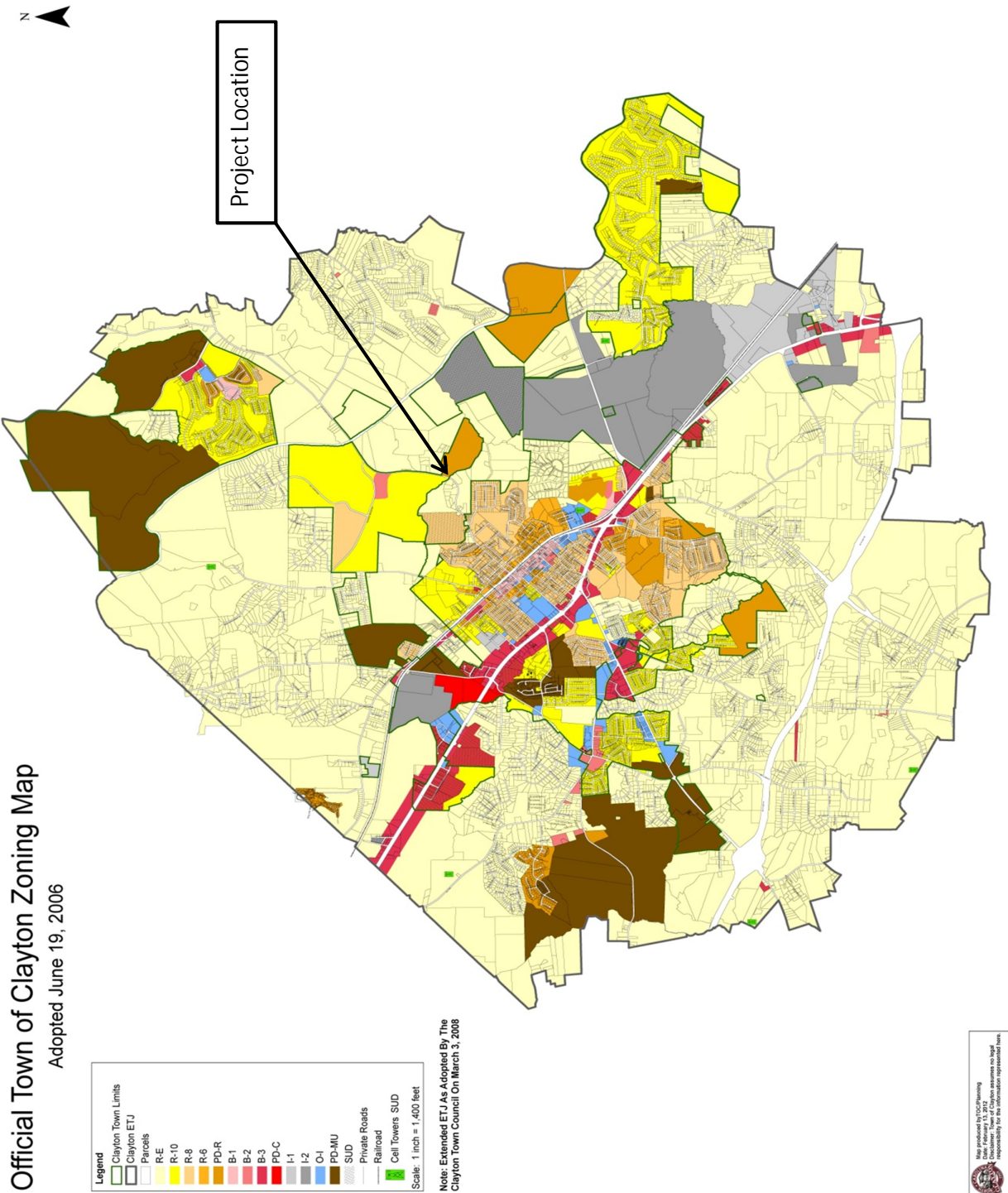
The project lies within the Town of Clayton jurisdictional boundary. Parcels immediately north of Sam's Branch fall within the Town of Clayton's planning jurisdiction (Figure 4). Parcels just to the south of Sam's Branch are in the Extraterritorial Jurisdiction (ETJ). The parcel immediately north of Sam's Branch and west of N. O'Neil Street is zoned R-10. The parcel immediately east of N. O'Neil Street and north of Sam's Branch is zoned PD-R. There is a watershed protection overlay due to the proximity to the Neuse River (Figure 5). The local land use in the vicinity of the project is a mix of residential and agricultural uses.

One residential subdivision, Ashcroft, in the area has been approved. Ashcroft is a 150-unit development located on the east side of N. O'Neil Street and immediately north of Sam's Branch. There will be one access point located on N. O'Neil Street approximately 300 feet north of the Sam's Branch crossing (Figure 6). The Ashcroft entrance will require and accommodate a newly configured entrance to the Sam's Branch Multi-use Path Trailhead. Improvements on N. O'Neil Street associated with the Ashcroft subdivision include exclusive left and right-turn lanes, bike lanes, and curb and gutter.

4. NATURAL RESOURCES IN THE PROJECT STUDY AREA

Project Study Area

The project study area is approximately 11.5 acres in size situated at the existing terminus of the Sam's Branch multi-use path at N. O'Neil Street. The project study area extends from just south of the existing Sam's Branch culvert beneath N. O'Neil Street approximately 1,000 feet to the north, and has a width of approximately 500 feet measured east-to-west perpendicular to, and crossing, N. O'Neil Street. The project study area is comprised of rural/roadside environment, agricultural fields, and hardwood and pine forest. The project vicinity, an area of approximately 300 acres in size and situated primarily south of the N. O'Neil Street - Covered Bridge Road intersection, is comprised primarily of agricultural fields, and hardwood and mixed pine-hardwood forest. Several rural residences are located along North O'Neil Street.



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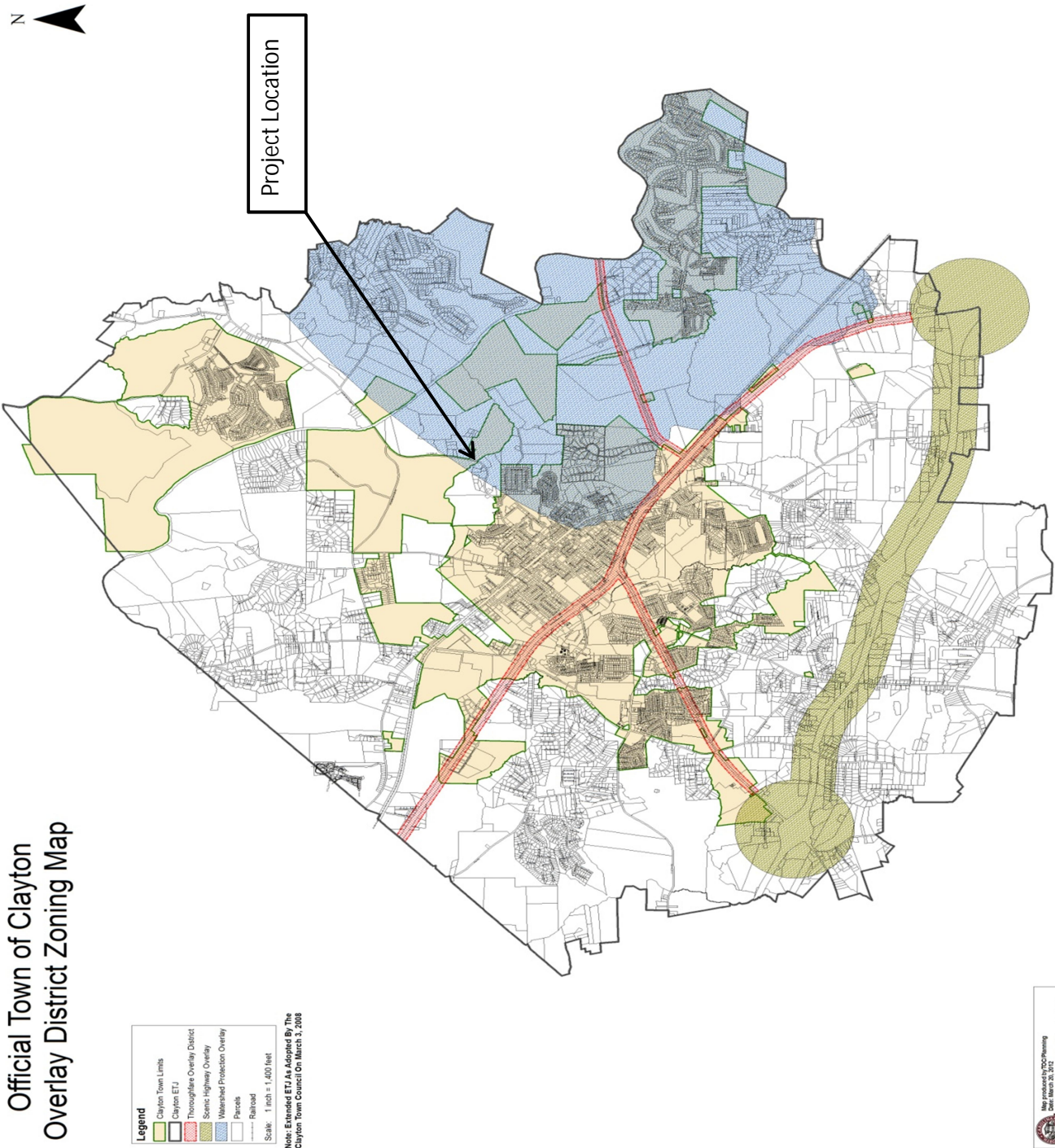
Sam's Branch Multi-Use Path Crossing

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FIGURE 4

Zoning

Official Town of Clayton Overlay District Zoning Map



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FIGURE 5
Overlay Districts

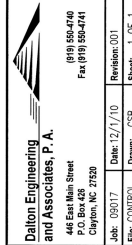


FIGURE 6
Ashcroft
Subdivision Plan

Waters of the U.S.

WSP SELLS conducted a desktop review of the following reference materials to identify potential jurisdictional waters of the U.S., including wetlands, which may be located in the project study area and vicinity:

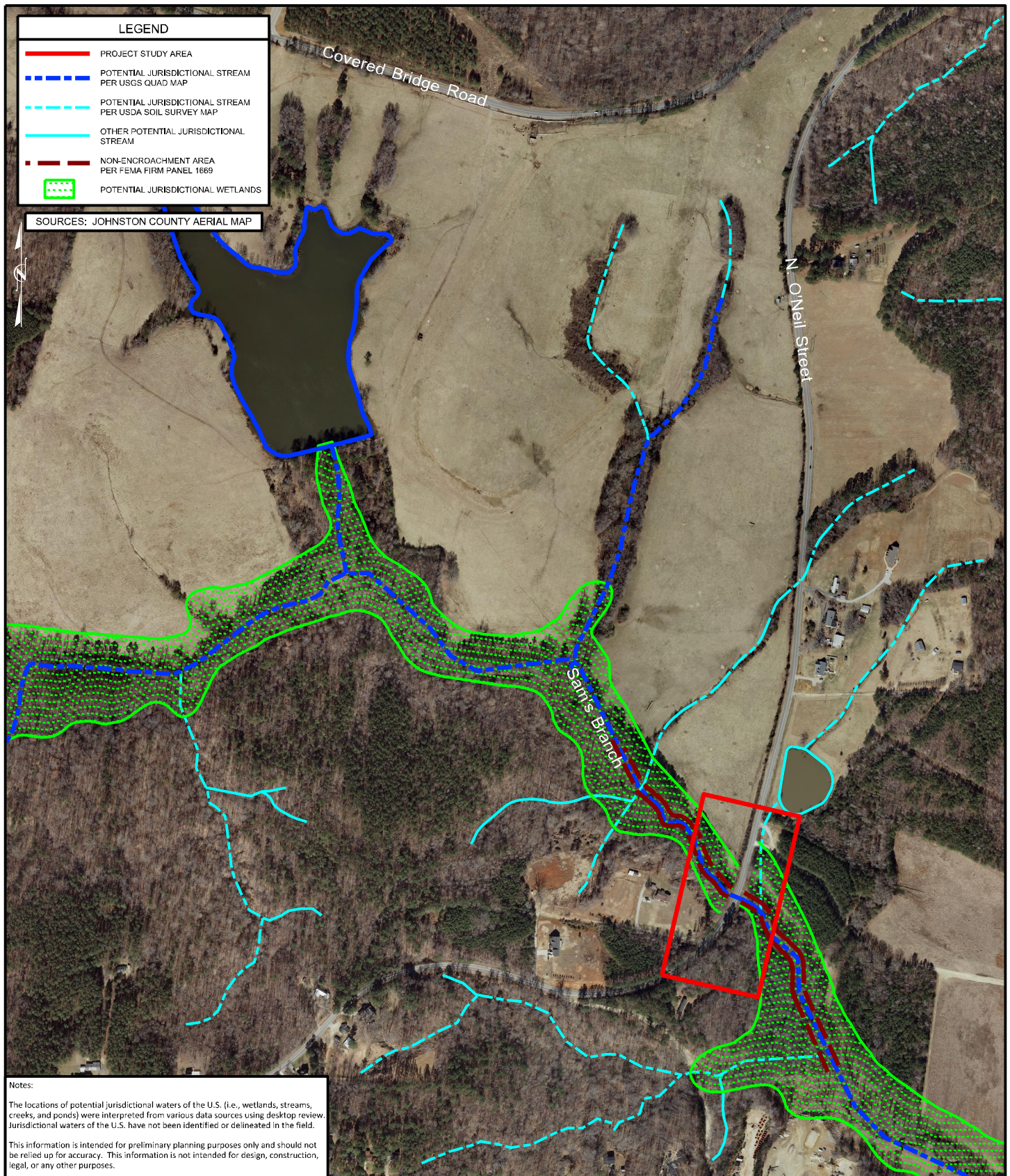
- Google Earth aerial photography, dated: February 18, 1993; February 21, 1999; April 22, 2004; October 16, 2005; July 30, 2006; October 3, 2008; October 18, 2009; and July 5, 2010.
- Natural Resources Conservation Service (NRCS) Soil Data Mart (<http://soildatamart.nrcs.usda.gov/>)
- Natural Resources Conservation Service (NRCS) Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>)
- USDA Soil Conservation Service Soil Survey of Johnston County, North Carolina (1994)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory Wetlands Mapper (<http://www.fws.gov/wetlands/Data/Mapper.html>)
- U.S. Geological Survey (USGS) 7.5 Minute topographic quadrangle Clayton, NC (2010) (<http://topomaps.usgs.gov/>)

Based on review of the above-listed references, potential jurisdictional waters of the U.S. that are or may be located in the project study area include:

- Sam's Branch, a perennial stream that flows west-to-east through the project study area and into the Neuse River, which is located approximately one mile to the east of the project study area;
- An unnamed tributary to Sam's Branch that parallels N. O'Neil Street to the east, which emanates from a farm pond located within 100 feet of the project study area; and
- Palustrine forested wetlands located adjacent to Sam's Branch.

Additional potential jurisdictional waters of the U.S. are located in the vicinity that surrounds the project study area.

Reference Figure 7 for the location of potential jurisdictional waters of the U.S. in the project vicinity. The information presented in Figure 7 and above is preliminary and subject to change. A field reconnaissance and delineation of waters of the U.S., including wetlands, should be conducted prior to final project design, and a jurisdictional determination should be obtained from the U.S. Army Corps of Engineers (USACE).



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**SAM'S BRANCH MULTI-USE PATH
N. O'NEIL ST. CROSSING STUDY**
JOHNSTON COUNTY, NC
EXISTING CONDITIONS MAP

Riparian Buffers

The Neuse River Basin Riparian Buffer Rules require a 50-foot wide protected buffer adjacent to intermittent streams, perennial streams, lakes, ponds, estuaries and modified natural streams that are depicted on the most recent printed version of the USDA soil survey map prepared by the NRCS (formerly the Soil Conservation Service) or the 1:24,000 scale quadrangle topographic map prepared by the USGS. Based on review of the USGS quadrangle and maps included in the Soil Survey of Johnston County, North Carolina, Sam's Branch and the unnamed tributary to Sam's Branch located in the project study area are both subject to the Neuse River Basin Riparian Buffer Rules. The aforementioned pond is also subject to the buffer rules. The presence of mapped, buffered streams should be verified in the field and coordinated with the NCDWQ.

FEMA Regulated Floodplains

WSP SELLS reviewed floodplain mapping on the Flood Mapping Information System at <http://www.floodmaps.nc.gov/fmis>. The project vicinity is included on Flood Insurance Rate Map (FIRM) Panels 3720166900J and 3720176000J. The floodplain surrounding Sam's Branch is a FEMA-mapped 100 year floodplain (i.e., Flood Hazard Area Zone AE).

Sam's Creek (the name FEMA uses rather than Sam's Branch) is in a Limited Detail Study area meaning it does not have a mapped floodway however, it does have a "non-encroachment area". On Figure 8, cross-section 082 is upstream, and cross-section 074 is just downstream of the N. O'Neil Street crossing. At section 082 the "non-encroachment" width is 15/15 – meaning 15 feet on the left of centerline, and 15 feet on the right of centerline (left and right are always looking in the downstream direction). At section 074, it is 32/13 – and at section 069 (which isn't mapped, but would be between section 074 and 056, the next mapped section) it is 14/42.

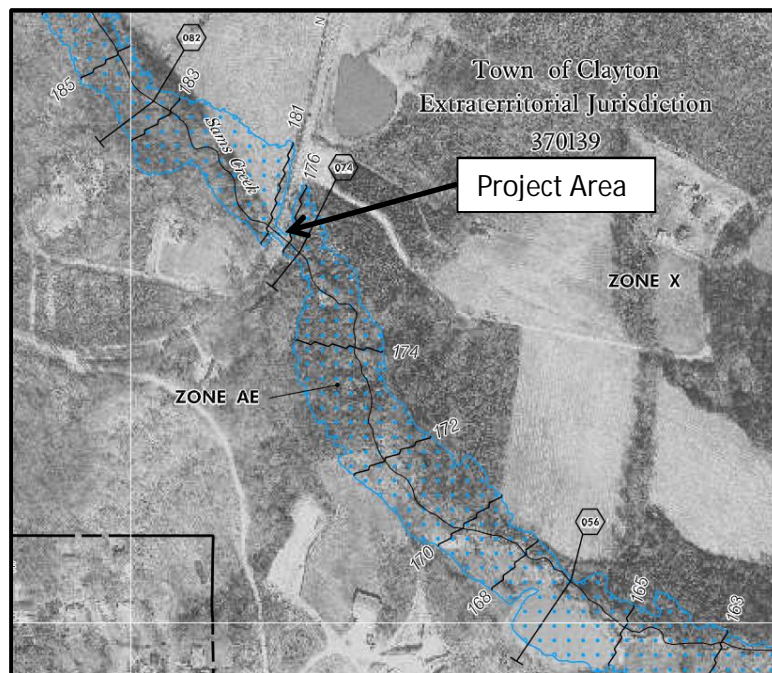


Figure 8: Flood Insurance Rate Map for Project Area

The Town of Clayton has jurisdiction as the Floodplain Administrator and most likely limits development within these limits without the benefit of a flood study in accordance with minimum requirements of the National Flood Insurance Program. If a Flood Study determines that development results in a changed condition, then FEMA coordination and possible Conditional Letter of Map Revisions (CLOMR) will be required. Otherwise, the Town of Clayton may issue a floodplain development permit based on a “No-Rise” certification.

Threatened and Endangered Species

WSP SELLS reviewed the most recent list of federal threatened and endangered species for Johnston County, North Carolina, found on the U.S. Fish and Wildlife Service website at <http://www.fws.gov/nc-es/es/countyfr.html> (last updated September 22, 2010). Table 1 below identifies the five protected species listed in Johnston County.

Table 1: Federal Threatened and Endangered Species of Johnston County, NC

Common Name	Scientific name	Federal Status	Record Status	Potential Habitat Present in Project Study Area?
Vertebrate:				
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	Current	No
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGPA	Current	No
Invertebrate:				
Dwarf wedgemussel	<i>Alasmodonta heterodon</i>	E	Current	Maybe
Tar River spiny mussel	<i>Elliptio steinstansana</i>	E	Current	Maybe
Vascular Plant:				
Michaux's sumac	<i>Rhus michauxii</i>	E	Historic	Maybe

E = Federal Endangered; T = Federal Threatened; BGPA = Bald and Golden Eagle Protection Act

Habitat Descriptions

Below is a brief description of the listed protected species:

Red-cockaded woodpecker

The red-cockaded woodpecker (RCW) typically occupies open, mature stands of southern pines, particularly longleaf pine (*Pinus palustris*), for foraging and nesting/roosting habitat. The RCW excavates cavities for nesting and roosting in living pine trees, aged 60 years or older, and which are contiguous with pine stands at least 30 years of age to provide foraging habitat. The foraging range of the RCW is normally no more than 0.5 miles.

Based on review of aerial photography, it does not appear that any pine stands are located in the project study area or within 0.5 miles of the project study area that meet the habitat requirements described above.

Bald eagle

Bald Eagles live near rivers, lakes, and marshes where they can find fish, their staple food. Bald Eagles will also feed on waterfowl, turtles, rabbits, snakes, and other small animals and carrion. Bald Eagles require a good food base, perching areas, and nesting sites. Their habitat includes estuaries, large lakes, reservoirs, rivers, and some seacoasts. In winter, the birds congregate near open water in tall trees for spotting prey and night roosts for sheltering. Bald eagles were removed from the endangered species list in August 2007 because their populations recovered sufficiently. Bald eagles are protected under the BGPA.

Based on review of aerial photography, it does not appear that any large bodies of water are located in close proximity to the project study area, therefore appropriate habitat does not appear to be present in the project study area.

Dwarf wedgemussel

The dwarf wedgemussel is known from the Neuse and Tar River drainages. The mussel inhabits creek and river areas with a slow to moderate current and sand, gravel, or firm silt bottoms. Water in these areas must be well oxygenated. Stream banks in these areas are generally stable with extensive root systems holding soils in place.

Given the presence of Sam's Branch and the unnamed tributary in the project study area, potential habitat for dwarf wedgemussel may be present. Further investigation should be conducted if impacts to Sam's Creek or the unnamed tributaries are proposed.

Tar River spinymussel

The Tar spinymussel is known to occupy two river systems in North Carolina. Populations exist in the Tar River drainage in the Tar River (Nash and Edgecombe Counties), Swift Creek and Sandy Creek (Franklin, Nash, and Edgecombe Counties), Little Fishing Creek (Halifax County), Shocco Creek (Warren and Franklin Counties), and Fishing Creek (Warren County). The species has also been documented in the Little River (Johnston County) in the Neuse River system. This mussel requires a stream with fast flowing, well-oxygenated, circumneutral pH water. The bottom should be composed of unconsolidated gravel and coarse sand. The water needs to be relatively silt-free, and stream banks should be stable, typically with many roots from adjacent riparian trees and shrubs.

Given the presence of Sam's Branch and the unnamed tributary in the project study area, potential habitat for Tar River spinymussel may be present. Further investigation should be conducted if impacts to Sam's Creek or the unnamed tributary are proposed.

Michaux's sumac

Michaux's sumac, endemic to the inner Coastal Plain and lower Piedmont, grows in sandy or rocky, open, upland woods on acidic or circumneutral, well-drained sands or sandy loam soils with low cation exchange capacities. The species is also found on sandy or submesic loamy swales and depressions in the fall line Sandhills region as well as in openings along the rim of Carolina bays; maintained railroad, roadside, power line, and utility rights-of-way; areas where forest canopies have been opened up by blowdowns and/or storm damage; small wildlife food plots; abandoned building sites; under sparse to moderately dense pine or pine/hardwood canopies; and in and along edges of other artificially maintained clearings undergoing natural succession. In the central Piedmont, it occurs on clayey soils derived from mafic rocks. The plant is shade intolerant and, therefore, grows best where disturbance (e.g., mowing, clearing, grazing, periodic fire) maintains its open habitat.

Based on review of aerial photography, the wooded portions of the project study area appear to be dense, and little open habitat is apparent. No canopy openings are evident. Some roadside disturbance along North O'Neil Street is evident, and could provide suitable habitat. However, considering that Michaux's sumac has not been recorded in the county in over 50 years, this plant is not likely to be present in the project study area.

5. CULTURAL RESOURCES IN THE PROJECT STUDY AREA

WSP SELLS sent a letter to the North Carolina State Historic Preservation Office (SHPO), dated April 23, 2012, requesting information concerning the presence or known existence of historic, archaeological or cultural resources in the project vicinity, specifically within the approximately 300 acre area located south of the N. O'Neil Street - Covered Bridge Road intersection (see Appendix D). SHPO responded in a letter dated May 9, 2012 (see Appendix B), writing:

"There are no known recorded archaeological sites within the project boundaries. However, the project area has never been systematically surveyed to determine the location or significance of archaeological resources. We recommend that a comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project. Potential effects on unknown resources must be assessed prior to the initiation of construction activities...We have determined that the project as proposed will not have an effect on any historic structures."

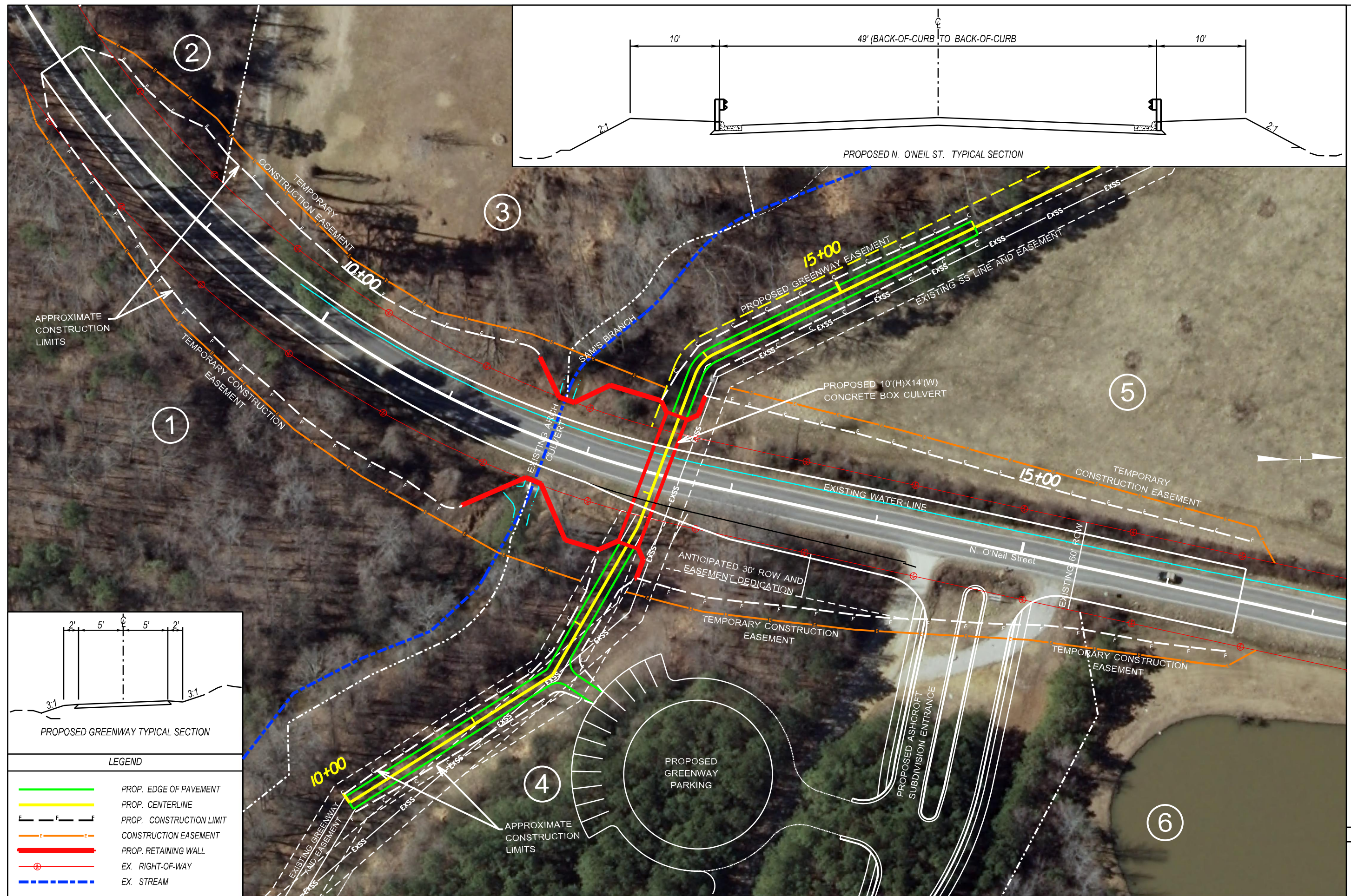
It should be emphasized that the SHPO response is related to an area that covers 300 acres, while the proposed N. O'Neil Street crossing project study area encompasses only 11.5 of those 300 acres. Therefore, SHPO should be contacted again prior to construction to request comment on the project study area.

6. ALTERNATIVES

N. O'Neil Street acts as a physical barrier to fulfilling the vision for Sam's Branch Multi-use Path and proceeding with Phase II to complete the path from MTS to the Clemmons State Forest. Several alternatives were identified during the project scoping effort and confirmed at the Project Kickoff Meeting. These alternatives included both at-grade crossings and grade-separated options which are discussed in detail below. It should be noted that functional designs were completed using existing available GIS information from Johnston County's website. No detailed location surveys were completed for the project.

Alternative A – Existing Location Grade Separation: Raise N. O'Neil St.

Alternative A considers extending the existing alignment of Sam's Branch Multi-use Path under N. O'Neil Street. A 10-foot high by 14-foot wide reinforced concrete box culvert (RCBC) is proposed to be constructed to accommodate the passage of pedestrians and bicyclists under N. O'Neil Street. The length of the 10x14 RCBC would accommodate the future roadway improvements associated with the Ashcroft Subdivision (Figure 8). Constructing the RCBC will require adjusting the profile grade of N. O'Neil Street by up to 7 feet in order to provide adequate cover and meet design requirements for vertical curvature (Figure 9). Raising the elevation of the road on embankment/fill will increase the overall "footprint" of the road. This will require acquisition of temporary construction easements (TCE) or right-of-way (ROW) and permanent greenway easements (west side of N. O'Neill Street only). To avoid linear stream impacts to Sam's Branch, the existing headwall will be extended to contain the additional fill and avoid having to extend the culvert to meet the new fill slope. (Please note that no engineering analysis of the existing concrete arch culvert that conveys Sam's Branch under N. O'Neil Street was completed to determine if the culvert could withstand the additional loading associated with increased embankment/fill heights.) Re-construction of N. O'Neil Street will require detouring traffic off-site during the construction period (Figure 10). This would be an inconvenience to the motorists who use this facility on a daily basis for an estimated 4 – 6 months.

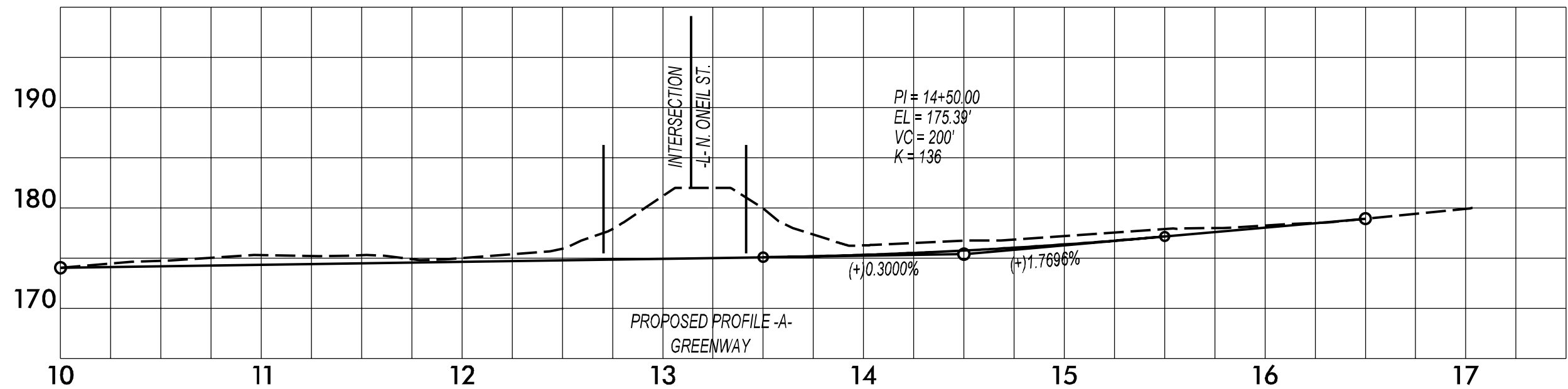
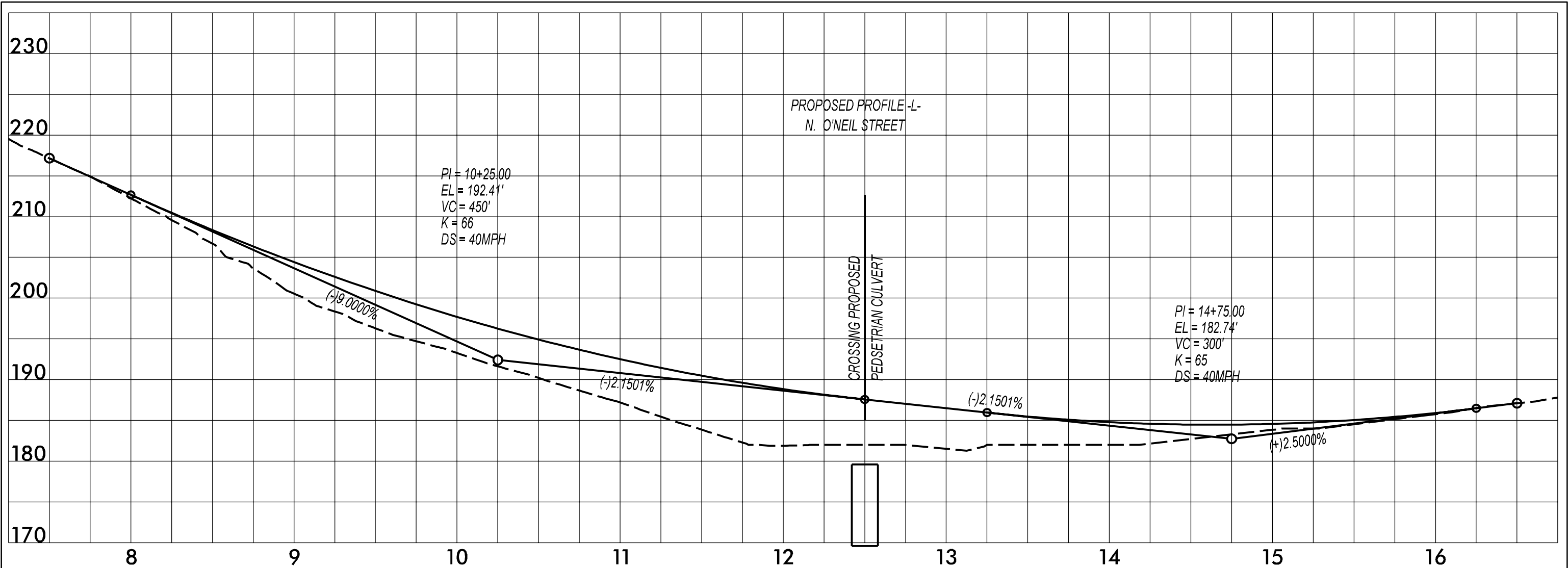


SAM'S BRANCH MULTI-USE PATH N. O'NEIL ST. CROSSING STUDY

ALTERNATIVE A - EXISTING LOCATION GRADE SEPARATED: RAISE N. O'NEIL ST.

FIGURE 9

DRAWN BY: JLS SCALE: 1"=60'
CHECKED BY: BDD DATE: 6-26-12



SAM'S BRANCH MULTI-USE PATH N. O'NEIL ST. CROSSING STUDY

ALTERNATIVE A - EXISTING LOCATION GRADE SEPARATED: RAISE N. O'NEIL ST.

FIGURE 10

DRAWN BY:	SCALE:
JLS	1"=60'
CHECKED BY:	DATE:
BDD	6-26-12

Alternative B – New Location At-Grade Crossing

Alternative B considers relocating the existing Phase I alignment of Sam's Branch Multi-use Path and positions a new at-grade crossing near the proposed Ashcroft Subdivision access on N. O'Neil Street (Figure 11). The new alignment will swing around the proposed new Trailhead parking area to the new entrance road. A high visibility cross-walk treatment will be utilized for the at-grade crossing. Once across N. O'Neil Street, the Multi-use Path will turn south and run parallel to N. O'Neil Street with downward slope to reach existing ground. The profile alignment minimizes grading by following the existing ground line. Alternative B will require acquisition of temporary construction easements and permanent greenway easements. Some disruption of traffic on N. O'Neil Street should be expected during construction for installation of pavement markings and signs. Temporary lane closures will be required to safely protect the construction crew. One lane would remain open and one-lane/two-way traffic would be controlled by trained flaggers.

Alternative C – Existing Location At-Grade Crossing

Alternative C considers extending the existing alignment of Sam's Branch Multi-use Path across N. O'Neil Street at-grade (Figure 12). The alignment is similar to that considered in Alternative A. Construction will require adjusting the profile grade of the Multi-use Path upwards to match the elevation of N. O'Neil Street. A high visibility cross-walk treatment will be utilized for the at-grade crossing. Once across N. O'Neil Street, the Multi-use Path will follow the existing sanitary sewer easement with downward slope to reach existing ground. Alternative C will require acquisition of temporary construction easements and permanent greenway easements (west side of N. O'Neil Street only). Some disruption of traffic on N. O'Neil Street should be expected during construction for installation of pavement markings and signs. Temporary lane closures will be required to safely protect the construction crew. One lane would remain open and one-lane/two-way traffic would be controlled by trained flaggers.

Alternative D – Existing Location Grade Separation: Lower Sam's Branch Multi-use Path

Alternative D provides a grade separated crossing by lowering the multi-use path as it passes under N. O'Neil Street. The alignment of the multi-use path is similar to that in Alternative A, however, Alternative D eliminates much of the grading and re-construction of N. O'Neil Street. The multi-use path would cross under N. O'Neil Street in a 10-ft high by 14-ft wide RCBC. It is anticipated that N. O'Neil Street would be open cut to construct the RCBC and therefore would be closed to traffic during this phase of construction. The duration motorists would be inconvenienced during this operation would be less than half the time when compared to Alternative A. This may be an option if the elevation of the multi-use path is higher than Sam's Branch and permits proper drainage of the facility. The existing GIS information available was not sufficient at the time of this study to make this determination.



**SAM'S BRANCH MULTI-USE PATH
N. O'NEIL ST. CROSSING STUDY**

ALTERNATIVE B - NEW LOCATION AT-GRADE CROSSING

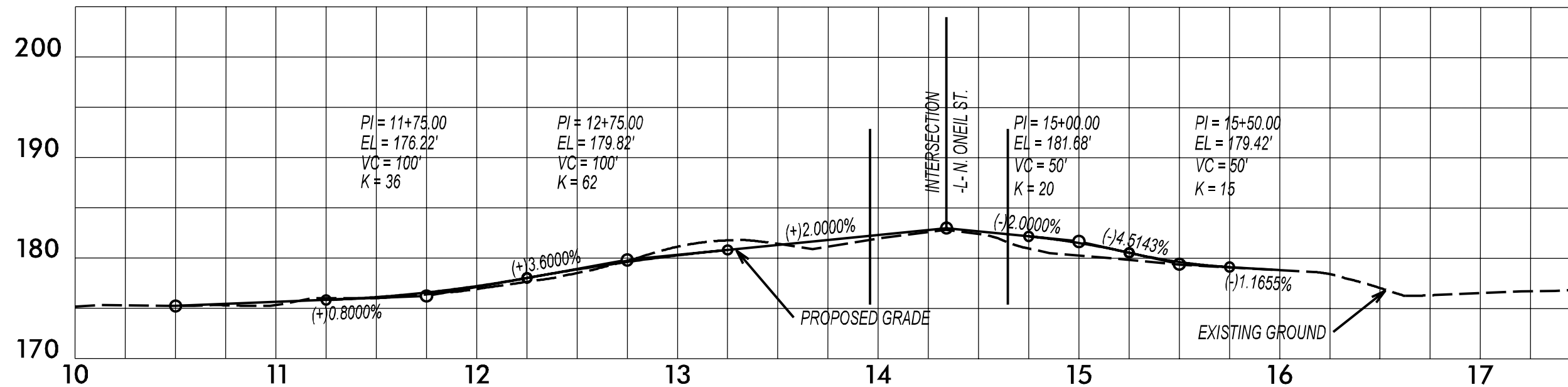
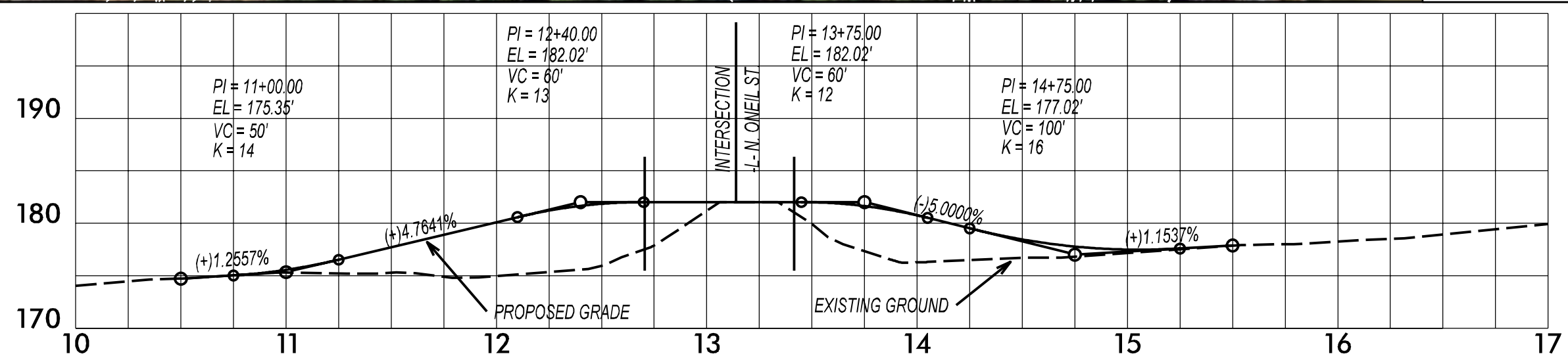
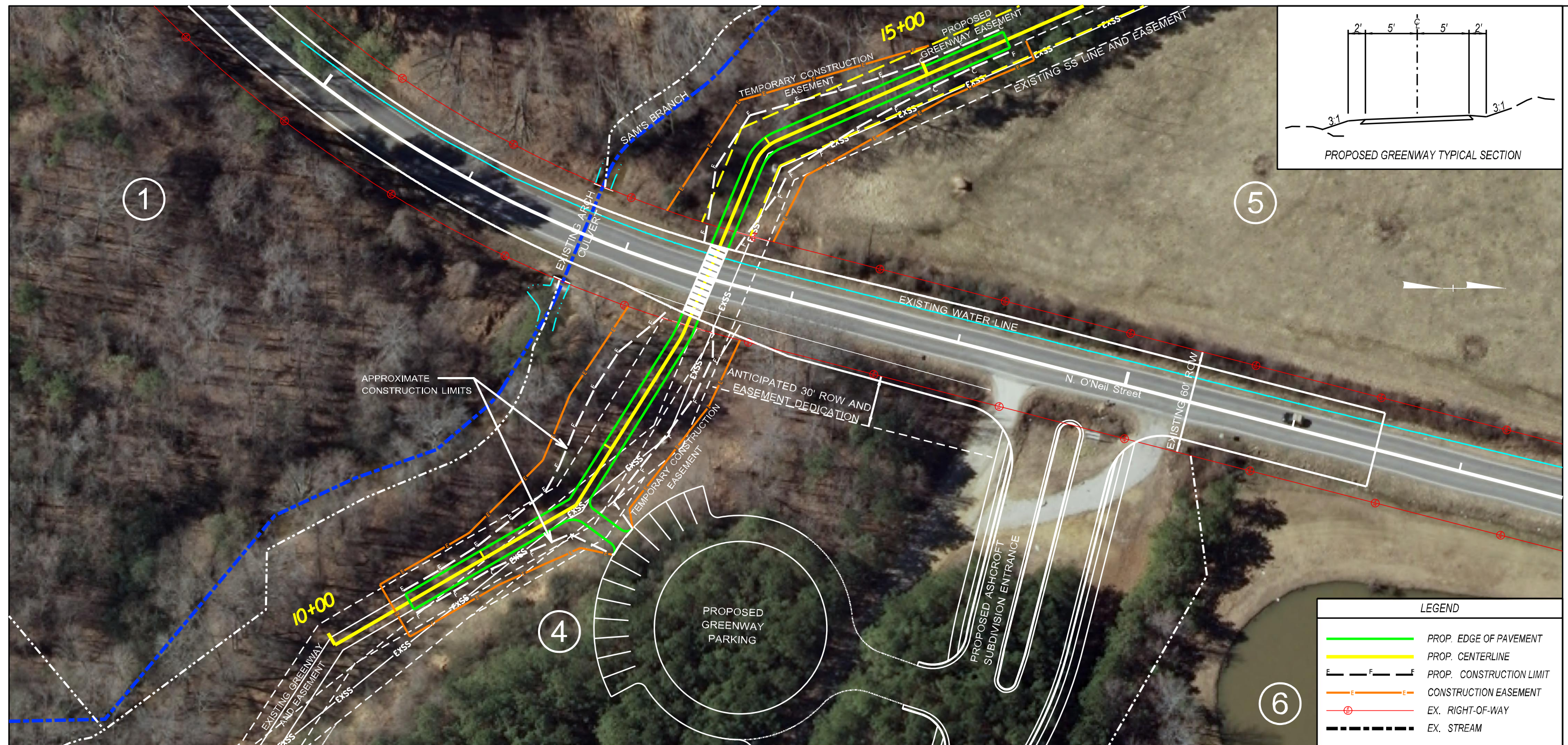


FIGURE 12

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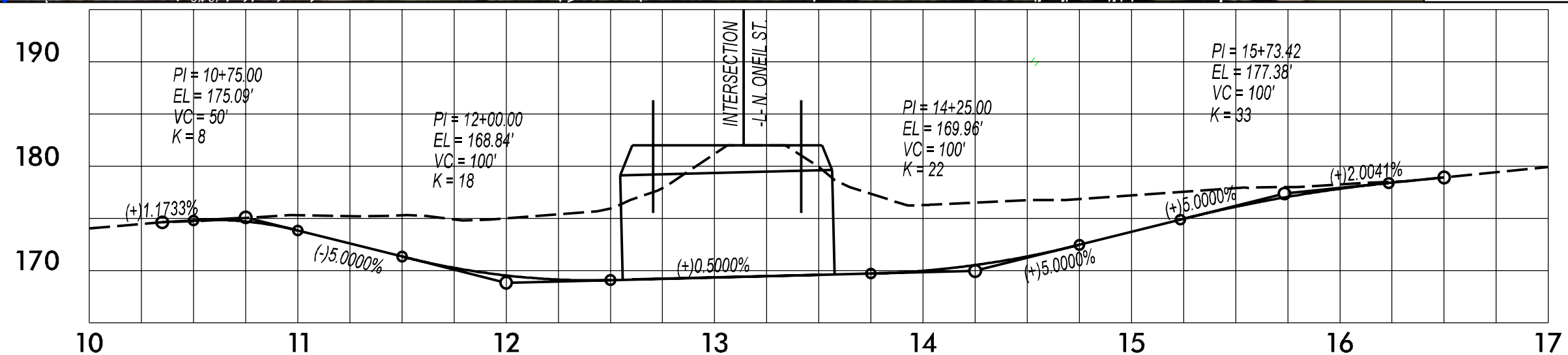
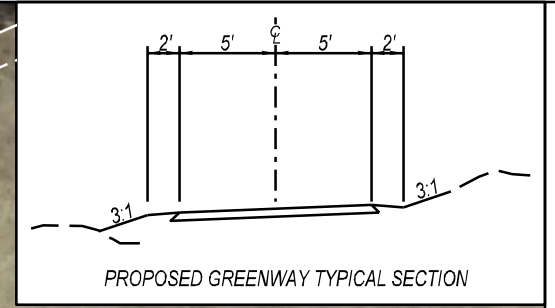
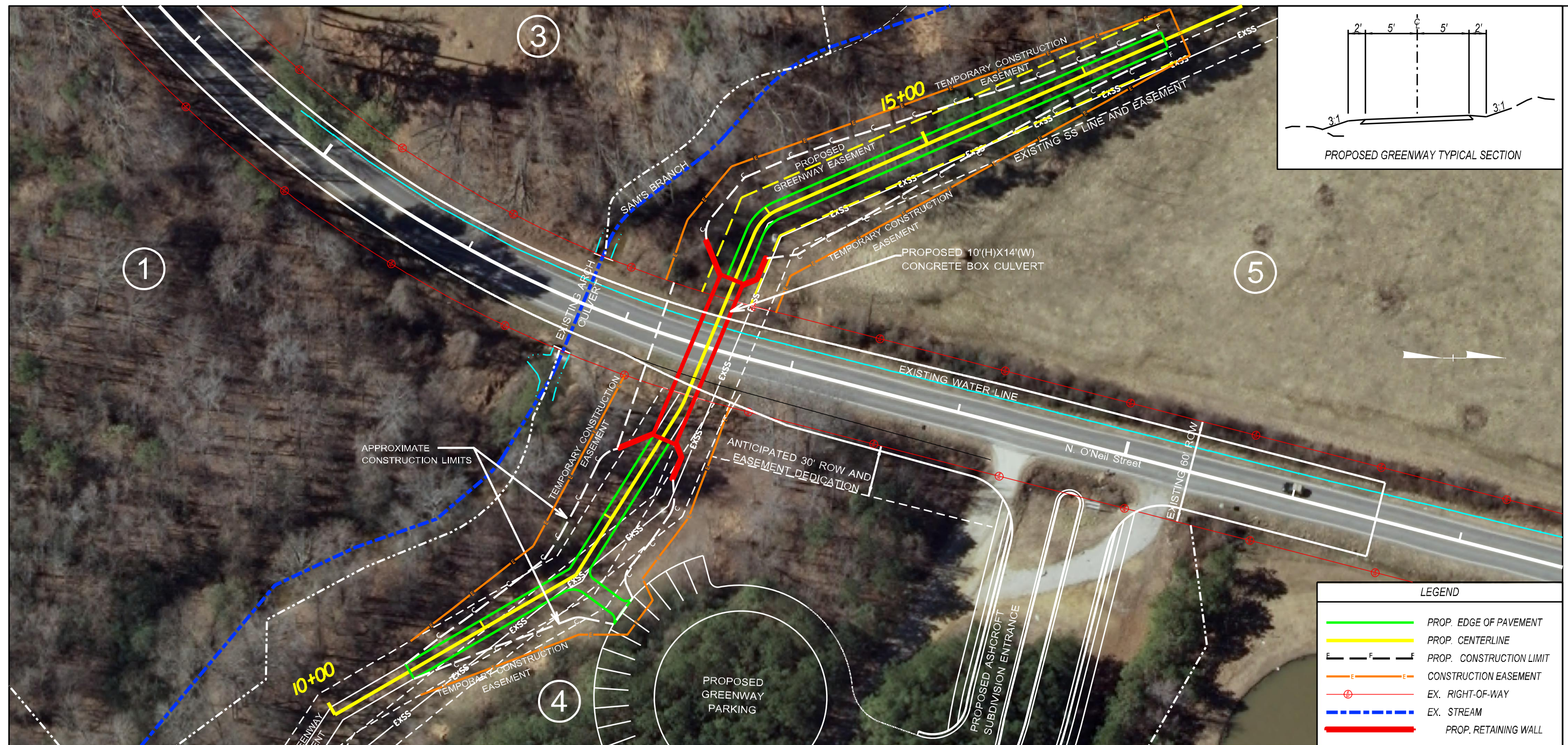
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**SAM'S BRANCH MULTI-USE PATH
N. O'NEIL ST. CROSSING STUDY**
ALTERNATIVE C - EXISTING LOCATION AT-GRADE CROSSING

FIGURE 13

DRAWN BY: JLS
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SCALE: 1"=60'
DATE: 6-26-12



SAM'S BRANCH MULTI-USE PATH N. O'NEIL ST. CROSSING STUDY

ALTERNATIVE D - EXISTING LOCATION GRADE SEPARATED: LOWER SAM'S BRANCH MULTI-USE PATH

FIGURE 14

DRAWN BY: JLS
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DATE: 6-26-12

At-Grade Crossing Safety

A grade separated crossing is safer than an at-grade crossing by the simple fact that it eliminates the conflict point between a pedestrian or bicyclist and a motor vehicle. However, safety of at-grade crossings that occur at mid-block locations can be improved by the installation of pavement markings, advanced warning signs, and even flashing beacons. These treatments serve to alert drivers that they are approaching a crossing. It is safe to say that the higher the speed of approaching traffic, the more important it becomes to implement crossing protection using one or more of the devices above.

Protective devices can be broken down into two categories, 1) passive and 2) active. A passive device is one that requires no input from the user. Pavement markings and signs are examples of passive protection devices. Active devices require some input from the user. Examples of active devices are push button pedestrian signals. Concerns exist about active devices giving the user a false sense of security when entering the crosswalk.

The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) – 2009 Edition recommends that an Engineering Study be completed before installing a crosswalk at a location away from a traffic signal or approach controlled by a stop or yield sign. No specific treatment is recommended as a result of this study although a discussion of potential treatments is provided below.

High Visibility Crosswalk – This treatment consists of installing white thermoplastic pavement marking lines, 24-inch wide and 10-foot long spaced 4 feet on center, parallel to the direction of automobile traffic flow.

Advanced signage – Advance warning signs will alert drivers that they are approaching a crosswalk. The current version of the MUTCD includes signage suitable for multi-use trails as shown below. These signs are designated as W11-15, W11-15P (TRAIL X-ING), and W16-9P (AHEAD). The trail crossing location will be designated with the W-16-7P (diagonal arrow). The MUTCD should be consulted to determine the placement of these signs.



Pedestrian Hybrid Beacons - The pedestrian hybrid beacon (also known as the High intensity Activated crossWalk (or HAWK)) is a pedestrian-activated warning device located on the roadside or on mast arms over midblock pedestrian crossings. The beacon head consists of two red lenses above a single yellow lens. The beacon head is "dark" until the pedestrian desires to cross the street. At this point, the pedestrian will push an easy to reach button that activates the beacon. After displaying brief flashing and steady yellow intervals, the device



Pedestrian Hybrid Beacon (Source: USDOT FHWA website)

displays a steady red indication to drivers and a "WALK" indication to pedestrians, allowing them to cross a major roadway while traffic is stopped. After the pedestrian phase ends, the "WALK" indication changes to a flashing orange hand to notify pedestrians that their clearance time is ending. The hybrid beacon displays alternating flashing red lights to drivers while pedestrians finish their crossings before once again going dark at the conclusion of the cycle.

Pedestrian hybrid beacons should only be used in conjunction with a marked crosswalk. In general, they should be used if gaps in traffic are not adequate to permit pedestrians to cross, if vehicle speeds on the major street are too high to permit pedestrians to cross, or if pedestrian delay is excessive. Chapter 4 of the Manual on Uniform Traffic Controls (MUTCD), 2009 Edition, Chapter 4 provides guidelines for the installation of HAWK signals.

Rectangular Rapid Flashing Beacon (RRFB) – This is another form of a pedestrian activated flashing warning device to alert motorists that there is a pedestrian in the crosswalk. RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system. RRFBs use an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs may be installed on either two-lane or multi-lane roadways.



Potential benefits of RRFBs are they offer a lower cost alternative to traffic signals and hybrid signals that are shown to increase driver yielding behavior at crosswalks significantly when supplementing standard pedestrian crossing warning signs and markings. The unique nature of the stutter flash may elicit a greater response from drivers than traditional methods.

Another measure of protecting pedestrians and bicyclists in at-grade crossings is by controlling the speeds of the approaching motorists. As noted in Section 3 – Existing Conditions, the posted speed on N. O'Neil Street changes from 45 MPH to 55 MPH immediately north of the entrance to the Trailhead. In an attempt to have the posted speed limit lowered in the vicinity of potential at-grade crossings, a Speed Study was requested of the NCDOT Division 4 Traffic Engineer. The results of the Speed Study were summarized in an email correspondence See Appendix B) as follows:

“As we discussed, NCDOT installed our traffic counters to see what the 85th percentile speed is at the crossing location. The 85th percentile speed in both directions is 55 mph. As you know the crossing is basically located the 45/55 mph speed limit change. Based on the speed data and combined with our field investigation, we do not feel comfortable reducing the speed limit to 35 mph in this area. We do not believe that motorists will drive 35 mph in this area. If 35 mph signs were posted, we believe that it would give pedestrians a false sense of security.

However, we believe that we could push the 45/55 mph transition further north (approx. 300 – 400 feet) away from the proposed crossing. This would put the crossing well within the 45 mph zone. We could also adjust some of the curve warning signs in the area. Another item that should be considered is the removal of some of the vegetation/trees on the inside of the curve (coming from Clayton) in order to increase the sight distance for people attempting to use the crosswalk.”

7. PROJECT IMPACTS

Potential Direct Impacts

Waters of the U.S.

Four preliminary, conceptual alternatives have been developed by WSP SELLS to address crossing N. O'Neil Street with the Sam's Branch Multi-Use Path. Potential impacts to jurisdictional waters of the U.S. for each alternate are shown below in Table 2.

Table 2: Potential Impacts to Jurisdictional Waters of the U.S.

Project Option	Potential Stream Impact	Potential Wetland Impact
Alternative A	± 390 linear feet	± 0.65 acre
Alternative B	± 40 linear feet	± 0.20 acre
Alternative C	± 70 linear feet	± 0.35 acre
Alternative D	± 70 linear feet	± 0.54 acre

Impacts to waters of the U.S. would require a Clean Water Act Section 404 permit from the USACE and a corresponding Clean Water Act 401 Water Quality Certification from the N.C. Division of Water Quality (NCDWQ). Compensatory mitigation for wetland and stream impacts may be required for any project requiring submittal of a pre-construction notification (i.e., permit application) to the USACE or NCDWQ.

For multi-use paths, roadways, and other linear transportation projects, impacts of up to 0.5 acre of wetlands and/or up to 300 linear feet of jurisdictional streams exhibiting significant aquatic function may be permitted pursuant to a Section 404 Nationwide Permit Number 14. Based on the preliminary conceptual design and potential wetland and stream locations in the project area, Alternatives B and C may qualify for a Nationwide Permit from the USACE and a General Water Quality Certification (GC) from the NCDWQ since stream impacts appear to be less than 300 feet and wetland impacts appear to be less than 0.5 acre for each alternate. A Nationwide Permit is typically issued within 45 days from the USACE's receipt of a complete application. The 401 GC is typically issued within 60 days from the NCDWQ's receipt of a complete application.

Based on the preliminary conceptual design, and potential wetland and stream locations in the project area, Alternatives A and D appear to exceed one or both the wetland and stream impact thresholds for Nationwide Permit No. 14. Impacts exceeding 0.5 acre of wetland and/or 300 linear feet of aquatically-significant stream would require a Standard Individual Permit from the USACE and corresponding 401 WQC from the NCDWQ. The Individual Permit process commonly takes six months or more to complete.

A jurisdictional wetland and stream delineation should be conducted in the project area, and the delineation should be verified by the U.S. Army Corps of Engineers. Further, a stream assessment and classification should be conducted on the unnamed tributary to Sam's Branch

to determine aquatic significance. An approved wetland and stream delineation overlain on site grading plans would allow for an accurate quantification of impacts to waters of the U.S.

Neuse River Basin Riparian Buffers

Potential development activities associated with the crossing may require adherence to the Neuse River Basin Riparian Buffer Rules, depending on proximity of the improvements to Sam's Branch or other buffered streams. Impacts associated with a multi-use path are considered "allowable" in accordance with the Rules. Uses designated as allowable may proceed within the riparian buffer provided that there are no practical alternatives to the requested. These uses require written authorization from the NCDWQ or the delegated local authority.

Associated impacts, such as utility relocation, roadway realignment, storm water drainage, etc., may be considered exempt, allowable, allowable with mitigation, or prohibited, depending on the specific activity and the extent of impacts to the riparian buffer. Activities considered prohibited would require a variance from the Rules in order to proceed.

FEMA-Regulated Floodplains

Anticipated impacts to the "non-encroachment area" will include construction/extension of headwalls and retaining walls for Alternatives A and D.

Protected Species

A field assessment of the project area should be conducted to determine if appropriate habitat for dwarf wedgemussel and/or Tar River spiny mussel exists. If appropriate habitat or the species exist in the project location, consultation with the U.S. Fish and Wildlife Service in accordance with Section 7 of the Federal Endangered Species Act would be required. Potential direct impacts to individuals and/or habitat would require consultation with, and approval from, USFWS and would likely require a review of prudent alternatives and potential project modifications.

Cultural Resources

While the likely area of disturbance resulting from the proposed project is considerably smaller than the 300-acre area reviewed by SHPO, a cultural resources survey may be required in the future prior to any construction activity for the crossing of N. O'Neil Street. Based on SHPO's letter, any future realignment of N. O'Neil Street and the future extension of the multi-use path should also include a comprehensive archaeological survey. SHPO should be contacted again prior to construction of the crossing project.

Potential Indirect Impacts

The proposed crossing of N. O'Neil Street by the multi-use path is not expected to result in any changes in the pattern of land use, population density, or growth rate, and is not expected to affect air quality, water quality, or natural systems. Indirect impacts resulting from the crossing

may include sedimentation to Sam's Branch and the unnamed tributary during construction. Stringent erosion and sedimentation controls should be implemented.

Construction Impacts

Right-of-Way and Utilities

The project will not result in any residential or business relocations. Project alternatives will require right-of-way, permanent greenway easements, and/or temporary construction easements for access and the construction of proposed improvements.

Construction impacts on utilities may result in adjustments or relocations. Detailed information on underground utilities was not available for this study so a "worse case" methodology was applied. The 12" waterline on the west side of N. O'Neil Street could be in conflict with the proposed 10-ft by 14-ft RCBC proposed in Alternatives A and D. For Alternative A, if a conflict exists, it may be possible to relocate the waterline above the proposed RCBC if sufficient cover is provided. For Alternative D, the 12" waterline will likely need to be relocated below the proposed multi-use path to provide adequate cover.

Fill embankment to construct the multi-use path at-grade crossing for Alternative C may impact the existing 8" Sanitary Sewer line that runs parallel to Sam's Branch. Manhole adjustments may be necessary to keep them exposed above the proposed embankment. Footings for retaining walls proposed in Alternatives A and D may be placed above the existing sanitary sewer line, therefore relocation may be required to mitigate this conflict.

Overhead utilities may be in conflict with Alternative A only. Vertical clearance under existing overhead lines should be checked during the design phase should Alternative A be selected for implementation.

Right-of-way and utility costs are included in Table 3.

Construction Costs

A Preliminary Engineer's Estimate of probable construction costs was developed for each of the build alternatives. Major items of construction including grading, paving, drainage, traffic control, and structures were quantified. Unit costs for pay items were taken from 2011 Bid Averages available on NCDOT's website. Overall construction costs are included in Table 3. Detailed cost estimates are provided in Appendix C.

Permits

In addition to the environmental permits discussed above, permit applications will need the approval of the NCDOT. An NCDOT driveway permit will allow access to N. O'Neil Street and an Encroachment Agreement will permit construction within the NCDOT right-of-way.

Table 3: Impacts Matrix

GROUP	Description	ALTERNATIVES			
		Alternative A Existing Location Grade Separated: Raise N. O'Neil St.	Alternative B New Location At-Grade	Alternative C Existing Location At-Grade	Alternative D Existing Location Grade Separated: Lower Sam's Branch Multi-use Path
IMPACTS	Stream Impacts (LF)	320	40	70	70
	Wetland Impact (AC)	0.65	0.20	0.35	0.54
	Wooded Area (AC)	2.00	0.20	70.00	0.00
	Utiilities *	W, OH	none	SS	W, SS
	Offsite Detour	Yes	No	No	Yes
PERMITTING					
	Est. Construction Duration (mos)	6 < Alt A > 9	0 < Alt B > 3	3 < Alt C > 6	6 < Alt D > 9
	COE 404	IP	NP	NP	IP
	DWQ 401 WQC	Yes	Yes	Yes	Yes
	NCDOT Encroachment	Yes	Yes	Yes	Yes
COSTS	NCDOT Driveway	Yes	Yes	Yes	Yes
	Construction Costs (x 1000)	\$ 1,103	\$ 102	\$ 115	\$ 439
	Right-of-Way Costs (x 1000)	\$ 20	\$ 5	\$ 5	\$ 5
	TOTAL COSTS (x 1000)	\$ 1,123	\$ 107	\$ 120	\$ 444

* Water (W); Sanitary Sewer (SS); Overhead (OH)

8. CONCLUSIONS

The Sam's Branch Multi-use Path Crossing Study identified and evaluated a number of alternatives to safely cross N. O'Neil Street. The alternatives included both at-grade and grade separation configurations ranging in cost from around \$100,000 to just over \$1.1 million. While the grade separated configuration is the safest, the cost of the least expensive grade separation alternative is nearly 5 times the cost of the least expensive at-grade alternative.

Environmental impacts are greater for the grade separation alternatives and will require more intensive permitting efforts with the Army Corps of Engineers (COE). This will add more time and more cost to the project development phase. If more intense environmental investigations, i.e. wetland determination and stream identification, are undertaken, then a more definitive permitting strategy can be implemented.

The grade separation alternatives will be more of an inconvenience to motorists who regularly use N. O'Neil Street to commute or travel to Clayton or other destinations for jobs, shopping and entertainment. N. O'Neil Street will be closed to through traffic for extended periods of time during grading, paving, and culvert construction operations. During construction of the at-grade alternatives, at least one lane of N. O'Neil Street will be open to traffic at all times. When traffic is reduced to one-lane, two-way traffic, trained flagging personnel will direct traffic flow through the work zone. It is anticipated that the facility would be returned to two-lane/two-way traffic at the end of each work day.

Minor right-of-way, permanent greenway easement and/or temporary construction easements will be required for both at-grade and grade separated alternatives.

The Speed Study conducted by the NCDOT Division 4 Traffic Engineer noted that the 85th percentile running speed in the area is 55 MPH. Facilities that have this high rate of speed are not typically interrupted by mid-block, at-grade pedestrian crossings. However, by implementing a strategy of extending the 45 MPH posted speed zone, adjusting curve warning signs, and improving sight distance, at-grade crossing safety can be improved when coupled with the proper crossing treatments discussed in Section 6. Of the two at-grade alternatives, Alternatives B and C, presented in this study Alternative B – New Location At-Grade would be preferred due to its location adjacent to an intersection (Ashcroft Entrance), improved sight distance (further from the curved NB approach on N. O'Neil St.), less environmental impacts, and lower cost.

The Town of Clayton prefers Alternative D, grade separation achieved by lowering Sam's Branch Multi-use Path under N. O'Neil Street, based on visibility, vehicle speeds, and current usage of Phase I of the Multi-use Path (see Appendix B for correspondence dated August 21, 2012).

The purpose of this study was to assess the feasibility, safety, traffic, environmental impacts, and estimated costs of options for continuing the multi-use facility across N. O'Neil Street. The alternatives presented in this report including both at-grade and grade separation options, are considered feasible based on engineering design, environmental impacts, and costs. More detailed studies are recommended to refine the alternatives, address citizen and stakeholder input, identify potential funding resources, and develop an implementation strategy for Sam's Branch Multi-use Path crossing and Phase II.

Figures 15 and 16 provide renderings of an at-grade and grade separated alternative, respectively.



15401 Weston Parkway
Suite 100
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www.wspells.com

Sam's Branch
Multi-Use Path Crossing

Transportation Feasibility
& Impact Analysis
Town of Clayton, NC

FIGURE 15
Rendering -
At-grade



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FIGURE 16
Rendering -
Grade Separation

APPENDIX A

Site Photos

Appendix A - Site photos



Sam's Branch Under N. O'Neil Street - Downstream Side



N. O'Neil Street Trailhead Sign



Sam's Branch Multi-use Path Approaching N. O'Neil Street



Sanitary Sewer Manhole on West Side of N. O'Neil Street

Appendix A - Site photos



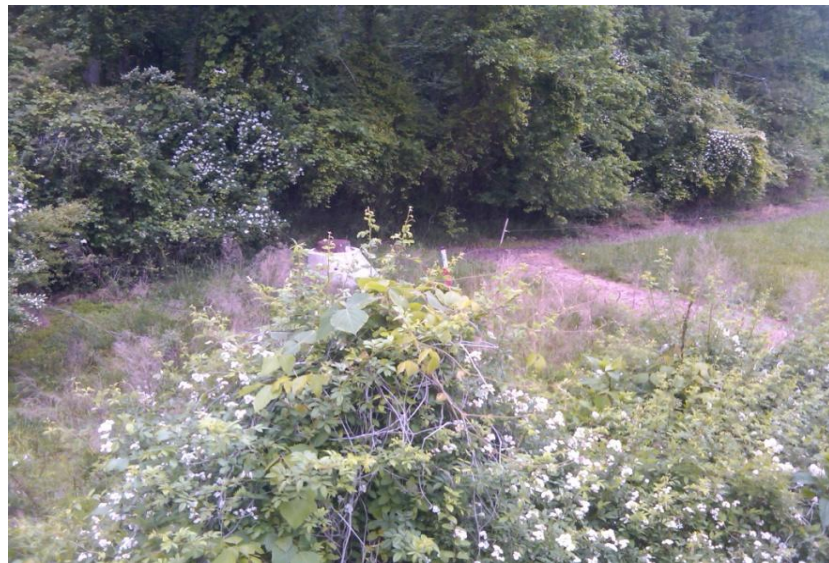
N. O'Neil Street Looking South from Trailhead Entrance



N. O'Neil Street Looking North from Trailhead Entrance



Sam's Branch Multi-Use Path Looking West from N. O'Neil Street



Looking West from N. O'Neil Street at Trailhead Entrance

Appendix A - Site photos



High Visibility Crosswalk



Pedestrian Warning Sign w/Flashing Beacon



Yield to Pedestrian Sign



Pedestrian Warning Sign

APPENDIX B

Correspondence / Meeting Summaries

April 23, 2012

Ms. Renee Gledhill-Earley
N.C. State Historic Preservation Office
109 E. Jones St.
Raleigh NC 27601

Subject: Sam's Branch Multi-Use Path Crossing
Clayton, Johnston County, North Carolina
WSP SELLS Project No. 12-2013

Dear Ms. Gledhill-Earley:

The Capital Area Metropolitan Planning Organization (CAMPO) has retained the firm of WSP SELLS to conduct a transportation improvement feasibility and impact study associated with the Sam's Branch Multi-Use Path crossing of North O'Neil Street in the Town of Clayton, Johnston County, North Carolina. As an integral part of the study, we are soliciting input from your agency concerning the potential presence or known existence of historic, archaeological or cultural resources in the project study area.

The project study area is approximately 300 acres in size and is generally located south of the Covered Bridge Road (SR 1700) – North O'Neil Street (SR 1708) intersection. The project study area is comprised of hardwood forest, mixed pine-hardwood forest, agricultural fields, and several rural-residential properties. Sam's Branch and several unnamed tributaries are located within the project study area. The existing Sam's Branch multi-use path has been constructed from the Neuse River, heading west for about 1½ miles and presently terminating within the project study area, just east of North O'Neil Street. The surrounding area is also comprised primarily of forested land, agricultural fields, and residential properties. A USGS map is attached for your reference.

The transportation improvement feasibility and impact study will include an assessment of the future upgrading of North O'Neil Street to a thoroughfare. Part of the road's upgrade will likely address both vertical and horizontal sight distance deficiencies that presently exist on the road. Addressing these site deficiencies may result in realignment of the road. If the road were realigned, a less costly at-grade crossing of North O'Neil Street may provide a safe and cost effective means of getting the multi-use path across the road for future path extension. Both at-grade and grade-separated crossings will be assessed with consideration given to safety, traffic, and environmental impacts.

Ms. Renee Gledhill-Earley
April 23, 2012
Page 2

Please respond in writing concerning any beneficial or adverse impacts of the proposed project relating to the interests of your office. The study has a June 30, 2012 completion schedule; therefore, in order for your input to be included, a timely response no later than May 25, 2012 would be greatly appreciated. Kindly direct your response to:

Adam Karagosian, PWS
WSP SELLS
128 Overhill Drive, Suite 105
Mooreville, NC 28117
TEL: (704) 975-0559 (cell)
FAX: (704) 662-0101
E-MAIL: adam.karagosian@wsp-sells.com

If you have any questions or need additional information concerning this project, please feel free contact me.

Sincerely,

WSP-SELLS



Adam H. Karagosian, PWS
Natural Resources Group Manager

AHK
Enclosures

cc: Shelby Powell, CAMPO
Brian Dehler, WSP SELLS



Source: 7.5 Minute Topographic Quadrangle, Clayton, NC (USGS, 2010)

1 inch = 2,000 feet



15401 Weston Pkwy. Suite 100 • Cary, NC 27513
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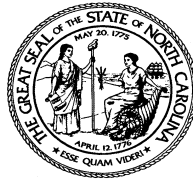
Sam's Branch Multi-Use Path Crossing Traffic Improvement Feasibility and Impact Study Clayton, North Carolina

Capital Area Metropolitan Planning Organization
127 W. Hargett St. Ste. 800
Raleigh, NC 27601-2940

Figure 1
USGS Topographic Quad

WSP SELLs
Project No.
12-2013

Date:
04.23.2012



**North Carolina Department of Cultural Resources
State Historic Preservation Office**

Ramona M. Bartos, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

May 9, 2012

Adam Karagosian
WSP SELLS
128 Overhill Drive, Suite 105
Mooresville, NC 28117
adam.karagosian@wspells.com

Re: Sam's Branch Multi Use Path Crossing Clayton, WSP SELLS. 12-2013, Johnston County, ER 12-0717

Dear Mr. Karagosian:

Thank you for your letter of April 23, 2012, concerning the above project.

There are no known recorded archaeological sites within the project boundaries. However, the project area has never been systematically surveyed to determine the location or significance of archaeological resources.

We recommend that a comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project. Potential effects on unknown resources must be assessed prior to the initiation of construction activities.

Two copies of the resulting archaeological survey report, as well as one copy of the appropriate site forms, should be forwarded to us for review and comment as soon as they are available and well in advance of any construction activities.

A list of archaeological consultants who have conducted or expressed an interest in contract work in North Carolina is available at <http://www.archaeology.ncdcr.gov/ncarch/resource/consultants.htm>. The archaeologists listed, or any other experienced archaeologist, may be contacted to conduct the recommended survey.

We have determined that the project as proposed will not have an effect on any historic structures.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,



for Ramona M. Bartos

Dehler, Brian

From: Brown, Andy H <ahbrown@ncdot.gov>
Sent: Thursday, June 21, 2012 12:08 PM
To: Dehler, Brian
Cc: Little, Timothy M; Brown, Andy H
Subject: RE: Sam's Branch Multi-use Path Crossing Study

Brian,

As we discussed, NCDOT installed our traffic counters to see what the 85th percentile speed is at the crossing location. The 85th percentile speed in both directions is 55 mph. As you know the crossing is basically located the 45/55 mph speed limit change. Based on the speed data and combined with our field investigation, we do not feel comfortable reducing the speed limit to 35 mph in this area. We do not believe that motorists will drive 35 mph in this area. If 35 mph signs were posted, we believe that it would give pedestrians a false sense of security.

However, we believe that we could push the 45/55 mph transition further north (approx.. 300 – 400 feet) away from the proposed crossing. This would put the crossing well within the 45 mph zone. We could also adjust some of the curve warning signs in the area. Another item that should be considered is the removal of some of the vegetation/trees on the inside of the curve (coming from Clayton) in order to increase the sight distance for people attempting to use the crosswalk.

Hope this helps.

Sincerely,
Andy Brown

From: Dehler, Brian [<mailto:Brian.Dehler@wspells.com>]
Sent: Thursday, May 10, 2012 5:40 PM
To: Brown, Andy H
Cc: Shelby Powell
Subject: Sam's Branch Multi-use Path Crossing Study

Andy,

It was nice to finally catch up and speak with you yesterday. I appreciate your cooperation and consideration of our request to evaluate the speeds along N. O'Neil Street in the vicinity of our project. We are asking for a speed study in the hopes of extending the 35 mph speed zone to the north of the Sam's Branch Multi-use Crossing. There is also an approved subdivision, Ashcroft, proposed in the same vicinity. I have included a vicinity map and a project concept to help you identify the area of our project. As noted during our phone conversation, our study deadline is the end of June.

We greatly appreciate your assistance and input with the study. If you should have any questions or concerns, please give me a call or drop me an email.

Thank you,

Brian D. Dehler, P.E.
Project Manager



15401 Weston Pkwy, Suite 100
Cary, NC 27513
T: 919.678.0035
F: 919.678.0206
brian.dehler@wspells.com
www.wspells.com

Email correspondence to and from this sender is subject to the N.C. Public Records Law and may be disclosed to third parties.

MEETING MINUTES - Final

Attendees: Shelby Powell..... CAMPO
David DeYoung..... Town of Clayton
Skip Browder..... Town of Clayton
Jimmy Eatmon..... NCDOT Hwy Division 4
Jerry Page..... NCDOT Hwy Division 4
John McCullen..... Town of Clayton
Kumar Trivedi..... NCDOT Bicycle & Pedestrian Division
Brian Dehler WSP SELLS

Date: Monday, April 23, 2012; 2:30 PM

Location: Town Hall, Clayton, NC

Subject: Sam's Branch Multi-use Path Crossing Study – Kickoff Meeting

A meeting of project stakeholders was conducted to kickoff the subject project. It was noted that Chris Lukasina, CAMPO, and Tim Simpson, Town of Clayton Public Works Director, were invited but absent from the meeting.

The meeting handout, including the Agenda, is attached to this meeting summary. Following introductions, Shelby Powell, David DeYoung, and Ship Browder provided a brief overview of the project background:

- STPDA funds are being used for the study as part of the Hot Spot Program to fund small feasibility study type projects for local municipalities.
- Phase I of the Sam's Branch Multi-use Trail is complete up to N. O'Neil Street.
- Phase II will connect the Mountains to Sea Trail to points west such as Legends Park and Clemmons State Educational Forest.
- The N. O'Neil Street crossing is the critical link between Phase I and Phase II.

Brian reviewed the contract scope of work included in the Meeting Handout. There was some discussion regarding the improvement scenario in Item II.a.v., New N. O'Neil St. western alignment:

- The CTP should be checked to determine if improvements to N. O'Neil Street from north of downtown to Covered Bridge Road/Clayton Northern Connector are included.

- If included in the CTP, no TIP number has been assigned and based on current funding, the project would not move forward until beyond 2023.

Other general discussion:

- Brian noted that the posted speed limit transitioned through the reverse curves south of the project area. Heading out of the downtown area, the posted speed is 25 mph. The posted speed increases to 35 mph in the curve under the label "N. O'Neil St" as shown on Figure 1 in the Meeting Handout. The next curve is posted at 45 mph. N. O'Neil St. remains at 45 mph until just north of the Sam's Branch Trailhead, where the posted speed limit is 55 mph. Brian asked NCDOT if they would consider pushing the speed transition to north of the project site thereby holding the 35 mph posted speed through the project area. NCDOT instructed Brian to contact the NCDOT Division Traffic Engineer, Andy Brown.
- Kumar noted that a culvert carrying a multi-use path under N. O'Neil Street would need to be 14'W x 10'H.
- There is a question about to configuration of the existing box culvert carrying Sam's Branch under N. O'Neil St. Is it a single or double RCBC?
- A new box culvert under N. O'Neil St. would have to be long enough to accommodate a typical section on N. O'Neil St. that follows NCDOT's new Complete Streets guidelines.
- The group agreed that a grade separation option that takes the Multi-use path over N. O'Neil St. is not considered feasible.
- Consideration of traffic control/maintenance of traffic for construction of the alternative scenarios should be included. This would include both on- and off-site detours.
- The latest approved site plan for the Ashcroft Subdivision relocates the existing driveway to the north.
- The Town had requested a 45' b-b urban section for improvements on N. O'Neil St. as part of the Ashcroft Subdivision.
- David will email a copy of the approved Ashcroft Subdivision plan to Brian.

Brian reviewed the project schedule noting the project has a short duration and to expect a second Stakeholder Meeting in approximately one month.

Meeting Summary
Sam's Branch Multi-Use Path Crossing Study
Stakeholder Meeting No. 1 – April 23, 2012
Page 3 of 3

Please review and provide any comments, corrections and/or additions by April 30, 2012.

Prepared By:
(submitted via email)
Brian D. Dehler, PE

enclosures: Meeting Handout

MEETING MINUTES - Draft

Attendees: Chris Lukasina..... CAMPO
Shelby Powell..... CAMPO
Tim Simpson..... Town of Clayton
John McCullen..... Town of Clayton
David DeYoung..... Town of Clayton
Skip Browder..... Town of Clayton
Jimmy Eatmon..... NCDOT Hwy Division 4
Jerry Page..... NCDOT Hwy Division 4
Kumar Trivedi..... NCDOT Bicycle & Pedestrian Division
Brian Dehler..... WSP SELLS

Date: Tuesday, June 5, 2012; 10:00 AM

Location: Town Hall, Clayton, NC

Subject: Sam's Branch Multi-use Path Crossing Study – Stakeholder Meeting No. 2

A meeting of project stakeholders was conducted to review project progress. A PowerPoint presentation was prepared for the meeting. Following the meeting, David DeYoung made the presentation available to attendees in PDF format.

Brian Dehler provided a narrative of the slides which are included at the end of this summary. Highlights of ensuing discussion include:

1) Option A – Grade Separated on Existing Location

- a) Raising the elevation of N. O'Neil Street 5± feet to accommodate new 10'H x 14'W Reinforced Concrete Box Culvert (RCBC) will require closing N. O'Neil Street during construction. An offsite detour will be required. The offsite detour could make use of W. Stallings Road to avoid crossing the railroad (RR) twice as shown in the presentation.
- b) David DeYoung was not in favor of having to close N. O'Neil Street for prolonged periods of time. Construction duration for Option A could be 4 – 6 months.
- c) Chris Lukasina suggested looking at an Option 1A which would lower the multi-use path through the culvert to avoid having to raise the elevation of N. O'Neil Street.

- d) Brian Dehler noted that the existing culvert carrying Sam's Branch has not been inspected or analyzed to determine if it is sufficient to handle load resulting from additional fill from raising the elevation of N. O'Neil Street.
- 2) Option B – At-Grade Crossing on New Location
- a) Alternatives show a future condition considering Ashcroft Subdivision.
 - b) David DeYoung noted that Ashcroft may be stalled for some time due to economy and demand (or lack thereof) for the product.
 - c) There is opportunity for a concrete refuge island in N. O'Neil Street when the road is eventually widened in accordance with plans for Ashcroft subdivision. The cost of the concrete island should be included in the construction cost estimate.
- 3) Option C – At-Grade Crossing on Existing Location
- a) A 5% grade was utilized to accomplish the change in elevation from the existing trail to the existing roadway elevation.
 - b) Sight distance and travel speeds are a concern. Andy Brown, Division Traffic Engineer, has agreed to complete a speed study along the N. O'Neil Street in the vicinity of Sam's Branch.
- 4) Signage
- a) Brian Dehler presented various options for pedestrian signage for the at-grade crossings.
 - b) Chris Lukasina mentioned flashing in pavement lighting and rectangular rapid flashing beacons that have been used in several areas around the state.
 - c) Brian Dehler mentioned the potential for pedestrian activated signals providing a false sense of security for the pedestrian in the crossing. There is also concern over drivers becoming immune to the flashing beacons.
- 5) Impacts
- a) There was some discussion in reducing the cost of Option A as mentioned in 1.c above.
 - b) Chris Lukasina noted that if the cost of a grade separated option was half of that shown for Option A, it would be competitive as a mid-to-long-term solution.
 - c) The Town may want to consider the project for LAPP funding.

Meeting Summary
Sam's Branch Multi-Use Path Crossing Study
Stakeholder Meeting No. 2 – June 5, 2012
Page 3 of 3

Please review and provide any comments, corrections and/or additions by June 13, 2012.

Prepared By:
(submitted via email)
Brian D. Dehler, PE

enclosures: Meeting Presentation

SAM'S BRANCH MULTI-USE PATH CROSSING STUDY

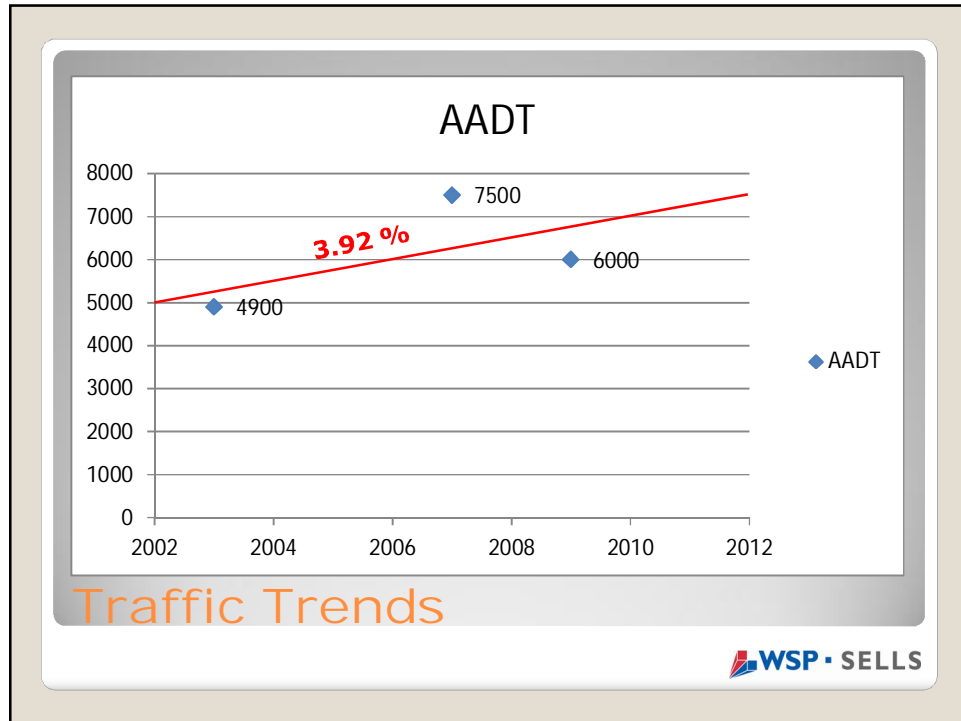


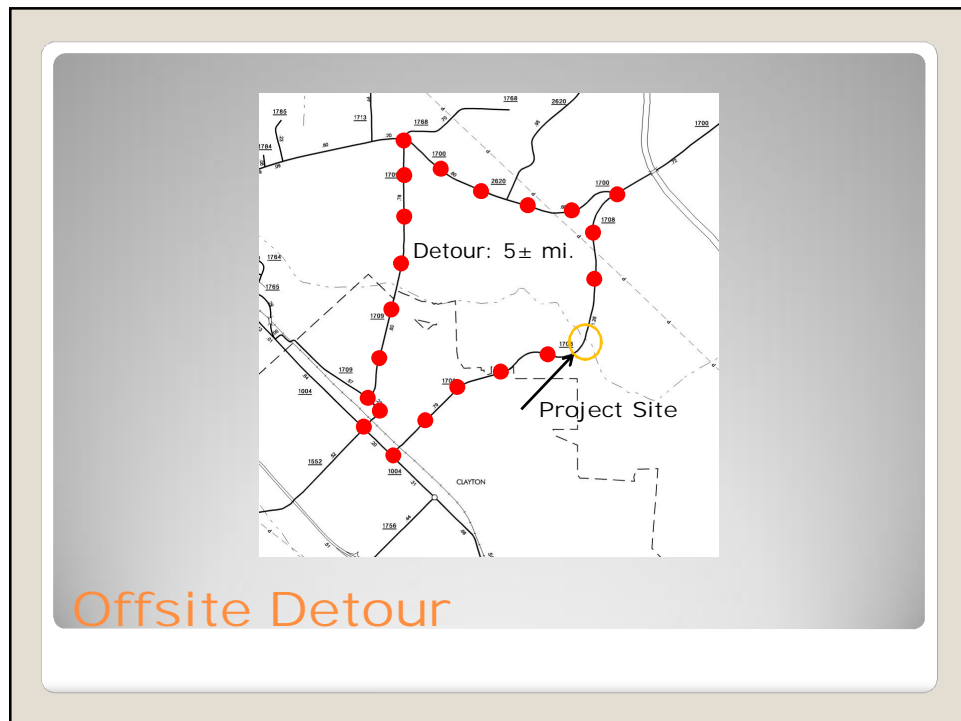
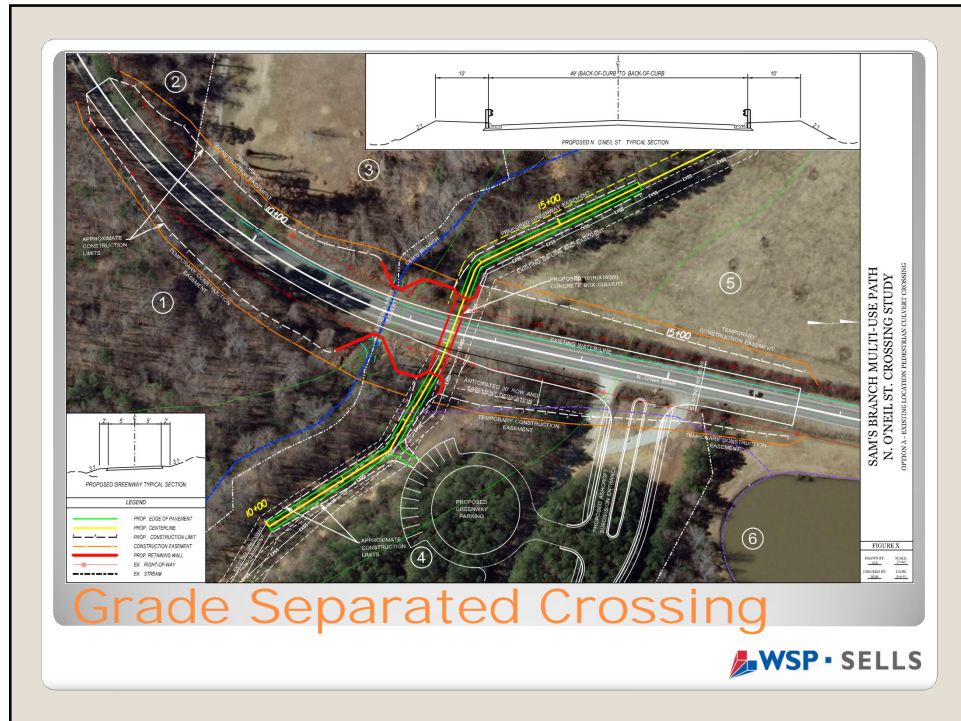
Stakeholder Meeting No. 2
June 5, 2012

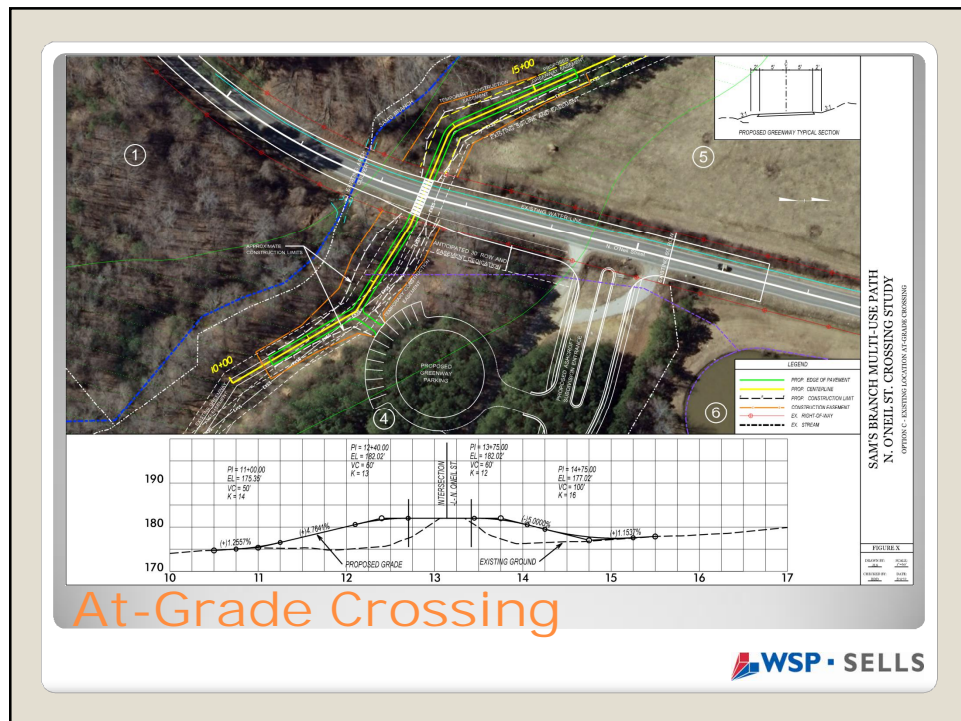
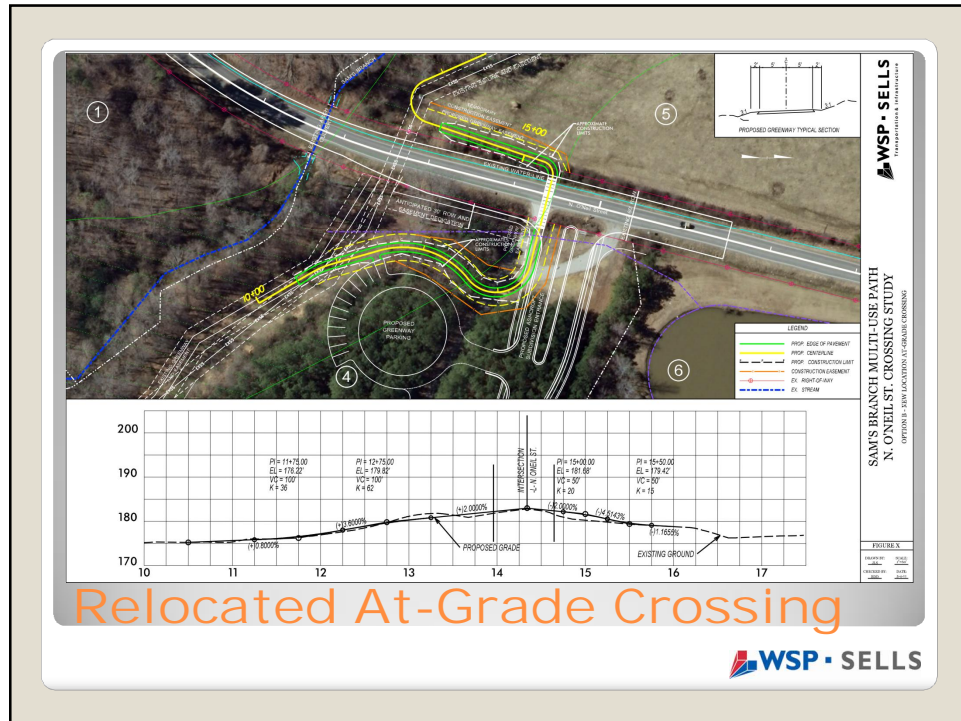


Existing Topography







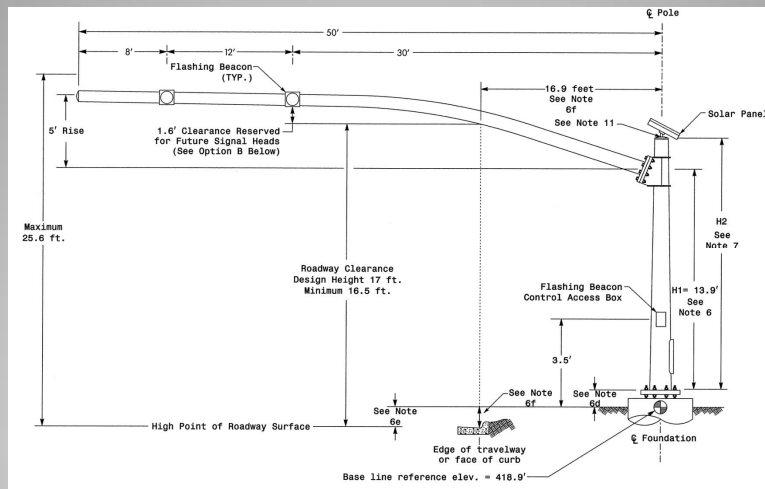




Pedestrian Signage



Flashing Beacons



Overhead Flashing Beacons



Rendering – Grade Separation



Rendering – At-Grade Crossing

WSP • SELLS

		ALTERNATIVES		
		Option A Existing Location Grade Separated	Option B New Location At-Grade	Option C Existing Location At-Grade
IMPACTS	Stream Impacts (LF)	320	40	70
	Wetland Impact (AC)	0.65	0.20	0.35
	Wooded Area (AC)	2.00	0.20	0.50
PERMITTING	COE 404	IP	NP	NP
	DWQ 401 WQC	Yes	Yes	Yes
	NCDOT Encroachment	Yes	Yes	Yes
	NCDOT Driveway	Yes	Yes	Yes
COSTS	Construction Costs (x 1000)	\$ 1,115	\$ 85	\$ 96
	Right-of-Way Costs (x 1000)	\$ 15	\$ 5	\$ 5
	TOTAL COSTS (x 1000)	\$ 1,130	\$ 90	\$ 101

Impacts Matrix



Dehler, Brian

From: David DeYoung <DDeYoung@townofclaytonnc.org>
Sent: Tuesday, August 21, 2012 2:56 PM
To: Dehler, Brian; Chris Lukasina; Jerry Page; Jimmy Eatman; John McCullen; Kumar Trivedi; Shelby Powell; Skip Browder; Tim Simpson; Steve Biggs
Subject: RE: Sam's Branch Multi-use Path Crossing Study Report

Brian,

Sorry for the delay in response, but we have a comment. First, we feel the safest way across N. O'Neil is Alternative D (below).

- **Alternative D** – On existing location, grade separate N. O'Neil Street and the Multi-use Path using a 10-ft high by 14-ft wide reinforced concrete box culvert (RCBC). This involves holding the elevation of N. O'Neil Street and lowering the existing elevation of the Multi-use Path.

We believe that this will be a highly used crossing based on the pedestrian volumes we are experiencing already on the un-opened greenway. The visibility and vehicular speeds on N. O'Neil have us concerned that an at-grade crossing would be dangerous. We are also wondering why the culvert for Alt. D needs to be so large.

If you have any questions regarding the above, please feel free to contact me.

Thanks,

Dave
David L. DeYoung, AICP
Planning Director
Town of Clayton
111 East Second Street | Clayton, NC 27528
P (919)553-1545 | F (919)553-1720
ddeyoung@townofclaytonnc.org



Please consider the environment before printing this email.

From: Dehler, Brian [<mailto:Brian.Dehler@wspells.com>]
Sent: Monday, August 13, 2012 10:19 AM
To: Chris Lukasina; David DeYoung; Jerry Page; Jimmy Eatman; John McCullen; Kumar Trivedi; Shelby Powell; Skip Browder; Tim Simpson
Subject: FW: Sam's Branch Multi-use Path Crossing Study Report

Good Morning,
Friday, August 10 has come and gone. We will begin to finalize the report on Monday, August 20 so please provide any comments you may have by this Friday.

Thanks!

Brian

From: Dehler, Brian
Sent: Wednesday, August 01, 2012 1:25 PM
To: Chris Lukasina; David DeYoung; Jerry Page; Jimmy Eatman; John McCullen; Kumar Trivedi; Shelby Powell; Skip Browder; Tim Simpson
Subject: Sam's Branch Multi-use Path Crossing Study Report

Greetings!

The DRAFT report is available for download from the CAMPO FTP site (link and login information provided below). We have incorporated review comments from Chris and Shelby prior to distributing to all the stakeholders for review and comment. I request your comments by Friday, August 10.

<ftp://campo-nc.us>

username: campoguest

password: Welcome-1

I look forward to your comments.

Thank you,

Brian D. Dehler, P.E.
Project Manager



15401 Weston Pkwy, Suite 100

Cary, NC 27513

T: 919.678.0035

F: 919.678.0206

brian.dehler@wspells.com

www.wspells.com

APPENDIX C

Cost Estimates

TIP No. **Sam's Branch Multi-use path Crossing**
Route
Location Clayton, NC
Typical Section **Alt. A - Existing Location Grade Separation**

Func

County: **Wake**

Priced By:
Prepared By: Jennifer L. Starnes, PE - WSP Sells, Inc. 5/14/12
Checked By: Brian Dehler, PE - WSP SELLS 6/25/12

CONSTR.COST
\$ 1,103,000

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing & Grubbing	2.0	Acres	\$ 5,000.00	\$ 10,000.00
			Unclassified Excavation	1,000	CY	\$ 4.00	\$ 4,000.00
			Borrow	23,000	CY	\$ 5.00	\$ 115,000.00
			Supplementary Clearing & Grubbing	1.0	Acres	\$ 3,100.00	\$ 3,100.00
			<u>Pavement Items: Roadway</u>				
			Asphalt Concrete Surf Crs, S9.5B (3")	700	Ton	\$ 30.00	\$ 21,000.00
			Asphalt Concrete Inter. Crs, I19.0B (4")	950	Ton	\$ 35.00	\$ 33,250.00
			Aggregate Base Course (10")	2,800	Ton	\$ 20.00	\$ 56,000.00
			Subgrade Stabilization		Ton	\$ 11.00	\$ -
			2'-6" Curb & Gutter	1,800	LF	\$ 11.00	\$ 19,800.00
			Sidewalk	1,000	SY	\$ 21.00	
			Concrete Curb Ramps	4	EA	\$ 900.00	\$ 3,600.00
			<u>Pavement Items: Greenway</u>				
			Asphalt Concrete Surf Crs, S9.5B (2")	70	Ton	\$ 30.00	\$ 2,100.00
			Aggregate Base Course (4")	300	Ton	\$ 20.00	\$ 6,000.00
			Asphalt Binder for Plant Mix (64-22)	95	Ton	\$ 600.00	\$ 57,000.00
			Asphalt Binder for Plant Mix (70-22)	-	Ton	\$ 700.00	\$ -
			Guardrail	1,200	LF	\$ 16.00	\$ 19,200.00
			Guardrail Anchor Units (GRAU 350)	4	EA	\$ 2,000.00	\$ 8,000.00
			<u>Traffic Control Items</u>				
			Type III Barricades	40	LF	\$ 45.00	\$ 1,800.00
			Flaggers	3	MD	\$ 250.00	\$ 750.00
			Portable Workzone Signs (10 Assumed)	160	SF	\$ 40.00	\$ 6,400.00
			Drums (1 every 40' Assumed)	50	EA	\$ 70.00	\$ 3,500.00
			<u>Pavement Markers, Markings, Signing Items</u>				
			4" Thermoplastic Lane Lines (Roadway)	4,700.0	LF	\$ 1.00	\$ 4,700.00
			8" Thermoplastic Diagonals (Roadway)	100	LF	\$ 15.00	\$ 1,500.00
			Arrow Symbols (Roadway)	4.00	EA	\$ 100.00	\$ 400.00
			4" Paint Lane Lines (Greenway)	650	LF	\$ 0.50	\$ 325.00
			Flashing Warning Beacons	2	EA	\$ 10,000.00	\$ 20,000.00
			<u>Erosion Control & Drainage Items</u>				
			Temporary Silt Fence (Assumed Length of Proj)	1,800	LF	\$ 1.60	\$ 2,880.00
			18" RCP (Assumed Size)	1,400	LF	\$ 30.00	\$ 42,000.00
			Catch Basins	5	EA	\$ 1,400.00	\$ 7,000.00
			Frame Grate & Hood	5	EA	\$ 475.00	\$ 2,375.00
			<u>Structures and Culverts</u>				
			10x14' Concrete Box Culvert	100	LF	\$ 1,800.00	\$ 180,000.00
			Retaining Wall	350	SF	\$ 55.00	\$ 19,250.00
			Headwalls	1,700	SF	\$ 55.00	\$ 93,500.00
			Misc. & Mob. (15%, Structures)	1	LS	\$ 44,000.00	\$ 44,000.00
			Misc. & Mob. (45%, Roadway)	1	LS	\$ 170,000.00	\$ 170,000.00

Contract Cost.....	\$ 958,430.00
E. & C. (15%).....	\$ 144,000.00
Construction Cost.....	\$ 1,102,430.00

TIP No. **Sam's Branch Multi-use path Crossing**
Route
Location Clayton, NC
Typical Section **Alt. B - New Location, At Grade Crossing**

Func

County: **Wake**

Priced By:
Prepared By: Jennifer L. Starnes, PE - WSP Sells, Inc. 5/14/12
Checked By: Brian Dehler, PE - WSP SELLS 6/25/12

CONSTR.COST	
\$	102,000

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing & Grubbing	1.0	Acres	\$ 5,000.00	\$ 5,000.00
			Unclassified Excavation	100	CY	\$ 4.00	\$ 400.00
			Borrow	-	CY	\$ 5.00	
			Supplementary Clearing & Grubbing	1.0	Acres	\$ 3,100.00	\$ 3,100.00
			<u>Pavement Items: Greenway</u>				
			Asphalt Concrete Surf Crs, S9.5B (2")	65	Ton	\$ 45.00	\$ 2,925.00
			Aggregate Base Course (4")	270	Ton	\$ 30.00	\$ 8,100.00
			Asphalt Binder for Plant Mix (64-22)	5	Ton	\$ 750.00	\$ 3,750.00
			Guardrail	-	LF		\$ -
			Guardrail Anchor Units (GRAU 350)	-	EA		\$ -
			<u>Traffic Control Items</u>				
			Type III Barricades	-	LF	\$ 45.00	\$ -
			Flaggers	1	MD	\$ 250.00	\$ 125.00
			Portable Workzone Signs (6 Assumed)	300	SF	\$ 40.00	\$ 12,000.00
			Drums (1 every 40' Assumed)	20	EA	\$ 70.00	\$ 1,400.00
			<u>Pavement Markers, Markings, Signing Items</u>				
			4" Paint Lane Lines (Greenway)	500.0	LF	\$ 0.50	\$ 250.00
			24" Thermoplastic High Visibility Crosswalk Lines	160	LF	\$ 10.00	\$ 1,600.00
			Flashing Warning Beacons	2	EA	\$ 10,000.00	\$ 20,000.00
					LF	\$ 1.50	\$ -
			<u>Erosion Control & Drainage Items</u>				
			Temporary Silt Fence (Assumed Length of Proj)	1,000	LF	\$ 1.60	\$ 1,600.00
			18" RCP (Assumed Size)		LF	\$ 30.00	\$ -
			<u>Structures and Culverts</u>				
			Misc. & Mob. (45%, Structures)		LS	\$ -	\$ -
			Misc. & Mob. (45%, Roadway)	1	LS	\$ 27,000.00	\$ 27,000.00

Contract Cost..... \$ 87,250.00
E. & C. (15%)..... \$ 14,000.00
Construction Cost..... \$ 101,250.00

TIP No. **Sam's Branch Multi-use path Crossing**
Route
Location Clayton, NC
Typical Section **Alt. C - Existing Location, At Grade Crossing**

Func

County: **Wake**

Priced By:
Prepared By: Jennifer L. Starnes, PE - WSP Sells, Inc. 5/14/12
Checked By: Brian Dehler, PE - WSP SELLS 6/25/12

CONSTR.COST	
\$	115,000

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing & Grubbing	1.0	Acres	\$ 5,000.00	\$ 5,000.00
			Unclassified Excavation	50	CY	\$ 4.00	\$ 200.00
			Borrow	1,500	CY	\$ 5.00	\$ 7,500.00
			Supplementary Clearing & Grubbing	1.0	Acres	\$ 3,100.00	\$ 3,100.00
			<u>Pavement Items: Greenway</u>				
			Asphalt Concrete Surf Crs, S9.5B (2")	60	Ton	\$ 45.00	\$ 2,700.00
			Aggregate Base Course (4")	260	Ton	\$ 30.00	\$ 7,800.00
			Asphalt Binder for Plant Mix (64-22)	5	Ton	\$ 750.00	\$ 3,750.00
			SS MH Adjustments	2	EA	\$ 1,200.00	\$ 2,400.00
			Guardrail	-	LF		\$ -
			Guardrail Anchor Units (GRAU 350)	-	EA		\$ -
			<u>Traffic Control Items</u>				
			Type III Barricades	-	LF	\$ 45.00	\$ -
			Flaggers	1	MD	\$ 250.00	\$ 125.00
			Portable Workzone Signs (6 Assumed)	300	SF	\$ 40.00	\$ 12,000.00
			Drums (1 every 40' Assumed)	20	EA	\$ 70.00	\$ 1,400.00
			<u>Pavement Markers, Markings, Signing Items</u>				
			4" Paint Lane Lines (Greenway)	500	LF	\$ 0.50	\$ 250.00
			24" Thermoplastic High Visibility Crosswalk Lines	110	LF	\$ 10.00	\$ 1,100.00
			Flashing Warning Beacons	2	EA	\$ 10,000.00	\$ 20,000.00
					LF	\$ 1.50	\$ -
			<u>Erosion Control & Drainage Items</u>				
			Temporary Silt Fence (Assumed Length of Proj)	860	LF	\$ 1.60	\$ 1,376.00
			18" RCP (Assumed Size)		LF	\$ 30.00	\$ -
			<u>Structures and Culverts</u>				
			Misc. & Mob. (45%, Structures)		LS	\$ -	\$ -
			Misc. & Mob. (45%, Roadway)	1	LS	\$ 31,000.00	\$ 31,000.00

Contract Cost.....	\$	99,701.00
E. & C. (15%).....	\$	15,000.00
Construction Cost.....	\$	114,701.00

TIP No. **Sam's Branch Multi-use path Crossing**
Route
Location Clayton, NC
Typical Section **Alt. D - Existing Location Grade Separation**

Func

County: **Wake**

Priced By:
Prepared By: Jennifer L. Starnes, PE - WSP Sells, Inc. 5/14/12
Checked By: Brian Dehler, PE - WSP SELLS 6/25/12

CONSTR.COST
\$ 439,000

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
			Clearing & Grubbing	1.0	Acres	\$ 5,000.00	\$ 5,000.00
			Unclassified Excavation	5,000	CY	\$ 4.00	\$ 20,000.00
			Borrow	-	CY	\$ 5.00	\$ -
			Supplementary Clearing & Grubbing	1.0	Acres	\$ 3,100.00	\$ 3,100.00
			<u>Pavement Items: Roadway</u>				
			Asphalt Concrete Surf Crs, S9.5B (3")	50	Ton	\$ 45.00	\$ 2,250.00
			Asphalt Concrete Inter. Crs, I19.0B (4")	60	Ton	\$ 50.00	\$ 3,000.00
			Aggregate Base Course (10")	150	Ton	\$ 30.00	\$ 4,500.00
			Subgrade Stabilization		Ton	\$ 11.00	\$ -
			2'-6" Curb & Gutter	-	LF	\$ 11.00	\$ -
			Sidewalk	-	SY	\$ 21.00	\$ -
			Concrete Curb Ramps	-	EA	\$ 900.00	\$ -
			<u>Pavement Items: Greenway</u>				
			Asphalt Concrete Surf Crs, S9.5B (2")	70	Ton	\$ 45.00	\$ 3,150.00
			Aggregate Base Course (4")	150	Ton	\$ 30.00	\$ 4,500.00
			Asphalt Binder for Plant Mix (64-22)	15	Ton	\$ 750.00	\$ 11,250.00
			Asphalt Binder for Plant Mix (70-22)	-	Ton	\$ 700.00	\$ -
			Guardrail	1,200	LF	\$ 16.00	\$ 19,200.00
			Guardrail Anchor Units (GRAU 350)	4	EA	\$ 2,000.00	\$ 8,000.00
			<u>Traffic Control Items</u>				
			Type III Barricades	40	LF	\$ 45.00	\$ 1,800.00
			Flaggers	3	MD	\$ 250.00	\$ 750.00
			Portable Workzone Signs (10 Assumed)	160	SF	\$ 40.00	\$ 6,400.00
			Drums (1 every 40' Assumed)	50	EA	\$ 70.00	\$ 3,500.00
			<u>Pavement Markers, Markings, Signing Items</u>				
			4" Thermoplastic Lane Lines (Roadway)	200.0	LF	\$ 1.00	\$ 200.00
			8" Thermoplastic Diagonals (Roadway)	-	LF	\$ 15.00	\$ -
			Arrow Symbols (Roadway)	-	EA	\$ 100.00	\$ -
			4" Paint Lane Lines (Greenway)	200	LF	\$ 0.50	\$ 100.00
			Flashing Warning Beacons	-	EA	\$ 10,000.00	\$ -
			<u>Erosion Control & Drainage Items</u>				
			Temporary Silt Fence (Assumed Length of Proj)	400	LF	\$ 1.60	\$ 640.00
			18" RCP (Assumed Size)	-	LF	\$ 30.00	\$ -
			Catch Basins	-	EA	\$ 1,400.00	\$ -
			Frame Grate & Hood	-	EA	\$ 475.00	\$ -
			<u>Structures and Culverts</u>				
			10x14' Concrete Box Culvert	100	LF	\$ 1,800.00	\$ 180,000.00
			Retaining Wall	-	SF	\$ 55.00	\$ -
			Headwalls	500	SF	\$ 55.00	\$ 27,500.00
			Misc. & Mob. (15%, Structures)	1	LS	\$ 32,000.00	\$ 32,000.00
			Misc. & Mob. (45%, Roadway)	1	LS	\$ 44,000.00	\$ 44,000.00

Contract Cost.....	\$ 380,840.00
E. & C. (15%).....	\$ 58,000.00
Construction Cost.....	\$ 438,840.00