

MITIGATION PLAN
AYCOCK SPRINGS
STREAM AND WETLAND MITIGATION SITE

Alamance County, North Carolina

Full Delivery Contract No. 5791

USACE Action ID No. SAW-2014-01711

Cape Fear River Basin
Cataloging Unit 03030002



Prepared for:



NCDENR-Ecosystem Enhancement Program
217 West Jones Street, Suite 3000A
Raleigh, North Carolina 27603

May 2015

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May 2015

EXECUTIVE SUMMARY

The Aycock Springs Stream and Wetland Mitigation Site (Site) is located approximately 1.5 miles north of Elon and Gibsonville in western Alamance County within 14-digit Cataloging Unit and Targeted Local Watershed 03030002030010 of the Cape Fear River Basin.

The Site encompasses approximately 13 acres of agricultural land used for livestock grazing and timber production. The Site is situated along Travis Creek and four unnamed tributaries (UT's) to Travis Creek. Existing streams have been cleared, dredged, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock and adjacent runoff. A breached dam located at the downstream extent of Travis Creek doesn't effectively pass storm flows and impounds water during rain events. In addition, streamside wetlands have been cleared and drained by channel downcutting and land uses. The Site was identified to assist the North Carolina Ecosystem Enhancement Program (NCEEP) in meeting its stream and wetland restoration goals.

Site activities include the restoration of perennial and intermittent stream channels, enhancement (Level II) of the perennial stream channel, and re-establishment of riparian wetlands. Priority I restoration of intermittent channels at the Site is imperative to provide significant functional uplift to Site hydrology, water quality, and habitat, in addition to restore adjacent streamside, riparian wetlands. A total of 3628 Stream Mitigation Units (SMUs) and 0.5 Riparian Wetland Mitigation Units (WMUs) are being offered as depicted in the following table.

Stream Mitigation Type	Perennial Stream (linear feet)	Intermittent Stream (linear feet)	Ratio	Stream Mitigation Units
Restoration	3058	177	1:1	3235
Restoration (See Notes below concerning landowner violations)		122	1:5:1	81
Enhancement (Level II)	677	--	2.5:1	271
Totals	3735	299		3578
Wetland Mitigation Type	Acreage	Ratio	Riparian Wetland Mitigation Units	
Riparian Re-establishment	0.5	1:1	0.5	
Riparian Enhancement	1.5*		--	
Totals	2.0		0.5	

*Wetland enhancement acreage is not included in mitigation credit calculations as per RFP 16-005568 requirements.

Prior to Site selection, the landowner received a violation for unauthorized discharge of fill material into Waters of the United States. Fill resulted from unpermitted upgrades to a farm pond dam, including widening the dam footprint, dredging stream channel, and casting spoil material adjacent to the stream channel on jurisdictional wetlands. Prior to restoration activities the landowner was required to obtain an after-the-fact permit to resolve the violations of Section 301 of the Clean Water Act (Action ID:SAW-2014-00665). In addition, stream reaches and wetland areas associated with the violation have been removed from credit generation.

In addition, the landowner received a violation for riparian buffer impacts due to clearing of trees adjacent to streams draining to Jordan Lake (NOV-2013-BV-0001). As a result of this violation, the upper 122 linear feet of UT 3 has a reduced credit ratio (1.5:1). On-site visits conducted with USACE representatives determined that the functional uplift of project restoration to UT 3 would be satisfactory to generate credit at this ratio.

Positive aspects supporting proposed mitigation activities at the Site include the following.

- Streams have a Best Usage Classification of WS-V, NSW
- Located in a Targeted Local Watershed and within the NCEEP Travis, Tickle, Little Alamance Local Watershed Planning (LWP) Area
- Travis Creek is listed on the NCDENR 2012 303(d) list for ecological/biological integrity
- Immediately south and abutting the Site is a property identified in the *Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan* (PTCOG 2008) as a target property for wetland restoration and streambank enhancement/conservation
- Immediately west of the Site is a large tract associated with Guilford County open space

The following six goals were identified by the Stakeholder group of the Travis, Tickle, Little Alamance LWP Phase I assessment which address the water quality impacts and watershed needs in all of the Little Alamance, Travis, Tickle watersheds in 2006.

- 1) Increase local government awareness of the impacts of urban growth on water resources;
- 2) Strengthen watershed protection standards;
- 3) Improve water quality through stormwater management;
- 4) Identify and rank parcels for retrofits, stream repair, preservation, and/or conservation;
- 5) Assess aquatic health to identify stressors that are the most likely causes of poor biological conditions;
- 6) Meet requirements of outside funding sources for implementation of projects.

The eight priority goals of the Travis, Tickle, Little Alamance LWP include the following.

- 1) reduce sediment loading;
- 2) reduce nutrient loading;
- 3) manage stormwater runoff;
- 4) reduce toxic inputs;
- 5) provide and improve instream habitat;
- 6) provide and improve terrestrial habitat;
- 7) improve stream stability; and
- 8) improve hydrologic function.

The following table summarizes the project goals/objectives and proposed functional uplift based on proposed restoration activities and observations of two reference areas located in the vicinity of the Site. Goals and objectives target functional uplift identified in the Travis, Tickle, Little Alamance LWP and based stream/wetland functional assessments developed by the regulatory agencies.

Project Goals and Objectives

Project Goal/Objective	How Goal/Objective will be Accomplished
Improve Hydrology	
Restore Floodplain Access	Building a new channel at the historic floodplain elevation to restore overbank flows
Restore Wooded Riparian Buffer	Planting a woody riparian buffer
Restore Stream Stability	Providing proper channel width and depth, stabilizing channel banks, providing gravel/cobble substrate, planting a woody riparian buffer, and removing cattle
Improve Sediment Transport to Convert the UT's from Sand/Silt Dominated to Gravel/Cobble Dominated Streams	
Improve Stream Geomorphology	
Increase Surface Storage and Retention	Building a new channel at the historic floodplain elevation restoring overbank flows, removing cattle, scarifying compacted soils, and planting woody vegetation
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	Raising the stream bed elevation and rip compacted soils
Improve Water Quality	
Increase Upland Pollutant Filtration	Planting a native, woody riparian buffer
Increase Thermoregulation	Planting a native, woody riparian buffer
Reduce Stressors and Sources of Pollution	Removing cattle and other agricultural inputs
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Raising the stream bed elevation, restoring overbank flows, planting with woody vegetation, removing cattle, increasing surface storage and retention, and restoring appropriate inundation/duration
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Raising the stream bed elevation, restoring overbank flows, and planting with woody vegetation
Restore Habitat	
Restore In-stream Habitat	Building a stable channel with a cobble/gravel bed and planting a woody riparian buffer
Restore Stream-side Habitat	
Improve Vegetation Composition and Structure	

This mitigation plan has been written in compliance with the requirements of the following documents, which govern NCEEP operations and procedures for the delivery of compensatory mitigation.

- Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).
- NCDENR Ecosystem Enhancement Program In-Lieu Fee Instrument signed and dated July 28, 2010.

This detailed mitigation plan includes 1) descriptions of existing conditions; 2) reference stream, wetland, and forest studies; 3) restoration plans; and 4) monitoring and success criteria. Proposed restoration activities may be modified during the design stage to address constraints such as access issues, sediment-erosion control measures, drainage needs (floodway constraints), or other design considerations.

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1.0 PROJECT SITE IDENTIFICATION AND LOCATION

The Aycock Springs Stream and Wetland Mitigation Site (Site) is located approximately 1.5 miles north of Elon and Gibsonville in western Alamance County (Figure 1, Appendix A). The Site encompasses approximately 13 acres of agricultural land used for livestock grazing, hay production, and timber harvest. Within the Site, existing streams have been cleared, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock and timber harvest activities. Stream impacts in Travis Creek have also occurred due to a breached dam that impounds water during storm events. In addition, streamside wetlands have been drained by channel incision, soil compaction, the loss of forest vegetation, and land uses.

1.1 Directions to Project Site

Directions to the Site from Interstate 40/85 in Burlington/Elon, North Carolina.

- Exit onto University Drive (I-40/85 Exit 140) and travel north towards Elon,
- Travel north for 2.8 miles and merge with NC 100,
- Continue on University Drive (NC 100) for 0.5 mile and turn left onto Manning Street (SR 1503),
- Travel northwest for 0.8 mile and turn right onto Gibsonville-Ossipee Road (SR 1500),
- Travel north for 0.7 mile and Site is on the right.
 - Site Latitude, Longitude
36.127271°N, 79.525214°W (NAD83/WGS84)

1.2 USGS Hydrologic Unit Code and NCDWR River Basin Designation

The Site is located within the Cape Fear River Basin in 14-digit United States Geological Survey (USGS) Cataloging Unit and Targeted Local Watershed 03030002030010 of the South Atlantic/Gulf Region (North Carolina Division of Water Resources [NCDWR], formerly the North Carolina Division of Water Quality subbasin number 03-06-02) [Figure 2, Appendix A]. Topographic features of the Site include Travis Creek, which has been assigned Stream Index Number 16-12 and a Best Usage Classification of WS-V, NSW (NCDWR 2013).

1.3 Project Components and Structure

Proposed restoration activities include the construction of meandering, E/C-type stream channel resulting in 3357 linear feet of Priority I and II stream restoration, 677 linear feet of stream enhancement (Level II), 0.5 acres of riparian wetland re-establishment, and 1.5 acres of riparian wetland enhancement (Table 1).

Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 2-4.

**Table 1. Project Components and Mitigation Credits
Aycock Springs Restoration Site**

Mitigation Credits							
Stream	Stream	Riparian Wetland			Nonriparian Wetland		
Restoration	Enhancement	Re-establishment			Re-establishment		
3316	271	0.5			--		
Projects Components							
Station Range	Existing Linear Footage/Acreage	Priority Approach	Restoration/Restoration Equivalent	Restoration Linear Footage/Acreage	Mitigation Ratio	Mitigation Credits	Comment
UT 1 Station 00+06 to 13+21	1173	PI	Restoration	$1315-24=1291$	1:1	1291	24 lf of UT 1 is located outside of easement and is not credit generating
UT 2 Station 00+00 to 06+75	723	PI	Restoration	675	1:1	675	
UT 3 Station 00+00 to 01+22	147	PI	Restoration	122	1.5:1	81	*** The upper 122 linear feet of channel is in a violation area and is generating credit at a reduced ratio of 1.5:1
UT 3 Station 01+22 to 02+12	16	PI	Restoration	90	1:1	90	
UT 4 Station 00+00 to 04+13	448	PI	Restoration	$413-107=306$	1:1	306	****The upper 107 linear feet of channel is in a violation area and is not credit generating
Travis Creek Station 00+00 to 05+78	578		EII	578	2.5:1	231	
Travis Creek Station 05+78 to 07+87	274	PII	Restoration	209	1:1	209	
Travis Creek Station 07+87 to 08+86	99		EII	99	2.5:1	40	
Travis Creek Station 13+71 to 20+35	936	PI	Restoration	664	1:1	664	

**Table 1. Project Components and Mitigation Credits (continued)
Aycock Springs Restoration Site**

Component Summation			
Restoration Level	Stream (linear footage)	Riparian Wetland (acreage)	Nonriparian Wetland (acreage)
Restoration	3357*	0.5	--
Enhancement (Level I)	--	--	--
Enhancement (Level II)	677	--	
Enhancement	--	1.5**	
Totals	4034	--	--
Mitigation Units	3587 SMUs	0.5 Riparian WMUs	0.00 Nonriparian WMUs

*An additional 165 linear feet of stream restoration is proposed outside of the easement and is therefore not included in this total or in mitigation credit calculations.

**Wetland enhancement acreage is not included in mitigation credit calculations as per RFP 16-005568 requirements.

***Prior to Site selection, the landowner received a violation for riparian buffer impacts due to clearing of trees adjacent to streams draining to Jordan Lake (NOV-2013-BV-0001). As a result of this violation, the upper 122 linear feet of UT 3 has a reduced credit ratio of 1.5:1. On-site visits conducted with USACE representatives determined that the functional uplift of project restoration to UT 3 would be satisfactory to generate credit at this ratio.

**** Prior to Site selection, the landowner received a violation for unauthorized discharge of fill material into Waters of the United States. Fill resulted from unpermitted upgrades to a farm pond dam, including widening the dam footprint, dredging stream channel, and casting spoil material adjacent to the stream channel on jurisdictional wetlands. Prior to restoration activities the landowner was required to obtain an after-the-fact permit to resolve the violations of Section 301 of the Clean Water Act (Action ID:SAW-2014-00665). In addition, stream reaches and wetland areas associated with the violation area have been removed from credit generation (see Figure 6A [Appendix A] – UT 4 begins credit generation at Station 01+07).

**Table 2. Project Activity and Reporting History
Aycock Springs Restoration Site**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Technical Proposal (RFP No. 16-005568)	--	October 2013
EEP Contract No. 5791	--	February 2014
Mitigation Plan	October 2014	May 2015
Construction Plans	--	---

**Table 3. Project Contacts Table
Aycock Springs Restoration Site**

Full Delivery Provider	Restoration Systems 1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 Worth Creech 919-755-9490
Designer	Axiom Environmental, Inc. 218 Snow Avenue Raleigh, NC 27603 Grant Lewis 919-215-1693

**Table 4. Project Attribute Table
Aycock Springs Restoration Site**

Project Information	
Project Name	Aycock Springs Restoration Site
Project County	Alamance County, North Carolina
Project Area (acres)	15
Project Coordinates (latitude & longitude)	36.127271°N, 79.525214°W
Project Watershed Summary Information	
Physiographic Province	Piedmont
Project River Basin	Cape Fear
USGS HUC for Project (14-digit)	03030002030010
NCDWQ Sub-basin for Project	03-06-02
Project Drainage Area (acres)	26-3008
Project Drainage Area Percentage of Impervious Area	<2%

Table 4. Project Attribute Table (continued)
Aycock Springs Restoration Site

Reach Summary Information				
Parameters	Travis Cr	UT 1/UT2	UT 3	UT 4
Length of reach (linear feet)	1550	1966	212	413
Valley Classification	alluvial			
Drainage Area (acres)	3008	68	26	119
NCDWQ Stream ID Score	--	30.75/25.5	26.75	27.5
NCDWR Water Quality Classification	WS-V, NSW			
Existing Morphological Description (Rosgen 1996)	Cg 5/6-, Eg 5-, and Fc 5-type			
Existing Evolutionary Stage (Simon and Hupp 1986)	IV	IV	III	III
Underlying Mapped Soils	Cecil, Helena, Mixed Alluvial Land, Severely Gullied Land, Worsham			
Drainage Class	Well-drained, moderately well-drained, poorly drained, variable, poorly drained			
Hydric Soil Status	Nonhydric and Hydric			
Slope	0.0023	0.0249	0.0153	0.0093
FEMA Classification	AE	Special Hazard Flood Area		
Native Vegetation Community	Piedmont Alluvial Forest/Dry-Mesic Oak-Hickory Forest			
Watershed Land Use/Land Cover (Site)	42% forest, 53% agricultural land, <5% low density residential/impervious surface			
Watershed Land Use/Land Cover (Cedarrock Reference Channel)	65% forest, 30% agricultural land, <5% low density residential/impervious surface			
Percent Composition of Exotic Invasive Vegetation	< 5%			
Wetland Summary Information				
Parameters	Wetlands			
Wetland acreage	1.6			
Wetland Type	Riparian			
Mapped Soil Series	Worsham and Mixed Alluvial Land			
Drainage Class	Poorly drained			
Hydric Soil Status	Hydric			
Source of Hydrology	Groundwater, stream overbank			
Hydrologic Impairment	Incised streams, compacted soils, livestock			
Native Vegetation Community	Piedmont/Low Mountain Alluvial Forest			
Percent Composition of Exotic Invasive Vegetation	<5%			
Regulatory Considerations				
Regulation	Applicable?	Resolved?	Supporting Documentation	
Waters of the United States-Section 401	Yes	In progress	JD Package (App D)	
Waters of the United States-Section 404	Yes	In progress	JD Package (App D)	
Endangered Species Act	No	--	CE Doc. (App E)	
Historic Preservation Act	No	--	CE Doc. (App E)	
Coastal Zone Management Act	No	--	NA	
FEMA Floodplain Compliance	Yes	In progress	Appendix F	
Essential Fisheries Habitat	No	--	NA	

2.0 WATERSHED CHARACTERIZATION

2.1 Drainage Area

The Site provides water quality function to a 0.11-square mile (68-acre) watershed at the Site outfall of UT1 and a 4.7-square mile (3008-acre) watershed at the Site outfall of Travis Creek (Figure 3, Appendix A). The Site drainage area is primarily composed of agricultural pasture, with sparse residential areas along state maintained roads, and forest land in the upper headwaters. Immediately west of the Site is a large tract associated with Guilford County open space (Figure 3, Appendix A). In addition, this property was identified in the *Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan* (PTCOG 2008) as Travis & Tickle Site 3.1. The property was identified based on a need for wetland restoration and stream bank enhancement/conservation.

2.2 Surface Water Classification/Water Quality

The Site is located within the Cape Fear River Basin in 14-digit USGS Cataloging Unit and Targeted Local Watershed 03030002030010 of the South Atlantic/Gulf Region (NCDWR subbasin number 03-06-02) (Figure 2, Appendix A). Topographic features of the Site include Travis Creek, which has been assigned Stream Index Number 16-12 and a Best Usage Classification of WS-V, NSW (NCDWR 2013). Streams with a designation of WS-V are protected as water supplies which are generally upstream and draining to Class WS-IV waters, waters used by industry to supply their employees with drinking water, or as waters formerly used as water supply. These waters are also protected for Class C uses, such as aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses not involving human body contact with waters on an organized or frequent basis. The designation NSW (Nutrient Sensitive Waters) includes areas with water quality problems associated with excessive plant growth resulting from nutrient enrichment.

The North Carolina Department of Environment and Natural Resources (NCDENR) has assembled a list of impaired waterbodies according to the Clean Water Act Section 303(d) and 40 CFR 130.7, which is a comprehensive public accounting of all impaired waterbodies. An impaired waterbody is one that does not meet water quality standards including designated uses, numeric and narrative criteria, and anti-degradation requirements defined in 40 CFR 131. Travis Creek is listed on the NCDENR draft 2014 and final 2012 303(d) lists for reduced ecological/biological integrity (NCDENR 2013, NCDENR 2014).

2.3 Physiography, Geology, and Soils

The Site is located in the Southern Outer Piedmont portion of the Piedmont Ecoregion of North Carolina within USGS Cataloging Unit 03030002 (NCDWR subbasin number 03-06-02) of the Cape Fear River Basin. Regional physiography is characterized by dissected irregular plains, some low rounded hills and ridges; low to moderate gradient streams with mostly cobble, gravel, and sandy substrates (Griffith et al. 2002). Onsite elevations range from a high of 630 feet National Geodetic Vertical Datum (NGVD) at the upper reaches of UT1 to a low of approximately 600 feet NGVD at the Site outfall (USGS Ossipee, North Carolina 7.5-minute topographic quadrangle) (Figure 3, Appendix A).

Geology of the Site includes intrusive rock of the Raleigh Belt. Intrusive rocks include metamorphosed granitic rock which is megacrystic, well-foliated and locally contains hornblende

(NCGS 1985). Rock outcrops at the Site were surveyed and depicted on mapping as avoidance areas for channel excavation. In addition, bedrock outcrops in the channels were mapped and have been incorporated into the design channel as natural grade control.

Site soils are depicted on Figure 4 (Appendix A) and are summarized below.

Table 5. Site Soils
Aycock Springs Restoration Site

Soil Series	Hydric Status	Description
Cecil fine sandy loam (CbC2)	Nonhydric	The Cecil series consists of very deep, well-drained, moderately permeable soils on ridges and side slopes of the Piedmont uplands. They formed in residuum weathered from felsic, igneous and high-grade metamorphic rocks of the Piedmont uplands. Slopes range from 0 to 25 percent.
Helena clay loam (HaC3) and Helena coarse sandy loam (HbB2)	Nonhydric	This series consists of moderately well-drained soils in ridges and hill slopes from toe slope to summits and heads of drains. They formed in residuum from granite and gneiss cut by dykes of gabbro and diorite. Slopes range from 0 to 15 percent.
Mixed Alluvial Land (Mc)	Hydric	This soil series consists of poorly-drained soils found on bottoms and along streams. This soil series is derived from material deposited by streams carried from uplands. This land is generally characterized by a high water table.
Severely Gullied Land (Sa)	Nonhydric	This series consists of mixed soils that have been severely eroded. In some instances all horizons have been removed exposing bedrock or parent material.
Worsham sandy loam (Wd)	Hydric	This series consists of poorly drained soils found on 2-6 percent slopes and in low wet depressions. They are derived from colluvium and alluvial materials primarily of the slate belt. These soils are widespread throughout the county.

2.4 Protected Species

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered, and Proposed Threatened are protected under provisions of Sections 7 and 9 of the Endangered Species Act of 1973, as amended.

Based on the most recently updated county-by-county database of federally listed species in North Carolina as posted by the United States Fish and Wildlife Service (USFWS) at <http://www.fws.gov/southeast/es/county%20lists.htm>, no federally protected species are listed for Alamance County.

2.5 Cultural Resources

The term “cultural resources” refers to prehistoric or historic archaeological sites, structures, or artifact deposits over 50 years old. “Significant” cultural resources are those that are eligible or potentially eligible for inclusion in the *National Register of Historic Places*. Evaluations of Site

significance are made with reference to the eligibility criteria of the National Register (36 CFR 60) and in consultation with the North Carolina State Historic Preservation Office (SHPO).

In a letter dated March 20, 2014, SHPO indicated they “conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.” A copy of the letter is included in the Categorical Exclusion document in Appendix E.

2.6 Potential Constraints

The presence of conditions or characteristics that have the potential to hinder restoration activities within the Site were evaluated. The evaluation focused primarily on the presence of hazardous materials, utilities and restrictive easements, rare/threatened/endangered species or critical habitats, and the potential for hydrologic trespass. Existing information regarding constraints was acquired and reviewed. In addition, any Site conditions that have the potential to restrict the proposed restoration design and implementation were documented during the field investigation.

No constraints that may hinder restoration activities have been identified for this Site.

2.6.1 Property Ownership and Boundary

The property is held by Gary Oakley. A perpetual conservation easement will be prepared that incorporates the results of this study. The conservation easement will be depicted on a recordable map, signed by the owner, and recorded in Alamance County.

2.6.2 Site Access

The Site is accessed from Amick Road (SR 1549) for proposed restoration work on UT 1 and UT 2, or from Gibsonville-Ossipee Road (SR 1500) for proposed restoration work on UT 3, UT 4, and Travis Creek. An access easement to the conservation easement will be obtained and recorded in Alamance County.

2.6.3 Utilities

Utilities are not located within the vicinity of the project and are therefore not considered a constraint for this project.

2.6.4 FEMA/Hydrologic Trespass

Surface drainage on the Site and surrounding areas have been analyzed to predict the feasibility of manipulating existing surface drainage patterns without adverse effects to the Site or adjacent properties. The following presents a summary of hydrologic and hydraulic analyses along with provisions designed to maximize groundwater recharge and wetland re-establishment while reducing potential impacts to adjacent properties.

Two HEC-RAS models were prepared for this project; a bed shear stress model and a FEMA model. The bed shear stress model is highly detailed with cross sections every 50 to 150 feet in the project area. The purpose of this analysis is to predict flood elevations and bed shear stress for the bankfull, 2-times bankfull, 2-year, 5-year, 10-year, and 100-year return period storms under both the existing conditions and the proposed post-restoration conditions. This model is not

calibrated to analyze FEMA flood elevations and hydraulic trespass. The comparative flood elevations were evaluated using simulated peak flood discharges generated with the NRCS TR-55 method and regional regression curves. The FEMA model contains cross sections spaced 100'-500' apart over a larger portion of the studied stream and has been calibrated to analyze FEMA flood elevations. The purpose of this analysis is to predict changes in FEMA flood elevations between the existing conditions and the proposed post-restoration conditions that would result in hydraulic trespass. The comparative flood elevations were provided in the FEMA FIS report for Alamance County dated September 6, 2006.

The existing river geometry was digitized from a DTM (digital terrain model) surface, prepared by a professional surveyor, using Microstation Geopak software. Cross sections were cut using Geopak at strategic locations with the intent to generate the most accurate and useful model output as reasonably possible. Existing cross sections were cut using the DTM and adjusted where necessary based on field-collected data. Proposed post-restoration sections were cut using the existing cross sections and a proposed typical stream section and profile, with some slight adjustments made for realistic constructability. These cross sections were then imported into HEC-RAS.

Watershed measurements and land use estimates were made using the existing DEM (digital elevation model) data and aerial photography. Observations of the existing hydraulic and hydrographic characteristics were incorporated into the model, and adjustments were made to the model where necessary based on engineering judgment.

Analysis of the FEMA model indicates that FEMA 100-year flood elevations will not increase due to the proposed stream and wetland restoration design and no additional hydraulic trespass will occur compared to existing conditions (HEC RAS data and output are included in Appendix F). A maximum decrease in FEMA 100-year flood elevation of 0.20 feet is expected within the project vicinity. The decrease in flood elevation, along with a change in the location of the floodway indicates a Conditional Letter of Map Revision (CLOMR) may be needed for the Site. The CLOMR will be completed at the discretion of the local Floodplain Administrator. Coordination with FEMA representatives (see EEP Floodplain Requirement Checklist in Appendix F) has been initiated.

Inspection of the FEMA Flood Insurance Rate Map 3710884600K, effective June 18, 2007, indicates that Travis Creek is located within a Zone AE flood area. In addition, Site UT's are located within a Special Flood Hazard Area (SFHA) and are backwater only. There are no FEMA models for these UTs have not been studied individually, so comparative models for these reaches are not necessary.

The CLOMR will include written documentation of modeling, preparation of topographic work maps, annotated FIRM or Floodway Maps, FIRM Flood Profiles and Data Tables. The CLOMR will be sent to Alamance County for approval and signature, and then the CLOMR will be sent to FEMA for review and approval. The CLOMR approval process is expected to take 3-6 months. The CLOMR should be prepared, submitted, and approved prior to construction. A requirement of the CLOMR is to prepare and submit a Letter of Map Revision (LOMR) once construction is complete.

3.0 PROJECT SITE STREAMS (EXISTING CONDITIONS)

Streams targeted for restoration include UTs to Travis Creek (UTs 1-4) and Travis Creek proper. The UTs have been cleared, dredged of cobble substrate, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock. Approximately 95 percent of the existing UT stream channels have been degraded contributing to sediment export from the Site. In addition, streamside wetlands have been cleared and drained by channel downcutting and land uses.

Travis Creek is targeted for restoration in two outer bends that are characterized by excessive shear and tight meander radii, as well as the downstream reach which historically was impounded by an agricultural dam. The dam has been breached and a channel has scoured sediment from the historic impoundment; however, the breach is small enough to impede stormwater pulses, resulting in hydrologic stacking of water upstream from the breach area. Approximately 30 percent of the existing Travis Creek stream channel has been degraded from vegetative clearing, erosion of channel banks, and impediment of stormwater flows.

Current Site conditions have resulted in degraded water quality, a loss of aquatic habitat, reduced nutrient and sediment retention, and unstable channel characteristics (loss of horizontal flow vectors that maintain pools and an increase in erosive forces to channel bed and banks). Site restoration activities will restore riffle-pool morphology, aid in energy dissipation, increase aquatic habitat, stabilize channel banks, and greatly reduce sediment loss from channel banks.

3.1 Existing Conditions Survey

Site stream dimension, pattern, and profile were measured to characterize existing channel conditions. Locations of existing stream reaches are depicted in Figure 4 (Appendix A) and cross-section locations are depicted in Figure B1 (Appendix B). Stream geometry measurements under existing conditions are summarized in Table 6 (Morphological Stream Characteristics).

3.2 Channel Classification and Morphology

Stream geometry and substrate data have been evaluated to classify existing stream conditions based on a classification utilizing fluvial geomorphic principles (Rosgen 1996). This classification stratifies streams into comparable groups based on pattern, dimension, profile, and substrate characteristics. Primary components of the classification include degree of entrenchment, width-depth ratio, sinuosity, channel slope, and stream substrate composition.

Existing Site reaches are classified as unstable Cg-type, Eg-type, and Fc-type streams with little to no sinuosity. Each stream type is modified by a number 1 through 6 (e. g., E5), denoting a stream type which supports a substrate dominated by 1) bedrock, 2) boulders, 3) cobble, 4) gravel, 5) sand, or 6) silt/clay. Existing Site reaches are characterized by sand and silt substrate as the result of channel impacts including livestock trampling, channel straightening, and riparian vegetation removal. Substrate will be used in the restored stream channel to mimic relatively undisturbed reaches near the Site, which are comprised of gravel/cobble substrate.

**Table 6. Morphological Stream Characteristics
Aycock Springs Restoration Site**

Variables	REFERENCE - CEDAROCK PARK	REFERENCE - CRIPPLE* CREEK
Stream Type	Eb 4	E4
Drainage Area (m ²)	0.21	0.17
Bankfull Discharge (cfs)	31.3	22.6
Dimension Variables		
Bankfull Cross-Sectional Area (A_{bkf})	8.0	5.9
Existing Cross-Sectional Area at TOB ($A_{existing}$)	8.0	2.2 - 9.4
Bankfull Width (W_{bkf})	Mean: 8.1 Range: 8.0 - 12.1	Mean: 4.6 Range: 3.0 - 6.1
Bankfull Mean Depth (D_{bkf})	Mean: 0.8 Range: 0.8 - 1.0	Mean: 1.1 Range: 0.7 - 1.5
Bankfull Maximum Depth (D_{max})	Mean: 1.4 Range: 1.1 - 1.4	Mean: 1.7 Range: 1.0 - 2.3
Pool Width (W_{pool})	Mean: 9.3 Range: 8.9 - 9.7	Mean: 7.1 Range: 7.1 - 7.1
Maximum Pool Depth (D_{pool})	Mean: 1.8 Range: 1.5 - 2.1	Mean: 1.8 Range: 1.7 - 1.9
Width of Floodprone Area (W_{fpa})	Mean: 18 Range: 15 - 25	Mean: 150.0 Range: 150 - 150
Dimension Ratios		
Entrenchment Ratio (W_{fpa}/W_{bkf})	Mean: 2.1 Range: 1.9 - 2.2	Mean: 37.3 Range: 24.6 - 50
Width / Depth Ratio (W_{bkf}/D_{bkf})	Mean: 10.1 Range: 8.0 - 15.1	Mean: 4.2 Range: 4.0 - 4.3
Max. D_{bkf} / D_{bkf} Ratio	Mean: 1.4 Range: 1.4 - 1.8	Mean: 1.5 Range: 1.4 - 1.5
Low Bank Height / Max. D_{bkf} Ratio	Mean: 1.0 Range: 1.0 - 1.8	Mean: 1.3 Range: 1.0 - 1.5
Maximum Pool Depth / Bankfull Mean Depth (D_{pool}/D_{bkf})	Mean: 1.9 Range: 0 - 2.1	Mean: 1.9 Range: 1.1 - 2.7
Pool Width / Bankfull Width (W_{pool}/W_{bkf})	Mean: 1.1 Range: 0 - 1.2	Mean: 1.8 Range: 1.2 - 2.4
Pool Area / Bankfull Cross Sectional Area	Mean: 1.4 Range: 0 - 1.6	Mean: 2.7 Range: 0.7 - 4.6

Existing UT 1 and 2	Existing UT 3	PROPOSED
Cg 5/6	Eg 5	E/C 3/4
0.11	0.04	0.11
16.3	7.8	16.3
Dimension Variables		
4.3	2.2	4.3
5.8 - 68.4	2.2 - 18.4	4.3
Mean: 6.7 Range: 3.8 - 9.6	Mean: 4.5 Range: 4.1 - 5.0	Mean: 7.8 Range: 7.2 - 8.3
Mean: 0.7 Range: 0.4 - 1.1	Mean: 0.5 Range: 0.4 - 0.5	Mean: 0.6 Range: 0.5 - 0.7
Mean: 1.3 Range: 0.8 - 1.8	Mean: 1.0 Range: 0.8 - 1.1	Mean: 0.8 Range: 0.7 - 0.9
No distinct repetitive pattern of riffles and pools due to straightening activities	No distinct repetitive pattern of riffles and pools due to straightening activities	Mean: 9.4 Range: 7.8 - 12.5 Mean: 1.1 Range: 0.7 - 1.3
Mean: 30 Range: 8.0 - 73	Mean: 12 Range: 7.0 - 18.0	Mean: 50 Range: 20 - 70
Dimension Ratios		
Mean: 4.6 Range: 1.8 - 12.8	Mean: 2.5 Range: 1.7 - 3.6	Mean: 6.4 Range: 2.6 - 9.0
Mean: 11.6 Range: 3.5 - 24	Mean: 9.9 Range: 8.2 - 12.5	Mean: 14.0 Range: 12.0 - 16.0
Mean: 1.9 Range: 1.5 - 2.2	Mean: 2.2 Range: 1.6 - 2.8	Mean: 1.4 Range: 1.2 - 1.5
Mean: 2.2 Range: 1.2 - 3.9	Mean: 2.0 Range: 1.0 - 3.0	Mean: 1.0 Range: 1.0 - 1.2
No distinct repetitive pattern of riffles and pools due to straightening activities		Mean: 1.9 Range: 1.3 - 2.1 Mean: 1.2 Range: 1.0 - 1.6 Mean: 1.4 Range: 1.1 - 1.6

Existing UT 4	PROPOSED
Eg 5	E/C 3/4
0.19	0.19
24.2	24.2
Dimension Variables	
6.3	6.3
9.1 - 25.6	6.3
Mean: 8.3 Range: 4.8 - 11.7	Mean: 9.4 Range: 8.7 - 10.0
Mean: 0.8 Range: 0.5 - 1.3	Mean: 0.7 Range: 0.6 - 0.8
Mean: 1.5 Range: 0.9 - 2.0	Mean: 1.0 Range: 0.8 - 1.1
No distinct repetitive pattern of riffles and pools due to straightening activities	Mean: 11.3 Range: 9.4 - 15.0 Mean: 1.3 Range: 0.9 - 1.5
Mean: 39 Range: 8.0 - 70.0	Mean: 150 Range: 70 - 200
Dimension Ratios	
Mean: 4.9 Range: 1.2 - 11.5	Mean: 16.0 Range: 7.5 - 21.3
Mean: 12.4 Range: 3.7 - 23.4	Mean: 14.0 Range: 12.0 - 16.0
Mean: 1.9 Range: 1.4 - 2.2	Mean: 1.4 Range: 1.2 - 1.5
Mean: 1.8 Range: 1.2 - 2.4	Mean: 1.0 Range: 1.0 - 1.2
No distinct repetitive pattern of riffles and pools due to straightening activities	Mean: 1.9 Range: 1.3 - 2.1 Mean: 1.2 Range: 1.0 - 1.6 Mean: 1.4 Range: 1.1 - 1.6

Travis Creek Downstream	PROPOSED
Fc 5	E/C 3/4
4.7	4.7
245.1	245.1
Dimension Variables	
54.9	54.9
20.7 - 54.9	54.9
Mean: 41.4 Range: 30.0 - 51.7	Mean: 27.7 Range: 25.7 - 29.6
Mean: 1.4 Range: 1.1 - 1.8	Mean: 2.0 Range: 1.9 - 2.1
Mean: 3.7 Range: 3.3 - 4.1	Mean: 2.8 Range: 2.7 - 3.0
No distinct repetitive pattern of riffles and pools due to straightening activities	Mean: 33.3 Range: 27.7 - 44.3 Mean: 3.8 Range: 2.6 - 3.8
Mean: 122 Range: 68.0 - 160	Mean: 250 Range: 200 - 300
Dimension Ratios	
Mean: 3.2 Range: 1.6 - 5.3	Mean: 9.0 Range: 7.2 - 10.8
Mean: 32.1 Range: 16.7 - 47.0	Mean: 14.0 Range: 12.0 - 16.0
Mean: 2.8 Range: 2.0 - 3.7	Mean: 1.4 Range: 1.2 - 1.5
Mean: 1.0 Range: 1.0 - 1.1	Mean: 1.0 Range: 1.0 - 1.2
No distinct repetitive pattern of riffles and pools due to straightening activities	Mean: 1.9 Range: 1.3 - 2.1 Mean: 1.2 Range: 1.0 - 1.6 Mean: 1.6 Range: 1.1 - 2.5

* Cripple Creek includes measurements from a Reference Site measured in 2009.

**Table 6. Morphological Stream Characteristics (continued)
Aycok Springs Restoration Site**

Variables	REFERENCE - CEDAROCK PARK	REFERENCE - CRIPPLE* CREEK
Pattern Variables		
Pool to Pool Spacing (L_{p-p})	Med: 37.2 Range: 25 - 69	Med: 32.4 Range: 14.0 - 39.6
Meander Length (L_m)	Med: 68.4 Range: 44 - 116	Med: 47.8 Range: 31.0 - 74.0
Belt Width (W_{belt})	Med: 22.8 Range: 20 - 38	Med: 24.3 Range: 15.1 - 29.2
Radius of Curvature (R_c)	Med: 16.5 Range: 11 - 27	Med: 13.2 Range: 8.9 - 19.4
Sinuosity (Sin)	1.20	1.22
Pattern Ratios		
Pool to Pool Spacing/ Bankfull Width (L_{p-p}/W_{bkt})	Med: 4.6 Range: 3.1 - 8.4	Med: 4.5 Range: 1.9 - 5.5
Meander Length/ Bankfull Width (L_m/W_{bkt})	Med: 8.4 Range: 5.5 - 14.3	Med: 6.6 Range: 4.3 - 10.2
Meander Width Ratio (W_{belt}/W_{bkt})	Med: 2.8 Range: 2.4 - 4.7	Med: 3.4 Range: 2.1 - 4.0
Radius of Curvature/ Bankfull Width (R_c/W_{bkt})	Med: 2.0 Range: 1.4 - 3.3	Med: 1.8 Range: 1.2 - 2.7
Profile Variables		
Average Water Surface Slope (S_{ave})	0.0258	0.0050
Valley Slope (S_{valley})	0.0310	0.0061
Riffle Slope (S_{riffle})	Mean: 0.0316 Range: 0.01 - 0.0576	Mean: 0.0083 Range: 0 - 0.0154
Pool Slope (S_{pool})	Mean: 0.0007 Range: 0 - 0.018	Mean: 0.0002 Range: 0 - 0.0008
Run Slope (S_{run})	Mean: 0.0353 Range: 0 - 0.3565	Mean: 0.0020 Range: 0 - 0.0053
Glide Slope (S_{glide})	Mean: 0.0029 Range: 0 - 0.0431	Mean: 0.0009 Range: 0 - 0.0040
Profile Ratios		
Riffle Slope/ Water Surface Slope (S_{riffle}/S_{ave})	Mean: 1.2 Range: 0.39 - 2.23	Mean: 2.46 Range: 0 - 3.08
Pool Slope/Water Surface Slope (S_{pool}/S_{ave})	Mean: 0.0 Range: 0 - 0.70	Mean: 0.04 Range: 0 - 0.16
Run Slope/Water Surface Slope (S_{run}/S_{ave})	Mean: 1.37 Range: 0 - 13.82	Mean: 0.44 Range: 0 - 1.06
Glide Slope/Water Surface Slope (S_{glide}/S_{ave})	Mean: 0.11 Range: 0 - 1.67	Mean: 0.18 Range: 0 - 0.8

Existing UT 1 and 2	Existing UT 3	PROPOSED
Pattern Variables		
No distinct repetitive pattern of riffles and pools due to staightening activities		Med: 31 Range: 23 - 62
		Med: 66 Range: 47 - 94
		Med: 31 Range: 23 - 47
		Med: 23 Range: 14 - 31
1.02	1.01	1.10
Pattern Ratios		
No distinct repetitive pattern of riffles and pools due to staightening activities		Med: 4.0 Range: 3.0 - 8.0
		Med: 8.5 Range: 6.0 - 12.0
		Med: 4.0 Range: 3.0 - 6.0
		Med: 3.0 Range: 1.8 - 4.0
0.0137 - 0.0361	0.0153	0.0127 - 0.0335
0.0140 - 0.0368	0.0155	0.0140 - 0.0368
No distinct repetitive pattern of riffles and pools due to staightening activities		Mean: 0.0416 Range: 0.0277 - 0.0647
		Mean: 0.0012 Range: 0 - 0.0162
		Mean: 0.0092 Range: 0 - 0.0185
		Mean: 0.0025 Range: 0 - 0.0185
Profile Variables		
No distinct repetitive pattern of riffles and pools due to staightening activities		Mean: 1.80 Range: 1.2 - 2.8
		Mean: 0.05 Range: 0 - 0.7
		Mean: 0.40 Range: 0 - 0.8
		Mean: 0.11 Range: 0 - 0.8

Existing UT 4	PROPOSED
Pattern Variables	
No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 38 Range: 28 - 75
	Med: 80 Range: 56 - 113
	Med: 38 Range: 28 - 56
	Med: 28 Range: 17 - 38
1.10	1.10
Pattern Ratios	
No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 4.0 Range: 3.0 - 8.0
	Med: 8.5 Range: 6.0 - 12.0
	Med: 4.0 Range: 3.0 - 6.0
	Med: 3.0 Range: 1.8 - 4.0
0.0093	0.0093
0.0102	0.0102
No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 0.0167 Range: 0.0112 - 0.0260
	Mean: 0.0005 Range: 0 - 0.0065
	Mean: 0.0037 Range: 0 - 0.0074
	Mean: 0.0010 Range: 0 - 0.0074
Profile Variables	
No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 1.80 Range: 1.2 - 2.8
	Mean: 0.05 Range: 0 - 0.7
	Mean: 0.40 Range: 0 - 0.8
	Mean: 0.11 Range: 0 - 0.8

Travis Creek Downstream	PROPOSED
Pattern Variables	
No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 111 Range: 83 - 222
	Med: 236 Range: 166 - 332
	Med: 111 Range: 83 - 166
	Med: 83 Range: 55 - 111
1.05	1.05
Pattern Ratios	
No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 4.0 Range: 3.0 - 8.0
	Med: 8.5 Range: 6.0 - 12.0
	Med: 4.0 Range: 3.0 - 6.0
	Med: 3.0 Range: 2.0 - 4.0
NA	0.0023
0.0024	0.0024
No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 0.0041 Range: 0.0028 - 0.0064
	Mean: 0.0001 Range: 0 - 0.0016
	Mean: 0.0009 Range: 0 - 0.0018
	Mean: 0.0003 Range: 0 - 0.0018
Profile Variables	
No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 1.80 Range: 1.2 - 2.8
	Mean: 0.05 Range: 0 - 0.7
	Mean: 0.40 Range: 0 - 0.8
	Mean: 0.11 Range: 0 - 0.8

* Cripple Creek Reference includes measurements from a Reference Site measured in 2009.

3.3 Channel Evolution

Typically, in the Piedmont of North Carolina, bed and bank erosion leads to channel downcutting and evolution from a stable E-type channel into a G-type (gully) channel. Continued erosion eventually results in lateral extension of the G-type channel into an F-type (widened gully) channel. The F-type channel will continue to widen laterally until the channel is wide enough to support a stable C-type or E-type channel at a lower elevation so that the original floodplain is no longer subject to regular flooding.

Site UT's are subject to extensive trampling by livestock with little, to no deep rooted vegetation adjacent to the channels. Trampling has resulted in bank sloughing, shallowing and widening of the channels, and filling of the channels with unconsolidated sediment. This results in a channel that is not subject to extensive scour, or erosion and a classification as a degraded (Class III) channel. Other reaches are subject to bed erosion for short sections from channel instability. These reaches are classified as degraded and widened (Class IV) channels (Simon and Hupp 1986).

3.4 Valley Classification

The Site is located within the alluvial valley of Travis Creek with an average 250-foot floodplain valley width. The slopes descending to Travis Creek are dissected by smaller alluvial valleys with floodplains ranging from approximately 40 to 150 feet. Valley slopes are typical for the Piedmont region and range from 0.0024 for Travis Creek up to 0.0368 in the upper reaches of UT1. Typical streams in this region include C- and E-type streams with slightly entrenched, meandering channels with a riffle-pool sequence. Steeper sections of the Site are characterized by short isolated lengths of Eb-type step-pool channels.

3.5 Discharge

This hydrophysiographic region is characterized by moderate rainfall with precipitation averaging approximately 40-50 inches per year (USDA 1960). Drainage basin sizes range from 0.04-square mile for UT 2 to 4.7-square miles for Travis Creek at the Site outfall.

The Site's discharge is dominated by a combination of upstream basin catchment, groundwater flow, and precipitation. Based on regional curves (Harman et al. 1999), the bankfull discharge for a 0.04-square mile watershed and a 4.7-square mile watershed is expected to average 8.7 cubic feet per second and 272 cubic feet per second, respectively. Bankfull discharge is expected to occur on average once per year.

3.6 Channel Stability Assessment

3.6.1 Stream Power

Stability of a stream refers to its ability to adjust itself to inflowing water and sediment load. One form of instability occurs when a stream is unable to transport its sediment load, leading to aggradation, or deposition of sediment onto the stream bed. Conversely, when the ability of the stream to transport sediment exceeds the availability of sediments entering a reach, and/or stability thresholds for materials forming the channel boundary are exceeded, erosion or degradation occurs.

Stream power is the measure of a stream's capacity to move sediment over time. Stream power can be used to evaluate the longitudinal profile, channel pattern, bed form, and sediment transport of streams. Stream power may be measured over a stream reach (total stream power) or per unit of channel bed area. The total stream power equation is defined as:

$$\Omega = \rho g Q s$$

where Ω = total stream power (ft-lb/s-ft), ρ = density of water (lb/ft³), g = gravitational acceleration (ft/s²), Q = discharge (ft³/sec), and s = energy slope (ft/ft). The specific weight of water ($\gamma = 62.4$ lb/ft³) is equal to the product of water density and gravitational acceleration, ρg . A general evaluation of power for a particular reach can be calculated using bankfull discharge and water surface slope for the reach. As slopes become steeper and/or velocities increase, stream power increases and more energy is available for reworking channel materials. Straightening and clearing channels increases slope and velocity and thus stream power. Alterations to the stream channel may conversely decrease stream power. In particular, over-widening of a channel will dissipate energy of flow over a larger area. This process will decrease stream power, allowing sediment to fall out of the water column, possibly leading to aggradation of the stream bed.

The relationship between a channel and its floodplain is also important in determining stream power. Streams that remain within their banks at high flows tend to have higher stream power and relatively coarser bed materials. In comparison, streams that flood over their banks onto adjacent floodplains have lower stream power, transport finer sediments, and are more stable. Stream power assessments can be useful in evaluating sediment discharge within a stream and the deposition or erosion of sediments from the stream bed.

3.6.2 Shear Stress

Shear stress, expressed as force per unit area, is a measure of the frictional force that flowing water exerts on a streambed. Shear stress and sediment entrainment are affected by sediment supply (size and amount), energy distribution within the channel, and frictional resistance of the stream bed and bank on water within the channel. These variables ultimately determine the ability of a stream to efficiently transport bedload and suspended sediment.

For flow that is steady and uniform, the average boundary shear stress exerted by water on the bed is defined as follows:

$$\tau = \gamma R s$$

where τ = shear stress (lb/ft²), γ = specific weight of water, R = hydraulic radius (ft), and s = the energy slope (ft/ft). Shear stress calculated in this way is a spatial average and does not necessarily provide a good estimate of bed shear at any particular point. Adjustments to account for local variability and instantaneous values higher than the mean value can be applied based on channel form and irregularity. For a straight channel, the maximum shear stress can be assumed from the following equation:

$$\tau_{\max} = 1.5\tau$$

for sinuous channels, the maximum shear stress can be determined as a function of plan form characteristics:

$$\tau_{\max} = 2.65\tau(Rc / Wb_{kf})^{-0.5}$$

where Rc = radius of curvature (ft) and Wb_{kf} = bankfull width (ft).

Shear stress represents a difficult variable to predict due to variability of channel slope, dimension, and pattern. Typically, as valley slope decreases channel depth and sinuosity increase to maintain adequate shear stress values for bedload transport. Channels that have higher shear stress values than required for bedload transport will scour bed and bank materials, resulting in channel degradation. Channels with lower shear stress values than needed for bedload transport will deposit sediment, resulting in channel aggradation.

The actual amount of work accomplished by a stream per unit of bed area depends on the available power divided by the resistance offered by the channel sediments, plan form, and vegetation. The stream power equation can thus be written as follows:

$$\omega = \rho g Q_s = \tau v$$

where ω = stream power per unit of bed area (N/ft-sec, Joules/sec/ft²), τ = shear stress, and v = average velocity (ft/sec). Similarly,

$$\omega = \Omega / Wb_{kf}$$

where Wb_{kf} = width of stream at bankfull (ft).

3.6.3 Stream Power and Shear Stress Methods and Results

Channel degradation or aggradation occurs when hydraulic forces exceed or do not approach the resisting forces in the channel. The amount of degradation or aggradation is a function of relative magnitude of these forces over time. The interaction of flow within the boundary of open channels is only imperfectly understood. Adequate analytical expressions describing this interaction have yet to be developed for conditions in natural channels. Thus, means of characterizing these processes rely heavily upon empirical formulas.

Traditional approaches for characterizing stability can be placed in one of two categories: 1) maximum permissible velocity and 2) tractive force, or stream power and shear stress. The former is advantageous in that velocity can be measured directly. Shear stress and stream power cannot be measured directly and must be computed from various flow parameters. However, stream power and shear stress are generally better measures of fluid force on the channel boundary than velocity.

Using these equations, stream power and shear stress were estimated for 1) existing degraded reaches, 2) reference reaches, and 3) proposed Site conditions. Important input values and output results (including stream power, shear stress, and per unit shear power and shear stress) are

presented in Table 7. Average stream velocity and discharge values were calculated for the existing Site stream reaches, reference reach, and proposed conditions.

Table 7. Stream Power (Ω) and Shear Stress (τ) Values

	Discharge (ft ³ /s)	Water surface Slope (ft/ft)	Total Stream Power (Ω)	Ω /W	Hydraulic Radius	Shear Stress (τ)	Velocity (v)	τ v	τ_{max}
Existing Conditions									
UT 1/2	16.3	0.0249	25.33	3.78	4.58	7.12	0.44	3.13	10.7
UT 3	7.8	0.0153	7.45	1.65	1.87	1.79	0.76	1.35	2.68
UT 4	24.2	0.0093	14.04	1.69	1.75	1.02	1.39	1.42	1.53
Travis Creek	245.1	0.0023	35.18	0.85	0.86	0.12	6.48	0.80	0.18
Reference Conditions									
Reference Reach-Cedarock	31.3	0.0258	50.39	6.22	0.82	1.33	3.91	5.19	1.99
Reference Cripple Creek	22.6	0.005	7.05	1.53	0.87	0.27	3.83	1.04	0.41
Proposed Conditions									
UTs 1, 2, 3	16.3	0.0231	23.5	3.01	0.48	0.69	3.79	2.61	1.03
UT 4	24.2	0.0093	14.04	1.49	0.58	0.34	3.84	1.30	0.51
Travis Creek	245.1	0.0023	35.18	1.27	1.73	0.25	4.46	1.11	0.37

In order to maintain sediment transport functions of a stable stream system, the proposed channel should exhibit stream power and shear stress values so the channel is neither aggrading nor degrading. Results of the analysis indicate the proposed channel reaches are expected to maintain stream power as a function of width values of approximately 1.27-3.01 and shear stress values of approximately 0.25-0.69 (comparable to that of the Cripple Creek reference reach, which most closely resembles the Site).

Cedarock reference reach values for stream power and shear stress, as well as valley and water surface slopes are comparable to values for UT 1, 2, and 3. Cripple Creek reference reach values for stream power and shear stress are slightly lower due to flatter valley and water surface slopes and are comparable to values for UT 4.

Existing, preconstruction Site streams are not characterized by excessive scour or erosion, and impacts are due primarily to removal of stream bed material (reduction in channel roughness) and livestock trampling. Stream power values of existing streams are not elevated as evidenced by minimal channel erosion at the Site. Stream power values of existing streams are comparable to reference reaches, residing between the Cedarock and Cripple Creek. Therefore, proposed stream power values should not be considerably different from existing values and should remain between reference reach values. Proposed stream power and shear values provide confirmation that sediment will be mobilized and transported through the Site without aggradation, or erosion on proposed stream banks.

Project UTs are headwater systems characterized by forested, or impounded watersheds. These channels are not expected to be characterized by high sediment supply and based on stream power and shear stress values in Table 7 the channels will adequately move sediment entering each reach. Travis Creek is primarily characterized by enhancement Level II measures, with short sections of restoration. The maintenance of channel dimension and slope are expected to consistently move sediment that enters the reach.

3.7 Bankfull Verification

Discharge estimates for the Site utilize an assumed definition of “bankfull” and the return interval associated with that bankfull discharge. For this study, the bankfull channel is defined as the channel dimensions designed to support the “channel forming” or “dominant” discharge (Gordon et al. 1992).

Based on available Piedmont regional curves, the bankfull discharge for the reference reaches averages approximately 28.8 and 24.8 cubic feet per second (cfs) for Cedarock and Cripple Creek, respectively (Harman et al. 1999). The USGS regional regression equation for the Piedmont region indicates that bankfull discharge for the reference reaches at a 1.3-1.5 year return interval average approximately 27-32 and 10-15 cfs, respectively (USGS 2006). The manning formula (Manning’s equation) was also utilized to calculate bankfull discharge, which predicted a discharge of approximately 30.2 and 10.8, which is similar to other methods of calculating discharge.

**Table 8. Reference Reach Bankfull Discharge Analysis
Aycock Springs Restoration Site**

Method	Watershed Area (square miles)	Return Interval (years)	Discharge (cfs)
Cedarock Reference Reach			
Piedmont Regional Curves (Harman et al. 1999)	0.2	1.3-1.5	28.8
Peidmont Regional Regression Model (USGS 2004)	0.2	1.3-1.5	27-32
Field Indicators of Bankfull	0.2	1.3-1.5	31.3
Manning's Equation	0.2	1.3-1.5	30.2
Cripple Creek Reference Reach			
Piedmont Regional Curves (Harman et al. 1999)	0.17	1.3-1.5	24.8
Peidmont Regional Regression Model (USGS 2004)	0.17	1.3-1.5	10-15
Field Indicators of Bankfull	0.17	1.3-1.5	22.6
Manning's Equation	0.17	1.3-1.5	10.8

Field indicators of bankfull, primarily topographic breaks identified on the banks, and riffle cross-sections were utilized to obtain an average bankfull cross-sectional area for the reference reaches. The Piedmont regional curves were then utilized to plot the watershed area and discharge for the reference reach cross-sectional area. Field indicators of bankfull approximate an average

discharge of 31.3 and 22.6 cfs, respectively for the reference reaches, which is 109 and 91 percent of that predicted by the regional curves.

Based on the above analysis of methods to determine bankfull discharge, proposed conditions at the Site will be based on bankfull indicators found on the reference reaches and most importantly onsite indicators of bankfull. Based on field indicators of bankfull in relatively undisturbed reaches and the Cripple Creek Reference Reach (91 percent of the curves), which closely resembles on-Site conditions, the designed onsite channel restoration area will equal approximately 90 percent of the channel size indicated by Piedmont regional curves. Table 8 summarizes all methods analyzed for estimating bankfull discharge.

4.0 REFERENCE STREAMS

Two reference reaches were identified for the Site. The first reference stream (Cedarock) is located approximately 5 miles north of the Site in Cedarock Park on an unnamed tributary to Rock Creek (Figures 2 and 5A-5C, Appendix A). The second reference stream (Cripple Creek) is located less than 8 miles east of the Site, south of Deep Creek Church Road on unnamed tributaries to the Haw River (Figure 2, Appendix A). The Cripple Creek reference was measured in 2009 as a reference reach for the Cripple Creek Stream Mitigation Bank, which is a successful project through four years of monitoring with no issues. The streams were measured and classified by stream type (Rosgen 1996).

Travis Creek is primarily proposed for stream enhancement Level II treatments including spot treatment for bank stabilization. Two reaches of Travis Creek are proposed for restoration, one is the relief of a tight meander bend encompassing approximately 209 linear feet in length (one outer bend), and the other includes tying the channel into historic, abandoned channel reaches at the downstream extent of the project encompassing approximately 664 linear feet (six outer bends). Reference for Travis Creek includes cross sections along the on-site, enhancement reaches to determine proposed cross sectional area, pattern, and slope.

4.1 Channel Classification

The reference reaches are both characterized as E-type streams; however, Cedarock is significantly steeper (Eb-type) and is characterized by moderate sinuosity (1.2). Cripple Creek has slightly higher sinuosity, due to a lower valley slope. Both channels are dominated by gravel substrate.

E-type streams are characterized as slightly entrenched, riffle-pool channels exhibiting high sinuosity (1.3 to greater than 1.5); however, reference streams in the region typically are characterized by sinuosities slightly lower than 1.3. E-type streams typically exhibit a sequence of riffles and pools associated with a sinuous flow pattern. In North Carolina, E-type streams often occur in narrow to wide valleys with well-developed alluvial floodplains. E-type channels are typically considered stable; however, these streams are sensitive to upstream drainage basin changes and/or channel disturbance, and may rapidly convert to other stream types.

4.2 Discharge

Based on an analysis of bankfull discharge, proposed conditions at the Site will be based on 90 percent of Piedmont regional curves (see Section 3.7 Bankfull Verification).

4.3 Channel Morphology

Dimension: Data collected at Cedarrock and Cripple Creek indicate bankfull cross-sectional areas of 8.0 and 5.9 square feet, respectively. Cedarrock was slightly larger than predicted by regional curves (7.5 square feet) and Cripple Creek was slightly smaller than predicted by regional curves (6.5 square feet). However, both streams are within a reasonable deviation from predictions by regional curve calculations and adequately verify the use of regional curves at the Site. Cedarrock and Cripple Creek exhibit a bankfull width of 8.1 and 4.6, a bankfull depth of 0.8 and 1.1 feet, and width-to-depth ratios of 10.1 and 4.2, respectively (see Table 6, Morphological Stream Characteristics). Figures 5A-5C (Appendix A) provide plan view and cross-sectional data for the Cedarrock reference reach. The reference reaches exhibit a bank-height ratio of 1.0 and 1.3, respectively.

Pattern and Profile: In-field measurements of the reference reaches have yielded an average sinuosity of 1.2 at Cedarrock and 1.22 at Cripple Creek (thalweg distance/straight-line distance). Onsite valley slopes range from 0.0024 in Travis Creek to 0.0102-0.0368 in the UTs at the Site. Valley slopes exhibited by reference channels range from 0.0310 at Cedarrock to 0.0061 at Cripple Creek, providing a good range of slopes to compare existing and proposed Site conditions.

Substrate: Reference channels are characterized by substrate dominated by gravel-sized particles.

5.0 PROJECT SITE WETLANDS (EXISTING CONDITIONS)

5.1 Existing Jurisdictional Wetlands

Jurisdictional wetlands within the Site were delineated in the field following guidelines set forth in the *Corps of Engineers Wetlands Delineation Manual* and subsequent regional supplements, and located using GPS technology with reported submeter accuracy (Environmental Laboratory 1987). Jurisdictional delineations were approved by David Bailey of the United States Army Corps of Engineers (USACE) during a field visit on May 29, 2014 (Appendix D). Approval documentation for the delineation, dated September 16, 2014 is included in Appendix D. Existing jurisdictional wetlands are depicted in Pink on Figure 4 (Appendix A).

5.2 Hydrological Characterization

Construction activities are expected to restore groundwater hydrology to approximately 0.5 acre of drained, or otherwise impacted riparian hydric soils and enhance 1.5 acres of cleared riparian wetlands. Areas of the Site targeted for riparian wetlands will receive hydrological inputs from periodic overbank flooding of restored tributaries, groundwater migration into the wetlands, upland/stormwater runoff, and, to a lesser extent, direct precipitation. Hydrological impairment of drained soils has resulted from lateral draw-down of the water table adjacent to existing, incised stream channels and/or compaction of surficial soils to the extent that percolation of hydrology to the groundwater table is hindered.

5.3 Soil Characterization

5.3.1 Taxonomic Classification

Detailed soil mapping conducted by a North Carolina Licensed Soil Scientist (NCLSS) in October 2013 indicate that 2.3 acres of the Site is currently underlain by hydric soils of the Worsham Series and Mixed Alluvial Land, Poorly Drained (Figure 4, Appendix A). Onsite hydric soils are grey to gley in color and are compacted and pockmarked by livestock trampling. Livestock trampling, grazing, and annual mowing for harvest of hay has resulted in an herbaceous vegetative community. Groundwater springs and surface runoff contribute hydrology to these areas, although the dominant hydrological influence is the lateral draw-down of the water table adjacent to incised stream channels. A detailed soil profile conducted by a NCLSS is as follows;

5.3.2 Profile Description

Soil Profile

0 to 3 inches; (10YR 4/2) silt loam

3 to 5 inches; (10YR 5/4) sandy clay loam,
faint brown (10YR 4/2) mottles, extensive
rhizospheres

5 to 9 inches; (10YR 5/2) sandy clay loam,
common medium brownish to red (10YR 4/4)
mottles

9 to 18 inches; (10YR 5/2) clay,
common medium brownish to red (10YR 4/4)
mottles

18 + inches; (10YR 5/1) clay,
few distinct low chroma (10YR 5/3) mottles

5.4 Plant Community Characterization

Areas proposed for wetland re-establishment and enhancement are primarily vegetated by fescue and opportunistic herbaceous species with very little vegetative diversity.

6.0 Reference Forest Ecosystem

A Reference Forest Ecosystem (RFE) is a forested area on which to model restoration efforts at the Site in relation to soils and vegetation. RFEs should be ecologically stable climax communities and should be a representative model of the Site forested ecosystem as it likely existed prior to human disturbances. Data describing plant community composition and structure should be collected at the RFEs and subsequently applied as reference data in an attempt to emulate a natural climax community.

The RFE for this project is located on the west and south banks of Travis Creek in areas undisturbed by land clearing and agriculture. The RFE supports plant community and landform characteristics that restoration efforts will attempt to emulate. Tree and shrub species identified

within the reference forest and outlined in Table 9 will be used, in addition to other relevant species in appropriate Schafale and Weakley (1990) community descriptions.

Table 9. Reference Forest Ecosystem

Piedmont/Low Mountain Alluvial Forest
red maple (<i>Acer rubrum</i>)
pignut hickory (<i>Carya glabra</i>)
green ash (<i>Fraxinus pennsylvanica</i>)
eastern red cedar (<i>Juniperus virginiana</i>)
tulip poplar (<i>Liriodendron tulipifera</i>)
sweetgum (<i>Liquidambar styraciflua</i>)
black cherry (<i>Prunus serotina</i>)
white oak (<i>Quercus alba</i>)
swamp chestnut oak (<i>Quercus michauxii</i>)
water oak (<i>Quercus nigra</i>)
cherrybark oak (<i>Quercus pagoda</i>)
willow oak (<i>Quercus phellos</i>)
slippery elm (<i>Ulmus rubra</i>)
American sycamore (<i>Platanus occidentalis</i>)
winged elm (<i>Ulmus alata</i>)
American holly (<i>Ilex opaca</i>)
dogwood (<i>Cornus florida</i>)

7.0 PROJECT SITE RESTORATION PLAN

7.1 Restoration Project Goals and Objectives

Based on the *Cape Fear River Basin Restoration Priorities Report 2009* (NCEEP 2009) and the *Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan* (PTCOG 2008), Targeted Local Watershed 03030002030010 is not meeting its designated use of supporting aquatic life. Agricultural land use appears to be the main source of stress in the Hydrologic Unit, as well as land clearing and poor riparian management. This project will meet goals of the Local Watershed Plan including 1) reduce sediment loading, 2) reduce nutrient loading, 3) manage stormwater runoff, 4) reduce toxic inputs, 5) provide and improve instream habitat, 6) provide and improve terrestrial habitat, 7) improve stream stability, and 8) improve hydrologic function.

The following six goals were identified by the Stakeholder group of the Travis, Tickle, Little Alamance LWP Phase I assessment which address the water quality impacts and watershed needs in all of the Little Alamance, Travis, Tickle watersheds in 2006.

- 1) Increase local government awareness of the impacts of urban growth on water resources;
- 2) Strengthen watershed protection standards;
- 3) Improve water quality through stormwater management;
- 4) Identify and rank parcels for retrofits, stream repair, preservation, and/or conservation;
- 5) Assess aquatic health to identify stressors that are the most likely causes of poor biological conditions;
- 6) Meet requirements of outside funding sources for implementation of projects.

The eight priority goals of the Travis, Tickle, Little Alamance LWP include the following.

- 1) reduce sediment loading;
- 2) reduce nutrient loading;
- 3) manage stormwater runoff;
- 4) reduce toxic inputs;
- 5) provide and improve instream habitat;
- 6) provide and improve terrestrial habitat;
- 7) improve stream stability; and
- 8) improve hydrologic function.

Site activities include the restoration of perennial and intermittent stream channels, enhancement (level II) of perennial stream channels, and re-establishment of riparian wetlands. The following table summarizes the project goals/objectives and proposed functional uplift based on proposed restoration activities and observations of two reference areas located in the vicinity of the Site. Goals and objectives target functional uplift identified in the Travis, Tickle, Little Alamance LWP and based stream/wetland functional assessments developed by the regulatory agencies.

Table 10. Project Goals and Objectives

Project Goal/Objective	How Goal/Objective will be Accomplished
Improve Hydrology	
Restore Floodplain Access	Building a new channel at the historic floodplain elevation to restore overbank flows
Restore Wooded Riparian Buffer	Planting a woody riparian buffer
Restore Stream Stability	Providing proper channel width and depth, stabilizing channel banks, providing gravel/cobble substrate, planting a woody riparian buffer, and removing cattle
Improve Sediment Transport to Convert the UT's from Sand/Silt Dominated to Gravel/Cobble Dominated Streams	
Improve Stream Geomorphology	
Increase Surface Storage and Retention	Building a new channel at the historic floodplain elevation restoring overbank flows, removing cattle, scarifying compacted soils, and planting woody vegetation
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	Raising the stream bed elevation and rip compacted soils
Improve Water Quality	
Increase Upland Pollutant Filtration	Planting a native, woody riparian buffer
Increase Thermoregulation	Planting a native, woody riparian buffer
Reduce Stressors and Sources of Pollution	Removing cattle and other agricultural inputs
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Raising the stream bed elevation, restoring overbank flows, planting with woody vegetation, removing cattle, increasing surface storage and retention, and restoring appropriate inundation/duration
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Raising the stream bed elevation, restoring overbank flows, and planting with woody vegetation
Restore Habitat	
Restore In-stream Habitat	Building a stable channel with a cobble/gravel bed and planting a woody riparian buffer
Restore Stream-side Habitat	Planting a woody riparian buffer
Improve Vegetation Composition and Structure	

Restoration and protection of aquatic resources with a conservation easement will result in net gains in hydrology, water quality, and habitat functions at the Site. A summary of mitigation activities includes the following.

- Providing a minimum of 3587 SMUs, as calculated in accordance with the requirements stipulated in RFP #16-005568.
 - Restoring approximately 3357 linear feet of stream channel through construction of stable stream channels in the historic floodplain location and elevation.
 - Enhancing (Level II) approximately 677 linear feet of stream channel by ceasing current land use practices, removing invasive species, spot treating stressed banks with willow stakes and brush mattresses, and planting with native forest vegetation.
- Providing a minimum of 0.5 riparian WMUs, as calculated in accordance with the requirements stipulated in RFP #16-005568.
 - Restoring 0.5 acre of riparian wetland by removing livestock, restoring compacted soils, raising stream channels to historic elevations, and rehydrating floodplain soils.
 - Enhancing an additional 1.5 acres of riparian wetland.
- Removing cattle from the Site and fencing the entire conservation easement.
- Revegetating wetlands, floodplains, and slopes adjacent to restored streams.
- Protecting the Site in perpetuity with a conservation easement.

7.2 Stream Design

Onsite streams targeted for restoration have endured significant disturbance from land use activities such as land clearing, livestock grazing, and other anthropogenic maintenance. Site streams will be restored to emulate historic conditions at the Site utilizing parameters from nearby, relatively undisturbed reference streams (see Section 4.0 Reference Streams).

7.2.1 Designed Channel Classification

The proposed channel has been designed to emulate parameters of the relatively undisturbed reference streams (see Table 6 Morphological Stream Characteristics). Proposed channels are expected to be characterized by sand, gravel, and cobble substrate similar to reference streams, which emulate historic Site conditions.

7.2.2 Target Wetland Communities/Buffer Communities

Onsite wetland and buffer areas targeted for re-establishment and enhancement have endured significant disturbance from land use activities such as land clearing, livestock grazing, and other anthropogenic maintenance. These areas will be planted with native forest species typical of wetland and buffer communities in the region such as those found within the reference forest (see Section 6.0 Reference Forest Ecosystem). Emphasis will focus on developing a diverse plant assemblage.

7.3 Stream Restoration

Stream restoration efforts depicted in Figures 6A-6C (Appendix A) are designed to restore stable streams that approximate hydrodynamics, stream geometry, and local microtopography relative to reference conditions. Restoration at the Site will be Priority I restoration; therefore, bankfull elevations will be raised to meet the adjacent valley floodplain elevation. The farthest downstream

reach of Travis Creek will be restored through a mixture of Priority I and Priority II restoration. This reach will be routed to a historic channel identified in the floodplain.

Belt-width Preparation and Grading

Stream restoration is expected to entail 1) belt-width preparation, 2) channel excavation, 3) spoil stockpiling, 4) channel stabilization, 5) channel diversion, and 6) channel backfill.

Belt-width corridor preparation will entail channel staking, floodplain clearing and grubbing, and any necessary grading prior to channel excavation. After the floodplain has been prepped, the proposed design channel will be staked and/or clearly marked to the design parameters. Spoil material excavated during floodplain grading will be stockpiled adjacent to the existing channels. After construction of the new channel is complete, existing channels will be abandoned and backfilled with stockpiled soils. Grading of topsoil at the Site is expected to be minimal; however, where grading is necessary, topsoils will be stockpiled, managed, and reapplied after grading is complete.

Once belt-width corridor preparation is complete, the proposed channel will be excavated to the average width, depth, and cross-sectional area derived from reference reach studies and detailed measurements of the onsite reach (Figure 7, Appendix A). Stream banks and the belt-width area of constructed channels will be planted with shrub and herbaceous vegetation. Root mats may also be selectively removed from adjacent areas and placed as erosion control features on channel banks.

Once the proposed design channel has been excavated and stabilized, abandoned channels will be backfilled utilizing spoil material stockpiled from channel excavation and/or from suitable material excavated from the Site, or adjacent to the Site. Abandoned channels will be backfilled to the maximum extent feasible.

In-stream Structures

The use of in-stream structures for grade control and habitat is essential for successful stream restoration (Figure 8A, Appendix A). In-stream structures may be placed in the channel to elevate local water surface profiles in the channel, potentially flattening the water energy slope or gradient. The structures would likely consist of log/rock cross-vanes or log/rock j-hook vanes designed primarily to direct stream energy into the center of the channel and away from banks. In addition, the structures would be placed in relatively straight reaches to provide secondary (perpendicular) flow cells during bankfull events.

Piped Channel Crossings

Landowner constraints will necessitate the installation of piped channel crossings within breaks in the easement to allow access to portions of the property isolated by stream restoration activities (Figures 6A-6C, Appendix A). The crossings will be constructed of properly sized pipes and hydraulically stable rip-rap or suitable rock. Crossings will be large enough to handle the weight of anticipated vehicular traffic. Approach grades to the crossing will be at an approximate 10:1 slope and constructed of hard, scour-resistant crushed rock or other permeable material, which is free of fines.

Outfall Structures

Drop structures are proposed at confluence of the UTs with Travis Creek. The locations of proposed drop structures are depicted on Figures 6A-6C (Appendix A). The drop structures may be constructed out of TerraCell, or large cobble depending upon anticipated scour from the restored stream channels (Figure 8B, Appendix A). The structures should be constructed to resist erosive forces associated with hydraulic drops proposed at the Site.

TerraCell is a light weight, flexible mat made of high density polyethylene strips. The strips are bonded together to form a honeycomb configuration. The honeycomb mat is fixed in place and filled with gravel or sand. Material in the TerraCell structure may be planted with grasses and shrubs for additional erosion protection. The TerraCell structure will form a nickpoint that approximates geologic controls in stream beds.

7.4 Stream Enhancement (Level II)

Stream enhancement (level II) will occur along Travis Creek in areas depicted on Figures 6A and 6B (Appendix A). Stream enhancement will entail the cessation of current land management practices, invasive species control (predominantly Chinese privet), bank treatments including willow staking and brush mattress installation (Figure 8B, Appendix A), and planting riparian buffers with native forest vegetation. Riparian buffers will extend a minimum of 50 feet from the top of stream banks to facilitate stream recovery and prevent further degradation of the stream.

7.5 Sediment Transport Analysis

Existing Site reaches are characterized by sand and silt substrate as the result of channel impacts including livestock trampling and riparian vegetation removal. Due to headwaters being dammed and/or originating onsite, sediment supply from upstream sources is not expected to overwhelm the Site. UT 4 and UT 3 are expected to be sediment starved from upstream impoundments; therefore, adequate sized channel bed material will be required as part of stream restoration activities. UT 2 originates onsite and adequate buffering of the headwaters will occur to alleviate excessive sediment inputs that would overwhelm and aggrade the channel. UT 1 is the only stream that originates offsite and enters the project unimpeded. The channel has been classified as intermittent in the upper reaches and scour upstream of the Site is not expected to be significant. The upstream reach is forested with natural substrate free of excessive fines; therefore, pulses of fine materials from upstream are not expected to infiltrate UT 1.

Stream stability assessments include calculations of stream power and shear stress to compare 1) existing dredged and straightened reaches, 2) Cedarock Reference Reach, 3) Cripple Creek Reference Reach, and 4) proposed Site conditions are discussed in Section 3.6 (Channel Stability Assessment).

7.6 HEC RAS Analysis

The HEC-RAS analysis has been completed for Site restoration activities. This analysis is discussed in more detail in Section 2.6.4 (FEMA/Hydrological Trespass).

7.7 Hydrological Modifications (Wetland Re-Establishment and Enhancement)

Areas proposed for wetland re-establishment are designed to restore a fully functioning wetland system, which will provide surface water storage, nutrient cycling, removal of imported elements and compounds, and will create a variety and abundance of wildlife habitat. Portions of the Site underlain by hydric soils have been impacted by channel incision, vegetative clearing, channel manipulation, and earth movement associated with agricultural practices. Wetland re-establishment will focus on the restoration of vegetative communities, the reestablishment of soil structure and microtopographic variations, and redirecting normal surface hydrology back to Site floodplains. These activities will result in the re-establishment of 0.5 acre of riparian wetland and enhancement of 1.5 acre of riparian wetland (Figure 6A-6C, Appendix A).

Reestablishment of Historic Groundwater Elevations

Hydric soils adjacent to incised channels have been drained due to lowering of the groundwater table and a lateral drainage effect from existing stream reaches. Reestablishment of channel inverts is expected to rehydrate soils adjacent to Site streams, resulting in the re-establishment of jurisdictional hydrology to riparian wetlands.

Reestablishment of Soil Structure

Soil structure throughout the Site, particularly within wetland areas, will be reestablished to allow for penetration of rain water to the groundwater table. This will be accomplished by removing livestock from the Site, ripping compacted soils, and revegetating the Site.

Hydrophytic Vegetation

Site wetland areas targeted for re-establishment and enhancement have endured significant disturbance from land use activities such as land clearing, livestock grazing, and other anthropogenic maintenance. Wetland areas will be revegetated with native vegetation typical of wetland communities in the region. Emphasis will focus on developing a diverse plant assemblage. Section 7.9 (Natural Plant Community Restoration) provides detailed information concerning community species associations.

Reconstruction of Stream Corridors

The stream restoration plan involves the reconstruction of Site streams in place, or on new location. Existing channels will be backfilled so that water tables may be restored to historic conditions. Wetlands located utilizing a GPS with reported sub-meter accuracy have been plotted on plan sheets and have been avoided to the maximum extent feasible. Some in-channel wetlands will be affected by channel reconstruction; however, a net gain in wetlands from 1.5 acres to 2.0 acres will be realized from the project.

7.8 Soil Restoration

Soil grading will occur during stream restoration activities. Topsoils will be stockpiled during construction activities and will be spread on the soil surface once critical subgrade has been established. The replaced topsoil will serve as a viable growing medium for community restoration to provide nutrients and aid in the survival of planted species.

7.9 Natural Plant Community Restoration

Restoration of floodplain forest and stream-side habitat allows for development and expansion of characteristic species across the landscape. Ecotonal changes between community types contribute to diversity and provide secondary benefits, such as enhanced feeding and nesting opportunities for mammals, birds, amphibians, and other wildlife. Reference Forest Ecosystem (RFE) data, onsite observations, and community descriptions from *Classification of the Natural Communities of North Carolina* (Schafale and Weakley 1990) were used to develop the primary plant community associations that will be promoted during community restoration activities.

7.9.1 Planting Plan

Stream-side trees and shrubs include species with high value for sediment stabilization, rapid growth rate, and the ability to withstand hydraulic forces associated with bankfull flow and overbank flood events. Stream-side trees and shrubs will be planted within 15 feet of the channel throughout the meander belt-width. Shrub elements will be planted along the reconstructed stream banks, concentrated along outer bends. Piedmont Alluvial Forest is the target community for Site floodplains and Dry-Mesic Oak-Hickory Forest is the target community for upland side-slopes.

Bare-root seedlings within the Piedmont Alluvial and Dry-Mesic Oak-Hickory Forests will be planted at a density of approximately 680 stems per acre on 8-foot centers. Shrub species in the stream-side assemblage will be planted at a density of 2720 stems per acre on 4-foot centers.

Table 11 depicts the total number of stems and species distribution within each vegetation association (Figure 9, Appendix A). Planting will be performed between December 1 and March 15 to allow plants to stabilize during the dormant period and set root during the spring season.

7.9.2 Nuisance Species Management

Chinese privet and multiflora rose, located within wooded areas along Travis Creek, will be controlled mechanically and/or chemically, as part of this project. No other nuisance species controls are proposed at this time. Inspections for beaver and other potential nuisance species will occur throughout the course of the monitoring period. Appropriate actions may be taken to ameliorate any negative impacts regarding vegetation development and/or water management on an as-needed basis. The presences of nuisance species will be monitored over the course of the monitoring period. Appropriate actions will be taken to ameliorate any negative impacts regarding vegetation development and/or water management on an as-needed basis.

Table 11. Planting Plan

Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Stream-side Assemblage**		TOTAL
Area (acres)	4.8		4.3		2.8		11.9
Species	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted
Tag alder (<i>Alnus serrulata</i>)	--	--	--	--	3046	40	3046
River birch (<i>Betula nigra</i>)	326	10	--	--	--	--	326
Ironwood (<i>Carpinus caroliniana</i>)	--	--	439	15	--	--	439
Silky dogwood (<i>Cornus amomum</i>)	326	10	--	--	1523	20	1849
Flowering dogwood (<i>Cornus florida</i>)	--	--	146	5	--	--	146
Persimmon (<i>Diospyros virginiana</i>)	--	--	146	5	--	--	146
White ash (<i>Fraxinus americana</i>)	--	--	439	15	--	--	439
Green ash (<i>Fraxinus pennsylvanica</i>)	326	10	--	--	--	--	326
Tulip poplar (<i>Liriodendron tulipifera</i>)	326	10	--	--	--	--	326
Swamp black gum (<i>Nyssa biflora</i>)	326	10	--	--	--	--	326
Sycamore (<i>Platanus occidentalis</i>)	326	10	--	--	--	--	326
Red maple (<i>Acer rubrum</i>)	--	--	439	15	--	--	439
White oak (<i>Quercus alba</i>)	--	--	439	15	--	--	439
Water oak (<i>Quercus nigra</i>)	326	10	292	10	--	--	618
Cherrybark oak (<i>Quercus pagoda</i>)	326	10	--	--	--	--	326
Willow oak (<i>Quercus phellos</i>)	326	10	292	10	--	--	618
Northern red oak (<i>Quercus rubra</i>)	--	--	292	10	--	--	292
Black willow (<i>Salix nigra</i>)	--	--	--	--	3046	40	3046
American elm (<i>Ulmus americana</i>)	326	10	--	--	--	--	326
TOTAL	3260	100	2924	100	7615	100	13,799

* Planted at a density of 680 stems/acre.

** Planted at a density of 2720 stems/acre.

8.0 PERFORMANCE CRITERIA

Monitoring requirements and success criteria outlined in the latest guidance by USACE in April 2003 (*Stream Mitigation Guidelines*) will be followed and are briefly outlined below. Monitoring data collected at the Site should include reference photos, plant survival analysis, channel stability analysis, and biological data, if specifically required by permit conditions.

Wetland hydrology is proposed to be monitored for a period of seven years (years 1-7). Riparian vegetation and stream morphology is proposed to be monitored for a period of seven years with measurements completed in years 1-3, year 5, and year 7. Monitoring reports for years 4 and 6 will include photo documentation of stream stability and wetland hydrology monitoring data. If monitoring demonstrates the Site is successful by year 5 and no concerns have been identified, Restoration Systems may propose to terminate monitoring at the Site and forego monitoring requirements for years 6 and 7. Early closure will only be provided through written approval from the USACE in consultation with the Interagency Review Team (NC IRT). Monitoring will be conducted by Axiom Environmental, Inc. Annual monitoring reports of the data collected will be submitted to the NCEEP by Restoration Systems no later than December 31 of each monitoring year data is collected.

8.1 Streams

Annual monitoring will include development of channel cross-sections and substrate on riffles and pools. Data to be presented in graphic and tabular format will include 1) cross-sectional area, 2) bankfull width, 3) average depth, 4) maximum depth, 5) width-to-depth ratio, 6) bank height ratio, and 7) entrenchment ratio. Longitudinal profiles will not be measured routinely unless monitoring demonstrates channel bank or bed instability, in which case, longitudinal profiles may be required by the USACE along reaches of concern to track changes and demonstrate stability.

Visual assessment of in-stream structures will be conducted to determine if failure has occurred. Failure of a structure may be indicated by collapse of the structure, undermining of the structure, abandonment of the channel around the structure, and/or stream flow beneath the structure. In addition, visual assessments of the entire channel will be conducted in years 1-3, 5, and 7 of monitoring as outlined in NCEEP *Monitoring Requirements and Reporting Standards for Stream and/or Wetland Mitigation*. Areas of concern will be depicted on a plan view figure identifying the location of concern along with a written assessment and photograph of the area.

8.1.1 Stream Success Criteria

Monitoring and success criteria for stream restoration should relate to project goals and objectives. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving vegetation success criteria. The following summarizes stream success criteria related to goals and objectives.

8.1.2 Stream Contingency

In the event that stream success criteria are not fulfilled, a mechanism for contingency will be implemented. Stream contingency may include, but may not be limited to 1) structure repair and/or

installation; 2) repair of dimension, pattern, and/or profile variables; and 3) bank stabilization. The method of contingency is expected to be dependent upon stream variables that are not in compliance with success criteria. Primary concerns, which may jeopardize stream success, include 1) structure failure, 2) headcut migration through the Site, and/or 3) bank erosion.

Table 12. Stream Goals and Success Criteria

Project Goal/Objective	Stream Success Criteria
Improve Hydrology	
Restore Floodplain Access	Two overbank events in separate monitoring years will be documented during the monitoring period.
Restore Wooded Riparian Buffer	Attaining Vegetation Success Criteria (Section 8.3.1).
Restore Stream Stability	Cross-sections, monitored annually, will be compared to as-built measurements to determine channel stability and maintenance of channel geomorphology.
Improve Stream Geomorphology	Convert stream channels from unstable G- and F-type channels to stable E- and C- type stream channels.
Increase Surface Storage and Retention	Two overbank events in separate monitoring years, and attaining Wetland and Vegetation Success Criteria (Sections 8.2.1 and 8.3.1).
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	Two overbank events will be documented, in separate years, during the monitoring period and documentation of an elevated groundwater table (within 12 inches of the soil surface) for greater than 10 percent of the growing season during average climatic conditions.
Improve Sediment Transport to Convert the UT's from Sand/Silt Dominated to Gravel/Cobble Dominated Streams	Pebble counts documenting coarsening of bed material from pre-existing conditions of sand and silt to post restoration conditions of gravel and cobble.
Improve Water Quality	
Increase Upland Pollutant Filtration	Attaining Wetland and Vegetation Success Criteria (Sections 8.2.1 and 8.3.1)
Increase Thermoregulation	Attaining Vegetation Success Criteria (Section 8.3.1).
Reduce Stressors and Sources of Pollution	Fencing maintained throughout the monitoring period and encroachment within the easement eliminated.
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Removal of cattle, documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria (Section 8.3.1)
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Documentation of two overbank events in separate monitoring years and attaining Vegetation Success Criteria (Section 8.3.1)
Restore Habitat	
Restore In-stream Habitat	Pebble counts documenting coarsening of bed material from pre-existing conditions of sand and silt to post restoration conditions of gravel and cobble, and attaining Vegetation Success Criteria (Section 8.3.1)
Restore Stream-side Habitat	Attaining Vegetation Success Criteria (Section 8.3.1)
Improve Vegetation Composition and Structure	Attaining Vegetation Success Criteria (Section 8.3.1)

Structure Failure

In the event that structures are compromised the affected structure will be repaired, maintained, or replaced. Once the structure is repaired or replaced, it must function to stabilize adjacent stream banks and/or maintain grade control within the channel. Structures which remain intact, but exhibit flow around, beneath, or through the header/footer will be repaired by excavating a trench on the upstream side of the structure and reinstalling filter fabric in front of the pilings. Structures

which have been compromised, resulting in shifting or collapse of header/footer, will be removed and replaced with a structure suitable for Site flows.

Headcut Migration Through the Site

In the event that a headcut occurs within the Site (identified visually or through measurements [i.e. bank-height ratios exceeding 1.4]), provisions for impeding headcut migration and repairing damage caused by the headcut will be implemented. Headcut migration may be impeded through the installation of in-stream grade control structures (rip-rap sill and/or log cross-vane weir) and/or restoring stream geometry variables until channel stability is achieved. Channel repairs to stream geometry may include channel backfill with coarse material and stabilizing the material with erosion control matting, vegetative transplants, and/or willow stakes.

Bank Erosion

In the event that severe bank erosion occurs within the Site, resulting in elevated width-to-depth ratios, contingency measures to reduce bank erosion and width-to-depth ratios will be implemented. Bank erosion contingency measures may include the installation of log-vane weirs and/or other bank stabilization measures. If the resultant bank erosion induces shoot cutoffs or channel abandonment, a channel may be excavated which will reduce shear stress to stable values.

8.2 Wetlands

Two to three groundwater monitoring gauges will be installed to take measurements after hydrological modifications are performed at the Site. Hydrological sampling will continue throughout the growing season at intervals necessary to satisfy jurisdictional hydrology success criteria (USEPA 1990). In addition, an on-site rain gauge will document rainfall data for comparison of groundwater conditions with extended drought conditions and floodplain crest gauges will be installed to confirm overbank flooding events.

8.2.1 Wetland Success Criteria

Monitoring and success criteria for wetland re-establishment should relate to project goals and objectives. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving vegetation success criteria. The following summarizes wetland success criteria related to goals and objectives.

According to the *Soil Survey of Alamance County*, the growing season for Alamance County is from April 17 – October 22 (USDA 1960). However, the start date for the growing season is not typical for the Piedmont region; therefore, for purposes of this project gauge hydrologic success will be determined using data from February 1 - October 22 to more accurately represent the period of biological activity. This will be confirmed annually by soil temperatures and/or bud burst. The growing season will be initiated each year on the documented date of biological activity. Photographic evidence of bud burst and field logs of date and temperature will be included in the annual monitoring reports.

Target hydrological characteristics include saturation or inundation for 10 percent of the monitored period (February 1-October 22), during average climatic conditions. During years with atypical climatic conditions, groundwater gauges in reference wetlands may dictate threshold hydrology

success criteria (75 percent of reference). These areas are expected to support hydrophytic vegetation. If wetland parameters are marginal as indicated by vegetation and/or hydrology monitoring, a jurisdictional determination will be performed.

Table 13. Wetland Goals and Success Criteria

Project Goal/Objective	Wetland Success Criteria
Improve Hydrology	
Restore Wooded Riparian Buffer	Attaining Vegetation Success Criteria (Section 8.3.1).
Increase Surface Storage and Retention	Two overbank events in separate monitoring years, and attaining Wetland and Vegetation Success Criteria (Sections 8.2.1 and 8.3.1).
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	
Improve Water Quality	
Increase Upland Pollutant Filtration	Attaining Wetland and Vegetation Success Criteria (Sections 8.2.1 and 8.3.1).
Reduce Stressors and Sources of Pollution	Fencing maintained throughout the monitoring period and encroachment within the easement eliminated.
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Removal of cattle, documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria (Section 8.3.1).
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria (Section 8.3.1).
Restore Habitat	
Restore Stream-side Habitat	Attaining Vegetation Success Criteria (Section 8.3.1).
Improve Vegetation Composition and Structure	

8.2.2 Wetland Contingency

Hydrological contingency will require consultation with hydrologists and regulatory agencies if wetland hydrology re-establishment is not achieved. Floodplain surface modifications, including construction of ephemeral pools, represent a likely mechanism to increase the floodplain area in support of jurisdictional wetlands. Recommendations for contingency to establish wetland hydrology will be implemented and monitored until Hydrology Success Criteria are achieved.

8.3 Vegetation

After planting has been completed in winter or early spring, an initial evaluation will be performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

During quantitative vegetation sampling, 14 sample plots (10-meter by 10-meter) will be installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph.

8.3.1 Vegetation Success Criteria

An average density of 320 planted stems per acre must be surviving in the first three monitoring years. Subsequently, 290 planted stems per acre must be surviving in year 4, 260 planted stems per acre in year 5, and 210 planted stems per acre in year 7. In addition, planted vegetation must average 10 feet in height in each plot at year 7 since this Site is located in the Piedmont. Volunteer

stems may be considered on a case-by-case basis in determining overall vegetation success; however, volunteer stems should be counted separately from planted stems.

8.3.2 Vegetation Contingency

If vegetation success criteria are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting will be performed as needed until achievement of vegetation success criteria.

9.0 MAINTENANCE PLAN

Restoration Systems shall monitor the Site on a regular basis and shall conduct a physical inspection of the Site a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These Site inspections may identify Site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following.

10.0 LONG-TERM MANAGEMENT PLAN

Upon approval for close-out by the NC IRT, the Site will be transferred to a third party for long term management as described in the NCEEP's in lieu free instrument.

Table 14. Site Maintenance Plan

Component/Feature	Maintenance through Project Close-out
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant communities. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical (i.e. chainsaw) and/or chemical (i.e. basal bark herbicide application) methods. Any vegetation control requiring herbicide application and soil fertilization will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations and 15A NCAC 02B .0233.
Streams	Stream contingency may include structure repair and/or installation; repair of dimension, pattern, and/or profile variables; bank stabilization; chinking of in-stream structures to prevent piping; securing of loose coir-fiber matting; supplemental planting along the channel; and/or maintenance to areas of the stream bank where stormwater or floodplain flows are intercepted to prevent bank failure and head-cutting of the channel. The method of contingency is expected to be dependent upon stream variables that are not in compliance with success criteria.
Hydrology	Hydrologic contingency may include floodplain surface modifications such as construction of ephemeral pools, deep ripping of the soil profile, installation of berms to retard surface water flows, supplemental planting, and/or maintenance to areas of the wetland where stormwater or floodplain flows are intercepted to prevent scour. Recommendations for contingency to establish wetland hydrology may be implemented and monitored until hydrology success criteria are achieved. In the event that beaver become a nuisance within the Site, beaver management will be initiated and continued on an as-needed basis in accordance with North Carolina Wildlife Resource Commission (NCWRC) rules and regulations.

Site Boundary	Site boundaries shall be identified in the field to ensure a clear distinction between the mitigation Site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by Site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis.
Drop Structures	The proposed drop structures will be monitored annually at a minimum. In the event of erosion or scour within the structure, maintenance may include structure repair, chinking of the structure to prevent piping, securing of loose coir-fiber matting, and/or supplemental planting of livestakes and erosion control grasses. In the event that debris clogs or inhibits flow over the structure, manual or mechanical removal of debris will occur; maintenance is only expected until the structure naturalizes.

11.0 ADAPTIVE MANAGEMENT PLAN

Upon completion of Site construction Restoration Systems will implement the post-construction monitoring and project maintenance protocols previously defined in this document. If, during the course of annual monitoring it is determined the Site’s ability to achieve performance standards are jeopardized, Restoration Systems will notify the NCEEP of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized Restoration Systems will complete the following.

1. Notify the NCEEP
2. Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the NCDWR/NCEEP.
3. Obtain other permits as necessary.
4. Implement the Corrective Action Plan.
5. Provide the NCEEP a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

12.0 FINANCIAL ASSURANCES

As required by RFP # 16-005568 Restoration Systems will provide financial assurance for 100% of the total value of the contract to be submitted with this document (Appendix G). This bond will remain in effect until the successful completion of Task 6 (Baseline Monitoring Report Submittal). After the successful completion of Task 6, the bond will be retired and a second bond for 25% of the total value of the contract will be substituted for the first to cover the monitoring period. The monitoring phase performance bond may be reduced concurrent with the payment schedule once the yearly deliverable is approved by EEP and credits are released by the NC IRT. Therefore, the monitoring phase performance bond can be reduced after release of mitigation credit each monitoring year as follows.

Release of Mitigation Credit	Bond Value as % of Total Contract Value
Monitoring Year 1	20%
Monitoring Year 2	18%
Monitoring Year 3	16%
Monitoring Year 4	14%
Monitoring Year 5	12%
Monitoring Year 6	10%

The monitoring phase performance bond will be maintained at 10% through Monitoring Year 7 and project closeout until the final determination and release of mitigation credit by the NC IRT.

13.0 CREDIT RELEASE SCHEDULE

All credit releases will be based on the total credit generated as reported by the as-built survey. The release of project credits will be subject to the criteria described as follows.

Forested Wetlands Credits

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50%
3	Third year monitoring report demonstrates performance standards are being met	10%	60%
4	Fourth year monitoring report demonstrates performance standards are being met	10%	70%
5	Fifth year monitoring report demonstrates performance standards are being met; Provided that all performance standards are met, the IRT may allow the NCEEP to discontinue hydrologic monitoring after the fifth year, but vegetation monitoring must continue for an additional two years after the fifth year for a total of seven years.	10%	80%
6	Sixth year monitoring report demonstrates performance standards are being met	10%	90%
7	Seventh year monitoring report demonstrates performance standards are being met, and project has received close-out approval	10%	100%

Stream Credits

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50% (60%*)
3	Third year monitoring report demonstrates performance standards are being met	10%	60% (70%*)
4	Fourth year monitoring report demonstrates performance standards are being met	5%	65% (75%*)
5	Fifth year monitoring report demonstrates performance standards are being met	10%	75% (85%*)
6	Sixth year monitoring report demonstrates performance standards are being met	5%	80% (90%)
7	Seventh year monitoring report demonstrates performance standards are being met and project has received closeout approval	10%	90% (100%)

*For stream projects a reserve of 10% of a site's total stream credits shall be released after two bank-full events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bank-full events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT.

Initial Allocation of Released Credits

The initial allocation of released credits, as specified in the mitigation plan can be released by the NCEEP without prior written approval of the DE upon satisfactory completion of the following activities.

- a. Approval of the final Mitigation Plan
- b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property

- c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; Per the NCEEP Instrument, construction means that a mitigation site has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.
- d. Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

Subsequent Credit Releases

All subsequent credit releases must be approved by the DE, in consultation with the IRT, based on a determination that required performance standards have been achieved. For stream projects a reserve of 10% of a site's total stream credits shall be released after two bank-full events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bank-full events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with credit release, the NCEEP will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

14.0 REFERENCES

- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Gordon, N.D., T.A. McMahon, and B.L. Finlayson. 1992. Stream Hydrology: an Introduction for Ecologists. John Wiley & Sons, Ltd. West Sussex, England.
- Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. Ecoregions of North Carolina and South Carolina. U.S. Geological Survey, Reston, Virginia.
- Harman, W.A., G.D. Jennings, J.M. Patterson, D.R. Clinton, L.A. O'Hara, A. Jessup, R. Everhart. 1999. Bankfull Hydraulic Geometry Relationships for North Carolina Streams. N.C. State University, Raleigh, North Carolina.
- Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.
- North Carolina Department of Environment and Natural Resources (NCDENR). 2013. Water Quality Data Assessment (2012 Final 303(d) List) (online). Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=9d45b3b4-d066-4619-82e6-ea8ea0e01930&groupId=38364 [October 15, 2013]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- North Carolina Department of Environment and Natural Resources (NCDENR). 2014. 2014 Draft Category 5 Water Quality Assessments-303(d) List (online). Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=d61a8974-6af6-4edb-829f-e658935e3341&groupId=38364 [March 17, 2014]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- North Carolina Division of Water Resources (NCDWR). 2013. North Carolina Water Bodies Report (online). Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=10c60296-dcc8-439f-a41c-d475ea7ad1fa&groupId=38364 [March 17, 2014]. North Carolina Department of Environment and Natural Resources, Raleigh.
- North Carolina Ecosystem Enhancement Program (NCEEP 2009). Cape Fear River Basin Restoration Priorities 2009 (online). Available : http://portal.ncdenr.org/c/document_library/get_file?uuid=864e82e8-725c-415e-8ed9-c72dfcb55012&groupId=60329

- North Carolina Geological Survey (NCGS), Philip M. Brown, Chief Geologist, and John M. Parker, III, State Geologic Map Coordinator in association with The State Geologic Map Advisory Committee, 1985, 1 plate. Copyright: NCGS.
- The Piedmont Triad Council of Governments (PTCOG 2008). Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.
- Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology (Publisher). Pagosa Springs, Colorado
- Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, North Carolina Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.
- Simon A, Hupp CR. 1986. Geomorphic and Vegetative Recovery Processes Along Modified Tennessee Streams: An Interdisciplinary Approach to Disturbed Fluvial Systems. Forest Hydrology and Watershed Management. IAHS-AISH Publ.167.
- United States Department of Agriculture (USDA). 2013. Web Soil Survey (online). Available: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx> [October 2013].
- United States Department of Agriculture (USDA). 1960. Soil Survey of Alamance County, North Carolina. Soil Conservation Service.
- United States Environmental Protection Agency (USEPA). 1990. Mitigation Site Type Classification (MiST). EPA Workshop, August 13-15, 1989. EPA Region IV and Hardwood Research Cooperative, NCSU, Raleigh, North Carolina.
- United States Geological Survey (USGS). 2006. Estimating the Magnitude and Frequency of Floods in Rural Basins of North Carolina – Recompiled. USGS Water-Resources Investigations Report 01-4207. Raleigh, North Carolina.

APPENDIX A FIGURES

- Figure 1. Project Location
- Figure 2. Hydrologic Unit Map
- Figure 3. Topography and Drainage Area
- Figure 4. Existing Conditions
- Figure 5A. Cedarock Reference Drainage Area
- Figure 5B. Existing Conditions Cedarock Reference
- Figure 5C. Cedarock Reference Reach Dimension, Pattern, and Profile
- Figures 6A-C. Restoration Plan
- Figure 7. Proposed Dimension, Pattern, and Profile
- Figures 8A-B. Typical Structure Details
- Figure 9. Planting Plan
- Figure 10. Monitoring Plan



Prepared for:



Project:

Aycock Springs Stream and Wetland Restoration Site

Alamance County, NC

Title:

Project Location

Notes:

- Background Imagery sources (provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) created by the U.S. Park Service (upper inset).
 2. Delorme World Basemap digital mapping (2010, lower inset).
 3. Burlington, NC (1980), Lake Burlington, NC (1969), Gibsonville, NC (1970), and Ossipee, NC (1970) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey.

Drawn by: SGD

Date: Oct 2013

Scale: As Shown

Project No.: 13-004.02

FIGURE

1

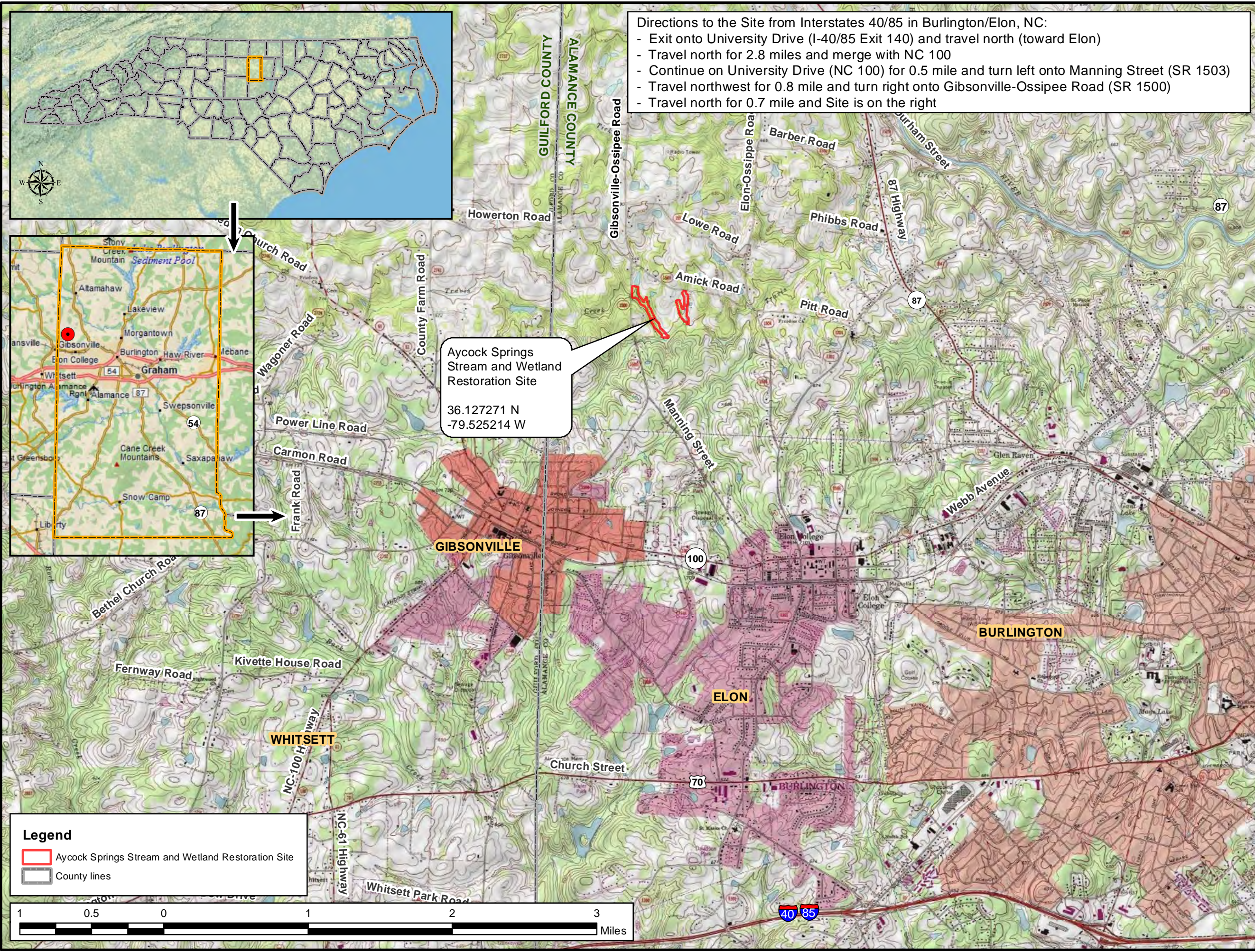
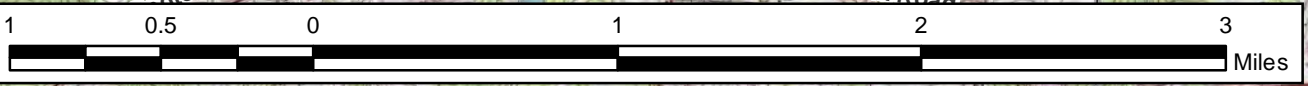
Directions to the Site from Interstates 40/85 in Burlington/Elon, NC:

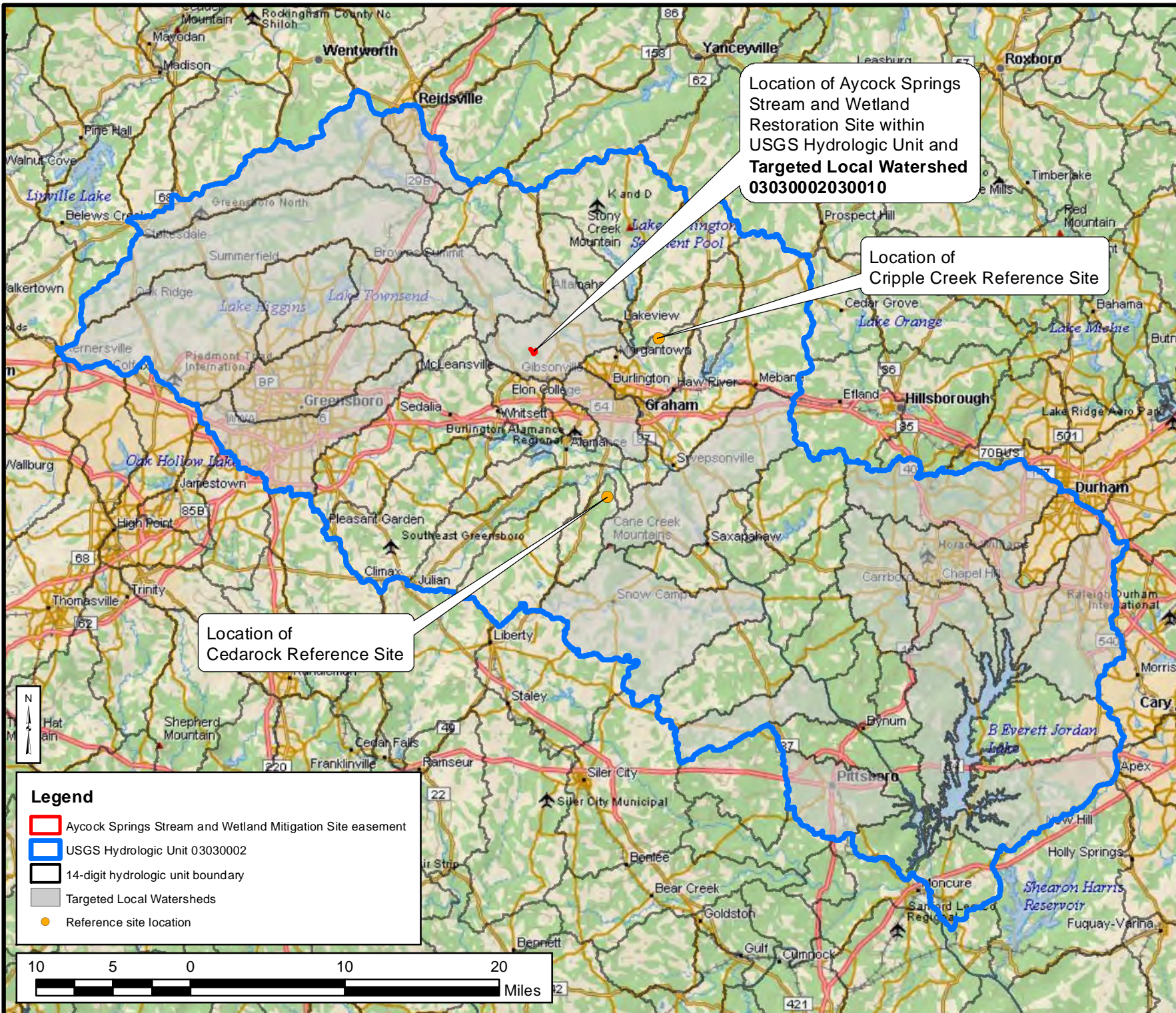
- Exit onto University Drive (I-40/85 Exit 140) and travel north (toward Elon)
- Travel north for 2.8 miles and merge with NC 100
- Continue on University Drive (NC 100) for 0.5 mile and turn left onto Manning Street (SR 1503)
- Travel northwest for 0.8 mile and turn right onto Gibsonville-Ossipee Road (SR 1500)
- Travel north for 0.7 mile and Site is on the right

Aycock Springs Stream and Wetland Restoration Site
 36.127271 N
 -79.525214 W

Legend

- Aycock Springs Stream and Wetland Restoration Site
- County lines





Location of Aycock Springs Stream and Wetland Restoration Site within USGS Hydrologic Unit and Targeted Local Watershed 03030002030010

Location of Cripple Creek Reference Site

Location of Cedarock Reference Site



Prepared for:



Project:

Aycock Springs Stream and Wetland Restoration Site

Alameda County, NC

Title:

Hydrologic Unit Map

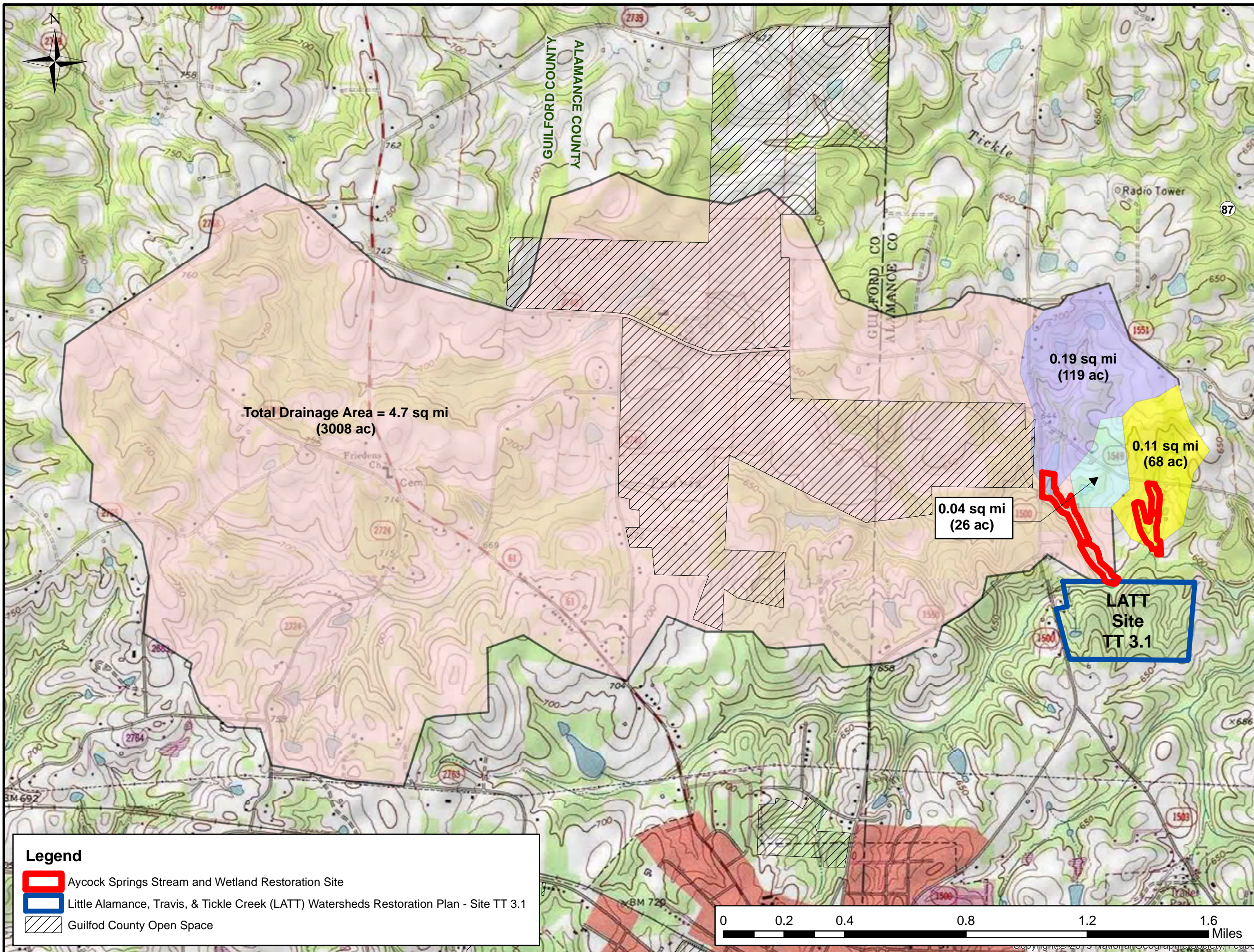
Drawn by: SGD

Date: Nov 2014

Scale: As Shown

Project No.: 13-004.02

FIGURE 2



Legend

- Aycock Springs Stream and Wetland Restoration Site
- Little Alamance, Travis, & Tickle Creek (LATT) Watersheds Restoration Plan - Site TT 3.1
- Guilford County Open Space



Project:

Aycock Springs Stream and Wetland Restoration Site

Alamance County, NC

Title:

Topography and Drainage Area

Notes:

Background Imagery sources (provided by ESRI Data and Maps):

1. Burlington, NC (1980), Lake Burlington, NC (1969), Gibsonville, NC (1970), and Ossipee, NC (1970) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey.

Drawn by: WGL

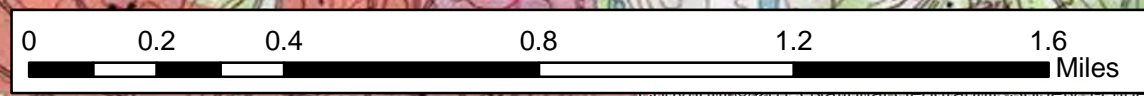
Date: OCT 2013

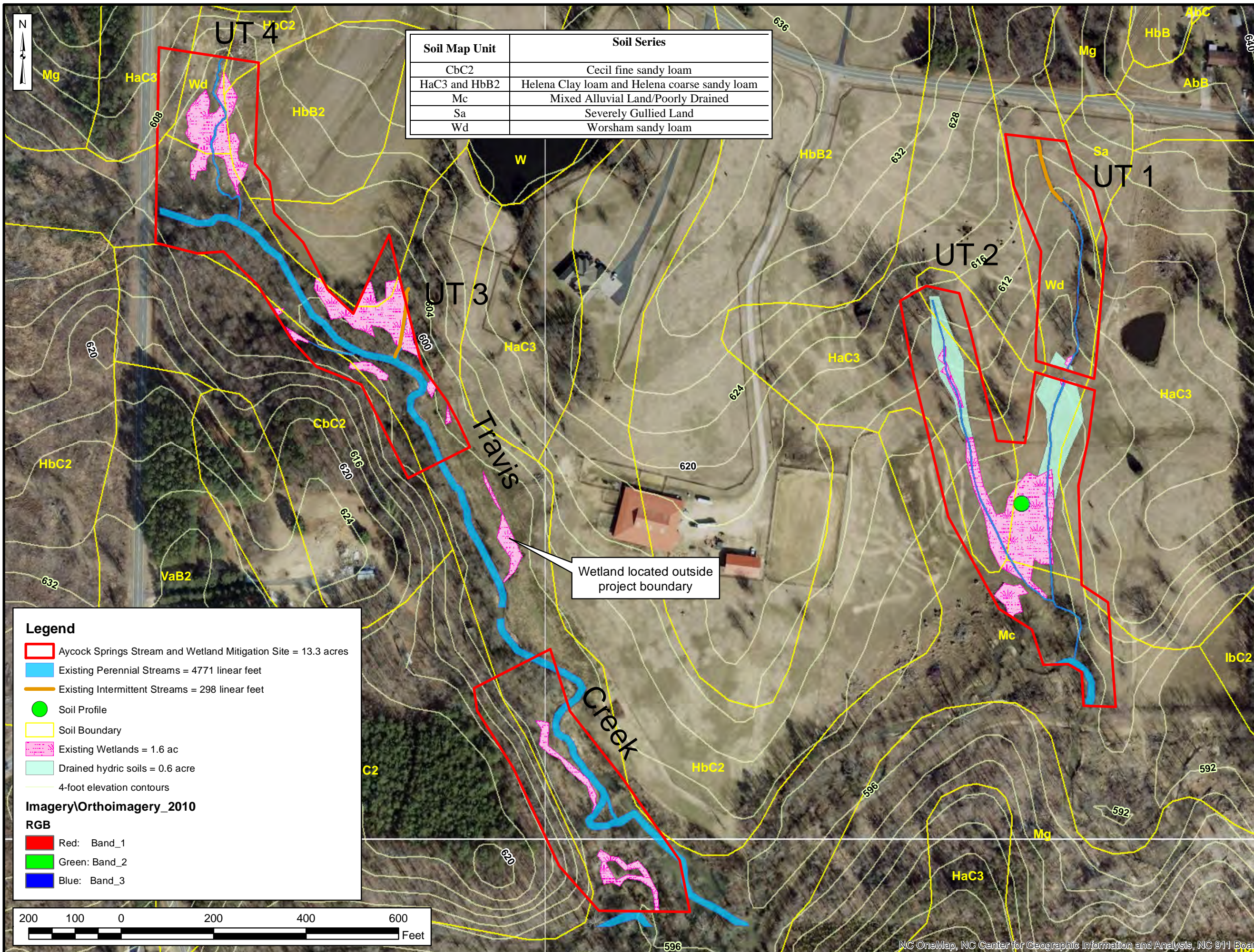
Scale: As Shown

Project No.: 13-004.02

FIGURE

3





Soil Map Unit	Soil Series
CbC2	Cecil fine sandy loam
HaC3 and HbB2	Helena Clay loam and Helena coarse sandy loam
Mc	Mixed Alluvial Land/Poorly Drained
Sa	Severely Gullied Land
Wd	Worsham sandy loam



Prepared for:

Project:
Aycock Springs Stream and Wetland Mitigation Site
 Alamance County, NC

Title:
Existing Conditions

Notes:
 1. Background Imagery source: 2010 aerial photography provided by the NC OneMap Program (online, supported by the NC Geographic Information Coordination Council).
 2. 4-foot elevation contours are generated from 2007 Light Distance and Ranging (LiDAR) data generated by the NC Floodplain Mapping Program and provided by the NC Department of Transportation.

Drawn by: SGD
 Date: APR 2014
 Scale: 1:2400
 Project No.: 14-006

FIGURE 4

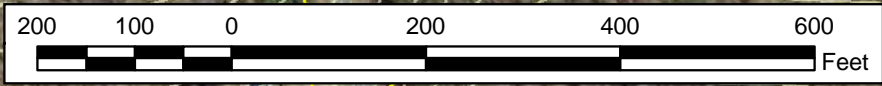
Legend

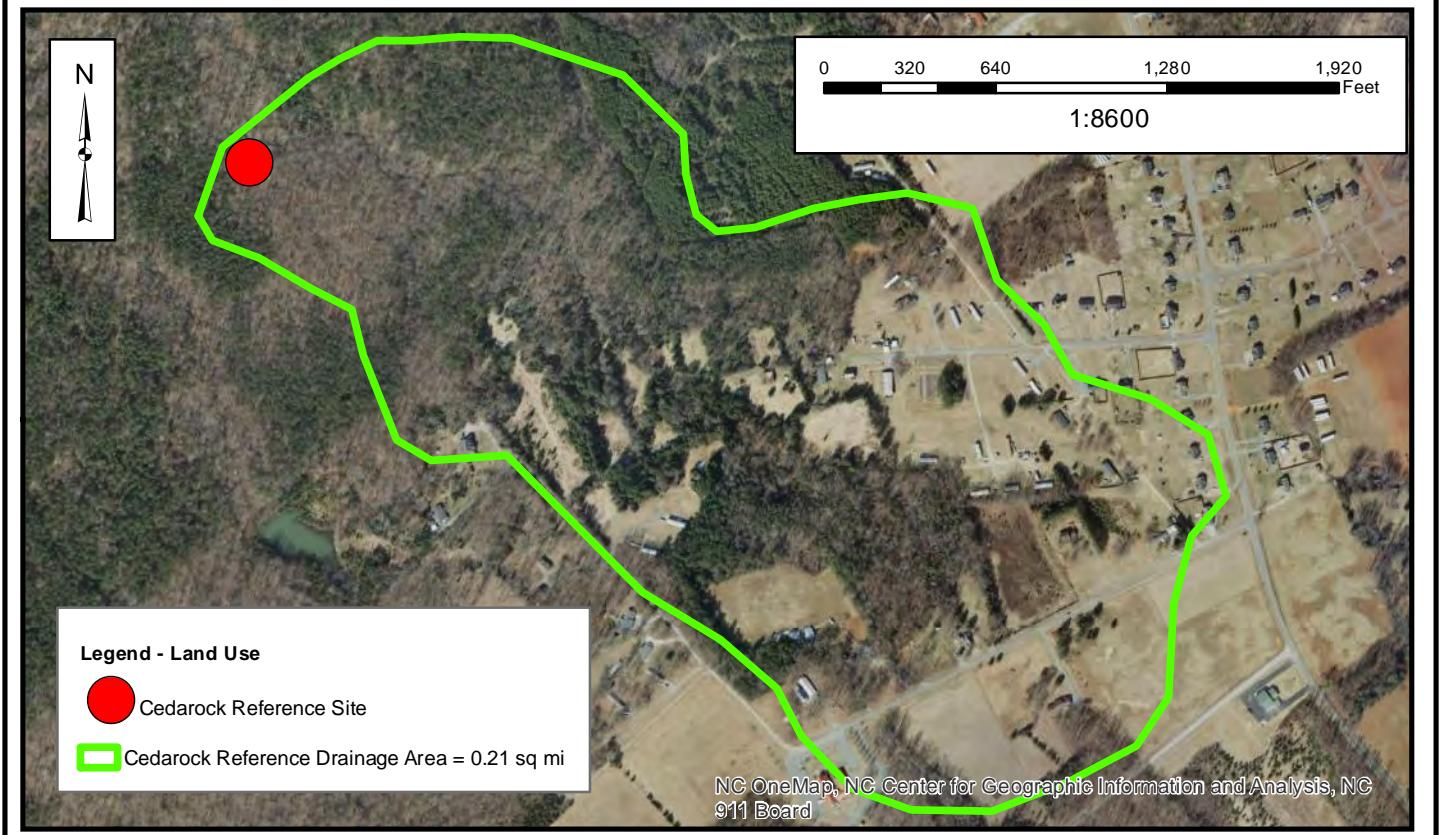
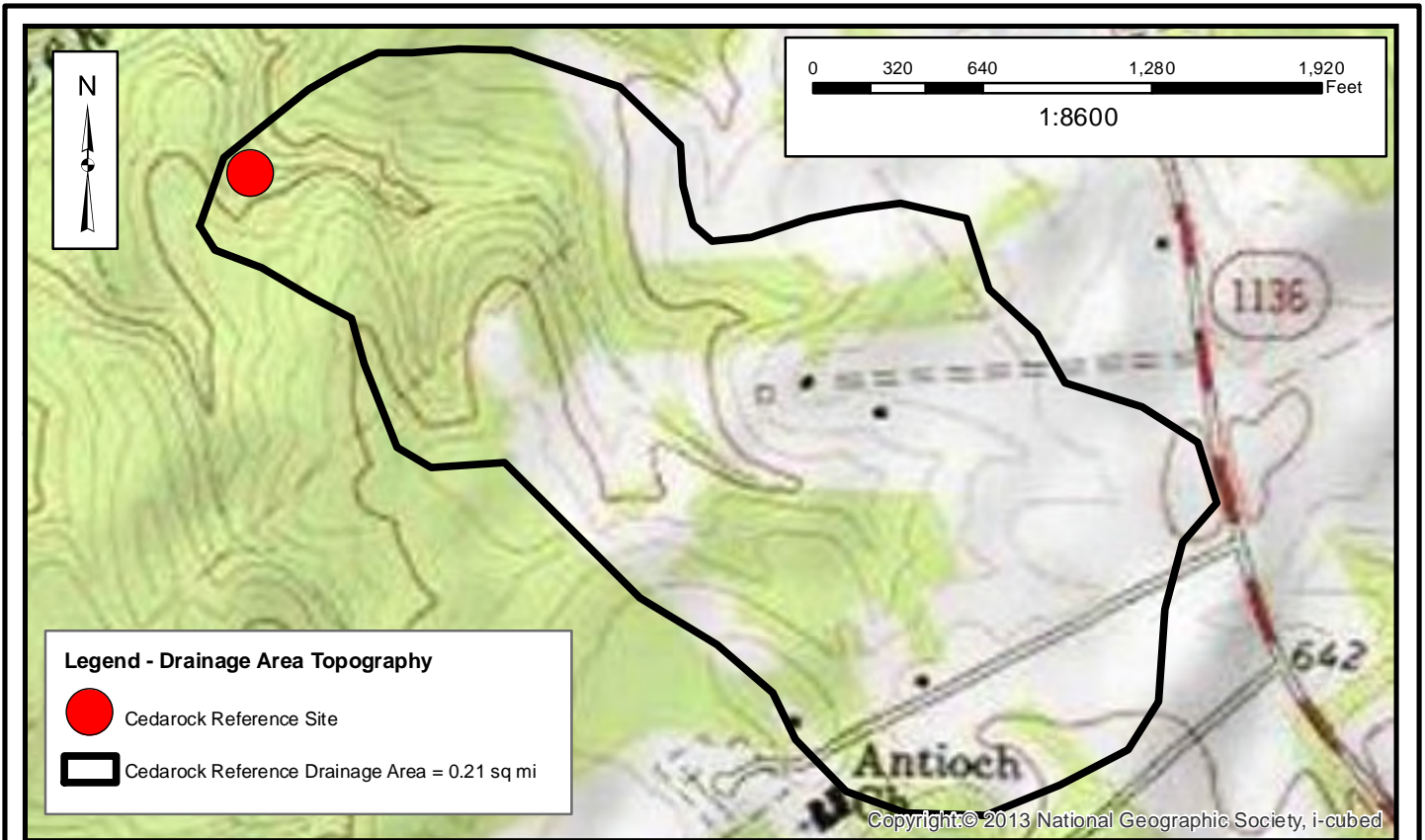
- Aycock Springs Stream and Wetland Mitigation Site = 13.3 acres
- Existing Perennial Streams = 4771 linear feet
- Existing Intermittent Streams = 298 linear feet
- Soil Profile
- Soil Boundary
- Existing Wetlands = 1.6 ac
- Drained hydric soils = 0.6 acre
- 4-foot elevation contours

Imagery\Orthoimagery_2010

RGB

- Red: Band_1
- Green: Band_2
- Blue: Band_3





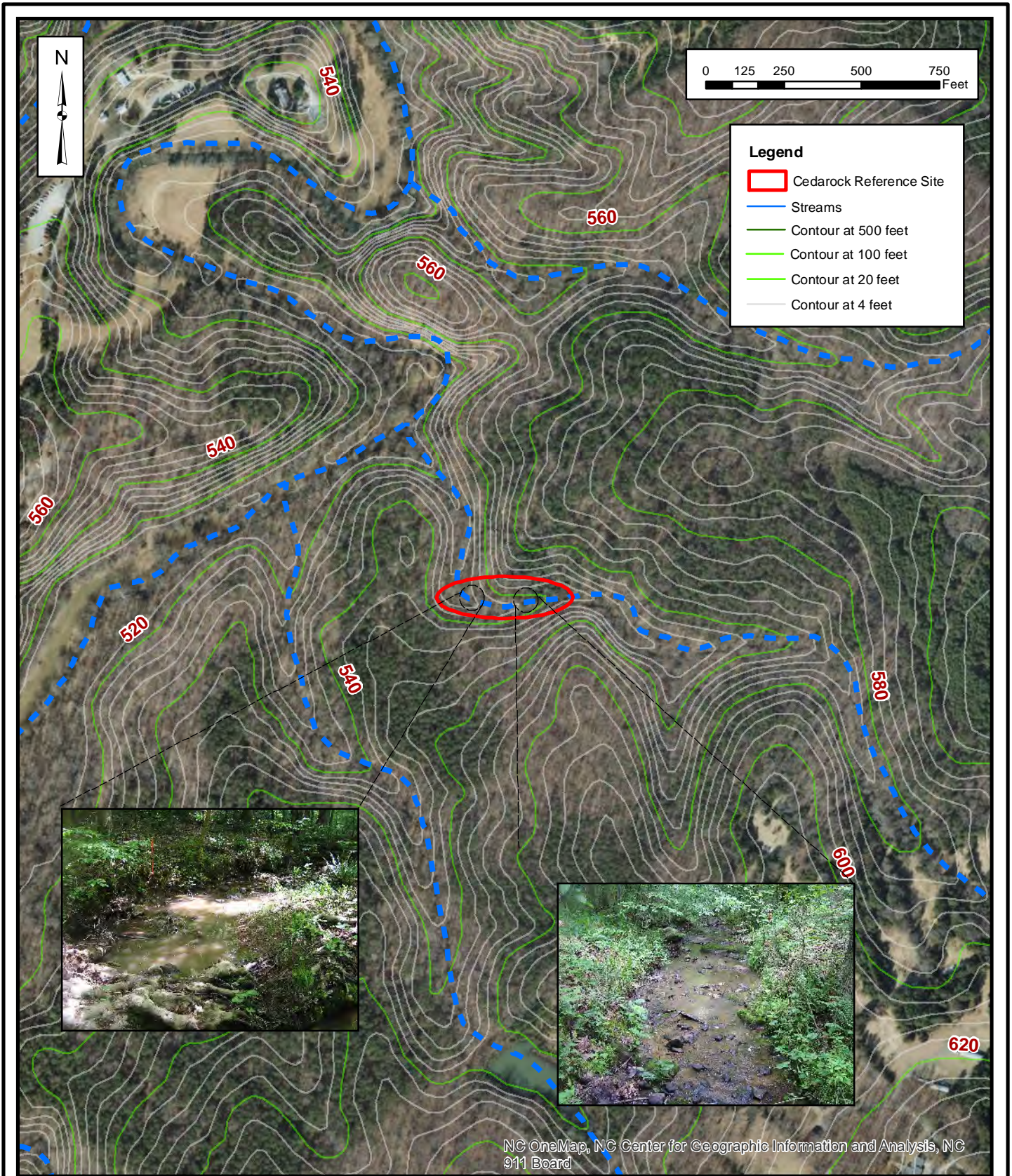

Axiom Environmental
 218 Snow Avenue
 Raleigh, NC 27603
 (919) 215-1693

Axiom Environmental, Inc.

CEDAROCK REFERENCE DRAINAGE AREA
AYCOCK SPRINGS RESTORATION SITE
 Alamance County, North Carolina

Dwn. by:	WGL
Date:	Mar 2014
Project:	14-005

FIGURE
5A



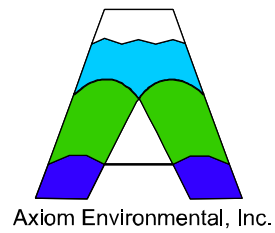

Axiom Environmental
 218 Snow Avenue
 Raleigh, NC 27603
 (919) 215-1693

Axiom Environmental, Inc.

EXISTING CONDITIONS
AYCOCK SPRINGS REFERENCE REACH
ABBEY LAMM REFERENCE SITE
 Alamance County, North Carolina

Dwn. by:	WGL
Date:	Mar 2014
Project:	14-005

FIGURE
5B



NOTES/REVISIONS

Project:

**Aycock Springs
Restoration Site**

**Alamance County
North Carolina**

Title:

**Cedarrock Reference Reach
Dimension, Pattern,
and Profile**

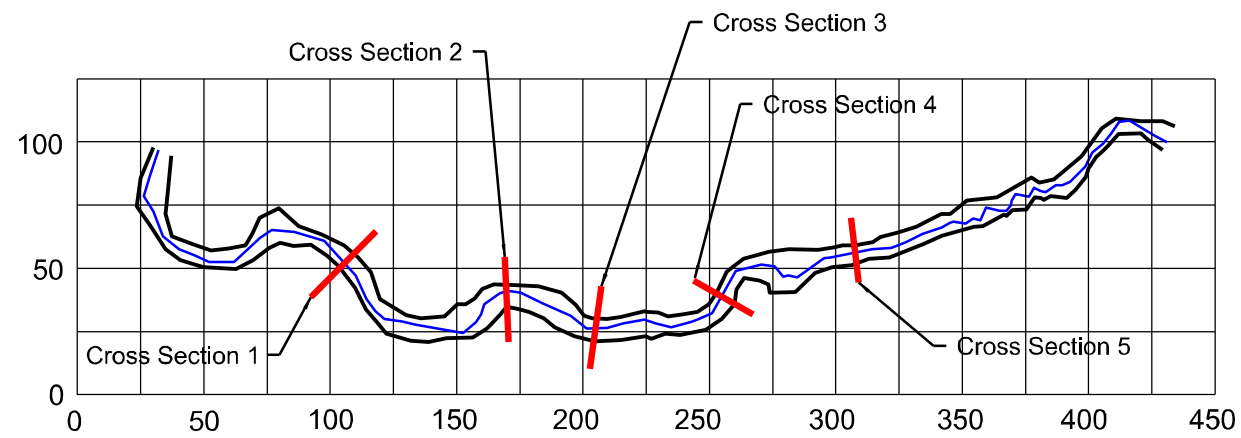
Scale: NA

Date: October 2014

Project No.: 14-006

FIGURE NO.

5C

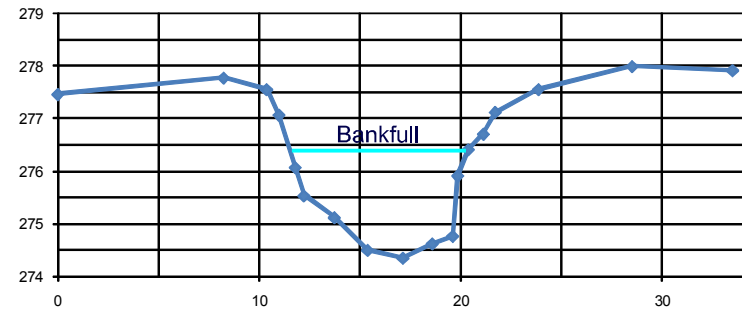


Reference Pattern

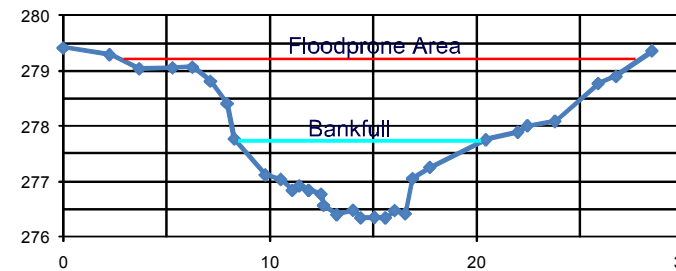
- Lp-p = 37 (25 - 68) ft
- Lm = 68 (44 - 116) ft
- Wbelt = 23 (20 - 38) ft
- Rc = 16 (11 - 27) ft
- Lp-p/Wbkf = 4.6 (3.1 - 8.4)
- Lm/Wbkf = 8.4 (5.5 - 14.3)
- Wbelt/Wbkf = 2.8 (2.4 - 4.7)
- Rc/Wbkf = 2.0 (1.4 - 3.3)
- SIN = 1.20

Pattern Legend

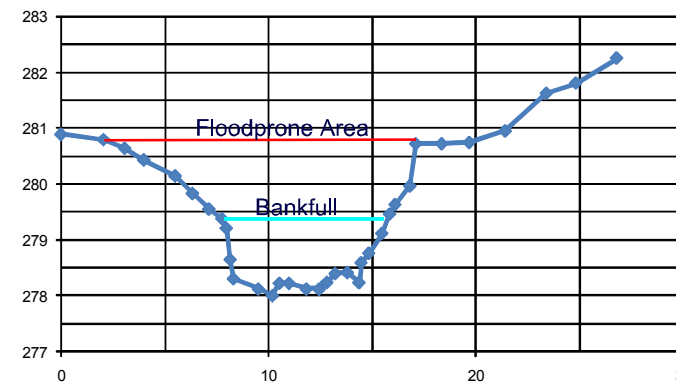
- Top of Bank
- Thalweg
- Cross Section



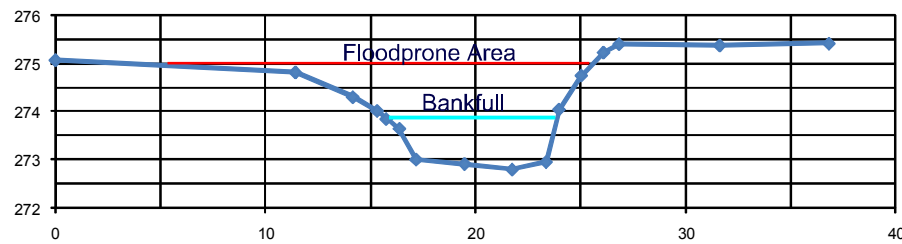
Cross Section 3 - Pool
Abkf = 13.1 ft
Wbkf = 8.9 ft
Dmax = 2.1 ft



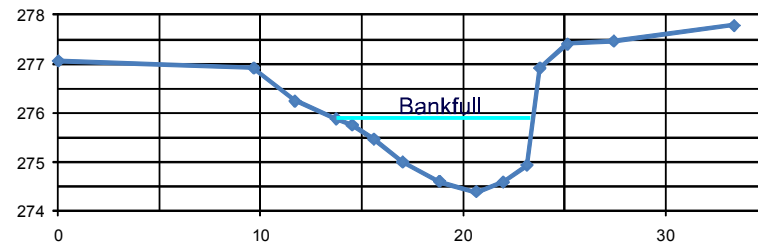
Cross Section 4 - Riffle
Abkf = 9.6 ft
Dave = 0.8 ft
Wbkf = 12.1 ft
Dmax = 1.4 ft
Bank Height = 1.4 ft
Bank Height Ratio = 1.0
W/D = 15.2
FPA = 25
ENT = 2.1
Stream Type = Eb



Cross Section 5 - Riffle
Abkf = 8.0 ft
Dave = 1.0 ft
Wbkf = 8.0 ft
Dmax = 1.4 ft
Bank Height = 1.4 ft
Bank Height Ratio = 1.0
W/D = 8.0
FPA = 15
ENT = 1.9
Stream Type = Eb

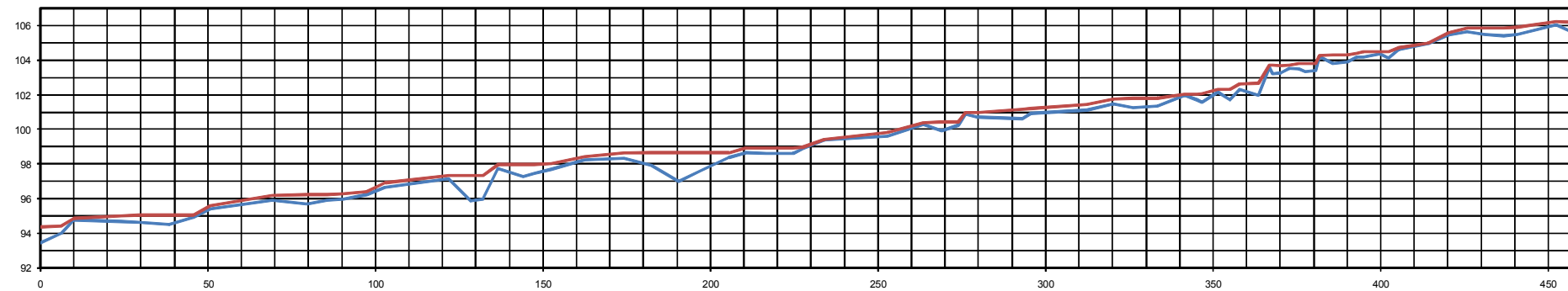


Cross Section 1 - Riffle
Abkf = 6.6 ft
Dave = 0.8 ft
Wbkf = 8.1 ft
Dmax = 1.1 ft
Bank Height = 2.0 ft
Bank Height Ratio = 1.8
W/D = 10.0
FPA = 18
ENT = 2.2
Stream Type = E



Cross Section 2 - Pool
Abkf = 9.0 ft
Wbkf = 9.7 ft
Dmax = 1.5 ft

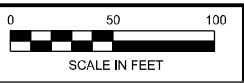
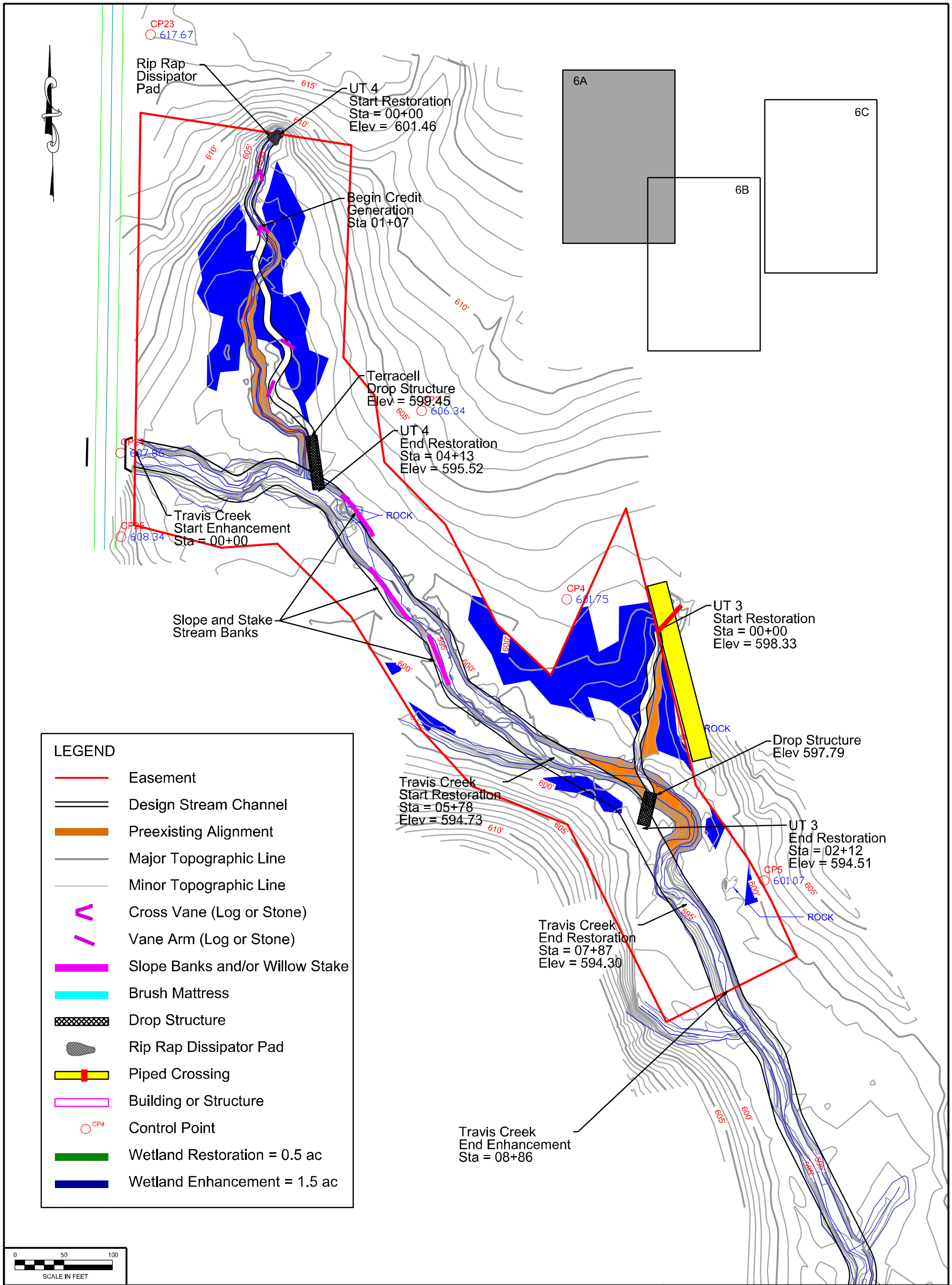
Cedarrock Reference Reach



Profile (Reference Reach)

- Save = 0.0258 rise/run
- Svalley = 0.0310 rise/run
- Sriffle = 0.0316 (0 - 0.0576) rise/run
- Spool = 0.0007 (0 - 0.018) rise/run
- Srun = 0.0353 (0 - 0.3565) rise/run
- Sgslide = 0.0029 (0 - 0.0431) rise/run

- Water Surface
- Channel Bed



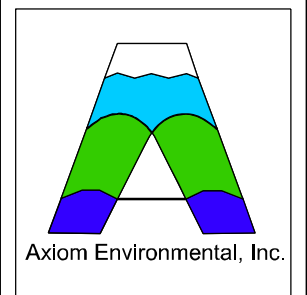
Scale:
As Shown

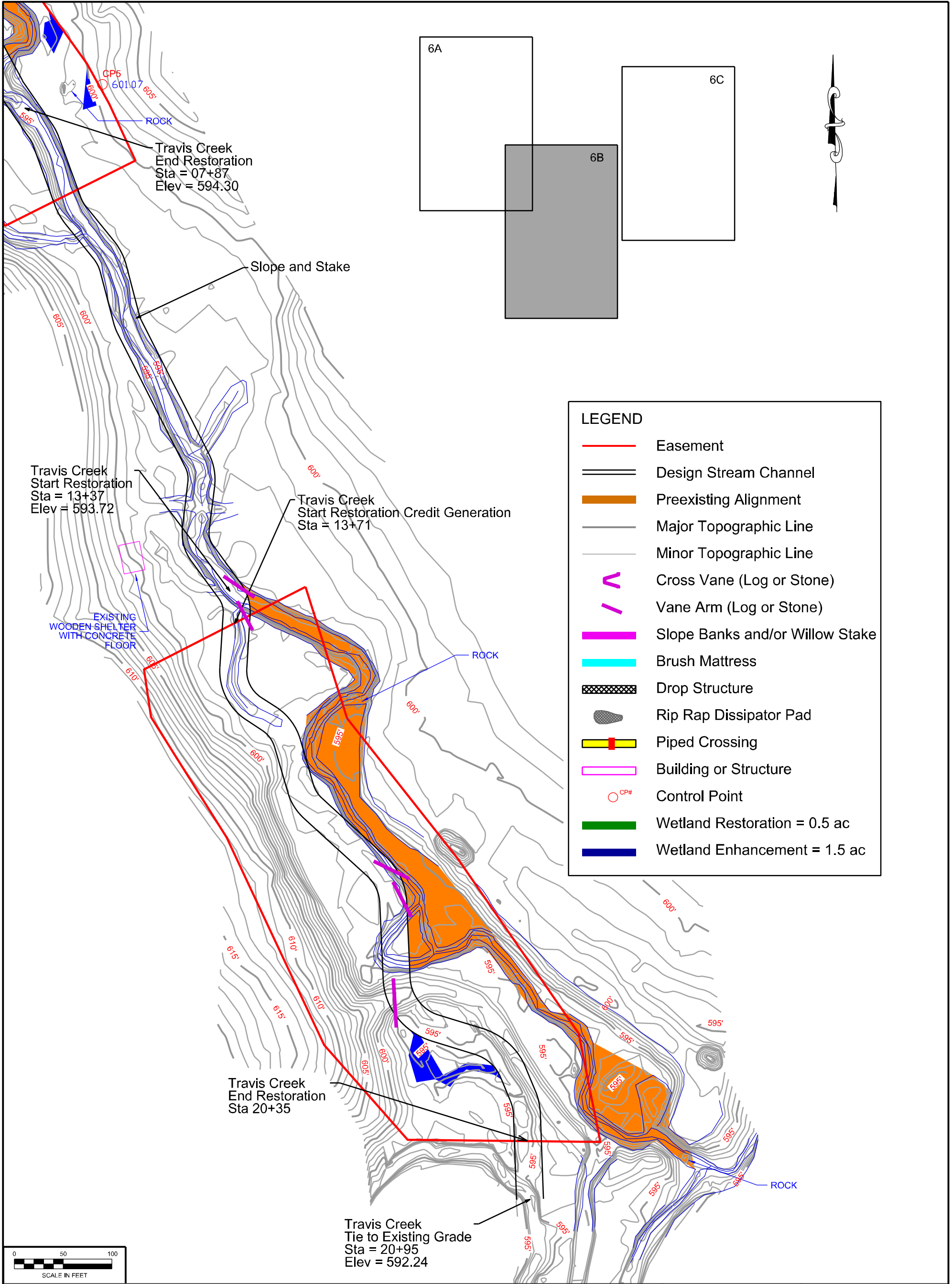
Date:
October 2014

Project No.:
14-006

FIGURE NO.
6A

Project:
**Restoration Plan
Aycock Springs Restoration Site
Alamance County, North Carolina**





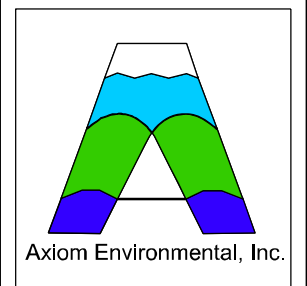
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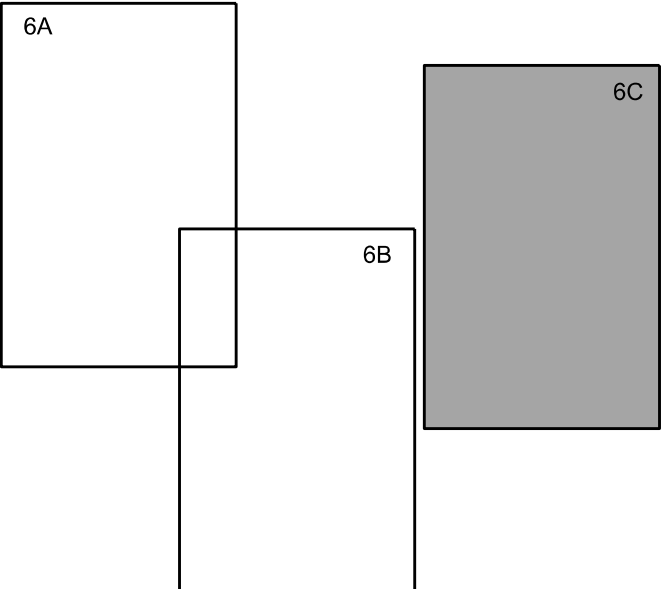
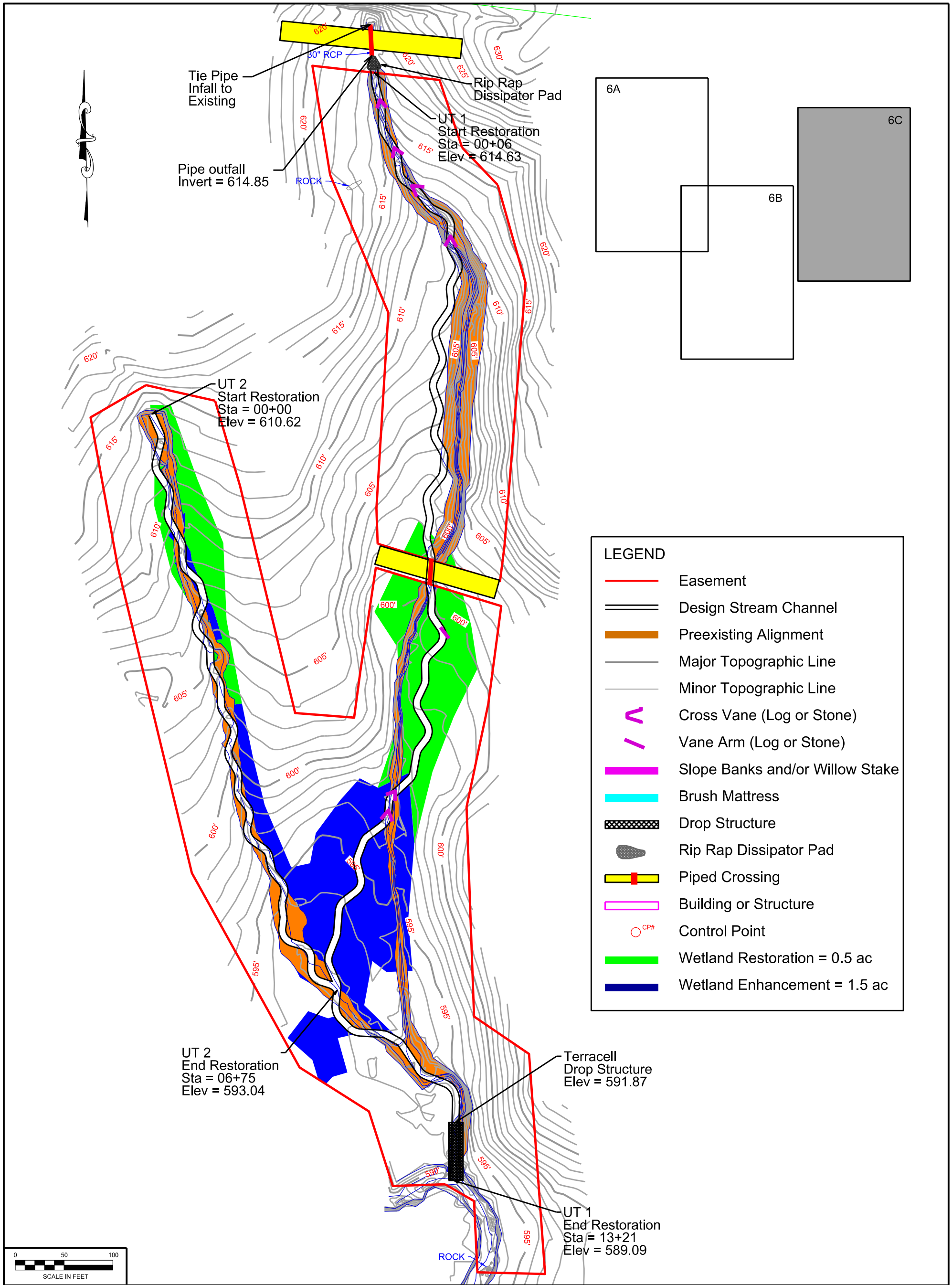
Date:
October 2014

Project No.:
14-006

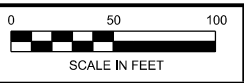
FIGURE NO.
6B

Project:
Restoration Plan
Aycock Springs Restoration Site
Alamance County, North Carolina





LEGEND	
	Easement
	Design Stream Channel
	Preexisting Alignment
	Major Topographic Line
	Minor Topographic Line
	Cross Vane (Log or Stone)
	Vane Arm (Log or Stone)
	Slope Banks and/or Willow Stake
	Brush Mattress
	Drop Structure
	Rip Rap Dissipator Pad
	Piped Crossing
	Building or Structure
	Control Point
	Wetland Restoration = 0.5 ac
	Wetland Enhancement = 1.5 ac



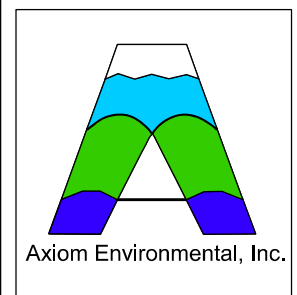
Scale:
As Shown

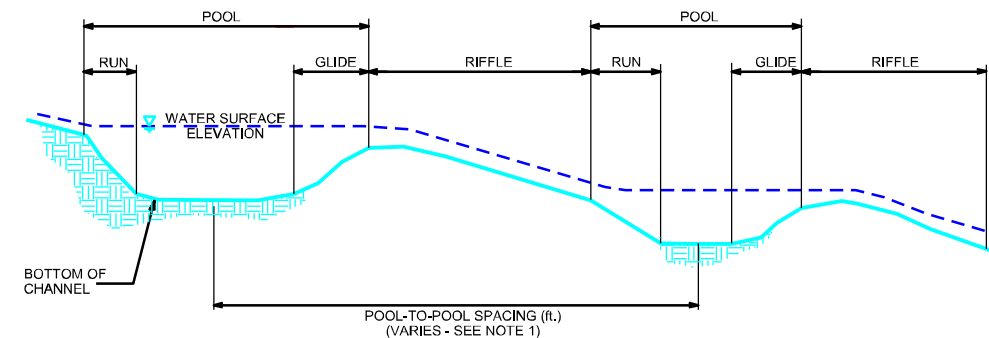
Date:
October 2014

Project No.:
14-006

FIGURE NO.
6C

Project:
**Restoration Plan
Aycock Springs Restoration Site
Alamance County, North Carolina**

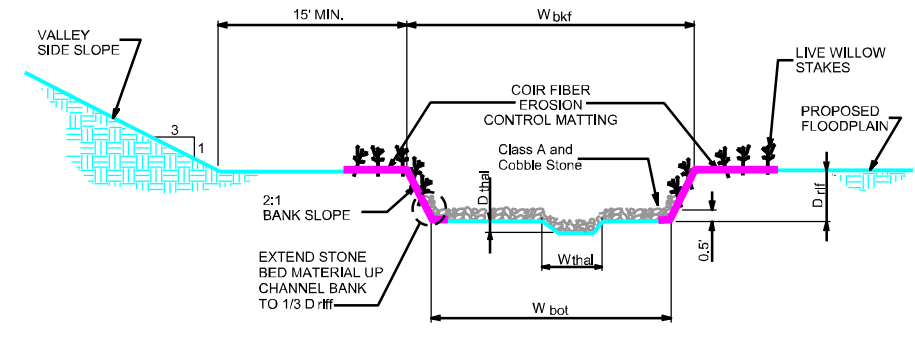




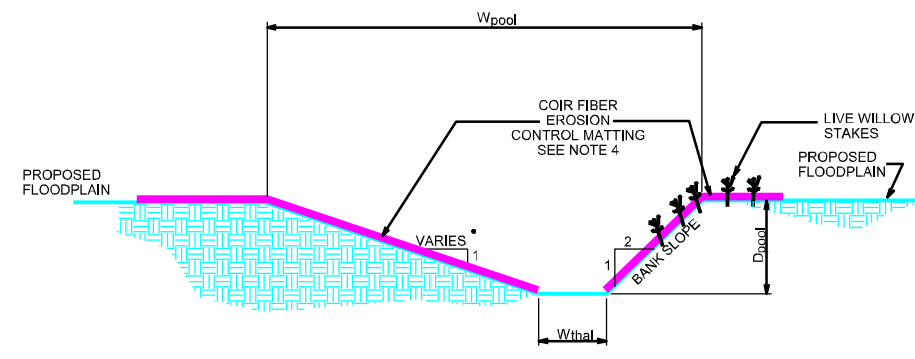
TYPICAL CHANNEL PROFILE

NOTES:

1. POOL-TO-POOL SPACING IS MEASURED FROM CENTER OF POOL BEND TO CENTER OF POOL BEND.



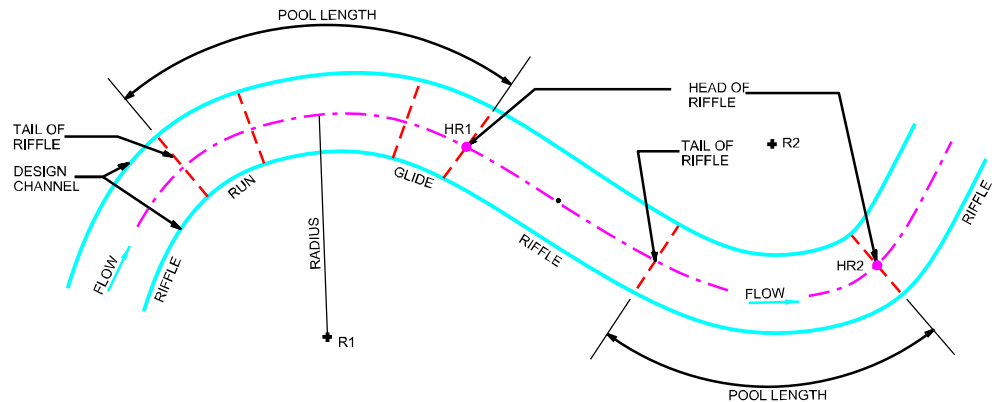
TYPICAL RIFFLE CROSS-SECTION



TYPICAL POOL CROSS-SECTION

CHANNEL CONSTRUCTION NOTES:

1. MATERIAL EXCAVATED FROM CHANNEL AND FLOODPLAIN SHALL BE USED TO BACKFILL EXISTING CHANNEL.
2. BANK PROTECTION SHALL CONSIST OF NATURAL COIR FIBER MATTING.
3. THE CONTRACTOR SHALL SUPPLY BED MATERIAL FOR THE ENTIRE BED LENGTH OF EACH RIFFLE SECTION. THE BED MATERIAL SHALL CONSIST OF A MIX OF CLASS B AND CLASS 1 STONE.

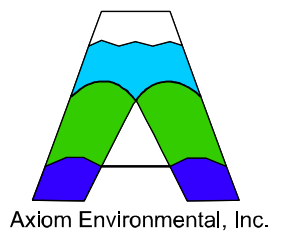


TYPICAL CHANNEL PLAN VIEW

CHANNEL PLAN VIEW NOTES:

1. THE CONTRACTOR SHALL LAYOUT THE CHANNEL ALIGNMENT BY LOCATING THE RADII AND SCRIBING THE CENTER LINE FOR EACH POOL BEND. THE CONNECTING TANGENT SECTIONS SHALL COMPLETE THE LAYOUT OF THE CHANNEL.
2. FIELD ADJUSTMENTS OF THE ALIGNMENT MAY BE REQUIRED TO SAVE TREES OR AVOID OBSTACLES. THE STAKE-OUT SHALL BE APPROVED BY THE CONSTRUCTION MANAGER BEFORE CONSTRUCTION OF THE CHANNEL.

CROSS-SECTION DIMENSIONS							
REACH	W _{bkf} (ft.)	W _{bot} (ft.)	Drif (ft.)	D _{thal} (ft.)	D _{pool} (ft.)	W _{pool} (ft.)	W _{thal} (ft.)
Unnamed Tributaries 1 and 2	7.8	4.6	0.7	0.1	1.1	9.4	1.0
Unnamed Tributary 3	5.5	3.9	0.3	0.1	0.8	6.6	1.0
Unnamed Tributary 4	9.4	5.4	0.9	0.1	1.0	11.3	0.5
Travis Creek	27.7	16.5	2.7	0.1	3.8	33.3	1.0



NOTES/REVISIONS

Project:

**Aycock Springs
Restoration Site**

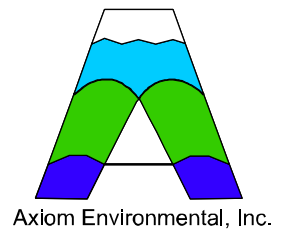
**Alamance County
North Carolina**

Title:

**PROPOSED DIMENSION,
PATTERN, AND PROFILE**

Scale: NA
Date: October 2014
Project No.: 14-006

FIGURE NO.
7



NOTES/REVISIONS

Project:

Aycock Springs
Restoration Site

Alamance County
North Carolina

Title:

TYPICAL
STRUCTURE
DETAILS

Scale:
NO SCALE

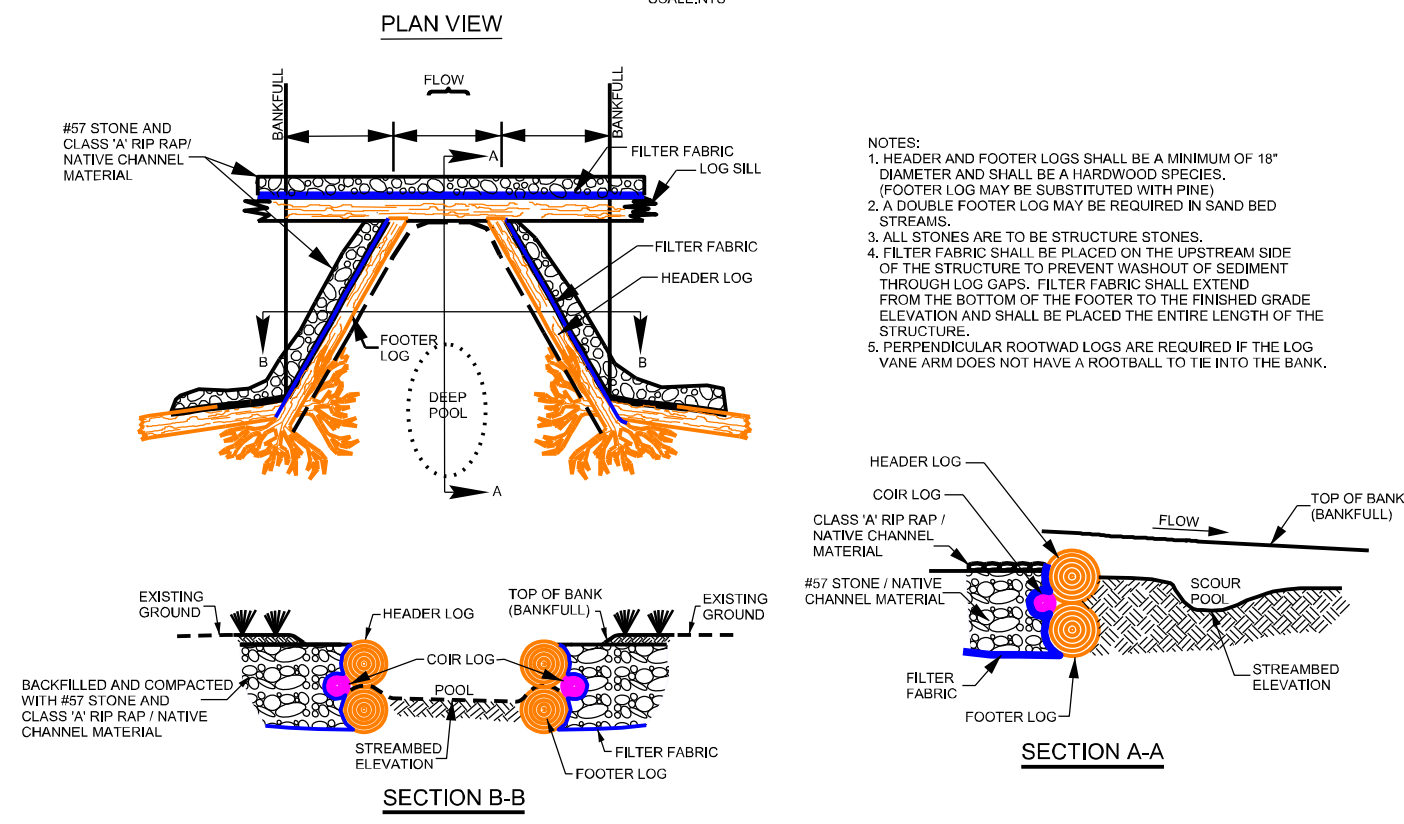
Date:
October 2014

Project No.:
14-006

FIGURE NO.

8A

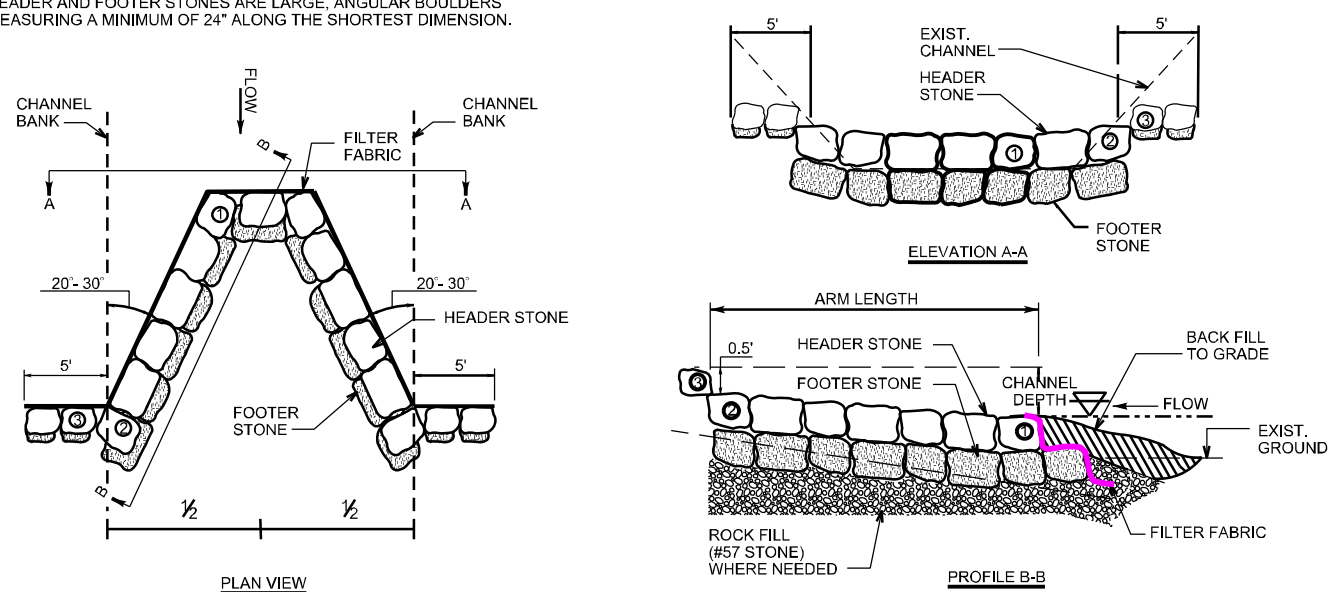
LOG CROSS VANE
SCALE: N.T.S.



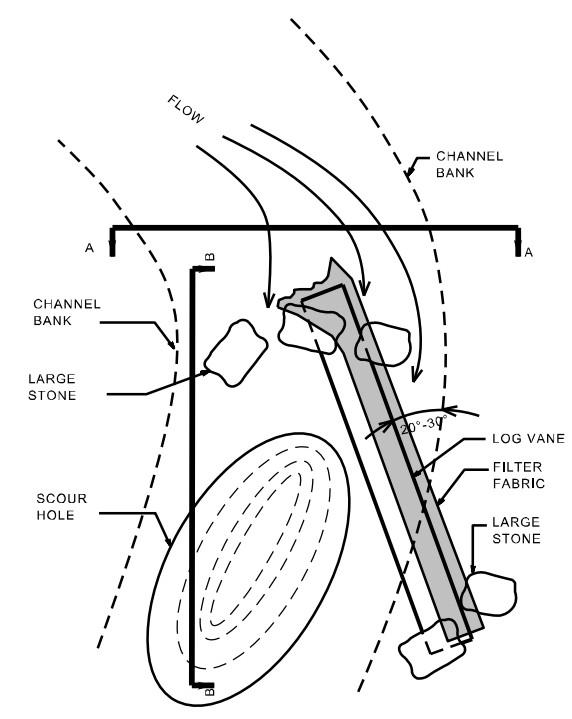
- NOTES:
1. HEADER AND FOOTER LOGS SHALL BE A MINIMUM OF 18" DIAMETER AND SHALL BE A HARDWOOD SPECIES. (FOOTER LOG MAY BE SUBSTITUTED WITH PINE)
 2. A DOUBLE FOOTER LOG MAY BE REQUIRED IN SAND BED STREAMS.
 3. ALL STONES ARE TO BE STRUCTURE STONES.
 4. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH LOG GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
 5. PERPENDICULAR ROOTWAD LOGS ARE REQUIRED IF THE LOG VANE ARM DOES NOT HAVE A ROOTBALL TO TIE INTO THE BANK.

REACH	ARM LENGTH (FT.)	CHANNEL DEPTH (FT.)
Tributaries 1, 2, 3 and 4	7	0.8 - 1.0
Travls Creek	22	2.7 - 3.0

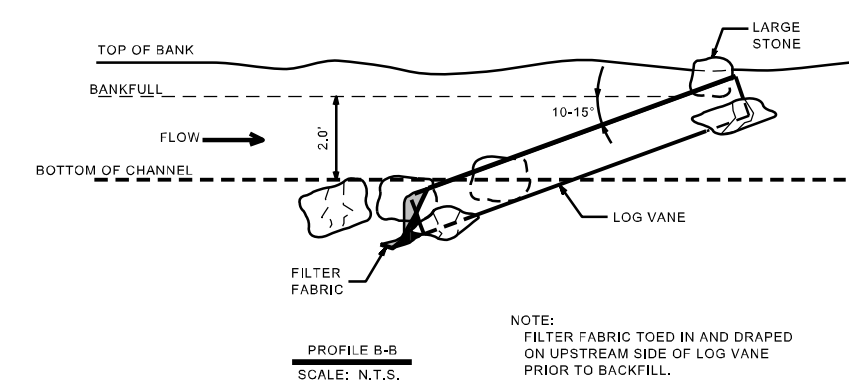
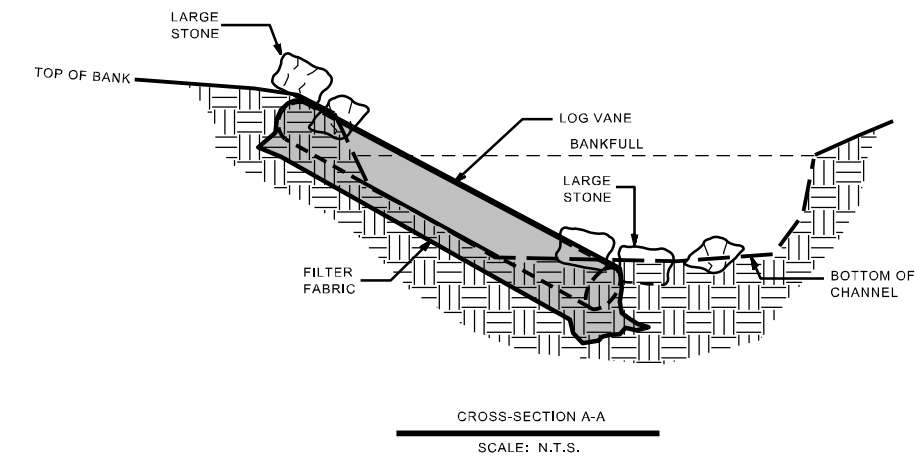
NOTE:
HEADER AND FOOTER STONES ARE LARGE, ANGULAR BOULDERS MEASURING A MINIMUM OF 24" ALONG THE SHORTEST DIMENSION.



TYPICAL CROSS-VANE

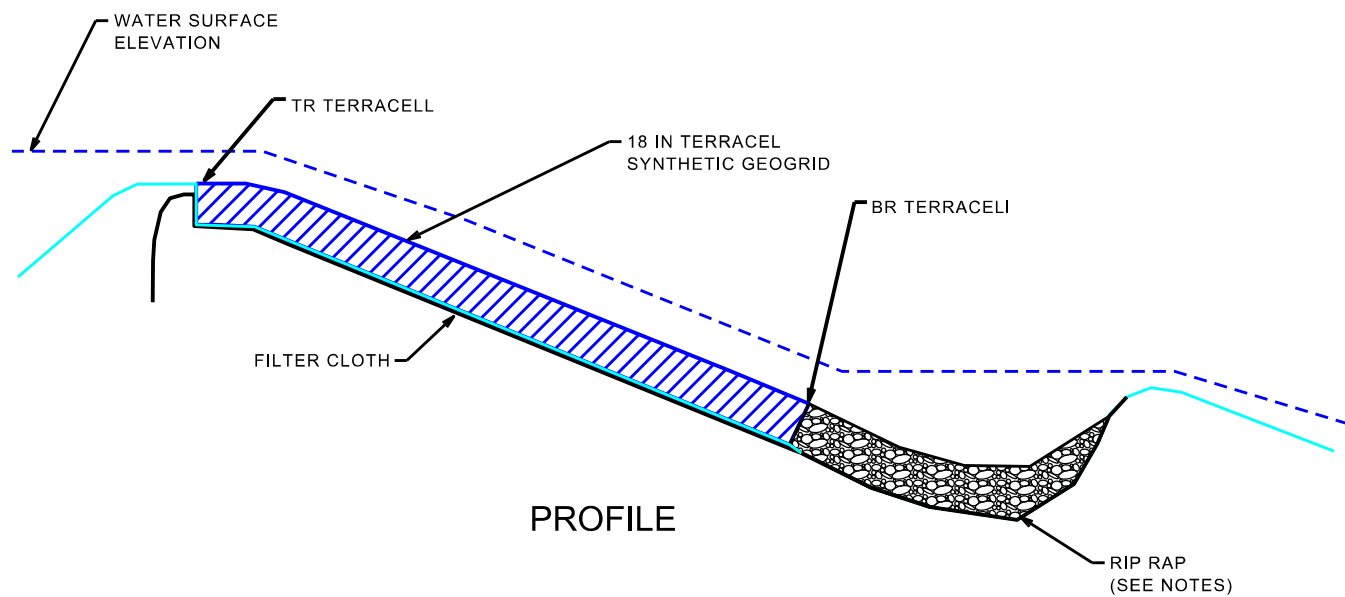


NOTE:
FILTER FABRIC TOED IN AND DRAPED ON UPSTREAM SIDE OF LOG VANE PRIOR TO BACKFILL.



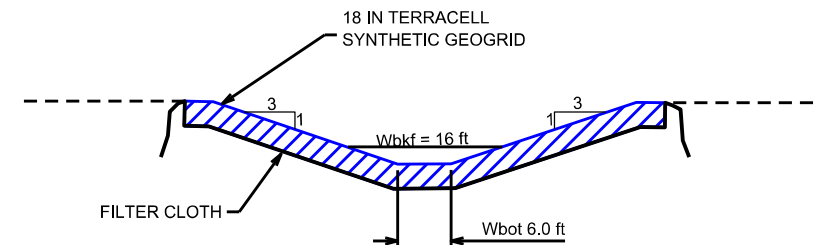
NOTE:
FILTER FABRIC TOED IN AND DRAPED ON UPSTREAM SIDE OF LOG VANE PRIOR TO BACKFILL.

TYPICAL LOG VANE



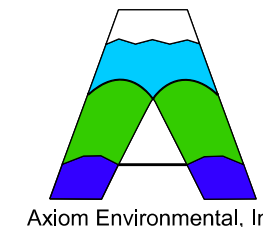
TERRACELL STRUCTURE NOTES:

1. CONTRACTOR WILL INSTALL 18-INCH TERRACELL SYNTHETIC GEOGRID AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. AT BOTTOM RIFFLE DOWNSTREAM FROM TERRACELL STRUCTURE THE POOL WILL BE ARMORED WITH EROSION CONTROL FABRIC AND CLASS 1 RIP RAP OR OTHER SUITABLE MATERIAL.



TERRACELL STRUCTURE NOTES:

1. CONTRACTOR WILL INSTALL 18-INCH TERRACELL SYNTHETIC GEOGRID AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. ONCE THE SYNTHETIC GEOGRID HAS BEEN INSTALLED, GEOCELLS WILL BE BACKFILLED WITH GRAVEL AND TOPSOIL AND PLANTED WITH EROSION CONTROL GRASSES AND WILLOW STAKES (*SALIX NIGRA*).



NOTES/REVISIONS

Project:

Aycock Springs
Restoration Site

Alamance County
North Carolina

Title:

TYPICAL
STRUCTURE
DETAILS

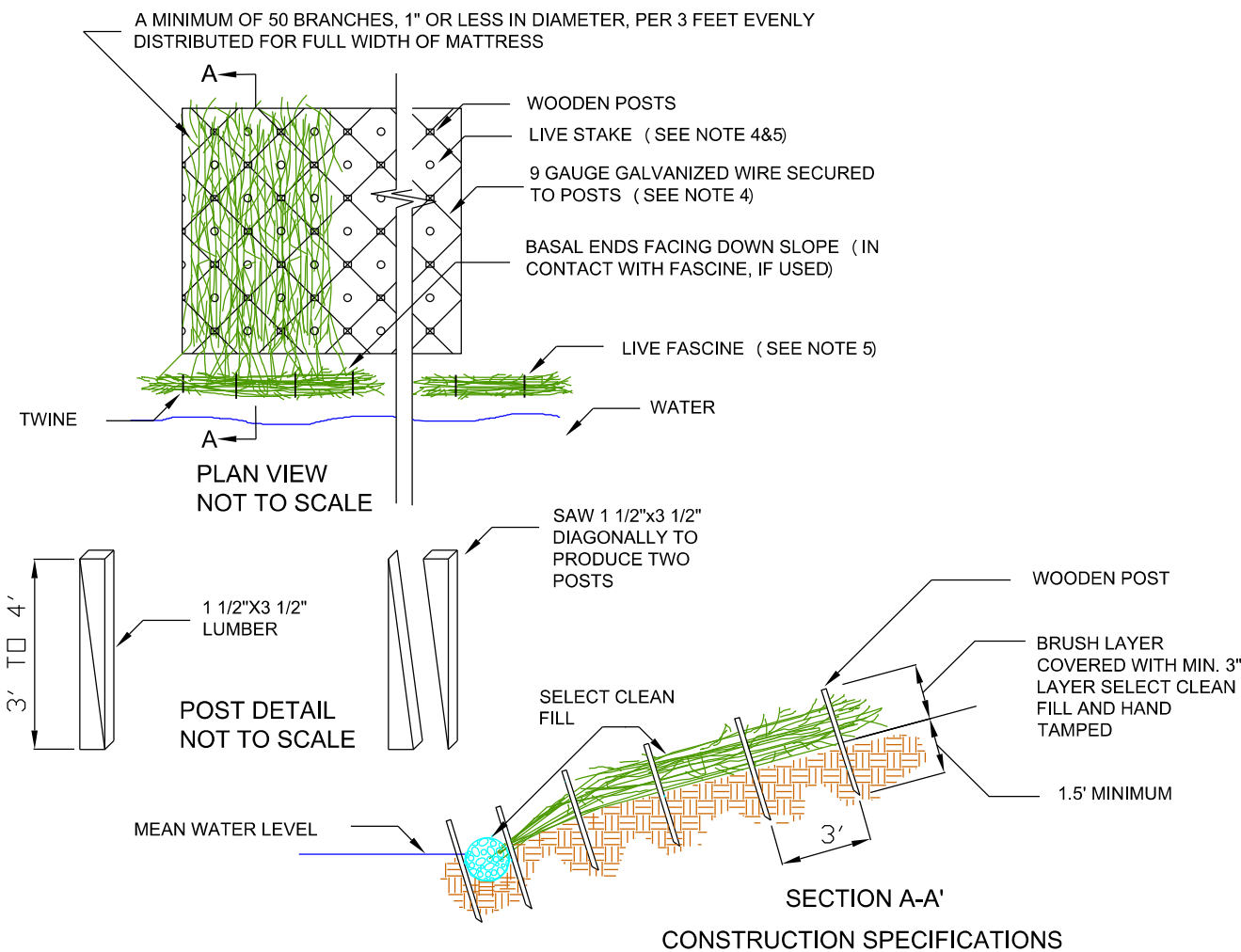
Scale:
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Date:
October 2014

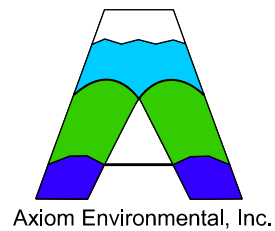
Project No.:
14-006

FIGURE NO.

8B



1. LAYERS SHALL BE COMPRISED OF LIVE QUICK-ROOTING SPECIES.
2. FILL MATTRESS WITH SOIL AND EVENLY DISTRIBUTE TO APPROXIMATELY 4" IN DEPTH AND HAND TAMP.
3. PLACE POSTS EVENLY OVER THE GRADED FACE USING 3' SQUARE SPACING. IF LIVE STAKES ARE SPECIFIED, ALTERNATE EVERY OTHER ON WITH THE POSTS.
4. STRETCH 9 GAUGE GALVANIZED WIRE DIAGONALLY FROM ONE POST TO ANOTHER BY TIGHTLY WRAPPING WIRE AROUND POSTS, NO CLOSER THAN 6" FROM THE TOP OF POST. WIRE SHALL NOT BE ATTACHED TO LIVE STAKES, IF THEY ARE SPECIFIED. POUND STAKES TO COMPRESS MATTRESS.
5. LIVE FASCINES AND LIVE STAKES ARE INSTALLED AT TOE OF ALL BRUSH MATTRESS LOCATIONS. ROCK TOE PROTECTION MAY BE USED AT THE DIRECTION OF THE FIELD ENGINEER.



NOTES/REVISIONS

Project:

Aycock Springs
Restoration Site

Alamance County
North Carolina

Title:

Planting Plan

Scale:

As Shown

Date:

October 2014

Project No.:

14-006

FIGURE NO.

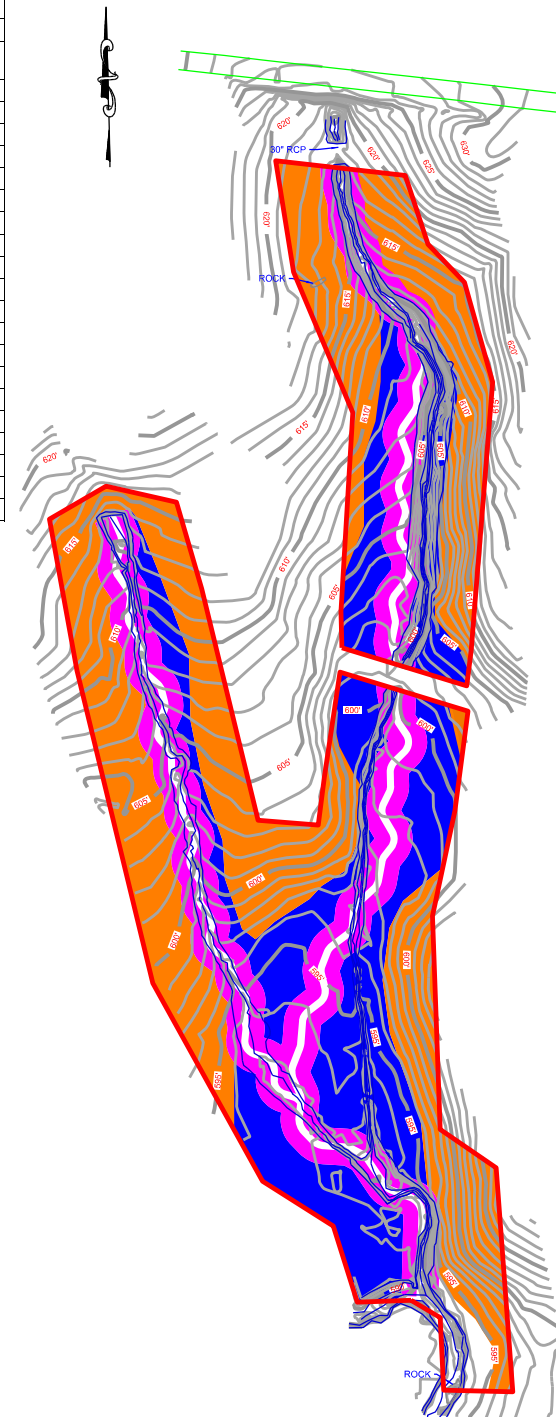
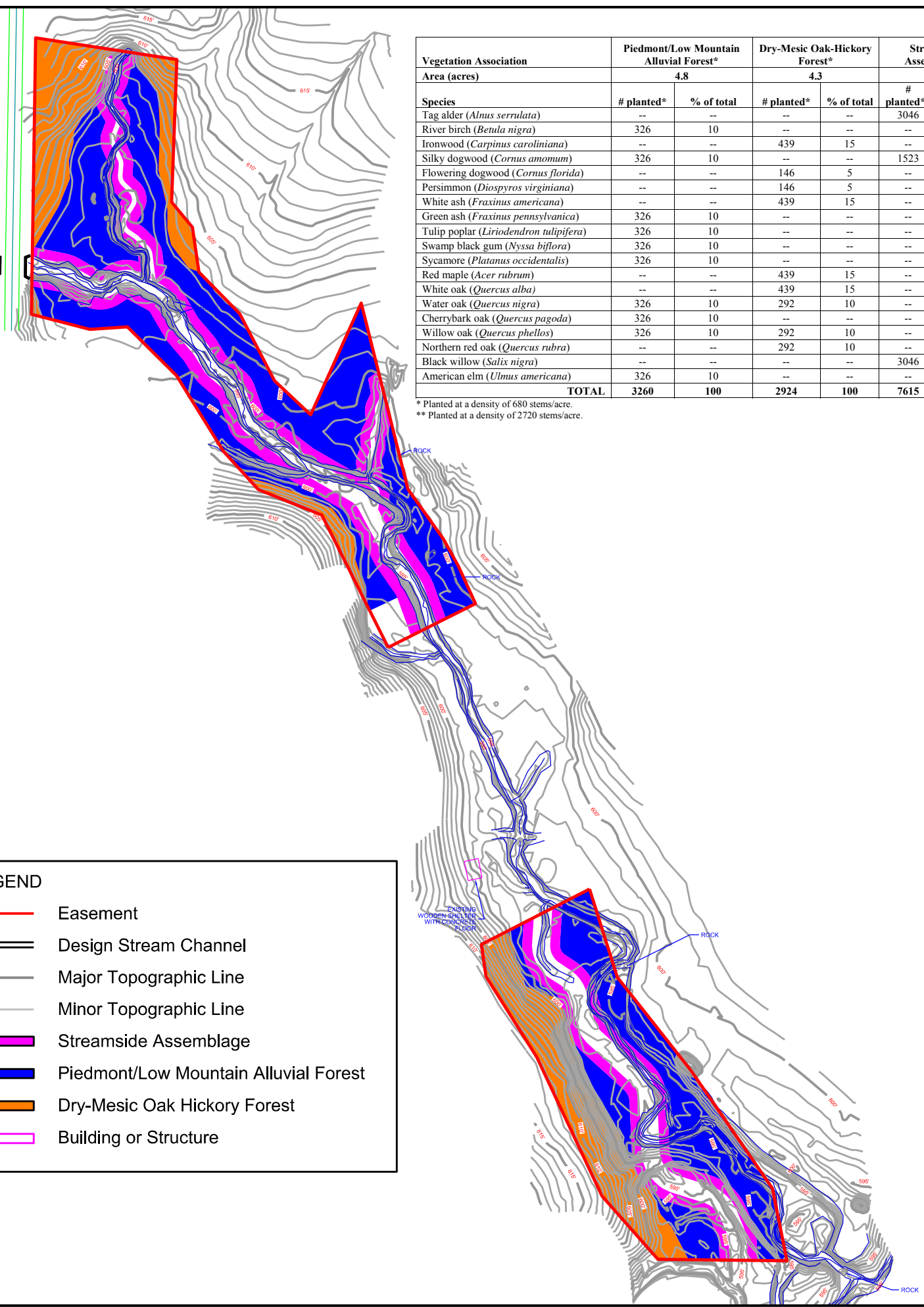
9

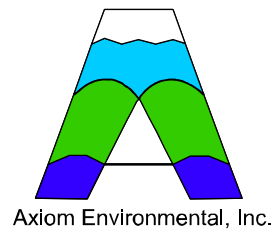
Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Stream-side Assemblage**		TOTAL
	Area (acres)		Area (acres)		Area (acres)		
		4.8		4.3		2.8	11.9
Species	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted
Tag alder (<i>Alnus serrulata</i>)	--	--	--	--	3046	40	3046
River birch (<i>Betula nigra</i>)	326	10	--	--	--	--	326
Ironwood (<i>Carpinus caroliniana</i>)	--	--	439	15	--	--	439
Silky dogwood (<i>Cornus amomum</i>)	326	10	--	--	1523	20	1849
Flowering dogwood (<i>Cornus florida</i>)	--	--	146	5	--	--	146
Persimmon (<i>Diospyros virginiana</i>)	--	--	146	5	--	--	146
White ash (<i>Fraxinus americana</i>)	--	--	439	15	--	--	439
Green ash (<i>Fraxinus pennsylvanica</i>)	326	10	--	--	--	--	326
Tulip poplar (<i>Liriodendron tulipifera</i>)	326	10	--	--	--	--	326
Swamp black gum (<i>Nyssa biflora</i>)	326	10	--	--	--	--	326
Sycamore (<i>Platanus occidentalis</i>)	326	10	--	--	--	--	326
Red maple (<i>Acer rubrum</i>)	--	--	439	15	--	--	439
White oak (<i>Quercus alba</i>)	--	--	439	15	--	--	439
Water oak (<i>Quercus nigra</i>)	326	10	292	10	--	--	618
Cherrybark oak (<i>Quercus pagoda</i>)	326	10	--	--	--	--	326
Willow oak (<i>Quercus phellos</i>)	326	10	292	10	--	--	618
Northern red oak (<i>Quercus rubra</i>)	--	--	292	10	--	--	292
Black willow (<i>Salix nigra</i>)	--	--	--	--	3046	40	3046
American elm (<i>Ulmus americana</i>)	326	10	--	--	--	--	326
TOTAL	3260	100	2924	100	7615	100	13,799

* Planted at a density of 680 stems/acre.
** Planted at a density of 2720 stems/acre.

LEGEND

- Easement
- Design Stream Channel
- Major Topographic Line
- Minor Topographic Line
- Streamside Assemblage
- Piedmont/Low Mountain Alluvial Forest
- Dry-Mesic Oak Hickory Forest
- Building or Structure





NOTES/REVISIONS

Project:

Aycock Springs
Restoration Site

Alamance County
North Carolina

Title:

Monitoring Plan

Scale:

As Shown

Date:

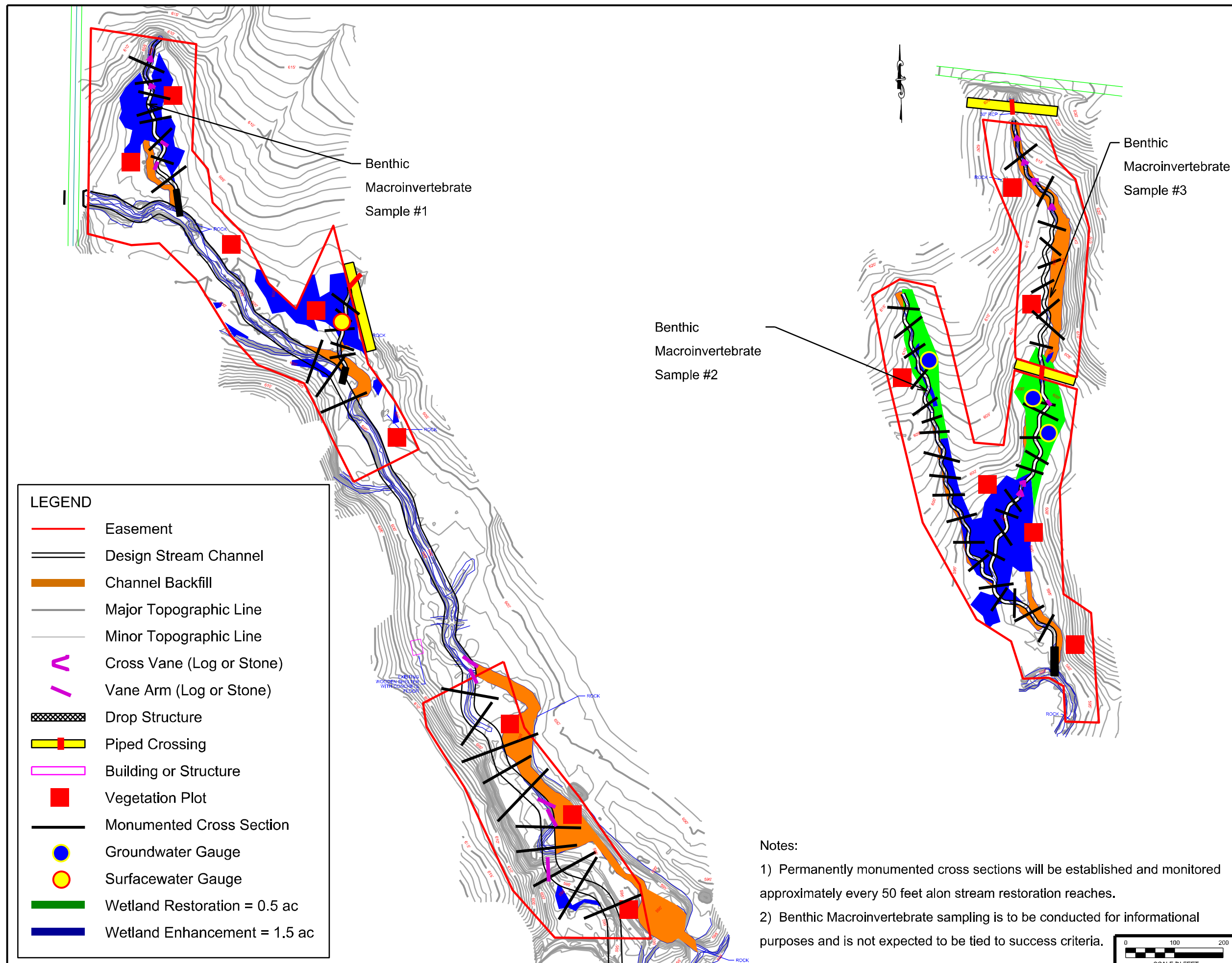
October 2014

Project No.:

14-006

FIGURE NO.

10

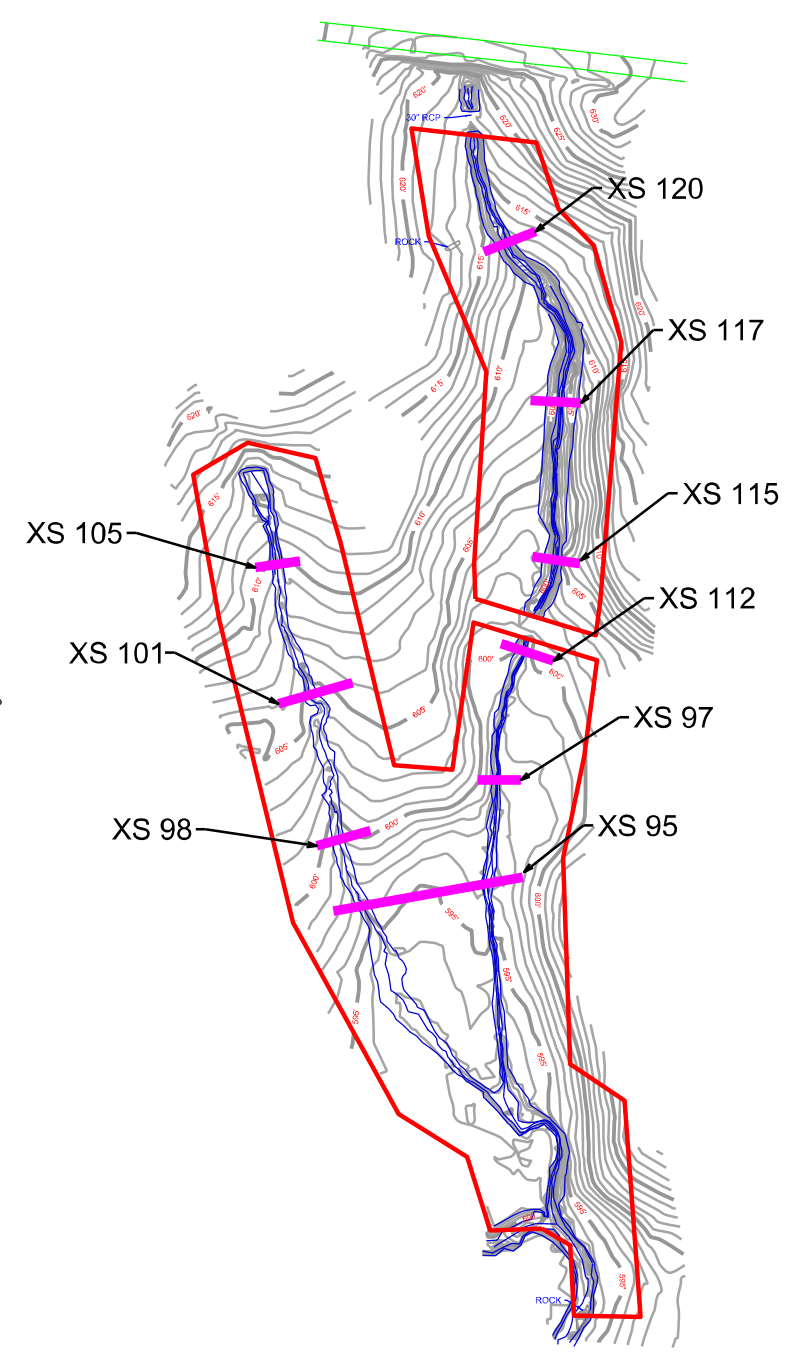
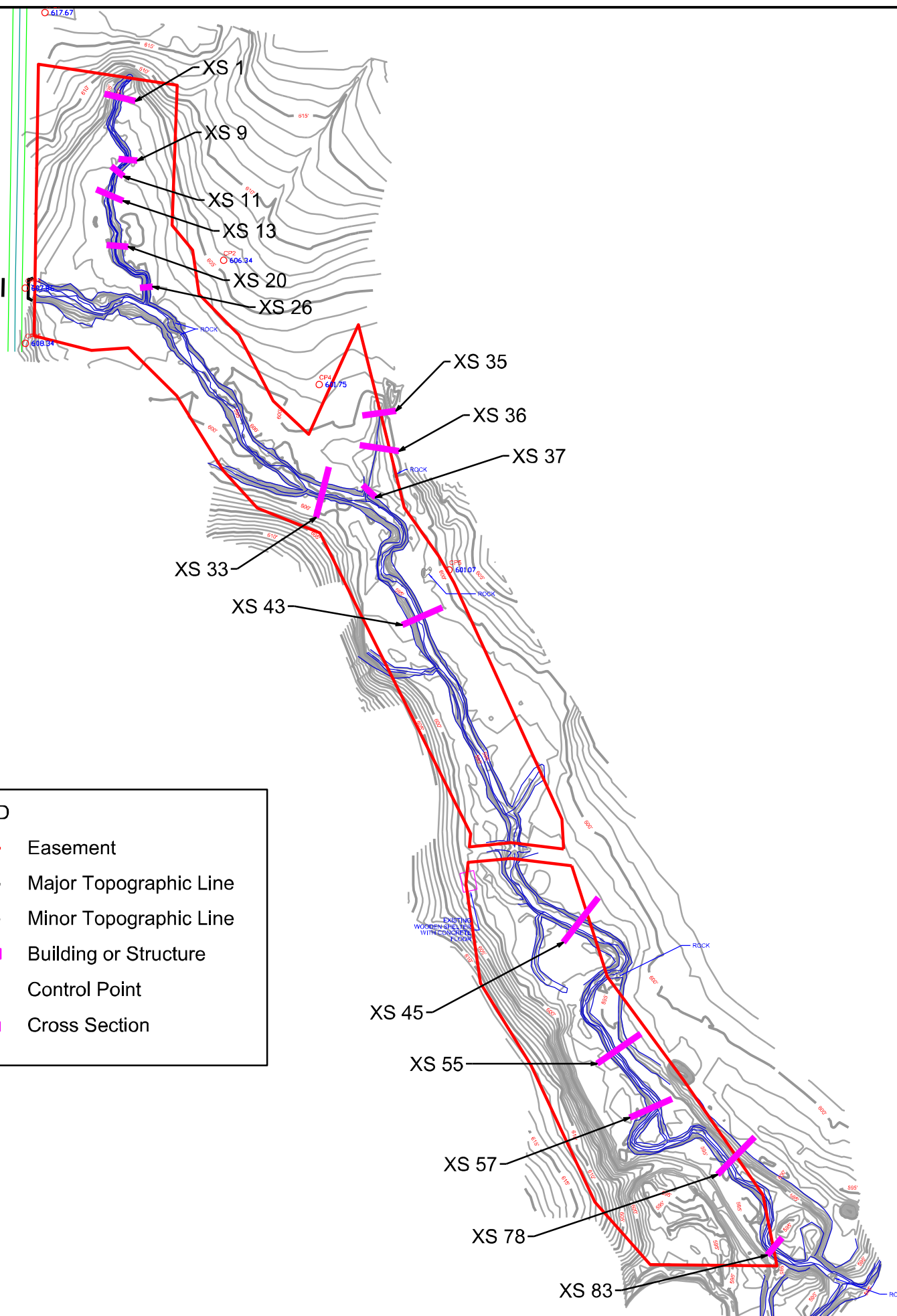


Notes:

- 1) Permanently monumented cross sections will be established and monitored approximately every 50 feet along stream restoration reaches.
- 2) Benthic Macroinvertebrate sampling is to be conducted for informational purposes and is not expected to be tied to success criteria.

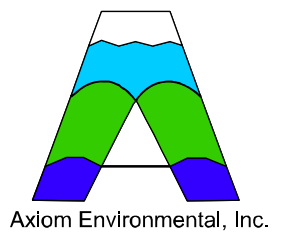
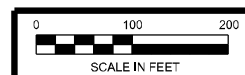


Appendix B
Existing Stream Data
Figure B1. Cross-section Locations
Existing Stream Data



LEGEND

- Easement
- Major Topographic Line
- Minor Topographic Line
- Building or Structure
- CP# Control Point
- Cross Section



NOTES/REVISIONS

Project:

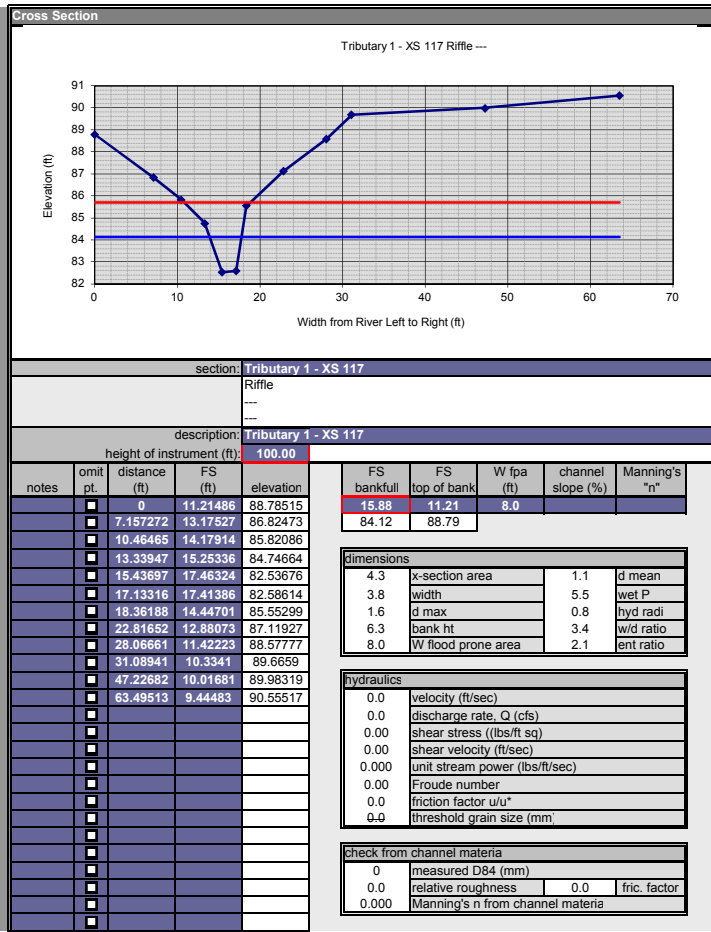
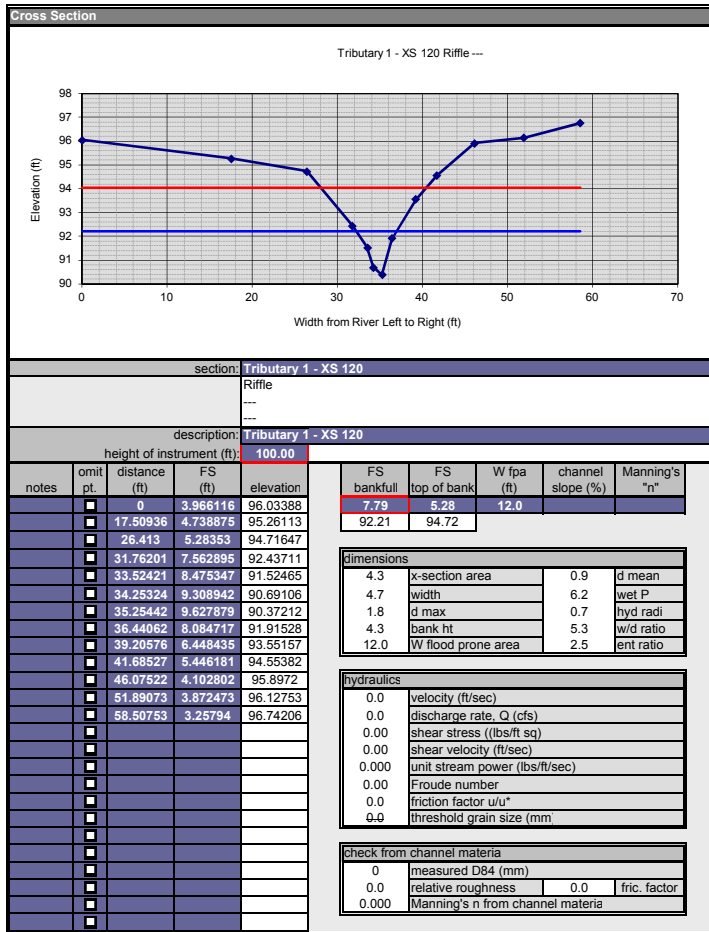
**Aycock Springs
Restoration Site**

**Alamance County
North Carolina**

Title:

**Cross Section
Locations**

Scale: As Shown	FIGURE NO. B-1
Date: October 2014	
Project No.: 14-006	





section: Tributary 1 - XS 115
Rifle

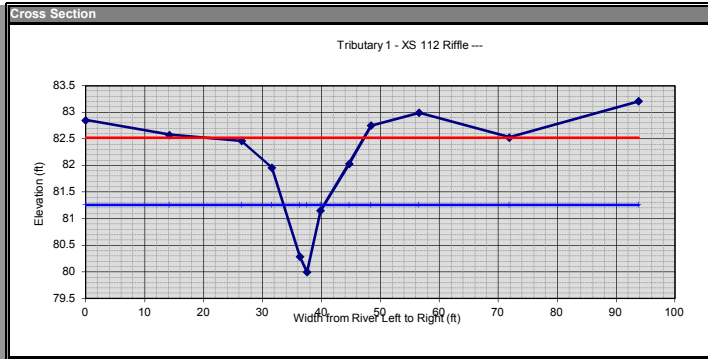
description: Tributary 1 - XS 115
height of instrument (ft): 100.00

notes	omit pt.	distance (ft)	FS (ft)	elevation	FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
		0	11.75486	88.24514	17.56	15.11	27.0		
		6.805661	12.83356	87.16644	82.44	84.89			
		10.44949	17.14314	82.85686					
		12.53799	18.76196	81.23804					
		14.17088	18.79814	81.20186					
		14.67682	18.68416	81.31584					
		15.9239	17.65015	82.34985					
		18.85467	17.19346	82.80654					
		22.84168	16.09078	83.90923					
		25.50756	15.1137	84.8863					
		35.24799	14.61247	85.38753					
		41.23516	14.99201	85.00799					
		52.08941	15.55314	84.44686					
		66.47531	14.78756	85.21244					
		75.75846	14.64446	85.35554					

dimensions			
4.3	x-section area	0.8	d mean
5.5	width	6.3	wet P
1.2	d max	0.7	hyd radi
3.7	bank ht	7.0	w/d ratio
27.0	W flood prone area	4.9	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0.0	threshold grain size (mm)

check from channel materia			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel materia		



section: Tributary 1 - XS 112
Rifle

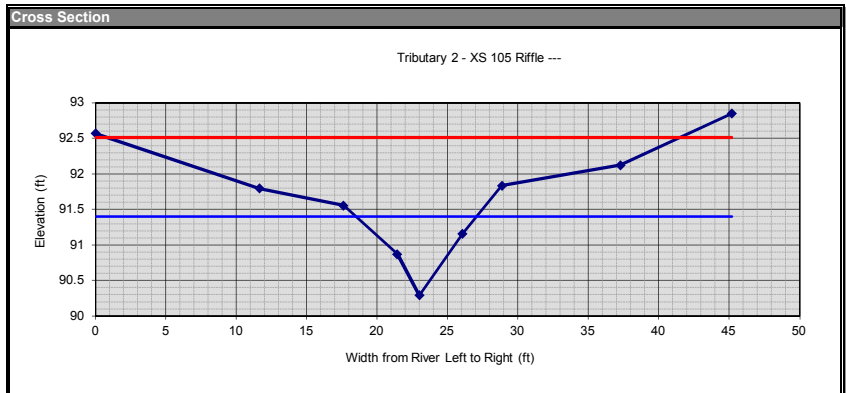
description: Tributary 1 - XS 112
height of instrument (ft): 100.00

notes	omit pt.	distance (ft)	FS (ft)	elevation	FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
		0	17.15078	82.84922	18.74	17.54	20.0		
		14.20333	17.4292	82.5708	81.26	82.46			
		26.52116	17.54025	82.45975					
		31.65333	18.03903	81.96097					
		36.36605	19.71639	80.28361					
		37.62981	20.001	79.999					
		39.83092	18.85325	81.14675					
		44.6943	17.97784	82.02216					
		48.46308	17.25153	82.74847					
		56.60477	17.01422	82.98578					
		71.93629	17.47357	82.52643					
		93.86313	16.79637	83.20363					

dimensions			
4.3	x-section area	0.6	d mean
6.8	width	7.3	wet P
1.3	d max	0.6	hyd radi
2.5	bank ht	10.9	w/d ratio
20.0	W flood prone area	2.9	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0.0	threshold grain size (mm)

check from channel materia			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel materia		



section: Tributary 2 - XS 105
Riffle

description: Tributary 2 - XS 105
height of instrument (ft): 100.00

notes	omit pt.	distance (ft)	FS (ft)	elevation
	<input type="checkbox"/>	0	7.428074	92.57193
	<input type="checkbox"/>	11.65535	8.207391	91.79261
	<input type="checkbox"/>	17.59759	8.443627	91.55637
	<input type="checkbox"/>	21.41474	9.131458	90.86854
	<input type="checkbox"/>	22.97686	9.713355	90.28665
	<input type="checkbox"/>	26.05141	8.840689	91.15931
	<input type="checkbox"/>	28.86153	8.166071	91.83393
	<input type="checkbox"/>	37.25607	7.874606	92.12539
	<input type="checkbox"/>	45.16904	7.147763	92.85224

FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
8.6	8.44	40.0		
91.4	91.56			

dimensions			
4.3	x-section area	0.5	d mean
8.6	width	8.9	wet P
1.1	d max	0.5	hyd radi
1.3	bank ht	17.3	w/d ratio
40.0	W flood prone area	4.7	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0.0	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		



section: Tributary 2 - XS 101
Riffle

description: Tributary 2 - XS 101
height of instrument (ft): 100.00

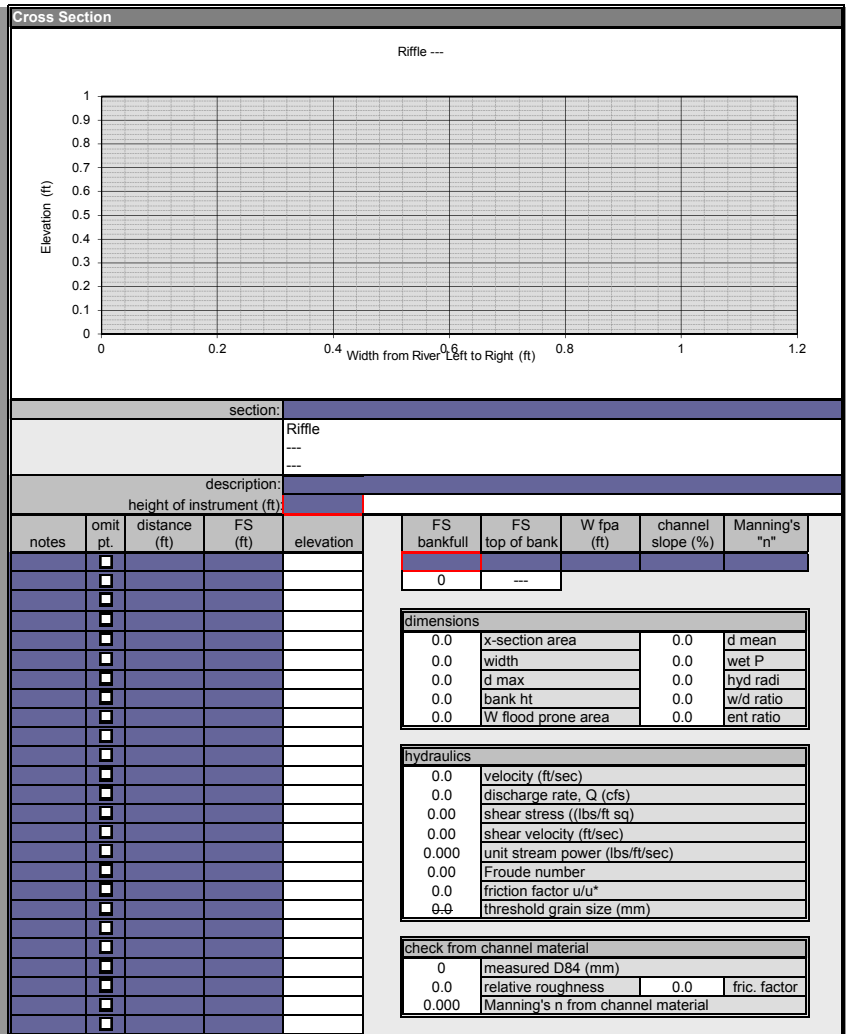
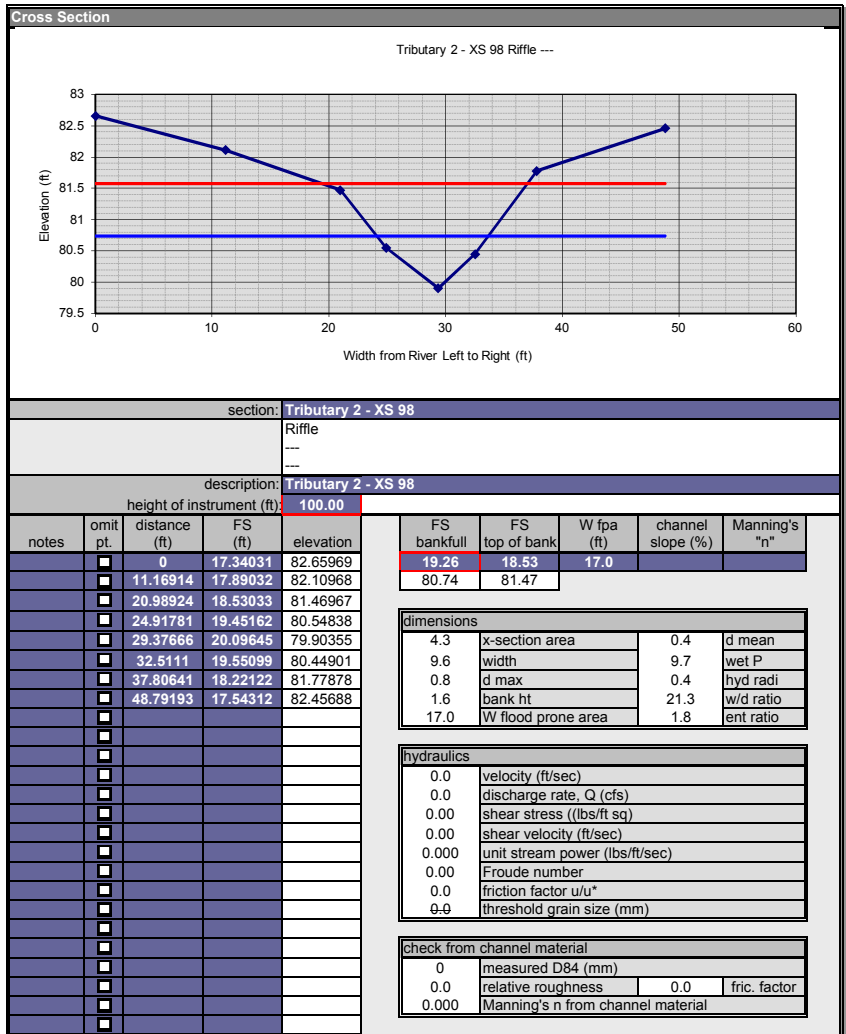
notes	omit pt.	distance (ft)	FS (ft)	elevation
	<input type="checkbox"/>	0	11.93948	88.06053
	<input type="checkbox"/>	15.72837	12.63872	87.36128
	<input type="checkbox"/>	32.27918	13.11127	86.88873
	<input type="checkbox"/>	38.84601	13.01539	86.98461
	<input type="checkbox"/>	43.76651	14.08199	85.91801
	<input type="checkbox"/>	46.47618	14.44955	85.55046
	<input type="checkbox"/>	48.55094	13.634	86.36601
	<input type="checkbox"/>	52.73963	13.0763	86.9237
	<input type="checkbox"/>	54.46965	12.61432	87.38568
	<input type="checkbox"/>	65.10428	11.96467	88.03533
	<input type="checkbox"/>	76.57903	11.70086	88.29914

FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
13.47	13.01	44.0		
86.53	86.99			

dimensions			
4.3	x-section area	0.5	d mean
8.8	width	9.1	wet P
1.0	d max	0.5	hyd radi
1.4	bank ht	18.1	w/d ratio
44.0	W flood prone area	5.0	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0.0	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		





section: Tributary 3 - XS 35
Riffle

description: Tributary 3 - XS 35
height of instrument (ft): 100.00

notes	omit pt.	distance (ft)	FS (ft)	elevation
		0	17.55786	82.44215
		9.415187	17.58808	82.41192
		12.12334	17.77705	82.22295
		13.67401	18.06104	81.93896
		17.02431	19.80992	80.19008
		18.27247	21.06174	78.93829
		19.6838	21.26927	78.73073
		21.98017	20.48107	79.51893
		24.88552	19.8046	80.1954
		33.10985	18.93697	81.06304
		42.45958	18.19894	81.80108

FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
20.45	19.8	10.0		
79.55	80.2			

dimensions			
2.2	x-section area	0.5	d mean
4.5	width	4.9	wet P
0.8	d max	0.4	hyd radi
1.5	bank ht	9.1	w/d ratio
10.0	W flood prone area	2.2	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0.0	threshold grain size (mm)

check from channel materia			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel materia		



section: Tributary 3 - XS 36
Riffle

description: Tributary 3 - XS 36
height of instrument (ft): 100.00

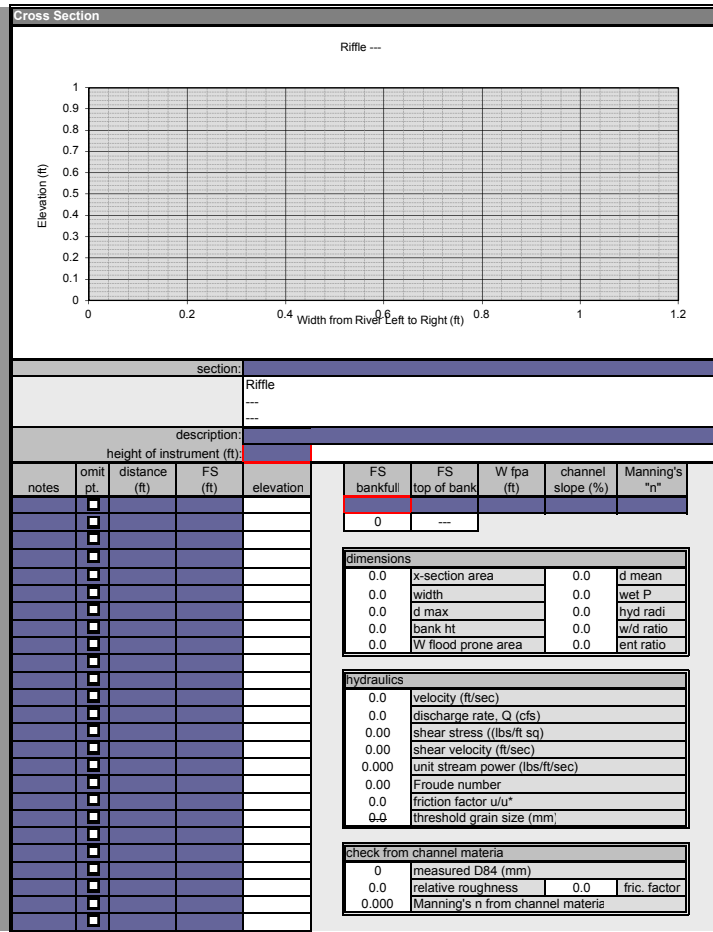
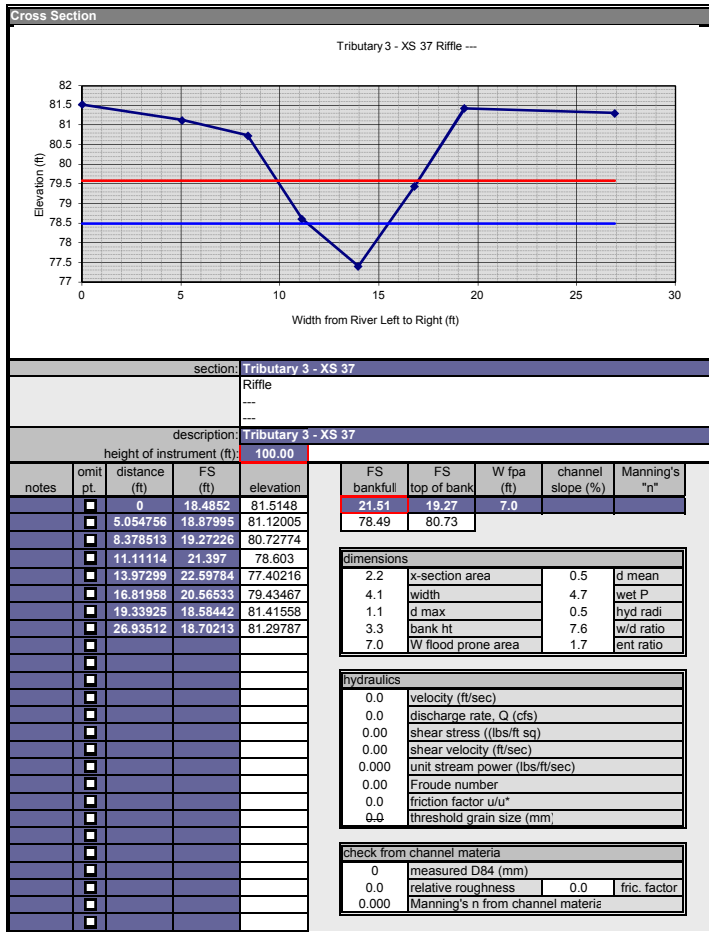
notes	omit pt.	distance (ft)	FS (ft)	elevation
		0	17.79732	82.20268
		8.020899	19.1369	80.8631
		16.86487	20.56734	79.43267
		23.09963	21.10642	78.89359
		25.04906	22.17381	77.82619
		26.50473	21.32191	78.67809
		30.53755	20.71817	79.28183
		36.28806	19.99403	80.00597
		45.0675	19.61149	80.38851

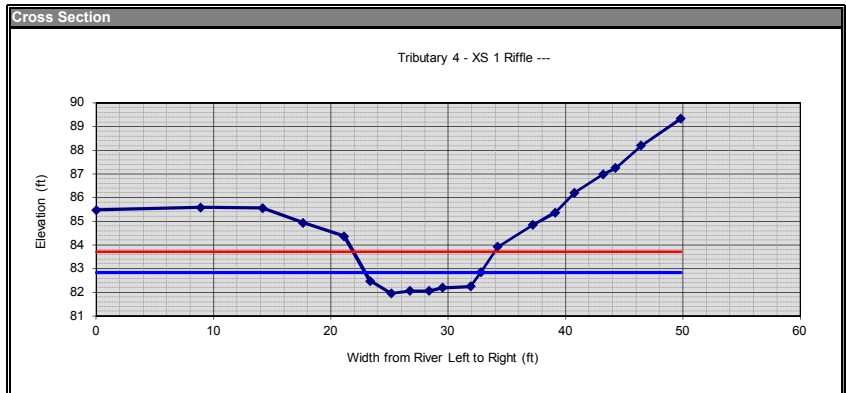
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
21.1	21.1	18.0		
78.9	78.9			

dimensions			
2.2	x-section area	0.4	d mean
5.0	width	5.5	wet P
1.1	d max	0.4	hyd radi
1.1	bank ht	11.4	w/d ratio
18.0	W flood prone area	3.6	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0.0	threshold grain size (mm)

check from channel materia			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel materia		





section: Tributary 4 - XS 1
Riffle

description: Tributary 4 - XS 1
height of instrument (ft): 100.00

notes	omit pt.	distance (ft)	FS (ft)	elevation	FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
		0	14.52495	85.47505	17.17	16.08	12.0		
		8.907697	14.40894	85.59106	82.83	83.92			
		14.1689	14.43886	85.56114					
		17.6434	15.06159	84.93842					
		21.11384	15.63167	84.36833					
		23.31755	17.527	82.473					
		25.14626	18.0478	81.9522					
		26.71832	17.9522	82.0478					
		28.35396	17.94157	82.05843					
		29.49803	17.80724	82.19276					
		31.89178	17.75591	82.24409					
		32.77751	17.16199	82.83801					
		34.20417	16.0781	83.92191					
		37.17474	15.1633	84.8367					
		39.13152	14.62665	85.37335					
		40.75871	13.79502	86.20498					
		43.21968	13.01537	86.98463					
		44.25449	12.75321	87.24679					
		46.42432	11.80429	88.19571					
		49.81493	10.65722	89.34278					

dimensions			
6.3	x-section area	0.6	d mean
9.9	width	10.3	wet P
0.9	d max	0.6	hyd radi
2.0	bank ht	15.4	w/d ratio
12.0	W flood prone area	1.2	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0-0	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		



section: Tributary 4 - XS 9
Riffle

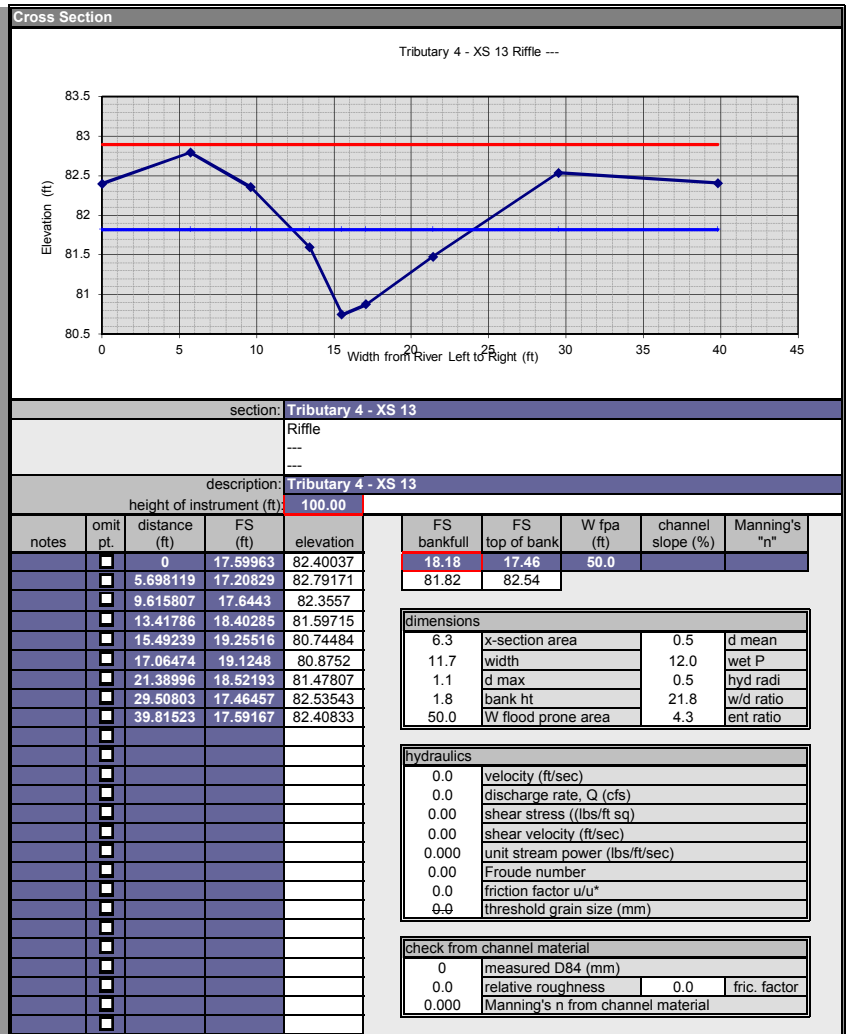
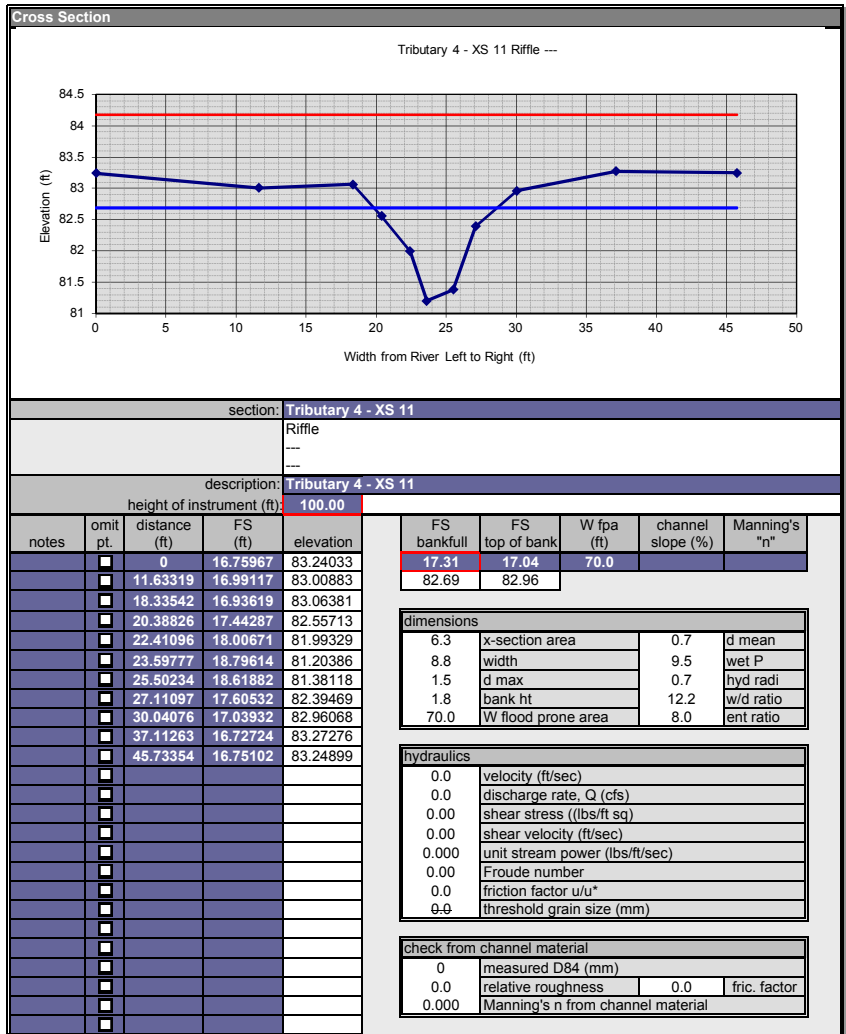
description: Tributary 4 - XS 9
height of instrument (ft): 100.00

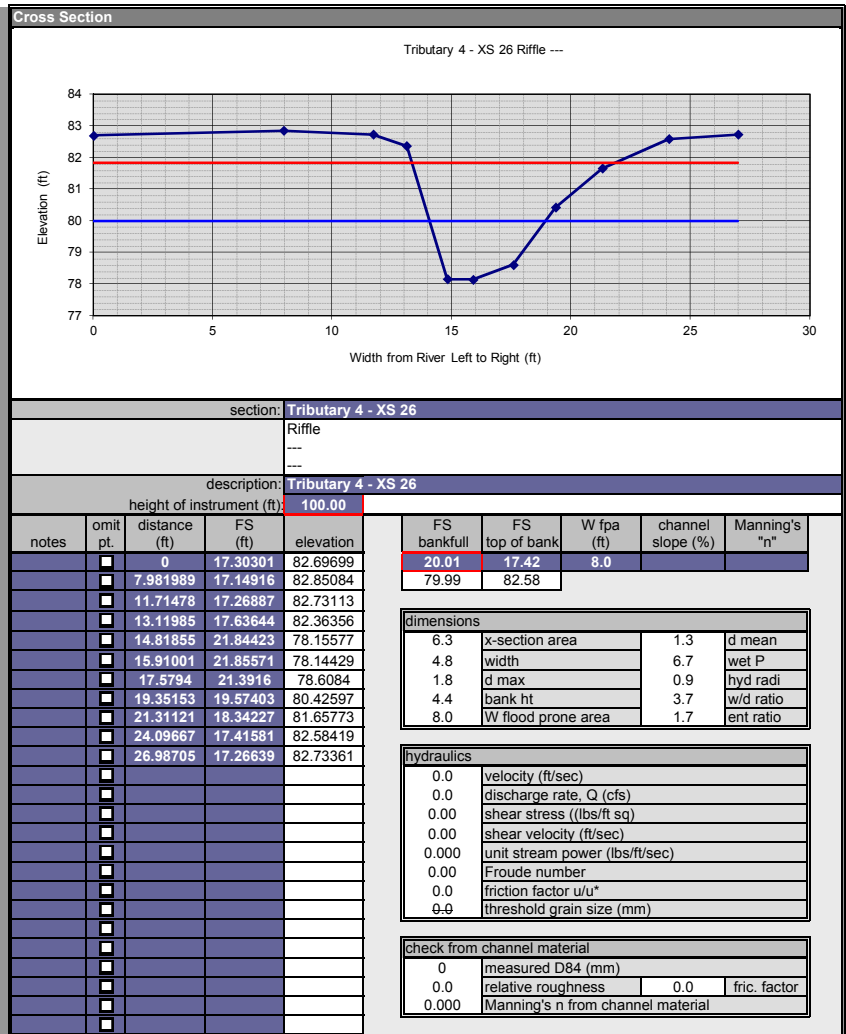
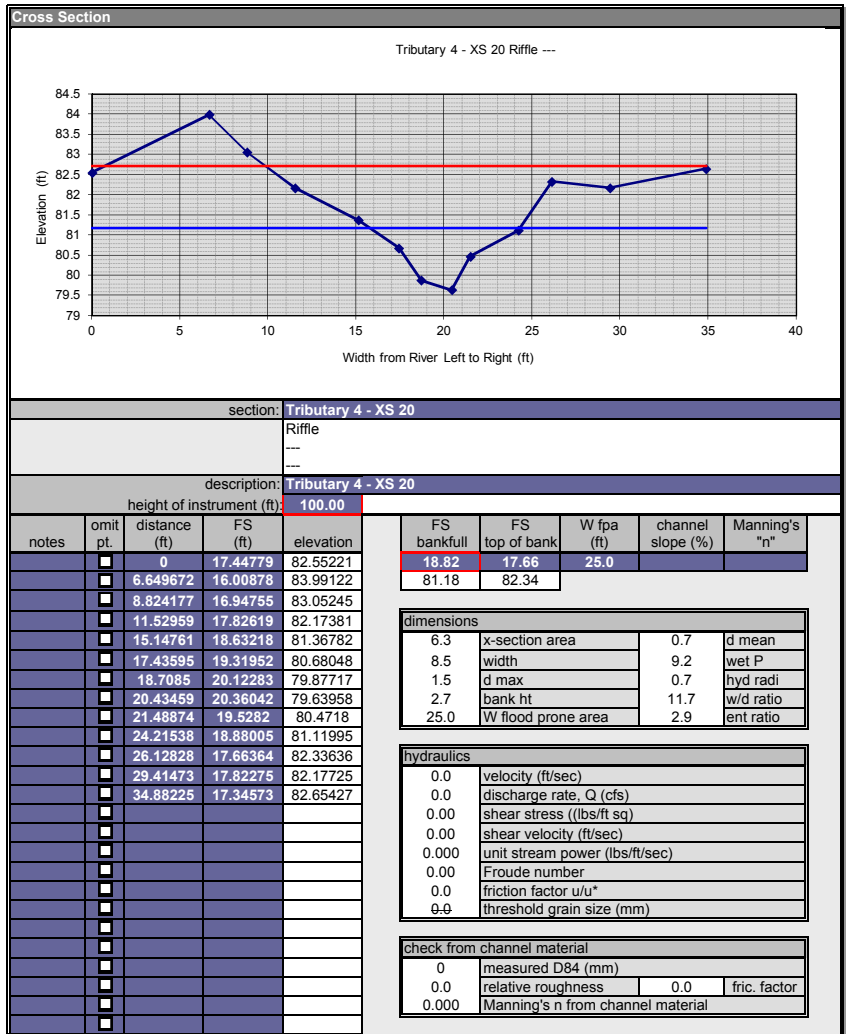
notes	omit pt.	distance (ft)	FS (ft)	elevation	FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
		0	16.1269	83.8731	17.25	16.81	70.0		
		7.997065	16.13518	83.86482	82.75	83.19			
		15.96541	15.83619	84.16382					
		19.04321	15.69819	84.30182					
		22.81313	17.26211	82.73789					
		25.7905	19.22028	80.77972					
		26.76899	18.79489	81.20511					
		29.45895	16.81278	83.18722					
		34.39588	16.81266	83.18734					
		40.59682	16.8268	83.1732					
		46.98389	16.80681	83.19319					

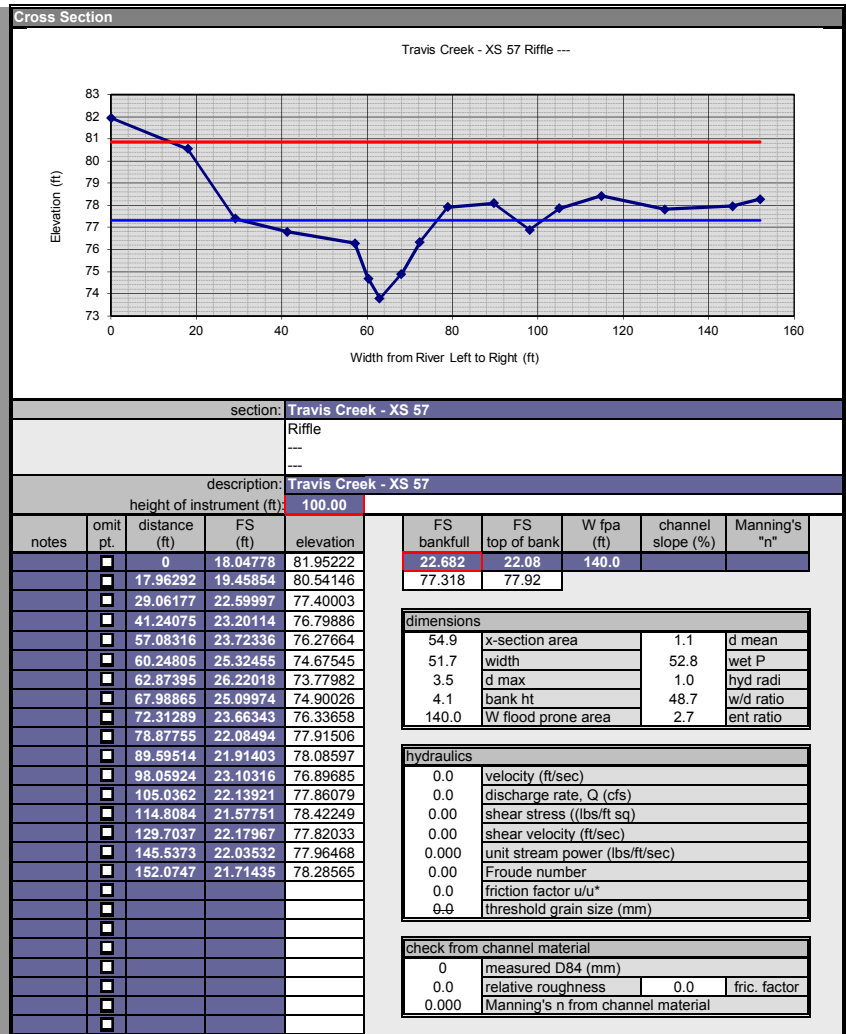
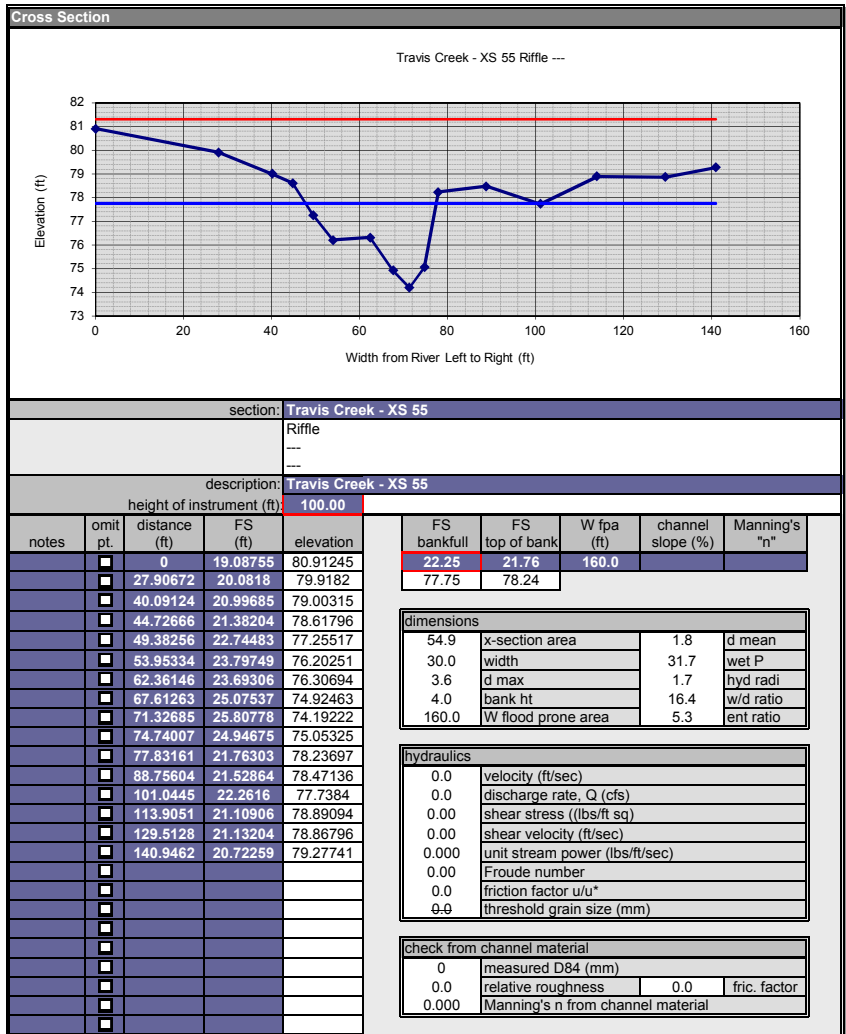
dimensions			
6.3	x-section area	1.0	d mean
6.1	width	7.3	wet P
2.0	d max	0.9	hyd radi
2.4	bank ht	5.9	w/d ratio
70.0	W flood prone area	11.5	ent ratio

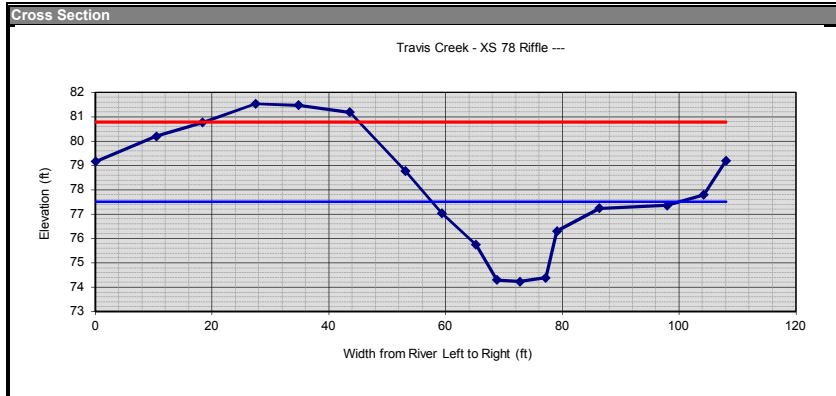
hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0-0	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		









section: Travis Creek - XS 78

Riffle

description: Travis Creek - XS 78

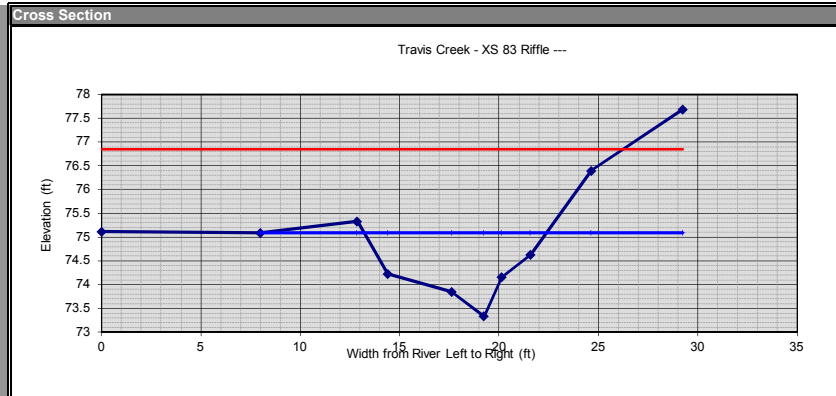
height of instrument (ft): 100.00

notes	omit pt.	distance (ft)	FS (ft)	elevation	FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
	<input type="checkbox"/>	0	20.84392	79.15609	22.49	22.49	68.0		
	<input type="checkbox"/>	10.44907	19.79385	80.20615	77.51	77.51			
	<input type="checkbox"/>	18.35793	19.22998	80.77003					
	<input type="checkbox"/>	27.46399	18.46482	81.53519					
	<input type="checkbox"/>	34.82906	18.52792	81.47208					
	<input type="checkbox"/>	43.61984	18.80885	81.19115					
	<input type="checkbox"/>	53.08457	21.22282	78.77719					
	<input type="checkbox"/>	59.31459	22.957	77.043					
	<input type="checkbox"/>	65.16892	24.24289	75.75712					
	<input type="checkbox"/>	68.75002	25.70858	74.29142					
	<input type="checkbox"/>	72.71671	25.76798	74.23202					
	<input type="checkbox"/>	77.15866	25.61501	74.38499					
	<input type="checkbox"/>	79.06255	23.68871	76.31129					
	<input type="checkbox"/>	86.32437	22.75673	77.24327					
	<input type="checkbox"/>	97.96328	22.63785	77.36215					
	<input type="checkbox"/>	104.1989	22.20506	77.79494					
	<input type="checkbox"/>	108	20.8	79.2					

dimensions			
54.9	x-section area	1.3	d mean
42.5	width	43.8	wet P
3.3	d max	1.3	hyd radi
3.3	bank ht	32.8	w/d ratio
68.0	W flood prone area	1.6	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0-0	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		



section: Travis Creek - XS 83

Riffle

description: Travis Creek - XS 83

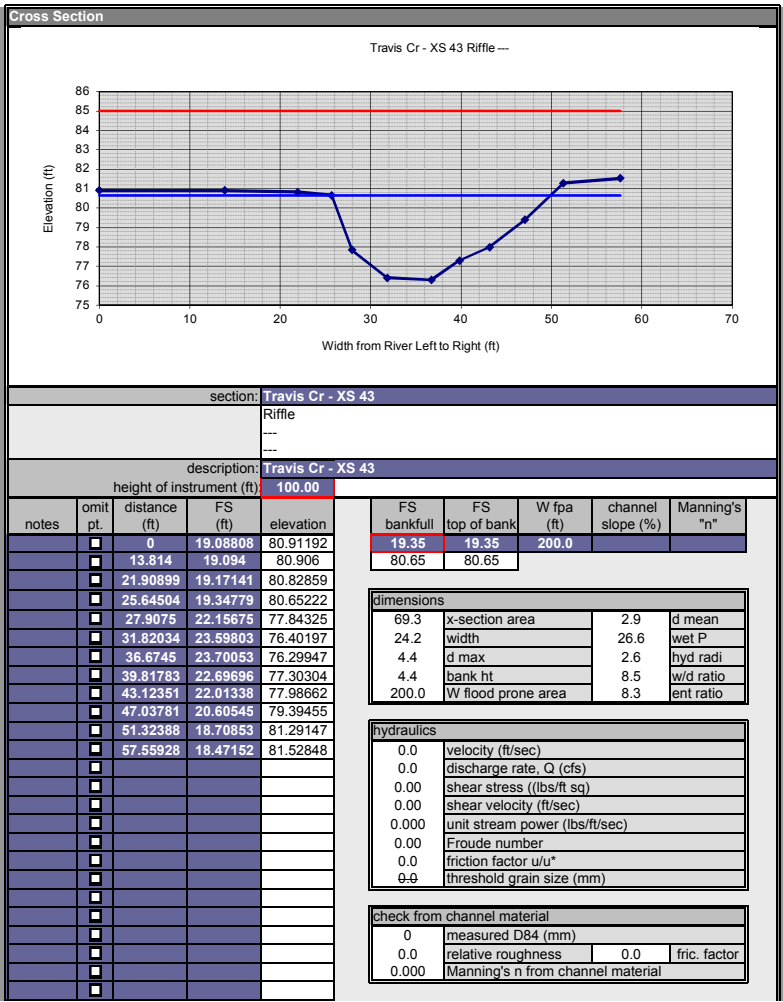
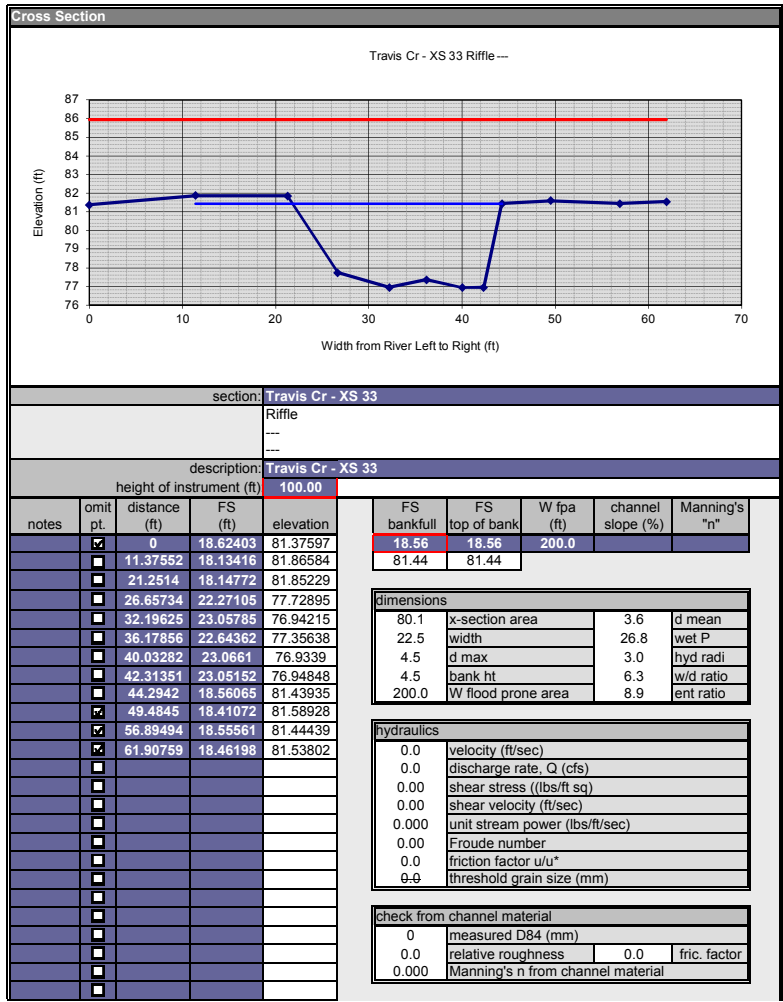
height of instrument (ft): 100.00

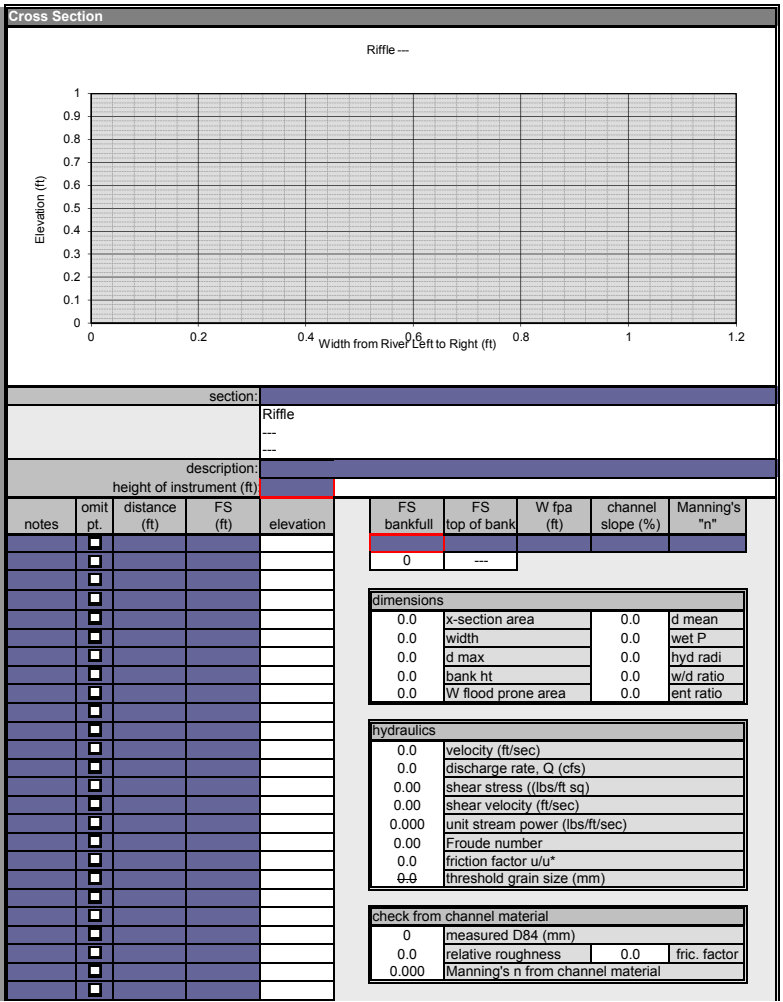
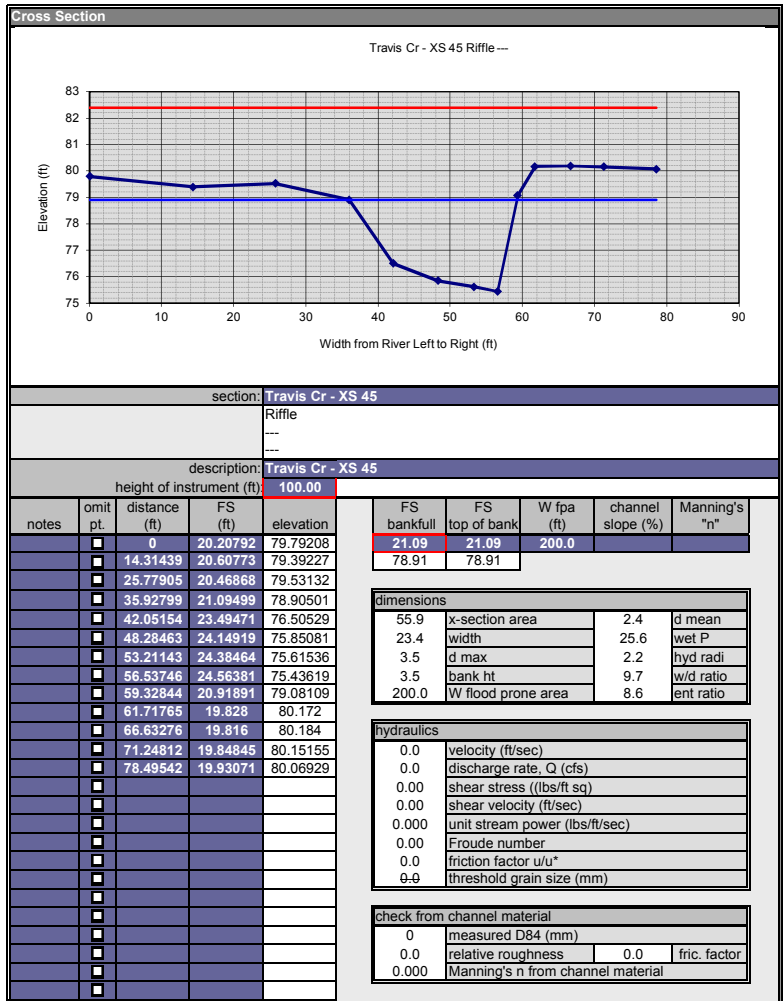
notes	omit pt.	distance (ft)	FS (ft)	elevation	FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
	<input checked="" type="checkbox"/>	0	24.88702	75.11298	24.91	24.91	40.0		
	<input type="checkbox"/>	7.975341	24.91038	75.08962	75.09	75.09			
	<input type="checkbox"/>	12.85972	24.66779	75.33222					
	<input type="checkbox"/>	14.37637	25.77771	74.22229					
	<input type="checkbox"/>	17.60457	26.15249	73.84751					
	<input type="checkbox"/>	19.22895	26.66931	73.33069					
	<input type="checkbox"/>	20.12555	25.84743	74.15258					
	<input type="checkbox"/>	21.56904	25.3774	74.6226					
	<input type="checkbox"/>	24.61759	23.6104	76.3896					
	<input type="checkbox"/>	29.22597	22.3226	77.6774					

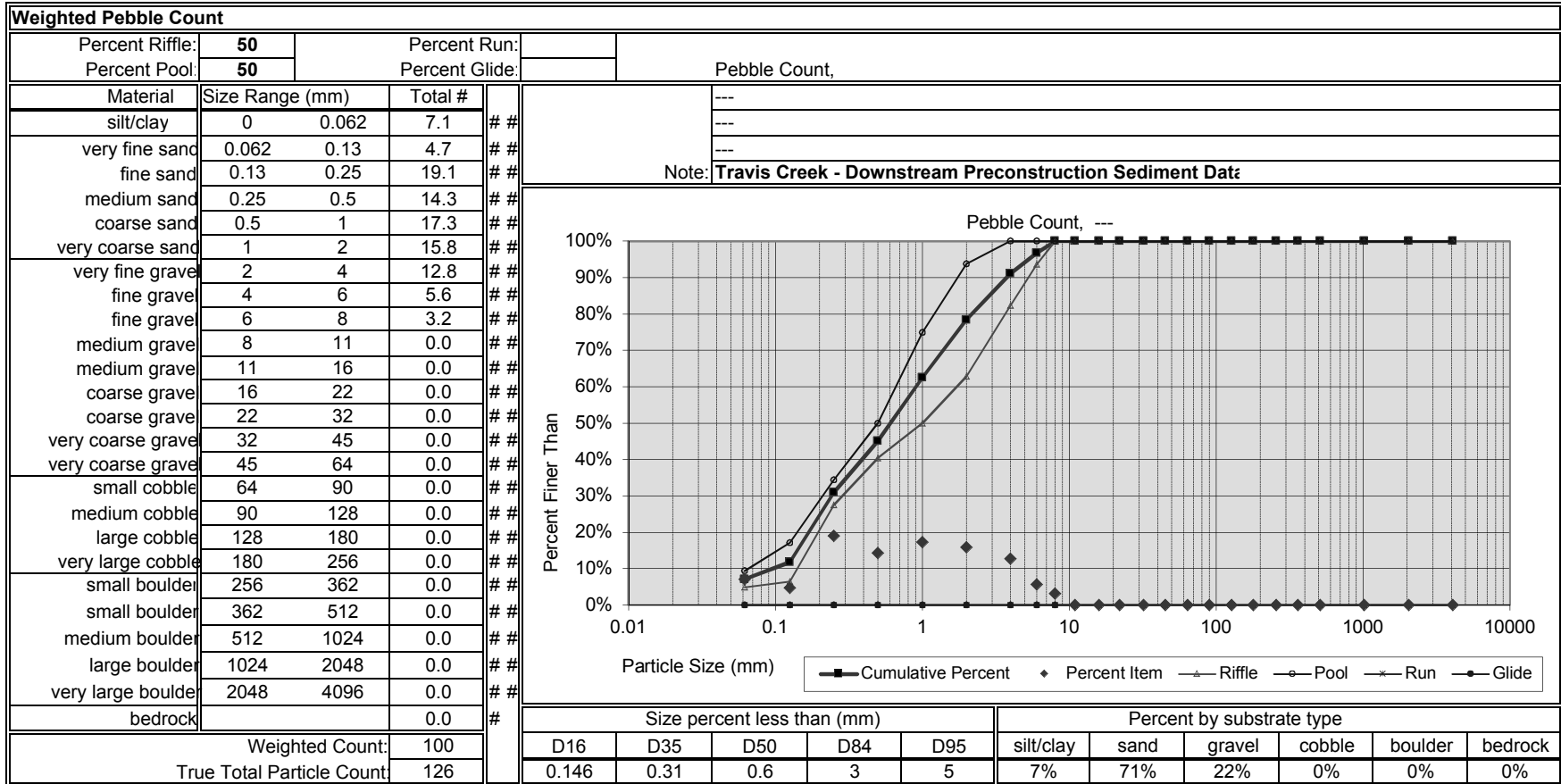
dimensions			
8.8	x-section area	1.0	d mean
9.2	width	10.1	wet P
1.8	d max	0.9	hyd radi
1.8	bank ht	9.6	w/d ratio
40.0	W flood prone area	4.4	ent ratio

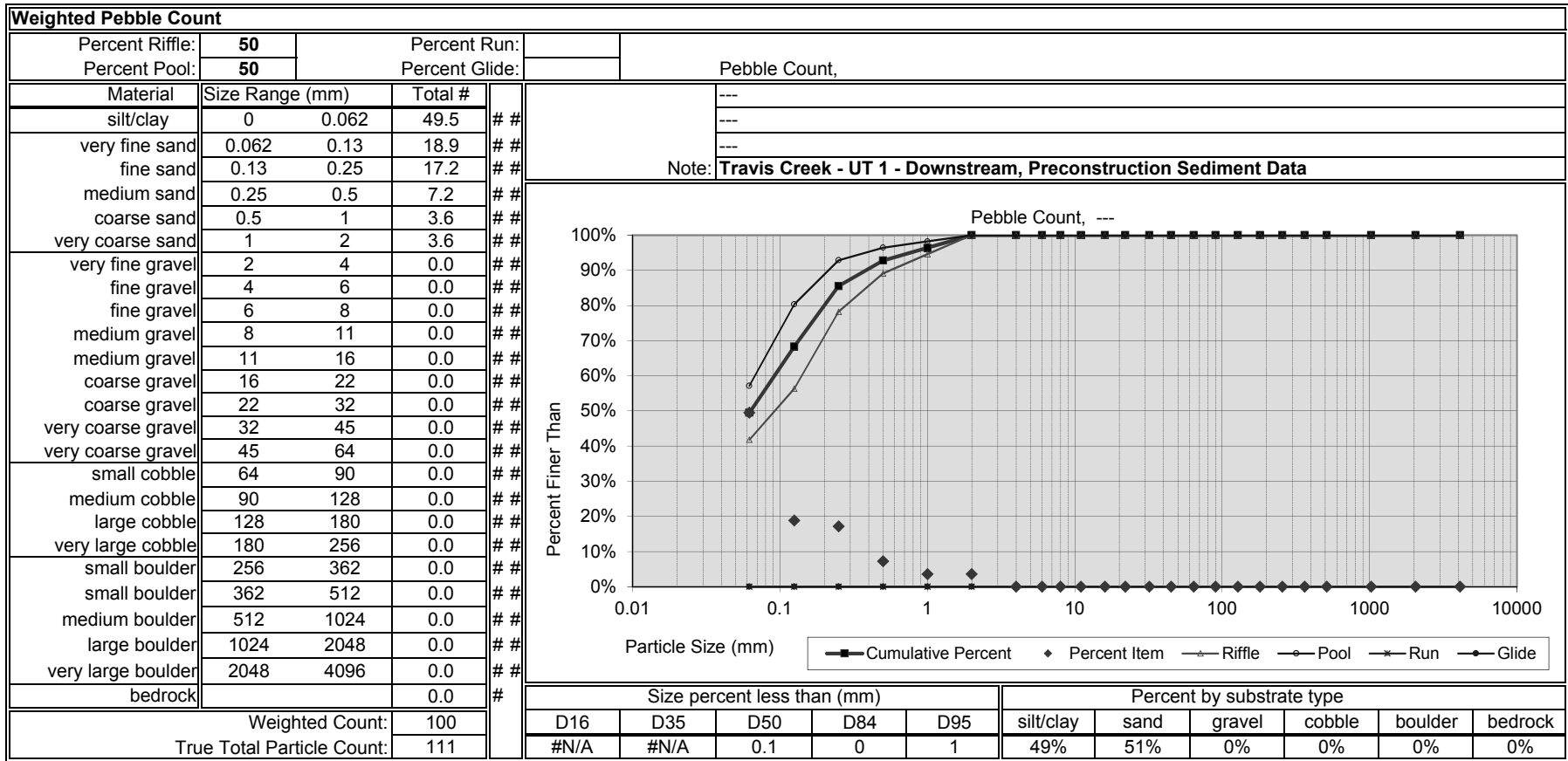
hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
0-0	threshold grain size (mm)

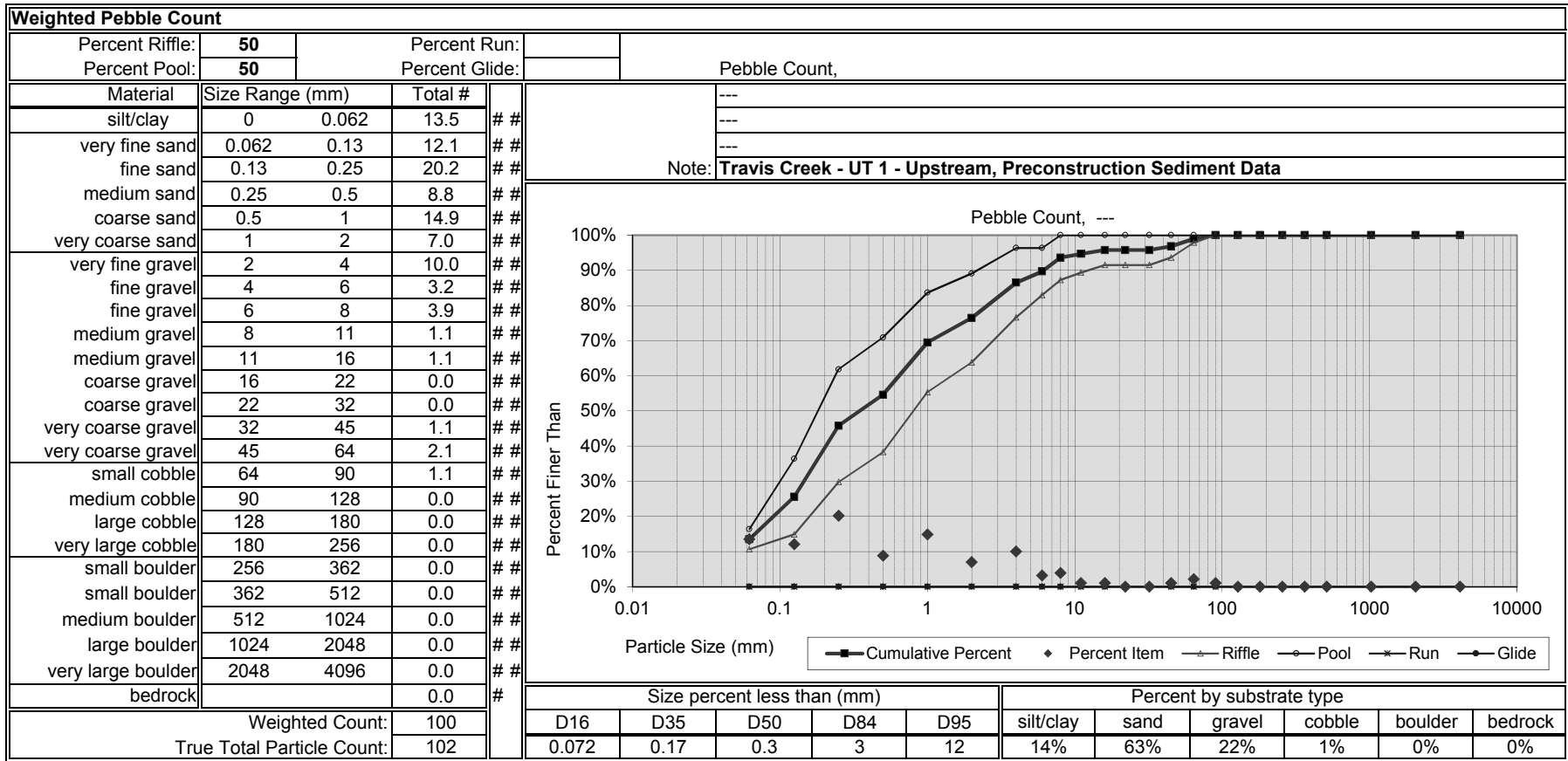
check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

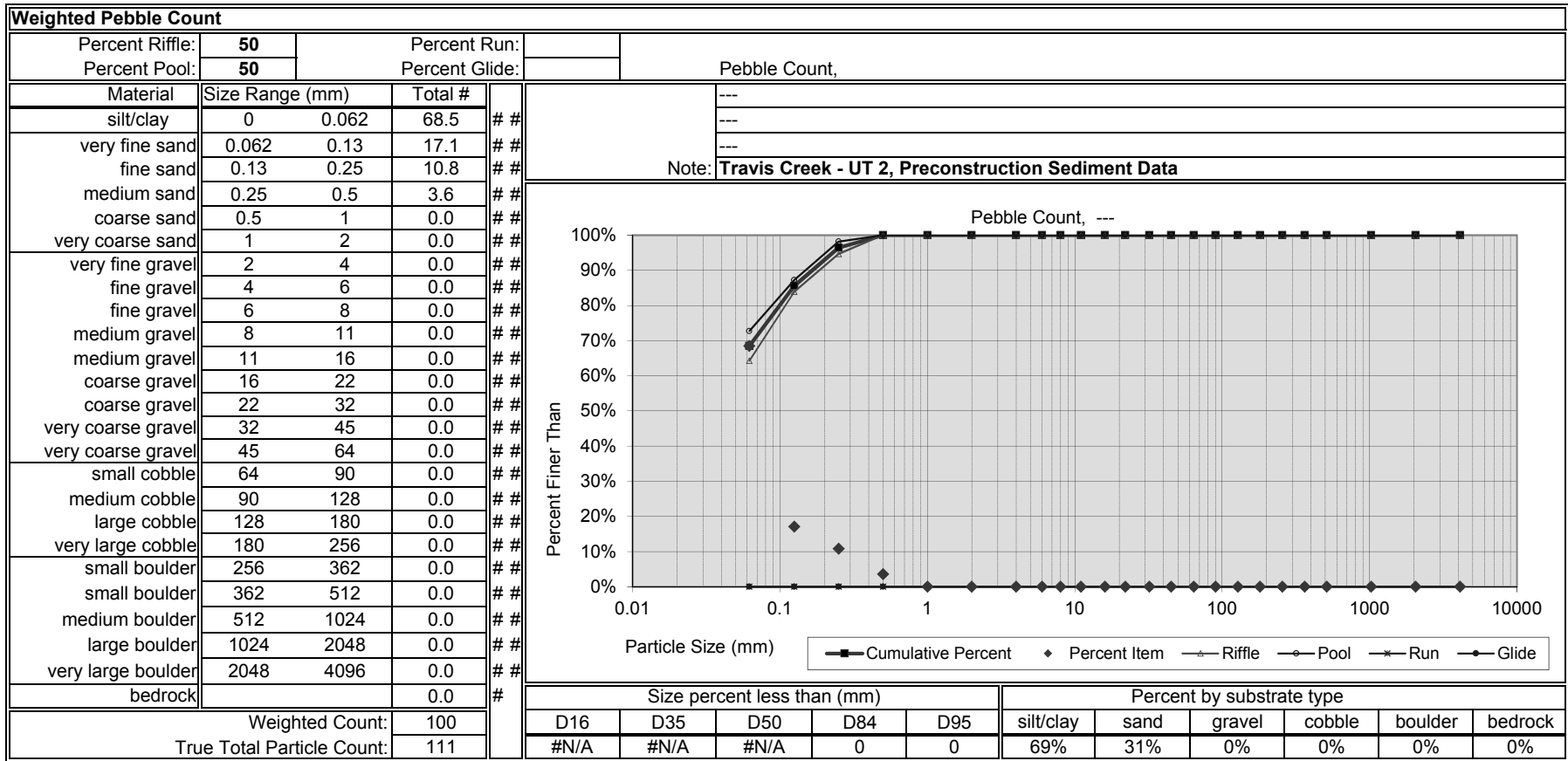


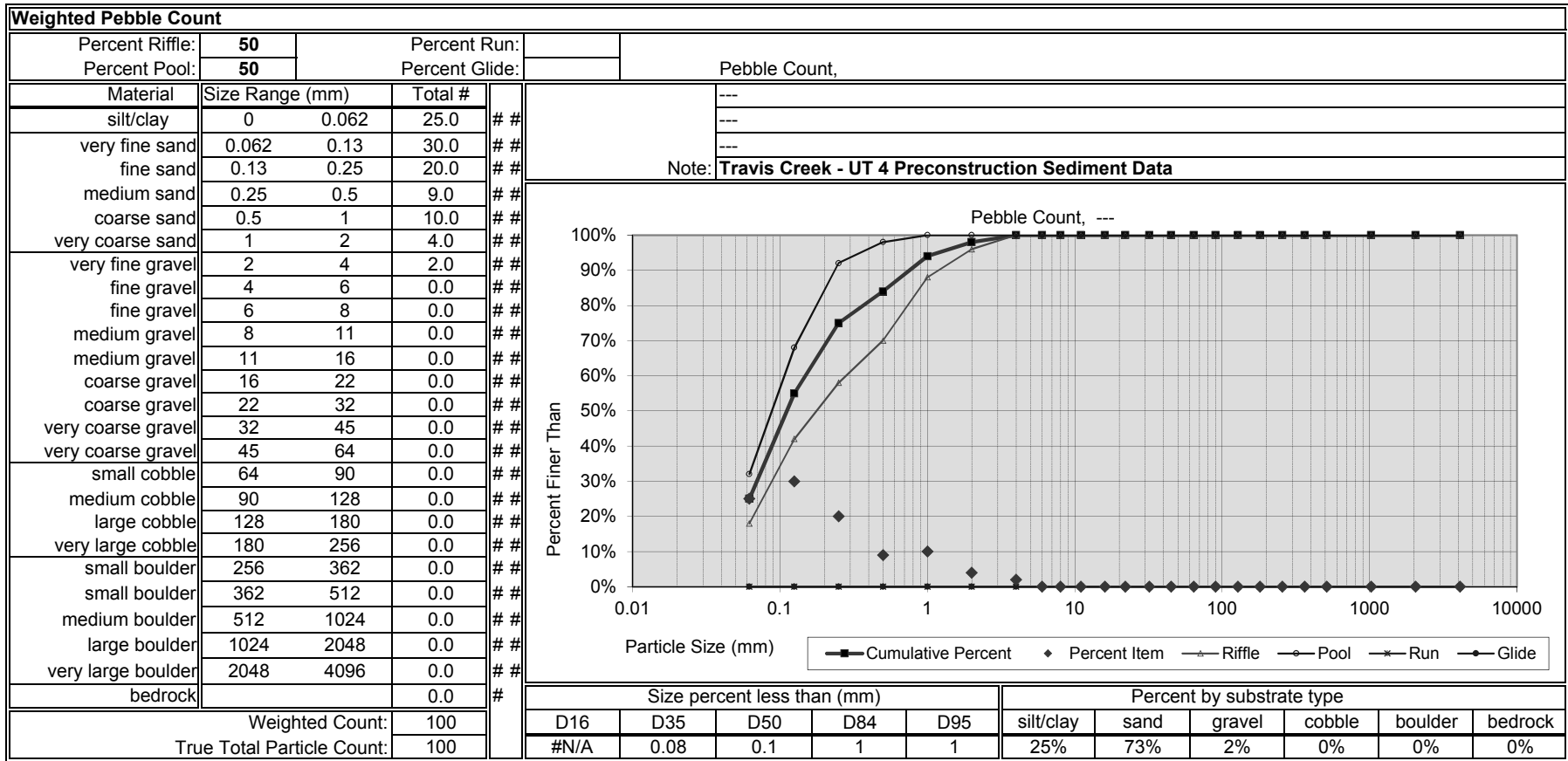






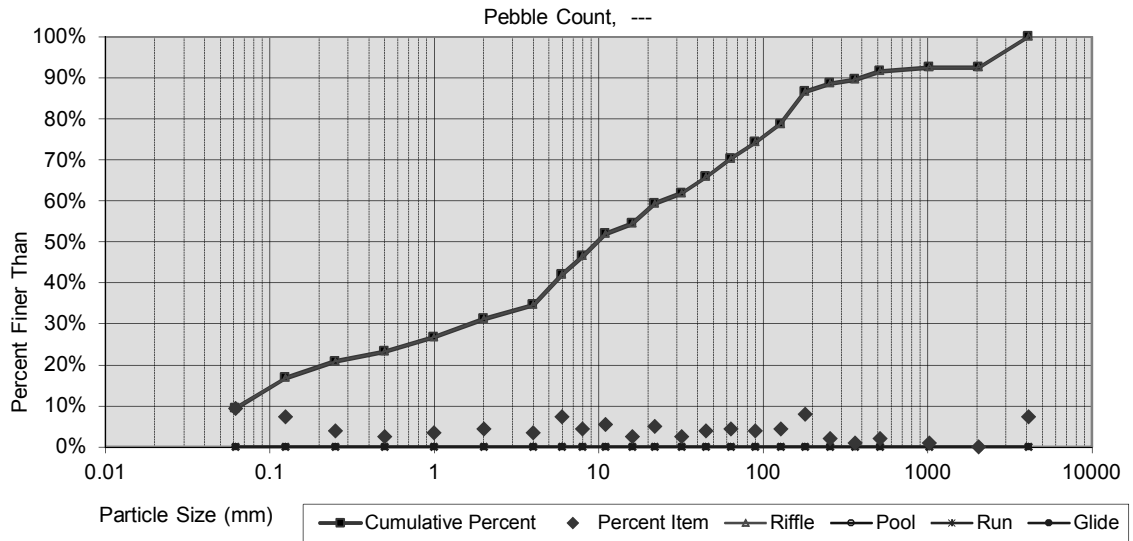






Material	Size Range (mm)		Total #	
silt/clay	0	0.062	9.4	# #
very fine sand	0.062	0.13	7.4	# #
fine sand	0.13	0.25	4.0	# #
medium sand	0.25	0.5	2.5	# #
coarse sand	0.5	1	3.5	# #
very coarse sand	1	2	4.5	# #
very fine gravel	2	4	3.5	# #
fine gravel	4	6	7.4	# #
fine gravel	6	8	4.5	# #
medium gravel	8	11	5.4	# #
medium gravel	11	16	2.5	# #
coarse gravel	16	22	5.0	# #
coarse gravel	22	32	2.5	# #
very coarse gravel	32	45	4.0	# #
very coarse gravel	45	64	4.5	# #
small cobble	64	90	4.0	# #
medium cobble	90	128	4.5	# #
large cobble	128	180	7.9	# #
very large cobble	180	256	2.0	# #
small boulder	256	362	1.0	# #
small boulder	362	512	2.0	# #
medium boulder	512	1024	1.0	# #
large boulder	1024	2048	0.0	# #
very large boulder	2048	4096	7.4	# #
bedrock			0.0	#
Weighted Count:			100	
True Total Particle Count:			202	

Note: Cedarrock Reference Pebble Count



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
0.116	4.08	9.8	161	2568	9%	22%	39%	18%	11%	0%

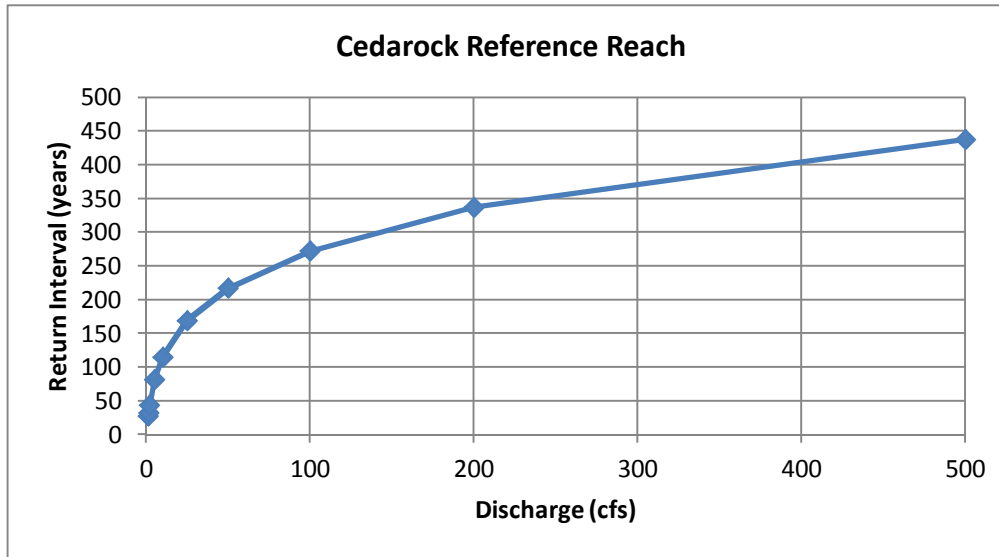
Weighted Pebble Count											
Percent Riffle:		50		Percent Run:				Pebble Count,			
Percent Pool:		50		Percent Glide:							
Material	Size Range (mm)		Total #	#	#	---					
silt/clay	0	0.062	4.9	#	#	---					
very fine sand	0.062	0.13	5.8	#	#	---					
fine sand	0.13	0.25	9.7	#	#	Note: Cripple Creek Reference Reach					
medium sand	0.25	0.5	4.9	#	#	Pebble Count, ---					
coarse sand	0.5	1	9.7	#	#						
very coarse sand	1	2	5.8	#	#						
very fine gravel	2	4	6.8	#	#						
fine gravel	4	6	4.8	#	#						
fine gravel	6	8	8.7	#	#						
medium gravel	8	11	7.8	#	#						
medium gravel	11	16	1.9	#	#						
coarse gravel	16	22	4.9	#	#						
coarse gravel	22	32	5.8	#	#						
very coarse gravel	32	45	7.7	#	#						
very coarse gravel	45	64	6.8	#	#						
small cobble	64	90	0.0	#	#						
medium cobble	90	128	1.9	#	#						
large cobble	128	180	1.9	#	#						
very large cobble	180	256	0.0	#	#						
small boulder	256	362	0.0	#	#						
small boulder	362	512	0.0	#	#						
medium boulder	512	1024	0.0	#	#						
large boulder	1024	2048	0.0	#	#						
very large boulder	2048	4096	0.0	#	#						
bedrock			0.0	#	#						
Weighted Count:			100								
True Total Particle Count:			103								
Size percent less than (mm)					Percent by substrate type						
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock	
0.182	1.00	4.8	35	60	5%	36%	55%	4%	0%	0%	

Appendix C
Flood Frequency Analysis Data

Reference Reaches
Flood Frequency Analysis-Regional Regression Equation (USGS 2004)

Cedarrock Reference Reach

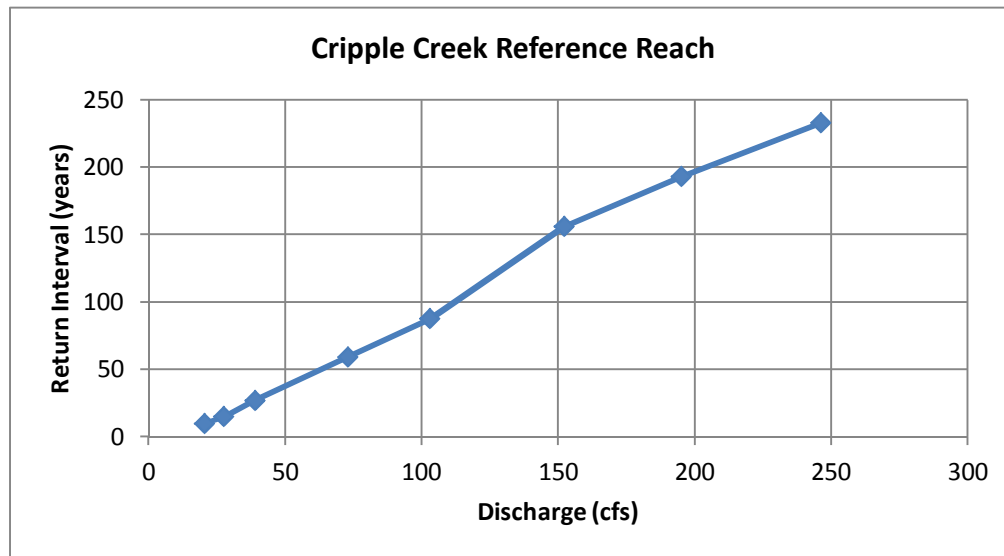
Return Interval (years)	Discharge (cfs)
1.3	27
1.5	32
2	43.6
5	81.4
10	115
25	169
50	217
100	272
200	337
500	438



Note: Bold values are interpolated.

Cripple Creek Reference Reach

Return Interval (years)	Discharge (cfs)
20.5	10
27.5	15
38.9	27.1
72.9	59.3
103	87.6
152	156
195	193
246	233
305	
397	



Appendix D
Jurisdictional Determination Info

**U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT**

Action Id. SAW-2014-01711 County: Alamance U.S.G.S. Quad: NC-Ossipee/Gibsonville

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: Restoration Systems, LLC
attn: Worth Creech
Address: 1101 Haynes Street, Suite 211
Raleigh, NC. 27604

Size (acres)	<u>15</u>	Nearest Town	<u>Elon</u>
Nearest Waterway	<u>Travis Creek</u>	River Basin	<u>Haw. North Carolina.</u>
USGS HUC	<u>3030002</u>	Coordinates	<u>36.127740 N, -79.523669 W</u>

Location description: The site, called Aycock Springs, is located along an approximately 4760 foot of sections of Travis Creek and UTs to Travis Creek, in the southeast quadrant of the intersection of Gibsonville Ossipee Road and Amick Road, in Elon, Alamance County, North Carolina.

Indicate Which of the Following Apply:

A. Preliminary Determination

Based on preliminary information, there may be waters of the U.S. including wetlands on the above described project area. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

B. Approved Determination

- There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- There are waters of the U.S. including wetlands on the above described property subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
 - We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.
 - The waters of the U.S. including wetlands on your project area have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.
 - The waters of the U.S. including wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

- The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **David Bailey** at **919-554-4884 ext 30** or **David.E.Bailey2@usace.army.mil**.

C. Basis For Determination:

The project area exhibits water bodies with ordinary high water and wetland criteria as defined in the applicable regional supplement to the 1987 wetland delineation manual. The water bodies on the site are listed in the attached table. This determination is based on a field verification by David E. Bailey (USACE) on 5/29/2014.

D. Remarks:

The wetlands and other Waters of the US on the property were flagged by Axiom Environmental with changes made in the field by David E. Bailey (USACE) and are approximated on the attached sheet titled "Jurisdictional Areas", dated April 2014.

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **N/A**.

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: 

Date: **September 16, 2014**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at <http://regulatory.usacesurvey.com/>.

Copy furnished:

Scott Davis, Axiom Environmental, Inc., 218 Snow Avenue, Raleigh, NC 27603
Sue Homewood, NCDENR-DWR, 585 Waughtown Street, Winston-Salem, NC 27107

**NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND
REQUEST FOR APPEAL**

Applicant: **Restoration Systems, LLC** File Number: **SAW-2014-01711** Date: **September 16, 2014**

Attached is:	See Section below
<input type="checkbox"/> INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
<input type="checkbox"/> PROFFERED PERMIT (Standard Permit or Letter of permission)	B
<input type="checkbox"/> PERMIT DENIAL	C
<input type="checkbox"/> APPROVED JURISDICTIONAL DETERMINATION	D
<input checked="" type="checkbox"/> PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx> or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

**District Engineer, Wilmington Regulatory Division
attn: David E. Bailey**

**Raleigh Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587**

If you only have questions regarding the appeal process you may also contact:

**Mr. Jason Steele, Administrative Appeal Review Officer
CESAD-PDO**

**U.S. Army Corps of Engineers, South Atlantic Division
60 Forsyth Street, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137**

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Date:

Telephone number:

Signature of appellant or agent.

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: David Bailey, 69 Darlington Avenue, Wilmington, North Carolina 28403

For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:

**Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137**



Prepared for:



Project:

Aycock Springs Stream and Wetland Mitigation Site

Alamance County, NC

Title:

Project Location

Notes:

- Background Imagery sources (provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) created by the U.S. Park Service (upper inset).
 2. Delorme World Basemap digital mapping (2010, lower inset).
 3. Burlington, NC (1980), Lake Burlington, NC (1969), Gibsonville, NC (1970), and Ossipee, NC (1970) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey.

Drawn by: SGD

Date: Apr 2014

Scale: As Shown

Project No.: 14-006

FIGURE

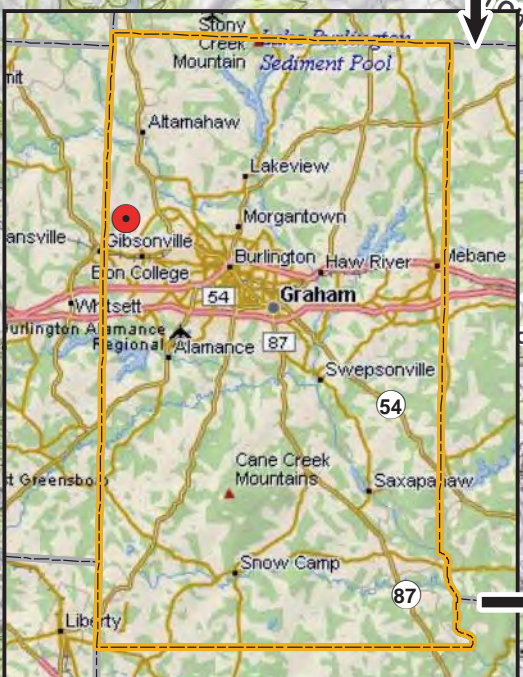
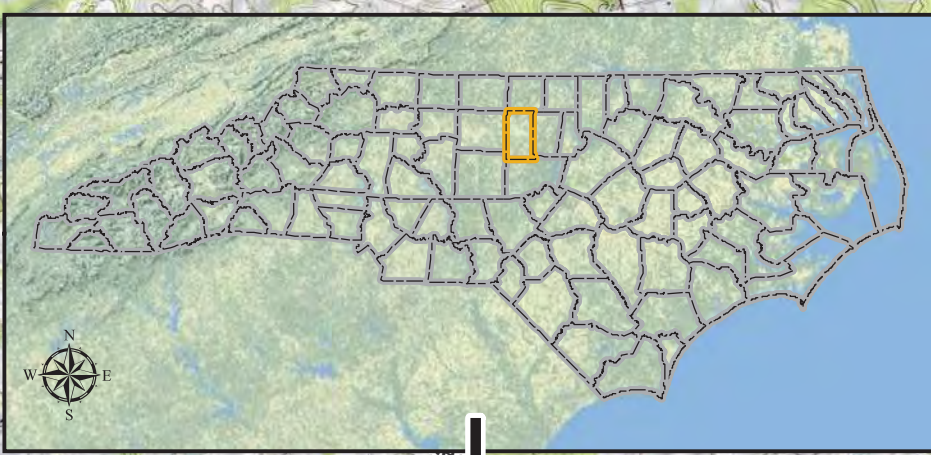
1

Directions to the Site from Interstates 40/85 in Burlington/Elon, NC:

- Exit onto University Drive (I-40/85 Exit 140) and travel north (toward Elon)
- Travel north for 2.8 miles and merge with NC 100
- Continue on University Drive (NC 100) for 0.5 mile and turn left onto Manning Street (SR 1503)
- Travel northwest for 0.8 mile and turn right onto Gibsonville-Ossipee Road (SR 1500)
- Travel north for 0.7 mile and Site is on the right

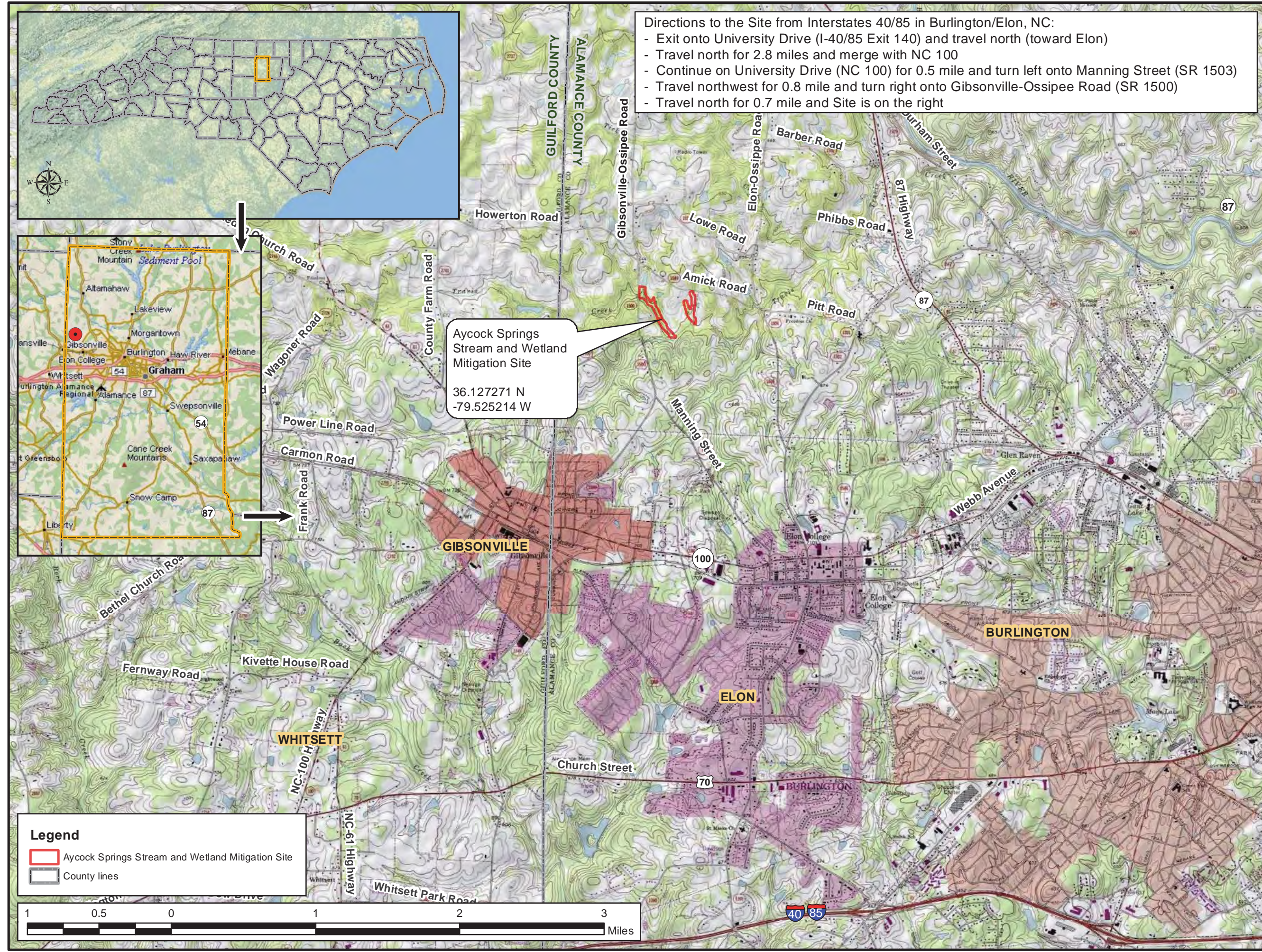
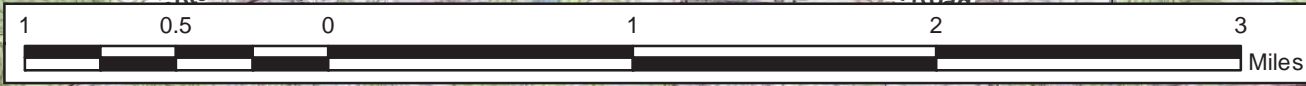
Aycock Springs Stream and Wetland Mitigation Site

36.127271 N
-79.525214 W



Legend

- Aycock Springs Stream and Wetland Mitigation Site
- County lines





Prepared for:



Project:

Aycock Springs Stream and Wetland Mitigation Site

Alamance County, NC

Title:

Project Area Mapping

Notes:

Background Imagery source:
1. Ossippee, NC (1970), and Gibsonville, NC (1970) 7.5-minute topographic quadrangles provided by the US Geological Survey (left window).
2. Soil Survey of Alamance County (page 9), provided by the Natural Resources Conservation Service, US Department of Agriculture (right window).

Drawn by: SGD

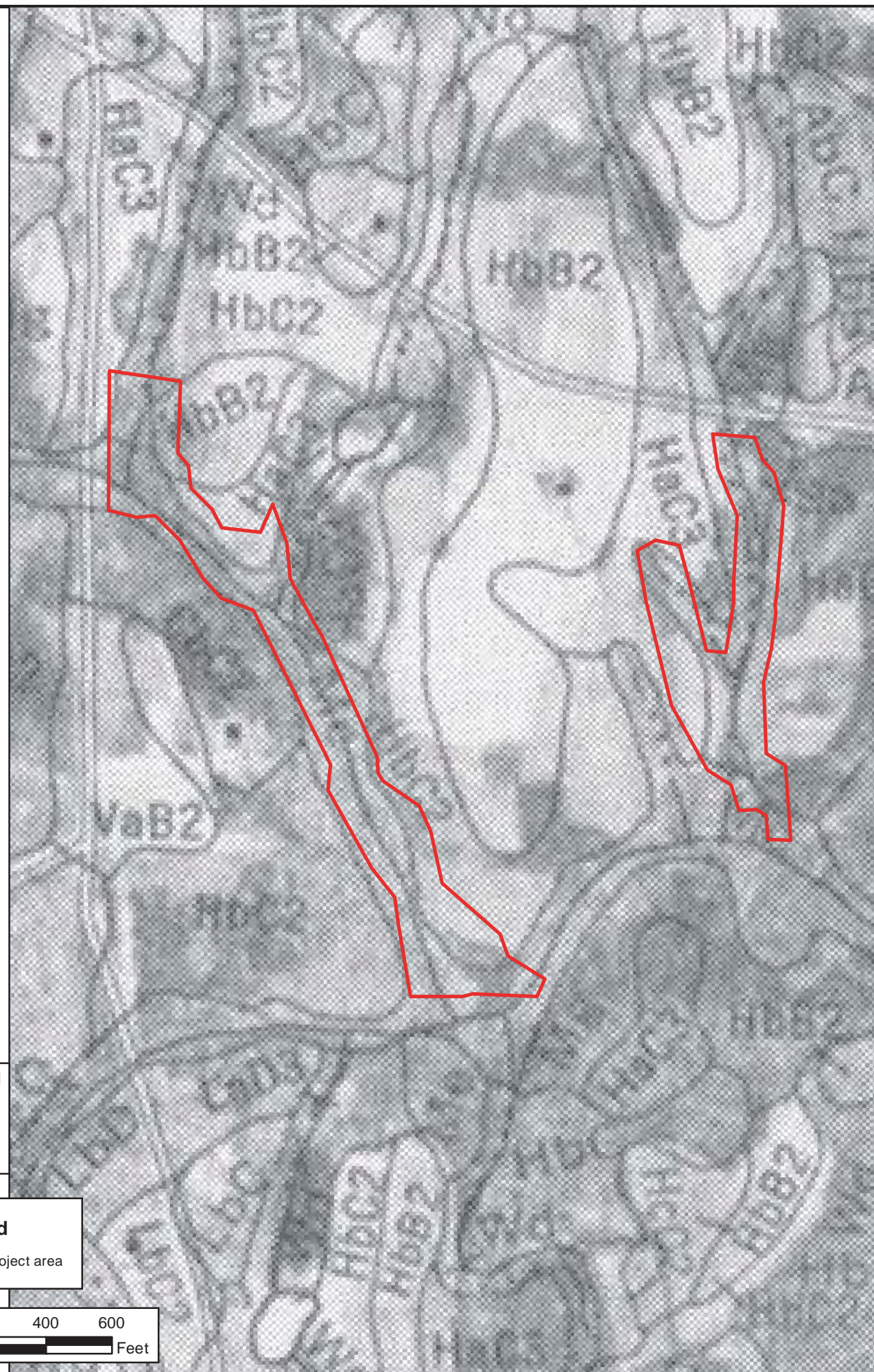
Date: APR 2014

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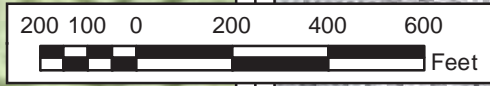
Project No.: 14-006

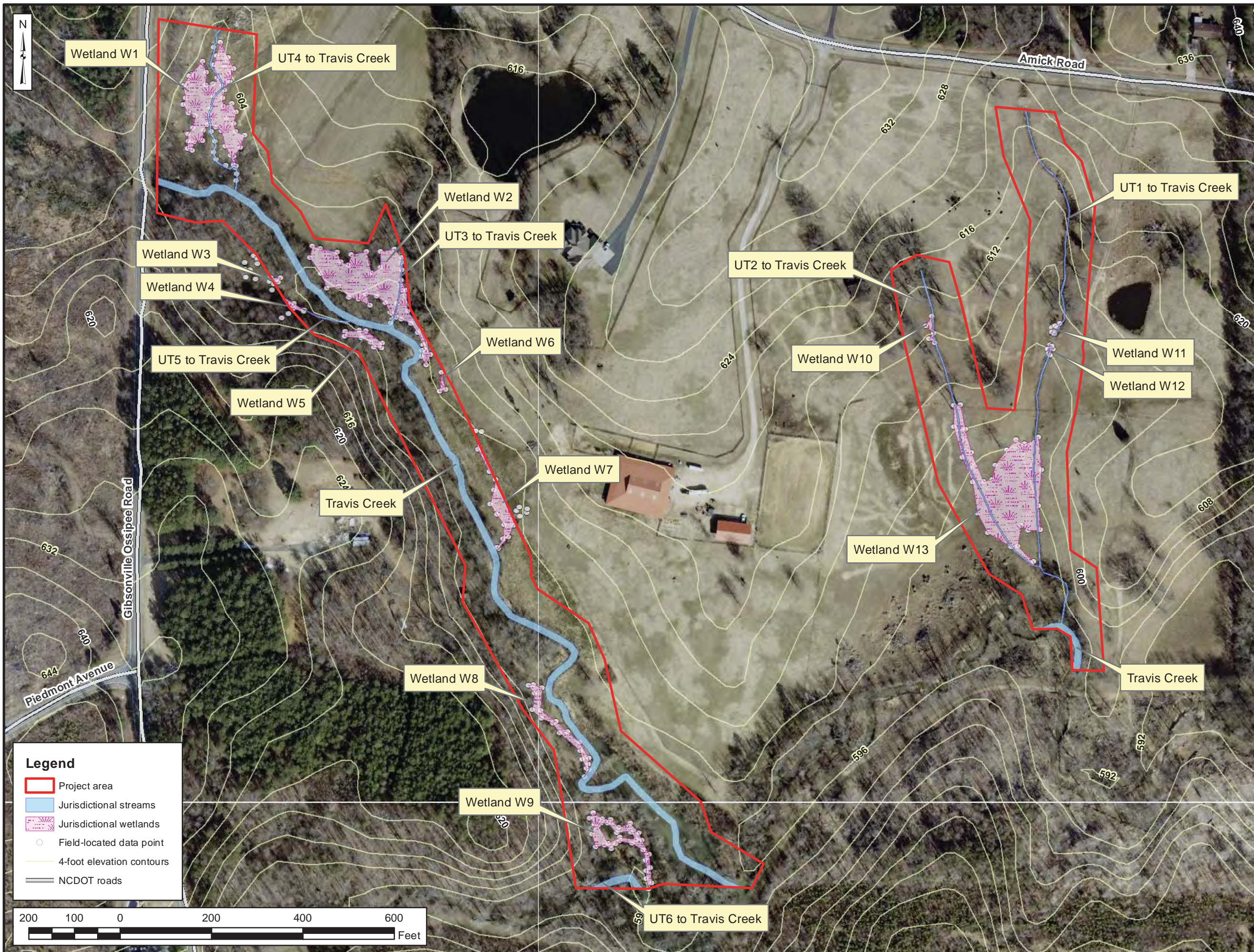
FIGURE


2



Legend
Project area





Prepared for:

 RESTORATION SYSTEMS LLC

Project:
Aycock Springs Stream and Wetland Mitigation Site
 Alamance County, NC

Title:
Jurisdictional Areas

Notes:
 1. Background Imagery source: 2010 aerial photography provided by the NC OneMap Program (online, supported by the NC Geographic Information Coordination Council).
 2. 4-foot elevation contours are generated from 2007 Light Distance and Ranging (LiDAR) data generated by the NC Floodplain Mapping Program and provided by the NC Department of Transportation.

Drawn by:	SGD
Date:	APR 2014
Scale:	1:2400
Project No.:	14-006

FIGURE
4

Legend

- Project area
- Jurisdictional streams
- Jurisdictional wetlands
- Field-located data point
- 4-foot elevation contours
- NCDOT roads



Appendix E
Categorical Exclusion Document

Appendix A

**Categorical Exclusion Form for Ecosystem Enhancement
Program Projects
Version 1.4**

Note: Only Appendix A should be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Aycock Springs Stream and Wetland Mitigation Site
County Name:	Alamance County
EEP Number:	
Project Sponsor:	Restoration Systems, LLC
Project Contact Name:	Worth Creech
Project Contact Address:	1101 Haynes Street, Suite 211 Raleigh, NC 27604
Project Contact E-mail:	Worth@restorationsystems.com
EEP Project Manager:	
Project Description	
<p>The Aycock Springs Site encompasses 15 acres of land used for livestock grazing, hay production, and timber harvest. Existing Site streams have been cleared, dredged of cobble substrate, trampled by livestock, eroded vertically and laterally. The project will restore streams and wetlands within the Site for total of 3610 Stream Mitigation Units (SMUs) and 1.4 Riparian Wetland Mitigation Units (WMUs).</p>	
For Official Use Only	
Reviewed By:	
_____	_____
Date	EEP Project Manager
Conditional Approved By:	
_____	_____
Date	For Division Administrator FHWA
<input type="checkbox"/> Check this box if there are outstanding issues	
Final Approval By:	
_____	_____
Date	For Division Administrator FHWA

Part 2: All Projects Regulation/Question		Response
Coastal Zone Management Act (CZMA)		
1. Is the project located in a CAMA county?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Has a CAMA permit been secured?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has NCDCEM agreed that the project is consistent with the NC Coastal Management Program?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Is there an approved hazardous mitigation plan?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
National Historic Preservation Act (Section 106)		
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project affect such properties and does the SHPO/THPO concur?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. If the effects are adverse, have they been resolved?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project require the acquisition of real estate?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Was the property acquisition completed prior to the intent to use federal funds?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Part 3: Ground-Disturbing Activities Regulation/Question		Response
American Indian Religious Freedom Act (AIRFA)		
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2. Is the site of religious importance to American Indians?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
4. Have the effects of the project on this site been considered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Antiquities Act (AA)		
1. Is the project located on Federal lands?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
3. Will a permit from the appropriate Federal agency be required?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
4. Has a permit been obtained?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Archaeological Resources Protection Act (ARPA)		
1. Is the project located on federal or Indian lands (reservation)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2. Will there be a loss or destruction of archaeological resources?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
3. Will a permit from the appropriate Federal agency be required?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
4. Has a permit been obtained?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Endangered Species Act (ESA)		
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2. Is Designated Critical Habitat or suitable habitat present for listed species?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Have the USFWS and the NCWRC been consulted?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the NPS approved of the conversion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is suitable habitat present for EFH-protected species?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Will the project adversely affect EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. Has consultation with NOAA-Fisheries occurred?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Have the USFWS recommendations been incorporated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Wilderness Act	
1. Is the project in a Wilderness area?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A



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

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

March 20, 2014

Grant Lewis
Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, NC 27603

Re: Aycock Springs Stream and Wetland Mitigation, Alamance County, ER 14-0442

Dear Mr. Lewis:

Thank you for your letter of March 7, 2014, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

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, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

A handwritten signature in blue ink that reads "Renee Gledhill-Earley".

for Ramona M. Bartos



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Raleigh ES Field Office

Post Office Box 33726

Raleigh, North Carolina 27636-3726

April 4, 2014

Grant Lewis
Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, NC 27603

Re: Aycock Springs Stream and Wetland Mitigation Project - Alamance County, NC

Dear Mr. Lewis:

This letter is to inform you that a list of all federally-protected endangered and threatened species with known occurrences in North Carolina is now available on the U.S. Fish and Wildlife Service's (Service) web page at <http://www.fws.gov/raleigh>. Therefore, if you have projects that occur within the Raleigh Field Office's area of responsibility (see attached county list), you no longer need to contact the Raleigh Field Office for a list of federally-protected species.

Our web page contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act), and a list of federal species of concern¹ that are known to occur in each county in North Carolina.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or evaluation can be found on our web page at <http://www.fws.gov/raleigh>. Please check the web site often for updated information or changes.

¹ The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

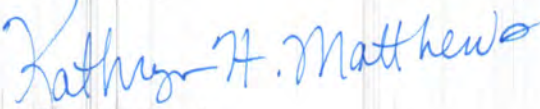
Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (<http://www.fws.gov/raleigh>) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact Kathy Matthews of this office at (919) 856-4520 ext. 27.

Sincerely,


for Pete Benjamin
Field Supervisor

List of Counties in the Service's Raleigh Field Office Area of Responsibility

Alamance
Beaufort
Bertie
Bladen
Brunswick
Camden
Carteret
Caswell
Chatham
Chowan
Columbus
Craven
Cumberland
Currituck
Dare
Duplin
Durham
Edgecombe
Franklin
Gates
Granville
Greene
Guilford
Halifax
Harnett
Hertford
Hoke
Hyde
Johnston
Jones
Lee
Lenoir
Martin
Montgomery
Moore
Nash
New Hanover
Northampton
Onslow
Orange
Pamlico
Pasquotank
Pender

Perquimans
Person
Pitt
Randolph
Richmond
Robeson
Rockingham
Sampson
Scotland
Tyrrell
Vance
Wake
Warren
Washington
Wayne
Wilson

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 03/07/2014				
Name of Project Aycock Springs Sites		Federal Agency Involved FHWA				
Proposed Land Use Stream Restoration Site		County and State Alamance County and North Carolina				
PART II (To be completed by NRCS)		Date Request Received By NRCS 03/10/2014		Person Completing Form Milton Cortes-NRCS NC		
Does the site contain Prime, Unique, Statewide or Local Important Farmland? (If no, the FPPA does not apply - do not complete additional parts of this form)		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	Acres Irrigated none	Average Farm Size 117	
Major Crop(s) Corn	Farmable Land In Govt. Jurisdiction Acres: 179,30' acres 64.4 %	Amount of Farmland As Defined in FPPA Acres: 240,62 acres 86.4 %				
Name of Land Evaluation System Used Alamance Co. Lesa	Name of State or Local Site Assessment System N/A	Date Land Evaluation Returned by NRCS 04/09/2014				
PART III (To be completed by Federal Agency)		Alternative Site Rating				
		Site A	Site B	Site C	Site D	
A. Total Acres To Be Converted Directly		11				
B. Total Acres To Be Converted Indirectly						
C. Total Acres In Site		15				
PART IV (To be completed by NRCS) Land Evaluation Information						
A. Total Acres Prime And Unique Farmland		1				
B. Total Acres Statewide Important or Local Important Farmland		1				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted		0.0008				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value		81				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)		44				
PART VI (To be completed by Federal Agency) Site Assessment Criteria (Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)		Maximum Points	Site A	Site B	Site C	Site D
1. Area In Non-urban Use		(15)	15			
2. Perimeter In Non-urban Use		(10)	10			
3. Percent Of Site Being Farmed		(20)	20			
4. Protection Provided By State and Local Government		(20)	0			
5. Distance From Urban Built-up Area		(15)	5			
6. Distance To Urban Support Services		(15)	10			
7. Size Of Present Farm Unit Compared To Average		(10)	10			
8. Creation Of Non-farmable Farmland		(10)	0			
9. Availability Of Farm Support Services		(5)	5			
10. On-Farm Investments		(20)	10			
11. Effects Of Conversion On Farm Support Services		(10)	0			
12. Compatibility With Existing Agricultural Use		(10)	0			
TOTAL SITE ASSESSMENT POINTS		160	0	0	0	0
PART VII (To be completed by Federal Agency)						
Relative Value Of Farmland (From Part V)		100	44	0	0	0
Total Site Assessment (From Part VI above or local site assessment)		160	85	0	0	0
TOTAL POINTS (Total of above 2 lines)		260	44	0	0	0
Site Selected:		Date Of Selection		Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>		
Reason For Selection:						
Name of Federal agency representative completing this form: FHWA (Axiom Environmental) Date: 4/11/14						

(See Instructions on reverse side)



⊠ North Carolina Wildlife Resources Commission ⊠

Gordon Myers, Executive Director

11 March 2014

Mr. Grant Lewis, Senior Project Manager
Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, North Carolina 27603

Subject: Aycock Springs Stream and Wetland Restoration Site, Alamance County

Dear Mr. Lewis:

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the subject information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The proposed project would restore stream channels through active pasture land, and provide in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel have been identified as significantly degraded. The project site includes Travis Creek and an unnamed tributary to Travis Creek in the Cape Fear River basin.

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Thank you for the opportunity to review this proposed project. If we can provide further assistance, please contact our office at (336) 449-7625 or shari.bryant@ncwildlife.org.

Sincerely,

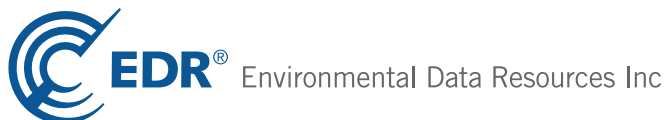
Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

Aycock Springs Stream and Wetland Restoration Site

Amick Road
Elon, NC 27244

Inquiry Number: 3873620.6s
March 06, 2014

The EDR Radius Map™ Report



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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GEOCHECK ADDENDUM

GeoCheck - Not Requested

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

AMICK ROAD
ELON, NC 27244

COORDINATES

Latitude (North): 36.1273000 - 36° 7' 38.28"
Longitude (West): 79.5249000 - 79° 31' 29.64"
Universal Transverse Mercator: Zone 17
UTM X (Meters): 632740.9
UTM Y (Meters): 3998874.8
Elevation: 626 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: 36079-B5 OSSIPEE, NC
Most Recent Revision: 1970

South Map: 36079-A5 GIBSONVILLE, NC
Most Recent Revision: 1994

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year: 2012
Source: USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List

EXECUTIVE SUMMARY

Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls
LUCIS..... Land Use Control Information System

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

NC HSDS..... Hazardous Substance Disposal Site

State- and tribal - equivalent CERCLIS

SHWS..... Inactive Hazardous Sites Inventory

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... List of Solid Waste Facilities

State and tribal leaking storage tank lists

LUST..... Regional UST Database

EXECUTIVE SUMMARY

LUST TRUST..... State Trust Fund Database
LAST..... Leaking Aboveground Storage Tanks
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST..... Petroleum Underground Storage Tank Database
AST..... AST Database
INDIAN UST..... Underground Storage Tanks on Indian Land
FEMA UST..... Underground Storage Tank Listing

State and tribal institutional control / engineering control registries

INST CONTROL..... No Further Action Sites With Land Use Restrictions Monitoring

State and tribal voluntary cleanup sites

VCP..... Responsible Party Voluntary Action Sites
INDIAN VCP..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS..... Brownfields Projects Inventory

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI..... Open Dump Inventory
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
SWRCY..... Recycling Center Listing
HIST LF..... Solid Waste Facility Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL..... Clandestine Drug Labs
US HIST CDL..... National Clandestine Laboratory Register

Local Land Records

LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
IMD..... Incident Management Database
SPILLS 80..... SPILLS 80 data from FirstSearch
SPILLS 90..... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR..... RCRA - Non Generators

EXECUTIVE SUMMARY

DOT OPS.....	Incident and Accident Data
DOD.....	Department of Defense Sites
FUDS.....	Formerly Used Defense Sites
CONSENT.....	Superfund (CERCLA) Consent Decrees
ROD.....	Records Of Decision
UMTRA.....	Uranium Mill Tailings Sites
US MINES.....	Mines Master Index File
TRIS.....	Toxic Chemical Release Inventory System
TSCA.....	Toxic Substances Control Act
FTTS.....	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS.....	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS.....	Section 7 Tracking Systems
ICIS.....	Integrated Compliance Information System
PADS.....	PCB Activity Database System
MLTS.....	Material Licensing Tracking System
RADINFO.....	Radiation Information Database
FINDS.....	Facility Index System/Facility Registry System
RAATS.....	RCRA Administrative Action Tracking System
RMP.....	Risk Management Plans
UIC.....	Underground Injection Wells Listing
DRYCLEANERS.....	Drycleaning Sites
NPDES.....	NPDES Facility Location Listing
INDIAN RESERV.....	Indian Reservations
SCRD DRYCLEANERS.....	State Coalition for Remediation of Drycleaners Listing
COAL ASH.....	Coal Ash Disposal Sites
2020 COR ACTION.....	2020 Corrective Action Program List
LEAD SMELTERS.....	Lead Smelter Sites
EPA WATCH LIST.....	EPA WATCH LIST
US FIN ASSUR.....	Financial Assurance Information
COAL ASH DOE.....	Steam-Electric Plant Operation Data
COAL ASH EPA.....	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER.....	PCB Transformer Registration Database
US AIRS.....	Aerometric Information Retrieval System Facility Subsystem
PRP.....	Potentially Responsible Parties
Financial Assurance.....	Financial Assurance Information Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP.....	EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat.....	EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners.....	EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS.....	Recovered Government Archive State Hazardous Waste Facilities List
RGA LF.....	Recovered Government Archive Solid Waste Facilities List
RGA LUST.....	Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

EXECUTIVE SUMMARY

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State and tribal landfill and/or solid waste disposal site lists

OLI: Old Landfill Inventory Database.

A review of the OLI list, as provided by EDR, and dated 04/05/2013 has revealed that there is 1 OLI site within approximately 0.5 miles of the target property.

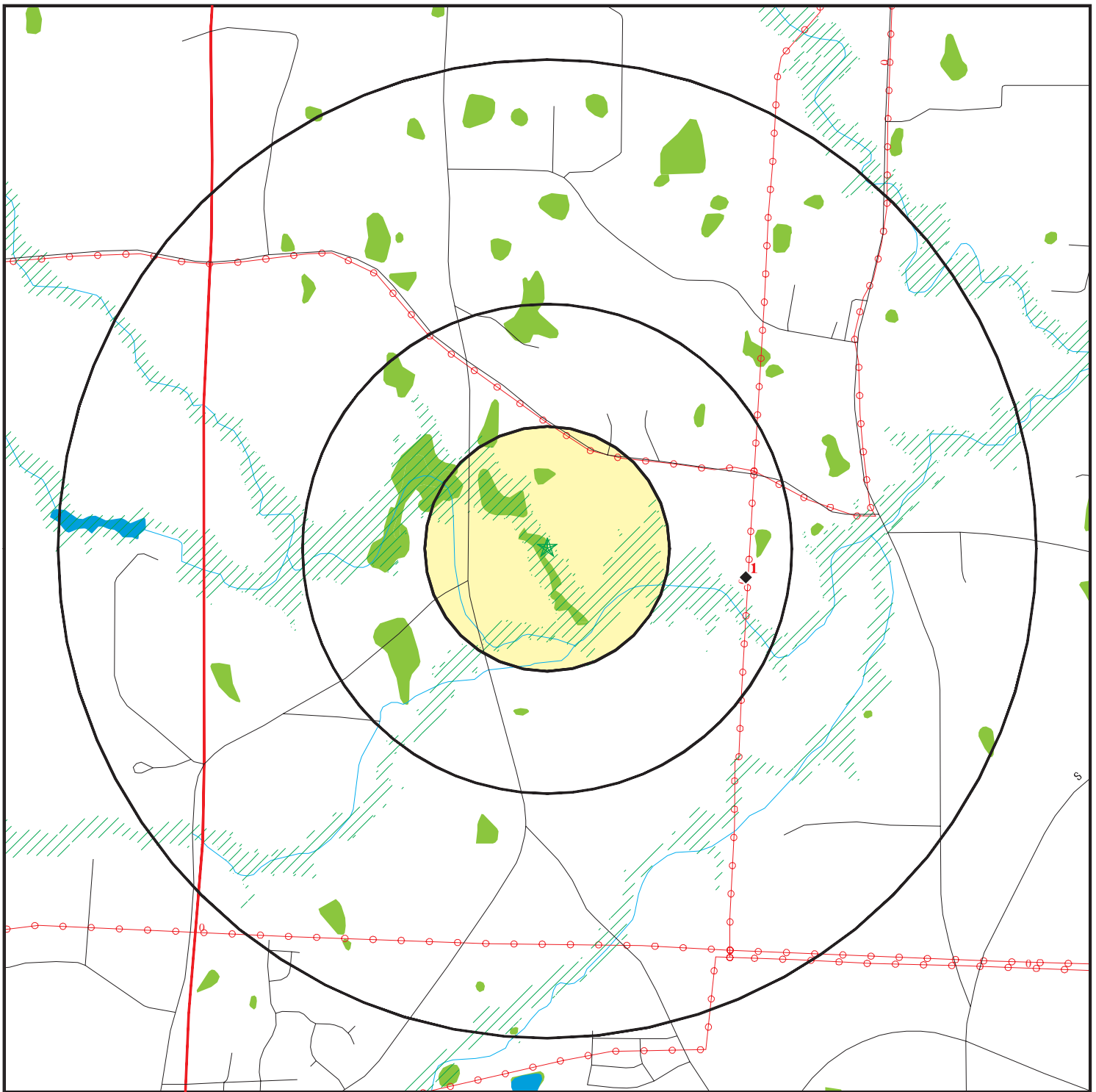
<u>Lower Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
ELON COLLEGE LDFL - AMICK RD	FROM I-40 W., TAKE EXIT	E 1/4 - 1/2 (0.410 mi.)	1	8

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 18 records.

<u>Site Name</u>	<u>Database(s)</u>
GENTRY PROPERTY, KENNETH	LAST
ALTAMAHAW MALL	LUST, RGA LUST
MATKINS MEAT PROCESSORS	IMD, LUST, UST, RGA LUST
FOSCOE'S SERVICE STATION	IMD, LUST, RGA LUST
PANTRY #161-B	LUST TRUST
TOWN OF ELON	UST
S & S PATTERN SHOP	UST
SHOMAKER PLANT	UST
TRAVIS CREEK PUMP STATION	UST
C & H MARKET	UST
HOME ENTERTAINMENT&DECOR SYS	UST
ROGER BEAUCHESNE GEN. CONT.	UST
W.L. SMITH 66 SERVICE	UST
FRYAR AMBULANCE SERVICE	UST
HWY 87 CONVENIENCE STORE	UST
SERV-U-SERVICENTER	UST
GIBSONVILLE	UST
BACK CREEK PUMP STATION	UST

OVERVIEW MAP - 3873620.6s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ☒ National Priority List Sites
- ☒ Dept. Defense Sites



- ☒ Indian Reservations BIA
- ⚡ County Boundary
- ⚡ Power transmission lines
- ⚡ Oil & Gas pipelines from USGS
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- National Wetland Inventory
- State Wetlands
- ☒ Hazardous Substance Disposal Sites

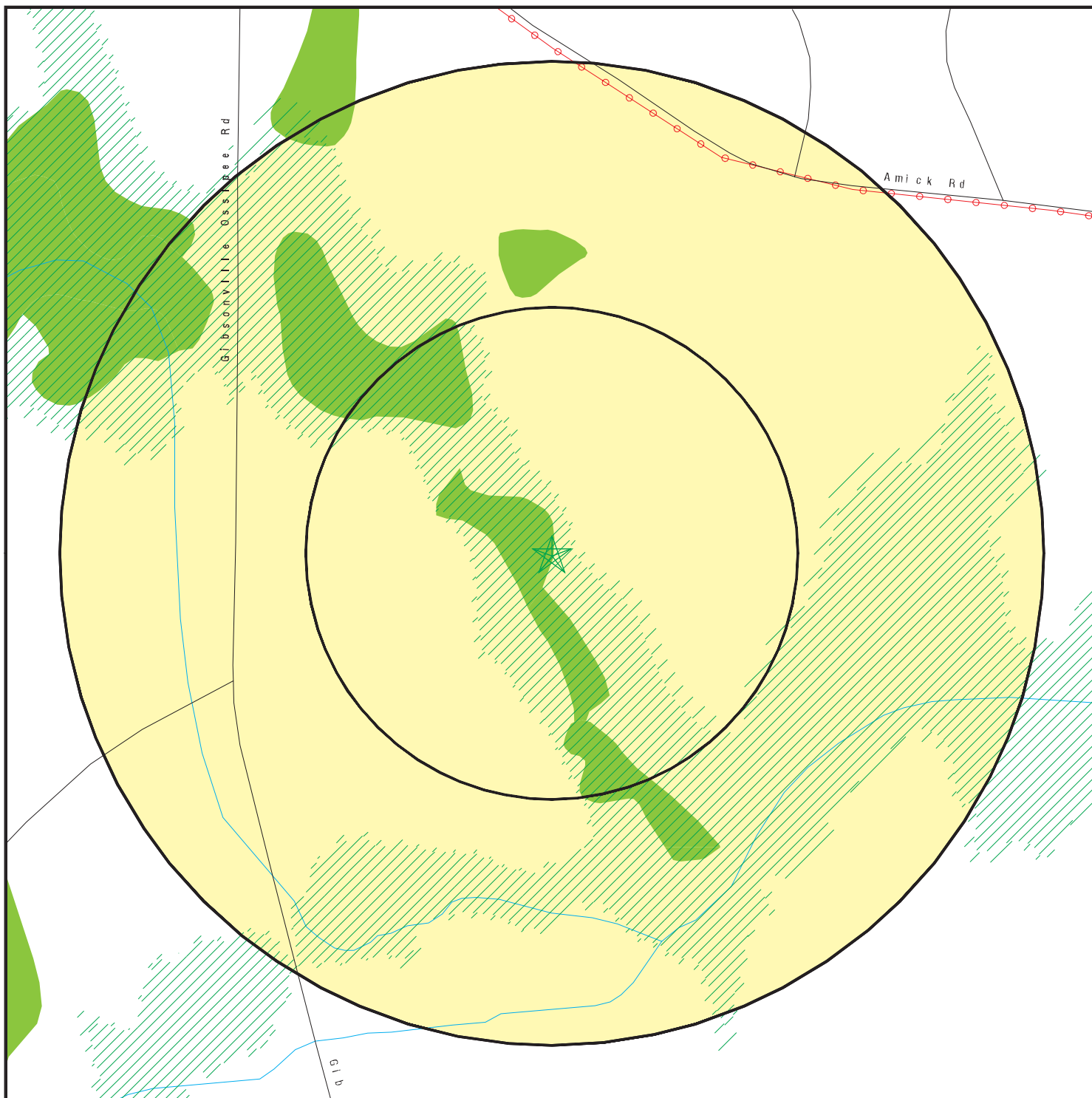


This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

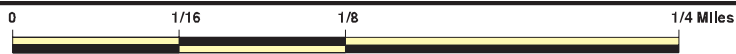
SITE NAME: Aycock Springs Stream and Wetland Restoration Site
 ADDRESS: Amick Road
 Elon NC 27244
 LAT/LONG: 36.1273 / 79.5249

CLIENT: Axiom Environmental
 CONTACT: Grant Lewis
 INQUIRY #: 3873620.6s
 DATE: March 06, 2014 6:09 pm

DETAIL MAP - 3873620.6s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- ☒ National Priority List Sites
- ☒ Dept. Defense Sites



- ☒ Indian Reservations BIA
- ⚡ Power transmission lines
- ⚡ Oil & Gas pipelines from USGS
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- National Wetland Inventory
- State Wetlands
- ☒ Hazardous Substance Disposal Sites



This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Aycock Springs Stream and Wetland Restoration Site
 ADDRESS: Amick Road
 Elon NC 27244
 LAT/LONG: 36.1273 / 79.5249

CLIENT: Axiom Environmental
 CONTACT: Grant Lewis
 INQUIRY #: 3873620.6s
 DATE: March 06, 2014 6:12 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
<i>Federal CERCLIS NFRAP site List</i>								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
<i>Federal institutional controls / engineering controls registries</i>								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	TP		NR	NR	NR	NR	NR	0
<i>State- and tribal - equivalent NPL</i>								
NC HSDS	1.000		0	0	0	0	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
SHWS	1.000		0	0	0	0	NR	0
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
SWF/LF	0.500		0	0	0	NR	NR	0
OLI	0.500		0	0	1	NR	NR	1
<i>State and tribal leaking storage tank lists</i>								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST TRUST	0.500		0	0	0	NR	NR	0
LAST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
<i>State and tribal registered storage tank lists</i>								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
<i>State and tribal institutional control / engineering control registries</i>								
INST CONTROL	0.500		0	0	0	NR	NR	0
<i>State and tribal voluntary cleanup sites</i>								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
<i>State and tribal Brownfields sites</i>								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
<u>ADDITIONAL ENVIRONMENTAL RECORDS</u>								
<i>Local Brownfield lists</i>								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
<i>Local Lists of Landfill / Solid Waste Disposal Sites</i>								
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HIST LF	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
<i>Local Lists of Hazardous waste / Contaminated Sites</i>								
US CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
<i>Local Land Records</i>								
LIENS 2	TP		NR	NR	NR	NR	NR	0
<i>Records of Emergency Release Reports</i>								
HMIRS	TP		NR	NR	NR	NR	NR	0
IMD	0.500		0	0	0	NR	NR	0
SPILLS 80	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
<i>Other Ascertainable Records</i>								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	0	NR	NR	NR	0
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

<u>Database</u>	<u>Search Distance (Miles)</u>	<u>Target Property</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
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NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Site

Database(s)

EDR ID Number
 EPA ID Number

1
East
1/4-1/2
0.410 mi.
2165 ft.

ELON COLLEGE LDFL - AMICK RD
FROM I-40 W., TAKE EXIT 141 AND TURN RIGHT ON HUFFMAN MILL R
ELON COLLEGE, NC

OLI S106338944
N/A

Relative:
Lower

NC OLI:
 Facility ID: NONCD0000730
 State Plane X: 563004
 State Plane Y: 263753
 Other Agency Lead: Not reported
 Unable to Locate: Not reported

Actual:
623 ft.

Count: 18 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ELON	S109684856	PANTRY #161-B	1031 HIGHWAY 7 NORTH		LUST TRUST
ELON	U001206772	TOWN OF ELON	HWY 70 WEST SEWER PUMPING STAT	27244	UST
ELON COLLEGE	U001200725	S & S PATTERN SHOP	ROUTE 1, HIGHWAY 87, OSSIPEE R	27244	UST
ELON COLLEGE	U001200915	SHOMAKER PLANT	HIGHWAY 100 RT 3	27244	UST
ELON COLLEGE	U001200611	TRAVIS CREEK PUMP STATION	S.R. 1549 AT S.R. 1504	27244	UST
ELON COLLEGE	U003142416	C & H MARKET	RT 2	27244	UST
ELON COLLEGE	S105766581	ALTAMAHAW MALL	ROUTE 2, BOX 104 B	27244	LUST, RGA LUST
ELON COLLEGE	U000828948	HOME ENTERTAINMENT&DECOR SYS	RTE 3 BOX 115 A - HWY 100	27244	UST
ELON COLLEGE	U001188505	ROGER BEAUCHESNE GEN. CONT.	PITTS ROAD - ROUTE 1	27244	UST
GIBSONVILLE	U001194668	W.L. SMITH 66 SERVICE	RT #1	27249	UST
GIBSONVILLE	U001192064	FRYAR AMBULANCE SERVICE	ROUTE 1	27249	UST
GIBSONVILLE	U001188741	MATKINS MEAT PROCESSORS	RT. 1	27249	IMD, LUST, UST, RGA LUST
GIBSONVILLE	U000829169	HWY 87 CONVENIENCE STORE	RT. 1 BOX 359 AA	27249	UST
GIBSONVILLE	U001197580	SERV-U-SERVICENTER	HIGHWAY 100 WEST	27249	UST
GIBSONVILLE	U001192546	GIBSONVILLE	HIGHWAY 61 NORTH	27249	UST
GIBSONVILLE	U001192034	BACK CREEK PUMP STATION	SPRINGWOOD AVE. EXT. (SR 2748)	27249	UST
GIBSONVILLE	S110629681	GENTRY PROPERTY, KENNETH	6176 NC HWY 87 N.	27249	LAST
OSSIPEE	S104482947	FOSCOE'S SERVICE STATION	NC HWY 87 NORTH	27244	IMD, LUST, RGA LUST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 11/11/2013	Telephone: N/A
Date Made Active in Reports: 01/28/2014	Last EDR Contact: 01/21/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/21/2014
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 11/11/2013	Telephone: N/A
Date Made Active in Reports: 01/28/2014	Last EDR Contact: 01/09/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/21/2014
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 08/15/2011
Number of Days to Update: 56	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 11/11/2013	Telephone: N/A
Date Made Active in Reports: 01/28/2014	Last EDR Contact: 01/09/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/21/2014
	Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 11/11/2013	Telephone: 703-412-9810
Date Made Active in Reports: 02/13/2014	Last EDR Contact: 02/28/2014
Number of Days to Update: 94	Next Scheduled EDR Contact: 06/09/2014
	Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/31/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/08/2013	Telephone: 703-603-8704
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 01/10/2014
Number of Days to Update: 151	Next Scheduled EDR Contact: 04/21/2014
	Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 11/11/2013	Telephone: 703-412-9810
Date Made Active in Reports: 02/13/2014	Last EDR Contact: 02/28/2014
Number of Days to Update: 94	Next Scheduled EDR Contact: 06/09/2014
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/17/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/14/2014	Telephone: 703-603-0695
Date Made Active in Reports: 01/28/2014	Last EDR Contact: 12/09/2013
Number of Days to Update: 14	Next Scheduled EDR Contact: 03/24/2014
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/17/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/14/2014	Telephone: 703-603-0695
Date Made Active in Reports: 01/28/2014	Last EDR Contact: 12/09/2013
Number of Days to Update: 14	Next Scheduled EDR Contact: 03/24/2014
	Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 11/20/2013	Source: Department of the Navy
Date Data Arrived at EDR: 11/21/2013	Telephone: 843-820-7326
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 02/14/2014
Number of Days to Update: 95	Next Scheduled EDR Contact: 06/02/2014
	Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/30/2013	Source: National Response Center, United States Coast Guard
Date Data Arrived at EDR: 10/01/2013	Telephone: 202-267-2180
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 02/07/2014
Number of Days to Update: 66	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Annually

State- and tribal - equivalent NPL

HSDS: Hazardous Substance Disposal Site

Locations of uncontrolled and unregulated hazardous waste sites. The file includes sites on the National Priority List as well as those on the state priority list.

Date of Government Version: 08/09/2011	Source: North Carolina Center for Geographic Information and Analysis
Date Data Arrived at EDR: 11/08/2011	Telephone: 919-754-6580
Date Made Active in Reports: 12/05/2011	Last EDR Contact: 02/05/2014
Number of Days to Update: 27	Next Scheduled EDR Contact: 05/19/2014
	Data Release Frequency: Biennially

State- and tribal - equivalent CERCLIS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SHWS: Inactive Hazardous Sites Inventory

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 12/11/2013	Source: Department of Environment, Health and Natural Resources
Date Data Arrived at EDR: 12/19/2013	Telephone: 919-508-8400
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 12/19/2013
Number of Days to Update: 42	Next Scheduled EDR Contact: 03/31/2014
	Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: List of Solid Waste Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 12/30/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 12/31/2013	Telephone: 919-733-0692
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 12/31/2013
Number of Days to Update: 30	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Semi-Annually

OLI: Old Landfill Inventory

Old landfill inventory location information. (Does not include no further action sites and other agency lead sites).

Date of Government Version: 04/05/2013	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 04/18/2013	Telephone: 919-733-4996
Date Made Active in Reports: 05/09/2013	Last EDR Contact: 01/13/2014
Number of Days to Update: 21	Next Scheduled EDR Contact: 04/28/2014
	Data Release Frequency: Varies

State and tribal leaking storage tank lists

LUST: Regional UST Database

This database contains information obtained from the Regional Offices. It provides a more detailed explanation of current and historic activity for individual sites, as well as what was previously found in the Incident Management Database. Sites in this database with Incident Numbers are considered LUSTs.

Date of Government Version: 11/06/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 11/15/2013	Telephone: 919-733-1308
Date Made Active in Reports: 12/13/2013	Last EDR Contact: 02/12/2014
Number of Days to Update: 28	Next Scheduled EDR Contact: 05/26/2014
	Data Release Frequency: Quarterly

LUST TRUST: State Trust Fund Database

This database contains information about claims against the State Trust Funds for reimbursements for expenses incurred while remediating Leaking USTs.

Date of Government Version: 10/11/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 10/15/2013	Telephone: 919-733-1315
Date Made Active in Reports: 10/30/2013	Last EDR Contact: 01/15/2014
Number of Days to Update: 15	Next Scheduled EDR Contact: 04/28/2014
	Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LAST: Leaking Aboveground Storage Tanks

A listing of leaking aboveground storage tank site locations.

Date of Government Version: 11/06/2013
Date Data Arrived at EDR: 11/15/2013
Date Made Active in Reports: 12/13/2013
Number of Days to Update: 28

Source: Department of Environment & Natural Resources
Telephone: 877-623-6748
Last EDR Contact: 02/12/2014
Next Scheduled EDR Contact: 05/26/2014
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 08/27/2013
Date Data Arrived at EDR: 08/27/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 66

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 02/13/2014
Date Data Arrived at EDR: 02/14/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 10

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/06/2013
Date Data Arrived at EDR: 11/07/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/27/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 02/21/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 11/21/2013	Source: EPA Region 4
Date Data Arrived at EDR: 11/26/2013	Telephone: 404-562-8677
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 01/27/2014
Number of Days to Update: 90	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013	Source: EPA Region 1
Date Data Arrived at EDR: 05/01/2013	Telephone: 617-918-1313
Date Made Active in Reports: 11/01/2013	Last EDR Contact: 01/30/2014
Number of Days to Update: 184	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

State and tribal registered storage tank lists

UST: Petroleum Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 11/06/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 11/15/2013	Telephone: 919-733-1308
Date Made Active in Reports: 12/13/2013	Last EDR Contact: 02/12/2014
Number of Days to Update: 28	Next Scheduled EDR Contact: 05/26/2014
	Data Release Frequency: Quarterly

AST: AST Database
Facilities with aboveground storage tanks that have a capacity greater than 21,000 gallons.

Date of Government Version: 12/17/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 12/24/2013	Telephone: 919-715-6183
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 12/17/2013
Number of Days to Update: 37	Next Scheduled EDR Contact: 04/07/2014
	Data Release Frequency: Semi-Annually

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 07/29/2013	Source: EPA Region 8
Date Data Arrived at EDR: 08/01/2013	Telephone: 303-312-6137
Date Made Active in Reports: 11/01/2013	Last EDR Contact: 01/27/2014
Number of Days to Update: 92	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Quarterly

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/10/2011	Source: EPA Region 6
Date Data Arrived at EDR: 05/11/2011	Telephone: 214-665-7591
Date Made Active in Reports: 06/14/2011	Last EDR Contact: 01/27/2014
Number of Days to Update: 34	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 12/31/2012	Source: EPA Region 7
Date Data Arrived at EDR: 02/28/2013	Telephone: 913-551-7003
Date Made Active in Reports: 04/12/2013	Last EDR Contact: 01/27/2014
Number of Days to Update: 43	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/13/2014	Source: EPA Region 5
Date Data Arrived at EDR: 02/14/2014	Telephone: 312-886-6136
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 01/27/2014
Number of Days to Update: 10	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 11/21/2013	Source: EPA Region 4
Date Data Arrived at EDR: 11/26/2013	Telephone: 404-562-9424
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 01/27/2014
Number of Days to Update: 90	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013	Source: EPA, Region 1
Date Data Arrived at EDR: 05/01/2013	Telephone: 617-918-1313
Date Made Active in Reports: 01/27/2014	Last EDR Contact: 01/30/2014
Number of Days to Update: 271	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/05/2013	Source: EPA Region 10
Date Data Arrived at EDR: 02/06/2013	Telephone: 206-553-2857
Date Made Active in Reports: 04/12/2013	Last EDR Contact: 01/27/2014
Number of Days to Update: 65	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 07/29/2013	Source: EPA Region 9
Date Data Arrived at EDR: 07/30/2013	Telephone: 415-972-3368
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 01/27/2014
Number of Days to Update: 129	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010	Source: FEMA
Date Data Arrived at EDR: 02/16/2010	Telephone: 202-646-5797
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 01/13/2014
Number of Days to Update: 55	Next Scheduled EDR Contact: 04/28/2014
	Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

INST CONTROL: No Further Action Sites With Land Use Restrictions Monitoring

A land use restricted site is a property where there are limits or requirements on future use of the property due to varying levels of cleanup possible, practical, or necessary at the site.

Date of Government Version: 12/11/2013	Source: Department of Environment, Health and Natural Resources
Date Data Arrived at EDR: 12/19/2013	Telephone: 919-508-8400
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 12/19/2013
Number of Days to Update: 42	Next Scheduled EDR Contact: 03/31/2014
	Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

VCP: Responsible Party Voluntary Action Sites

Responsible Party Voluntary Action site locations.

Date of Government Version: 12/11/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 12/19/2013	Telephone: 919-508-8400
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 12/19/2013
Number of Days to Update: 42	Next Scheduled EDR Contact: 03/31/2014
	Data Release Frequency: Semi-Annually

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/17/2013	Source: EPA, Region 1
Date Data Arrived at EDR: 10/01/2013	Telephone: 617-918-1102
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 01/03/2014
Number of Days to Update: 66	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Projects Inventory

A brownfield site is an abandoned, idled, or underused property where the threat of environmental contamination has hindered its redevelopment. All of the sites in the inventory are working toward a brownfield agreement for cleanup and liability control.

Date of Government Version: 12/03/2013	Source: Department of Environment and Natural Resources
Date Data Arrived at EDR: 01/07/2014	Telephone: 919-733-4996
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 01/07/2014
Number of Days to Update: 23	Next Scheduled EDR Contact: 04/21/2014
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 09/24/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/24/2013	Telephone: 202-566-2777
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 02/25/2014
Number of Days to Update: 73	Next Scheduled EDR Contact: 04/07/2014
	Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009	Source: EPA, Region 9
Date Data Arrived at EDR: 05/07/2009	Telephone: 415-947-4219
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 01/27/2014
Number of Days to Update: 137	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/09/2004	Telephone: 800-424-9346
Date Made Active in Reports: 09/17/2004	Last EDR Contact: 06/09/2004
Number of Days to Update: 39	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

HIST LF: Solid Waste Facility Listing

A listing of solid waste facilities.

Date of Government Version: 11/06/2006	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 02/13/2007	Telephone: 919-733-0692
Date Made Active in Reports: 03/02/2007	Last EDR Contact: 01/19/2009
Number of Days to Update: 17	Next Scheduled EDR Contact: 04/19/2009
	Data Release Frequency: Quarterly

SWRCY: Recycling Center Listing

A listing of recycling center locations.

Date of Government Version: 11/23/2013	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 11/25/2013	Telephone: 919-707-8137
Date Made Active in Reports: 12/16/2013	Last EDR Contact: 11/18/2013
Number of Days to Update: 21	Next Scheduled EDR Contact: 02/17/2014
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/03/2007	Telephone: 703-308-8245
Date Made Active in Reports: 01/24/2008	Last EDR Contact: 11/04/2013
Number of Days to Update: 52	Next Scheduled EDR Contact: 02/17/2014
	Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 12/04/2013	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 12/10/2013	Telephone: 202-307-1000
Date Made Active in Reports: 02/13/2014	Last EDR Contact: 03/04/2014
Number of Days to Update: 65	Next Scheduled EDR Contact: 06/16/2014
	Data Release Frequency: Quarterly

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 11/19/2008	Telephone: 202-307-1000
Date Made Active in Reports: 03/30/2009	Last EDR Contact: 03/23/2009
Number of Days to Update: 131	Next Scheduled EDR Contact: 06/22/2009
	Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/06/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 04/25/2013	Telephone: 202-564-6023
Date Made Active in Reports: 05/10/2013	Last EDR Contact: 01/27/2014
Number of Days to Update: 15	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2013	Source: U.S. Department of Transportation
Date Data Arrived at EDR: 01/03/2014	Telephone: 202-366-4555
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 01/03/2014
Number of Days to Update: 52	Next Scheduled EDR Contact: 01/13/2014
	Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

IMD: Incident Management Database

Groundwater and/or soil contamination incidents

Date of Government Version: 07/21/2006
Date Data Arrived at EDR: 08/01/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 22

Source: Department of Environment and Natural Resources
Telephone: 919-733-3221
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 09/27/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/06/2013
Number of Days to Update: 62

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS 80: SPILLS80 data from FirstSearch

Spills 80 includes those spill and release records available from FirstSearch databases prior to 1990. Typically, they may include chemical, oil and/or hazardous substance spills recorded before 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 80.

Date of Government Version: 06/14/2001
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/06/2013
Number of Days to Update: 62

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 10/02/2013
Date Made Active in Reports: 12/16/2013
Number of Days to Update: 75

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 01/02/2014
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transportation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transportation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/06/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/15/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/28/2014
Next Scheduled EDR Contact: 03/24/2014
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/24/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 31

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 12/26/2013
Next Scheduled EDR Contact: 04/14/2014
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/12/2013
Next Scheduled EDR Contact: 03/24/2014
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/25/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/01/2013
Date Data Arrived at EDR: 09/05/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 28

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/05/2014
Next Scheduled EDR Contact: 06/16/2014
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/26/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/26/2013
Next Scheduled EDR Contact: 04/07/2014
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/28/2014
Next Scheduled EDR Contact: 05/12/2014
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 10/09/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2013
Date Data Arrived at EDR: 07/17/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 107

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/28/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/22/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 12/09/2013
Next Scheduled EDR Contact: 03/24/2014
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 09/30/2013
Date Data Arrived at EDR: 10/09/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/10/2014
Next Scheduled EDR Contact: 04/21/2014
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 03/08/2013	Source: EPA
Date Data Arrived at EDR: 03/21/2013	Telephone: (404) 562-9900
Date Made Active in Reports: 07/10/2013	Last EDR Contact: 12/10/2013
Number of Days to Update: 111	Next Scheduled EDR Contact: 03/24/2014
	Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/01/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/12/2013	Telephone: 202-564-8600
Date Made Active in Reports: 02/13/2014	Last EDR Contact: 01/27/2014
Number of Days to Update: 63	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011	Source: EPA/NTIS
Date Data Arrived at EDR: 02/26/2013	Telephone: 800-424-9346
Date Made Active in Reports: 04/19/2013	Last EDR Contact: 02/28/2014
Number of Days to Update: 52	Next Scheduled EDR Contact: 06/09/2014
	Data Release Frequency: Biennially

UIC: Underground Injection Wells Listing

A listing of underground injection wells locations.

Date of Government Version: 11/13/2013	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 11/15/2013	Telephone: 919-807-6412
Date Made Active in Reports: 12/20/2013	Last EDR Contact: 02/10/2014
Number of Days to Update: 35	Next Scheduled EDR Contact: 05/26/2014
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DRYCLEANERS: Drycleaning Sites

Potential and known drycleaning sites, active and abandoned, that the Drycleaning Solvent Cleanup Program has knowledge of and entered into this database.

Date of Government Version: 11/18/2013	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 12/24/2013	Telephone: 919-508-8400
Date Made Active in Reports: 01/30/2014	Last EDR Contact: 12/24/2013
Number of Days to Update: 37	Next Scheduled EDR Contact: 04/07/2014
	Data Release Frequency: Varies

NPDES: NPDES Facility Location Listing

General information regarding NPDES(National Pollutant Discharge Elimination System) permits.

Date of Government Version: 05/01/2013	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 06/05/2013	Telephone: 919-733-7015
Date Made Active in Reports: 07/05/2013	Last EDR Contact: 02/17/2014
Number of Days to Update: 30	Next Scheduled EDR Contact: 05/19/2014
	Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 12/08/2006	Telephone: 202-208-3710
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 01/15/2014
Number of Days to Update: 34	Next Scheduled EDR Contact: 04/28/2014
	Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/09/2011	Telephone: 615-532-8599
Date Made Active in Reports: 05/02/2011	Last EDR Contact: 01/20/2014
Number of Days to Update: 54	Next Scheduled EDR Contact: 05/05/2014
	Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931 and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001	Source: American Journal of Public Health
Date Data Arrived at EDR: 10/27/2010	Telephone: 703-305-6451
Date Made Active in Reports: 12/02/2010	Last EDR Contact: 12/02/2009
Number of Days to Update: 36	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 11/20/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/03/2013	Telephone: 202-566-1917
Date Made Active in Reports: 02/13/2014	Last EDR Contact: 02/14/2014
Number of Days to Update: 72	Next Scheduled EDR Contact: 06/02/2014
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 04/15/2013	Source: EPA
Date Data Arrived at EDR: 07/03/2013	Telephone: 202-564-6023
Date Made Active in Reports: 09/13/2013	Last EDR Contact: 01/02/2014
Number of Days to Update: 72	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing

Information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 10/02/2012	Source: Department of Environmental & Natural Resources
Date Data Arrived at EDR: 10/03/2012	Telephone: 919-508-8496
Date Made Active in Reports: 10/26/2012	Last EDR Contact: 12/30/2013
Number of Days to Update: 23	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/23/2013	Source: EPA
Date Data Arrived at EDR: 11/06/2013	Telephone: 202-564-5962
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 12/26/2013
Number of Days to Update: 30	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005	Source: U.S. Geological Survey
Date Data Arrived at EDR: 02/06/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 01/15/2014
Number of Days to Update: 339	Next Scheduled EDR Contact: 04/28/2014
	Data Release Frequency: N/A

Financial Assurance 3: Financial Assurance Information

Hazardous waste financial assurance information.

Date of Government Version: 09/30/2012	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 10/19/2012	Telephone: 919-707-8222
Date Made Active in Reports: 11/29/2012	Last EDR Contact: 12/16/2013
Number of Days to Update: 41	Next Scheduled EDR Contact: 03/31/2014
	Data Release Frequency: Varies

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/23/2013	Source: EPA
Date Data Arrived at EDR: 11/06/2013	Telephone: 202-564-5962
Date Made Active in Reports: 12/06/2013	Last EDR Contact: 12/26/2013
Number of Days to Update: 30	Next Scheduled EDR Contact: 04/14/2014
	Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Financial Assurance 1: Financial Assurance Information Listing

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 11/06/2013	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 11/15/2013	Telephone: 919-733-1322
Date Made Active in Reports: 12/13/2013	Last EDR Contact: 02/12/2014
Number of Days to Update: 28	Next Scheduled EDR Contact: 05/26/2014
	Data Release Frequency: Quarterly

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/19/2011	Telephone: 202-566-0517
Date Made Active in Reports: 01/10/2012	Last EDR Contact: 01/30/2014
Number of Days to Update: 83	Next Scheduled EDR Contact: 05/12/2014
	Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/29/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/14/2013	Telephone: 703-603-8787
Date Made Active in Reports: 02/27/2013	Last EDR Contact: 01/03/2014
Number of Days to Update: 13	Next Scheduled EDR Contact: 04/21/2014
	Data Release Frequency: Varies

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 05/18/2012	Telephone: 703-308-4044
Date Made Active in Reports: 05/25/2012	Last EDR Contact: 02/14/2014
Number of Days to Update: 7	Next Scheduled EDR Contact: 05/26/2014
	Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005	Source: Department of Energy
Date Data Arrived at EDR: 08/07/2009	Telephone: 202-586-8719
Date Made Active in Reports: 10/22/2009	Last EDR Contact: 01/13/2014
Number of Days to Update: 76	Next Scheduled EDR Contact: 04/28/2014
	Data Release Frequency: Varies

COAL ASH: Coal Ash Disposal Sites

A listing of coal combustion products distribution permits issued by the Division for the treatment, storage, transportation, use and disposal of coal combustion products.

Date of Government Version: 12/31/2007	Source: Department of Environment & Natural Resources
Date Data Arrived at EDR: 08/04/2009	Telephone: 919-807-6359
Date Made Active in Reports: 08/17/2009	Last EDR Contact: 11/04/2013
Number of Days to Update: 13	Next Scheduled EDR Contact: 02/17/2014
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 06/30/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/13/2013	Telephone: 617-520-3000
Date Made Active in Reports: 09/13/2013	Last EDR Contact: 02/10/2014
Number of Days to Update: 31	Next Scheduled EDR Contact: 05/26/2014
	Data Release Frequency: Quarterly

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 08/17/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/03/2011	Telephone: N/A
Date Made Active in Reports: 03/21/2011	Last EDR Contact: 12/13/2013
Number of Days to Update: 77	Next Scheduled EDR Contact: 03/24/2014
	Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

Date of Government Version: N/A	Source: N/A
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

Date of Government Version: N/A	Source: N/A
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environment, Health and Natural Resources in North Carolina.

Date of Government Version: N/A	Source: Department of Environment, Health and Natural Resources
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 12/20/2013	Last EDR Contact: 06/01/2012
Number of Days to Update: 172	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environment, Health and Natural Resources in North Carolina.

Date of Government Version: N/A	Source: Department of Environment, Health and Natural Resources
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 01/13/2014	Last EDR Contact: 06/01/2012
Number of Days to Update: 196	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environment, Health and Natural Resources in North Carolina.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/24/2013
Number of Days to Update: 176

Source: Department of Environment, Health and Natural Resources
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/21/2014
Next Scheduled EDR Contact: 06/02/2014
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/17/2014
Next Scheduled EDR Contact: 04/28/2014
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 11/01/2013
Date Data Arrived at EDR: 11/07/2013
Date Made Active in Reports: 11/18/2013
Number of Days to Update: 11

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/07/2014
Next Scheduled EDR Contact: 05/19/2014
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 07/24/2013
Date Made Active in Reports: 08/19/2013
Number of Days to Update: 26

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/20/2014
Next Scheduled EDR Contact: 05/05/2014
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 06/21/2013
Date Made Active in Reports: 08/05/2013
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/24/2014
Next Scheduled EDR Contact: 06/09/2014
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2012

Date Data Arrived at EDR: 08/09/2013

Date Made Active in Reports: 09/27/2013

Number of Days to Update: 49

Source: Department of Natural Resources

Telephone: N/A

Last EDR Contact: 12/11/2013

Next Scheduled EDR Contact: 03/31/2014

Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data

Source: Rextag Strategies Corp.

Telephone: (281) 769-2247

U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.

Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services

Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institutes of Health

Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Facility List

Source: Department of Health & Human Services

Telephone: 919-662-4499

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory

Source: Department of Environment & Natural Resources

Telephone: 919-733-2090

Scanned Digital USGS 7.5' Topographic Map (DRG)

Source: United States Geologic Survey

A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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Appendix F
NCEEP Floodplain Requirements Checklist/HEC RAS Output



Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-215-1693

October 29, 2014

John Gerber, PE, CFM
State NFIP Coordinator
NC Floodplain Management Branch
4218 Mail Service Center
Raleigh, NC 27699-4218

Re: Aycock Springs Stream and Wetland mitigation project Alamance County **14-006**
FEMA Floodplain Requirements Checklist

Dear Mr. Gerber:

The purpose of this letter is to request concurrence from the National Flood Insurance Program (NFIP) concerning a stream and wetland restoration site located in Alamance County. The Site encompasses approximately 15 acres of agricultural land used for livestock grazing and hay production. Existing Site streams have been cleared, dredged of cobble substrate, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock. Proposed activities at the Site include the restoration of perennial and intermittent stream channels, enhancement of perennial stream channel, and restoration of riparian wetlands. Work proposed on the main channel of Travis Creek includes easing two tight meanders, removing a breached dam that impinges flow at the site outfall, moving the channel to a relict and abandoned reach of channel, and planting with forest vegetation on cleared sections.

Stream reaches are depicted on the attached figures and lengths/priority are as follows:

Reach	Length	Priority
UT 1	1315	Priority 1 Restoration
UT 2	675	Priority 1 Restoration
UT 3	212	Priority 1 Restoration
UT 4	413	Priority 1 Restoration
Travis Creek	1351	Enhancement Level II
Travis Creek	744	Priority 1 and 2 Restoration

FEMA mapping was reviewed to determine if the project is located in a FEMA study area (DFIRM panel number 8846). Based on existing floodplain mapping, the site is located in Special Flood Hazard Area and the project may require a "Conditional Letter of Map Revision" (CLOMR), and a subsequent "Letter of Map Revision" (LOMR).

We thank you in advance for your timely response and cooperation. Please feel free to contact the below referenced EEP Project Manager with any questions that you may have concerning the extent of site disturbance associated with this project.

Yours truly,

AXIOM ENVIRONMENTAL

A handwritten signature in blue ink that reads "W Grant Lewis". The signature is written in a cursive style and is positioned above a faint, light blue rectangular stamp.

W. Grant Lewis
Senior Project Manager

Attachments

Figure 1 Project Location
Figure 2 Topography
EEP Floodplain Requirements Checklist

Cc Raymond Holz
Kristie Corson



Prepared for:



Project:

Aycock Springs Stream and Wetland Restoration Site

Alamance County, NC

Title:

Project Location

Notes:

- Background Imagery sources (provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) created by the U.S. Park Service (upper inset).
 2. Delorme World Basemap digital mapping (2010, lower inset).
 3. Burlington, NC (1980), Lake Burlington, NC (1969), Gibsonville, NC (1970), and Ossipee, NC (1970) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey.

Drawn by: SGD

Date: Oct 2013

Scale: As Shown

Project No.: 13-004.02

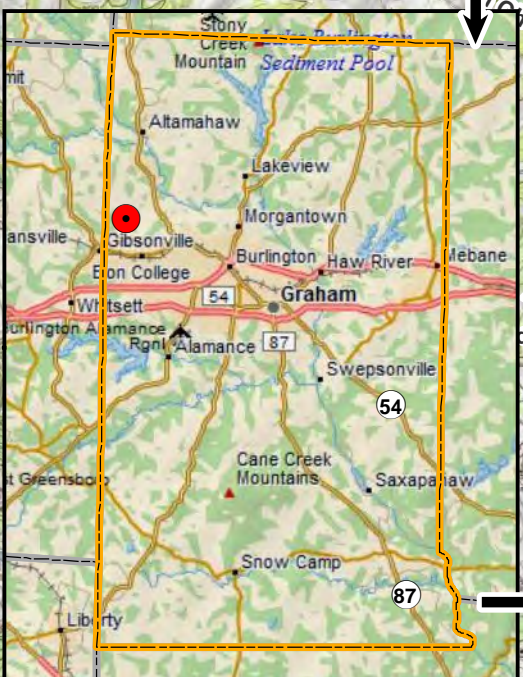
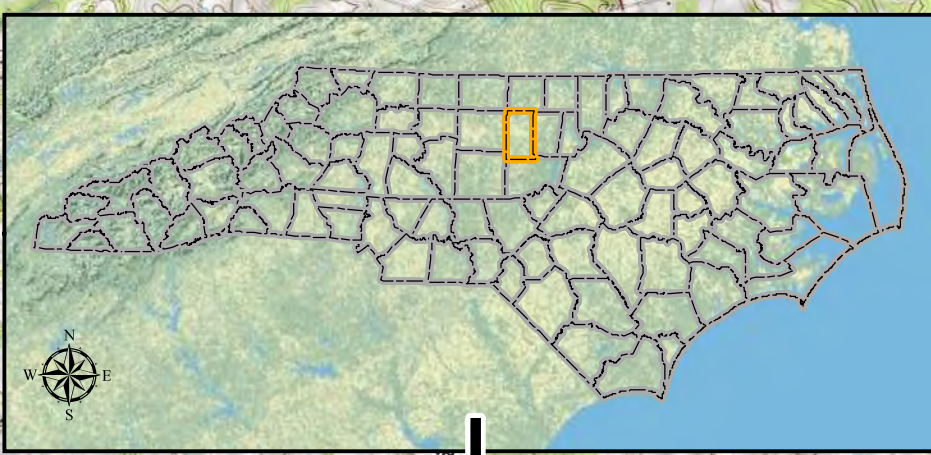
FIGURE

1

Directions to the Site from Interstates 40/85 in Burlington/Elon, NC:

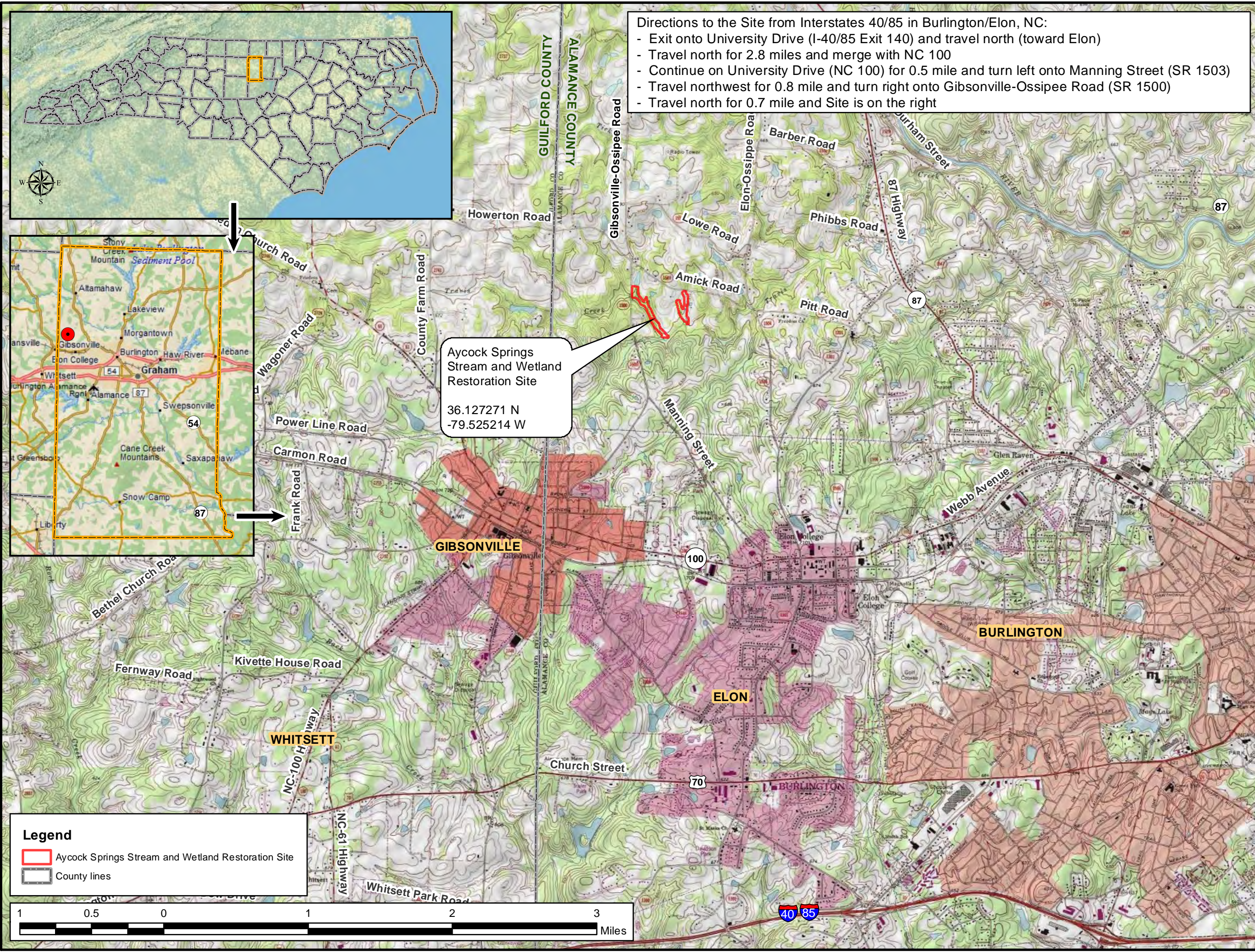
- Exit onto University Drive (I-40/85 Exit 140) and travel north (toward Elon)
- Travel north for 2.8 miles and merge with NC 100
- Continue on University Drive (NC 100) for 0.5 mile and turn left onto Manning Street (SR 1503)
- Travel northwest for 0.8 mile and turn right onto Gibsonville-Ossipee Road (SR 1500)
- Travel north for 0.7 mile and Site is on the right

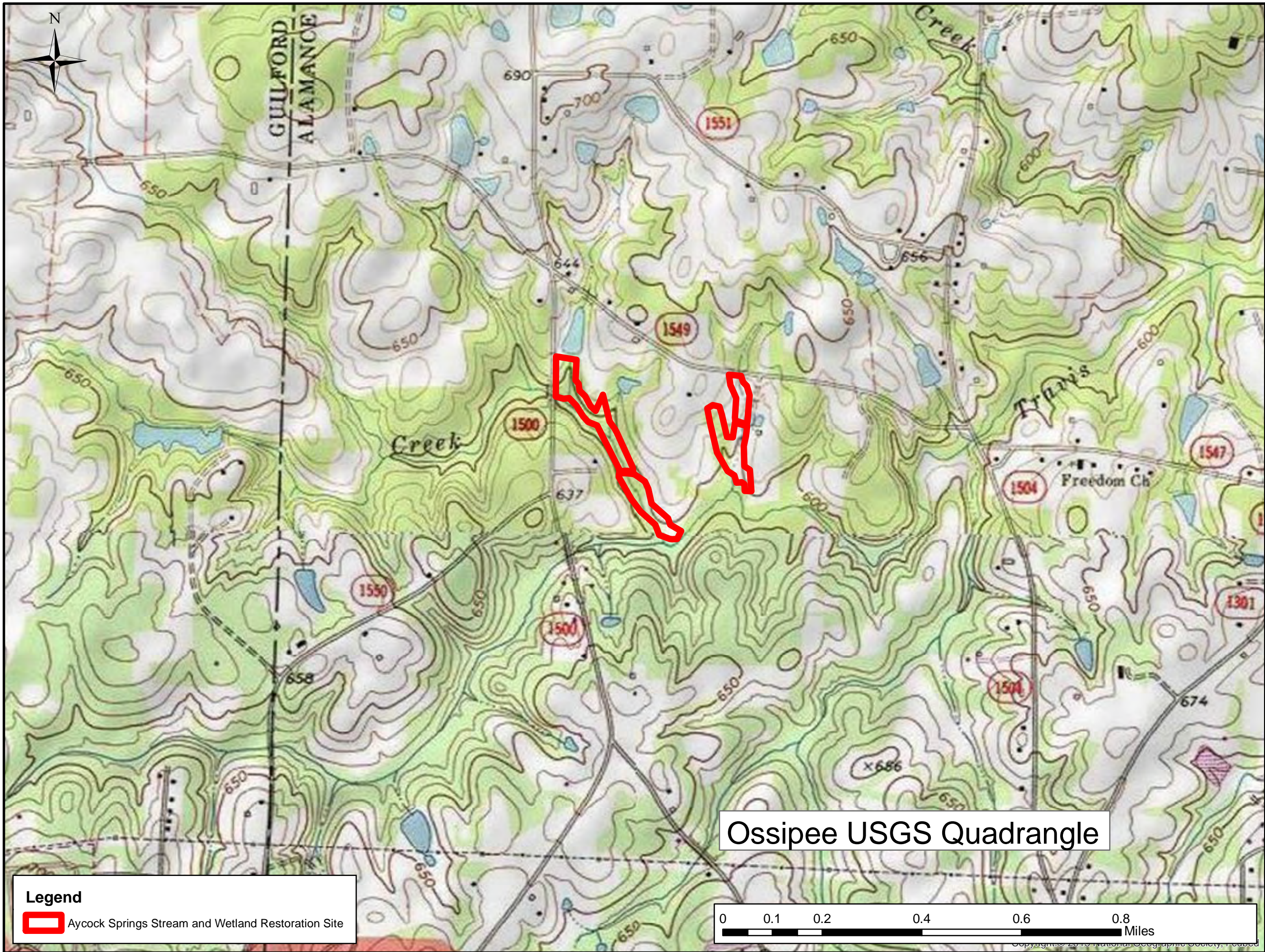
Aycock Springs Stream and Wetland Restoration Site
 36.127271 N
 -79.525214 W



Legend

- Aycock Springs Stream and Wetland Restoration Site
- County lines





Prepared for:

Project:

Aycock Springs Stream and Wetland Restoration Site

Alamance County, NC

Title:

Topography

Notes:
Background Imagery sources (provided by ESRI Data and Maps):
1. Burlington, NC (1980), Lake Burlington, NC (1969), Gibsonville, NC (1970), and Ossipee, NC (1970) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey.

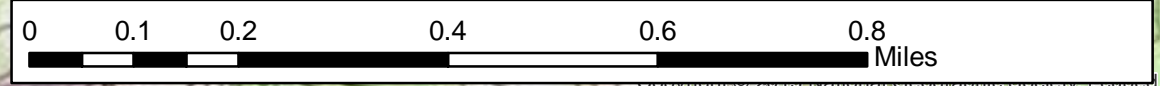
Drawn by: WGL

Date: OCT 2013

Scale: As Shown

Project No.: 13-004.02

Ossipee USGS Quadrangle



Legend
 Aycock Springs Stream and Wetland Restoration Site



EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Aycock Springs Stream and Wetland Restoration Site
Name if stream or feature:	Travis Creek
County:	Alamance
Name of river basin:	Cape Fear
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Alamance
DFIRM panel number for entire site:	8846
Consultant name:	Axiom Environmental, Inc.
Phone number:	919-215-1693
Address:	218 Snow Avenue Raleigh, NC 27603

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500". (See Attached)

Summarize stream reaches or wetland areas according to their restoration priority.
(See Attached)

Example

Reach	Length	Priority
<i>Example: Reach A</i>	<i>1000</i>	<i>One (Restoration)</i>
<i>Example: Reach B</i>	<i>2000</i>	<i>Three (Enhancement)</i>

Floodplain Information

<p>Is project located in a Special Flood Hazard Area (SFHA)?</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>
<p>If project is located in a SFHA, check how it was determined:</p> <p><input checked="" type="checkbox"/> Redelineation</p> <p><input checked="" type="checkbox"/> Detailed Study</p> <p><input type="checkbox"/> Limited Detail Study</p> <p><input type="checkbox"/> Approximate Study</p> <p><input type="checkbox"/> Don't know</p>
<p>List flood zone designation:</p> <p>Check if applies:</p> <p><input checked="" type="checkbox"/> AE Zone</p> <p style="padding-left: 20px;"> <input checked="" type="radio"/> Floodway <input type="radio"/> Non-Encroachment <input type="radio"/> None </p> <p><input type="checkbox"/> A Zone</p> <p style="padding-left: 20px;"> <input type="radio"/> Local Setbacks Required <input type="radio"/> No Local Setbacks Required </p>
<p>If local setbacks are required, list how many feet:</p>
<p>Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?</p> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>

<p>Land Acquisition (Check)</p> <p><input type="checkbox"/> State owned (fee simple)</p> <p><input type="checkbox"/> Conservation easment (Design Bid Build)</p> <p><input checked="" type="checkbox"/> Conservation Easement (Full Delivery Project)</p> <p>Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)</p>
<p>Is community/county participating in the NFIP program?</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)</p>
<p>Name of Local Floodplain Administrator: Jason Martin Libby Hodges</p> <p>Phone Number: 336-570-4052</p>

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

- No Action
- No Rise
- Letter of Map Revision (copy)
- Conditional Letter of Map Revision (copy)
- Other Requirements

List other requirements:
Please see Floodplain Development Permit and Flood Flood Damage Prevention Ordinance.

Libby Hodges 12/19/2014

Comments:

Name: W. Grant Lewis Signature: *W Grant Lewis*

Title: President Date: 10/29/14

-Travis- (Main Reach)				Proposed Conditions		Existing Conditions		Δ W.S. Elev		Δ Shear, Channel		
HEC-RAS Sta.	Project Sta.	Profile	Q Total (cfs)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	+/- (ft)	+/- (lb/sq ft)			
23026	1013	Bankfull	231	600.53	0.41	600.62	0.39	- 0.09	+ 0.02			
		2x Bankfull	462	601.6	0.95	601.65	0.92	- 0.05	+ 0.03			
		2 Yr	370	601.41	0.68	601.42	0.68	- 0.01	0.00			
		5 Yr	650	602.02	1.46	602.09	1.41	- 0.07	+ 0.05			
		10 Yr	850	602.55	1.83	602.61	1.78	- 0.06	+ 0.05			
		100 Yr	1800	604.12	3.65	604.2	3.53	- 0.08	+ 0.12			
22822	1217	Bankfull	241	600.5	0.53	600.59	0.51	- 0.09	+ 0.02			
		2x Bankfull	481	601.61	0.88	601.66	0.83	- 0.05	+ 0.05			
		2 Yr	380	601.37	0.79	601.38	0.78	- 0.01	+ 0.01			
		5 Yr	650	602.08	0.99	602.14	0.93	- 0.06	+ 0.06			
		10 Yr	900	602.65	1.08	602.7	1.03	- 0.05	+ 0.05			
		100 Yr	1900	604.41	1.18	604.48	1.13	- 0.07	+ 0.05			
22729	1310	Bankfull	241	600.19	0.7	600.3	0.66	- 0.11	+ 0.04			
		2x Bankfull	481	601.24	1.06	601.33	0.95	- 0.09	+ 0.11			
		2 Yr	380	600.94	1.13	600.95	1.12	- 0.01	+ 0.01			
		5 Yr	650	601.71	1.14	601.82	1.02	- 0.11	+ 0.12			
		10 Yr	900	602.29	1.22	602.38	1.13	- 0.09	+ 0.09			
		100 Yr	1900	604.12	1.33	604.2	1.27	- 0.08	+ 0.06			
22638	1401	Bankfull	241	599.84	0.76	599.99	0.69	- 0.15	+ 0.07			
		2x Bankfull	481	600.91	0.82	601.06	0.68	- 0.15	+ 0.14			
		2 Yr	380	600.52	1	600.66	0.7	- 0.14	+ 0.30			
		5 Yr	650	601.41	0.85	601.56	0.72	- 0.15	+ 0.13			
		10 Yr	900	602	0.91	602.11	0.83	- 0.11	+ 0.08			
		100 Yr	1900	603.86	1.05	603.96	0.99	- 0.10	+ 0.06			
22541	1498	Bankfull	241	599.46	0.68	599.67	0.59	- 0.21	+ 0.09			
		2x Bankfull	481	600.48	0.97	600.73	0.77	- 0.25	+ 0.20			
		2 Yr	380	600.09	0.89	600.33	0.7	- 0.24	+ 0.19			
		5 Yr	650	600.98	1.1	601.24	0.85	- 0.26	+ 0.25			
		10 Yr	900	601.59	1.18	601.77	1.01	- 0.18	+ 0.17			
		100 Yr	1900	603.56	1.19	603.69	1.09	- 0.13	+ 0.10			
R E S T O R A T I O N	22339	1700	Bankfull	245	599.52	0.16	599.7	0.38	- 0.18	- 0.22		
			2x Bankfull	490	600.56	0.28	600.77	0.49	- 0.21	- 0.21		
			2 Yr	390	600.16	0.24	600.36	0.46	- 0.20	- 0.22		
			5 Yr	650	601.06	0.35	601.28	0.55	- 0.22	- 0.20		
			10 Yr	900	601.66	0.46	601.8	0.7	- 0.14	- 0.24		
			100 Yr	1900	603.58	0.81	603.68	1.05	- 0.10	- 0.24		
	22239	1800	Bankfull	245	599.45	0.19	599.49	0.43	- 0.04	- 0.24		
			2x Bankfull	490	600.45	0.34	600.55	0.58	- 0.10	- 0.24		
			2 Yr	390	600.06	0.29	600.12	0.57	- 0.06	- 0.28		
			5 Yr	650	600.94	0.41	601.06	0.63	- 0.12	- 0.22		
			10 Yr	900	601.53	0.52	601.56	0.8	- 0.03	- 0.28		
			100 Yr	1900	603.41	0.84	603.43	1.08	- 0.02	- 0.24		
22139	1900	Bankfull	245	599.32	0.4	599.31	0.41	+ 0.01	- 0.01			
		2x Bankfull	490	600.32	0.49	600.38	0.46	- 0.06	+ 0.03			
		2 Yr	390	599.92	0.47	599.94	0.47	- 0.02	0.00			
		5 Yr	650	600.8	0.55	600.89	0.5	- 0.09	+ 0.05			
		10 Yr	900	601.37	0.65	601.36	0.66	+ 0.01	- 0.01			
		100 Yr	1900	603.24	0.88	603.23	0.89	+ 0.01	- 0.01			
22042	1997	Bankfull	245	599.1	0.48	599.07	0.5	+ 0.03	- 0.02			
		2x Bankfull	490	600.13	0.49	600.21	0.45	- 0.08	+ 0.04			
		2 Yr	390	599.71	0.51	599.73	0.5	- 0.02	+ 0.01			
		5 Yr	650	600.61	0.52	600.73	0.47	- 0.12	+ 0.05			
		10 Yr	900	601.17	0.61	601.16	0.62	+ 0.01	- 0.01			
		100 Yr	1900	603.06	0.75	603.05	0.76	+ 0.01	- 0.01			
21962	2077	Bankfull	245	598.96	0.35	598.92	0.37	+ 0.04	- 0.02			
		2x Bankfull	490	600.01	0.37	600.11	0.33	- 0.10	+ 0.04			

-Travis- (Main Reach)				Proposed Conditions		Existing Conditions		Δ W.S.	Δ Shear,	
HEC-RAS Sta.	Project Sta.	Profile	Q Total	W.S. Elev	Shear Chan	W.S. Elev	Shear Chan	Elev	Channel	
			(cfs)	(ft)	(lb/sq ft)	(ft)	(lb/sq ft)	+/- (ft)	+/- (lb/sq ft)	
		2 Yr	390	599.58	0.38	599.6	0.37	- 0.02	+ 0.01	
		5 Yr	650	600.5	0.4	600.63	0.35	- 0.13	+ 0.05	
		10 Yr	900	601.05	0.46	601.04	0.47	+ 0.01	- 0.01	
		100 Yr	1900	602.95	0.58	602.94	0.58	+ 0.01	0.00	
21839	2200	Bankfull	245	598.68	0.51	598.61	0.56	+ 0.07	- 0.05	
		2x Bankfull	490	599.79	0.53	599.91	0.47	- 0.12	+ 0.06	
		2 Yr	390	599.31	0.57	599.35	0.55	- 0.04	+ 0.02	
		5 Yr	650	600.28	0.57	600.45	0.49	- 0.17	+ 0.08	
		10 Yr	900	600.82	0.68	600.8	0.7	+ 0.02	- 0.02	
		100 Yr	1900	602.74	0.8	602.72	0.81	+ 0.02	- 0.01	
21738	2301	Bankfull	245	598.49	0.37	598.39	0.42	+ 0.10	- 0.05	
		2x Bankfull	490	599.64	0.38	599.79	0.33	- 0.15	+ 0.05	
		2 Yr	390	599.13	0.42	599.17	0.4	- 0.04	+ 0.02	
		5 Yr	650	600.13	0.42	600.32	0.36	- 0.19	+ 0.06	
		10 Yr	900	600.65	0.52	600.63	0.53	+ 0.02	- 0.01	
		100 Yr	1900	602.6	0.6	602.58	0.6	+ 0.02	0.00	
R E S T O R A T I O N	21592	2447	Bankfull	245	598.23	0.32	598.2	0.23	+ 0.03	+ 0.09
			2x Bankfull	490	599.47	0.26	599.67	0.2	- 0.20	+ 0.06
			2 Yr	390	598.91	0.3	599.01	0.24	- 0.10	+ 0.06
			5 Yr	650	599.96	0.3	600.2	0.23	- 0.24	+ 0.07
			10 Yr	900	600.46	0.38	600.45	0.37	+ 0.01	+ 0.01
			100 Yr	1900	602.4	0.54	602.4	0.51	0.00	+ 0.03
	21502	2537	Bankfull	245	598.14	0.17	598.13	0.19	+ 0.01	- 0.02
			2x Bankfull	490	599.38	0.28	599.6	0.32	- 0.22	- 0.04
			2 Yr	390	598.81	0.26	598.93	0.3	- 0.12	- 0.04
			5 Yr	650	599.85	0.37	600.11	0.42	- 0.26	- 0.05
			10 Yr	900	600.3	0.55	600.3	0.73	0.00	- 0.18
			100 Yr	1900	602.23	0.82	602.24	1.03	- 0.01	- 0.21
	21388	2651	Bankfull	245	598.07	0.16	598.04	0.22	+ 0.03	- 0.06
			2x Bankfull	490	599.29	0.23	599.51	0.24	- 0.22	- 0.01
			2 Yr	390	598.72	0.22	598.83	0.26	- 0.11	- 0.04
		5 Yr	650	599.74	0.31	600.01	0.31	- 0.27	0.00	
		10 Yr	900	600.16	0.46	600.11	0.55	+ 0.05	- 0.09	
		100 Yr	1900	602.08	0.64	602.05	0.7	+ 0.03	- 0.06	
21314	2725	Bankfull	245	598.04	0.1	598.02	0.08	+ 0.02	+ 0.02	
		2x Bankfull	490	599.26	0.15	599.48	0.11	- 0.22	+ 0.04	
		2 Yr	390	598.68	0.15	598.8	0.11	- 0.12	+ 0.04	
		5 Yr	650	599.7	0.24	599.97	0.17	- 0.27	+ 0.07	
		10 Yr	900	600.1	0.34	600.05	0.31	+ 0.05	+ 0.03	
		100 Yr	1900	602.02	0.47	601.99	0.43	+ 0.03	+ 0.04	
21215	2824	Bankfull	245	597.97	0.18	597.95	0.2	+ 0.02	- 0.02	
		2x Bankfull	490	599.19	0.21	599.4	0.31	- 0.21	- 0.10	
		2 Yr	390	598.61	0.23	598.71	0.29	- 0.10	- 0.06	
		5 Yr	650	599.63	0.24	599.88	0.35	- 0.25	- 0.11	
		10 Yr	900	600.01	0.34	599.89	0.66	+ 0.12	- 0.32	
		100 Yr	1900	601.93	0.42	601.86	0.65	+ 0.07	- 0.23	
21099	2940	Bankfull	245	597.9	0.12	597.88	0.15	+ 0.02	- 0.03	
		2x Bankfull	490	599.13	0.13	599.3	0.27	- 0.17	- 0.14	
		2 Yr	390	598.53	0.14	598.62	0.24	- 0.09	- 0.10	
		5 Yr	650	599.56	0.16	599.85	0.11	- 0.29	+ 0.05	
		10 Yr	900	599.92	0.21	599.82	0.21	+ 0.10	0.00	
		100 Yr	1900	601.85	0.26	601.8	0.24	+ 0.05	+ 0.02	
20609	3430	Bankfull	351	597.25	0.48	597.25	0.48	0.00	0.00	
		2x Bankfull	702	598.46	0.77	598.46	0.77	0.00	0.00	
		2 Yr	500	597.86	0.59	597.86	0.59	0.00	0.00	
		5 Yr	850	598.83	0.87	598.83	0.87	0.00	0.00	

-Travis- (Main Reach)				Proposed Conditions		Existing Conditions		Δ W.S. Elev	Δ Shear, Channel
HEC-RAS Sta.	Project Sta.	Profile	Q Total	W.S. Elev	Shear Chan	W.S. Elev	Shear Chan	+/-	+/-
			(cfs)	(ft)	(lb/sq ft)	(ft)	(lb/sq ft)	(ft)	(lb/sq ft)
		10 Yr	1100	599.26	0.6	599.26	0.6	0.00	0.00
		100 Yr	2400	601.28	0.77	601.28	0.77	0.00	0.00
20283	3756	Bankfull	351	596.77	0.26	596.77	0.26	0.00	0.00
		2x Bankfull	702	597.79	0.47	597.79	0.47	0.00	0.00
		2 Yr	500	597.31	0.34	597.31	0.34	0.00	0.00
		5 Yr	850	598.12	0.55	598.12	0.55	0.00	0.00
		10 Yr	1100	598.58	0.69	598.58	0.69	0.00	0.00
		100 Yr	2400	600.54	1.12	600.54	1.12	0.00	0.00
19916	4123	Bankfull	351	594.9	4.95	594.9	4.95	0.00	0.00
		2x Bankfull	702	595.92	3.24	595.92	3.24	0.00	0.00
		2 Yr	500	595.24	5.23	595.24	5.23	0.00	0.00
		5 Yr	850	596.28	2.86	596.28	2.86	0.00	0.00
		10 Yr	1100	597.24	1.45	597.24	1.45	0.00	0.00
		100 Yr	2400	599.54	1.09	599.54	1.09	0.00	0.00
19442	4597	Bankfull	362	594.97	0.58	594.97	0.58	0.00	0.00
		2x Bankfull	724	596.16	0.6	596.16	0.6	0.00	0.00
		2 Yr	500	595.45	0.59	595.45	0.59	0.00	0.00
		5 Yr	850	596.49	0.63	596.49	0.63	0.00	0.00
		10 Yr	1200	597.32	0.71	597.32	0.71	0.00	0.00
		100 Yr	2400	599.59	0.73	599.59	0.73	0.00	0.00
18981	5058	Bankfull	362	594.23	0.22	594.23	0.22	0.00	0.00
		2x Bankfull	724	595.51	0.29	595.51	0.29	0.00	0.00
		2 Yr	500	594.77	0.24	594.77	0.24	0.00	0.00
		5 Yr	850	595.87	0.29	595.87	0.29	0.00	0.00
		10 Yr	1200	596.75	0.31	596.75	0.31	0.00	0.00
		100 Yr	2400	599.12	0.39	599.12	0.39	0.00	0.00
18168	5871	Bankfull	362	594.03	0.03	594.03	0.03	0.00	0.00
		2x Bankfull	724	595.25	0.05	595.25	0.05	0.00	0.00
		2 Yr	500	594.55	0.04	594.55	0.04	0.00	0.00
		5 Yr	850	595.6	0.06	595.6	0.06	0.00	0.00
		10 Yr	1200	596.47	0.08	596.47	0.08	0.00	0.00
		100 Yr	2400	598.81	0.13	598.81	0.13	0.00	0.00
17792	6247	Bankfull	362	593.91	0.23	593.91	0.23	0.00	0.00
		2x Bankfull	724	595.1	0.28	595.1	0.28	0.00	0.00
		2 Yr	500	594.41	0.25	594.41	0.25	0.00	0.00
		5 Yr	850	595.45	0.3	595.45	0.3	0.00	0.00
		10 Yr	1200	596.3	0.34	596.3	0.34	0.00	0.00
		100 Yr	2400	598.61	0.45	598.61	0.45	0.00	0.00

-UT 1-				Proposed Conditions		Existing Conditions		Δ W.S. Elev	Δ Shear, Channel
HEC-RAS Sta.	Project Sta.	Profile	Q Total (cfs)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	+/- (ft)	+/- (lb/sq ft)
2311	1009	Bankfull	15.1	615.35	0.57	614.49	0.53	+ 0.86	+ 0.04
		2x Bankfull	30.2	615.52	0.87	615.03	0.77	+ 0.49	+ 0.10
		2 Yr	18	615.41	0.57	614.62	0.59	+ 0.79	- 0.02
		5 Yr	35	615.58	0.9	615.15	0.83	+ 0.43	+ 0.07
		10 Yr	51	615.74	1.02	615.5	1.02	+ 0.24	0.00
		100 Yr	116	616.23	1.39	616.42	1.6	- 0.19	- 0.21
2251	1069	Bankfull	15.1	613.86	1.73	613.43	1.25	+ 0.43	+ 0.48
		2x Bankfull	30.2	614.22	1.44	613.82	1.68	+ 0.40	- 0.24
		2 Yr	18	613.92	1.94	613.52	1.35	+ 0.40	+ 0.59
		5 Yr	35	614.27	1.59	613.92	1.79	+ 0.35	- 0.20
		10 Yr	51	614.42	1.9	614.18	2.1	+ 0.24	- 0.20
		100 Yr	116	614.87	2.81	614.96	2.54	- 0.09	+ 0.27
2177	1143	Bankfull	15.1	612.14	0.6	609.58	2.97	+ 2.56	- 2.37
		2x Bankfull	30.2	612.27	1.26	609.95	3.57	+ 2.32	- 2.31
		2 Yr	18	612.2	0.64	609.67	3.11	+ 2.53	- 2.47
		5 Yr	35	612.33	1.3	610.04	3.71	+ 2.29	- 2.41
		10 Yr	51	612.49	1.49	610.3	4.14	+ 2.19	- 2.65
		100 Yr	116	612.97	2.09	611.05	5.29	+ 1.92	- 3.20
2104	1216	Bankfull	15.1	609.86	2.63	605.78	1.29	+ 4.08	+ 1.34
		2x Bankfull	30.2	610.25	1.44	606.22	1.67	+ 4.03	- 0.23
		2 Yr	18	609.93	2.72	605.88	1.37	+ 4.05	+ 1.35
		5 Yr	35	610.28	1.59	606.33	1.77	+ 3.95	- 0.18
		10 Yr	51	610.36	1.96	606.6	2.21	+ 3.76	- 0.25
		100 Yr	116	610.59	3.26	607.4	3.24	+ 3.19	+ 0.02
2052	1268	Bankfull	15.1	608.66	0.48	604.15	1.41	+ 4.51	- 0.93
		2x Bankfull	30.2	608.83	0.69	604.7	1.57	+ 4.13	- 0.88
		2 Yr	18	608.69	0.57	604.27	1.48	+ 4.42	- 0.91
		5 Yr	35	608.88	0.72	604.83	1.57	+ 4.05	- 0.85
		10 Yr	51	609.01	0.86	605.2	1.58	+ 3.81	- 0.72
		100 Yr	116	609.36	1.22	606.11	1.95	+ 3.25	- 0.73
1981	1339	Bankfull	15.1	607.32	1.32	601.98	1.45	+ 5.34	- 0.13
		2x Bankfull	30.2	607.55	1.21	602.55	1.9	+ 5.00	- 0.69
		2 Yr	18	607.43	1.05	602.12	1.54	+ 5.31	- 0.49
		5 Yr	35	607.59	1.32	602.69	2.05	+ 4.90	- 0.73
		10 Yr	51	607.69	1.4	603.08	2.38	+ 4.61	- 0.98
		100 Yr	116	608.05	1.79	604.1	2.87	+ 3.95	- 1.08
1924	1396	Bankfull	15.1	605.71	0.89	601.47	0.31	+ 4.24	+ 0.58
		2x Bankfull	30.2	605.86	1.55	602.03	0.43	+ 3.83	+ 1.12
		2 Yr	18	605.71	1.3	601.6	0.33	+ 4.11	+ 0.97
		5 Yr	35	605.91	1.55	602.15	0.47	+ 3.76	+ 1.08
		10 Yr	51	606.02	1.92	602.51	0.57	+ 3.51	+ 1.35
		100 Yr	116	606.26	2.78	603.49	0.85	+ 2.77	+ 1.93
1867	1453	Bankfull	15.1	603.87	1.61	601.19	0.25	+ 2.68	+ 1.36
		2x Bankfull	30.2	604.03	1.49	601.71	0.34	+ 2.32	+ 1.15
		2 Yr	18	603.94	1.19	601.31	0.27	+ 2.63	+ 0.92
		5 Yr	35	604.06	1.65	601.84	0.36	+ 2.22	+ 1.29
		10 Yr	51	604.14	1.65	602.18	0.42	+ 1.96	+ 1.23
		100 Yr	116	604.47	2.03	603.14	0.62	+ 1.33	+ 1.41
1806	1514	Bankfull	15.1	602.32	0.65	600.64	0.75	+ 1.68	- 0.10
		2x Bankfull	30.2	602.53	0.83	601.04	1.19	+ 1.49	- 0.36
		2 Yr	18	602.37	0.72	600.74	0.84	+ 1.63	- 0.12
		5 Yr	35	602.57	0.92	601.13	1.32	+ 1.44	- 0.40
		10 Yr	51	602.7	1.17	601.41	1.66	+ 1.29	- 0.49
		100 Yr	116	603.01	1.54	602.09	2.88	+ 0.92	- 1.34
1767	1553	Bankfull	15.1	601.35	1.26	600.17	0.41	+ 1.18	+ 0.85
		2x Bankfull	30.2	601.55	1.65	600.54	0.54	+ 1.01	+ 1.11

-UT 1-				Proposed Conditions		Existing Conditions		Δ W.S. Elev	Δ Shear, Channel
HEC-RAS Sta.	Project Sta.	Profile	Q Total (cfs)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	+/- (ft)	+/- (lb/sq ft)
		2 Yr	18	601.42	1.27	600.26	0.44	+ 1.16	+ 0.83
		5 Yr	35	601.62	1.6	600.63	0.58	+ 0.99	+ 1.02
		10 Yr	51	601.75	1.53	600.91	0.67	+ 0.84	+ 0.86
		100 Yr	116	602.15	2.26	601.67	1.03	+ 0.48	+ 1.23
1724	1596	Bankfull	15.1	600.22	0.9	599.4	1.05	+ 0.82	- 0.15
		2x Bankfull	30.2	600.53	1.09	599.87	1.01	+ 0.66	+ 0.08
		2 Yr	18	600.27	1.05	599.51	1.03	+ 0.76	+ 0.02
		5 Yr	35	600.57	1.26	599.96	1.06	+ 0.61	+ 0.20
		10 Yr	51	600.77	1.68	600.22	1.24	+ 0.55	+ 0.44
		100 Yr	116	600.95	2.05	600.42	2.16	+ 0.53	- 0.11
1648	1672	Bankfull	15.1	599.19	0.35	598.03	0.66	+ 1.16	- 0.31
		2x Bankfull	30.2	599.3	0.66	598.56	0.85	+ 0.74	- 0.19
		2 Yr	18	599.23	0.37	598.17	0.71	+ 1.06	- 0.34
		5 Yr	35	599.35	0.65	598.66	0.9	+ 0.69	- 0.25
		10 Yr	51	599.42	0.69	598.93	1.02	+ 0.49	- 0.33
		100 Yr	116	599.88	0.93	599.77	1.29	+ 0.11	- 0.36
1602	1718	Bankfull	15.1	598.32	1.17	597.28	1.01	+ 1.04	+ 0.16
		2x Bankfull	30.2	598.63	0.71	597.71	1.43	+ 0.92	- 0.72
		2 Yr	18	598.35	1.37	597.39	1.12	+ 0.96	+ 0.25
		5 Yr	35	598.66	0.8	597.81	1.54	+ 0.85	- 0.74
		10 Yr	51	598.89	1.04	598.08	1.97	+ 0.81	- 0.93
		100 Yr	116	599.71	1.31	599.69	2.14	+ 0.02	- 0.83
1537	1783	Bankfull	15.1	597.64	0.27	596.81	0.27	+ 0.83	0.00
		2x Bankfull	30.2	597.7	0.72	597.2	0.42	+ 0.50	+ 0.30
		2 Yr	18	597.7	0.27	596.9	0.3	+ 0.80	- 0.03
		5 Yr	35	597.77	0.67	597.27	0.46	+ 0.50	+ 0.21
		10 Yr	51	597.7	0.63	597.45	0.57	+ 0.25	+ 0.06
		100 Yr	116	599.67	0.85	599.67	1.22	0.00	- 0.37
1487	1833	Bankfull	15.1	596.7	2.61	595.99	2.34	+ 0.71	+ 0.27
		2x Bankfull	30.2	596.93	0.68	596.28	2.81	+ 0.65	- 2.13
		2 Yr	18	596.77	2.73	596.05	2.53	+ 0.72	+ 0.20
		5 Yr	35	596.93	0.91	596.38	2.98	+ 0.55	- 2.07
		10 Yr	51	597.39	1.84	597.39	3.03	0.00	- 1.19
		100 Yr	116	599.66	3.41	599.66	2.42	0.00	+ 0.99
1264	2056	Bankfull	16.3	595.03	0.46	595.03	0.22	0.00	+ 0.24
		2x Bankfull	32.6	596.22	0.37	596.22	0.17	0.00	+ 0.20
		2 Yr	19	595.51	0.46	595.51	0.22	0.00	+ 0.24
		5 Yr	36	596.55	0.37	596.55	0.17	0.00	+ 0.20
		10 Yr	52	597.39	0.3	597.39	0.11	0.00	+ 0.19
		100 Yr	118	599.66	0.25	599.66	0.1	0.00	+ 0.15
1194	2126	Bankfull	16.3	595.03	0.08	595.03	0.1	0.00	- 0.02
		2x Bankfull	32.6	596.22	0.09	596.22	0.03	0.00	+ 0.06
		2 Yr	19	595.51	0.08	595.51	0.08	0.00	0.00
		5 Yr	36	596.55	0.09	596.55	0.03	0.00	+ 0.06
		10 Yr	52	597.39	0.09	597.39	0.04	0.00	+ 0.05
		100 Yr	118	599.66	0.12	599.66	0.05	0.00	+ 0.07
1163	2157	Bankfull	16.3	595.03	0.06	595.03	0.01	0.00	+ 0.05
		2x Bankfull	32.6	596.22	0.08	596.22	0.01	0.00	+ 0.07
		2 Yr	19	595.51	0.06	595.51	0.01	0.00	+ 0.05
		5 Yr	36	596.55	0.08	596.55	0.01	0.00	+ 0.07
		10 Yr	52	597.39	0.1	597.39	0.02	0.00	+ 0.08
		100 Yr	118	599.66	0.15	599.66	0.04	0.00	+ 0.11
1094	2226	Bankfull	16.3	595.03	0.07	595.03	0.09	0.00	- 0.02
		2x Bankfull	32.6	596.22	0.08	596.22	0.11	0.00	- 0.03
		2 Yr	19	595.51	0.07	595.51	0.09	0.00	- 0.02
		5 Yr	36	596.55	0.09	596.55	0.11	0.00	- 0.02

-UT 1-				Proposed Conditions		Existing Conditions		Δ W.S. Elev	Δ Shear, Channel
HEC-RAS Sta.	Project Sta.	Profile	Q Total (cfs)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	+/- (ft)	+/- (lb/sq ft)
		10 Yr	52	597.39	0.1	597.39	0.12	0.00	- 0.02
		100 Yr	118	599.66	0.12	599.66	0.15	0.00	- 0.03

-UT 2-				Proposed Conditions		Existing Conditions		Δ W.S.	Δ Shear,
HEC-RAS Sta.	Project Sta.	Profile	Q Total	W.S. Elev	Shear Chan	W.S. Elev	Shear Chan	Elev	Channel
			(cfs)	(ft)	(lb/sq ft)	(ft)	(lb/sq ft)	+/- (ft)	+/- (lb/sq ft)
1672	1002	Bankfull	3.7	612.49	0.54	610.91	0.08	+ 1.58	+ 0.46
		2x Bankfull	7.4	612.69	0.73	611.11	0.12	+ 1.58	+ 0.61
		2 Yr	4.3	612.53	0.57	610.95	0.09	+ 1.58	+ 0.48
		5 Yr	8.8	612.75	0.79	611.16	0.12	+ 1.59	+ 0.67
		10 Yr	13	612.89	0.95	611.31	0.16	+ 1.58	+ 0.79
		100 Yr	31	613.11	1.23	611.75	0.27	+ 1.36	+ 0.96
1609	1065	Bankfull	3.7	610.89	0.54	610.49	0.28	+ 0.40	+ 0.26
		2x Bankfull	7.4	611.07	0.78	610.64	0.41	+ 0.43	+ 0.37
		2 Yr	4.3	610.92	0.59	610.52	0.3	+ 0.40	+ 0.29
		5 Yr	8.8	611.13	0.86	610.68	0.46	+ 0.45	+ 0.40
		10 Yr	13	611.24	0.98	610.79	0.62	+ 0.45	+ 0.36
		100 Yr	31	611.48	1.42	611.13	1.33	+ 0.35	+ 0.09
1557	1117	Bankfull	3.7	609.44	0.61	608.74	1.48	+ 0.70	- 0.87
		2x Bankfull	7.4	609.63	0.83	608.9	1.8	+ 0.73	- 0.97
		2 Yr	4.3	609.47	0.65	608.76	1.59	+ 0.71	- 0.94
		5 Yr	8.8	609.69	0.89	608.96	1.83	+ 0.73	- 0.94
		10 Yr	13	609.85	1.09	609.1	1.71	+ 0.75	- 0.62
		100 Yr	31	610.05	1.4	609.42	1.56	+ 0.63	- 0.16
1497	1177	Bankfull	3.7	607.45	0.7	606.8	0.33	+ 0.65	+ 0.37
		2x Bankfull	7.4	607.61	1.04	607	0.48	+ 0.61	+ 0.56
		2 Yr	4.3	607.48	0.77	606.85	0.36	+ 0.63	+ 0.41
		5 Yr	8.8	607.67	1.15	607.05	0.53	+ 0.62	+ 0.62
		10 Yr	13	607.76	1.33	607.19	0.69	+ 0.57	+ 0.64
		100 Yr	31	608.03	1.92	607.52	1.67	+ 0.51	+ 0.25
1465	1209	Bankfull	3.7	606.11	0.93	605.79	1.33	+ 0.32	- 0.40
		2x Bankfull	7.4	606.32	1.09	605.94	1.64	+ 0.38	- 0.55
		2 Yr	4.3	606.15	0.95	605.81	1.42	+ 0.34	- 0.47
		5 Yr	8.8	606.39	1.14	605.99	1.65	+ 0.40	- 0.51
		10 Yr	13	606.61	1.39	606.08	1.83	+ 0.53	- 0.44
		100 Yr	31	606.88	1.3	606.3	1.59	+ 0.58	- 0.29
1417	1257	Bankfull	3.7	604.9	0.36	604.25	0.26	+ 0.65	+ 0.10
		2x Bankfull	7.4	605.1	0.51	604.39	0.35	+ 0.71	+ 0.16
		2 Yr	4.3	604.94	0.39	604.29	0.27	+ 0.65	+ 0.12
		5 Yr	8.8	605.15	0.56	604.45	0.38	+ 0.70	+ 0.18
		10 Yr	13	605.2	0.67	604.58	0.48	+ 0.62	+ 0.19
		100 Yr	31	605.5	1.5	604.99	1.05	+ 0.51	+ 0.45
1376	1298	Bankfull	3.7	603.44	1.48	603.11	1.35	+ 0.33	+ 0.13
		2x Bankfull	7.4	603.6	1.83	603.33	1.67	+ 0.27	+ 0.16
		2 Yr	4.3	603.47	1.57	603.13	1.45	+ 0.34	+ 0.12
		5 Yr	8.8	603.66	1.9	603.37	1.7	+ 0.29	+ 0.20
		10 Yr	13	603.93	2.37	603.46	1.84	+ 0.47	+ 0.53
		100 Yr	31	604.12	1.79	603.62	1.46	+ 0.50	+ 0.33
1333	1341	Bankfull	3.7	601.82	0.46	601.61	0.46	+ 0.21	0.00
		2x Bankfull	7.4	602.01	0.68	601.66	0.65	+ 0.35	+ 0.03
		2 Yr	4.3	601.86	0.5	601.64	0.49	+ 0.22	+ 0.01
		5 Yr	8.8	602.07	0.76	601.71	0.71	+ 0.36	+ 0.05
		10 Yr	13	602.04	0.89	601.82	0.86	+ 0.22	+ 0.03
		100 Yr	31	602.38	1.55	602.32	2.4	+ 0.06	- 0.85
1285	1389	Bankfull	3.7	600.12	1.11	600.06	1.31	+ 0.06	- 0.20
		2x Bankfull	7.4	600.28	1.45	600.33	1.54	- 0.05	- 0.09
		2 Yr	4.3	600.15	1.2	600.08	1.36	+ 0.07	- 0.16
		5 Yr	8.8	600.34	1.53	600.37	1.6	- 0.03	- 0.07
		10 Yr	13	600.64	1.75	600.47	1.93	+ 0.17	- 0.18
		100 Yr	31	600.79	1.7	600.56	1.12	+ 0.23	+ 0.58
1231	1443	Bankfull	3.7	598.41	0.44	598.01	0.32	+ 0.40	+ 0.12
		2x Bankfull	7.4	598.64	0.58	597.98	0.41	+ 0.66	+ 0.17

-UT 2-				Proposed Conditions		Existing Conditions		Δ W.S. Elev		Δ Shear, Channel	
HEC-RAS Sta.	Project Sta.	Profile	Q Total	W.S. Elev	Shear Chan	W.S. Elev	Shear Chan	+/-	(ft)	+/-	(lb/sq ft)
			(cfs)	(ft)	(lb/sq ft)	(ft)	(lb/sq ft)				
		2 Yr	4.3	598.46	0.46	598.04	0.34	+ 0.42		+ 0.12	
		5 Yr	8.8	598.7	0.63	598.02	0.44	+ 0.68		+ 0.19	
		10 Yr	13	598.56	0.75	598.11	0.5	+ 0.45		+ 0.25	
		100 Yr	31	599.66	1.52	599.66	2.24	0.00		- 0.72	
1175	1499	Bankfull	3.7	596.26	1.7	595.73	1.5	+ 0.53		+ 0.20	
		2x Bankfull	7.4	596.43	2.18	596.21	1.79	+ 0.22		+ 0.39	
		2 Yr	4.3	596.28	1.88	595.75	1.56	+ 0.53		+ 0.32	
		5 Yr	8.8	596.48	2.24	596.55	1.85	- 0.07		+ 0.39	
		10 Yr	13	597.39	2.48	597.39	2.08	0.00		+ 0.40	
		100 Yr	31	599.66	0.01	599.66	0.11	0.00		- 0.10	

-UT 3-				Proposed Conditions		Existing Conditions		Δ W.S. Elev		Δ Shear, Channel	
HEC-RAS Sta.	Project Sta.	Profile	Q Total	W.S. Elev	Shear Chan	W.S. Elev	Shear Chan	+/-	(ft)	+/-	(lb/sq ft)
			(cfs)	(ft)	(lb/sq ft)	(ft)	(lb/sq ft)				
1207	1005	Bankfull	7.8	599.55	0.24	599.77	0.32	- 0.22		- 0.08	
		2x Bankfull	15.6	600.6	0.55	600.84	0.41	- 0.24		+ 0.14	
		2 Yr	9	600.2	0.27	600.43	0.33	- 0.23		- 0.06	
		5 Yr	19	601.11	0.66	601.36	0.45	- 0.25		+ 0.21	
		10 Yr	28	601.73	0.79	601.9	0.51	- 0.17		+ 0.28	
		100 Yr	68	603.71	0.72	603.83	0.68	- 0.12		+ 0.04	
1163	1049	Bankfull	7.8	599.55	1.21	599.77	0.15	- 0.22		+ 1.06	
		2x Bankfull	15.6	600.6	0.42	600.84	0.19	- 0.24		+ 0.23	
		2 Yr	9	600.2	1.07	600.43	0.16	- 0.23		+ 0.91	
		5 Yr	19	601.11	0.35	601.36	0.2	- 0.25		+ 0.15	
		10 Yr	28	601.73	0.29	601.9	0.23	- 0.17		+ 0.06	
		100 Yr	68	603.7	0.27	603.83	0.28	- 0.13		- 0.01	
1107	1105	Bankfull	7.8	599.55	0.05	599.77	0.01	- 0.22		+ 0.04	
		2x Bankfull	15.6	600.6	0.06	600.84	0.02	- 0.24		+ 0.04	
		2 Yr	9	600.2	0.05	600.43	0.01	- 0.23		+ 0.04	
		5 Yr	19	601.11	0.06	601.36	0.02	- 0.25		+ 0.04	
		10 Yr	28	601.73	0.07	601.9	0.03	- 0.17		+ 0.04	
		100 Yr	68	603.7	0.11	603.83	0.04	- 0.13		+ 0.07	
1077	1135	Bankfull	7.8	599.55	0.02	599.76	0.03	- 0.21		- 0.01	
		2x Bankfull	15.6	600.6	0.03	600.84	0.03	- 0.24		0.00	
		2 Yr	9	600.2	0.03	600.43	0.03	- 0.23		0.00	
		5 Yr	19	601.11	0.04	601.36	0.04	- 0.25		0.00	
		10 Yr	28	601.73	0.04	601.9	0.04	- 0.17		0.00	
		100 Yr	68	603.7	0.06	603.83	0.06	- 0.13		0.00	

-UT 4-				Proposed Conditions		Existing Conditions		Δ W.S. Elev		Δ Shear, Channel	
HEC-RAS Sta.	Project Sta.	Profile	Q Total (cfs)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	W.S. Elev (ft)	Shear Chan (lb/sq ft)	+/- (ft)	+/- (lb/sq ft)		
1399	1013	Bankfull	24.2	602.69	0.36	601.91	0.57	+ 0.78	- 0.21		
		2x Bankfull	48.4	603	0.57	602.52	0.73	+ 0.48	- 0.16		
		2 Yr	27	602.73	0.38	602.06	0.58	+ 0.67	- 0.20		
		5 Yr	56	603.07	0.63	602.7	0.81	+ 0.37	- 0.18		
		10 Yr	85	603.36	0.84	603.15	1.1	+ 0.21	- 0.26		
		100 Yr	204	604.7	1.53	604.71	2.19	- 0.01	- 0.66		
1339	1073	Bankfull	24.2	602.24	0.59	601.59	0.35	+ 0.65	+ 0.24		
		2x Bankfull	48.4	602.53	0.65	602.15	0.6	+ 0.38	+ 0.05		
		2 Yr	27	602.29	0.6	601.79	0.38	+ 0.50	+ 0.22		
		5 Yr	56	602.59	0.69	602.42	0.68	+ 0.17	+ 0.01		
		10 Yr	85	602.99	0.88	602.94	0.94	+ 0.05	- 0.06		
		100 Yr	204	604.62	1.19	604.66	1.73	- 0.04	- 0.54		
1274	1138	Bankfull	24.2	601.83	0.29	600.97	1.11	+ 0.86	- 0.82		
		2x Bankfull	48.4	602.01	0.6	601.85	1.55	+ 0.16	- 0.95		
		2 Yr	27	601.79	0.31	601.56	1.26	+ 0.23	- 0.95		
		5 Yr	56	602.32	0.63	602.32	1.41	0.00	- 0.78		
		10 Yr	85	602.86	0.6	602.88	1.1	- 0.02	- 0.50		
		100 Yr	204	604.59	0.48	604.64	0.58	- 0.05	- 0.10		
1226	1186	Bankfull	24.2	601.33	1.07	600.78	0.24	+ 0.55	+ 0.83		
		2x Bankfull	48.4	601.83	0.3	601.84	0.14	- 0.01	+ 0.16		
		2 Yr	27	601.57	1.16	601.56	0.22	+ 0.01	+ 0.94		
		5 Yr	56	602.28	0.26	602.31	0.13	- 0.03	+ 0.13		
		10 Yr	85	602.84	0.21	602.87	0.13	- 0.03	+ 0.08		
		100 Yr	204	604.58	0.18	604.64	0.16	- 0.06	+ 0.02		
1166	1246	Bankfull	24.2	600.91	0.03	600.74	0.05	+ 0.17	- 0.02		
		2x Bankfull	48.4	601.8	0.04	601.83	0.05	- 0.03	- 0.01		
		2 Yr	27	601.55	0.03	601.55	0.05	0.00	- 0.02		
		5 Yr	56	602.26	0.04	602.31	0.05	- 0.05	- 0.01		
		10 Yr	85	602.83	0.05	602.87	0.06	- 0.04	- 0.01		
		100 Yr	204	604.58	0.08	604.63	0.09	- 0.05	- 0.01		
1120	1292	Bankfull	24.2	600.8	0.03	600.71	0.07	+ 0.09	- 0.04		
		2x Bankfull	48.4	601.79	0.04	601.82	0.06	- 0.03	- 0.02		
		2 Yr	27	601.54	0.03	601.55	0.07	- 0.01	- 0.04		
		5 Yr	56	602.26	0.04	602.3	0.06	- 0.04	- 0.02		
		10 Yr	85	602.82	0.05	602.86	0.07	- 0.04	- 0.02		
		100 Yr	204	604.57	0.08	604.63	0.1	- 0.06	- 0.02		
1067	1345	Bankfull	24.2	600.57	0.04	600.69	0.04	- 0.12	0.00		
		2x Bankfull	48.4	601.77	0.05	601.81	0.06	- 0.04	- 0.01		
		2 Yr	27	601.54	0.04	601.54	0.05	0.00	- 0.01		
		5 Yr	56	602.25	0.05	602.3	0.06	- 0.05	- 0.01		
		10 Yr	85	602.81	0.06	602.86	0.07	- 0.05	- 0.01		
		100 Yr	204	604.57	0.08	604.63	0.09	- 0.06	- 0.01		

River Sta	Plan	W.S. Elev 100 yr. (ft)	W.S. Elev 100 yr. w/FW (ft)	Prof Delta WS (ft)	Top Wdth Act (ft)	Encro. Sta LT (ft)	Encro. Sta RT (ft)	Project Impact 100 yr. Revised-Corr Eff (ft)
WSEs in NGVD 29 Datum								
		(ft)	(ft)	(ft)	(ft)			
27950	Revised	619.67	620.12	0.46	70	1330	1400	0.00
27950	Corrected	619.67	620.12	0.46	70	1330	1400	
27950	Duplicate	619.67	620.15	0.48	70	1330	1400	
27770	Revised	619.05	619.50	0.45	100	1327	1427	0.00
27770	Corrected	619.05	619.50	0.45	100	1327	1427	
27770	Duplicate	619.06	619.54	0.49	100	1327	1427	
26840	Revised	617.34	617.88	0.54	200	1530	1730	0.00
26840	Corrected	617.34	617.88	0.54	200	1530	1730	
26840	Duplicate	617.45	618.05	0.60	200	1530	1730	
26070	Revised	616.85	617.42	0.57	250	1600	1850	0.00
26070	Corrected	616.85	617.42	0.57	250	1600	1850	
26070	Duplicate	617.00	617.64	0.64	250	1600	1850	
25340	Revised	616.61	617.02	0.40	200	1745	1945	0.00
25340	Corrected	616.61	617.02	0.40	200	1745	1945	
25340	Duplicate	616.79	617.28	0.50	200	1745	1945	
23335	Revised	615.68	615.69	0.01	180	1610	1790	0.00
23335	Corrected	615.68	615.69	0.01	180	1610	1790	
23335	Duplicate	615.93	616.13	0.19	180	1610	1790	
23245	Revised	615.61	615.62		165	1635	1800	0.00
23245	Corrected	615.61	615.62		165	1635	1800	
23245	Duplicate	615.88	616.02	0.14	120	1635	1755	
23201	Revised	614.23	614.24		28	1679	1707	0.00
23201	Corrected	614.23	614.24		28	1679	1707	
23201	Duplicate	615.86	614.93		28	1679	1707	
23181		Culvert	Culvert					
23160	Revised	610.55	610.54		28	1679	1707	0.00
23160	Corrected	610.55	610.54		28	1679	1707	
23160	Duplicate	610.55	612.42	1.88	28	1679	1707	
23110	Revised	606.17	606.82	0.64	174	274	448	-0.17
23110	Corrected	606.34	607.28	0.93	196	165	361	
23110	Duplicate	611.51	612.26	0.76	60	1665	1725	
22970	Revised	605.86	606.45	0.59	203	285	488	-0.20
22970	Corrected	606.06	607.01	0.95	277	198	475	
22970	Duplicate	611.01	611.69	0.68	120	1645	1765	

River Sta	Plan	W.S. Elev 100 yr. (ft)	W.S. Elev 100 yr. w/FW (ft)	Prof Delta WS (ft)	Top Wdth Act (ft)	Encro. Sta LT (ft)	Encro. Sta RT (ft)	Project Impact 100 yr. Revised-Corr Eff (ft)
22440	Revised	605.58	606.09	0.51	112	178	290	-0.13
22440	Corrected	605.71	606.59	0.88	112	178	290	
22440	Duplicate	608.63	609.23	0.60	140	1602	1742	
22110	Revised	605.30	605.85	0.55	205	153	358	-0.12
22110	Corrected	605.42	606.38	0.97	205	153	358	
21750	Revised	605.09	605.61	0.51	173	270	443	-0.09
21750	Corrected	605.18	606.19	1.01	271	148	419	
21750	Duplicate	606.62	607.31	0.69	160	1595	1755	
21270	Revised	604.99	605.48	0.49	223	230	453	-0.02
21270	Corrected	605.01	606.02	1.01	198	290	488	
21270	Duplicate	605.62	606.02	0.40	150	1210	1360	
21250	Revised	604.99	605.48	0.49	237	224	461	-0.01
21250	Corrected	605.00	605.76	0.76	80	409	489	
21250	Duplicate	605.60	606.05	0.44	160	1200	1360	
21085	Revised	604.96	605.44	0.48	262	313	575	0.00
21085	Corrected	604.96	605.75	0.79	260	210	470	
21085	Duplicate	605.49	605.94	0.45	190	1160	1350	
21075	Revised	604.96	605.44	0.48	259	316	574	0.00
21075	Corrected	604.96	605.76	0.80	265	210	475	
21075	Duplicate	605.49	605.90	0.42	225	1200	1425	
21030	Revised	604.95	605.43	0.48	280	253	533	0.00
21030	Corrected	604.95	605.68	0.74	225	135	360	
21030	Duplicate	605.44	605.87	0.43	235	1178	1413	
20970	Revised	604.93	605.41	0.47	320	207	527	0.00
20970	Corrected	604.93	605.63	0.71	275	65	340	
20970	Duplicate	605.39	605.81	0.43	260	1885	2145	
20230	Revised	604.48	604.90	0.42	170	2050	2220	0.00
20230	Corrected	604.48	604.90	0.42	170	2050	2220	
20230	Duplicate	604.51	604.93	0.42	170	2050	2220	
19430	Revised	602.84	603.58	0.74	180	2030	2210	0.00
19430	Corrected	602.84	603.58	0.74	180	2030	2210	
19430	Duplicate	602.87	603.60	0.73	180	2030	2210	
17790	Revised	600.75	601.42	0.67	150	1265	1415	0.00
17790	Corrected	600.75	601.42	0.67	150	1265	1415	
17790	Duplicate	600.80	601.45	0.66	150	1265	1415	
16030	Revised	596.35	597.09	0.74	129	1367	1497	0.00
16030	Corrected	596.35	597.09	0.74	129	1367	1497	
16030	Duplicate	596.35	597.09	0.74	129	1367	1497	

TravisCreek-Bed Shear Report.txt

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

X	X	XXXXXX	XXXX	XXXX	XX	XXXX
X	X	X	X X	X X	X X	X
X	X	X	X	X X	X X	X
XXXXXXXX	XXXX	X	XXX	XXXX	XXXXXX	XXXX
X	X	X	X	X X	X X	X
X	X	X	X X	X X	X X	X
X	X	XXXXXX	XXXX	X X	X X	XXXXX

PROJECT DATA

Project Title: Aycok Springs Study - Axiom_Travis Crk
Project File : TravisCreekAycok.prj
Run Date and Time: 2/5/2015 2:15:15 PM

Project in English units

Project Description:

Alamance County, Travis Creek, Aycok Springs Stream and Wetland Restoration

####(Haw Reedy)####

TRAVIS CREEK

HCFCU Unit X###-##-##

(Flood

Hazard, Floodway) Model

10, 2, 1, 0.2% Event

Filename:

n:\NC_flood\60273\Approximates\Eng\Haw-Reedy\Eng\Travis Creek\Travis Creek.prj

Prepared by: L Arnold Date: March 15, 2004

Reviewed by:

_____ Date: _____

STATUS (Draft RAS, SVSQ, FINAL)

FPMS BR

FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW

10 YR NATURAL

TravisCreek-Bed Shear Report.txt

TRAVIS
CR
FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW
10 YR
NATURAL
TRAVIS CR
FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC
BLW
100 YR NATURAL
TRAVIS CR
FPMS BR FIA STUDY TRAVIS CR
ALAMANCE CO, NC BLW
100 YR NATURAL
TRAVIS CR
FPMS BR FIA
STUDY TRAVIS CR ALAMANCE CO, NC BLW
100 YR NATURAL
TRAVIS CR

PLAN DATA

Plan Title: Proposed

Plan File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS Axiom Study\TravisCreekAycock.p05

Geometry Title: Proposed

Geometry File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS Axiom Study\TravisCreekAycock.g02

Flow Title : Imported Flow 01

Flow File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS Axiom Study\TravisCreekAycock.f01

Plan Summary Information:

Number of: Cross Sections =	67	Multiple Openings =	0
Culverts =	0	Inline Structures =	0
Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3

TravisCreek-Bed Shear Report.txt

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data

Equal Conveyance = True
Left Offset = 0
Right Offset = 0

River = RIVER-1	Reach = Reach-1			
RS	Profile	Method	Value1	Value2
14435	2x Bankfull		0	
14385	2x Bankfull		0	
14365	2x Bankfull		0	
14320	2x Bankfull		0	
5930	2x Bankfull		0	
5770	2x Bankfull		0	
961	2x Bankfull		0	
935	2x Bankfull		0	
850	2x Bankfull		0	

River = RIVER-1	Reach = Reach-1			
RS	Profile	Method	Value1	Value2
14435	2 Yr	1	1627	1772
14385	2 Yr	1	1660	1725
14365	2 Yr	1	1660	1725
14320	2 Yr	1	1641	1736
5930	2 Yr	1	1990	2155
5770	2 Yr	1	2035	2110
961	2 Yr	1	1878	1998
935	2 Yr	1	1878	1998
850	2 Yr	1	1372	1552

FLOW DATA

Flow Title: Imported Flow 01
Flow File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS Axiom Study\TravisCreekAycock.f01

Flow Data (cfs)

TravisCreek-Bed Shear Report.txt

River	Reach	RS	Bankfull	2x Bankfull
2 Yr	5 Yr	10 Yr	100 Yr	
RIVER-1	UT4	1399	24.2	48.4
27	56	85	204	
RIVER-1	Main Upper	23036	231	462
370	650	850	1800	
RIVER-1	Main Upper	23026	231	462
370	650	850	1800	
RIVER-1	Main 2	22822	241	481
380	650	900	1900	
RIVER-1	UT3	1207	7.8	15.6
9	19	28	68	
RIVER-1	UT1-Upper	2311	15.1	30.2
18	35	51	116	
RIVER-1	UT2	1672	3.7	7.4
4.3	8.8	13	31	
RIVER-1	UT1-Lower	1264	16.3	32.6
19	36	52	118	
RIVER-1	Main 3	22339	245	490
390	650	900	1900	
RIVER-1	Main 3	20609	351	702
500	850	1100	2400	
RIVER-1	Main Lower	19442	362	724
500	850	1200	2400	

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
RIVER-1	Main Lower	Bankfull	
Normal S = 0.00086			
RIVER-1	Main Lower	2x Bankfull	
Normal S = 0.00086			
RIVER-1	Main Lower	2 Yr	
Normal S = 0.00086			
RIVER-1	Main Lower	5 Yr	
Normal S = 0.00086			
RIVER-1	Main Lower	10 Yr	
Normal S = 0.00086			
RIVER-1	Main Lower	100 Yr	

Normal S = 0.00086

GEOMETRY DATA

Geometry Title: Proposed
 Geometry File : I:\ProjectList\1221 - Axiom\14038 - Aycok\Design Files\Project Models\HEC-RAS Axiom Study\TravisCreekAycok.g02

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
RIVER-1	UT4		J1
RIVER-1	Main Upper		J1
RIVER-1	Main 2	J1	J2
RIVER-1	UT3		J2
RIVER-1	UT1-Upper		J4
RIVER-1	UT2		J4
RIVER-1	UT1-Lower	J4	J3
RIVER-1	Main 3	J2	J3
RIVER-1	Main Lower	J3	

JUNCTION INFORMATION

Name: J1
 Description:
 Energy computation Method

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
RIVER-1	Main Upper	to RIVER-1	Main 2	0	0
RIVER-1	UT4	to RIVER-1	Main 2	0	0

Name: J2
 Description:
 Energy computation Method

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
RIVER-1	Main 2	to RIVER-1	Main 3	0	0
RIVER-1	UT3	to RIVER-1	Main 3	0	0

TravisCreek-Bed Shear Report.txt

Name: J3
 Description:
 Energy computation Method

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
RIVER-1	Main 3	to RIVER-1	Main Lower	0	0
RIVER-1	UT1-Lower	to RIVER-1	Main Lower	0	0

Name: J4
 Description:
 Energy computation Method

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
RIVER-1	UT1-Upper	to RIVER-1	UT1-Lower	0	0
RIVER-1	UT2	to RIVER-1	UT1-Lower	0	0

CROSS SECTION

RIVER: RIVER-1
 REACH: UT4 RS: 1399

INPUT

Description:

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	610	8.73	609.16	9.98	608.97	11.06	608.78	24.32	606.64
30.72	605.57	31.75	605.4	32.75	605.12	33.41	605	42.83	602.43
44.74	602.27	55	602.27	56.8	601.37	59.25	601.37	59.45	601.27
59.55	601.27	59.75	601.37	62.2	601.37	64	602.27	79	602.27
112.26	613.36	114.3	613.75	119.34	614.01	135.68	615.01	136.74	615.08
137.2	615.1	155.74	616						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	55	.067	64	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	55	64		59 60	61		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT4 RS: 1339

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INPUT

Description:

Station Elevation Data		num= 29									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608.3	9.52	606.94	10.36	606.79	10.96	606.67	26.64	603.66		
46.22	603.09	54.56	602.86	60.57	602.46	69.3	601.97	77.5	601.93		
78.32	601.96	79.16	601.93	85.45	601.98	87.1	601.95	91.05	602		
92.26	602.03	95.31	602.02	97.12	601.12	99.57	601.12	99.87	601.02		
100.07	601.12	102.52	601.12	104.32	602.02	119.32	602.02	138.41	608.39		
147.91	609.29	150.84	609.56	151.16	609.59	180.84	611.98				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	95.31	.067	104.32	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	95.31	104.32		65	65		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT4 RS: 1274

INPUT

Description:

Station Elevation Data		num= 39									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608.98	3.47	608.61	20.52	606.82	33.3	605.98	40.16	605.38		
55.06	603.9	61.31	603.4	80.8	602.34	81.2	602.32	81.53	602.3		
82	602.28	90.39	601.81	95.7	601.75	97.57	601.74	98.85	601.73		
105.8	601.99	107.07	601.99	107.9	602.1	108.92	602.15	110.24	601.89		
111.2	601.43	130.27	601.43	132.08	600.53	134.52	600.53	134.83	600.43		
135.03	600.53	137.47	600.53	139.28	601.43	150.12	601.43	151.46	601.49		
154.18	601.52	157.04	601.55	174.85	601.68	177.84	602.01	183.43	602.69		
194.47	603.83	205.74	606.13	212.77	607.29	227.23	609.01				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	130.27	.067	139.28	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	130.27	139.28		48	48		.1	.3

Ineffective Flow		num= 1	
Sta L	Sta R	Elev	Permanent
0	109.2	602.1	F

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CROSS SECTION

RIVER: RIVER-1

REACH: UT4

RS: 1226

INPUT

Description:

Station Elevation Data		num= 22		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608.84	16.14	607.83	27.18	606.91	45.9	605.08	53.58	604.36		
63.73	603.29	77.39	602.26	82.39	602.02	90.4	601.79	96.77	601.59		
100.62	601.4	105.17	601.22	119.61	601.22	134.61	601.22	136.62	600.22		
137.12	600.22	145.92	601.22	206.37	601.22	229.68	603.91	236.07	604.4		
238.73	604.6	242.85	604.96								

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	134.61	.067	145.92	.1		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	134.61	145.92		59	60		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: UT4

RS: 1166

INPUT

Description:

Station Elevation Data		num= 33		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	607.71	6.02	607.38	24.09	606.02	32.34	605.38	33.38	605.32		
48.96	603.79	61.8	603.08	72.95	602.16	79.49	601.52	85.83	601.3		
93.54	601.07	110.21	600.53	110.55	600.52	120.48	600.52	122.47	599.52		
122.98	599.52	131.78	600.52	146.92	600.52	147.62	600.53	148.14	600.56		
149.67	600.28	164.7	600.28	165.53	600.3	175.08	600.62	176.41	600.57		
180.24	600.26	183.74	600	194.31	600.67	208.22	601.17	220.66	601.77		
225.45	602.11	227.48	602.25	252.18	604.29						

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	120.48	.067	131.78	.1		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.

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120.48 131.78 46 46 46 .1 .3

CROSS SECTION

RIVER: RIVER-1
REACH: UT4

RS: 1120

INPUT

Description:

Station Elevation Data		num= 26							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608	35.56	606.59	65.03	605.12	69.74	604.89	87.13	604
110.94	602.6	119.45	602.1	132.27	601.39	135.41	601.21	147.12	600.61
157.1	600.08	159.45	600.08	175.67	600.34	184.46	599.38	184.96	599.38
186.96	600.38	214.81	600.38	214.95	600.39	225.51	600.69	229.95	600.72
251.74	600.68	252.15	600.69	259.82	601.31	284.52	603.37	297.87	604.3
302.27	604.67								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	175.67	.067	186.96	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	175.67	186.96		51	53		.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: UT4

RS: 1067

INPUT

Description:

Station Elevation Data		num= 35							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	607	37.74	605.15	58.08	604.1	77.25	603.01	80.5	602.83
89.57	602.71	101.54	601.85	113.04	601.14	115.9	600.19	130.89	600.19
132.89	599.19	133.39	599.19	142.2	600.19	149.23	600.19	149.7	600.36
150.05	600.37	153.39	600.36	155.74	600.33	159.27	600.4	166.42	600.54
169.21	600.51	170.14	600.57	173.59	600.57	188.87	600.55	191.64	600.56
194.07	600.6	197.61	600.69	210.89	601.04	219.76	601.09	221.45	601.15
225.5	601.28	240.3	601.25	246.93	601.27	256.3	601.09	292.65	604.29

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	130.89	.067	142.2	.1

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 130.89 142.2 54 50 45 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main Upper RS: 23036

INPUT

Description:

Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	617.28	4	617.3	27.74	616.12	41.92	615.41	86.25	613.72
88.36	613.61	89.81	613.49	140.27	612.36	140.99	612.34	141.86	612.25
144.2	612.08	191.17	609.69	197.54	609.96	202.64	609.7	221.84	608.17
222.83	608.04	223.23	608.03	224.21	607.96	240.96	605.9	252.97	605.73
275.56	605.16	294.51	604.94	303.27	604.84	313.65	604.77	389.29	605.16
392.31	605.21	393.93	605.2	396.28	605.17	398.08	605.14	401.95	604.66
413.24	601.83	417.67	601.4	423.66	601.4	427.22	595.24	434.26	595.75
436.2	595.96	437.4	596.13	441.8	596.69	447.13	597.26	456.3	601.96
464.43	605.35	464.77	605.48	465.08	605.59	487.76	602.95	489.01	602.98
491.99	603.05	510.34	604.1	519.15	603.69	519.54	603.7	521.38	603.77
547.43	605.04	547.78	605.07	548.74	605.2	549.44	605.27	550.66	605.39
551.63	605.7	552.44	605.95	556.78	607.33	562.81	609.24	564.85	608.69
570.3	607.84	572.85	607.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	398.08	.067	465.08	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 398.08 465.08 10 10 10 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	392.31	605.21	F
465.08	572.85	605.59	F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main Upper RS: 23026

INPUT

Description:

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Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	617.28	4	617.3	27.74	616.12	41.92	615.41	86.25	613.72
88.36	613.61	89.81	613.49	140.27	612.36	140.99	612.34	141.86	612.25
144.2	612.08	191.17	609.69	197.54	609.96	202.64	609.7	221.84	608.17
222.83	608.04	223.23	608.03	224.21	607.96	240.96	605.9	252.97	605.73
275.56	605.16	294.51	604.94	303.27	604.84	313.65	604.77	389.29	605.16
392.31	605.21	393.93	605.2	396.28	605.17	398.08	605.14	401.95	604.66
413.24	601.83	417.67	601.4	423.66	601.4	427.22	595.24	434.26	595.75
436.2	595.96	437.4	596.13	441.8	596.69	447.13	597.26	456.3	601.96
464.43	605.35	464.77	605.48	465.08	605.59	487.76	602.95	489.01	602.98
491.99	603.05	510.34	604.1	519.15	603.69	519.54	603.7	521.38	603.77
547.43	605.04	547.78	605.07	548.74	605.2	549.44	605.27	550.66	605.39
551.63	605.7	552.44	605.95	556.78	607.33	562.81	609.24	564.85	608.69
570.3	607.84	572.85	607.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	398.08	.067	465.08	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	398.08	465.08		213	204		.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	392.31	605.21	F
465.08	572.85	605.59	F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 2 RS: 22822

INPUT

Description:

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605.01	37.42	602.77	38.84	602.68	58.44	601.92	67.91	601.8
70.81	601.76	78.95	601.44	90.05	600.78	90.95	600.74	91.47	600.7
94.74	600.77	102	600.7	107.57	595.56	110.03	595.37	114.76	595.67
121.52	595.9	128.96	601.04	132.46	601.02	137.03	601.24	139.77	601.4
147.08	601.3	155	601.08	168.18	601.1	179.74	601.09	187.38	601.08
195.4	601.08	205.86	601.02	219.78	600.65	229.77	600.48	237.87	600.47
242.73	600.47	250.6	601.3	299.48	606.05				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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0 .1 102 .067 128.96 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 102 128.96 96 94 90 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 139.77 299.48 601.4 F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 2 RS: 22728

INPUT

Description:

Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605	4.73	604.82	14.65	604.33	44.09	602.57	45.11	602.5
54.86	601.79	58.84	601.54	63.21	601.32	70.12	600.97	77.32	600.62
102.71	600.41	107.68	600.45	110.92	596.33	111.57	595.69	111.94	595.39
121.13	595.36	124.98	595.36	126.09	595.34	128.98	601.03	156.39	600.67
182.15	600.21	184.29	600.17	190.94	600.11	208.89	599.85	211.16	599.93
221.74	599.93	257.08	603.66	281.39	606.02				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	107.68	.067	128.98	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 107.68 128.98 93 90 88 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 128.98 281.39 601.03 F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 2 RS: 22638

INPUT

Description:

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603.99	16.69	603.44	29.24	602.91	38.19	602.58	58.42	602.03
65.34	601.61	82.79	600.49	86.79	600.22	113.59	599.5	117.01	599.54

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117.41	599.55	131.24	599.75	137.33	600.01	138.68	600.15	143.68	596.36
145.2	595.29	148.57	594.87	150.71	595.16	155.06	595.76	155.54	595.83
156.4	596.16	168.15	600.58	169.88	600.54	181.93	600.27	185.78	600.19
186.71	600.16	187.74	600.17	189.84	600.15	220.34	599.69	224.66	599.68
227.21	599.66	234.49	599.56	241.6	599.51	247.73	600.04	261.27	602.03
299.01	606.01	299.53	606.06						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	138.68	.067	168.15	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

138.68	168.15	91	97	103	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	138.68	600.15	F
168.15	299.53	600.58	F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 2 RS: 22541

INPUT

Description:

Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603.38	7.94	603.22	28.34	602.83	41.53	602.45	46.09	602.38
47.3	602.36	69.5	601.84	71.04	601.76	100.06	600.65	116.32	600.61
131.93	600.49	152.47	599.86	153.94	599.8	157.06	599.76	162.58	599.68
163.09	599.69	163.49	599.64	165.39	599.6	172.89	599.59	176.56	599.65
183.61	600.33	186.09	600.36	193.6	596.12	202	595.46	206.26	595.17
208.45	594.91	211.78	595.2	212.24	596.01	213.95	599.77	226.27	599.75
226.99	599.77	227.59	599.76	228.63	599.67	237.3	599.1	239.02	598.99
241.43	597.96	244.54	596.61	250.99	599.27	253.3	599.51	268.51	601.19
283.15	603.17	285.03	603.49	290.34	604.31	313.75	608.04	325.14	610.03

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	186.09	.067	213.95	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

186.09	213.95	209	202	197	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
213.95	325.14	599.77	F

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CROSS SECTION

RIVER: RIVER-1

REACH: UT3

RS: 1207

INPUT

Description:

Station Elevation Data		num= 28									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	602.61	29.91	600.55	31.77	600.43	34.29	599.77	34.48	600.08		
35.34	600.37	35.65	600.57	40.68	600.62	45.71	600.08	46.56	599.41		
46.69	599.38	50.49	598.11	52.24	598.11	52.83	597.81	54.28	597.81		
54.48	597.71	55.09	597.71	55.29	597.81	56.74	597.81	57.34	598.11		
77.59	598.11	82.58	599.77	92.87	600.09	107.75	600.2	112.73	600.24		
117.32	600.33	119.45	600.38	132.04	600.56						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	52.24	.067	57.34	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	52.24	57.34		44	44		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: UT3

RS: 1163

INPUT

Description:

Station Elevation Data		num= 24									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	604.17	20.41	602.71	41.31	600.72	46.31	600.29	50.7	599.93		
51.34	599.84	54	599.5	59.65	597.62	74.65	597.62	75.25	597.32		
76.7	597.32	76.9	597.22	77.5	597.22	77.7	597.32	79.15	597.32		
79.75	597.62	94.75	597.62	100.02	599.44	101.73	599.53	116.21	599.73		
120.55	599.74	133.45	600.22	134.39	600.23	134.94	600.22				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	74.65	.067	79.75	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	74.65	79.75		56	56		.1	.3

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CROSS SECTION

RIVER: RIVER-1

REACH: UT3

RS: 1107

INPUT

Description:

Station Elevation Data		num= 38									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605.02	38.62	599.91	43.62	600	48.63	599.83	54.34	599.41		
56.43	599.19	63.95	598.18	71.4	597.37	72.3	597.36	78.9	597.2		
81.09	597.15	81.95	597.05	94.35	597.05	94.94	596.75	96.39	596.75		
96.59	596.65	97.19	596.65	97.39	596.75	98.85	596.75	99.44	597.05		
114.44	597.05	117.14	597.95	132.16	598.91	138.42	598.9	146.07	598.86		
149.73	598.85	155.97	598.91	162.88	599.06	176.57	599.19	183.99	599.26		
184.7	599.28	188.13	599.29	191.28	599.31	192.89	599.34	193.23	599.35		
193.54	599.35	194.12	599.36	211.08	599.92						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	94.35	.067	99.44	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	94.35	99.44		29	30		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: UT3

RS: 1077

INPUT

Description:

Station Elevation Data		num= 40									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	604.96	35.88	599.54	36.76	599.62	38.61	599.73	41.76	599.93		
46.76	599.72	49.84	599.6	51.18	599.55	52.54	599.49	53.1	599.44		
54.51	599.22	60.79	598.08	66.9	597.6	80.07	597.09	80.74	597.15		
84.87	597.35	86.44	596.83	101.44	596.83	102.04	596.53	103.49	596.53		
103.69	596.43	104.29	596.43	104.49	596.53	105.94	596.53	106.55	596.83		
121.24	596.83	129.88	599.71	138.38	599.79	150.34	599.77	152.54	599.75		
154.59	599.7	163.76	599.72	167.83	599.62	168.65	599.61	172.92	599.48		
184.21	599.44	186.64	599.62	189.31	599.63	197.98	599.66	199.04	599.66		

Manning's n Values		num= 3	

TravisCreek-Bed Shear Report.txt

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	101.44	.067	106.55	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	101.44	106.55		63	58		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 2311

INPUT

Description:

Station Elevation Data	num=	55							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	634.19	5.41	634.27	11.05	634.16	19.4	633.36	33.07	631.53
45.83	628.65	48.77	628.54	50.16	628.49	52.36	628.42	52.82	628.4
53.56	628.37	68.48	629.51	82.84	629.72	89.56	629.87	108.05	630.48
111.28	630.24	123.79	629.48	145.25	627.01	148.95	626.76	167.91	624.42
171.26	624.04	190.89	621.83	196.49	621.1	217.06	619.11	224.1	618.7
234.71	615.16	249.7	615.16	251.1	614.46	252.9	614.46	253.1	614.36
253.7	614.36	253.9	614.46	255.7	614.46	257.1	615.16	272.1	615.16
279.82	617.73	287.86	618.28	288.25	618.3	292.85	618.44	305.25	618.81
307.81	618.9	331.28	620.48	338.95	621.32	346.78	621.81	361.46	623.06
380.27	625.01	394.25	626.72	394.84	626.75	397.35	626.87	401.59	627.08
406.94	627.33	413.17	627.63	420.69	627.99	432.64	628.56	435.26	628.69

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.085	249.7	.067	257.1	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	249.7	257.1		59	60		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 2251

INPUT

Description:

Station Elevation Data	num=	70							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	633.98	10.41	633.58	16.18	632.75	23.76	632	42.57	630.69
45.23	630.57	45.66	630.53	47.19	630.45	58.37	627.73	62.53	626.46

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67.63	626.2	69.61	626.09	70.48	626.05	77.05	625.7	78.02	625.65
79.52	625.57	79.83	625.56	80.32	625.53	105.91	626.25	106.8	626.16
114.72	625.79	132.24	624.21	137.66	623.49	153.93	622.06	163.12	621.48
174.57	620.59	183.38	619.45	195.12	617.84	211.04	616.66	213.51	616.67
224.44	616.08	234.69	615.55	246.14	614.41	246.61	614.36	247.08	614.18
247.63	613.99	250.17	613.99	256.38	612.89	257.37	612.89	259.58	613.99
274.57	613.99	283.29	616.89	291.48	617.35	295.09	617.55	315.73	618.33
318.68	618.44	327.14	618.84	329.19	619.04	337.31	619.84	356.48	621.59
358.24	621.73	377.9	623.18	386.39	623.3	390.6	623.42	391.46	623.46
392.04	623.49	392.72	623.52	393.58	623.56	394.62	623.61	396.19	623.68
397	623.72	398.34	623.78	399.62	623.84	401.63	623.94	404.88	624.09
407.68	624.22	410.87	624.37	421.36	624.86	459.82	626.67	479.96	627.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	250.17	.067	259.58	.085

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	250.17	259.58		73	74	76		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 2177

INPUT
 Description:

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	623.64	9.91	623.17	12.72	623.03	14.32	622.96	18.34	622.77
18.69	622.75	37.46	621.64	48.67	620.49	57.28	619.17	68.35	618.29
78.65	617.43	92.3	616.25	115.84	613.96	134.2	612.83	136.61	612.03
151.61	612.03	153.8	610.93	154.81	610.93	161.01	612.03	168.4	612.03
169.53	612.45	175.65	613.02	185.33	613.73	197.46	614.72	200.36	615.07
203.79	615.25	211.18	616.04	216.26	616.64	220.88	617.02	236.65	618.37
241.84	618.51	257.12	619.13	262.9	619.36	276.98	620.27	282.82	620.72
316.5	621.87	325.69	622.17	355.5	622.57	377.09	623.14		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	151.61	.067	161.01	.085

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	151.61	161.01		74	73	73		.1	.3

CROSS SECTION

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RIVER: RIVER-1
 REACH: UT1-Upper RS: 2104

INPUT

Description:

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	621.98	3.97	622.05	4.49	622.07	9.15	622.21	11.56	622.02
13.98	621.83	15.68	621.7	25.33	619.85	35.85	617.8	40.82	616.95
44.97	616.57	59.42	614.76	65	614.25	75.61	613.12	77.89	612.88
87.48	612.12	97.18	611.06	99.05	610.73	100.6	610.09	112.36	610.09
118.56	608.99	119.56	608.99	121.76	610.09	159.41	610.09	162.97	610.25
166.73	610.4	173.29	610.77	175	610.89	189.95	612.31	194.62	612.84
209.52	614.97	211.8	615.33	212.48	615.4	213.01	615.43	241.26	618.16
253.12	618.93	254.02	618.99	256.41	619.07	294.75	620.43		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	112.36	.067	121.76	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	112.36	121.76		53	52		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 2052

INPUT

Description:

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	620	8.39	619.65	12.94	620.02	15.33	620.11	15.97	620
28.62	617.87	33.3	617.18	38.62	616.25	55.65	613.06	60.51	612.57
77.18	610.77	79.26	610.31	86.21	609.08	87.68	608.46	120.14	608.46
121.53	607.76	123.34	607.76	123.54	607.66	124.14	607.66	124.34	607.76
126.14	607.76	127.52	608.45	130.63	608.54	133.99	608.59	138.48	608.68
153.65	609.07	157.51	609.21	159.98	609.37	176.51	610.52	180.79	610.81
181.61	610.89	204.87	613.49	209.88	614.2	220.4	615.61	246.87	617.84
249	618	257.44	618.57	275.75	619.22	295.58	619.99		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	120.14	.067	127.52	.085

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 120.14 127.52 72 71 71 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1981

INPUT

Description:

Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	617.48	1.8	617.55	5.35	617.5	16.63	616.88	28.71	616.01
37.62	614.36	42.72	613.5	43.41	613.36	58.9	609.74	65.75	608.14
66.5	607.96	66.99	607.88	69.81	607.35	113.25	607.35	115.46	606.25
116.45	606.25	122.66	607.46	126.75	607.54	134.65	607.82	148.08	608.29
155.07	608.66	166.63	609.74	168.42	609.85	184.77	611.01	215.5	614.18
216.17	614.24	216.98	614.32	229.44	615.27				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	113.25	.067	122.66	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 113.25 122.66 56 57 57 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1924

INPUT

Description:

Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	616.14	4.14	615.87	8.43	615.6	14.59	615.21	19.16	614.82
24.87	613.97	40.82	611.35	44.95	610.58	55.56	608.82	63.49	607.5
71.5	605.74	108.78	605.74	110.98	604.64	111.99	604.64	118.18	605.55
124.33	605.74	125.31	605.77	146.44	606.45	147.45	606.49	151.16	606.65
170.12	607.7	178.33	608.28	196.8	609.94	213.21	611.46		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	108.78	.067	118.18	.085

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 108.78 118.18 58 57 58 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1867

INPUT

Description:

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	613.79	11.98	613.16	28.72	610.33	33.98	609.17	41.55	607.28
44.83	606.47	51.03	604.95	56.86	603.84	85.4	603.84	86.8	603.14
88.59	603.14	88.79	603.04	89.4	603.04	89.6	603.14	91.39	603.14
92.79	603.84	119.89	603.84	127.58	604.07	129.53	604.1	139.05	605.11
142.18	605.35	143.09	605.42	153.12	605.9	175.49	607.91	176.62	608.01
200.22	609.63	205.17	610.02						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	85.4	.067	92.79	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 85.4 92.79 61 61 61 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1806

INPUT

Description:

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	613.23	.49	613.22	1.43	613.21	8.21	613.1	13.11	613.41
13.92	613.42	15.67	613.33	16.39	613.3	21.97	613.13	29.88	612.79
31.97	612.64	50.01	609.49	52.31	609.08	61.15	607.6	64.29	607.21
74.82	606.23	76.19	606.07	78.83	605.84	80.02	605.81	82.54	605.46
92.61	604.15	97.76	602.43	110.76	602.43	125.75	602.43	127.96	601.33
128.95	601.33	135.16	602.14	137.57	602.09	145.05	602.03	149.54	602.12
155.13	602.36	156.21	602.43	161.25	602.76	174.3	603.46	178.95	603.74
191.7	604.81	206.82	605.63	237.19	607.85	245.79	608.79	249.99	609.27
264.53	611.24								

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 125.75 .067 135.16 .085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 125.75 135.16 40 39 38 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1767

INPUT
 Description:

Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608.97	8.52	608.72	69.59	607.89	70.05	607.89	84.62	606.88
96.58	605.53	101.51	605.19	121.51	604.29	132.46	603.74	133.36	603.71
133.82	603.7	135.89	603.6	154.89	602.84	168.07	602.38	178.29	601.97
179.48	601.89	179.9	601.86	180.5	601.81	181.96	601.79	188.92	601.57
189.41	601.27	202.78	601.27	204.18	600.57	205.97	600.57	206.18	600.47
206.78	600.47	206.98	600.57	208.78	600.57	210.18	601.27	214.28	601.27
214.92	601.35	217	601.41	219.51	601.37	225.8	601.48	238.02	601.69
242.79	601.67	249.53	602.02	266.66	602.57	271.93	603.46	287.92	604.89
295.71	605.51	298.05	605.89	299.2	606.07	316.34	607.26	325.66	608.44
336.18	608.94	341.88	609.16	344.28	609.31				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 202.78 .067 210.18 .085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 202.78 210.18 43 43 44 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1724

INPUT
 Description:

Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609	5.53	608.74	7.7	608.65	11.64	608.32	31.44	607.13

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36.61	606.77	46.21	606.03	51.13	605.66	58.47	605.25	74.09	604.65
80.65	605.11	81.5	605.27	82.47	605.45	84.54	605.27	84.85	605.24
85.84	605.15	87.82	605	91.59	604.87	110.24	603.8	116.52	603.48
124.95	603.13	132.84	602.68	139.87	602.57	152.43	602.23	157.05	602.09
171	600.96	178.5	600.74	178.86	600.73	192.13	600.51	193.66	600.47
196.22	600.5	201.09	600.51	203.32	600.45	205.9	600.27	206.59	600.18
208.54	600.18	210.73	599.08	211.73	599.08	217.94	600.18	224.84	600.18
225.58	600.35	227.19	600.6	235.04	600.83	235.38	600.84	237.74	600.77
249.68	600.37	251.7	600.39	270.17	600.92	273.08	600.98	275.59	601.38
287.71	603.14	293.59	604.07	301.07	604.89	309.02	605.81	311.77	606.23
315.4	606.35	341.92	607.15	365.88	608.47	370.9	608.69		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	208.54	.067	217.94	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	208.54	217.94		76	76		.1	.3
Ineffective Flow			num=	1				
Sta L	Sta R	Elev	Permanent					
235.04	370.9	600.83	F					

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1648

INPUT

Description:

Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	606	13.44	605.32	23.33	604.71	26.42	604.52	31.02	604.29
47.3	603.47	57.49	604.16	57.93	604.29	62.02	603.95	62.73	603.89
63.43	603.83	65.91	603.62	66.64	603.56	66.95	603.54	68.59	603.4
73.49	602.97	83.3	602.28	103.38	601.51	104.1	601.47	105.18	601.39
109.84	601.04	133.2	599.48	133.55	599.47	134.83	599.44	141.91	599.25
152.73	598.95	154.25	598.95	170.22	598.91	171.29	598.89	173.85	598.86
180.06	598.09	181.05	598.09	183.26	599.19	218.08	599.19	227.05	599.48
247.14	602.34	249.02	602.58	256.12	603.64	261.5	604.38	269.27	604.71
271	604.78	277.78	605.08	281.92	605.26	282.27	605.28	312.27	605.95

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	170.22	.067	183.26	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
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170.22 183.26 45 46 46 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1602

INPUT

Description:

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	604.03	3.31	603.91	26.92	603.19	30.93	603.07	31.63	603.04
58.55	601.97	68.52	602.41	74.16	602.88	79.79	602.36	82.88	602.08
86.01	601.79	86.8	601.72	87.65	601.64	88.56	601.56	89.31	601.49
89.85	601.44	96.08	600.83	97.8	600.71	100.13	600.56	111.61	599.86
113.7	599.74	114.57	599.68	120.46	599.43	133.03	598.91	137.54	598.7
153.1	598.29	163.11	598.13	165.56	598.11	168.41	598.17	174.53	598.25
176.8	598.25	183	597.45	184	597.45	186.2	598.55	201.2	598.55
209.08	598.55	211.15	598.86	218.93	600.12	225.44	601.03	227.32	601.24
237.94	602.36	249.88	602.88	250.82	602.94	255.13	603.2	255.6	603.23
255.99	603.23	256.65	603.23	277.55	603.35	290.49	603.52		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	176.8	.067	186.2	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

176.8	186.2	66	65	65	.1	.3
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CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1537

INPUT

Description:

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605	1.77	604.89	9.93	604.1	16.37	603.66	31.24	602.36
35.15	602.15	41.77	601.79	42.38	601.76	43	601.79	44.05	601.76
47.38	601.45	63.47	600.08	72.65	599.3	83.46	598.08	87.27	597.82
91.77	597.75	106.24	597.41	108.51	597.42	111.42	597.41	113.23	597.38
127.9	597.38	129.3	596.68	131.1	596.68	131.3	596.58	131.9	596.58
132.1	596.68	133.9	596.68	135.29	597.38	159.75	597.38	164.27	597.79
172.72	598.86	175.36	598.96	177.13	598.93	187.09	599.74	190.26	600.14

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200.75 601.11 210.45 601.9 223.05 602.67 228.77 602.97

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 127.9 .067 135.29 .085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 127.9 135.29 50 50 50 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Upper RS: 1487

INPUT

Description:

Station Elevation Data num= 34
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 604.73 2.97 604.47 7.02 603.74 8.64 603.6 25.91 602.05
 26.41 602 30.4 601.76 35.77 602.03 37.59 602.13 39.7 602.17
 47.29 601.82 55.92 601.14 60.52 600.6 66.03 600.02 76.01 599.01
 80.04 598.82 83.27 598.78 100.05 597.17 103.46 597.15 106.86 597.11
 111.04 596.93 130.27 596.93 136.48 595.83 137.48 595.83 139.68 596.93
 154.68 596.93 155.74 596.57 159.54 596.57 167.08 596.47 167.73 596.45
 177.84 596.26 205.96 597.28 206.71 597.32 207.95 597.42

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 130.27 .067 139.68 .085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 130.27 139.68 224 223 223 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 154.68 207.95 596.93 F

CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1672

INPUT

Description:

Station Elevation Data num= 31
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

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0	616.58	12.95	615.72	20.77	615.4	43.42	614.69	45.17	614.61
50.6	612.8	65.6	612.8	67.01	612.1	68.81	612.1	69	612
69.61	612	69.8	612.1	71.61	612.1	73	612.8	88	612.8
90.47	613.62	90.83	613.66	102.3	614.9	111.76	615.33	112.93	615.39
114.09	615.42	115.75	615.46	127.3	616.14	134.06	616.71	150.28	618.07
155.41	618.3	163.6	618.65	166.7	619.02	169.77	619.12	174.92	619.52
178.9	620								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	65.6	.067	73	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

65.6	73	63	63	64	.1	.3
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CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1609

INPUT
 Description:

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	614.35	4.85	614.37	9.99	614.26	21.02	613.86	40.37	613.12
46	612.93	65.92	612.09	66.55	612.07	67.05	612.05	67.91	612.03
72.36	611.83	73.87	611.2	88.47	611.2	89.87	610.5	91.66	610.5
91.87	610.4	92.47	610.4	92.67	610.5	94.47	610.5	95.87	611.2
110.87	611.2	113.48	612.07	122.8	612.44	123.65	612.49	138	613.64
150.86	614.13	173.6	615.37	179.05	615.85	185.54	616.69	185.89	616.74
186.45	616.8	203.96	618						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	88.47	.067	95.87	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

88.47	95.87	52	52	52	.1	.3
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CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1557

INPUT

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Description:

Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	612.67	5.31	612.47	17.02	612.12	36.1	611.22	41.9	610.92
51.18	610.4	54.17	610.19	60.23	609.77	81.58	609.77	82.98	609.07
84.78	609.07	84.98	608.97	85.58	608.97	85.78	609.07	87.58	609.07
88.98	609.77	95.46	609.77	105.05	610.13	114.43	610.48	115.26	610.49
117.74	610.7	130.16	612.19	137.28	612.49	149.34	613.21	157.94	613.57
173.68	614.69	182.69	615.21	185.94	615.5	189.07	615.77	195.13	616.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	81.58	.067	88.98	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

81.58	88.98	59	60	60	.1	.3
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CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1497

INPUT

Description:

Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609.76	11.08	609.52	14.48	609.44	15.44	609.41	32.64	608.64
34.15	608.59	48.85	608.11	49.39	608.09	53.99	607.93	58.17	607.8
65.27	607.8	66.67	607.1	68.47	607.1	68.67	607	69.26	607
69.47	607.1	71.26	607.1	72.67	607.8	91.69	607.8	97.45	608.27
97.87	608.31	98.27	608.33	109.97	608.83	126.19	609.72	127.91	609.86
128.41	609.86	129.49	609.94	157.79	611.95	167.66	612.73	179.39	613.56
192.7	614.28	194.57	614.42	197.17	614.61	201.67	614.94	202.38	614.99

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	65.27	.067	72.67	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

65.27	72.67	34	32	30	.1	.3
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CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1465

TravisCreek-Bed Shear Report.txt

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608.21	2.06	608.23	12.09	607.94	37.52	607.7	44.68	606.97
46.33	606.82	51.28	606.67	71.68	606.67	73.89	605.57	74.88	605.57
81.08	606.67	93.91	606.67	97.75	607.03	104.25	607.37	111.17	607.57
111.94	607.61	120.37	608.04	128.61	608.41	143.73	608.54	158.53	608.71
160.72	608.78	169.61	608.97	171.87	609.1	174.42	609.24	175.3	609.29
178.57	609.47	187.26	610.04	192.25	610.4	193.46	610.51	196.77	610.82
207.99	611.59	214.14	611.91	229.95	613.08	231.22	613.18	232.15	613.3
244.84	614.62	250.19	615.14	250.51	615.18	252.13	615.28	253.36	615.34

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.085	71.68	.067	81.08	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	71.68	81.08		47	48		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1417

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	607.59	4.68	607.55	31.56	606.72	38.29	606.58	39.98	606.42
52.39	605.9	56.7	605.72	62.91	605.37	63.08	605.36	86.89	605.36
89.09	604.26	90.09	604.26	96.29	605.08	96.81	605.15	100.92	605.26
102.4	605.28	103.84	605.36	110.38	605.74	112.35	605.89	117.49	605.98
120.26	606.01	122.81	605.87	131.05	605.95	134.56	605.65	152.7	605.78
158.63	605.77	162.91	605.75	164.2	605.77	165.8	605.78	169.86	605.82
170.26	605.84	173.64	605.96	181.49	606.27	190.36	606.6	191.16	606.63
191.57	606.64	194.55	606.79	203.03	607.23	203.93	607.27	224.66	607.88
225.45	607.9	241.81	608.73	242.15	608.75	260.48	609.53	269.65	610.18
272.96	610.4	279.44	611						

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.085	86.89	.067	96.81	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.

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86.89 96.81 42 41 40 .1 .3

CROSS SECTION

RIVER: RIVER-1
REACH: UT2

RS: 1376

INPUT

Description:

Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	606.07	16.71	606	40.84	605.39	49.53	605	55.84	604.75
60.57	604.48	68.91	604.06	72.64	603.89	90.54	603.89	91.94	603.19
93.74	603.19	93.94	603.09	94.54	603.09	94.75	603.19	96.54	603.19
97.94	603.89	112.94	603.89	115.77	604.83	119.83	604.9	124.89	604.97
129.28	605	150.93	605.09	160.19	604.15	167.82	604.48	174.36	604
177.68	603.71	180.19	604.17	184.71	604.35	194.83	609.48	198.39	610.06
204.72	610.06								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	90.54	.067	97.94	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
90.54 97.94 43 43 43 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
150.93 204.72 605.09 F

CROSS SECTION

RIVER: RIVER-1
REACH: UT2

RS: 1333

INPUT

Description:

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605.07	19.73	604.85	35.85	604.16	42.4	604.02	49.66	603.87
59.82	603.73	62.74	603.61	63.71	603.59	66.77	603.45	70.98	603.07
72.45	602.95	73.88	602.86	76.14	602.11	91.14	602.11	92.54	601.41
94.33	601.41	94.53	601.31	95.14	601.31	95.34	601.41	97.14	601.41
98.54	602.11	113.54	602.11	115.3	602.7	124.41	603.04	125.48	603.06
125.8	603.07	126.34	603.07	140.93	603.3	148.38	603.42	152.15	603.41
164.38	603.49	165.96	603.35	167.24	603.23	168.97	603.08	172.22	602.78

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176.32	603.13	178.13	603.63	190.06	603.46	201.9	603.44	208.11	603.41
232.84	602.9	251.92	602.92	257.32	602.92	260.65	603.04	272.09	603.41
278.55	603.74	284.73	604.07	290.38	604.32	292.52	604.41	293.48	604.49
301.77	604.83	315.93	605.65	322.22	605.85	337.81	606.59	340.91	606.74
342.26	606.84	348.34	609						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	91.14	.067	98.54	.085

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	91.14	98.54		48	48	49		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1285

INPUT
 Description:

Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603.52	5.01	603.47	8.35	603.56	12.91	603.44	18.49	603.35
26.35	603.13	39.02	602.86	46.41	602.6	47.47	602.57	53.45	602.29
55.49	602.2	74.26	601.41	78.34	601.19	80.33	600.53	95.33	600.53
96.73	599.83	98.52	599.83	98.72	599.73	99.32	599.73	99.52	599.83
101.32	599.83	102.73	600.53	110.79	600.53	126.27	601.17	127.34	601.23
140.78	601.56	147.05	601.7	150.8	601.72	152.48	601.71	153.18	601.71
154.47	601.71	164.37	601.73	176.17	601.73	180.55	601.73	182.01	601.75
184.14	601.78	194.65	602.08	199.6	602.25	207.96	602.35	220.57	602.52
247.37	602.61	258.84	602.89	264.2	603.02	266.18	603.07	279.05	603.49
292.97	603.95	300.87	604.28	309.87	605.13	313.32	605.27	320.53	605.51
338.21	606.08	345.71	606.85	356.04	607.63	361.88	608.72	371.26	611.5
379.69	612								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	95.33	.067	102.73	.085

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	95.33	102.73		54	54	53		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: UT2

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	599	19.69	599.05	31.44	598.88	44.25	598.92	45.82	598.95
46.27	598.94	51.06	598.85	76.99	598.85	79.18	597.75	80.19	597.75
86.38	598.85	98.77	598.85	102.06	599.07	104.73	599.27	108.54	599.55
113.26	599.89	120.42	600.09	130.27	600.21	139.83	600.34	148.25	600.47
154.37	600.51	155.86	600.53	172.15	601.02	172.95	601.04	190.44	601.54
193.7	601.58	197.05	601.67	214.55	602.1	227.11	602.24	240.29	602.4
254.25	603	264.63	603.25	269	603.39	285.88	603.95	294.8	604.25
297.89	604.35	307.02	605.12	313.42	605.47	330.61	606.02	345.85	607.6
348.6	607.8	360.45	610						

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.085	76.99	.067	86.38	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	76.99	86.38		55	56		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT2 RS: 1175

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	596.23	.6	596.22	20.05	595.44	22.5	595.45	38.69	595.4
43.06	595.41	43.88	595.4	44.65	595.42	56.32	595.71	72.61	595.8
85.11	595.97	89.31	596.06	91.85	596.9	106.84	596.9	109.04	595.8
110.04	595.8	116.25	596.9	129.91	596.9	135.35	597.27	142.6	597.59
147.34	597.71	150.45	597.86	158.87	598.29	169.12	598.74	173.51	598.85
174.37	598.89	175.08	598.92	177.78	599.05	179.87	599.15	183.85	599.28
188.1	599.42	189.48	599.47	200.32	599.57	203.02	599.63	214.35	599.79
224.39	600.07	232.1	600.26	239.47	600.47	271.98	606.63		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.085	106.84	.067	116.25	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.

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106.84	116.25		165	170	174		.1	.3
Ineffective Flow		num=	1					
Sta L	Sta R	Elev	Permanent					
0	91.85	596.9	F					

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Lower RS: 1264

INPUT

Description:

Station Elevation Data		num=	81							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	604.93	9.6	604.12	11.6	603.93	12.39	603.85	13.33	603.76	
13.94	603.7	14.74	603.62	15.27	603.57	27.15	602.92	32.32	602.27	
39.56	601.16	49	599.7	53.47	599.15	60.8	598.14	71.95	596.52	
77.18	595.72	80.26	595.3	88.79	594.77	91.88	594.59	93.34	594.45	
101.03	593.93	102.48	593.88	103.89	593.89	111.8	593.65	113.54	593.58	
114.78	593.57	116.71	593.44	125.85	593.25	130.18	593.24	133.1	593.6	
139.02	593.63	151.22	593.73	158.09	593.54	161.85	593.46	164.82	593.28	
170.74	593.23	172.12	593.16	175.1	593.03	178.72	593.06	180.02	592.95	
187.77	592.95	189.16	592.25	190.97	592.25	191.16	592.15	191.77	592.15	
191.96	592.25	193.77	592.25	195.17	592.95	210.17	592.95	211.1	593.24	
212.64	593.22	219.12	593.23	234.43	593.45	242.82	593.57	246.16	593.58	
247.74	593.63	251.17	593.68	255.1	593.94	266.13	594.52	270.68	594.73	
275.82	594.96	282.91	595.28	283.66	595.3	287.47	595.4	291.42	595.51	
295.14	595.62	299.21	595.52	304.16	595.41	304.77	595.39	319.97	595.93	
326.89	596.2	327.81	596.25	344.72	596.97	350.42	597.18	354.6	597.33	
364.7	597.75	373.28	598.14	375.7	598.22	405.56	599.64	414.26	600	
446.67	601									

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
0	.085	187.77	.067	195.17	.085	

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
187.77	195.17	64	70	75		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Lower RS: 1194

INPUT

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Description:

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	604.92	5.75	604.59	8.58	604.34	10.92	604.11	11.65	604.04
12.06	604	13.62	603.85	13.95	603.82	14.34	603.78	20.27	603.41
22.6	603.11	36.94	600.91	52.58	598.51	53.96	598.29	54.26	598.25
60.44	597.48	72.71	595.7	77.44	595.34	81.23	594.89	89.85	594.39
94.67	594.05	103.58	593.68	112.59	593.21	115.17	592.94	123.5	592.63
126.68	593.11	127.5	593.18	137.54	593.41	141.81	593.43	144.84	592.37
159.84	592.37	161.24	591.67	163.04	591.67	163.24	591.57	163.84	591.57
164.04	591.67	165.85	591.67	167.25	592.37	173.14	592.37	177.94	592.65
187.02	592.88	198.49	592.88	198.82	592.91	199.25	592.91	199.82	592.92
215.22	593.26	216.51	593.28	232.64	593.09	236.53	593.05	237.59	593.07
244.42	593.23	245.66	593.28	254.93	593.35	270.44	593.54	295.56	594.13
303.13	594.19	304.98	594.26	314.66	594.32	329.01	594.35	331.48	594.38
335.02	594.39	346.74	594.49	356.73	594.67	364.56	594.86	376.21	595
400.42	595.39	404.37	595.45	424.44	595.65	427.02	595.77	430.49	595.95
431.03	595.97	439.7	596	499.7	599	547.1	601		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	159.84	.067	167.25	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	159.84	167.25		34	31		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Lower

RS: 1163

INPUT

Description:

Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605.07	5.65	604.57	9.05	604.24	10.63	604.08	11.05	604.04
16.44	603.31	27.15	601.81	37.95	599.63	39.4	599.37	44.75	598.54
61.39	596.21	62.21	596.11	63.9	595.86	75.7	594.96	77.38	594.84
80.72	594.53	83.11	594.36	84.23	594.32	88.75	594.13	94.53	593.89
101.48	593.58	103.2	593.6	107.41	593.41	111.01	592.21	126.01	592.21
127.41	591.51	129.21	591.51	129.41	591.41	130.01	591.41	130.21	591.51
132.01	591.51	133.41	592.21	143.95	592.21	145.11	592.59	153.62	592.77
157.88	592.85	158.47	592.89	159.58	592.91	166.74	593.03	178.59	592.95
183.47	593	194.37	593.43	197.21	593.35	202.96	593.19	208.33	593.2
209.17	593.11	212.98	592.72	213.72	593.11	215.38	593.15	223.71	593.34
226.34	593.42	236.53	593.57	253.62	593.68	275.65	593.87	280.75	593.88

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283.91	593.88	288.09	594.02	295.58	594.22	304.13	594.21	316.65	594.31
325.18	594.41	330.08	594.48	344.71	594.88	351.36	595.04	356.41	595.14
369.28	595.41	380.07	595.49	394.02	595.66	408.37	595.88	418	596
469.1	598	531.5	600.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	126.01	.067	133.41	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	126.01	133.41		70	69		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: UT1-Lower RS: 1094

INPUT
 Description:

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605.87	1.83	605.75	3.54	605.24	13.07	603.48	22.95	602.07
29.83	600.7	33.83	599.92	39.5	598.98	59.96	592.16	74.96	592.16
77.16	591.06	78.16	591.06	84.36	592.36	85.21	592.4	88.44	592.74
93.15	592.73	99.05	592.96	101.11	593.07	102.83	593.11	107.55	593.12
108.24	593.11	111.97	593.04	114.3	593.03	116.22	592.97	122.97	593.19
126.39	593.28	128.51	593.28	141.65	593.04	146.03	593.36	147.65	593.34
149.31	593.32	168.47	593.49	181.1	593.46	181.77	593.4	184.59	593.17
192.1	592	194.9	593	284.2	594	398.5	596	476.9	598
525.7	601								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	74.96	.067	84.36	.085

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	74.96	84.36		82	78		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 22339

INPUT
 Description:

TravisCreek-Bed Shear Report.txt

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608.1	3.1	607.71	16.24	606.42	23.38	605.49	31.09	604.29
31.74	604.19	48.28	600.8	54.89	600	62.89	598.73	65.25	598.76
67.15	599.07	68.37	599.26	73.45	599.38	78.52	599.09	79.3	599.06
87.78	597.95	94.27	598.06	100.56	598.28	123.75	598.28	126.86	597.24
141.86	597.24	147.26	594.54	155.02	594.54	155.22	594.44	155.81	594.44
156.01	594.54	163.76	594.54	169.16	597.24	184.16	597.24	195.15	600.9
195.3	600.92	202.26	602.5	205.39	603	214.43	603.72	229.69	606.28
231.46	606.66	234.89	607.07	238.22	607.54	243.78	608.39	258.75	610.4
264.53	611.05								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	141.86	.067	169.16	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	141.86	169.16		98	100		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 22239

INPUT

Description:

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605	10.85	604.05	13.14	603.9	21.96	602.98	26.65	602.46
34.28	601.61	38.08	601.13	42.25	600.69	43.35	600.57	43.99	600.49
47.46	600.27	56.36	599.87	65.48	599.36	66.65	599.3	68.53	599.39
71.44	599.6	72.18	599.53	74.67	599.21	74.99	599.22	77.62	599.78
79.39	599.78	82.03	598.97	83.46	598.92	87.66	598.7	92.62	597.05
107.62	597.05	113.02	594.35	120.77	594.35	120.97	594.25	121.57	594.25
121.78	594.35	129.52	594.35	134.93	597.05	149.93	597.05	156.97	599.4
164.04	599.3	173.42	599.03	181.17	598.98	186.31	598.97	195.68	598.96
205.5	603	221.71	606.42	236.92	609.61	239.15	609.99		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	107.62	.067	134.93	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	107.62	134.93		102	100		.1	.3

CROSS SECTION

TravisCreek-Bed Shear Report.txt

RIVER: RIVER-1
 REACH: Main 3

RS: 22139

INPUT

Description:

Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605	2.72	604.75	4.12	604.62	24	602.45	30.23	601.96
35.71	601.38	41.17	600.87	50	600.28	61.49	599.54	66.56	599.21
67.34	599.17	77.45	598.93	85.86	598.78	88.89	598.7	92.53	598.65
110.49	598.32	118.05	598.4	121.39	598.19	129.64	598.35	134.54	595.01
143.42	594.39	144.42	594.32	145.29	594.26	148.92	594.69	150.98	598.8
152.45	599.26	153.81	599.18	174.74	598.07	176.63	598.03	178.67	598.09
185.91	598.08	186.75	598.09	192.41	598.22	197.86	597.07	201.45	597.16
210.97	600.93	219.52	603.2	226.67	604.94	230.43	605.95	246.3	608.25
248.71	608.61	258.33	610.04						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	129.64	.071	152.45	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

129.64	152.45	101	97	94	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
152.45	258.33	599.26	F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3

RS: 22042

INPUT

Description:

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	605.07	6.66	603.49	9.88	602.63	12.85	602.32	19.18	601.64
28.04	600.98	51.36	599.22	67.64	598.6	71.72	598.42	77.36	598.43
97.41	598.28	104.45	598.27	106.7	598.27	117.61	598.38	138.44	598.39
147.34	598.41	157.13	598.43	159.71	598.43	162.41	594.31	165.24	593.82
165.71	593.76	170.91	594.2	174.07	594.46	175.69	596.54	176.47	596.74
183.02	598.01	194.44	598.26	197.33	598.33	205.35	598.81	212.17	599.44
213.6	599.69	217.8	600.45	241.81	604.97	242.17	605.04	271.97	609.06
280.96	610.03								

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 159.71 .071 183.02 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 159.71 183.02 76 80 83 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 21962

INPUT
 Description:

Station Elevation Data num= 38
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 610 2.68 609.73 7.97 609.24 16.11 608.52 25.72 604.28
 30.57 603.46 31.82 603.22 36.65 602.46 45.82 601 49.05 600.53
 85.63 598.66 92 598.41 99.42 598.14 110.97 598.01 111.41 598.01
 132.48 597.83 151.64 597.87 175.38 597.85 190.29 597.59 200.41 597.86
 206.77 594.47 213.53 594.02 214.24 593.97 218.16 594.28 222.06 598.66
 237.97 598.61 244.08 598.43 245.77 598.47 258.21 600 258.83 600.08
 269.55 601.33 273.11 601.95 278.58 602.97 286.58 604.44 290.14 605.03
 302.47 606.37 309.87 607.21 328.09 608.99

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 200.41 .071 222.06 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 200.41 222.06 126 123 120 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 21839

INPUT
 Description:

Station Elevation Data num= 52
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 608.92 .4 608.88 2.59 608.64 11.19 607.28 19.29 606.37
 25.89 605.7 30.13 605.22 33.35 604.63 40.21 604.08 41.69 603.96
 59.3 603 71.98 602.25 74.26 602.1 85.36 601.3 87.04 601.18

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96.59	600.49	98.33	600.43	102.48	600.28	108.34	600	109.71	599.93
111.06	599.87	135.88	598.7	137.96	598.61	146.33	598.48	160.81	598.13
161.31	598.12	173.76	598.03	193.44	597.95	197.18	597.85	201.48	593.69
204.38	593.85	208.83	594.27	213.82	594.66	220.66	597.07	235.3	597.92
237.26	598.03	240.34	598.22	241.7	598.26	243.77	598.23	246.81	598.16
259.9	597.95	271.24	597.93	281.25	598.68	293.21	599.61	296.88	600
307.74	601.14	308.94	601.27	318.54	602.71	321.77	603.24	345.09	606.96
350.5	607.8	362.79	609.01						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	197.18	.071	220.66	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	197.18	220.66		97	101		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 21738

INPUT
 Description:

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609	13.85	607.43	22.26	606.71	27.96	606.15	31.98	605.96
42.45	605	47.91	604.36	48.77	604.02	53.61	603.72	56.79	603.51
60.8	603.26	73.33	602.47	87.66	601.55	91.43	601.33	99.26	600.79
107.47	600.38	111.15	600.18	115.15	600.24	115.89	600.25	116.62	600.22
122.55	599.99	131.68	599.73	138.46	599.49	141.83	599.37	151.37	599.02
156.06	598.81	168.57	598.24	169.19	598.23	181.6	597.94	183.04	597.9
187.43	597.85	189.02	597.74	212.06	597.29	230.23	596.95	243.45	597.25
248.15	597.34	252.75	597.4	256.73	594.65	264.15	593.75	265.26	593.63
269.31	593.55	269.67	593.57	274.67	598.09	282.77	597.79	283.49	597.67
285.1	597.5	293.48	596.53	298.81	596.93	301.28	597.3	307	598.33
315.03	598.56	316.46	598.6	324.07	598.78	329.82	599.46	352.47	602
361.65	602.95	401.61	609						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	252.75	.071	274.67	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	252.75	274.67		148	146		.1	.3

CROSS SECTION

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RIVER: RIVER-1
 REACH: Main 3

RS: 21592

INPUT

Description:

Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	612	18.84	611.44	19.64	611.4	22.14	611.34	32.6	611.1
35.44	610.98	40.65	610.8	49.34	610.48	57.71	610.25	63.27	610.09
75.44	609.66	84.71	609	88.74	608.83	97.67	608.44	108.36	607.98
119.66	606.87	127.26	606.46	139.52	605.87	148.63	605.51	156.08	605.03
160.19	604.77	172.51	604	179.48	603.65	186.67	603.46	193.62	603.22
199.28	603.01	201.2	602.91	203.41	602.76	210.72	602.14	211.49	602.12
221.57	601.91	223.08	601.88	243.22	601.42	262.91	600.52	268.34	600.24
270.55	600.05	280.22	599.31	299.87	597.86	306.92	597.64	312.11	597.33
435.82	597.33	460.51	593.53	461.51	593.53	469.12	597.33	484.11	597.33
490.49	599.45	491.78	599.56	498.47	599.96	527.82	606.57	530.45	607.27
531.75	607.47	539.16	609.04	545.25	610.13				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	435.82	.071	469.12	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	435.82	469.12		93	90		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3

RS: 21502

INPUT

Description:

Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	608	5.06	607.74	10.09	607.46	17.19	607.14	29.7	606.32
32.68	606.07	37.39	605.77	46.39	605.13	55.02	604.52	56.76	604.43
69.75	604.05	81.04	603.55	82.96	603.25	83.58	603.18	87.7	602.71
88.05	602.72	89.61	602.78	90.03	602.8	115.16	601.88	119.53	601.72
127.35	601.29	141.42	600.9	149.84	600.8	166.61	600.78	168.94	600.75
170.36	600.7	174.26	600.61	197.88	600.1	213.2	599.76	218.21	599.58
220.68	599.55	221.62	599.53	246.16	598.64	251.92	598.57	257.83	597.9
260.65	597.86	261.21	597.79	262.56	597.03	264.49	596.19	322.9	596.19
328.3	593.49	336.05	593.49	336.25	593.39	336.85	593.39	337.05	593.49

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344.8 593.49 350.2 596.19 365.13 596.19 392.75 605.48 408.21 608.08
 415.07 609

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .1 322.9 .071 350.2 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 322.9 350.2 106 114 122 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 21388

INPUT
 Description:

Station Elevation Data num= 52
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 608 6.08 607.71 21.41 606.97 21.8 606.94 40.77 605.99
 41.33 605.96 57.34 605.03 63.51 604.67 73.83 604.11 82.7 602.65
 84.14 602.5 84.85 602.52 88.27 602.66 89.15 602.69 90.27 602.73
 92.15 602.76 117.84 601.87 122.73 601.69 123.05 601.67 124.12 601.63
 144.15 600.69 152.64 600.35 161.98 600.22 188.24 599.83 206.23 599.35
 218.11 599.53 220.7 599.57 221.43 599.55 222.44 599.53 252.75 598.09
 266.98 597.62 268.26 597.62 273.95 597.59 276.8 597.4 277.54 597.33
 279.95 596.71 283.38 595.91 311.17 595.91 316.57 593.21 324.32 593.21
 324.52 593.11 325.12 593.11 325.32 593.21 333.07 593.21 338.19 595.78
 361.43 596.23 382.1 596.49 386.79 596.57 395.04 601.2 404.96 604.4
 408.24 605.11 426.76 609.98

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .1 311.17 .071 338.19 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 311.17 338.19 82 74 66 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 21314

INPUT
 Description:

TravisCreek-Bed Shear Report.txt

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	610	12.12	609.17	15.42	608.95	18.71	608.89	35.04	608.47
36.94	608.32	44.51	608.05	54.56	607.73	63.71	607.58	66.2	607.5
75.2	606.79	88.57	605.98	89.36	605.93	90.64	605.85	100.67	604.87
112.15	604.29	115.05	604.1	117.41	603.64	126.47	602.16	126.84	602.1
127.3	602.11	127.78	602.13	128.3	602.15	128.95	602.18	129.69	602.2
130.71	602.24	138.32	602.13	139.78	602.04	142.53	601.81	165.92	600.86
174.01	600.5	178.43	600.38	191.21	600.05	207.98	599.38	210.76	599.24
214.61	599.17	228.46	598.93	237.31	598.48	265.98	598.6	276.58	599.44
279.01	599.59	284.56	599.58	285.03	599.58	296.56	599.64	298.01	599.44
298.83	599.21	303.99	597.93	314.23	595.8	372.06	595.8	377.46	593.1
385.21	593.1	385.42	593	386.02	593	386.22	593.1	393.97	593.1
399.52	595.88	407.08	596.31	411.91	596.21	417.28	596.05	425.78	595.75
443.48	596.36	446.43	596.36	447.07	596.36	452.89	598.56	454.75	599.22
468.79	603.87	487.9	609.26	511.74	611.77	522.36	612.44	539.85	613.83
544.46	614.22	546.65	614.41	547.6	614.49	548.92	614.59	554.22	615

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	372.06	.071	399.52	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	372.06	399.52		95	99		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: Main 3

RS: 21215

INPUT

Description:

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	611	4.95	610.6	19.79	610.11	20.35	610.07	20.73	610.06
22.63	610	36.17	609.55	47.07	609.02	56.24	608.83	65.63	608.33
71.95	608.04	79.77	607.52	84.97	607.18	99.66	606.47	104.18	606.24
105.06	606.21	106.05	606.17	119.54	605.48	120.21	605.44	128.83	605
140.19	604.42	140.94	604.37	141.58	604.33	159.85	603.21	161.49	602.74
164.4	601.75	165.35	601.79	166.2	601.82	166.68	601.84	171.8	601.77
176.35	601.51	179.44	601.25	207.29	600.04	211.15	599.84	215.14	599.7
232.12	599.23	239.02	599.05	251.11	598.73	267.63	597.98	273.56	597.62
277.2	597.59	280.15	597.5	291.43	597.2	297.62	597.57	300.66	597.87
313.38	598.31	320.29	599.1	321.57	599.09	324.02	599.07	328.23	599.51
329.74	599.4	331.99	599.24	333.03	599.17	333.87	599.07	344.29	596.57
419.08	596.57	445.49	596.57	470.18	592.77	471.19	592.77	478.79	596.57

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493.79	596.57	512.99	602.97	514.16	603.09	515.51	603.58	519.81	604.27
523.41	605	528.06	606.2	535.69	607.26	541.63	608.74	552.32	610.72
558.55	611.85	568.08	612.9	584.48	614.4	586.04	614.53	592.17	614.94
593.04	615								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	445.49	.071	478.79	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	445.49	478.79		112	116		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
200	328.23	599.51	F

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 21099

INPUT

Description:

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609.72	11.01	609.55	11.57	609.53	12.12	609.54	25.04	609.46
33.63	609.21	34.47	609.18	35.02	609.17	48.49	609	51.54	608.91
65.97	608.14	77.89	607.28	79.88	607.14	81.51	607.03	86.87	606.59
93.43	606.08	95.24	606.01	109.45	605.7	118.87	605.43	129.83	604.79
138.05	604.2	147.18	603.5	155.19	602.72	160.62	602.35	161.17	602.15
165.2	601.57	165.61	601.58	166.21	601.6	167.24	601.64	170.4	601.57
176.7	601.22	177.51	601.15	184.48	600.85	194.69	600.33	206.56	599.75
209.71	599.63	223.97	599.14	239.51	598.7	240.03	598.69	251.23	598.28
274.76	597.32	286.32	596.89	297.69	597.71	299.04	597.84	300.04	597.91
310.5	598.97	311.64	599.1	316.94	599.72	319.21	599.9	323.34	599.85
330.32	599.73	330.65	599.72	341.41	596.61	342.18	596.4	408.53	596.4
425.01	596.4	432.6	592.6	433.61	592.6	458.3	596.4	484.91	596.4
495.05	596.66	497.92	596.75	499.09	596.62	511.04	596.64	524.86	596.74
526.35	596.61	527.08	596.64	528.99	596.64	539.51	596.47	545.98	596.47
565.62	600	573.98	601.42	576.03	601.8	588.12	603.64	595.16	603.76
606.39	606.01	626.05	608.89	630.92	609.25	670.51	613.15	686.29	615.08

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	425.01	.071	458.3	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.

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425.01	458.3		470	490	515		.1	.3
Ineffective Flow		num=	1					
Sta L	Sta R	Elev	Permanent					
0	319.21	599.9	F					

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3 RS: 20609

INPUT

Description:

Station Elevation Data		num=	100							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	609.01	4.39	608.95	8.13	608.9	22.1	608.28	23.02	608.23	
34.17	607.56	35.18	607.5	49.43	607.28	50.09	607.25	64.75	606.15	
71.74	605.71	76.5	605.18	80.41	604.96	93.61	604.42	102.48	604.08	
109.77	603.87	120.92	603.69	127.65	603.63	135.61	603.45	144.87	603.19	
151.41	603.05	154.14	602.98	165.98	602.4	174.94	602.45	185.63	602.22	
197.17	602.13	207.17	601.79	210.23	601.49	212.66	601.25	219.43	601.49	
226.01	601.04	228.55	601.18	231.65	600.17	243.41	598.13	245.69	598.03	
253.6	597.68	254.07	597.66	258.75	597.17	269.09	596.21	273.1	595.85	
275.15	595.66	275.75	595.61	277.32	595.54	296.55	594.91	300.86	595.23	
309.32	596.84	313.3	597.52	314.66	597.72	325.55	599.18	326.81	599.5	
327.34	599.38	336.29	599.46	339.93	599.37	345.06	599.1	351.39	598.93	
358.82	598.83	368.53	598.6	384.55	598.86	386.48	598.83	388.22	598.83	
412.49	598.51	421.37	596.69	427.88	595.59	443.73	593.02	444.58	592.86	
454.32	591.7	457.68	592.32	458.4	592.53	465.26	595.7	470.22	595.95	
470.62	595.96	472.69	596.02	490.79	596.72	501.43	597.59	507.48	598.24	
514.31	598.52	527.19	599.96	533.09	600.52	539.35	601.11	541.59	601.54	
552	602.28	566.91	603.38	573.1	604.68	576.58	605.17	591.69	606.43	
599.27	606.97	601.28	607.22	613.81	608.74	626.38	609.68	636.79	610.55	
647.33	612.02	649.01	612.27	657.78	613.12	670.53	614.24	673.06	614.7	
683.86	616.11	695.49	617.15	702.67	617.91	709.95	619.23	720.2	620	

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	412.49	.071	465.26	.09

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	412.49	465.26		329	326	318		.1	.3

Ineffective Flow		num=	1	
Sta L	Sta R	Elev	Permanent	
0	326.81	599.1	F	

CROSS SECTION

TravisCreek-Bed Shear Report.txt

RIVER: RIVER-1
 REACH: Main 3

RS: 20283

INPUT

Description:

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603.14	10.52	602.82	17.66	602.53	23.85	602.32	39.91	601.79
51	600.96	51.55	600.92	55.35	600.65	72.81	599.43	77.2	598.97
88.82	597.63	94.41	597.16	111	596	117.3	595	125	592.7
135	592	147	592.9	160	594	195	595	285	599.2
301.11	599.05	306.16	599.33	319.82	600.32	329.04	600.86	334.58	601.16
352.02	602.84	354.08	603.06	358.01	603.57	370.87	605.04	375.38	605.56
393.23	607.51	398.79	608.12	421	610.25	421.89	610.34	422.28	610.36
426.39	610.81	443.97	612.7	444.91	612.79	455.17	613.79	469.21	615
469.97	615.14								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	117.3	.071	160	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	117.3	160		364	367		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main 3

RS: 19916

INPUT

Description:

Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-103	605	0	600	2.65	599.75	16.78	599.27	28.8	598.89
31.31	598.79	32.55	598.71	36.6	598.54	72.94	596.54	84.15	596.32
87.27	596.3	90.71	596.25	103.19	596	120.21	595.56	128.92	595.38
129.66	595.37	130.82	595.36	148.02	595.25	164.34	595.13	170.46	595
179.19	594.6	189.36	594.24	204.15	593.88	212.08	592.15	215.22	592
226.17	594.75	229.33	595	230.4	596	253.57	596.47	261.19	596.71
277.76	597.56	281.29	597.75	302.3	598.89	303.23	598.95	304.64	599.08
310.36	599.62	318.14	600.34	322.58	600.79	335.11	601.74	340.87	602.98
341.42	603.05	342.02	603.09	354.12	603.91	361.33	604.37	362.03	604.44
378.26	605.6	380.09	605.73	380.6	605.77	399	607	401.17	607.16
406.5	607.65	415.54	608.28	424.71	608.76	432.85	609.12	435.37	609.3

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440.2 609.64 446.86 610.04 454.36 610.49 463.95 611.05

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -103 .085 170.46 .071 230.4 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 170.46 230.4 500 474 447 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main Lower RS: 19442

INPUT
 Description:

Station Elevation Data num= 50
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 605 5.35 604.39 8.92 603.99 22.16 602.43 24.75 602.14
 30.63 601.05 34.64 600.52 41.06 599.48 51.45 597.83 60.54 596.92
 62.1 596.78 63.77 596.6 66.92 596.33 80.78 594.98 87.64 594.7
 93.66 594.33 97.27 594.02 100.79 593.06 102.08 592.94 110.59 590.3
 113.84 591.33 121.98 592.68 122.54 592.72 132.59 593.07 143.29 593.23
 151.82 593.17 154.89 593.15 165.5 593.1 171.28 593.34 179.94 593.52
 181.59 593.61 183.55 593.72 184.08 593.75 188.99 593.75 200.21 593.77
 216.79 593.79 217.28 593.8 247.03 594.71 250.29 595.26 253.62 595.8
 256.17 596.03 272.86 596.79 273.91 596.83 275.49 596.9 291.26 597.17
 301.43 597.8 308.94 598.38 321.85 599.33 326 599.56 330.88 600

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .085 97.27 .071 122.54 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 97.27 122.54 446 461 475 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main Lower RS: 18981

INPUT
 Description:

Station Elevation Data num= 81
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

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0	604	4.25	603.61	12.58	602.47	15.81	602.08	16.31	602.06
16.95	602.01	26.93	601.59	34.95	601.14	37.51	601	39.31	600.86
52.54	599.79	61.82	599.53	69.96	598.92	72.76	598.71	75.1	598.53
94.38	598.62	97.07	598.5	97.49	598.52	98.69	598.52	122.28	598.46
123.92	598.48	142.16	598.54	155.75	598.49	157.54	598.44	165.86	597.72
167.42	597.47	186.41	597.71	187.69	597.74	190.77	597.77	199.91	597.69
210.7	597.46	221.01	597.25	247.13	596.2	250.63	595.94	252.32	595.94
255.99	595.99	271.28	595.22	288.15	595.46	299.37	595.1	301	595
306.78	594.83	308.52	594.83	322.46	593.82	326.78	593.66	338.74	593.04
345.82	592.8	364.47	592.16	370.93	591.7	399.36	591.98	402.95	592.13
412.39	592.33	419.81	592.46	434.65	592.59	439.31	592.51	442	591.62
444	589.6	451	589.1	458	589.6	460	591	469.37	592.73
475.93	592.82	485.54	592.86	495.91	593.22	502	593.4	516.59	594.32
518.66	594.44	519.27	594.53	536	598.84	537.41	599.11	553.07	601.29
565.47	602.93	570.53	603.38	581	604.99	588.14	606	592.52	606.79
606.05	609.25	620.31	610.7	624.62	611.11	627.6	611.28	636.89	610.81
639.67	611.42								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	439.31	.071	469.37	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	439.31	469.37		815	813		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main Lower RS: 18168

INPUT
 Description:

Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	601.1	4.11	600.87	10.44	600.47	32.52	600.02	36.42	599.97
37.82	600.01	42.05	600.04	57.66	599.88	69.12	599.02	73.36	598.7
90.71	597.06	92.44	596.84	95.52	596.62	107.71	595.39	108.64	595.25
113.01	594.63	125.16	593.73	128.56	593.47	130.34	593.35	143.15	592.06
148.3	590.1	150.3	589.6	157.29	589.1	164.3	589.6	165.43	591.1
172.26	590.81	176.28	590.82	184.72	590.62	202.58	590.62	206.54	590.73
210.14	590.7	218	590.59	221.65	590.54	228.81	590.49	240.61	590.41
249.7	590.25	258.66	589.97	260.52	589.9	265.23	589.98	277.33	590.3
288.91	590.68	292.31	590.78	294	590.75	308.56	590.26	316.65	590.19
325.43	590.16	326.56	590.21	336.32	590.27	337.13	590.29	339.84	590.31
357.44	590.48	358.94	590.5	359.69	590.49	362.9	590.54	382.55	590.96
386.86	591.16	402.22	591.7	403.44	591.75	403.87	591.77	419.52	592.72

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422.08	592.93	431.78	593.63	435.21	593.93	437.45	594.12	440.85	594.38
452.1	595.2	460.66	596	464.38	596.36	473.1	597.07	482.94	597.9
486.29	598.25	497.99	599.94	501.11	600.64	508.04	601.15	522.24	602.58
529.99	603.43	536.31	604.47	549.13	605.35	553.86	605.93	561.41	608.29
563.53	608.57	566.44	608.97	590.86	611.09	596.6	611.68	599.15	612.01

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	143.15	.071	165.43	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	143.15	165.43		375	376		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Main Lower RS: 17792

INPUT

Description:

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	614.14	22.82	608.39	47.83	602.59	53.6	593	63.6	592.3
65.6	588.7	77.6	589	87.6	588.7	88.6	591.2	105.6	592.6
188.6	592.4	235.6	592.3	274.67	592.73	279.19	593.97	306.12	600.33
307.24	600.42	309.29	600.59	320.33	601.5	325.43	601.7	340.95	602.91
346.51	603.54	353.29	603.95	373.12	604.97	374.18	605.02	375.5	605.07
388.99	605.65								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	63.6	.071	88.6	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	63.6	88.6		17792	17792		.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3
UT4	1399	.1	.067	.1
UT4	1339	.1	.067	.1

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UT4	1274	.1	.067	.1
UT4	1226	.1	.067	.1
UT4	1166	.1	.067	.1
UT4	1120	.1	.067	.1
UT4	1067	.1	.067	.1
Main Upper	23036	.1	.067	.1
Main Upper	23026	.1	.067	.1
Main 2	22822	.1	.067	.1
Main 2	22728	.1	.067	.1
Main 2	22638	.1	.067	.1
Main 2	22541	.1	.067	.1
UT3	1207	.1	.067	.1
UT3	1163	.1	.067	.1
UT3	1107	.1	.067	.1
UT3	1077	.1	.067	.1
UT1-Upper	2311	.085	.067	.085
UT1-Upper	2251	.085	.067	.085
UT1-Upper	2177	.085	.067	.085
UT1-Upper	2104	.085	.067	.085
UT1-Upper	2052	.085	.067	.085
UT1-Upper	1981	.085	.067	.085
UT1-Upper	1924	.085	.067	.085
UT1-Upper	1867	.085	.067	.085
UT1-Upper	1806	.085	.067	.085
UT1-Upper	1767	.085	.067	.085
UT1-Upper	1724	.085	.067	.085
UT1-Upper	1648	.085	.067	.085
UT1-Upper	1602	.085	.067	.085
UT1-Upper	1537	.085	.067	.085
UT1-Upper	1487	.085	.067	.085
UT2	1672	.085	.067	.085
UT2	1609	.085	.067	.085
UT2	1557	.085	.067	.085
UT2	1497	.085	.067	.085
UT2	1465	.085	.067	.085
UT2	1417	.085	.067	.085
UT2	1376	.085	.067	.085
UT2	1333	.085	.067	.085
UT2	1285	.085	.067	.085
UT2	1231	.085	.067	.085
UT2	1175	.085	.067	.085
UT1-Lower	1264	.085	.067	.085
UT1-Lower	1194	.085	.067	.085
UT1-Lower	1163	.085	.067	.085
UT1-Lower	1094	.085	.067	.085
Main 3	22339	.1	.067	.09
Main 3	22239	.1	.067	.09

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Main 3	22139	.085	.071	.1
Main 3	22042	.085	.071	.1
Main 3	21962	.085	.071	.1
Main 3	21839	.085	.071	.1
Main 3	21738	.085	.071	.1
Main 3	21592	.1	.071	.09
Main 3	21502	.1	.071	.09
Main 3	21388	.1	.071	.09
Main 3	21314	.1	.071	.09
Main 3	21215	.1	.071	.09
Main 3	21099	.1	.071	.09
Main 3	20609	.1	.071	.09
Main 3	20283	.1	.071	.1
Main 3	19916	.085	.071	.1
Main Lower	19442	.085	.071	.1
Main Lower	18981	.085	.071	.1
Main Lower	18168	.1	.071	.1
Main Lower	17792	.1	.071	.1

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
UT4	1399	59	60	61
UT4	1339	65	65	66
UT4	1274	48	48	49
UT4	1226	59	60	61
UT4	1166	46	46	46
UT4	1120	51	53	55
UT4	1067	54	50	45
Main Upper	23036	10	10	10
Main Upper	23026	213	204	197
Main 2	22822	96	94	90
Main 2	22728	93	90	88
Main 2	22638	91	97	103
Main 2	22541	209	202	197
UT3	1207	44	44	44
UT3	1163	56	56	54
UT3	1107	29	30	32
UT3	1077	63	58	52
UT1-Upper	2311	59	60	57
UT1-Upper	2251	73	74	76

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UT1-Upper	2177	74	73	73
UT1-Upper	2104	53	52	50
UT1-Upper	2052	72	71	71
UT1-Upper	1981	56	57	57
UT1-Upper	1924	58	57	58
UT1-Upper	1867	61	61	61
UT1-Upper	1806	40	39	38
UT1-Upper	1767	43	43	44
UT1-Upper	1724	76	76	77
UT1-Upper	1648	45	46	46
UT1-Upper	1602	66	65	65
UT1-Upper	1537	50	50	50
UT1-Upper	1487	224	223	223
UT2	1672	63	63	64
UT2	1609	52	52	52
UT2	1557	59	60	60
UT2	1497	34	32	30
UT2	1465	47	48	50
UT2	1417	42	41	40
UT2	1376	43	43	43
UT2	1333	48	48	49
UT2	1285	54	54	53
UT2	1231	55	56	56
UT2	1175	165	170	174
UT1-Lower	1264	64	70	75
UT1-Lower	1194	34	31	29
UT1-Lower	1163	70	69	68
UT1-Lower	1094	82	78	76
Main 3	22339	98	100	102
Main 3	22239	102	100	97
Main 3	22139	101	97	94
Main 3	22042	76	80	83
Main 3	21962	126	123	120
Main 3	21839	97	101	106
Main 3	21738	148	146	145
Main 3	21592	93	90	87
Main 3	21502	106	114	122
Main 3	21388	82	74	66
Main 3	21314	95	99	103
Main 3	21215	112	116	120
Main 3	21099	470	490	515
Main 3	20609	329	326	318
Main 3	20283	364	367	370
Main 3	19916	500	474	447
Main Lower	19442	446	461	475
Main Lower	18981	815	813	812
Main Lower	18168	375	376	377

Main Lower	17792	17792	17792	17792
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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: RIVER-1

Reach	River Sta.	Contr.	Expan.
UT4	1399	.1	.3
UT4	1339	.1	.3
UT4	1274	.1	.3
UT4	1226	.1	.3
UT4	1166	.1	.3
UT4	1120	.1	.3
UT4	1067	.1	.3
Main Upper	23036	.3	.5
Main Upper	23026	.3	.5
Main 2	22822	.1	.3
Main 2	22728	.1	.3
Main 2	22638	.1	.3
Main 2	22541	.1	.3
UT3	1207	.1	.3
UT3	1163	.1	.3
UT3	1107	.1	.3
UT3	1077	.1	.3
UT1-Upper	2311	.1	.3
UT1-Upper	2251	.1	.3
UT1-Upper	2177	.1	.3
UT1-Upper	2104	.1	.3
UT1-Upper	2052	.1	.3
UT1-Upper	1981	.1	.3
UT1-Upper	1924	.1	.3
UT1-Upper	1867	.1	.3
UT1-Upper	1806	.1	.3
UT1-Upper	1767	.1	.3
UT1-Upper	1724	.1	.3
UT1-Upper	1648	.1	.3
UT1-Upper	1602	.1	.3
UT1-Upper	1537	.1	.3
UT1-Upper	1487	.1	.3
UT2	1672	.1	.3
UT2	1609	.1	.3
UT2	1557	.1	.3
UT2	1497	.1	.3

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UT2	1465	.1	.3
UT2	1417	.1	.3
UT2	1376	.1	.3
UT2	1333	.1	.3
UT2	1285	.1	.3
UT2	1231	.1	.3
UT2	1175	.1	.3
UT1-Lower	1264	.1	.3
UT1-Lower	1194	.1	.3
UT1-Lower	1163	.1	.3
UT1-Lower	1094	.1	.3
Main 3	22339	.1	.3
Main 3	22239	.1	.3
Main 3	22139	.1	.3
Main 3	22042	.1	.3
Main 3	21962	.1	.3
Main 3	21839	.1	.3
Main 3	21738	.1	.3
Main 3	21592	.1	.3
Main 3	21502	.1	.3
Main 3	21388	.1	.3
Main 3	21314	.1	.3
Main 3	21215	.1	.3
Main 3	21099	.1	.3
Main 3	20609	.1	.3
Main 3	20283	.1	.3
Main 3	19916	.1	.3
Main Lower	19442	.1	.3
Main Lower	18981	.1	.3
Main Lower	18168	.1	.3
Main Lower	17792	.1	.3

Profile Output Table - Bed Shear Table

Reach Shear	River Sta Shear	Profile Shear	Plan E.G. Slope	Q Total Invert	W.S. Slope	Elev (ft)	Vel Chnl (ft/s)
(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft/ft)	(cfs)			
UT4 0.13	1399 0.36	Bankfull 0.13	Prop 0.005277	24.20 0.0042		602.69	1.70
UT4 0.17	1399 0.57	Bankfull 0.10	Exist 0.007082	24.20 0.0107		601.91	2.21
UT4	1399	2x Bankfull	Prop	48.40		603.00	2.23

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	0.27	0.57	0.28	0.006618	0.0042	
UT4	1399		2x Bankfull	Exist	48.40	602.52
	0.27	0.73	0.19	0.006301	0.0107	2.66
UT4	1399		2 Yr	Prop	27.00	602.73
	0.15	0.39	0.15	0.005543	0.0042	1.78
UT4	1399		2 Yr	Exist	27.00	602.06
	0.16	0.53	0.11	0.005897	0.0107	2.16
UT4	1399		5 Yr	Prop	56.00	603.07
	0.31	0.63	0.32	0.006984	0.0042	2.37
UT4	1399		5 Yr	Exist	56.00	602.70
	0.30	0.72	0.20	0.005706	0.0107	2.68
UT4	1399		10 Yr	Prop	85.00	603.36
	0.43	0.79	0.45	0.007379	0.0042	2.73
UT4	1399		10 Yr	Exist	85.00	603.15
	0.41	0.85	0.25	0.005579	0.0107	3.01
UT4	1399		100 Yr	Prop	204.00	604.70
	0.46	0.73	0.49	0.003912	0.0042	2.89
UT4	1399		100 Yr	Exist	204.00	604.71
	0.56	1.00	0.36	0.004070	0.0107	3.52
UT4	1339		Bankfull	Prop	24.20	602.24
	0.16	0.59	0.14	0.010504	0.0091	2.11
UT4	1339		Bankfull	Exist	24.20	601.59
		0.35		0.004570	0.0080	1.73
UT4	1339		2x Bankfull	Prop	48.40	602.53
	0.27	0.66	0.27	0.009023	0.0091	2.34
UT4	1339		2x Bankfull	Exist	48.40	602.15
	0.07	0.59	0.03	0.006014	0.0080	2.31
UT4	1339		2 Yr	Prop	27.00	602.29
	0.17	0.55	0.15	0.009257	0.0091	2.06
UT4	1339		2 Yr	Exist	27.00	601.79
		0.32		0.003851	0.0080	1.68
UT4	1339		5 Yr	Prop	56.00	602.59
	0.31	0.72	0.32	0.009404	0.0091	2.47
UT4	1339		5 Yr	Exist	56.00	602.42
	0.10	0.47	0.06	0.004186	0.0080	2.12
UT4	1339		10 Yr	Prop	85.00	602.99
	0.28	0.57	0.31	0.005648	0.0091	2.29
UT4	1339		10 Yr	Exist	85.00	602.94
	0.15	0.45	0.09	0.003212	0.0080	2.16
UT4	1339		100 Yr	Prop	204.00	604.62
	0.14	0.23	0.16	0.001186	0.0091	1.65
UT4	1339		100 Yr	Exist	204.00	604.66
	0.14	0.28	0.09	0.001161	0.0080	1.84

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UT4	1274	Bankfull	Prop	24.20	601.83	1.55
0.11	0.30	0.08	0.004508	0.0044		
UT4	1274	Bankfull	Exist	24.20	600.97	2.93
	1.10		0.018223	0.0042		
UT4	1274	2x Bankfull	Prop	48.40	602.01	2.18
0.25	0.56	0.20	0.007237	0.0044		
UT4	1274	2x Bankfull	Exist	48.40	601.85	1.91
	0.40	0.14	0.004370	0.0042		
UT4	1274	2 Yr	Prop	27.00	601.79	1.86
0.15	0.44	0.11	0.006760	0.0044		
UT4	1274	2 Yr	Exist	27.00	601.56	1.58
	0.29	0.08	0.003514	0.0042		
UT4	1274	5 Yr	Prop	56.00	602.32	1.51
0.10	0.25	0.12	0.002616	0.0044		
UT4	1274	5 Yr	Exist	56.00	602.32	1.20
0.03	0.15	0.07	0.001256	0.0042		
UT4	1274	10 Yr	Prop	85.00	602.86	1.25
0.08	0.16	0.09	0.001231	0.0044		
UT4	1274	10 Yr	Exist	85.00	602.88	1.08
0.04	0.11	0.07	0.000752	0.0042		
UT4	1274	100 Yr	Prop	204.00	604.59	1.04
0.05	0.09	0.06	0.000382	0.0044		
UT4	1274	100 Yr	Exist	204.00	604.64	0.96
0.04	0.07	0.05	0.000303	0.0042		
UT4	1226	Bankfull	Prop	24.20	601.33	2.67
0.18	1.07	0.18	0.027925	0.0117		
UT4	1226	Bankfull	Exist	24.20	600.78	1.25
0.04	0.19	0.06	0.002626	0.0158		
UT4	1226	2x Bankfull	Prop	48.40	601.83	1.25
0.09	0.19	0.10	0.002777	0.0117		
UT4	1226	2x Bankfull	Exist	48.40	601.84	0.66
0.02	0.04	0.02	0.000317	0.0158		
UT4	1226	2 Yr	Prop	27.00	601.57	1.23
0.08	0.20	0.08	0.003799	0.0117		
UT4	1226	2 Yr	Exist	27.00	601.56	0.48
0.01	0.02	0.01	0.000200	0.0158		
UT4	1226	5 Yr	Prop	56.00	602.28	0.78
0.03	0.07	0.04	0.000697	0.0117		
UT4	1226	5 Yr	Exist	56.00	602.31	0.53
0.01	0.03	0.02	0.000157	0.0158		
UT4	1226	10 Yr	Prop	85.00	602.84	0.71
0.03	0.05	0.04	0.000385	0.0117		
UT4	1226	10 Yr	Exist	85.00	602.87	0.57
0.01	0.03	0.02	0.000140	0.0158		
UT4	1226	100 Yr	Prop	204.00	604.58	0.71

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	0.03	0.04	0.03	0.000173	0.0117	
UT4	1226		100 Yr	Exist	204.00	604.64
	0.02	0.03	0.02	0.000106	0.0158	0.66
UT4	1166		Bankfull	Prop	24.20	600.91
	0.03	0.11	0.06	0.001928	0.0030	0.90
UT4	1166		Bankfull	Exist	24.20	600.74
	0.02	0.04	0.01	0.000484	0.0065	0.61
UT4	1166		2x Bankfull	Prop	48.40	601.80
	0.02	0.03	0.02	0.000282	0.0030	0.54
UT4	1166		2x Bankfull	Exist	48.40	601.83
	0.01	0.02	0.01	0.000122	0.0065	0.44
UT4	1166		2 Yr	Prop	27.00	601.55
	0.01	0.02	0.01	0.000177	0.0030	0.39
UT4	1166		2 Yr	Exist	27.00	601.55
	0.00	0.01	0.00	0.000069	0.0065	0.31
UT4	1166		5 Yr	Prop	56.00	602.26
	0.01	0.02	0.01	0.000133	0.0030	0.43
UT4	1166		5 Yr	Exist	56.00	602.31
	0.01	0.01	0.01	0.000069	0.0065	0.37
UT4	1166		10 Yr	Prop	85.00	602.83
	0.01	0.02	0.01	0.000115	0.0030	0.47
UT4	1166		10 Yr	Exist	85.00	602.87
	0.01	0.02	0.01	0.000071	0.0065	0.42
UT4	1166		100 Yr	Prop	204.00	604.58
	0.01	0.02	0.02	0.000084	0.0030	0.55
UT4	1166		100 Yr	Exist	204.00	604.63
	0.01	0.02	0.01	0.000064	0.0065	0.52
UT4	1120		Bankfull	Prop	24.20	600.80
	0.08	0.14	0.04	0.002427	0.0036	1.05
UT4	1120		Bankfull	Exist	24.20	600.71
	0.01	0.06	0.01	0.000548	0.0249	0.72
UT4	1120		2x Bankfull	Prop	48.40	601.79
	0.02	0.03	0.02	0.000243	0.0036	0.53
UT4	1120		2x Bankfull	Exist	48.40	601.82
	0.01	0.02	0.01	0.000134	0.0249	0.50
UT4	1120		2 Yr	Prop	27.00	601.54
	0.01	0.01	0.01	0.000143	0.0036	0.37
UT4	1120		2 Yr	Exist	27.00	601.55
	0.00	0.01	0.00	0.000073	0.0249	0.34
UT4	1120		5 Yr	Prop	56.00	602.26
	0.01	0.02	0.01	0.000121	0.0036	0.43
UT4	1120		5 Yr	Exist	56.00	602.30
	0.01	0.01	0.01	0.000076	0.0249	0.42

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UT4	1120	10 Yr	Prop	85.00	602.82	0.47
0.01	0.02	0.01	0.000109	0.0036		
UT4	1120	10 Yr	Exist	85.00	602.86	0.46
0.01	0.02	0.01	0.000077	0.0249		
UT4	1120	100 Yr	Prop	204.00	604.57	0.57
0.01	0.02	0.02	0.000085	0.0036		
UT4	1120	100 Yr	Exist	204.00	604.63	0.57
0.01	0.02	0.01	0.000069	0.0249		
UT4	1067	Bankfull	Prop	24.20	600.57	1.76
0.17	0.41	0.06	0.007549	0.0000		
UT4	1067	Bankfull	Exist	24.20	600.69	0.60
0.00	0.04	0.00	0.000323	0.0000		
UT4	1067	2x Bankfull	Prop	48.40	601.77	0.59
0.02	0.04	0.02	0.000275	0.0000		
UT4	1067	2x Bankfull	Exist	48.40	601.81	0.48
0.01	0.02	0.01	0.000118	0.0000		
UT4	1067	2 Yr	Prop	27.00	601.54	0.44
0.01	0.02	0.01	0.000174	0.0000		
UT4	1067	2 Yr	Exist	27.00	601.54	0.34
0.00	0.01	0.00	0.000065	0.0000		
UT4	1067	5 Yr	Prop	56.00	602.25	0.45
0.01	0.02	0.01	0.000119	0.0000		
UT4	1067	5 Yr	Exist	56.00	602.30	0.39
0.00	0.01	0.01	0.000065	0.0000		
UT4	1067	10 Yr	Prop	85.00	602.81	0.47
0.01	0.02	0.01	0.000103	0.0000		
UT4	1067	10 Yr	Exist	85.00	602.86	0.44
0.00	0.02	0.01	0.000066	0.0000		
UT4	1067	100 Yr	Prop	204.00	604.57	0.52
0.01	0.02	0.01	0.000069	0.0000		
UT4	1067	100 Yr	Exist	204.00	604.63	0.50
0.01	0.02	0.01	0.000054	0.0000		
Main Upper	23036	Bankfull	Prop	231.00	600.55	2.18
	0.41		0.002059	0.0000		
Main Upper	23036	Bankfull	Exist	231.00	600.64	2.12
	0.39		0.001921	0.0000		
Main Upper	23036	2x Bankfull	Prop	462.00	601.65	3.26
	0.92		0.004711	0.0000		
Main Upper	23036	2x Bankfull	Exist	462.00	601.70	3.21
	0.90		0.004585	0.0000		
Main Upper	23036	2 Yr	Prop	370.00	601.45	2.77
	0.66		0.003406	0.0000		
Main Upper	23036	2 Yr	Exist	370.00	601.45	2.76

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	0.66		0.003389	0.0000		
Main Upper	23036	5 Yr	Prop	650.00	602.11	4.02
	1.39		0.006791	0.0000		
Main Upper	23036	5 Yr	Exist	650.00	602.17	3.96
	1.34		0.006516	0.0000		
Main Upper	23036	10 Yr	Prop	850.00	602.66	4.55
	1.73		0.007860	0.0000		
Main Upper	23036	10 Yr	Exist	850.00	602.71	4.49
	1.68		0.007600	0.0000		
Main Upper	23036	100 Yr	Prop	1800.00	604.34	6.51
	3.31		0.012334	0.0000		
Main Upper	23036	100 Yr	Exist	1800.00	604.40	6.43
	3.22		0.011923	0.0000		
Main Upper	23026	Bankfull	Prop	231.00	600.53	2.19
	0.41		0.002095	0.0000		
Main Upper	23026	Bankfull	Exist	231.00	600.62	2.14
	0.39		0.001952	0.0000		
Main Upper	23026	2x Bankfull	Prop	462.00	601.60	3.31
	0.95		0.004862	0.0000		
Main Upper	23026	2x Bankfull	Exist	462.00	601.65	3.26
	0.92		0.004729	0.0000		
Main Upper	23026	2 Yr	Prop	370.00	601.41	2.80
	0.68		0.003477	0.0000		
Main Upper	23026	2 Yr	Exist	370.00	601.42	2.79
	0.68		0.003460	0.0000		
Main Upper	23026	5 Yr	Prop	650.00	602.02	4.12
	1.46		0.007240	0.0000		
Main Upper	23026	5 Yr	Exist	650.00	602.09	4.05
	1.41		0.006920	0.0000		
Main Upper	23026	10 Yr	Prop	850.00	602.55	4.67
	1.83		0.008452	0.0000		
Main Upper	23026	10 Yr	Exist	850.00	602.61	4.61
	1.78		0.008143	0.0000		
Main Upper	23026	100 Yr	Prop	1800.00	604.12	6.82
	3.65		0.013949	0.0000		
Main Upper	23026	100 Yr	Exist	1800.00	604.20	6.71
	3.53		0.013377	0.0000		
Main 2	22822	Bankfull	Prop	241.00	600.50	2.50
	0.53		0.002606	0.0003		
Main 2	22822	Bankfull	Exist	241.00	600.59	2.44
	0.51		0.002434	0.0003		
Main 2	22822	2x Bankfull	Prop	481.00	601.61	3.33
0.13	0.88	0.14	0.003420	0.0003		

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Main 2	22822	2x Bankfull	Exist	481.00	601.66	3.25
0.12	0.83	0.14	0.003212	0.0003		
Main 2	22822	2 Yr	Prop	380.00	601.37	3.12
0.10	0.79	0.05	0.003220	0.0003		
Main 2	22822	2 Yr	Exist	380.00	601.38	3.12
0.10	0.78	0.05	0.003195	0.0003		
Main 2	22822	5 Yr	Prop	650.00	602.08	3.59
0.16	0.99	0.23	0.003502	0.0003		
Main 2	22822	5 Yr	Exist	650.00	602.14	3.49
0.15	0.93	0.23	0.003246	0.0003		
Main 2	22822	10 Yr	Prop	900.00	602.65	3.82
0.22	1.08	0.34	0.003443	0.0003		
Main 2	22822	10 Yr	Exist	900.00	602.70	3.73
0.22	1.03	0.33	0.003244	0.0003		
Main 2	22822	100 Yr	Prop	1900.00	604.41	4.18
0.39	1.18	0.55	0.002872	0.0003		
Main 2	22822	100 Yr	Exist	1900.00	604.48	4.10
0.38	1.13	0.53	0.002730	0.0003		
Main 2	22728	Bankfull	Prop	241.00	600.19	2.85
0.70			0.003420	0.0052		
Main 2	22728	Bankfull	Exist	241.00	600.30	2.78
0.66			0.003164	0.0052		
Main 2	22728	2x Bankfull	Prop	481.00	601.24	3.63
0.16	1.06	0.23	0.004320	0.0052		
Main 2	22728	2x Bankfull	Exist	481.00	601.33	3.45
0.16	0.95	0.22	0.003818	0.0052		
Main 2	22728	2 Yr	Prop	380.00	600.94	3.71
0.12	1.13		0.004896	0.0052		
Main 2	22728	2 Yr	Exist	380.00	600.95	3.70
0.12	1.12		0.004844	0.0052		
Main 2	22728	5 Yr	Prop	650.00	601.71	3.82
0.25	1.14	0.34	0.004246	0.0052		
Main 2	22728	5 Yr	Exist	650.00	601.82	3.63
0.24	1.02	0.32	0.003735	0.0052		
Main 2	22728	10 Yr	Prop	900.00	602.29	4.02
0.35	1.22	0.46	0.004111	0.0052		
Main 2	22728	10 Yr	Exist	900.00	602.38	3.88
0.33	1.13	0.43	0.003760	0.0052		
Main 2	22728	100 Yr	Prop	1900.00	604.12	4.39
0.52	1.33	0.70	0.003456	0.0052		
Main 2	22728	100 Yr	Exist	1900.00	604.20	4.29
0.50	1.27	0.67	0.003246	0.0052		
Main 2	22638	Bankfull	Prop	241.00	599.84	2.91

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	0.76		0.004354	-0.0004		
Main 2	22638	Bankfull	Exist	241.00	599.99	2.77
	0.69		0.003805	-0.0004		
Main 2	22638	2x Bankfull	Prop	481.00	600.91	3.14
0.23	0.82	0.22	0.003713	-0.0004		
Main 2	22638	2x Bankfull	Exist	481.00	601.06	2.88
0.20	0.68	0.20	0.002972	-0.0004		
Main 2	22638	2 Yr	Prop	380.00	600.52	3.41
0.22	1.00		0.005026	-0.0004		
Main 2	22638	2 Yr	Exist	380.00	600.66	2.88
0.17	0.70	0.15	0.003407	-0.0004		
Main 2	22638	5 Yr	Prop	650.00	601.41	3.25
0.29	0.85	0.29	0.003389	-0.0004		
Main 2	22638	5 Yr	Exist	650.00	601.56	3.02
0.25	0.72	0.26	0.002786	-0.0004		
Main 2	22638	10 Yr	Prop	900.00	602.00	3.45
0.35	0.91	0.38	0.003207	-0.0004		
Main 2	22638	10 Yr	Exist	900.00	602.11	3.30
0.32	0.83	0.36	0.002855	-0.0004		
Main 2	22638	100 Yr	Prop	1900.00	603.86	3.91
0.43	1.05	0.56	0.002696	-0.0004		
Main 2	22638	100 Yr	Exist	1900.00	603.96	3.80
0.40	0.99	0.53	0.002500	-0.0004		
Main 2	22541	Bankfull	Prop	241.00	599.46	2.77
	0.68		0.003715	0.0000		
Main 2	22541	Bankfull	Exist	241.00	599.67	2.60
0.01	0.59		0.003108	0.0000		
Main 2	22541	2x Bankfull	Prop	481.00	600.48	3.43
0.15	0.97	0.33	0.004328	0.0000		
Main 2	22541	2x Bankfull	Exist	481.00	600.73	3.08
0.11	0.77	0.29	0.003238	0.0000		
Main 2	22541	2 Yr	Prop	380.00	600.09	3.23
0.09	0.89	0.25	0.004286	0.0000		
Main 2	22541	2 Yr	Exist	380.00	600.33	2.90
0.10	0.70	0.23	0.003242	0.0000		
Main 2	22541	5 Yr	Prop	650.00	600.98	3.72
0.20	1.10	0.43	0.004377	0.0000		
Main 2	22541	5 Yr	Exist	650.00	601.24	3.30
0.19	0.85	0.36	0.003204	0.0000		
Main 2	22541	10 Yr	Prop	900.00	601.59	3.92
0.31	1.18	0.52	0.004127	0.0000		
Main 2	22541	10 Yr	Exist	900.00	601.77	3.65
0.28	1.01	0.46	0.003408	0.0000		
Main 2	22541	100 Yr	Prop	1900.00	603.56	4.17
0.43	1.19	0.64	0.003042	0.0000		

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Main 2	22541	100 Yr	Exist	1900.00	603.69	3.98
0.41	1.09	0.59	0.002716	0.0000		
UT3	1207	Bankfull	Prop	7.80	599.55	0.26
0.00	0.01	0.01	0.000071	0.0111		
UT3	1207	Bankfull	Exist	7.80	599.77	0.30
0.00	0.01	0.00	0.000058	0.0086		
UT3	1207	2x Bankfull	Prop	15.60	600.60	0.33
0.00	0.01	0.00	0.000059	0.0111		
UT3	1207	2x Bankfull	Exist	15.60	600.84	0.30
0.00	0.01	0.00	0.000035	0.0086		
UT3	1207	2 Yr	Prop	9.00	600.20	0.24
0.00	0.01	0.00	0.000040	0.0111		
UT3	1207	2 Yr	Exist	9.00	600.43	0.24
0.00	0.00	0.00	0.000026	0.0086		
UT3	1207	5 Yr	Prop	19.00	601.11	0.26
0.00	0.01	0.00	0.000029	0.0111		
UT3	1207	5 Yr	Exist	19.00	601.36	0.24
0.00	0.00	0.00	0.000019	0.0086		
UT3	1207	10 Yr	Prop	28.00	601.73	0.25
0.00	0.01	0.00	0.000022	0.0111		
UT3	1207	10 Yr	Exist	28.00	601.90	0.25
0.00	0.01	0.00	0.000018	0.0086		
UT3	1207	100 Yr	Prop	68.00	603.71	0.27
0.00	0.01	0.00	0.000014	0.0111		
UT3	1207	100 Yr	Exist	68.00	603.83	0.27
0.00	0.01	0.00	0.000013	0.0086		
UT3	1163	Bankfull	Prop	7.80	599.55	0.16
0.00	0.00	0.00	0.000019	0.0102		
UT3	1163	Bankfull	Exist	7.80	599.77	0.19
0.00	0.00	0.00	0.000020	0.0089		
UT3	1163	2x Bankfull	Prop	15.60	600.60	0.19
0.00	0.00	0.00	0.000016	0.0102		
UT3	1163	2x Bankfull	Exist	15.60	600.84	0.18
0.00	0.00	0.00	0.000012	0.0089		
UT3	1163	2 Yr	Prop	9.00	600.20	0.14
0.00	0.00	0.00	0.000011	0.0102		
UT3	1163	2 Yr	Exist	9.00	600.43	0.14
0.00	0.00	0.00	0.000008	0.0089		
UT3	1163	5 Yr	Prop	19.00	601.11	0.18
0.00	0.00	0.00	0.000012	0.0102		
UT3	1163	5 Yr	Exist	19.00	601.36	0.17
0.00	0.00	0.00	0.000009	0.0089		
UT3	1163	10 Yr	Prop	28.00	601.73	0.20

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0.00	0.00	0.00	0.000012	0.0102		
UT3	1163	10 Yr	Exist	28.00	601.90	0.20
0.00	0.00	0.00	0.000010	0.0089		
UT3	1163	100 Yr	Prop	68.00	603.70	0.26
0.00	0.00	0.00	0.000012	0.0102		
UT3	1163	100 Yr	Exist	68.00	603.83	0.26
0.00	0.00	0.00	0.000011	0.0089		
UT3	1107	Bankfull	Prop	7.80	599.55	0.09
0.00	0.00	0.00	0.000005	0.0073		
UT3	1107	Bankfull	Exist	7.80	599.77	0.07
0.00	0.00	0.00	0.000002	0.0147		
UT3	1107	2x Bankfull	Prop	15.60	600.60	0.09
0.00	0.00	0.00	0.000003	0.0073		
UT3	1107	2x Bankfull	Exist	15.60	600.84	0.08
0.00	0.00	0.00	0.000002	0.0147		
UT3	1107	2 Yr	Prop	9.00	600.20	0.07
0.00	0.00	0.00	0.000002	0.0073		
UT3	1107	2 Yr	Exist	9.00	600.43	0.06
0.00	0.00	0.00	0.000001	0.0147		
UT3	1107	5 Yr	Prop	19.00	601.11	0.09
0.00	0.00	0.00	0.000002	0.0073		
UT3	1107	5 Yr	Exist	19.00	601.36	0.07
0.00	0.00	0.00	0.000001	0.0147		
UT3	1107	10 Yr	Prop	28.00	601.73	0.10
0.00	0.00	0.00	0.000002	0.0073		
UT3	1107	10 Yr	Exist	28.00	601.90	0.09
0.00	0.00	0.00	0.000002	0.0147		
UT3	1107	100 Yr	Prop	68.00	603.70	0.13
0.00	0.00	0.00	0.000003	0.0073		
UT3	1107	100 Yr	Exist	68.00	603.83	0.13
0.00	0.00	0.00	0.000002	0.0147		
UT3	1077	Bankfull	Prop	7.80	599.55	0.08
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	Bankfull	Exist	7.80	599.76	0.09
0.00	0.00	0.00	0.000005	0.0000		
UT3	1077	2x Bankfull	Prop	15.60	600.60	0.10
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	2x Bankfull	Exist	15.60	600.84	0.09
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	2 Yr	Prop	9.00	600.20	0.08
0.00	0.00	0.00	0.000002	0.0000		
UT3	1077	2 Yr	Exist	9.00	600.43	0.07
0.00	0.00	0.00	0.000002	0.0000		

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UT3	1077	5 Yr	Prop	19.00	601.11	0.10
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	5 Yr	Exist	19.00	601.36	0.09
0.00	0.00	0.00	0.000002	0.0000		
UT3	1077	10 Yr	Prop	28.00	601.73	0.11
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	10 Yr	Exist	28.00	601.90	0.10
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	100 Yr	Prop	68.00	603.70	0.15
0.00	0.00	0.00	0.000003	0.0000		
UT3	1077	100 Yr	Exist	68.00	603.83	0.14
0.00	0.00	0.00	0.000003	0.0000		
UT1-Upper	2311	Bankfull	Prop	15.10	615.35	2.02
0.15	0.57	0.15	0.012601	0.0245		
UT1-Upper	2311	Bankfull	Exist	15.10	614.49	2.00
	0.53		0.009917	0.0030		
UT1-Upper	2311	2x Bankfull	Prop	30.20	615.52	2.58
0.34	0.87	0.34	0.015610	0.0245		
UT1-Upper	2311	2x Bankfull	Exist	30.20	615.03	2.49
	0.77		0.011455	0.0030		
UT1-Upper	2311	2 Yr	Prop	18.00	615.41	2.04
0.18	0.57	0.18	0.011730	0.0245		
UT1-Upper	2311	2 Yr	Exist	18.00	614.62	2.12
	0.59		0.010300	0.0030		
UT1-Upper	2311	5 Yr	Prop	35.00	615.58	2.63
0.38	0.90	0.38	0.015070	0.0245		
UT1-Upper	2311	5 Yr	Exist	35.00	615.15	2.61
	0.83		0.011872	0.0030		
UT1-Upper	2311	10 Yr	Prop	51.00	615.74	2.88
0.51	1.02	0.51	0.014766	0.0245		
UT1-Upper	2311	10 Yr	Exist	51.00	615.50	2.95
	1.02		0.012871	0.0030		
UT1-Upper	2311	100 Yr	Prop	116.00	616.23	3.56
0.85	1.39	0.85	0.014139	0.0245		
UT1-Upper	2311	100 Yr	Exist	116.00	616.42	3.85
	1.59		0.015349	0.0030		
UT1-Upper	2251	Bankfull	Prop	15.10	613.86	3.32
	1.73		0.053175	0.0265		
UT1-Upper	2251	Bankfull	Exist	15.10	613.43	2.91
	1.25		0.031685	0.0482		
UT1-Upper	2251	2x Bankfull	Prop	30.20	614.22	3.26
0.37	1.44	0.40	0.028665	0.0265		
UT1-Upper	2251	2x Bankfull	Exist	30.20	613.82	3.51

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	1.68		0.033275	0.0482		
UT1-Upper	2251	2 Yr	Prop	18.00	613.92	3.54
	1.94		0.056152	0.0265		
UT1-Upper	2251	2 Yr	Exist	18.00	613.52	3.05
	1.35		0.032091	0.0482		
UT1-Upper	2251	5 Yr	Prop	35.00	614.27	3.45
0.45	1.59	0.50	0.029929	0.0265		
UT1-Upper	2251	5 Yr	Exist	35.00	613.92	3.65
	1.79		0.033508	0.0482		
UT1-Upper	2251	10 Yr	Prop	51.00	614.42	3.87
0.62	1.90	0.78	0.030513	0.0265		
UT1-Upper	2251	10 Yr	Exist	51.00	614.18	4.05
	2.10		0.034372	0.0482		
UT1-Upper	2251	100 Yr	Prop	116.00	614.87	4.99
0.95	2.81	1.58	0.031462	0.0265		
UT1-Upper	2251	100 Yr	Exist	116.00	614.96	4.62
	2.59		0.036297	0.0482		
UT1-Upper	2177	Bankfull	Prop	15.10	612.14	2.04
0.10	0.60	0.10	0.013757	0.0266		
UT1-Upper	2177	Bankfull	Exist	15.10	609.58	4.36
	2.97		0.088234	0.0540		
UT1-Upper	2177	2x Bankfull	Prop	30.20	612.27	3.05
0.36	1.26	0.36	0.024674	0.0266		
UT1-Upper	2177	2x Bankfull	Exist	30.20	609.95	5.01
	3.57		0.080565	0.0540		
UT1-Upper	2177	2 Yr	Prop	18.00	612.20	2.14
0.14	0.64	0.14	0.013621	0.0266		
UT1-Upper	2177	2 Yr	Exist	18.00	609.67	4.52
	3.11		0.086067	0.0540		
UT1-Upper	2177	5 Yr	Prop	35.00	612.33	3.13
0.43	1.30	0.42	0.023717	0.0266		
UT1-Upper	2177	5 Yr	Exist	35.00	610.04	5.16
	3.71		0.078925	0.0540		
UT1-Upper	2177	10 Yr	Prop	51.00	612.49	3.44
0.63	1.49	0.59	0.023141	0.0266		
UT1-Upper	2177	10 Yr	Exist	51.00	610.30	5.60
	4.14		0.075068	0.0540		
UT1-Upper	2177	100 Yr	Prop	116.00	612.97	4.34
1.10	2.09	0.91	0.022384	0.0266		
UT1-Upper	2177	100 Yr	Exist	116.00	611.05	6.65
	5.19		0.065597	0.0540		
UT1-Upper	2104	Bankfull	Prop	15.10	609.86	4.02
	2.63		0.089041	0.0256		

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UT1-Upper	2104	Bankfull	Exist	15.10	605.78	2.99
	1.29		0.030658	0.0346		
UT1-Upper	2104	2x Bankfull	Prop	30.20	610.25	3.20
0.30	1.44	0.29	0.031125	0.0256		
UT1-Upper	2104	2x Bankfull	Exist	30.20	606.22	3.56
	1.68		0.030255	0.0346		
UT1-Upper	2104	2 Yr	Prop	18.00	609.93	4.14
	2.72		0.085509	0.0256		
UT1-Upper	2104	2 Yr	Exist	18.00	605.88	3.12
	1.37		0.030384	0.0346		
UT1-Upper	2104	5 Yr	Prop	35.00	610.28	3.39
0.38	1.59	0.37	0.033335	0.0256		
UT1-Upper	2104	5 Yr	Exist	35.00	606.33	3.70
	1.77		0.030286	0.0346		
UT1-Upper	2104	10 Yr	Prop	51.00	610.36	3.82
0.61	1.96	0.58	0.036926	0.0256		
UT1-Upper	2104	10 Yr	Exist	51.00	606.60	4.22
	2.21		0.033272	0.0346		
UT1-Upper	2104	100 Yr	Prop	116.00	610.59	5.12
1.44	3.26	1.36	0.049083	0.0256		
UT1-Upper	2104	100 Yr	Exist	116.00	607.40	5.37
	3.24		0.036322	0.0346		
UT1-Upper	2052	Bankfull	Prop	15.10	608.66	1.84
0.13	0.48	0.06	0.010221	0.0199		
UT1-Upper	2052	Bankfull	Exist	15.10	604.15	3.15
	1.41		0.031447	0.0323		
UT1-Upper	2052	2x Bankfull	Prop	30.20	608.83	2.30
0.28	0.69	0.15	0.012264	0.0199		
UT1-Upper	2052	2x Bankfull	Exist	30.20	604.70	3.43
	1.57		0.029031	0.0323		
UT1-Upper	2052	2 Yr	Prop	18.00	608.69	2.02
0.17	0.57	0.08	0.011741	0.0199		
UT1-Upper	2052	2 Yr	Exist	18.00	604.27	3.27
	1.48		0.031179	0.0323		
UT1-Upper	2052	5 Yr	Prop	35.00	608.88	2.36
0.31	0.72	0.17	0.012060	0.0199		
UT1-Upper	2052	5 Yr	Exist	35.00	604.83	3.46
	1.57		0.028013	0.0323		
UT1-Upper	2052	10 Yr	Prop	51.00	609.01	2.58
0.41	0.83	0.22	0.012290	0.0199		
UT1-Upper	2052	10 Yr	Exist	51.00	605.20	3.57
	1.58		0.023901	0.0323		
UT1-Upper	2052	100 Yr	Prop	116.00	609.36	3.33
0.76	1.26	0.47	0.014333	0.0199		
UT1-Upper	2052	100 Yr	Exist	116.00	606.11	4.19

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	1.95		0.021100		0.0323	
UT1-Upper	1981	Bankfull	Prop	15.10	607.32	2.94
	1.32		0.036919		0.0282	
UT1-Upper	1981	Bankfull	Exist	15.10	601.98	3.25
	1.45		0.029590		0.0174	
UT1-Upper	1981	2x Bankfull	Prop	30.20	607.55	2.94
0.33	1.21	0.08	0.025951		0.0282	
UT1-Upper	1981	2x Bankfull	Exist	30.20	602.55	3.89
	1.90		0.029830		0.0174	
UT1-Upper	1981	2 Yr	Prop	18.00	607.43	2.67
0.13	1.05		0.026482		0.0282	
UT1-Upper	1981	2 Yr	Exist	18.00	602.12	3.39
	1.54		0.029276		0.0174	
UT1-Upper	1981	5 Yr	Prop	35.00	607.59	3.10
0.40	1.32	0.12	0.027318		0.0282	
UT1-Upper	1981	5 Yr	Exist	35.00	602.69	4.06
	2.05		0.030432		0.0174	
UT1-Upper	1981	10 Yr	Prop	51.00	607.69	3.38
0.58	1.51	0.23	0.027633		0.0282	
UT1-Upper	1981	10 Yr	Exist	51.00	603.08	4.42
	2.38		0.033853		0.0174	
UT1-Upper	1981	100 Yr	Prop	116.00	608.05	3.79
0.94	1.71	0.45	0.022406		0.0282	
UT1-Upper	1981	100 Yr	Exist	116.00	604.10	4.99
	2.87		0.034270		0.0174	
UT1-Upper	1924	Bankfull	Prop	15.10	605.71	2.46
	0.90	0.12	0.022937		0.0281	
UT1-Upper	1924	Bankfull	Exist	15.10	601.47	1.53
	0.31		0.005327		0.0084	
UT1-Upper	1924	2x Bankfull	Prop	30.20	605.86	3.35
0.25	1.55	0.32	0.032309		0.0281	
UT1-Upper	1924	2x Bankfull	Exist	30.20	602.03	1.88
	0.43		0.006003		0.0084	
UT1-Upper	1924	2 Yr	Prop	18.00	605.71	2.95
	1.30	0.16	0.033374		0.0281	
UT1-Upper	1924	2 Yr	Exist	18.00	601.60	1.61
	0.33		0.005470		0.0084	
UT1-Upper	1924	5 Yr	Prop	35.00	605.91	3.38
0.32	1.55	0.35	0.030472		0.0281	
UT1-Upper	1924	5 Yr	Exist	35.00	602.15	1.97
	0.47		0.006234		0.0084	
UT1-Upper	1924	10 Yr	Prop	51.00	606.02	3.66
0.53	1.74	0.45	0.030238		0.0281	

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UT1-Upper	1924	10 Yr	Exist	51.00	602.51	2.23
	0.57		0.006750	0.0084		
UT1-Upper	1924	100 Yr	Prop	116.00	606.26	4.96
1.31	2.98	0.93	0.041225	0.0281		
UT1-Upper	1924	100 Yr	Exist	116.00	603.49	2.84
	0.84		0.007575	0.0084		
UT1-Upper	1867	Bankfull	Prop	15.10	603.87	3.24
0.08	1.60	0.08	0.044346	0.0280		
UT1-Upper	1867	Bankfull	Exist	15.10	601.19	1.37
	0.25		0.004843	-0.0013		
UT1-Upper	1867	2x Bankfull	Prop	30.20	604.03	3.25
0.39	1.49	0.35	0.032408	0.0280		
UT1-Upper	1867	2x Bankfull	Exist	30.20	601.71	1.63
	0.34		0.005268	-0.0013		
UT1-Upper	1867	2 Yr	Prop	18.00	603.94	2.84
0.18	1.19	0.18	0.029415	0.0280		
UT1-Upper	1867	2 Yr	Exist	18.00	601.31	1.43
	0.27		0.004959	-0.0013		
UT1-Upper	1867	5 Yr	Prop	35.00	604.06	3.45
0.47	1.65	0.42	0.035010	0.0280		
UT1-Upper	1867	5 Yr	Exist	35.00	601.84	1.71
	0.36		0.005290	-0.0013		
UT1-Upper	1867	10 Yr	Prop	51.00	604.14	3.75
0.67	1.89	0.59	0.036048	0.0280		
UT1-Upper	1867	10 Yr	Exist	51.00	602.18	1.90
	0.42		0.005330	-0.0013		
UT1-Upper	1867	100 Yr	Prop	116.00	604.47	3.95
0.98	1.90	0.92	0.026501	0.0280		
UT1-Upper	1867	100 Yr	Exist	116.00	603.14	2.42
	0.62		0.005713	-0.0013		
UT1-Upper	1806	Bankfull	Prop	15.10	602.32	2.08
	0.65	0.23	0.017551	0.0221		
UT1-Upper	1806	Bankfull	Exist	15.10	600.64	2.32
	0.75		0.015896	0.0090		
UT1-Upper	1806	2x Bankfull	Prop	30.20	602.53	2.46
0.11	0.83	0.40	0.017072	0.0221		
UT1-Upper	1806	2x Bankfull	Exist	30.20	601.04	3.03
	1.19		0.020421	0.0090		
UT1-Upper	1806	2 Yr	Prop	18.00	602.37	2.21
	0.72	0.28	0.018269	0.0221		
UT1-Upper	1806	2 Yr	Exist	18.00	600.74	2.47
	0.84		0.016792	0.0090		
UT1-Upper	1806	5 Yr	Prop	35.00	602.57	2.60

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0.16	0.92	0.45	0.018060	0.0221		
UT1-Upper	1806	5 Yr	Exist	35.00	601.13	3.21
	1.32		0.021653	0.0090		
UT1-Upper	1806	10 Yr	Prop	51.00	602.70	2.81
0.29	1.02	0.54	0.017342	0.0221		
UT1-Upper	1806	10 Yr	Exist	51.00	601.41	3.68
	1.66		0.024192	0.0090		
UT1-Upper	1806	100 Yr	Prop	116.00	603.01	3.76
0.75	1.67	0.92	0.021615	0.0221		
UT1-Upper	1806	100 Yr	Exist	116.00	602.09	5.11
	2.96		0.033464	0.0090		
UT1-Upper	1767	Bankfull	Prop	15.10	601.35	2.90
0.16	1.25	0.15	0.031740	0.0323		
UT1-Upper	1767	Bankfull	Exist	15.10	600.17	1.65
	0.41		0.010403	0.0174		
UT1-Upper	1767	2x Bankfull	Prop	30.20	601.55	3.49
0.56	1.65	0.31	0.032127	0.0323		
UT1-Upper	1767	2x Bankfull	Exist	30.20	600.54	2.01
	0.54		0.010486	0.0174		
UT1-Upper	1767	2 Yr	Prop	18.00	601.42	2.96
0.27	1.26	0.13	0.029132	0.0323		
UT1-Upper	1767	2 Yr	Exist	18.00	600.26	1.73
	0.44		0.010534	0.0174		
UT1-Upper	1767	5 Yr	Prop	35.00	601.62	3.48
0.56	1.60	0.34	0.028980	0.0323		
UT1-Upper	1767	5 Yr	Exist	35.00	600.63	2.09
	0.58		0.010372	0.0174		
UT1-Upper	1767	10 Yr	Prop	51.00	601.75	3.84
0.67	1.87	0.46	0.029696	0.0323		
UT1-Upper	1767	10 Yr	Exist	51.00	600.91	2.31
	0.67		0.010329	0.0174		
UT1-Upper	1767	100 Yr	Prop	116.00	602.15	4.08
0.79	1.89	0.74	0.021752	0.0323		
UT1-Upper	1767	100 Yr	Exist	116.00	601.67	2.81
0.03	0.87	0.10	0.009270	0.0174		
UT1-Upper	1724	Bankfull	Prop	15.10	600.22	2.47
0.05	0.91	0.05	0.023367	0.0130		
UT1-Upper	1724	Bankfull	Exist	15.10	599.40	2.63
	1.05		0.029214	0.0224		
UT1-Upper	1724	2x Bankfull	Prop	30.20	600.53	2.89
0.12	1.09	0.37	0.018831	0.0130		
UT1-Upper	1724	2x Bankfull	Exist	30.20	599.87	2.70
	1.01		0.021069	0.0224		

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UT1-Upper	1724	2 Yr	Prop	18.00	600.27	2.69
0.12	1.05	0.13	0.025134	0.0130		
UT1-Upper	1724	2 Yr	Exist	18.00	599.51	2.63
	1.03		0.026556	0.0224		
UT1-Upper	1724	5 Yr	Prop	35.00	600.57	3.14
0.17	1.26	0.45	0.020981	0.0130		
UT1-Upper	1724	5 Yr	Exist	35.00	599.96	2.78
	1.06		0.021011	0.0224		
UT1-Upper	1724	10 Yr	Prop	51.00	600.77	3.31
0.28	1.32	0.41	0.018372	0.0130		
UT1-Upper	1724	10 Yr	Exist	51.00	600.22	3.03
	1.22		0.022501	0.0224		
UT1-Upper	1724	100 Yr	Prop	116.00	600.95	4.74
0.73	2.60	0.73	0.031256	0.0130		
UT1-Upper	1724	100 Yr	Exist	116.00	600.42	5.56
	4.02	0.14	0.069276	0.0224		
UT1-Upper	1648	Bankfull	Prop	15.10	599.19	1.52
0.12	0.35		0.009558	0.0139		
UT1-Upper	1648	Bankfull	Exist	15.10	598.03	2.22
	0.66		0.012526	0.0170		
UT1-Upper	1648	2x Bankfull	Prop	30.20	599.30	2.14
0.27	0.66	0.10	0.015038	0.0139		
UT1-Upper	1648	2x Bankfull	Exist	30.20	598.56	2.55
0.10	0.85		0.014472	0.0170		
UT1-Upper	1648	2 Yr	Prop	18.00	599.23	1.57
0.14	0.37	0.02	0.009290	0.0139		
UT1-Upper	1648	2 Yr	Exist	18.00	598.17	2.32
	0.71		0.012942	0.0170		
UT1-Upper	1648	5 Yr	Prop	35.00	599.35	2.15
0.28	0.65	0.13	0.013796	0.0139		
UT1-Upper	1648	5 Yr	Exist	35.00	598.66	2.67
0.12	0.90	0.02	0.014383	0.0170		
UT1-Upper	1648	10 Yr	Prop	51.00	599.42	2.60
0.41	0.92	0.24	0.017990	0.0139		
UT1-Upper	1648	10 Yr	Exist	51.00	598.93	2.96
0.14	1.03	0.12	0.013259	0.0170		
UT1-Upper	1648	100 Yr	Prop	116.00	599.88	2.40
0.38	0.68	0.34	0.008554	0.0139		
UT1-Upper	1648	100 Yr	Exist	116.00	599.77	2.21
0.19	0.49	0.15	0.003902	0.0170		
UT1-Upper	1602	Bankfull	Prop	15.10	598.32	2.73
0.29	1.19		0.038362	0.0134		
UT1-Upper	1602	Bankfull	Exist	15.10	597.28	2.75

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0.14	1.02		0.019396	0.0055		
UT1-Upper	1602	2x Bankfull	Prop	30.20	598.63	2.26
0.32	0.71	0.07	0.015024	0.0134		
UT1-Upper	1602	2x Bankfull	Exist	30.20	597.71	3.42
0.42	1.42	0.11	0.020326	0.0055		
UT1-Upper	1602	2 Yr	Prop	18.00	598.35	2.95
0.38	1.37		0.042262	0.0134		
UT1-Upper	1602	2 Yr	Exist	18.00	597.39	2.91
0.21	1.12		0.019980	0.0055		
UT1-Upper	1602	5 Yr	Prop	35.00	598.66	2.42
0.37	0.80	0.11	0.016333	0.0134		
UT1-Upper	1602	5 Yr	Exist	35.00	597.81	3.58
0.48	1.53	0.16	0.020301	0.0055		
UT1-Upper	1602	10 Yr	Prop	51.00	598.89	2.09
0.29	0.55	0.18	0.008773	0.0134		
UT1-Upper	1602	10 Yr	Exist	51.00	598.08	4.06
0.57	1.86	0.32	0.020853	0.0055		
UT1-Upper	1602	100 Yr	Prop	116.00	599.71	1.63
0.16	0.28	0.16	0.002448	0.0134		
UT1-Upper	1602	100 Yr	Exist	116.00	599.69	1.57
0.10	0.22	0.07	0.001301	0.0055		
UT1-Upper	1537	Bankfull	Prop	15.10	597.64	1.39
0.07	0.26	0.08	0.005289	0.0150		
UT1-Upper	1537	Bankfull	Exist	15.10	596.81	1.44
0.02	0.27		0.004549	-0.0048		
UT1-Upper	1537	2x Bankfull	Prop	30.20	597.70	2.32
0.21	0.72	0.25	0.013425	0.0150		
UT1-Upper	1537	2x Bankfull	Exist	30.20	597.20	1.92
0.07	0.42	0.06	0.005156	-0.0048		
UT1-Upper	1537	2 Yr	Prop	18.00	597.70	1.41
0.08	0.27	0.09	0.005002	0.0150		
UT1-Upper	1537	2 Yr	Exist	18.00	596.90	1.56
0.03	0.30	0.02	0.004711	-0.0048		
UT1-Upper	1537	5 Yr	Prop	35.00	597.77	2.26
0.21	0.67	0.26	0.011624	0.0150		
UT1-Upper	1537	5 Yr	Exist	35.00	597.27	2.05
0.09	0.48	0.07	0.005530	-0.0048		
UT1-Upper	1537	10 Yr	Prop	51.00	597.70	4.00
0.62	2.14	0.75	0.040315	0.0150		
UT1-Upper	1537	10 Yr	Exist	51.00	597.45	2.49
0.13	0.68	0.12	0.006975	-0.0048		
UT1-Upper	1537	100 Yr	Prop	116.00	599.67	0.89
0.05	0.07	0.04	0.000421	0.0150		
UT1-Upper	1537	100 Yr	Exist	116.00	599.67	0.85
0.03	0.06	0.02	0.000260	-0.0048		

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UT1-Upper	1487	Bankfull	Prop	15.10	596.70	4.01
	2.61		0.088115	0.0000		
UT1-Upper	1487	Bankfull	Exist	15.10	595.99	3.76
	2.39		0.090185	0.0000		
UT1-Upper	1487	2x Bankfull	Prop	30.20	596.93	2.12
	0.68	0.35	0.018562	0.0000		
UT1-Upper	1487	2x Bankfull	Exist	30.20	596.28	4.27
	2.81	0.05	0.080619	0.0000		
UT1-Upper	1487	2 Yr	Prop	18.00	596.77	4.14
	2.73		0.085666	0.0000		
UT1-Upper	1487	2 Yr	Exist	18.00	596.05	3.94
	2.55		0.088466	0.0000		
UT1-Upper	1487	5 Yr	Prop	35.00	596.93	2.45
	0.91	0.47	0.024945	0.0000		
UT1-Upper	1487	5 Yr	Exist	35.00	596.38	4.13
	2.54	0.24	0.065825	0.0000		
UT1-Upper	1487	10 Yr	Prop	51.00	597.39	1.21
0.07	0.19	0.12	0.002900	0.0000		
UT1-Upper	1487	10 Yr	Exist	51.00	597.39	0.98
0.03	0.10	0.05	0.001040	0.0000		
UT1-Upper	1487	100 Yr	Prop	116.00	599.66	0.48
0.01	0.02	0.02	0.000098	0.0000		
UT1-Upper	1487	100 Yr	Exist	116.00	599.66	0.47
0.01	0.02	0.01	0.000077	0.0000		
UT2	1672	Bankfull	Prop	3.70	612.49	1.72
	0.54		0.025488	0.0254		
UT2	1672	Bankfull	Exist	3.70	610.91	0.68
	0.08		0.003490	0.0049		
UT2	1672	2x Bankfull	Prop	7.40	612.69	2.13
	0.73		0.024608	0.0254		
UT2	1672	2x Bankfull	Exist	7.40	611.11	0.85
0.01	0.12		0.003768	0.0049		
UT2	1672	2 Yr	Prop	4.30	612.53	1.79
	0.57		0.024977	0.0254		
UT2	1672	2 Yr	Exist	4.30	610.95	0.71
	0.09		0.003560	0.0049		
UT2	1672	5 Yr	Prop	8.80	612.75	2.23
	0.79		0.024245	0.0254		
UT2	1672	5 Yr	Exist	8.80	611.16	0.90
0.01	0.13		0.003796	0.0049		
UT2	1672	10 Yr	Prop	13.00	612.89	2.39
0.11	0.84	0.11	0.021396	0.0254		
UT2	1672	10 Yr	Exist	13.00	611.31	1.04

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0.03	0.16	0.01	0.003798	0.0049		
UT2	1672	100 Yr	Prop	31.00	613.11	3.02
0.43	1.23	0.43	0.023398	0.0254		
UT2	1672	100 Yr	Exist	31.00	611.75	1.48
0.08	0.27	0.06	0.003875	0.0049		
UT2	1609	Bankfull	Prop	3.70	610.89	1.72
	0.54		0.025611	0.0275		
UT2	1609	Bankfull	Exist	3.70	610.49	1.22
	0.28		0.014816	0.0317		
UT2	1609	2x Bankfull	Prop	7.40	611.07	2.19
	0.78		0.026667	0.0275		
UT2	1609	2x Bankfull	Exist	7.40	610.64	1.60
	0.43		0.016197	0.0317		
UT2	1609	2 Yr	Prop	4.30	610.92	1.82
	0.59		0.026036	0.0275		
UT2	1609	2 Yr	Exist	4.30	610.52	1.28
	0.30		0.014680	0.0317		
UT2	1609	5 Yr	Prop	8.80	611.13	2.32
	0.86		0.027034	0.0275		
UT2	1609	5 Yr	Exist	8.80	610.68	1.74
	0.50		0.017395	0.0317		
UT2	1609	10 Yr	Prop	13.00	611.24	2.75
0.08	1.15	0.08	0.031255	0.0275		
UT2	1609	10 Yr	Exist	13.00	610.79	2.07
	0.67		0.019850	0.0317		
UT2	1609	100 Yr	Prop	31.00	611.48	3.24
0.48	1.42	0.47	0.027922	0.0275		
UT2	1609	100 Yr	Exist	31.00	611.13	2.96
	1.21		0.024636	0.0317		
UT2	1557	Bankfull	Prop	3.70	609.44	1.82
	0.61		0.030304	0.0328		
UT2	1557	Bankfull	Exist	3.70	608.74	2.65
	1.48		0.108763	0.0392		
UT2	1557	2x Bankfull	Prop	7.40	609.63	2.24
	0.83		0.028796	0.0328		
UT2	1557	2x Bankfull	Exist	7.40	608.90	2.88
	1.58		0.085507	0.0392		
UT2	1557	2 Yr	Prop	4.30	609.47	1.90
	0.65		0.029550	0.0328		
UT2	1557	2 Yr	Exist	4.30	608.76	2.77
	1.59		0.111146	0.0392		
UT2	1557	5 Yr	Prop	8.80	609.69	2.36
	0.89		0.028439	0.0328		

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UT2	1557	5 Yr	Exist	8.80	608.96	2.85
	1.50		0.073504	0.0392		
UT2	1557	10 Yr	Prop	13.00	609.85	2.48
0.11	0.91	0.10	0.023548	0.0328		
UT2	1557	10 Yr	Exist	13.00	609.10	2.85
	1.40		0.056614	0.0392		
UT2	1557	100 Yr	Prop	31.00	610.05	3.21
0.44	1.40	0.35	0.027484	0.0328		
UT2	1557	100 Yr	Exist	31.00	609.42	3.51
0.25	1.79	0.30	0.042652	0.0392		
UT2	1497	Bankfull	Prop	3.70	607.45	1.93
	0.70		0.036347	0.0447		
UT2	1497	Bankfull	Exist	3.70	606.80	1.39
	0.33		0.012986	0.0169		
UT2	1497	2x Bankfull	Prop	7.40	607.61	2.49
	1.04		0.038944	0.0447		
UT2	1497	2x Bankfull	Exist	7.40	607.00	1.82
	0.53		0.016952	0.0169		
UT2	1497	2 Yr	Prop	4.30	607.48	2.05
	0.77		0.037115	0.0447		
UT2	1497	2 Yr	Exist	4.30	606.85	1.46
	0.36		0.013360	0.0169		
UT2	1497	5 Yr	Prop	8.80	607.67	2.64
	1.15		0.039647	0.0447		
UT2	1497	5 Yr	Exist	8.80	607.05	1.96
	0.60		0.018248	0.0169		
UT2	1497	10 Yr	Prop	13.00	607.76	3.25
	1.66		0.050586	0.0447		
UT2	1497	10 Yr	Exist	13.00	607.19	2.29
	0.79		0.021042	0.0169		
UT2	1497	100 Yr	Prop	31.00	608.03	3.72
0.44	1.92	0.54	0.039838	0.0447		
UT2	1497	100 Yr	Exist	31.00	607.52	3.32
0.29	1.44	0.29	0.024986	0.0169		
UT2	1465	Bankfull	Prop	3.70	606.11	2.23
	0.93		0.047397	0.0273		
UT2	1465	Bankfull	Exist	3.70	605.79	2.45
	1.33		0.115209	0.0415		
UT2	1465	2x Bankfull	Prop	7.40	606.32	2.53
	1.09		0.041836	0.0273		
UT2	1465	2x Bankfull	Exist	7.40	605.94	2.48
	1.23		0.077583	0.0415		
UT2	1465	2 Yr	Prop	4.30	606.15	2.28

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	0.95		0.045798	0.0273		
UT2	1465	2 Yr	Exist	4.30	605.81	2.55
	1.42		0.116528	0.0415		
UT2	1465	5 Yr	Prop	8.80	606.39	2.62
	1.14		0.040819	0.0273		
UT2	1465	5 Yr	Exist	8.80	605.99	2.50
	1.23		0.072215	0.0415		
UT2	1465	10 Yr	Prop	13.00	606.61	2.53
	0.99		0.028521	0.0273		
UT2	1465	10 Yr	Exist	13.00	606.08	2.73
0.19	1.34		0.061086	0.0415		
UT2	1465	100 Yr	Prop	31.00	606.88	3.08
0.31	1.30	0.32	0.026567	0.0273		
UT2	1465	100 Yr	Exist	31.00	606.30	3.64
0.67	2.06	0.17	0.060055	0.0415		
UT2	1417	Bankfull	Prop	3.70	604.90	1.43
	0.36		0.016457	0.0285		
UT2	1417	Bankfull	Exist	3.70	604.25	1.20
	0.26		0.011379	0.0171		
UT2	1417	2x Bankfull	Prop	7.40	605.10	1.76
	0.51		0.018093	0.0285		
UT2	1417	2x Bankfull	Exist	7.40	604.39	1.67
	0.48		0.018258	0.0171		
UT2	1417	2 Yr	Prop	4.30	604.94	1.50
	0.39		0.016885	0.0285		
UT2	1417	2 Yr	Exist	4.30	604.29	1.24
	0.27		0.011465	0.0171		
UT2	1417	5 Yr	Prop	8.80	605.15	1.86
	0.56		0.018645	0.0285		
UT2	1417	5 Yr	Exist	8.80	604.45	1.76
	0.52		0.018708	0.0171		
UT2	1417	10 Yr	Prop	13.00	605.20	2.50
	0.99	0.05	0.030149	0.0285		
UT2	1417	10 Yr	Exist	13.00	604.58	1.98
	0.63		0.019785	0.0171		
UT2	1417	100 Yr	Prop	31.00	605.50	3.27
0.24	1.47	0.39	0.029939	0.0285		
UT2	1417	100 Yr	Exist	31.00	604.99	2.40
0.17	0.80		0.016884	0.0171		
UT2	1376	Bankfull	Prop	3.70	603.44	2.69
	1.48		0.099415	0.0414		
UT2	1376	Bankfull	Exist	3.70	603.11	2.48
	1.35		0.111424	0.0451		

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UT2	1376	2x Bankfull	Prop	7.40	603.60	3.20
	1.83		0.082086	0.0414		
UT2	1376	2x Bankfull	Exist	7.40	603.33	2.03
0.08	0.76		0.038152	0.0451		
UT2	1376	2 Yr	Prop	4.30	603.47	2.81
	1.57		0.096818	0.0414		
UT2	1376	2 Yr	Exist	4.30	603.13	2.60
	1.45		0.113592	0.0451		
UT2	1376	5 Yr	Prop	8.80	603.66	3.32
	1.90		0.077346	0.0414		
UT2	1376	5 Yr	Exist	8.80	603.37	2.13
0.13	0.82		0.037799	0.0451		
UT2	1376	10 Yr	Prop	13.00	603.93	2.74
0.07	1.14	0.08	0.031069	0.0414		
UT2	1376	10 Yr	Exist	13.00	603.46	2.38
0.24	0.96		0.036944	0.0451		
UT2	1376	100 Yr	Prop	31.00	604.12	3.59
0.47	1.79	0.52	0.037465	0.0414		
UT2	1376	100 Yr	Exist	31.00	603.62	3.91
0.73	2.33	0.35	0.064935	0.0451		
UT2	1333	Bankfull	Prop	3.70	601.82	1.60
	0.46		0.020633	0.0329		
UT2	1333	Bankfull	Exist	3.70	601.61	1.70
0.13	0.46	0.20	0.014542	0.0235		
UT2	1333	2x Bankfull	Prop	7.40	602.01	2.06
	0.68		0.022377	0.0329		
UT2	1333	2x Bankfull	Exist	7.40	601.66	2.91
0.38	1.31	0.60	0.037598	0.0235		
UT2	1333	2 Yr	Prop	4.30	601.86	1.69
	0.50		0.020779	0.0329		
UT2	1333	2 Yr	Exist	4.30	601.64	1.78
0.14	0.49	0.22	0.014644	0.0235		
UT2	1333	5 Yr	Prop	8.80	602.07	2.19
	0.76		0.022954	0.0329		
UT2	1333	5 Yr	Exist	8.80	601.71	3.06
0.41	1.41	0.67	0.037707	0.0235		
UT2	1333	10 Yr	Prop	13.00	602.04	3.46
	1.90		0.060442	0.0329		
UT2	1333	10 Yr	Exist	13.00	601.82	3.41
0.51	1.66	0.84	0.037665	0.0235		
UT2	1333	100 Yr	Prop	31.00	602.38	3.27
0.48	1.45	0.48	0.028724	0.0329		
UT2	1333	100 Yr	Exist	31.00	602.32	3.38
0.47	1.38	0.72	0.019080	0.0235		

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UT2	1285	Bankfull	Prop	3.70	600.12	2.37
	1.11		0.067527	0.0367		
UT2	1285	Bankfull	Exist	3.70	600.06	2.42
	1.28		0.104987	0.0409		
UT2	1285	2x Bankfull	Prop	7.40	600.28	2.88
	1.45		0.060422	0.0367		
UT2	1285	2x Bankfull	Exist	7.40	600.33	1.68
	0.50	0.08	0.021863	0.0409		
UT2	1285	2 Yr	Prop	4.30	600.15	2.49
	1.20		0.067228	0.0367		
UT2	1285	2 Yr	Exist	4.30	600.08	2.53
	1.37		0.106919	0.0409		
UT2	1285	5 Yr	Prop	8.80	600.34	3.01
	1.53		0.058031	0.0367		
UT2	1285	5 Yr	Exist	8.80	600.37	1.79
	0.55	0.11	0.022037	0.0409		
UT2	1285	10 Yr	Prop	13.00	600.64	2.27
0.13	0.76	0.11	0.018469	0.0367		
UT2	1285	10 Yr	Exist	13.00	600.47	2.05
	0.68	0.18	0.022534	0.0409		
UT2	1285	100 Yr	Prop	31.00	600.79	3.64
0.57	1.81	0.46	0.036601	0.0367		
UT2	1285	100 Yr	Exist	31.00	600.56	3.98
	2.44	0.77	0.070270	0.0409		
UT2	1231	Bankfull	Prop	3.70	598.41	1.57
	0.44		0.018690	0.0348		
UT2	1231	Bankfull	Exist	3.70	598.01	1.28
	0.33		0.019954	0.0386		
UT2	1231	2x Bankfull	Prop	7.40	598.64	1.89
	0.58		0.019190	0.0348		
UT2	1231	2x Bankfull	Exist	7.40	597.98	2.87
	1.67		0.108197	0.0386		
UT2	1231	2 Yr	Prop	4.30	598.46	1.63
	0.46		0.018546	0.0348		
UT2	1231	2 Yr	Exist	4.30	598.04	1.32
	0.34		0.019692	0.0386		
UT2	1231	5 Yr	Prop	8.80	598.70	2.00
	0.63		0.019706	0.0348		
UT2	1231	5 Yr	Exist	8.80	598.02	2.98
	1.76		0.106968	0.0386		
UT2	1231	10 Yr	Prop	13.00	598.56	3.90
	2.52		0.090512	0.0348		
UT2	1231	10 Yr	Exist	13.00	598.11	3.16
	1.89		0.101629	0.0386		

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UT2	1231	100 Yr	Prop	31.00	599.66	0.63
0.02	0.04	0.02	0.000525	0.0348		
UT2	1231	100 Yr	Exist	31.00	599.66	0.46
0.01	0.02	0.01	0.000217	0.0386		
UT2	1175	Bankfull	Prop	3.70	596.26	2.94
	1.70		0.100722	0.0000		
UT2	1175	Bankfull	Exist	3.70	595.73	2.63
	1.47		0.108459	0.0000		
UT2	1175	2x Bankfull	Prop	7.40	596.43	3.48
	2.18		0.098231	0.0000		
UT2	1175	2x Bankfull	Exist	7.40	596.21	1.07
0.05	0.18		0.005964	0.0000		
UT2	1175	2 Yr	Prop	4.30	596.28	3.12
	1.88		0.105868	0.0000		
UT2	1175	2 Yr	Exist	4.30	595.75	2.76
	1.59		0.111581	0.0000		
UT2	1175	5 Yr	Prop	8.80	596.48	3.58
	2.24		0.093963	0.0000		
UT2	1175	5 Yr	Exist	8.80	596.55	0.60
0.03	0.05	0.01	0.000921	0.0000		
UT2	1175	10 Yr	Prop	13.00	597.39	0.07
0.00	0.00	0.00	0.000010	0.0000		
UT2	1175	10 Yr	Exist	13.00	597.39	0.08
0.00	0.00	0.00	0.000007	0.0000		
UT2	1175	100 Yr	Prop	31.00	599.66	0.07
0.00	0.00	0.00	0.000002	0.0000		
UT2	1175	100 Yr	Exist	31.00	599.66	0.07
0.00	0.00	0.00	0.000002	0.0000		
UT1-Lower	1264	Bankfull	Prop	16.30	595.03	0.10
0.00	0.00	0.00	0.000006	0.0083		
UT1-Lower	1264	Bankfull	Exist	16.30	595.03	0.09
0.00	0.00	0.00	0.000005	0.0230		
UT1-Lower	1264	2x Bankfull	Prop	32.60	596.22	0.10
0.00	0.00	0.00	0.000004	0.0083		
UT1-Lower	1264	2x Bankfull	Exist	32.60	596.22	0.09
0.00	0.00	0.00	0.000003	0.0230		
UT1-Lower	1264	2 Yr	Prop	19.00	595.51	0.09
0.00	0.00	0.00	0.000004	0.0083		
UT1-Lower	1264	2 Yr	Exist	19.00	595.51	0.08
0.00	0.00	0.00	0.000003	0.0230		
UT1-Lower	1264	5 Yr	Prop	36.00	596.55	0.10
0.00	0.00	0.00	0.000003	0.0083		
UT1-Lower	1264	5 Yr	Exist	36.00	596.55	0.09

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0.00	0.00	0.00	0.000003	0.0230		
UT1-Lower	1264	10 Yr	Prop	52.00	597.39	0.10
0.00	0.00	0.00	0.000003	0.0083		
UT1-Lower	1264	10 Yr	Exist	52.00	597.39	0.09
0.00	0.00	0.00	0.000002	0.0230		
UT1-Lower	1264	100 Yr	Prop	118.00	599.66	0.12
0.00	0.00	0.00	0.000002	0.0083		
UT1-Lower	1264	100 Yr	Exist	118.00	599.66	0.12
0.00	0.00	0.00	0.000002	0.0230		
UT1-Lower	1194	Bankfull	Prop	16.30	595.03	0.07
0.00	0.00	0.00	0.000003	0.0052		
UT1-Lower	1194	Bankfull	Exist	16.30	595.03	0.06
0.00	0.00	0.00	0.000002	0.0003		
UT1-Lower	1194	2x Bankfull	Prop	32.60	596.22	0.07
0.00	0.00	0.00	0.000002	0.0052		
UT1-Lower	1194	2x Bankfull	Exist	32.60	596.22	0.06
0.00	0.00	0.00	0.000001	0.0003		
UT1-Lower	1194	2 Yr	Prop	19.00	595.51	0.06
0.00	0.00	0.00	0.000002	0.0052		
UT1-Lower	1194	2 Yr	Exist	19.00	595.51	0.05
0.00	0.00	0.00	0.000001	0.0003		
UT1-Lower	1194	5 Yr	Prop	36.00	596.55	0.07
0.00	0.00	0.00	0.000001	0.0052		
UT1-Lower	1194	5 Yr	Exist	36.00	596.55	0.06
0.00	0.00	0.00	0.000001	0.0003		
UT1-Lower	1194	10 Yr	Prop	52.00	597.39	0.07
0.00	0.00	0.00	0.000001	0.0052		
UT1-Lower	1194	10 Yr	Exist	52.00	597.39	0.06
0.00	0.00	0.00	0.000001	0.0003		
UT1-Lower	1194	100 Yr	Prop	118.00	599.66	0.09
0.00	0.00	0.00	0.000001	0.0052		
UT1-Lower	1194	100 Yr	Exist	118.00	599.66	0.08
0.00	0.00	0.00	0.000001	0.0003		
UT1-Lower	1163	Bankfull	Prop	16.30	595.03	0.08
0.00	0.00	0.00	0.000003	0.0051		
UT1-Lower	1163	Bankfull	Exist	16.30	595.03	0.06
0.00	0.00	0.00	0.000001	0.0091		
UT1-Lower	1163	2x Bankfull	Prop	32.60	596.22	0.08
0.00	0.00	0.00	0.000002	0.0051		
UT1-Lower	1163	2x Bankfull	Exist	32.60	596.22	0.07
0.00	0.00	0.00	0.000001	0.0091		
UT1-Lower	1163	2 Yr	Prop	19.00	595.51	0.07
0.00	0.00	0.00	0.000002	0.0051		

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UT1-Lower	1163	2 Yr	Exist	19.00	595.51	0.06
0.00	0.00	0.00	0.000001	0.0091		
UT1-Lower	1163	5 Yr	Prop	36.00	596.55	0.07
0.00	0.00	0.00	0.000001	0.0051		
UT1-Lower	1163	5 Yr	Exist	36.00	596.55	0.07
0.00	0.00	0.00	0.000001	0.0091		
UT1-Lower	1163	10 Yr	Prop	52.00	597.39	0.08
0.00	0.00	0.00	0.000001	0.0051		
UT1-Lower	1163	10 Yr	Exist	52.00	597.39	0.07
0.00	0.00	0.00	0.000001	0.0091		
UT1-Lower	1163	100 Yr	Prop	118.00	599.66	0.09
0.00	0.00	0.00	0.000001	0.0051		
UT1-Lower	1163	100 Yr	Exist	118.00	599.66	0.09
0.00	0.00	0.00	0.000001	0.0091		
UT1-Lower	1094	Bankfull	Prop	16.30	595.03	0.07
0.00	0.00	0.00	0.000002	0.0000		
UT1-Lower	1094	Bankfull	Exist	16.30	595.03	0.11
0.00	0.00	0.00	0.000005	0.0000		
UT1-Lower	1094	2x Bankfull	Prop	32.60	596.22	0.07
0.00	0.00	0.00	0.000001	0.0000		
UT1-Lower	1094	2x Bankfull	Exist	32.60	596.22	0.13
0.00	0.00	0.00	0.000005	0.0000		
UT1-Lower	1094	2 Yr	Prop	19.00	595.51	0.06
0.00	0.00	0.00	0.000001	0.0000		
UT1-Lower	1094	2 Yr	Exist	19.00	595.51	0.10
0.00	0.00	0.00	0.000004	0.0000		
UT1-Lower	1094	5 Yr	Prop	36.00	596.55	0.07
0.00	0.00	0.00	0.000001	0.0000		
UT1-Lower	1094	5 Yr	Exist	36.00	596.55	0.13
0.00	0.00	0.00	0.000004	0.0000		
UT1-Lower	1094	10 Yr	Prop	52.00	597.39	0.07
0.00	0.00	0.00	0.000001	0.0000		
UT1-Lower	1094	10 Yr	Exist	52.00	597.39	0.14
0.00	0.00	0.00	0.000004	0.0000		
UT1-Lower	1094	100 Yr	Prop	118.00	599.66	0.09
0.00	0.00	0.00	0.000001	0.0000		
UT1-Lower	1094	100 Yr	Exist	118.00	599.66	0.19
0.00	0.00	0.00	0.000006	0.0000		
Main 3	22339	Bankfull	Prop	245.00	599.52	1.44
0.05	0.16	0.07	0.000612	0.0019		
Main 3	22339	Bankfull	Exist	245.00	599.70	2.10
0.11	0.38	0.06	0.001862	0.0022		
Main 3	22339	2x Bankfull	Prop	490.00	600.56	1.94

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0.11	0.28	0.14	0.000845	0.0019		
Main 3	22339	2x Bankfull	Exist	490.00	600.77	2.50
0.21	0.49	0.17	0.001838	0.0022		
Main 3	22339	2 Yr	Prop	390.00	600.16	1.78
0.09	0.24	0.11	0.000779	0.0019		
Main 3	22339	2 Yr	Exist	390.00	600.36	2.39
0.18	0.46	0.13	0.001902	0.0022		
Main 3	22339	5 Yr	Prop	650.00	601.06	2.20
0.15	0.35	0.17	0.000968	0.0019		
Main 3	22339	5 Yr	Exist	650.00	601.28	2.70
0.26	0.55	0.22	0.001865	0.0022		
Main 3	22339	10 Yr	Prop	900.00	601.66	2.58
0.22	0.46	0.23	0.001164	0.0019		
Main 3	22339	10 Yr	Exist	900.00	601.80	3.10
0.35	0.70	0.31	0.002153	0.0022		
Main 3	22339	100 Yr	Prop	1900.00	603.58	3.58
0.46	0.81	0.36	0.001593	0.0019		
Main 3	22339	100 Yr	Exist	1900.00	603.68	3.97
0.60	1.05	0.54	0.002407	0.0022		
Main 3	22239	Bankfull	Prop	245.00	599.45	1.55
0.06	0.19	0.04	0.000688	-0.0001		
Main 3	22239	Bankfull	Exist	245.00	599.49	2.25
0.09	0.43	0.04	0.002040	0.0002		
Main 3	22239	2x Bankfull	Prop	490.00	600.45	2.15
0.10	0.34	0.12	0.001014	-0.0001		
Main 3	22239	2x Bankfull	Exist	490.00	600.55	2.72
0.18	0.58	0.17	0.002166	0.0002		
Main 3	22239	2 Yr	Prop	390.00	600.06	1.98
0.08	0.29	0.09	0.000949	-0.0001		
Main 3	22239	2 Yr	Exist	390.00	600.12	2.66
0.15	0.57	0.13	0.002346	0.0002		
Main 3	22239	5 Yr	Prop	650.00	600.94	2.40
0.14	0.41	0.16	0.001130	-0.0001		
Main 3	22239	5 Yr	Exist	650.00	601.06	2.89
0.23	0.63	0.23	0.002130	0.0002		
Main 3	22239	10 Yr	Prop	900.00	601.53	2.76
0.20	0.52	0.23	0.001323	-0.0001		
Main 3	22239	10 Yr	Exist	900.00	601.56	3.30
0.32	0.80	0.34	0.002472	0.0002		
Main 3	22239	100 Yr	Prop	1900.00	603.41	3.65
0.37	0.84	0.45	0.001658	-0.0001		
Main 3	22239	100 Yr	Exist	1900.00	603.43	4.02
0.53	1.08	0.60	0.002517	0.0002		

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Main 3	22139	Bankfull	Prop	245.00	599.32	2.03
0.09	0.40	0.13	0.001945	0.0052		
Main 3	22139	Bankfull	Exist	245.00	599.31	2.06
0.09	0.41	0.13	0.002005	0.0052		
Main 3	22139	2x Bankfull	Prop	490.00	600.32	2.35
0.17	0.49	0.24	0.001901	0.0052		
Main 3	22139	2x Bankfull	Exist	490.00	600.38	2.28
0.17	0.46	0.22	0.001757	0.0052		
Main 3	22139	2 Yr	Prop	390.00	599.92	2.28
0.15	0.47	0.20	0.002005	0.0052		
Main 3	22139	2 Yr	Exist	390.00	599.94	2.26
0.15	0.47	0.20	0.001972	0.0052		
Main 3	22139	5 Yr	Prop	650.00	600.80	2.52
0.22	0.55	0.29	0.001927	0.0052		
Main 3	22139	5 Yr	Exist	650.00	600.89	2.42
0.20	0.50	0.27	0.001741	0.0052		
Main 3	22139	10 Yr	Prop	900.00	601.37	2.80
0.29	0.65	0.37	0.002078	0.0052		
Main 3	22139	10 Yr	Exist	900.00	601.36	2.81
0.29	0.66	0.38	0.002100	0.0052		
Main 3	22139	100 Yr	Prop	1900.00	603.24	3.41
0.47	0.88	0.57	0.002131	0.0052		
Main 3	22139	100 Yr	Exist	1900.00	603.23	3.42
0.48	0.89	0.58	0.002144	0.0052		
Main 3	22042	Bankfull	Prop	245.00	599.10	2.22
0.10	0.48	0.11	0.002423	-0.0026		
Main 3	22042	Bankfull	Exist	245.00	599.07	2.27
0.10	0.50	0.11	0.002550	-0.0026		
Main 3	22042	2x Bankfull	Prop	490.00	600.13	2.35
0.19	0.49	0.18	0.001939	-0.0026		
Main 3	22042	2x Bankfull	Exist	490.00	600.21	2.25
0.18	0.45	0.17	0.001740	-0.0026		
Main 3	22042	2 Yr	Prop	390.00	599.71	2.36
0.17	0.51	0.16	0.002227	-0.0026		
Main 3	22042	2 Yr	Exist	390.00	599.73	2.34
0.16	0.50	0.16	0.002169	-0.0026		
Main 3	22042	5 Yr	Prop	650.00	600.61	2.46
0.23	0.52	0.21	0.001872	-0.0026		
Main 3	22042	5 Yr	Exist	650.00	600.73	2.34
0.21	0.47	0.20	0.001640	-0.0026		
Main 3	22042	10 Yr	Prop	900.00	601.17	2.71
0.29	0.61	0.27	0.001973	-0.0026		
Main 3	22042	10 Yr	Exist	900.00	601.16	2.72
0.30	0.62	0.28	0.002001	-0.0026		
Main 3	22042	100 Yr	Prop	1900.00	603.06	3.15

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0.45	0.75	0.39	0.001828	-0.0026		
Main 3	22042	100 Yr	Exist	1900.00	603.05	3.16
0.45	0.76	0.39	0.001842	-0.0026		
Main 3	21962	Bankfull	Prop	245.00	598.96	1.92
0.10	0.35	0.04	0.001693	0.0023		
Main 3	21962	Bankfull	Exist	245.00	598.92	1.98
0.11	0.37	0.04	0.001813	0.0023		
Main 3	21962	2x Bankfull	Prop	490.00	600.01	2.04
0.16	0.37	0.10	0.001374	0.0023		
Main 3	21962	2x Bankfull	Exist	490.00	600.11	1.95
0.14	0.33	0.10	0.001219	0.0023		
Main 3	21962	2 Yr	Prop	390.00	599.58	2.05
0.15	0.38	0.09	0.001573	0.0023		
Main 3	21962	2 Yr	Exist	390.00	599.60	2.03
0.14	0.37	0.08	0.001525	0.0023		
Main 3	21962	5 Yr	Prop	650.00	600.50	2.16
0.18	0.40	0.13	0.001354	0.0023		
Main 3	21962	5 Yr	Exist	650.00	600.63	2.04
0.17	0.35	0.12	0.001165	0.0023		
Main 3	21962	10 Yr	Prop	900.00	601.05	2.37
0.24	0.46	0.17	0.001426	0.0023		
Main 3	21962	10 Yr	Exist	900.00	601.04	2.38
0.24	0.47	0.17	0.001449	0.0023		
Main 3	21962	100 Yr	Prop	1900.00	602.95	2.77
0.36	0.58	0.27	0.001341	0.0023		
Main 3	21962	100 Yr	Exist	1900.00	602.94	2.78
0.36	0.58	0.27	0.001352	0.0023		
Main 3	21839	Bankfull	Prop	245.00	598.68	2.32
0.08	0.51	0.11	0.002392	0.0014		
Main 3	21839	Bankfull	Exist	245.00	598.61	2.42
0.07	0.56	0.11	0.002663	0.0014		
Main 3	21839	2x Bankfull	Prop	490.00	599.79	2.48
0.16	0.53	0.19	0.001922	0.0014		
Main 3	21839	2x Bankfull	Exist	490.00	599.91	2.33
0.14	0.47	0.17	0.001643	0.0014		
Main 3	21839	2 Yr	Prop	390.00	599.31	2.53
0.14	0.57	0.18	0.002302	0.0014		
Main 3	21839	2 Yr	Exist	390.00	599.35	2.49
0.14	0.55	0.17	0.002200	0.0014		
Main 3	21839	5 Yr	Prop	650.00	600.28	2.61
0.19	0.57	0.23	0.001881	0.0014		
Main 3	21839	5 Yr	Exist	650.00	600.45	2.44
0.17	0.49	0.21	0.001571	0.0014		

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Main 3	21839	10 Yr	Prop	900.00	600.82	2.90
0.25	0.68	0.30	0.002036	0.0014		
Main 3	21839	10 Yr	Exist	900.00	600.80	2.92
0.26	0.70	0.31	0.002077	0.0014		
Main 3	21839	100 Yr	Prop	1900.00	602.74	3.30
0.37	0.80	0.43	0.001805	0.0014		
Main 3	21839	100 Yr	Exist	1900.00	602.72	3.31
0.37	0.81	0.43	0.001823	0.0014		
Main 3	21738	Bankfull	Prop	245.00	598.49	1.97
0.11	0.37	0.10	0.001774	0.0001		
Main 3	21738	Bankfull	Exist	245.00	598.39	2.08
0.12	0.42	0.12	0.002062	0.0047		
Main 3	21738	2x Bankfull	Prop	490.00	599.64	2.08
0.15	0.38	0.14	0.001393	0.0001		
Main 3	21738	2x Bankfull	Exist	490.00	599.79	1.95
0.13	0.33	0.13	0.001167	0.0047		
Main 3	21738	2 Yr	Prop	390.00	599.13	2.14
0.15	0.42	0.13	0.001707	0.0001		
Main 3	21738	2 Yr	Exist	390.00	599.17	2.10
0.15	0.40	0.13	0.001611	0.0047		
Main 3	21738	5 Yr	Prop	650.00	600.13	2.23
0.18	0.42	0.18	0.001402	0.0001		
Main 3	21738	5 Yr	Exist	650.00	600.32	2.08
0.15	0.36	0.16	0.001162	0.0047		
Main 3	21738	10 Yr	Prop	900.00	600.65	2.51
0.22	0.52	0.23	0.001575	0.0001		
Main 3	21738	10 Yr	Exist	900.00	600.63	2.54
0.23	0.53	0.24	0.001613	0.0047		
Main 3	21738	100 Yr	Prop	1900.00	602.60	2.83
0.31	0.60	0.31	0.001369	0.0001		
Main 3	21738	100 Yr	Exist	1900.00	602.58	2.84
0.32	0.60	0.31	0.001383	0.0047		
Main 3	21592	Bankfull	Prop	245.00	598.23	1.77
0.10	0.32	0.09	0.001840	0.0016		
Main 3	21592	Bankfull	Exist	245.00	598.20	1.56
0.06	0.23	0.03	0.000985	0.0036		
Main 3	21592	2x Bankfull	Prop	490.00	599.47	1.70
0.13	0.26	0.12	0.001050	0.0016		
Main 3	21592	2x Bankfull	Exist	490.00	599.67	1.56
0.08	0.20	0.07	0.000638	0.0036		
Main 3	21592	2 Yr	Prop	390.00	598.91	1.79
0.13	0.30	0.12	0.001422	0.0016		
Main 3	21592	2 Yr	Exist	390.00	599.01	1.65

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0.08	0.24	0.07	0.000847	0.0036		
Main 3	21592	5 Yr	Prop	650.00	599.96	1.85
0.16	0.30	0.12	0.001068	0.0016		
Main 3	21592	5 Yr	Exist	650.00	600.20	1.70
0.09	0.23	0.09	0.000662	0.0036		
Main 3	21592	10 Yr	Prop	900.00	600.46	2.13
0.21	0.38	0.16	0.001245	0.0016		
Main 3	21592	10 Yr	Exist	900.00	600.45	2.16
0.15	0.37	0.16	0.001015	0.0036		
Main 3	21592	100 Yr	Prop	1900.00	602.40	2.69
0.30	0.54	0.27	0.001281	0.0016		
Main 3	21592	100 Yr	Exist	1900.00	602.40	2.66
0.18	0.51	0.28	0.001062	0.0036		
Main 3	21502	Bankfull	Prop	245.00	598.14	1.38
0.08	0.17	0.07	0.000702	0.0025		
Main 3	21502	Bankfull	Exist	245.00	598.13	1.47
0.13	0.19	0.08	0.000781	-0.0006		
Main 3	21502	2x Bankfull	Prop	490.00	599.38	1.84
0.12	0.28	0.14	0.000880	0.0025		
Main 3	21502	2x Bankfull	Exist	490.00	599.60	1.97
0.17	0.32	0.15	0.000984	-0.0006		
Main 3	21502	2 Yr	Prop	390.00	598.81	1.74
0.12	0.26	0.12	0.000916	0.0025		
Main 3	21502	2 Yr	Exist	390.00	598.93	1.87
0.17	0.30	0.13	0.001029	-0.0006		
Main 3	21502	5 Yr	Prop	650.00	599.85	2.14
0.16	0.37	0.19	0.001066	0.0025		
Main 3	21502	5 Yr	Exist	650.00	600.11	2.30
0.20	0.42	0.21	0.001198	-0.0006		
Main 3	21502	10 Yr	Prop	900.00	600.30	2.64
0.22	0.55	0.28	0.001465	0.0025		
Main 3	21502	10 Yr	Exist	900.00	600.30	3.04
0.34	0.73	0.37	0.002017	-0.0006		
Main 3	21502	100 Yr	Prop	1900.00	602.23	3.38
0.33	0.82	0.45	0.001675	0.0025		
Main 3	21502	100 Yr	Exist	1900.00	602.24	3.77
0.45	1.03	0.57	0.002221	-0.0006		
Main 3	21388	Bankfull	Prop	245.00	598.07	1.33
0.05	0.16	0.07	0.000602	0.0015		
Main 3	21388	Bankfull	Exist	245.00	598.04	1.57
0.09	0.22	0.10	0.000828	0.0084		
Main 3	21388	2x Bankfull	Prop	490.00	599.29	1.68
0.08	0.23	0.12	0.000691	0.0015		

TravisCreek-Bed Shear Report.txt

Main 3	21388	2x Bankfull	Exist	490.00	599.51	1.71
0.08	0.24	0.14	0.000693	0.0084		
Main 3	21388	2 Yr	Prop	390.00	598.72	1.63
0.08	0.22	0.11	0.000754	0.0015		
Main 3	21388	2 Yr	Exist	390.00	598.83	1.75
0.10	0.26	0.14	0.000849	0.0084		
Main 3	21388	5 Yr	Prop	650.00	599.74	1.98
0.09	0.31	0.18	0.000867	0.0015		
Main 3	21388	5 Yr	Exist	650.00	600.01	1.98
0.10	0.31	0.19	0.000839	0.0084		
Main 3	21388	10 Yr	Prop	900.00	600.16	2.42
0.14	0.46	0.27	0.001192	0.0015		
Main 3	21388	10 Yr	Exist	900.00	600.11	2.65
0.17	0.55	0.35	0.001473	0.0084		
Main 3	21388	100 Yr	Prop	1900.00	602.08	3.00
0.24	0.64	0.41	0.001285	0.0015		
Main 3	21388	100 Yr	Exist	1900.00	602.05	3.12
0.27	0.70	0.50	0.001466	0.0084		
Main 3	21314	Bankfull	Prop	245.00	598.04	1.08
0.05	0.10	0.05	0.000393	0.0023		
Main 3	21314	Bankfull	Exist	245.00	598.02	0.95
0.06	0.08	0.04	0.000302	-0.0046		
Main 3	21314	2x Bankfull	Prop	490.00	599.26	1.38
0.05	0.15	0.08	0.000462	0.0023		
Main 3	21314	2x Bankfull	Exist	490.00	599.48	1.17
0.04	0.11	0.07	0.000314	-0.0046		
Main 3	21314	2 Yr	Prop	390.00	598.68	1.34
0.06	0.15	0.08	0.000503	0.0023		
Main 3	21314	2 Yr	Exist	390.00	598.80	1.15
0.05	0.11	0.06	0.000357	-0.0046		
Main 3	21314	5 Yr	Prop	650.00	599.70	1.73
0.08	0.24	0.13	0.000659	0.0023		
Main 3	21314	5 Yr	Exist	650.00	599.97	1.47
0.06	0.17	0.10	0.000443	-0.0046		
Main 3	21314	10 Yr	Prop	900.00	600.10	2.08
0.12	0.34	0.20	0.000876	0.0023		
Main 3	21314	10 Yr	Exist	900.00	600.05	1.98
0.11	0.31	0.19	0.000792	-0.0046		
Main 3	21314	100 Yr	Prop	1900.00	602.02	2.56
0.20	0.47	0.29	0.000935	0.0023		
Main 3	21314	100 Yr	Exist	1900.00	601.99	2.47
0.18	0.43	0.29	0.000864	-0.0046		
Main 3	21215	Bankfull	Prop	245.00	597.97	1.36

TravisCreek-Bed Shear Report.txt

0.07	0.18	0.07	0.000880	0.0015		
Main 3	21215	Bankfull	Exist	245.00	597.95	1.50
0.06	0.20	0.10	0.000797	0.0041		
Main 3	21215	2x Bankfull	Prop	490.00	599.19	1.57
0.12	0.21	0.10	0.000778	0.0015		
Main 3	21215	2x Bankfull	Exist	490.00	599.40	1.94
0.09	0.31	0.12	0.000900	0.0041		
Main 3	21215	2 Yr	Prop	390.00	598.61	1.58
0.12	0.23	0.10	0.000943	0.0015		
Main 3	21215	2 Yr	Exist	390.00	598.71	1.85
0.09	0.29	0.15	0.000974	0.0041		
Main 3	21215	5 Yr	Prop	650.00	599.63	1.70
0.10	0.24	0.12	0.000806	0.0015		
Main 3	21215	5 Yr	Exist	650.00	599.88	2.10
0.09	0.35	0.12	0.000942	0.0041		
Main 3	21215	10 Yr	Prop	900.00	600.01	2.02
0.15	0.34	0.17	0.001036	0.0015		
Main 3	21215	10 Yr	Exist	900.00	599.89	2.90
0.17	0.66	0.22	0.001800	0.0041		
Main 3	21215	100 Yr	Prop	1900.00	601.93	2.39
0.22	0.42	0.23	0.000959	0.0015		
Main 3	21215	100 Yr	Exist	1900.00	601.86	3.01
0.24	0.65	0.31	0.001343	0.0041		
Main 3	21099	Bankfull	Prop	245.00	597.90	1.11
0.05	0.12	0.05	0.000569	0.0018		
Main 3	21099	Bankfull	Exist	245.00	597.88	1.31
0.04	0.15	0.08	0.000548	0.0006		
Main 3	21099	2x Bankfull	Prop	490.00	599.13	1.22
0.07	0.13	0.07	0.000456	0.0018		
Main 3	21099	2x Bankfull	Exist	490.00	599.30	1.83
0.09	0.27	0.15	0.000750	0.0006		
Main 3	21099	2 Yr	Prop	390.00	598.53	1.26
0.07	0.14	0.07	0.000581	0.0018		
Main 3	21099	2 Yr	Exist	390.00	598.62	1.71
0.08	0.24	0.13	0.000763	0.0006		
Main 3	21099	5 Yr	Prop	650.00	599.56	1.39
0.10	0.16	0.09	0.000526	0.0018		
Main 3	21099	5 Yr	Exist	650.00	599.85	1.18
0.03	0.11	0.06	0.000277	0.0006		
Main 3	21099	10 Yr	Prop	900.00	599.92	1.61
0.09	0.21	0.12	0.000641	0.0018		
Main 3	21099	10 Yr	Exist	900.00	599.82	1.64
0.06	0.21	0.11	0.000543	0.0006		
Main 3	21099	100 Yr	Prop	1900.00	601.85	1.89
0.14	0.26	0.17	0.000593	0.0018		

TravisCreek-Bed Shear Report.txt

Main 3	21099	100 Yr	Exist	1900.00	601.80	1.83
0.08	0.24	0.15	0.000475	0.0006		
Main 3	20609	Bankfull	Prop	351.00	597.25	2.21
	0.48	0.13	0.002437	-0.0009		
Main 3	20609	Bankfull	Exist	351.00	597.25	2.21
	0.48	0.13	0.002437	-0.0009		
Main 3	20609	2x Bankfull	Prop	702.00	598.46	2.91
	0.77	0.31	0.003157	-0.0009		
Main 3	20609	2x Bankfull	Exist	702.00	598.46	2.91
	0.77	0.31	0.003157	-0.0009		
Main 3	20609	2 Yr	Prop	500.00	597.86	2.52
	0.59	0.22	0.002708	-0.0009		
Main 3	20609	2 Yr	Exist	500.00	597.86	2.52
	0.59	0.22	0.002708	-0.0009		
Main 3	20609	5 Yr	Prop	850.00	598.83	3.14
0.03	0.87	0.37	0.003281	-0.0009		
Main 3	20609	5 Yr	Exist	850.00	598.83	3.14
0.03	0.87	0.37	0.003281	-0.0009		
Main 3	20609	10 Yr	Prop	1100.00	599.26	2.65
0.21	0.60	0.27	0.002060	-0.0009		
Main 3	20609	10 Yr	Exist	1100.00	599.26	2.65
0.21	0.60	0.27	0.002060	-0.0009		
Main 3	20609	100 Yr	Prop	2400.00	601.28	3.18
0.37	0.77	0.38	0.001854	-0.0009		
Main 3	20609	100 Yr	Exist	2400.00	601.28	3.18
0.37	0.77	0.38	0.001854	-0.0009		
Main 3	20283	Bankfull	Prop	351.00	596.77	1.68
0.05	0.26	0.11	0.001112	0.0000		
Main 3	20283	Bankfull	Exist	351.00	596.77	1.68
0.05	0.26	0.11	0.001112	0.0000		
Main 3	20283	2x Bankfull	Prop	702.00	597.79	2.36
0.12	0.47	0.21	0.001586	0.0000		
Main 3	20283	2x Bankfull	Exist	702.00	597.79	2.36
0.12	0.47	0.21	0.001586	0.0000		
Main 3	20283	2 Yr	Prop	500.00	597.31	1.97
0.08	0.34	0.15	0.001276	0.0000		
Main 3	20283	2 Yr	Exist	500.00	597.31	1.97
0.08	0.34	0.15	0.001276	0.0000		
Main 3	20283	5 Yr	Prop	850.00	598.12	2.58
0.16	0.55	0.25	0.001744	0.0000		
Main 3	20283	5 Yr	Exist	850.00	598.12	2.58
0.16	0.55	0.25	0.001744	0.0000		
Main 3	20283	10 Yr	Prop	1100.00	598.58	2.92

TravisCreek-Bed Shear Report.txt

0.21	0.69	0.31	0.001983	0.0000		
Main 3	20283	10 Yr	Exist	1100.00	598.58	2.92
0.21	0.69	0.31	0.001983	0.0000		
Main 3	20283	100 Yr	Prop	2400.00	600.54	3.91
0.38	1.12	0.51	0.002391	0.0000		
Main 3	20283	100 Yr	Exist	2400.00	600.54	3.91
0.38	1.12	0.51	0.002391	0.0000		
Main 3	19916	Bankfull	Prop	351.00	594.90	5.94
	4.95		0.075246	0.0000		
Main 3	19916	Bankfull	Exist	351.00	594.90	5.94
	4.95		0.075246	0.0000		
Main 3	19916	2x Bankfull	Prop	702.00	595.92	5.33
0.90	3.24		0.026454	0.0000		
Main 3	19916	2x Bankfull	Exist	702.00	595.92	5.33
0.90	3.24		0.026454	0.0000		
Main 3	19916	2 Yr	Prop	500.00	595.24	6.34
0.35	5.23		0.063786	0.0000		
Main 3	19916	2 Yr	Exist	500.00	595.24	6.34
0.35	5.23		0.063786	0.0000		
Main 3	19916	5 Yr	Prop	850.00	596.28	5.15
0.92	2.86	0.17	0.019792	0.0000		
Main 3	19916	5 Yr	Exist	850.00	596.28	5.15
0.92	2.86	0.17	0.019790	0.0000		
Main 3	19916	10 Yr	Prop	1100.00	597.24	3.89
0.64	1.45	0.34	0.007141	0.0000		
Main 3	19916	10 Yr	Exist	1100.00	597.24	3.89
0.64	1.45	0.34	0.007139	0.0000		
Main 3	19916	100 Yr	Prop	2400.00	599.54	3.68
0.57	1.09	0.43	0.003162	0.0000		
Main 3	19916	100 Yr	Exist	2400.00	599.54	3.68
0.57	1.09	0.43	0.003162	0.0000		
Main Lower	19442	Bankfull	Prop	362.00	594.97	2.41
0.08	0.58	0.27	0.003238	0.0026		
Main Lower	19442	Bankfull	Exist	362.00	594.97	2.41
0.08	0.58	0.27	0.003238	0.0026		
Main Lower	19442	2x Bankfull	Prop	724.00	596.16	2.58
0.17	0.60	0.35	0.002374	0.0026		
Main Lower	19442	2x Bankfull	Exist	724.00	596.16	2.58
0.17	0.60	0.35	0.002374	0.0026		
Main Lower	19442	2 Yr	Prop	500.00	595.45	2.49
0.13	0.59	0.32	0.002838	0.0026		
Main Lower	19442	2 Yr	Exist	500.00	595.45	2.49
0.13	0.59	0.32	0.002838	0.0026		

TravisCreek-Bed Shear Report.txt

Main Lower	19442	5 Yr	Prop	850.00	596.49	2.68
0.19	0.63	0.37	0.002318	0.0026		
Main Lower	19442	5 Yr	Exist	850.00	596.49	2.68
0.19	0.63	0.37	0.002318	0.0026		
Main Lower	19442	10 Yr	Prop	1200.00	597.32	2.93
0.25	0.71	0.40	0.002201	0.0026		
Main Lower	19442	10 Yr	Exist	1200.00	597.32	2.93
0.25	0.71	0.40	0.002201	0.0026		
Main Lower	19442	100 Yr	Prop	2400.00	599.59	3.16
0.32	0.73	0.45	0.001598	0.0026		
Main Lower	19442	100 Yr	Exist	2400.00	599.59	3.16
0.32	0.73	0.45	0.001598	0.0026		
Main Lower	18981	Bankfull	Prop	362.00	594.23	1.53
0.11	0.22	0.06	0.001005	0.0000		
Main Lower	18981	Bankfull	Exist	362.00	594.23	1.53
0.11	0.22	0.06	0.001005	0.0000		
Main Lower	18981	2x Bankfull	Prop	724.00	595.51	1.85
0.14	0.29	0.13	0.000979	0.0000		
Main Lower	18981	2x Bankfull	Exist	724.00	595.51	1.85
0.14	0.29	0.13	0.000979	0.0000		
Main Lower	18981	2 Yr	Prop	500.00	594.77	1.63
0.13	0.24	0.08	0.000941	0.0000		
Main Lower	18981	2 Yr	Exist	500.00	594.77	1.63
0.13	0.24	0.08	0.000941	0.0000		
Main Lower	18981	5 Yr	Prop	850.00	595.87	1.88
0.14	0.29	0.14	0.000926	0.0000		
Main Lower	18981	5 Yr	Exist	850.00	595.87	1.88
0.14	0.29	0.14	0.000926	0.0000		
Main Lower	18981	10 Yr	Prop	1200.00	596.75	1.98
0.16	0.31	0.16	0.000841	0.0000		
Main Lower	18981	10 Yr	Exist	1200.00	596.75	1.98
0.16	0.31	0.16	0.000841	0.0000		
Main Lower	18981	100 Yr	Prop	2400.00	599.12	2.34
0.16	0.39	0.23	0.000759	0.0000		
Main Lower	18981	100 Yr	Exist	2400.00	599.12	2.34
0.16	0.39	0.23	0.000760	0.0000		
Main Lower	18168	Bankfull	Prop	362.00	594.03	0.57
0.01	0.03	0.02	0.000119	0.0011		
Main Lower	18168	Bankfull	Exist	362.00	594.03	0.57
0.01	0.03	0.02	0.000119	0.0011		
Main Lower	18168	2x Bankfull	Prop	724.00	595.25	0.81
0.02	0.05	0.04	0.000170	0.0011		
Main Lower	18168	2x Bankfull	Exist	724.00	595.25	0.81

TravisCreek-Bed Shear Report.txt

0.02	0.05	0.04	0.000170	0.0011		
Main Lower	18168	2 Yr	Prop	500.00	594.55	0.68
0.01	0.04	0.03	0.000142	0.0011		
Main Lower	18168	2 Yr	Exist	500.00	594.55	0.68
0.01	0.04	0.03	0.000142	0.0011		
Main Lower	18168	5 Yr	Prop	850.00	595.60	0.88
0.02	0.06	0.05	0.000182	0.0011		
Main Lower	18168	5 Yr	Exist	850.00	595.60	0.88
0.02	0.06	0.05	0.000182	0.0011		
Main Lower	18168	10 Yr	Prop	1200.00	596.47	1.03
0.03	0.08	0.07	0.000208	0.0011		
Main Lower	18168	10 Yr	Exist	1200.00	596.47	1.03
0.03	0.08	0.07	0.000208	0.0011		
Main Lower	18168	100 Yr	Prop	2400.00	598.81	1.38
0.05	0.13	0.11	0.000251	0.0011		
Main Lower	18168	100 Yr	Exist	2400.00	598.81	1.38
0.05	0.13	0.11	0.000251	0.0011		
Main Lower	17792	Bankfull	Prop	362.00	593.91	1.61
0.06	0.23	0.08	0.000861			
Main Lower	17792	Bankfull	Exist	362.00	593.91	1.61
0.06	0.23	0.08	0.000861			
Main Lower	17792	2x Bankfull	Prop	724.00	595.10	1.86
0.11	0.28	0.14	0.000860			
Main Lower	17792	2x Bankfull	Exist	724.00	595.10	1.86
0.11	0.28	0.14	0.000860			
Main Lower	17792	2 Yr	Prop	500.00	594.41	1.72
0.08	0.25	0.11	0.000861			
Main Lower	17792	2 Yr	Exist	500.00	594.41	1.72
0.08	0.25	0.11	0.000861			
Main Lower	17792	5 Yr	Prop	850.00	595.45	1.93
0.12	0.30	0.16	0.000861			
Main Lower	17792	5 Yr	Exist	850.00	595.45	1.93
0.12	0.30	0.16	0.000861			
Main Lower	17792	10 Yr	Prop	1200.00	596.30	2.10
0.15	0.34	0.20	0.000861			
Main Lower	17792	10 Yr	Exist	1200.00	596.30	2.10
0.15	0.34	0.20	0.000861			
Main Lower	17792	100 Yr	Prop	2400.00	598.61	2.52
0.22	0.45	0.31	0.000860			
Main Lower	17792	100 Yr	Exist	2400.00	598.61	2.52
0.22	0.45	0.31	0.000860			

TravisCreek-FEMA Floodway Report.txt

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

X	X	XXXXXX	XXXX	XXXX	XX	XXXX
X	X	X	X X	X X	X X	X
X	X	X	X	X X	X X	X
XXXXXXXX	XXXX	X	XXX	XXXX	XXXXXX	XXXX
X	X	X	X	X X	X X	X
X	X	X	X X	X X	X X	X
X	X	XXXXXX	XXXX	X X	X X	XXXXX

PROJECT DATA

Project Title: Travis Creek Aycock Springs Restoration
Project File : TravisCreekAycock.prj
Run Date and Time: 2/24/2015 11:41:24 AM

Project in English units

Project Description:

Alamance County, Travis Creek, Aycock Springs Stream and Wetland Restoration

####(Haw Reedy)####

TRAVIS CREEK

HCFCU Unit X###-##-##

(Flood

Hazard, Floodway) Model

10, 2, 1, 0.2% Event

Filename:

n:\NC_flood\60273\Approximates\Eng\Haw-Reedy\Eng\Travis Creek\Travis Creek.prj

Prepared by: L Arnold Date: March 15, 2004

Reviewed by: _____ Date: _____

STATUS (Draft RAS, SVSQ, FINAL)

FPMS BR

FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW

10 YR NATURAL

TravisCreek-FEMA Floodway Report.txt

TRAVIS
CR
FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW
10 YR
NATURAL
TRAVIS CR
FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC
BLW
100 YR NATURAL
TRAVIS CR
FPMS BR FIA STUDY TRAVIS CR
ALAMANCE CO, NC BLW
100 YR NATURAL
TRAVIS CR
FPMS BR FIA
STUDY TRAVIS CR ALAMANCE CO, NC BLW
100 YR NATURAL
TRAVIS CR

PLAN DATA

Plan Title: Proposed - FW Truncated
Plan File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS\TravisCreekAycock.p07

Geometry Title: Proposed Truncated
Geometry File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS\TravisCreekAycock.g04

Flow Title : Imported Flow 02 Truncated
Flow File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS\TravisCreekAycock.f03

Plan Summary Information:

Number of: Cross Sections =	24	Multiple Openings =	0
Culverts =	1	Inline Structures =	0
Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3

TravisCreek-FEMA Floodway Report.txt

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Subcritical Flow

Encroachment Data

Equal Conveyance = True
 Left Offset = 0
 Right Offset = 0

River = RIVER-1	Reach = Reach-1	RS	Profile	Method	Value1	Value2
27950	FW	1	1330	1400		
27770	FW	1	1327	1427		
26840	FW	1	1530	1730		
26070	FW	1	1600	1850		
25340	FW	1	1745	1945		
23335	FW	1	1610	1790		
23245	FW	1	1635	1800		
23201	FW	1	1679	1707		
23160	FW	1	1679	1707		
23110	FW	1	273.6	447.8		
22970	FW	1	285.4	488.2		
22440	FW	1	178	289.7		
22110	FW	1	153	358		
21750	FW	1	270.3	442.9		
21270	FW	1	229.8	452.7		
21250	FW	1	223.6	460.9		
21085	FW	1	312.8	574.5		
21075	FW	1	315.7	574.3		
21030	FW	1	252.6	532.7		
20970	FW	1	207.2	526.7		
20230	FW	1	2050	2220		
19430	FW	1	2030	2210		
17790	FW	1	1265	1415		
16030	FW	1	1367	1497		
15580	FW	1	1345	1555		
14880	FW	1	1300	1570		
14435	FW	1	1635	1735		
14385	FW	1	1660	1725		
14365	FW	1	1660	1725		
14320	FW	1	1641	1736		
13900	FW	1	1130	1270		
12770	FW	1	1185	1350		

TravisCreek-FEMA Floodway Report.txt

11140	FW	1	1415	1580
10400	FW	1	1515	1695
9910	FW	1	1520	1720
8610	FW	1	960	1220
8569	FW	1	980	1230
8550	FW	1	1000	1240
8500	FW	1	1015	1255
8310	FW	1	1145	1305
7610	FW	1	1170	1330
6150	FW	1	2015	2155
5930	FW	1	2025	2135
5867	FW	1	2049	2094
5810	FW	1	2049	2094
5770	FW	1	2035	2110
5110	FW	1	1475	1625
4540	FW	1	1525	1695
2825	FW	1	1460	1640
1650	FW	1	1108	1278
1020	FW	1	1880	2000
961	FW	1	1878	1998
935	FW	1	1878	1998
850	FW	1	1372	1552
120	FW	1	1650	1850

FLOW DATA

Flow Title: Imported Flow 02 Truncated
 Flow File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS\TravisCreekAycock.f03

Flow Data (cfs)

River	Reach	RS	100-Yr	FW
RIVER-1	Reach-1	27950	1500	1500
RIVER-1	Reach-1	26070	1570	1570
RIVER-1	Reach-1	25340	2145	2145
RIVER-1	Reach-1	23335	2240	2240
RIVER-1	Reach-1	22970	2335	2335
RIVER-1	Reach-1	20970	2910	2910
RIVER-1	Reach-1	20230	3045	3045

Boundary Conditions

TravisCreek-FEMA Floodway Report.txt

River	Reach	Profile	Upstream
Downstream			
RIVER-1	Reach-1	100-Yr	
Known WS = 596.351			
RIVER-1	Reach-1	FW	
Known WS = 597.09			

GEOMETRY DATA

Geometry Title: Proposed Truncated
 Geometry File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS\TravisCreekAycock.g04

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 27950

INPUT
 Description: ** ATC-26 **

Station Elevation Data	num=	14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	638.8	1100	631.9	1200	630.3	1271	629.7	1300	625.4
1335	616.9	1349	615	1353	613.4	1358	613.3	1364	613.7
1371	614.4	1400	618.8	1500	635.4	1539	643.3		

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1353	.06	1371	.1

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	1353	1371		180	180	180		.2	.4

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 27770

TravisCreek-FEMA Floodway Report.txt

INPUT

Description: ** TOPO, WITH NEF; CHAN FM SEC 26 **

Station Elevation Data		num=		15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	635	1000	630	1200	625	1270	620	1330	615
1349	614.6	1353	613	1358	612.9	1364	613.3	1371	614
1430	615	1460	620	1535	625	1605	630	1635	635

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
900	.09	1353	.06	1371	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1353	1371		930	930		.2	.4

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 26840

INPUT

Description: ** TOPO, WITH HIGHER ELEVS TAKEN FM SEC 25 ROB; CHAN FM SEC 25**

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	640.6	1100	637.7	1200	632	1285	625	1400	620
1490	615	1642	613.1	1645	609.8	1650	610.2	1654	610.1
1658	612.2	1750	614	1760	615	1795	620	1835	625
1910	630	2070	635						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
950	.09	1642	.06	1658	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1642	1658		600	770		.2	.4

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 26070

TravisCreek-FEMA Floodway Report.txt

INPUT

Description: ** SEC 25 , NEF AT HIGHER ELEV ROB **

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	640.6	1100	637.7	1120	636.3	1200	632.5	1300	625.9
1400	620.8	1500	618.3	1520	616.9	1600	612.3	1642	611
1645	607.7	1650	608.1	1654	608	1658	610.1	1700	610.7
1800	612	1900	613.8	1990	625	2055	630	2150	635
2215	640								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1642	.06	1658	.11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

1642	1658	730	730	640	.2	.4
------	------	-----	-----	-----	----	----

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 25340

INPUT

Description: ** SEC 24 WITH NEF **

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	640.9	1100	637	1200	631	1300	625.5	1440	620
1540	615	1730	610.9	1764	610.1	1767	606.7	1772	607
1778	607.3	1785	609.9	1800	609.7	1900	609.7	2000	609.9
2050	615	2115	625	2200	634.5	2300	644.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.11	1764	.06	1785	.11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

1764	1785	2005	2005	2005	.2	.4
------	------	------	------	------	----	----

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23335

TravisCreek-FEMA Floodway Report.txt

INPUT

Description: This is a REPEATED section.

** PREVIOUS SEC TRANSFERRED

**

Station Elevation Data		num=		19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.7	1100	631.8	1200	627.9	1300	624.1	1400	623.5
1500	620.5	1600	614.2	1648	606.9	1682	606.7	1687	606
1694	604.5	1704	605.6	1707	606.7	1755	607	1800	612.7
1900	621.8	2000	626.9	2100	625.7	2200	629.5		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.11	1682	.06	1707	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1682	1707		90	90		.2	.4

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 23245

INPUT

Description:

** SEC 23; OVBK FM 21 **

Station Elevation Data		num=		19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.6	1100	631.7	1200	627.8	1300	624	1400	623.4
1500	620.4	1600	614.1	1648	606.8	1682	606.6	1687	605.9
1694	604.4	1704	605.5	1707	606.6	1755	606.9	1800	612.6
1900	621.7	2000	626.8	2100	625.6	2200	629.4		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.11	1682	.06	1707	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1682	1707		44	44		.3	.5

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 23201

TravisCreek-FEMA Floodway Report.txt

INPUT

Description: ** SR 1500; OVBKS FM SEC 23 **

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.6	1100	631.7	1200	627.8	1300	624	1400	623.4
1500	620.4	1575	615.9	1600	614.1	1648	606.8	1679	606.5
1679	604.6	1707	604.6	1707	606.5	1755	606.9	1800	612.6
1857	617.8	1900	621.7	2000	626.8	2100	625.6	2200	629.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1679	.06	1707	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
1679	1707	41	41	41	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	1679	615.2	F
1707	2200	615.5	F

CULVERT

RIVER: RIVER-1
 REACH: Reach-1 RS: 23180.5

INPUT

Description: Bridge #5

Distance from Upstream XS = 9.5
 Deck/Roadway Width = 22
 Weir Coefficient = 3

Upstream Deck/Roadway Coordinates num= 18

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1000	636.6	0	1100	631.7	0	1200	627.8	0	1300	624	0	1400	623.4	0
1500	620.4	0	1575	615.9	0	1600	615.5	0	1679	615.2	0	1707	615.5	0
1679	615.2	0	1707	615.5	0	1707	615.5	0	1707	615.5	0	1707	615.5	0
1800	616.6	0	1857	617.8	0	1900	621.7	0	1900	621.7	0	1900	621.7	0
2000	626.8	0	2100	625.6	0	2200	629.4	0	2200	629.4	0	2200	629.4	0

Upstream Bridge Cross Section Data

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-----	------	-----	------	-----	------	-----	------	-----	------

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1000	636.6	1100	631.7	1200	627.8	1300	624	1400	623.4
1500	620.4	1575	615.9	1600	614.1	1648	606.8	1679	606.5
1679	604.6	1707	604.6	1707	606.5	1755	606.9	1800	612.6
1857	617.8	1900	621.7	2000	626.8	2100	625.6	2200	629.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1679	.06	1707	.1

Bank Sta: Left Right Coeff Contr. Expan.

1679	1707		.3	.5
------	------	--	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	1679	615.2	F
1707	2200	615.5	F

Downstream Deck/Roadway Coordinates

num= 18

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1000	636.6		0		1100	631.7		0		1200	627.8		0	
1300	624		0		1400	623.4		0		1500	620.4		0	
1575	615.9		0		1600	615.5		0		1679	615.2		0	
1679	615.2		0		1707	615.5		0		1707	615.5		0	
1800	616.6		0		1857	617.8		0		1900	621.7		0	
2000	626.8		0		2100	625.6		0		2200	629.4		0	

Downstream Bridge Cross Section Data

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1155	632.7	1340	622	1470	617.5	1560	612.5	1630	606.9
1679	606.5	1679	604.6	1707	604.6	1707	606.5	1755	606.9
1800	612.6	1870	618	1950	621	2050	624.8	2230	629.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1155	.1	1679	.06	1707	.1

Bank Sta: Left Right Coeff Contr. Expan.

1679	1707		.3	.5
------	------	--	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1155	1679	612.6	F
1707	2230	612.6	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98

TravisCreek-FEMA Floodway Report.txt

Elevation at which weir flow begins = 615.2
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Box 8 13.5
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef
 .5 40 .012 .06 1 .4
 1

Number of Barrels = 2
 Upstream Elevation = 603.6
 Centerline Stations
 Sta. Sta.
 1685.75 1700.25
 Downstream Elevation = 603.6
 Centerline Stations
 Sta. Sta.
 1685.75 1700.25

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23160

INPUT

Description: ** SR 1500; SEC ATC-22, MOD BY SEC 23 **

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1155 632.7 1340 622 1470 617.5 1560 612.5 1630 606.9
 1679 606.5 1679 604.7 1707 604.7 1707 606.5 1755 606.9
 1800 612.6 1870 618 1950 621 2050 624.8 2230 629.4

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1155 .1 1679 .06 1707 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1679 1707 50 50 50 .3 .5

TravisCreek-FEMA Floodway Report.txt

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1155 1679 612.6 F
 1707 2230 612.6 F

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23110

INPUT

Description:

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	611.99	5.06	611.84	10.71	611.59	25.76	610.76	26.74	610.72
42.25	610.03	54.3	610.01	61.77	609.64	70.72	609.44	77.78	609.3
95.42	608.52	95.79	608.51	96.96	608.46	125.23	607.2	135.51	606.65
143.96	606.02	168.66	604.89	172.94	604.62	174.94	604.59	193.45	604.35
212.61	604.04	217.55	603.91	224.26	603.67	236.01	603.52	242.91	603.13
260.2	602.63	263.92	602.48	267.35	602.41	272.38	602.25	280.76	602.07
297.1	601.64	300.64	601.44	310.66	601.38	312.88	601.48	318.29	596.84
318.6	596.54	320.75	596.25	327.73	596.54	333.65	596.04	336.57	597.91
341.72	601.5	343.69	601.7	344.73	601.8	351.06	601.78	361.4	602.01
364.95	601.89	372.51	601.97	380.5	601.99	390.2	601.79	413.78	601.51
418.03	601.49	421.07	601.38	447.29	600.89	465.72	600.84	506.22	604.62
551.98	608.61	667.8	612.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	312.88	.06	343.69	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 312.88 343.69 346 357 324 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 22970

INPUT

Description: ** TOPO MOD BY SEC 23; CHAN FM ATC-21 **

Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	618.21	1.38	618.37	5.38	618.36	28.72	616.63	33.08	616.53
48.05	611.55	55.58	609.3	72.5	608.94	75.6	608.9	86.45	608.65

TravisCreek-FEMA Floodway Report.txt

97.81	607.96	100.47	607.92	105.6	607.63	117.07	607.4	123.3	607.28
134.04	607.78	140.43	607.83	150.93	607.86	159.27	608.5	164.65	608.45
170.58	608.25	174.42	607.64	174.93	607.84	176.95	607.65	186.62	606.76
189.88	606.46	190.87	606.37	195.39	605.96	196.06	605.9	196.74	605.83
198.43	605.68	200.27	605.51	202.13	605.34	202.94	605.26	203.34	605.23
204.63	605.11	205.03	605.07	205.39	605.04	205.75	605	206.21	604.96
206.85	604.9	207.49	604.84	207.79	604.82	208.94	604.71	226.95	602.37
239.72	602.39	241.42	602.45	259.45	601.95	272.84	601.31	288.73	600.96
291.07	600.95	295.35	600.99	341.38	601.03	342.23	601.03	344.16	601.04
356.89	600.86	366.63	600.38	381.8	600.17	387.34	600.08	388.69	600.05
393.15	599.98	403.64	599.86	406.29	599.95	414.82	600.07	423.45	600.1
428.11	600.16	435.15	600.36	451.33	600.86	453.93	598.23	455.71	595.66
456.83	595.51	463.63	595.85	471.55	598.54	474.51	600.55	477.63	600.14
478.89	600	481.76	598.65	487.58	596.49	488.01	596.79	491.23	598.75
492.75	599.69	498.39	600.36	516.48	603.01	525.04	604.73	528.41	605.22
535.52	606.24	575.28	612.41	590.22	614.52	591.36	614.65	612.63	611.87
617.79	612.06	623.18	610.85	625.24	610.85	626.56	611	627.12	611.07
627.57	611.12	627.87	611.15	629.1	611.29	629.57	611.34	630.4	613.5
644.5	619.04	651.64	619.26	653.15	619.27				

Manning's n Values	num=	5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	451.33	.06	474.51	.1	478.89	.06	492.75	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
451.33	474.51	216	209	206		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1

RS: 22440

INPUT

Description: ** TOPO,ADJ. BASED ON 23;NR OVBK & CHAN FM 21; NEF LOB **

Station Elevation Data	num=	76							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	615.64	14.33	614.61	16.67	614.48	34.63	613.47	35.39	613.42
44.32	612.39	50.38	611.6	55.75	610.89	67.35	609.8	71.15	609.56
74.24	609.23	86.48	608.06	92.36	606.97	93.37	606.62	94.88	606.5
96.41	606.34	122.67	604.03	132.79	603.17	135.2	602.94	139.7	602.7
146.05	602.35	151.03	601.97	157.38	601.42	161.88	600.94	172.57	600.41
179.61	600.14	183.24	599.98	187.68	599.82	194.07	599.41	198.47	599.18
200.6	599.18	209.72	599.15	211.99	599.12	216.37	599.13	219.94	597.94
234.95	597.94	240.35	595.24	248.09	595.24	248.3	595.14	248.89	595.14
249.1	595.24	256.84	595.24	262.24	597.94	277.24	597.94	282.29	599.62
292.66	599.57	303.37	600.21	307.07	600.46	310.04	601.09	352.45	609.29

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365.19	611.35	373.65	611.61	376.61	611.23	400.46	612.12	402.02	611.76
409.74	611.77	410.19	611.82	411.07	611.92	411.55	611.97	412.82	612.12
413.44	612.19	414.84	612.35	415.41	612.41	416.02	612.48	416.59	612.54
416.92	612.58	417.36	612.63	418.61	612.77	419.36	612.86	420.65	613
421.64	613.11	423.12	613.28	423.55	613.33	425.65	613.57	433.63	617.13
437.37	618.62								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	234.95	.06	262.24	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	234.95	262.24		309	313		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 22110

INPUT
 Description:

Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	617.42	.45	617.39	4.83	617.09	5.82	617.02	8.92	616.86
22.95	616.04	26.66	615.7	36.08	615.48	41.6	615.26	46.03	615.09
58.44	614.46	69.29	613.83	80.15	612.37	83.66	612.17	100.12	610.2
105.27	609.63	105.85	609.54	108.15	609.29	122.47	606.47	132.87	603.26
137.92	601.14	142.86	600.9	144.52	600.99	147.09	600.88	152.63	600.65
184.32	599.46	186.76	599.37	197.67	598.96	202.98	598.95	206.14	598.94
209.96	598.92	218.69	598.86	228.29	598.77	271.42	598.8	271.8	598.8
273.08	598.78	299.48	598.23	306.19	595.21	311.52	594.87	313.56	594.72
316.59	595.16	319.3	599.42	341.88	599.38	343.65	599.31	344.31	599.33
357.9	600.95	371.58	602.57	372.46	602.71	387.74	605.36	389.38	605.64
389.87	605.72	391.02	605.84	397.87	606.58	453.58	611.46		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	299.48	.06	319.3	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	299.48	319.3		375	381		.1	.3

CROSS SECTION

RIVER: RIVER-1

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RS: 21750

REACH: Reach-1

INPUT

Description: ** SEC 21 **

Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	614.74	9.65	614.57	22.14	613.79	30.39	613.62	42.36	612.55
47.36	612.11	53.37	611.43	57.85	610.66	63.11	610.37	71.16	609.72
80.19	609.28	84.56	609.07	87.27	608.89	93.86	608.14	108.07	607.19
110.5	607.06	130.81	605.92	131.12	605.91	131.72	605.86	148.19	604.83
151.76	604.53	159.46	604.05	161.44	603.94	163.15	603.67	164.27	603.49
164.64	603.44	183.05	602.73	194.63	602.24	206.29	602.06	207.65	602.03
210.9	601.86	225.3	600.99	232.61	600.55	238.73	600.2	242.95	599.97
268.28	599.35	272.84	599.2	287.05	598.59	288.55	598.55	292.79	598.42
295.05	598.37	306.7	598.04	317.22	598.16	318.61	598.13	320.06	597.99
327.67	597.52	328.85	597.13	400.22	597.13	409.61	597.13	434.31	593.33
435.31	593.33	442.91	597.13	456.72	597.13	466.56	600.41	467.52	600.46
474.63	600.71	496.91	605.27	509.13	607.76	519.59	609.69	523.39	610.53
534.58	612.48	538.99	613.01	582.79	613.52				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	409.61	.06	442.91	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	409.61	442.91		311	302		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 21270

INPUT

Description: ** SEC 20-A W/CHAN FM SEC 21 **

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609.96	4.94	609.62	11.3	609.44	24.21	609.12	27.26	608.96
35.3	608.49	38.96	608.29	42.46	608.1	56.41	607.65	71.24	607.47
71.73	607.46	83.61	606.68	86.21	606.44	96.5	605.66	103.58	605.37
116.65	604.6	120.14	604.07	125.37	602.96	125.92	602.83	126.56	602.85
126.93	602.87	127.39	602.88	128.35	602.91	129.11	602.93	129.67	602.95
130.28	602.97	137.89	602.84	140.37	602.71	145.37	602.32	158.43	601.8
180.64	600.95	191.32	600.68	204.9	600.3	212.95	600.02	218.67	599.89
230.72	599.6	231.85	599.58	232.5	599.55	243.03	598.96	252.81	598.58
258.24	598.37	265.97	598.32	272.41	598.32	275.94	598.52	280.37	598.74
283.76	599.09	294.37	600.1	295.35	600.18	296.65	600.13	301.91	600.57

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306.79	600.83	313.81	600.5	314.66	600.45	316.14	600.15	318.62	599.32
330.45	596.52	404.5	596.52	409.9	593.82	417.65	593.82	417.85	593.72
418.45	593.72	418.65	593.82	426.41	593.82	431.8	596.52	452.94	596.52
461.25	596.42	464.3	596.58	474.54	599.67	479.71	601.58	489.43	604.96
499.19	606.98	506.2	608.95	517.61	610.17	534.88	612.53	544.63	613.57
554.68	614.41	566.15	615	574.82	615.41	591.3	616.36	595.56	616.64

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	404.5	.1	409.9	.06	452.94	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	404.5	431.8		21	21		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 21250

INPUT

Description: ** SEC 20-A EXTENDED ON LOB **

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609.6	3.39	609.5	5.97	609.46	9.33	609.38	17.47	608.91
32.66	608.53	37.46	608.45	46.54	608.45	47.55	608.41	48.68	608.31
56.83	607.67	61.35	607.4	71.11	606.71	77.92	606.25	85.68	605.86
94.31	605.49	103.63	604.95	110.44	604.48	111.34	604.41	112.5	604.2
113.11	604.07	119.18	602.75	119.48	602.76	120.6	602.8	120.94	602.81
121.48	602.82	122.12	602.84	122.85	602.86	123.25	602.88	130.01	602.76
133.31	602.58	139.07	602.14	148.17	601.77	173.47	600.8	178.53	600.67
196.16	600.18	199.4	600.09	200.55	600.06	219.79	599.55	233.68	598.92
242.71	598.41	243.03	598.41	252.22	598.28	261.9	598.05	270.96	598.56
271.53	598.61	273.26	598.66	277.99	599.26	283.98	599.87	284.85	599.95
294.34	600.66	307.08	600.2	307.44	600.23	307.96	600.21	322.97	596.67
323.86	596.46	411.52	596.46	416.92	593.76	424.67	593.76	424.87	593.66
425.47	593.66	425.67	593.76	433.43	593.76	438.82	596.46	466.89	596.46
470.79	597.82	485.35	603.37	489.32	604.63	499.46	607.73	506.8	608.81
516.1	610.64	531.49	612.76	534.88	613.22	539.45	613.71	542.59	613.97
565.1	615.54	577.86	616.51	583.92	616.8	591.06	617.21	592.95	617.31
593.96	617.36	595.56	617.44						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	411.52	.1	424.67	.06	466.89	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
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411.52 438.82 127 134 141 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1

RS: 21085

INPUT

Description: ** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **

Station Elevation Data num= 103									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	613.68	6.25	613.61	18.74	613.37	20.13	613.33	20.62	613.31
30.82	612.98	48.02	612.28	49.83	612.21	50.13	612.19	50.69	612.16
67.17	611.13	80	610.65	83.29	610.52	83.95	610.5	97.79	609.95
103.61	609.68	117.22	609.02	120.22	608.87	132.02	608.34	135.25	608.19
148.28	607.56	151.05	607.31	155.65	607.04	170.02	606.5	172.72	606.39
183.73	605.66	190.96	605.22	198.05	604.81	205.51	604.32	208.1	604.01
209.58	603.65	213.93	602.61	214.73	602.64	215.49	602.67	216.32	602.69
216.8	602.71	222.51	602.62	226.82	602.39	230.69	602.07	261.61	600.77
264.05	600.65	267.13	600.55	285.6	600.02	293.96	599.8	304.48	599.52
323.77	598.63	331.06	598.38	347.88	597.88	350.15	598.01	358.37	598.8
368.07	599.15	373.32	599.54	376.19	599.61	379.13	599.86	381.9	600.06
389.46	599.98	393.16	599.06	400.85	597.27	406.07	596.06	432.91	596.06
441.07	596.09	445.98	596.18	446.83	596.23	486.69	596.23	492.1	593.53
499.85	593.53	500.05	593.43	500.64	593.43	500.85	593.53	508.6	593.53
514	596.23	528.99	596.23	531.08	596.92	531.52	596.95	535.45	597.15
535.82	597.15	539.08	597.18	545.72	597.07	548.83	597.2	552	597.12
560.85	596.83	562.95	596.56	566.17	595.86	568.01	595.54	576.82	595.98
596.87	599.22	610.34	601.81	619.52	604.48	625.3	605.96	627.66	606.51
635.44	608.14	642.8	609.47	654.72	611.37	659.51	612.23	663.06	612.5
670.08	613.39	676.75	614.08	689.46	615.14	692.06	615.34	696.58	615.62
698.18	615.71	706.82	616.21	721.56	617.11				

Manning's n Values num= 6									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	432.91	.11	492.1	.06	528.99	.11	562.95	.06
576.82	.11								

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	486.69	514		11	11	11		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1

RS: 21075

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INPUT

Description: ** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**

Station Elevation Data num= 98									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	612.85	1.37	612.83	5.17	612.79	8.54	612.73	18.91	612.6
25.44	612.65	32.03	612.81	41.8	612.69	42.1	612.69	42.88	612.64
53.89	611.87	59.71	611.51	66.18	611.08	76.34	610.67	83.83	610.45
90.31	610.19	104.63	609.54	108.05	609.37	113.45	609.09	126.09	608.52
131.61	608.15	139.05	607.71	143.8	607.47	150.6	607.22	162.69	606.74
169.07	606.41	176.4	605.94	185.16	605.49	192.95	605.04	197.49	604.74
209.45	604.04	212.51	603.25	214.64	602.56	215.7	602.59	216.6	602.62
217.11	602.64	222.51	602.57	227.34	602.3	230.51	602.05	255.83	600.98
263.27	600.61	272.7	600.29	283.68	599.98	296.84	599.63	301.81	599.49
310.93	599.07	346.42	597.85	347.72	597.82	353.6	598.38	358.5	598.85
365.96	599.36	366.89	599.45	375.16	600.15	376.04	600.25	379.13	600.23
382.61	600.18	384.39	600.12	389.09	600.07	391.6	599.88	400.58	597.61
401.47	597.39	402.3	597.13	405.52	596.21	486.89	596.21	494.49	592.41
495.49	592.41	520.19	596.21	537.07	596.21	543.46	597.03	543.83	597.06
544.32	597.05	548.02	597.21	553.42	597.45	558.62	597.31	561.5	597.07
563.59	596.81	568.41	596.2	570.1	595.83	578.11	596.17	584.16	596.49
585.17	596.48	616.5	602.57	618.09	602.92	619.05	603.11	634.7	606.89
646.97	609.22	651.45	610.03	653.42	610.35	662.62	612	669.43	612.53
682.91	614.23	685.19	614.46	689.51	614.82	697.68	615.45	701.36	615.68
712.78	616.36	717.51	616.63	720.38	616.81				

Manning's n Values num= 4									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	486.89	.1	494.49	.06	520.19	.1		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	486.89	520.19		66	61	50		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 21030

INPUT

Description: ** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **

Station Elevation Data num= 89									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	610.33	9.91	610.2	18	610.11	19.45	610.07	21.74	609.98
30.77	609.62	35.25	609.34	47.18	608.67	53.34	608.29	59.8	607.96
71.86	607.22	73.87	607.06	78.37	606.88	87.81	606.47	92.17	606.33
106.25	605.95	111.57	605.63	123.78	604.75	134.59	603.72	138.57	603.39

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140.43	603.04	144.92	602.41	145.69	602.44	146.29	602.46	147.29	602.49
150.82	602.42	156.92	602.08	158.11	601.98	168.7	601.54	181.17	600.92
189.01	600.54	191.63	600.45	206.77	599.95	221.96	599.53	222.87	599.5
227.24	599.34	237.87	598.96	263.4	597.93	267.84	597.58	272.16	596.14
406.09	596.14	425.81	596.14	430.88	593.44	438.63	593.44	438.83	593.34
439.43	593.34	439.63	593.44	447.38	593.44	452.79	596.14	465.58	596.14
468.84	596.56	477.91	596.83	488.03	597.04	489.21	597.08	491.55	597.12
504.53	597.31	506.56	597.21	507.31	597.13	510.37	596.66	512.81	596.27
514.16	596.15	519.41	595.92	521.38	595.99	525.24	595.75	527.83	596.23
532.7	596.95	536	596.97	540.34	596.95	548.31	596.85	551.92	596.87
565.14	599.59	584.32	604.06	589.03	604.82	592.19	604.85	606.22	607.61
623.33	609.89	626.73	609.98	649.47	611.33	675.2	613.91	676.09	613.97
683.12	614.48	685.48	614.65	686.88	614.76	692.25	615.15	696.05	616.78
697.23	618.47	701.51	618.93	709.74	620.1	712.07	620.56		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	406.09	.1	438.63	.06	465.58	.1	519.41	.06
532.7	.1								

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	425.81	452.79		68	61	61		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 20970

INPUT
 Description: ** TOPO SEC; CHAN FM ATC-20 **

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	607.8	48.61	604.8	108.51	601.8	192	597.8	213.3	597
268.5	596.01	406.26	596.01	421.1	596.01	426.65	593.31	434.4	593.31
434.61	593.21	435.2	593.21	435.4	593.31	443.15	593.31	448.8	596.01
463.55	596.01	466.59	597.02	473.14	597.24	479.34	597.22	493.47	597.23
499.39	597.34	506.46	597.46	516.25	598.05	526.12	598.41	533.81	598.88
540.38	599.31	552.72	599.71	553.73	599.74	571.96	600.37	573.79	600.43
582.38	600.66	589.83	601.01	594.14	601.35	607.88	600.27	623.49	601.03
633.04	602.51	640.49	602.67	652.53	602.63	653.14	602.65	653.71	602.71
663.9	604.8	683.8	607.8	694.31	613.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	421.1	.06	448.8	.11

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Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
421.1	448.8	682	716	744		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 20230

INPUT

Description: ** TOPO SEC; CHAN FM ATC-20 **

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1210	625	1320	620	1740	615	1890	610	1990	605
2050	600	2067	597.3	2070	593.5	2080	592.2	2092	593.7
2096	597.5	2230	600	2275	605	2330	610	2365	615
2400	620	2440	625						

Manning's n Values		num=		3			
Sta	n Val	Sta	n Val	Sta	n Val		
1210	.09	2067	.06	2096	.11		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
2067	2096	800	800	800		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 19430

INPUT

Description: ** ATC-20, MOD FOR NEF LOB **

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1245	625	1370	620	1570	615	1895	610	1980	605
2020	600	2053	596	2067	595.6	2070	591.8	2080	591.1
2092	592	2096	595.8	2100	597	2200	600.2	2300	605.7
2400	612.3	2500	618.1	2600	622.8				

Manning's n Values		num=		3			
Sta	n Val	Sta	n Val	Sta	n Val		
1245	.09	2067	.06	2096	.11		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
2067	2096	1640	1640	1640		.1	.3

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CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 17790

INPUT

Description: ** ATC-19 **

Station Elevation Data		num=		21					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	626.1	1100	622.4	1152	622.3	1200	619.5	1220	618.8
1265	593.8	1275	593.1	1277	589.5	1289	589.8	1299	589.5
1300	592	1317	593.4	1400	593.2	1447	593.1	1500	603.4
1565	609.6	1600	610.2	1700	612.3	1800	614.9	1900	617
1990	620.4								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1275	.06	1300	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1275	1300		1760	1760		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 16030

INPUT

Description: ** ATC-18 **

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	621.3	1100	617.3	1200	611.9	1300	602.9	1400	594.4
1429	589.8	1442	589.3	1445	585.5	1451	586	1457	585.9
1464	589.1	1500	597.3	1508	597.6	1520	602.3	1550	610.1
1600	611.5	1700	618.5	1750	620.1				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1442	.06	1464	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1442	1464		16261	16143		.2	.4

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SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach n6	River Sta.	n1	n2	n3	n4	n5
Reach-1	27950	.09	.06	.1		
Reach-1	27770	.09	.06	.1		
Reach-1	26840	.09	.06	.1		
Reach-1	26070	.1	.06	.11		
Reach-1	25340	.11	.06	.11		
Reach-1	23335	.11	.06	.11		
Reach-1	23245	.11	.06	.11		
Reach-1	23201	.1	.06	.1		
Reach-1	23180.5	Culvert				
Reach-1	23160	.1	.06	.1		
Reach-1	23110	.1	.06	.1		
Reach-1	22970	.1	.06	.1	.06	.1
Reach-1	22440	.1	.06	.1		
Reach-1	22110	.1	.06	.1		
Reach-1	21750	.1	.06	.11		
Reach-1	21270	.1	.1	.06	.11	
Reach-1	21250	.1	.1	.06	.1	
Reach-1	21085	.1	.11	.06	.11	.06

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.11	Reach-1	21075	.1	.1	.06	.1	
	Reach-1	21030	.1	.1	.06	.1	.06
.1	Reach-1	20970	.1	.06	.11		
	Reach-1	20230	.09	.06	.11		
	Reach-1	19430	.09	.06	.11		
	Reach-1	17790	.1	.06	.1		
	Reach-1	16030	.1	.06	.1		

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	27950	180	180	180
Reach-1	27770	930	930	930
Reach-1	26840	600	770	770
Reach-1	26070	730	730	640
Reach-1	25340	2005	2005	2005
Reach-1	23335	90	90	90
Reach-1	23245	44	44	44
Reach-1	23201	41	41	41
Reach-1	23180.5	Culvert		
Reach-1	23160	50	50	50
Reach-1	23110	346	357	324
Reach-1	22970	216	209	206
Reach-1	22440	309	313	310
Reach-1	22110	375	381	390
Reach-1	21750	311	302	297
Reach-1	21270	21	21	21
Reach-1	21250	127	134	141
Reach-1	21085	11	11	11
Reach-1	21075	66	61	50
Reach-1	21030	68	61	61
Reach-1	20970	682	716	744

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Reach-1	20230	800	800	800
Reach-1	19430	1640	1640	1640
Reach-1	17790	1760	1760	1760
Reach-1	16030	16261	16143	16001

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	27950	.2	.4
Reach-1	27770	.2	.4
Reach-1	26840	.2	.4
Reach-1	26070	.2	.4
Reach-1	25340	.2	.4
Reach-1	23335	.2	.4
Reach-1	23245	.3	.5
Reach-1	23201	.3	.5
Reach-1	23180.5	Culvert	
Reach-1	23160	.3	.5
Reach-1	23110	.1	.3
Reach-1	22970	.1	.3
Reach-1	22440	.1	.3
Reach-1	22110	.1	.3
Reach-1	21750	.1	.3
Reach-1	21270	.1	.3
Reach-1	21250	.1	.3
Reach-1	21085	.1	.3
Reach-1	21075	.1	.3
Reach-1	21030	.1	.3
Reach-1	20970	.1	.3
Reach-1	20230	.1	.3
Reach-1	19430	.1	.3
Reach-1	17790	.1	.3
Reach-1	16030	.2	.4

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Plan	Q Total	Min Ch El
W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Flow Area	Top Width

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Froude #	Ch1				(cfs)	(ft)
(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)
Reach-1	27950	100-Yr	Prop FW Trunc		1500.00	613.30
619.67		620.41	0.01079	8.47	288.64	81.60
0.61						
Reach-1	27950	100-Yr	Corr Eff FW Trnc		1500.00	613.30
619.67		620.41	0.01079	8.47	288.64	81.60
0.61						
Reach-1	27950	100-Yr	Dup Eff FW		1500.00	613.30
619.67		620.41	0.01077	8.47	288.86	81.63
0.61						
Reach-1	27950	FW	Prop FW Trunc		1500.00	613.30
620.12		620.70	0.00768	7.51	313.54	70.00
0.52						
Reach-1	27950	FW	Corr Eff FW Trnc		1500.00	613.30
620.12		620.70	0.00768	7.51	313.54	70.00
0.52						
Reach-1	27950	FW	Dup Eff FW		1500.00	613.30
620.15		620.72	0.00756	7.47	315.24	70.00
0.52						
Reach-1	27770	100-Yr	Prop FW Trunc		1500.00	612.90
619.05		619.19	0.00325	4.54	621.83	172.90
0.33						
Reach-1	27770	100-Yr	Corr Eff FW Trnc		1500.00	612.90
619.05		619.19	0.00325	4.54	621.83	172.90
0.33						
Reach-1	27770	100-Yr	Dup Eff FW		1500.00	612.90
619.06		619.20	0.00324	4.53	622.81	173.00
0.33						
Reach-1	27770	FW	Prop FW Trunc		1500.00	612.90
619.50		619.68	0.00324	4.77	519.01	100.00
0.34						
Reach-1	27770	FW	Corr Eff FW Trnc		1500.00	612.90
619.50		619.68	0.00324	4.77	519.01	100.00
0.34						
Reach-1	27770	FW	Dup Eff FW		1500.00	612.90
619.54		619.72	0.00317	4.73	522.95	100.00
0.33						

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Reach-1 617.34 0.20	26840	100-Yr 617.39	Prop FW Trunc 0.00125	2.88	1500.00 1095.13	609.80 328.52
Reach-1 617.34 0.20	26840	100-Yr 617.39	Corr Eff FW Trnc 0.00125	2.88	1500.00 1095.13	609.80 328.52
Reach-1 617.45 0.19	26840	100-Yr 617.49	Dup Eff FW 0.00114	2.79	1500.00 1129.73	609.80 331.14
Reach-1 617.88 0.19	26840	FW 617.93	Prop FW Trunc 0.00117	2.95	1500.00 931.27	609.80 200.00
Reach-1 617.88 0.19	26840	FW 617.93	Corr Eff FW Trnc 0.00117	2.95	1500.00 931.27	609.80 200.00
Reach-1 618.05 0.18	26840	FW 618.10	Dup Eff FW 0.00105	2.83	1500.00 965.74	609.80 200.00
Reach-1 616.85 0.12	26070	100-Yr 616.87	Prop FW Trunc 0.00046	2.02	1570.00 1784.55	607.70 403.59
Reach-1 616.85 0.12	26070	100-Yr 616.87	Corr Eff FW Trnc 0.00046	2.02	1570.00 1784.55	607.70 403.59
Reach-1 617.00 0.12	26070	100-Yr 617.02	Dup Eff FW 0.00042	1.95	1570.00 1845.27	607.70 407.09
Reach-1 617.42 0.12	26070	FW 617.44	Prop FW Trunc 0.00044	2.06	1570.00 1534.36	607.70 250.00
Reach-1 617.42 0.12	26070	FW 617.44	Corr Eff FW Trnc 0.00044	2.06	1570.00 1534.36	607.70 250.00
Reach-1 617.64 0.12	26070	FW 617.66	Dup Eff FW 0.00039	1.98	1570.00 1590.06	607.70 250.00
Reach-1 616.61 0.10	25340	100-Yr 616.63	Prop FW Trunc 0.00030	1.72	2145.00 2808.07	606.70 552.77

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Reach-1	25340	100-Yr	Corr Eff FW Trnc	2145.00	606.70
616.61		616.63	0.00030	2808.07	552.77
0.10					
Reach-1	25340	100-Yr	Dup Eff FW	2145.00	606.70
616.79		616.80	0.00027	2903.10	557.31
0.10					
Reach-1	25340	FW	Prop FW Trunc	2145.00	606.70
617.02		617.06	0.00067	1489.40	200.00
0.15					
Reach-1	25340	FW	Corr Eff FW Trnc	2145.00	606.70
617.02		617.06	0.00067	1489.40	200.00
0.15					
Reach-1	25340	FW	Dup Eff FW	2145.00	606.70
617.28		617.32	0.00060	1542.17	200.00
0.15					
Reach-1	23335	100-Yr	Prop FW Trunc	2240.00	604.50
615.68		615.74	0.00070	1554.21	256.15
0.17					
Reach-1	23335	100-Yr	Corr Eff FW Trnc	2240.00	604.50
615.68		615.74	0.00070	1554.21	256.15
0.17					
Reach-1	23335	100-Yr	Dup Eff FW	2240.00	604.50
615.93		615.99	0.00063	1621.18	263.08
0.16					
Reach-1	23335	FW	Prop FW Trunc	2240.00	604.50
615.69		615.75	0.00064	1431.68	180.00
0.16					
Reach-1	23335	FW	Corr Eff FW Trnc	2240.00	604.50
615.69		615.75	0.00064	1431.68	180.00
0.16					
Reach-1	23335	FW	Dup Eff FW	2240.00	604.50
616.13		616.18	0.00054	1510.78	180.00
0.15					
Reach-1	23245	100-Yr	Prop FW Trunc	2240.00	604.40
615.61		615.68	0.00069	1563.94	257.17
0.17					
Reach-1	23245	100-Yr	Corr Eff FW Trnc	2240.00	604.40
615.61		615.68	0.00069	1563.94	257.17
0.17					
Reach-1	23245	100-Yr	Dup Eff FW	2240.00	604.40
615.88		615.94	0.00062	1632.81	264.26

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0.16						
Reach-1	23245	FW	Prop FW Trunc	2240.00	604.40	
615.62		615.69	0.00069 3.04	1350.27	165.00	
0.17						
Reach-1	23245	FW	Corr Eff FW Trnc	2240.00	604.40	
615.62		615.69	0.00069 3.04	1350.27	165.00	
0.17						
Reach-1	23245	FW	Dup Eff FW	2240.00	604.40	
616.02		616.11	0.00084 3.42	1134.07	120.00	
0.18						

Reach-1	23201	100-Yr	Prop FW Trunc	2240.00	604.60	
614.23	610.44	615.30	0.00650 8.30	269.75	219.77	
0.47						
Reach-1	23201	100-Yr	Corr Eff FW Trnc	2240.00	604.60	
614.23	610.44	615.30	0.00650 8.30	269.75	219.77	
0.47						
Reach-1	23201	100-Yr	Dup Eff FW	2240.00	604.60	
615.86	610.44	615.91	0.00050 2.56	1654.71	260.16	
0.13						
Reach-1	23201	FW	Prop FW Trunc	2240.00	604.60	
614.24	610.44	615.31	0.01101 8.30	269.84	28.00	
0.47						
Reach-1	23201	FW	Corr Eff FW Trnc	2240.00	604.60	
614.24	610.44	615.31	0.01101 8.30	269.84	28.00	
0.47						
Reach-1	23201	FW	Dup Eff FW	2240.00	604.60	
614.93	610.44	615.86	0.00909 7.75	289.14	28.00	
0.42						

Reach-1 23180.5 Culvert

Reach-1	23160	100-Yr	Prop FW Trunc	2240.00	604.70	
610.55	610.55	613.45	0.03409 13.69	163.66	199.34	
1.00						
Reach-1	23160	100-Yr	Corr Eff FW Trnc	2240.00	604.70	
610.55	610.55	613.45	0.03409 13.69	163.66	199.34	
1.00						
Reach-1	23160	100-Yr	Dup Eff FW	2240.00	604.70	

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610.55	610.55	613.45	0.03409	13.69	163.66	199.34
1.00						
Reach-1	23160	FW	Prop FW Trunc		2240.00	604.70
610.54	610.54	613.45	0.04622	13.69	163.62	28.00
1.00						
Reach-1	23160	FW	Corr Eff FW Trnc		2240.00	604.70
610.54	610.54	613.45	0.04622	13.69	163.62	28.00
1.00						
Reach-1	23160	FW	Dup Eff FW		2240.00	604.70
612.42	610.54	614.09	0.02060	10.36	216.21	28.00
0.66						
Reach-1	23110	100-Yr	Prop FW Trunc		2240.00	596.04
606.17		606.25	0.00121	3.30	1435.15	382.11
0.20						
Reach-1	23110	100-Yr	Corr Eff FW Trnc		2240.00	596.04
606.34		606.41	0.00107	3.15	1500.56	386.35
0.19						
Reach-1	23110	100-Yr	Dup Eff FW		2240.00	604.30
611.51		611.69	0.00364	4.99	852.41	218.96
0.35						
Reach-1	23110	FW	Prop FW Trunc		2240.00	596.04
606.82		606.94	0.00144	3.78	1018.51	174.20
0.22						
Reach-1	23110	FW	Corr Eff FW Trnc		2240.00	596.04
607.28		607.43	0.00157	4.09	992.11	196.40
0.23						
Reach-1	23110	FW	Dup Eff FW		2240.00	604.30
612.26		613.09	0.00918	8.55	373.47	60.00
0.57						
Reach-1	22970	100-Yr	Prop FW Trunc		2335.00	595.51
605.86		605.90	0.00083	2.73	1619.24	336.35
0.16						
Reach-1	22970	100-Yr	Corr Eff FW Trnc		2335.00	595.51
606.06		606.10	0.00074	2.62	1688.69	340.00
0.15						
Reach-1	22970	100-Yr	Dup Eff FW		2335.00	603.80
611.01		611.16	0.00336	4.72	975.87	264.56
0.34						
Reach-1	22970	FW	Prop FW Trunc		2335.00	595.51
606.45		606.52	0.00101	3.15	1294.31	202.80
0.18						

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Reach-1	22970	FW	Corr Eff FW Trnc	2335.00	595.51
607.01		607.05	0.00069	1677.39	276.51
0.13			2.34		
Reach-1	22970	FW	Dup Eff FW	2335.00	603.80
611.69		612.00	0.00467	644.65	120.00
0.40			5.96		
Reach-1	22440	100-Yr	Prop FW Trunc	2335.00	595.14
605.58		605.69	0.00115	1214.55	228.24
0.21			3.73		
Reach-1	22440	100-Yr	Corr Eff FW Trnc	2335.00	594.40
605.71		605.82	0.00129	1176.57	230.38
0.21			3.63		
Reach-1	22440	100-Yr	Dup Eff FW	2335.00	601.20
608.63		608.92	0.00534	740.51	207.31
0.43			6.08		
Reach-1	22440	FW	Prop FW Trunc	2335.00	595.14
606.09		606.26	0.00138	892.60	111.70
0.23			4.22		
Reach-1	22440	FW	Corr Eff FW Trnc	2335.00	594.40
606.59		606.76	0.00143	879.24	111.70
0.22			4.06		
Reach-1	22440	FW	Dup Eff FW	2335.00	601.20
609.23		609.53	0.00462	673.24	140.00
0.40			6.01		
Reach-1	22110	100-Yr	Prop FW Trunc	2335.00	594.72
605.30		605.36	0.00090	1477.94	261.17
0.17			3.02		
Reach-1	22110	100-Yr	Corr Eff FW Trnc	2335.00	594.72
605.42		605.47	0.00085	1507.35	262.19
0.17			2.95		
Reach-1	22110	FW	Prop FW Trunc	2335.00	594.72
605.85		605.91	0.00078	1431.61	205.00
0.16			2.92		
Reach-1	22110	FW	Corr Eff FW Trnc	2335.00	594.72
606.38		606.43	0.00062	1540.64	205.00
0.15			2.69		
Reach-1	21750	100-Yr	Prop FW Trunc	2335.00	593.33
605.09		605.13	0.00042	2038.30	352.07
			2.30		

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0.13						
Reach-1	21750	100-Yr	Corr Eff FW Trnc	2335.00	594.25	
605.18		605.22	0.00060	2.64	1894.55	355.09
0.15						
Reach-1	21750	100-Yr	Dup Eff FW	2335.00	598.00	
606.62		606.73	0.00199	4.16	1247.34	326.55
0.27						
Reach-1	21750	FW	Prop FW Trunc	2335.00	593.33	
605.61		605.66	0.00056	2.37	1456.88	172.60
0.13						
Reach-1	21750	FW	Corr Eff FW Trnc	2335.00	594.25	
606.19		606.24	0.00053	2.63	1770.67	270.90
0.14						
Reach-1	21750	FW	Dup Eff FW	2335.00	598.00	
607.31		607.46	0.00200	4.43	955.72	160.00
0.27						
Reach-1	21270	100-Yr	Prop FW Trunc	2335.00	593.72	
604.99		605.01	0.00032	1.79	2297.95	379.58
0.10						
Reach-1	21270	100-Yr	Corr Eff FW Trnc	2335.00	593.42	
605.01		605.03	0.00029	2.04	2409.73	379.89
0.11						
Reach-1	21270	100-Yr	Dup Eff FW	2335.00	598.00	
605.62		605.71	0.00222	4.00	1250.21	343.42
0.28						
Reach-1	21270	FW	Prop FW Trunc	2335.00	593.72	
605.48		605.51	0.00038	2.03	1792.35	222.90
0.11						
Reach-1	21270	FW	Corr Eff FW Trnc	2335.00	593.42	
606.02		606.05	0.00030	2.20	1860.28	198.00
0.11						
Reach-1	21270	FW	Dup Eff FW	2335.00	598.00	
606.02		606.23	0.00337	5.13	796.59	150.00
0.34						
Reach-1	21250	100-Yr	Prop FW Trunc	2335.00	593.66	
604.99		605.01	0.00029	1.47	2400.70	387.51
0.08						
Reach-1	21250	100-Yr	Corr Eff FW Trnc	2335.00	593.44	
605.00		605.02	0.00025	1.90	2574.23	387.83
0.10						
Reach-1	21250	100-Yr	Dup Eff FW	2335.00	598.00	

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605.60		605.68	0.00085	2.57	1399.52	343.05
0.17						
Reach-1	21250	FW	Prop FW Trunc		2335.00	593.66
605.48		605.50	0.00035	1.67	1941.88	237.30
0.09						
Reach-1	21250	FW	Corr Eff FW Trnc		2335.00	593.44
605.76		606.02	0.00165	5.09	737.36	80.00
0.26						
Reach-1	21250	FW	Dup Eff FW		2335.00	598.00
606.05		606.15	0.00096	2.84	1006.71	160.00
0.19						
Reach-1	21085	100-Yr	Prop FW Trunc		2335.00	593.43
604.96		604.97	0.00021	1.41	2762.35	425.92
0.08						
Reach-1	21085	100-Yr	Corr Eff FW Trnc		2335.00	592.75
604.96		604.98	0.00028	2.02	2661.18	425.88
0.11						
Reach-1	21085	100-Yr	Dup Eff FW		2335.00	598.00
605.49		605.56	0.00088	2.58	1431.75	378.16
0.18						
Reach-1	21085	FW	Prop FW Trunc		2335.00	593.43
605.44		605.46	0.00025	1.60	2223.04	261.70
0.08						
Reach-1	21085	FW	Corr Eff FW Trnc		2335.00	592.75
605.75		605.80	0.00054	2.93	1751.22	259.98
0.15						
Reach-1	21085	FW	Dup Eff FW		2335.00	598.00
605.94		606.02	0.00085	2.65	1133.10	190.00
0.18						
Reach-1	21075	100-Yr	Prop FW Trunc		2335.00	592.41
604.96		604.97	0.00022	1.49	2787.56	432.47
0.08						
Reach-1	21075	100-Yr	Corr Eff FW Trnc		2335.00	592.89
604.96		604.97	0.00026	1.50	2713.46	433.67
0.08						
Reach-1	21075	100-Yr	Dup Eff FW		2335.00	598.40
605.49		605.54	0.00166	3.12	1523.35	459.61
0.22						
Reach-1	21075	FW	Prop FW Trunc		2335.00	592.41
605.44		605.46	0.00027	1.69	2191.36	258.60
0.09						

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Reach-1	21075	FW	Corr Eff FW Trnc	2335.00	592.89
605.76		605.79	0.00054	1794.15	265.00
0.12			2.26		
Reach-1	21075	FW	Dup Eff FW	2335.00	598.40
605.90		606.01	0.00218	1047.69	225.00
0.25			3.74		
Reach-1	21030	100-Yr	Prop FW Trunc	2335.00	593.34
604.95		604.96	0.00014	3283.85	471.68
0.06			1.06		
Reach-1	21030	100-Yr	Corr Eff FW Trnc	2335.00	592.53
604.95		604.96	0.00017	3070.63	471.96
0.08			1.56		
Reach-1	21030	100-Yr	Dup Eff FW	2335.00	594.70
605.44		605.47	0.00048	2111.40	458.33
0.13			2.25		
Reach-1	21030	FW	Prop FW Trunc	2335.00	593.34
605.43		605.44	0.00017	2591.71	280.10
0.06			1.19		
Reach-1	21030	FW	Corr Eff FW Trnc	2335.00	592.53
605.68		605.76	0.00060	1472.53	225.27
0.16			3.07		
Reach-1	21030	FW	Dup Eff FW	2335.00	594.70
605.87		605.91	0.00048	1681.77	235.00
0.13			2.31		
Reach-1	20970	100-Yr	Prop FW Trunc	2910.00	593.21
604.93		604.95	0.00018	3975.71	618.37
0.08			1.60		
Reach-1	20970	100-Yr	Corr Eff FW Trnc	2910.00	592.32
604.93		604.94	0.00028	3853.62	618.19
0.01			0.29		
Reach-1	20970	100-Yr	Dup Eff FW	2910.00	594.00
605.39		605.44	0.00076	2248.52	507.38
0.17			3.03		
Reach-1	20970	FW	Prop FW Trunc	2910.00	593.21
605.41		605.43	0.00021	2937.52	319.50
0.09			1.80		
Reach-1	20970	FW	Corr Eff FW Trnc	2910.00	592.32
605.63		605.67	0.00092	1979.30	275.00
0.03			0.54		
Reach-1	20970	FW	Dup Eff FW	2910.00	594.00
605.81		605.88	0.00077	1758.53	260.00
			3.13		

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0.17

Reach-1 604.48 0.24	20230	100-Yr 604.64	Prop FW Trunc 0.00156 4.47	3045.00 1393.96	592.20 273.99
Reach-1 604.48 0.24	20230	100-Yr 604.64	Corr Eff FW Trnc 0.00156 4.47	3045.00 1393.96	592.20 273.99
Reach-1 604.51 0.24	20230	100-Yr 604.67	Dup Eff FW 0.00158 4.45	3045.00 1397.66	592.80 274.78
Reach-1 604.90 0.24	20230	FW 605.08	Prop FW Trunc 0.00153 4.54	3045.00 1210.16	592.20 170.00
Reach-1 604.90 0.24	20230	FW 605.08	Corr Eff FW Trnc 0.00153 4.54	3045.00 1210.16	592.20 170.00
Reach-1 604.93 0.24	20230	FW 605.11	Dup Eff FW 0.00156 4.54	3045.00 1208.50	592.80 170.00
Reach-1 602.84 0.29	19430	100-Yr 603.11	Prop FW Trunc 0.00234 5.42	3045.00 1116.09	591.10 250.71
Reach-1 602.84 0.29	19430	100-Yr 603.11	Corr Eff FW Trnc 0.00234 5.42	3045.00 1116.09	591.10 250.71
Reach-1 602.87 0.29	19430	100-Yr 603.14	Dup Eff FW 0.00230 5.39	3045.00 1123.34	591.10 251.46
Reach-1 603.58 0.25	19430	FW 603.79	Prop FW Trunc 0.00169 4.82	3045.00 1142.53	591.10 180.00
Reach-1 603.58 0.25	19430	FW 603.79	Corr Eff FW Trnc 0.00169 4.82	3045.00 1142.53	591.10 180.00
Reach-1 603.60 0.25	19430	FW 603.81	Dup Eff FW 0.00167 4.80	3045.00 1145.75	591.10 180.00
Reach-1	17790	100-Yr	Prop FW Trunc	3045.00	589.50

TravisCreek-FEMA Floodway Report.txt

600.75		600.83	0.00089	3.30	1652.52	233.87
0.18						
Reach-1	17790	100-Yr	Corr Eff FW Trnc		3045.00	589.50
600.75		600.83	0.00089	3.30	1652.52	233.87
0.18						
Reach-1	17790	100-Yr	Dup Eff FW		3045.00	589.50
600.80		600.87	0.00087	3.28	1663.15	234.19
0.17						
Reach-1	17790	FW	Prop FW Trunc		3045.00	589.50
601.42		601.54	0.00111	3.85	1315.80	150.00
0.20						
Reach-1	17790	FW	Corr Eff FW Trnc		3045.00	589.50
601.42		601.54	0.00111	3.85	1315.80	150.00
0.20						
Reach-1	17790	FW	Dup Eff FW		3045.00	589.50
601.45		601.57	0.00110	3.83	1319.91	150.00
0.20						
Reach-1	16030	100-Yr	Prop FW Trunc		3045.00	585.50
596.35	594.13	597.26	0.00770	9.22	564.32	118.79
0.52						
Reach-1	16030	100-Yr	Corr Eff FW Trnc		3045.00	585.50
596.35	594.13	597.26	0.00770	9.22	564.32	118.79
0.52						
Reach-1	16030	100-Yr	Dup Eff FW		3045.00	585.50
596.35		597.26	0.00770	9.23	564.27	118.78
0.52						
Reach-1	16030	FW	Prop FW Trunc		3045.00	585.50
597.09	594.13	597.77	0.00546	8.16	656.02	128.65
0.44						
Reach-1	16030	FW	Corr Eff FW Trnc		3045.00	585.50
597.09	594.13	597.77	0.00546	8.16	656.02	128.65
0.44						
Reach-1	16030	FW	Dup Eff FW		3045.00	585.50
597.09		597.77	0.00546	8.16	655.95	128.64
0.44						
Reach-1	15580	100-Yr	Dup Eff FW		3045.00	584.20
595.78		595.89	0.00111	3.77	1462.11	255.09
0.20						
Reach-1	15580	FW	Dup Eff FW		3045.00	584.20
596.75		596.84	0.00072	3.22	1592.74	210.00
0.17						

TravisCreek-FEMA Floodway Report.txt

Reach-1	14880	100-Yr	Dup	Eff	FW	3045.00	582.20
595.57		595.59	0.00022		1.86	3307.57	504.69
0.09							
Reach-1	14880	FW	Dup	Eff	FW	3045.00	582.20
596.56		596.59	0.00022		1.95	2650.62	270.00
0.09							
Reach-1	14435	100-Yr	Dup	Eff	FW	3565.00	581.50
595.32		595.41	0.00072		3.44	2249.33	377.00
0.17							
Reach-1	14435	FW	Dup	Eff	FW	3565.00	581.50
596.06		596.33	0.00141		5.01	1106.18	100.00
0.24							
Reach-1	14385	100-Yr	Dup	Eff	FW	3565.00	581.30
595.30	587.47	595.38	0.00047		2.75	2326.17	376.68
0.14							
Reach-1	14385	FW	Dup	Eff	FW	3565.00	581.30
595.98	587.48	596.26	0.00141		4.21	847.49	65.00
0.21							
Reach-1	14365	100-Yr	Dup	Eff	FW	3565.00	581.30
594.75	587.39	595.10	0.00155		4.74	752.70	267.18
0.25							
Reach-1	14365	FW	Dup	Eff	FW	3565.00	581.30
595.69	587.39	595.99	0.00155		4.38	813.67	65.00
0.22							
Reach-1	14320	100-Yr	Dup	Eff	FW	3565.00	581.20
594.81		594.95	0.00149		4.50	1660.13	268.76
0.22							
Reach-1	14320	FW	Dup	Eff	FW	3565.00	581.20
595.43		595.87	0.00314		6.73	866.96	95.00
0.33							

TravisCreek-FEMA Floodway Report.txt

Reach-1	13900	100-Yr	Dup	Eff	FW	3625.00	580.50
594.15		594.30	0.00157		4.65	1621.34	264.78
0.23							
Reach-1	13900	FW	Dup	Eff	FW	3625.00	580.50
594.61		594.81	0.00175		5.02	1267.64	140.00
0.25							
Reach-1	12770	100-Yr	Dup	Eff	FW	3625.00	578.50
592.97		593.05	0.00079		3.45	1886.68	226.61
0.17							
Reach-1	12770	FW	Dup	Eff	FW	3625.00	578.50
593.36		593.46	0.00082		3.58	1699.24	165.00
0.17							
Reach-1	11140	100-Yr	Dup	Eff	FW	3625.00	576.70
591.31		591.45	0.00121		4.37	1513.01	191.75
0.21							
Reach-1	11140	FW	Dup	Eff	FW	3625.00	576.70
591.89		592.01	0.00095		3.98	1573.83	165.00
0.18							
Reach-1	10400	100-Yr	Dup	Eff	FW	4620.00	575.40
590.60		590.72	0.00084		3.92	2301.28	323.62
0.18							
Reach-1	10400	FW	Dup	Eff	FW	4620.00	575.40
591.23		591.37	0.00081		3.96	1922.93	180.00
0.18							
Reach-1	9910	100-Yr	Dup	Eff	FW	4760.00	574.50
590.29		590.37	0.00057		3.32	2715.89	320.18
0.15							
Reach-1	9910	FW	Dup	Eff	FW	4760.00	574.50
590.92		591.01	0.00060		3.48	2303.06	200.00
0.15							
Reach-1	8610	100-Yr	Dup	Eff	FW	4760.00	571.60

TravisCreek-FEMA Floodway Report.txt

589.79 0.11		589.83	0.00030	2.54	3775.23	436.18
Reach-1	8610	FW	Dup Eff FW		4760.00	571.60
590.43 0.11		590.48	0.00028	2.54	3306.05	260.00
Reach-1	8569	100-Yr	Dup Eff FW		4760.00	571.60
589.77 0.11	579.80	589.82	0.00030	2.44	3876.79	435.73
Reach-1	8569	FW	Dup Eff FW		4760.00	571.60
590.41 0.11	579.80	590.46	0.00030	2.53	3273.43	250.00
Reach-1	8550	100-Yr	Dup Eff FW		4760.00	571.60
589.32 0.15	579.80	589.42	0.00058	3.36	2680.09	336.34
Reach-1	8550	FW	Dup Eff FW		4760.00	571.60
590.12 0.13	579.79	590.21	0.00047	3.12	2684.45	240.00
Reach-1	8500	100-Yr	Dup Eff FW		4760.00	571.50
589.26 0.18		589.38	0.00086	4.24	2553.31	335.13
Reach-1	8500	FW	Dup Eff FW		4760.00	571.50
590.08 0.16		590.18	0.00067	3.87	2541.51	240.00
Reach-1	8310	100-Yr	Dup Eff FW		4760.00	571.50
589.00 0.21		589.18	0.00112	4.80	1854.35	187.91
Reach-1	8310	FW	Dup Eff FW		4760.00	571.50
589.88 0.19		590.03	0.00088	4.39	1946.91	160.00
Reach-1	7610	100-Yr	Dup Eff FW		4760.00	572.20
588.12 0.22		588.33	0.00131	4.87	1651.72	202.55

TravisCreek-FEMA Floodway Report.txt

Reach-1	7610	FW	Dup	Eff	FW	4760.00	572.20
589.23		589.39	0.00093		4.29	1750.28	160.00
0.19							
Reach-1	6150	100-Yr	Dup	Eff	FW	4760.00	570.10
586.74		586.85	0.00077		4.04	2565.53	356.69
0.18							
Reach-1	6150	FW	Dup	Eff	FW	4760.00	570.10
587.90		588.08	0.00087		4.51	1793.83	140.00
0.19							
Reach-1	5930	100-Yr	Dup	Eff	FW	4760.00	569.30
586.56		586.68	0.00077		4.14	2526.00	351.78
0.18							
Reach-1	5930	FW	Dup	Eff	FW	4760.00	569.30
587.55		587.83	0.00122		5.43	1446.71	110.00
0.23							
Reach-1	5867	100-Yr	Dup	Eff	FW	5065.00	569.00
586.51	577.71	586.62	0.00073		3.62	2583.51	350.40
0.16							
Reach-1	5867	FW	Dup	Eff	FW	5065.00	569.00
586.86	577.71	587.63	0.00267		7.02	741.23	45.00
0.30							
Reach-1	5810	100-Yr	Dup	Eff	FW	5065.00	569.00
583.35	577.71	584.59	0.00621		8.92	567.71	309.17
0.43							
Reach-1	5810	FW	Dup	Eff	FW	5065.00	569.00
584.34	577.71	585.41	0.00488		8.30	610.32	45.00
0.39							
Reach-1	5770	100-Yr	Dup	Eff	FW	5065.00	569.00
583.95		584.08	0.00070		3.46	2308.31	326.69
0.17							
Reach-1	5770	FW	Dup	Eff	FW	5065.00	569.00
584.67		585.02	0.00154		4.75	1066.77	75.00

TravisCreek-FEMA Floodway Report.txt

0.22

Reach-1	5110	100-Yr	Dup	Eff	FW	5150.00	567.70
583.38		583.52	0.00104		4.29	2527.68	359.59
0.20							
Reach-1	5110	FW	Dup	Eff	FW	5150.00	567.70
583.68		583.96	0.00160		5.40	1594.01	150.00
0.25							
Reach-1	4540	100-Yr	Dup	Eff	FW	5150.00	566.60
582.42		582.72	0.00181		5.71	1715.72	236.92
0.26							
Reach-1	4540	FW	Dup	Eff	FW	5150.00	566.60
582.65		582.97	0.00182		5.79	1547.18	170.00
0.26							
Reach-1	2825	100-Yr	Dup	Eff	FW	5150.00	562.90
579.58		579.86	0.00153		5.46	1816.99	244.68
0.24							
Reach-1	2825	FW	Dup	Eff	FW	5150.00	562.90
579.93		580.20	0.00142		5.33	1714.98	180.00
0.23							
Reach-1	1650	100-Yr	Dup	Eff	FW	5150.00	560.10
577.91		578.15	0.00136		5.22	2412.12	433.98
0.22							
Reach-1	1650	FW	Dup	Eff	FW	5150.00	560.10
578.07		578.40	0.00164		5.78	1652.83	170.00
0.25							
Reach-1	1020	100-Yr	Dup	Eff	FW	5150.00	558.10
577.03		577.31	0.00126		5.29	1789.50	239.83
0.22							
Reach-1	1020	FW	Dup	Eff	FW	5150.00	558.10
577.18		577.48	0.00127		5.36	1466.03	120.00
0.22							

TravisCreek-FEMA Floodway Report.txt

Reach-1	961	100-Yr	Dup	Eff	FW	5150.00	558.00
577.03	567.64	577.22	0.00076		3.54	1455.92	240.79
0.18							
Reach-1	961	FW	Dup	Eff	FW	5150.00	558.00
577.19	567.65	577.38	0.00083		3.49	1474.97	120.00
0.18							
Reach-1	935	100-Yr	Dup	Eff	FW	5150.00	558.00
576.72	567.81	576.85	0.00058		3.08	2094.88	265.06
0.16							
Reach-1	935	FW	Dup	Eff	FW	5150.00	558.00
576.87	567.83	577.06	0.00086		3.50	1470.54	120.00
0.18							
Reach-1	850	100-Yr	Dup	Eff	FW	5150.00	557.10
576.59		576.78	0.00089		4.55	2100.37	263.06
0.19							
Reach-1	850	FW	Dup	Eff	FW	5150.00	557.10
576.78		576.99	0.00090		4.61	1877.06	180.00
0.19							
Reach-1	120	100-Yr	Dup	Eff	FW	5150.00	555.90
576.32		576.37	0.00030		2.83	4368.34	695.73
0.11							
Reach-1	120	FW	Dup	Eff	FW	5150.00	555.90
576.24		576.41	0.00066		4.22	2111.08	200.00
0.17							
Reach-1	50	100-Yr	Dup	Eff	FW	13250.00	554.00
575.70	563.29	576.13	0.00109		5.45	3193.67	352.60
0.22							
Reach-1	50	FW	Dup	Eff	FW	13250.00	554.00
575.70	563.30	576.13	0.00109		5.45	3193.67	352.60
0.22							

TravisCreek-FEMA Multiple Flow Report.txt

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

X	X	XXXXXX	XXXX	XXXX	XX	XXXX
X	X	X	X X	X X	X X	X
X	X	X	X	X X	X X	X
XXXXXXXX	XXXX	X	XXX	XXXX	XXXXXX	XXXX
X	X	X	X	X X	X X	X
X	X	X	X X	X X	X X	X
X	X	XXXXXX	XXXX	X X	X X	XXXXX

PROJECT DATA

Project Title: Travis Creek Aycock Springs Restoration
Project File : TravisCreekAycock.prj
Run Date and Time: 2/24/2015 11:39:44 AM

Project in English units

Project Description:

Alamance County, Travis Creek, Aycock Springs Stream and Wetland Restoration

####(Haw Reedy)####

TRAVIS CREEK

HCFCU Unit X###-##-##

(Flood

Hazard, Floodway) Model

10, 2, 1, 0.2% Event

Filename:

n:\NC_flood\60273\Approximates\Eng\Haw-Reedy\Eng\Travis Creek\Travis Creek.prj

Prepared by: L Arnold Date: March 15, 2004

Reviewed by:

_____ Date: _____

STATUS (Draft RAS, SVSQ, FINAL)

FPMS BR

FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW

10 YR NATURAL

TravisCreek-FEMA Multiple Flow Report.txt

TRAVIS
CR
FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW
10 YR
NATURAL
TRAVIS CR
FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC
BLW
100 YR NATURAL
TRAVIS CR
FPMS BR FIA STUDY TRAVIS CR
ALAMANCE CO, NC BLW
100 YR NATURAL
TRAVIS CR
FPMS BR FIA
STUDY TRAVIS CR ALAMANCE CO, NC BLW
100 YR NATURAL
TRAVIS CR

PLAN DATA

Plan Title: Proposed - Multiple Truncated
Plan File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project
Models\HEC-RAS\TravisCreekAycock.p09

Geometry Title: Proposed Truncated
Geometry File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design
Files\Project Models\HEC-RAS\TravisCreekAycock.g04

Flow Title : Imported Flow 01 Truncated
Flow File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design
Files\Project Models\HEC-RAS\TravisCreekAycock.f04

Plan Summary Information:

Number of: Cross Sections =	24	Multiple Openings =	0
Culverts =	1	Inline Structures =	0
Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3

TravisCreek-FEMA Multiple Flow Report.txt

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data

Equal Conveyance = True
Left Offset = 0
Right Offset = 0

River = RIVER-1	Reach = Reach-1			
RS	Profile	Method	Value1	Value2
14435	50-Yr		0	
14385	50-Yr		0	
14365	50-Yr		0	
14320	50-Yr		0	
5930	50-Yr		0	
5770	50-Yr		0	
961	50-Yr		0	
935	50-Yr		0	
850	50-Yr		0	

River = RIVER-1	Reach = Reach-1			
RS	Profile	Method	Value1	Value2
14435	100-Yr	1	1627	1772
14385	100-Yr	1	1660	1725
14365	100-Yr	1	1660	1725
14320	100-Yr	1	1641	1736
5930	100-Yr	1	1990	2155
5770	100-Yr	1	2035	2110
961	100-Yr	1	1878	1998
935	100-Yr	1	1878	1998
850	100-Yr	1	1372	1552

FLOW DATA

Flow Title: Imported Flow 01 Truncated
Flow File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project Models\HEC-RAS\TravisCreekAycock.f04

Flow Data (cfs)

TravisCreek-FEMA Multiple Flow Report.txt

River 100-Yr	Reach 500-Yr	RS	10-Yr	50-Yr
RIVER-1 1500	Reach-1 2520	27950	625	1180
RIVER-1 1570	Reach-1 2635	26070	655	1235
RIVER-1 2145	Reach-1 3570	25340	905	1690
RIVER-1 2240	Reach-1 3735	23335	950	1770
RIVER-1 2335	Reach-1 3880	22970	990	1840
RIVER-1 2910	Reach-1 4810	20970	1240	2300
RIVER-1 3045	Reach-1 5030	20230	1300	2410

Boundary Conditions

River Downstream	Reach	Profile	Upstream
RIVER-1 Known WS = 593.23	Reach-1	10-Yr	
RIVER-1 Known WS = 595.15	Reach-1	50-Yr	
RIVER-1 Known WS = 596.61	Reach-1	100-Yr	
RIVER-1 Known WS = 598.89	Reach-1	500-Yr	

GEOMETRY DATA

Geometry Title: Proposed Truncated
 Geometry File : l:\ProjectList\1221 - Axiom\14038 - Aycock\Design Files\Project
 Models\HEC-RAS\TravisCreekAycock.g04

TravisCreek-FEMA Multiple Flow Report.txt

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 27950

INPUT
 Description: ** ATC-26 **

Station Elevation Data				num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
1000	638.8	1100	631.9	1200	630.3	1271	629.7	1300	625.4	
1335	616.9	1349	615	1353	613.4	1358	613.3	1364	613.7	
1371	614.4	1400	618.8	1500	635.4	1539	643.3			

Manning's n Values				num=	3	
Sta	n Val	Sta	n Val	Sta	n Val	
1000	.09	1353	.06	1371	.1	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1353	1371		180	180		.2	.4

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 27770

INPUT
 Description: ** TOPO, WITH NEF; CHAN FM SEC 26 **

Station Elevation Data				num=	15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
900	635	1000	630	1200	625	1270	620	1330	615	
1349	614.6	1353	613	1358	612.9	1364	613.3	1371	614	
1430	615	1460	620	1535	625	1605	630	1635	635	

Manning's n Values				num=	3	
Sta	n Val	Sta	n Val	Sta	n Val	
900	.09	1353	.06	1371	.1	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1353	1371		930	930		.2	.4

CROSS SECTION

TravisCreek-FEMA Multiple Flow Report.txt

RIVER: RIVER-1

REACH: Reach-1

RS: 26840

INPUT

Description: ** TOPO, WITH HIGHER ELEVS TAKEN FM SEC 25 ROB; CHAN FM SEC 25**

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	640.6	1100	637.7	1200	632	1285	625	1400	620
1490	615	1642	613.1	1645	609.8	1650	610.2	1654	610.1
1658	612.2	1750	614	1760	615	1795	620	1835	625
1910	630	2070	635						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
950	.09	1642	.06	1658	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1642	1658		600	770		.2	.4

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 26070

INPUT

Description: ** SEC 25 , NEF AT HIGHER ELEV ROB **

Station Elevation Data		num=		21					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	640.6	1100	637.7	1120	636.3	1200	632.5	1300	625.9
1400	620.8	1500	618.3	1520	616.9	1600	612.3	1642	611
1645	607.7	1650	608.1	1654	608	1658	610.1	1700	610.7
1800	612	1900	613.8	1990	625	2055	630	2150	635
2215	640								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1642	.06	1658	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1642	1658		730	730		.2	.4

CROSS SECTION

TravisCreek-FEMA Multiple Flow Report.txt

RIVER: RIVER-1
 REACH: Reach-1 RS: 25340

INPUT
 Description: ** SEC 24 WITH NEF **

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	640.9	1100	637	1200	631	1300	625.5	1440	620
1540	615	1730	610.9	1764	610.1	1767	606.7	1772	607
1778	607.3	1785	609.9	1800	609.7	1900	609.7	2000	609.9
2050	615	2115	625	2200	634.5	2300	644.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.11	1764	.06	1785	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1764	1785		2005	2005		.2	.4

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23335

INPUT
 Description: This is a REPEATED section.
 ** PREVIOUS SEC TRANSFERRED
 **

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.7	1100	631.8	1200	627.9	1300	624.1	1400	623.5
1500	620.5	1600	614.2	1648	606.9	1682	606.7	1687	606
1694	604.5	1704	605.6	1707	606.7	1755	607	1800	612.7
1900	621.8	2000	626.9	2100	625.7	2200	629.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.11	1682	.06	1707	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1682	1707		90	90		.2	.4

CROSS SECTION

TravisCreek-FEMA Multiple Flow Report.txt

RIVER: RIVER-1
 REACH: Reach-1 RS: 23245

INPUT
 Description: ** SEC 23; OVBK FM 21 **

Station Elevation Data		num=		19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.6	1100	631.7	1200	627.8	1300	624	1400	623.4
1500	620.4	1600	614.1	1648	606.8	1682	606.6	1687	605.9
1694	604.4	1704	605.5	1707	606.6	1755	606.9	1800	612.6
1900	621.7	2000	626.8	2100	625.6	2200	629.4		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.11	1682	.06	1707	.11

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1682	1707		44	44		.3	.5

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23201

INPUT
 Description: ** SR 1500; OVBKS FM SEC 23 **

Station Elevation Data		num=		20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.6	1100	631.7	1200	627.8	1300	624	1400	623.4
1500	620.4	1575	615.9	1600	614.1	1648	606.8	1679	606.5
1679	604.6	1707	604.6	1707	606.5	1755	606.9	1800	612.6
1857	617.8	1900	621.7	2000	626.8	2100	625.6	2200	629.4

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1679	.06	1707	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1679	1707		41	41		.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
1000	1679	615.2	F		

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1707 2200 615.5 F

CULVERT

RIVER: RIVER-1
 REACH: Reach-1 RS: 23180.5

INPUT
 Description: Bridge #5

Distance from Upstream XS = 9.5
 Deck/Roadway Width = 22
 Weir Coefficient = 3

Upstream Deck/Roadway Coordinates

num= 18

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1000	636.6	0	1100	631.7	0	1200	627.8	0						
1300	624	0	1400	623.4	0	1500	620.4	0						
1575	615.9	0	1600	615.5	0	1679	615.2	0						
1679	615.2	0	1707	615.5	0	1707	615.5	0						
1800	616.6	0	1857	617.8	0	1900	621.7	0						
2000	626.8	0	2100	625.6	0	2200	629.4	0						

Upstream Bridge Cross Section Data

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	636.6	1100	631.7	1200	627.8	1300	624	1400	623.4
1500	620.4	1575	615.9	1600	614.1	1648	606.8	1679	606.5
1679	604.6	1707	604.6	1707	606.5	1755	606.9	1800	612.6
1857	617.8	1900	621.7	2000	626.8	2100	625.6	2200	629.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1679	.06	1707	.1

Bank Sta: Left Right Coeff Contr. Expan.
 1679 1707 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	1679	615.2	F
1707	2200	615.5	F

Downstream Deck/Roadway Coordinates

num= 18

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1000	636.6	0	1100	631.7	0	1200	627.8	0						

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1300	624	0	1400	623.4	0	1500	620.4	0
1575	615.9	0	1600	615.5	0	1679	615.2	0
1679	615.2	0	1707	615.5	0	1707	615.5	0
1800	616.6	0	1857	617.8	0	1900	621.7	0
2000	626.8	0	2100	625.6	0	2200	629.4	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1155	632.7	1340	622	1470	617.5	1560	612.5	1630	606.9
1679	606.5	1679	604.6	1707	604.6	1707	606.5	1755	606.9
1800	612.6	1870	618	1950	621	2050	624.8	2230	629.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1155	.1	1679	.06	1707	.1

Bank Sta: Left Right Coeff Contr. Expan.

1679	1707	.3	.5
------	------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1155	1679	612.6	F
1707	2230	612.6	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins = 615.2
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span	Exit Loss Coef
Culvert #1	Box	8	13.5	.4
FHWA Chart # 8 - flared wingwalls				
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.				
Solution Criteria = Highest U.S. EG				
Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked
1	.5	40	.012	.06

Number of Barrels = 2
 Upstream Elevation = 603.6
 Centerline Stations
 Sta. Sta.

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1685.75 1700.25
 Downstream Elevation = 603.6
 Centerline Stations
 Sta. Sta.
 1685.75 1700.25

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23160

INPUT

Description: ** SR 1500; SEC ATC-22, MOD BY SEC 23 **

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1155	632.7	1340	622	1470	617.5	1560	612.5	1630	606.9
1679	606.5	1679	604.7	1707	604.7	1707	606.5	1755	606.9
1800	612.6	1870	618	1950	621	2050	624.8	2230	629.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1155	.1	1679	.06	1707	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1679 1707 50 50 50 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1155	1679	612.6	F
1707	2230	612.6	F

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 23110

INPUT

Description:

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	611.99	5.06	611.84	10.71	611.59	25.76	610.76	26.74	610.72
42.25	610.03	54.3	610.01	61.77	609.64	70.72	609.44	77.78	609.3
95.42	608.52	95.79	608.51	96.96	608.46	125.23	607.2	135.51	606.65
143.96	606.02	168.66	604.89	172.94	604.62	174.94	604.59	193.45	604.35
212.61	604.04	217.55	603.91	224.26	603.67	236.01	603.52	242.91	603.13

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260.2	602.63	263.92	602.48	267.35	602.41	272.38	602.25	280.76	602.07
297.1	601.64	300.64	601.44	310.66	601.38	312.88	601.48	318.29	596.84
318.6	596.54	320.75	596.25	327.73	596.54	333.65	596.04	336.57	597.91
341.72	601.5	343.69	601.7	344.73	601.8	351.06	601.78	361.4	602.01
364.95	601.89	372.51	601.97	380.5	601.99	390.2	601.79	413.78	601.51
418.03	601.49	421.07	601.38	447.29	600.89	465.72	600.84	506.22	604.62
551.98	608.61	667.8	612.1						

Manning's n Values

num=	3				
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	312.88	.06	343.69	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	312.88	343.69		346	357		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 22970

INPUT

Description: ** TOPO MOD BY SEC 23; CHAN FM ATC-21 **

Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	618.21	1.38	618.37	5.38	618.36	28.72	616.63	33.08	616.53
48.05	611.55	55.58	609.3	72.5	608.94	75.6	608.9	86.45	608.65
97.81	607.96	100.47	607.92	105.6	607.63	117.07	607.4	123.3	607.28
134.04	607.78	140.43	607.83	150.93	607.86	159.27	608.5	164.65	608.45
170.58	608.25	174.42	607.64	174.93	607.84	176.95	607.65	186.62	606.76
189.88	606.46	190.87	606.37	195.39	605.96	196.06	605.9	196.74	605.83
198.43	605.68	200.27	605.51	202.13	605.34	202.94	605.26	203.34	605.23
204.63	605.11	205.03	605.07	205.39	605.04	205.75	605	206.21	604.96
206.85	604.9	207.49	604.84	207.79	604.82	208.94	604.71	226.95	602.37
239.72	602.39	241.42	602.45	259.45	601.95	272.84	601.31	288.73	600.96
291.07	600.95	295.35	600.99	341.38	601.03	342.23	601.03	344.16	601.04
356.89	600.86	366.63	600.38	381.8	600.17	387.34	600.08	388.69	600.05
393.15	599.98	403.64	599.86	406.29	599.95	414.82	600.07	423.45	600.1
428.11	600.16	435.15	600.36	451.33	600.86	453.93	598.23	455.71	595.66
456.83	595.51	463.63	595.85	471.55	598.54	474.51	600.55	477.63	600.14
478.89	600	481.76	598.65	487.58	596.49	488.01	596.79	491.23	598.75
492.75	599.69	498.39	600.36	516.48	603.01	525.04	604.73	528.41	605.22
535.52	606.24	575.28	612.41	590.22	614.52	591.36	614.65	612.63	611.87
617.79	612.06	623.18	610.85	625.24	610.85	626.56	611	627.12	611.07
627.57	611.12	627.87	611.15	629.1	611.29	629.57	611.34	630.4	613.5
644.5	619.04	651.64	619.26	653.15	619.27				

TravisCreek-FEMA Multiple Flow Report.txt

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .1 451.33 .06 474.51 .1 478.89 .06 492.75 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 451.33 474.51 216 209 206 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 22440

INPUT

Description: ** TOPO,ADJ. BASED ON 23;NR OVBK & CHAN FM 21; NEF LOB **

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	615.64	14.33	614.61	16.67	614.48	34.63	613.47	35.39	613.42
44.32	612.39	50.38	611.6	55.75	610.89	67.35	609.8	71.15	609.56
74.24	609.23	86.48	608.06	92.36	606.97	93.37	606.62	94.88	606.5
96.41	606.34	122.67	604.03	132.79	603.17	135.2	602.94	139.7	602.7
146.05	602.35	151.03	601.97	157.38	601.42	161.88	600.94	172.57	600.41
179.61	600.14	183.24	599.98	187.68	599.82	194.07	599.41	198.47	599.18
200.6	599.18	209.72	599.15	211.99	599.12	216.37	599.13	219.94	597.94
234.95	597.94	240.35	595.24	248.09	595.24	248.3	595.14	248.89	595.14
249.1	595.24	256.84	595.24	262.24	597.94	277.24	597.94	282.29	599.62
292.66	599.57	303.37	600.21	307.07	600.46	310.04	601.09	352.45	609.29
365.19	611.35	373.65	611.61	376.61	611.23	400.46	612.12	402.02	611.76
409.74	611.77	410.19	611.82	411.07	611.92	411.55	611.97	412.82	612.12
413.44	612.19	414.84	612.35	415.41	612.41	416.02	612.48	416.59	612.54
416.92	612.58	417.36	612.63	418.61	612.77	419.36	612.86	420.65	613
421.64	613.11	423.12	613.28	423.55	613.33	425.65	613.57	433.63	617.13
437.37	618.62								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .1 234.95 .06 262.24 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 234.95 262.24 309 313 310 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 22110

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INPUT

Description:

Station Elevation Data									
num= 54									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	617.42	.45	617.39	4.83	617.09	5.82	617.02	8.92	616.86
22.95	616.04	26.66	615.7	36.08	615.48	41.6	615.26	46.03	615.09
58.44	614.46	69.29	613.83	80.15	612.37	83.66	612.17	100.12	610.2
105.27	609.63	105.85	609.54	108.15	609.29	122.47	606.47	132.87	603.26
137.92	601.14	142.86	600.9	144.52	600.99	147.09	600.88	152.63	600.65
184.32	599.46	186.76	599.37	197.67	598.96	202.98	598.95	206.14	598.94
209.96	598.92	218.69	598.86	228.29	598.77	271.42	598.8	271.8	598.8
273.08	598.78	299.48	598.23	306.19	595.21	311.52	594.87	313.56	594.72
316.59	595.16	319.3	599.42	341.88	599.38	343.65	599.31	344.31	599.33
357.9	600.95	371.58	602.57	372.46	602.71	387.74	605.36	389.38	605.64
389.87	605.72	391.02	605.84	397.87	606.58	453.58	611.46		

Manning's n Values					
num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	299.48	.06	319.3	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	299.48	319.3		375	381		.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 21750

INPUT

Description: ** SEC 21 **

Station Elevation Data									
num= 63									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	614.74	9.65	614.57	22.14	613.79	30.39	613.62	42.36	612.55
47.36	612.11	53.37	611.43	57.85	610.66	63.11	610.37	71.16	609.72
80.19	609.28	84.56	609.07	87.27	608.89	93.86	608.14	108.07	607.19
110.5	607.06	130.81	605.92	131.12	605.91	131.72	605.86	148.19	604.83
151.76	604.53	159.46	604.05	161.44	603.94	163.15	603.67	164.27	603.49
164.64	603.44	183.05	602.73	194.63	602.24	206.29	602.06	207.65	602.03
210.9	601.86	225.3	600.99	232.61	600.55	238.73	600.2	242.95	599.97
268.28	599.35	272.84	599.2	287.05	598.59	288.55	598.55	292.79	598.42
295.05	598.37	306.7	598.04	317.22	598.16	318.61	598.13	320.06	597.99
327.67	597.52	328.85	597.13	400.22	597.13	409.61	597.13	434.31	593.33
435.31	593.33	442.91	597.13	456.72	597.13	466.56	600.41	467.52	600.46
474.63	600.71	496.91	605.27	509.13	607.76	519.59	609.69	523.39	610.53
534.58	612.48	538.99	613.01	582.79	613.52				

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .1 409.61 .06 442.91 .11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 409.61 442.91 311 302 297 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 21270

INPUT

Description: ** SEC 20-A W/CHAN FM SEC 21 **

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609.96	4.94	609.62	11.3	609.44	24.21	609.12	27.26	608.96
35.3	608.49	38.96	608.29	42.46	608.1	56.41	607.65	71.24	607.47
71.73	607.46	83.61	606.68	86.21	606.44	96.5	605.66	103.58	605.37
116.65	604.6	120.14	604.07	125.37	602.96	125.92	602.83	126.56	602.85
126.93	602.87	127.39	602.88	128.35	602.91	129.11	602.93	129.67	602.95
130.28	602.97	137.89	602.84	140.37	602.71	145.37	602.32	158.43	601.8
180.64	600.95	191.32	600.68	204.9	600.3	212.95	600.02	218.67	599.89
230.72	599.6	231.85	599.58	232.5	599.55	243.03	598.96	252.81	598.58
258.24	598.37	265.97	598.32	272.41	598.32	275.94	598.52	280.37	598.74
283.76	599.09	294.37	600.1	295.35	600.18	296.65	600.13	301.91	600.57
306.79	600.83	313.81	600.5	314.66	600.45	316.14	600.15	318.62	599.32
330.45	596.52	404.5	596.52	409.9	593.82	417.65	593.82	417.85	593.72
418.45	593.72	418.65	593.82	426.41	593.82	431.8	596.52	452.94	596.52
461.25	596.42	464.3	596.58	474.54	599.67	479.71	601.58	489.43	604.96
499.19	606.98	506.2	608.95	517.61	610.17	534.88	612.53	544.63	613.57
554.68	614.41	566.15	615	574.82	615.41	591.3	616.36	595.56	616.64

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .1 404.5 .1 409.9 .06 452.94 .11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 404.5 431.8 21 21 21 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 21250

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INPUT

Description: ** SEC 20-A EXTENDED ON LOB **

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	609.6	3.39	609.5	5.97	609.46	9.33	609.38	17.47	608.91
32.66	608.53	37.46	608.45	46.54	608.45	47.55	608.41	48.68	608.31
56.83	607.67	61.35	607.4	71.11	606.71	77.92	606.25	85.68	605.86
94.31	605.49	103.63	604.95	110.44	604.48	111.34	604.41	112.5	604.2
113.11	604.07	119.18	602.75	119.48	602.76	120.6	602.8	120.94	602.81
121.48	602.82	122.12	602.84	122.85	602.86	123.25	602.88	130.01	602.76
133.31	602.58	139.07	602.14	148.17	601.77	173.47	600.8	178.53	600.67
196.16	600.18	199.4	600.09	200.55	600.06	219.79	599.55	233.68	598.92
242.71	598.41	243.03	598.41	252.22	598.28	261.9	598.05	270.96	598.56
271.53	598.61	273.26	598.66	277.99	599.26	283.98	599.87	284.85	599.95
294.34	600.66	307.08	600.2	307.44	600.23	307.96	600.21	322.97	596.67
323.86	596.46	411.52	596.46	416.92	593.76	424.67	593.76	424.87	593.66
425.47	593.66	425.67	593.76	433.43	593.76	438.82	596.46	466.89	596.46
470.79	597.82	485.35	603.37	489.32	604.63	499.46	607.73	506.8	608.81
516.1	610.64	531.49	612.76	534.88	613.22	539.45	613.71	542.59	613.97
565.1	615.54	577.86	616.51	583.92	616.8	591.06	617.21	592.95	617.31
593.96	617.36	595.56	617.44						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	411.52	.1	424.67	.06	466.89	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

411.52	438.82	127	134	141	.1	.3
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CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 21085

INPUT

Description: ** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **

Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	613.68	6.25	613.61	18.74	613.37	20.13	613.33	20.62	613.31
30.82	612.98	48.02	612.28	49.83	612.21	50.13	612.19	50.69	612.16
67.17	611.13	80	610.65	83.29	610.52	83.95	610.5	97.79	609.95
103.61	609.68	117.22	609.02	120.22	608.87	132.02	608.34	135.25	608.19
148.28	607.56	151.05	607.31	155.65	607.04	170.02	606.5	172.72	606.39
183.73	605.66	190.96	605.22	198.05	604.81	205.51	604.32	208.1	604.01
209.58	603.65	213.93	602.61	214.73	602.64	215.49	602.67	216.32	602.69
216.8	602.71	222.51	602.62	226.82	602.39	230.69	602.07	261.61	600.77

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264.05	600.65	267.13	600.55	285.6	600.02	293.96	599.8	304.48	599.52
323.77	598.63	331.06	598.38	347.88	597.88	350.15	598.01	358.37	598.8
368.07	599.15	373.32	599.54	376.19	599.61	379.13	599.86	381.9	600.06
389.46	599.98	393.16	599.06	400.85	597.27	406.07	596.06	432.91	596.06
441.07	596.09	445.98	596.18	446.83	596.23	486.69	596.23	492.1	593.53
499.85	593.53	500.05	593.43	500.64	593.43	500.85	593.53	508.6	593.53
514	596.23	528.99	596.23	531.08	596.92	531.52	596.95	535.45	597.15
535.82	597.15	539.08	597.18	545.72	597.07	548.83	597.2	552	597.12
560.85	596.83	562.95	596.56	566.17	595.86	568.01	595.54	576.82	595.98
596.87	599.22	610.34	601.81	619.52	604.48	625.3	605.96	627.66	606.51
635.44	608.14	642.8	609.47	654.72	611.37	659.51	612.23	663.06	612.5
670.08	613.39	676.75	614.08	689.46	615.14	692.06	615.34	696.58	615.62
698.18	615.71	706.82	616.21	721.56	617.11				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	432.91	.11	492.1	.06	528.99	.11	562.95	.06
576.82	.11								

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	486.69	514		11	11		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 21075

INPUT

Description: ** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**
 Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	612.85	1.37	612.83	5.17	612.79	8.54	612.73	18.91	612.6
25.44	612.65	32.03	612.81	41.8	612.69	42.1	612.69	42.88	612.64
53.89	611.87	59.71	611.51	66.18	611.08	76.34	610.67	83.83	610.45
90.31	610.19	104.63	609.54	108.05	609.37	113.45	609.09	126.09	608.52
131.61	608.15	139.05	607.71	143.8	607.47	150.6	607.22	162.69	606.74
169.07	606.41	176.4	605.94	185.16	605.49	192.95	605.04	197.49	604.74
209.45	604.04	212.51	603.25	214.64	602.56	215.7	602.59	216.6	602.62
217.11	602.64	222.51	602.57	227.34	602.3	230.51	602.05	255.83	600.98
263.27	600.61	272.7	600.29	283.68	599.98	296.84	599.63	301.81	599.49
310.93	599.07	346.42	597.85	347.72	597.82	353.6	598.38	358.5	598.85
365.96	599.36	366.89	599.45	375.16	600.15	376.04	600.25	379.13	600.23
382.61	600.18	384.39	600.12	389.09	600.07	391.6	599.88	400.58	597.61
401.47	597.39	402.3	597.13	405.52	596.21	486.89	596.21	494.49	592.41
495.49	592.41	520.19	596.21	537.07	596.21	543.46	597.03	543.83	597.06
544.32	597.05	548.02	597.21	553.42	597.45	558.62	597.31	561.5	597.07

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563.59	596.81	568.41	596.2	570.1	595.83	578.11	596.17	584.16	596.49
585.17	596.48	616.5	602.57	618.09	602.92	619.05	603.11	634.7	606.89
646.97	609.22	651.45	610.03	653.42	610.35	662.62	612	669.43	612.53
682.91	614.23	685.19	614.46	689.51	614.82	697.68	615.45	701.36	615.68
712.78	616.36	717.51	616.63	720.38	616.81				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	486.89	.1	494.49	.06	520.19	.1

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	486.89	520.19		66	61	50		.1	.3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 21030

INPUT

Description: ** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **

Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	610.33	9.91	610.2	18	610.11	19.45	610.07	21.74	609.98
30.77	609.62	35.25	609.34	47.18	608.67	53.34	608.29	59.8	607.96
71.86	607.22	73.87	607.06	78.37	606.88	87.81	606.47	92.17	606.33
106.25	605.95	111.57	605.63	123.78	604.75	134.59	603.72	138.57	603.39
140.43	603.04	144.92	602.41	145.69	602.44	146.29	602.46	147.29	602.49
150.82	602.42	156.92	602.08	158.11	601.98	168.7	601.54	181.17	600.92
189.01	600.54	191.63	600.45	206.77	599.95	221.96	599.53	222.87	599.5
227.24	599.34	237.87	598.96	263.4	597.93	267.84	597.58	272.16	596.14
406.09	596.14	425.81	596.14	430.88	593.44	438.63	593.44	438.83	593.34
439.43	593.34	439.63	593.44	447.38	593.44	452.79	596.14	465.58	596.14
468.84	596.56	477.91	596.83	488.03	597.04	489.21	597.08	491.55	597.12
504.53	597.31	506.56	597.21	507.31	597.13	510.37	596.66	512.81	596.27
514.16	596.15	519.41	595.92	521.38	595.99	525.24	595.75	527.83	596.23
532.7	596.95	536	596.97	540.34	596.95	548.31	596.85	551.92	596.87
565.14	599.59	584.32	604.06	589.03	604.82	592.19	604.85	606.22	607.61
623.33	609.89	626.73	609.98	649.47	611.33	675.2	613.91	676.09	613.97
683.12	614.48	685.48	614.65	686.88	614.76	692.25	615.15	696.05	616.78
697.23	618.47	701.51	618.93	709.74	620.1	712.07	620.56		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	406.09	.1	438.63	.06	465.58	.1	519.41	.06
532.7	.1								

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 425.81 452.79 68 61 61 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 20970

INPUT

Description: ** TOPO SEC; CHAN FM ATC-20 **

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	607.8	48.61	604.8	108.51	601.8	192	597.8	213.3	597
268.5	596.01	406.26	596.01	421.1	596.01	426.65	593.31	434.4	593.31
434.61	593.21	435.2	593.21	435.4	593.31	443.15	593.31	448.8	596.01
463.55	596.01	466.59	597.02	473.14	597.24	479.34	597.22	493.47	597.23
499.39	597.34	506.46	597.46	516.25	598.05	526.12	598.41	533.81	598.88
540.38	599.31	552.72	599.71	553.73	599.74	571.96	600.37	573.79	600.43
582.38	600.66	589.83	601.01	594.14	601.35	607.88	600.27	623.49	601.03
633.04	602.51	640.49	602.67	652.53	602.63	653.14	602.65	653.71	602.71
663.9	604.8	683.8	607.8	694.31	613.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	421.1	.06	448.8	.11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 421.1 448.8 682 716 744 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 20230

INPUT

Description: ** TOPO SEC; CHAN FM ATC-20 **

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1210	625	1320	620	1740	615	1890	610	1990	605
2050	600	2067	597.3	2070	593.5	2080	592.2	2092	593.7
2096	597.5	2230	600	2275	605	2330	610	2365	615
2400	620	2440	625						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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1210 .09 2067 .06 2096 .11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 2067 2096 800 800 800 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 19430

INPUT
 Description: ** ATC-20, MOD FOR NEF LOB **

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1245	625	1370	620	1570	615	1895	610	1980	605
2020	600	2053	596	2067	595.6	2070	591.8	2080	591.1
2092	592	2096	595.8	2100	597	2200	600.2	2300	605.7
2400	612.3	2500	618.1	2600	622.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1245	.09	2067	.06	2096	.11

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 2067 2096 1640 1640 1640 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 17790

INPUT
 Description: ** ATC-19 **

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	626.1	1100	622.4	1152	622.3	1200	619.5	1220	618.8
1265	593.8	1275	593.1	1277	589.5	1289	589.8	1299	589.5
1300	592	1317	593.4	1400	593.2	1447	593.1	1500	603.4
1565	609.6	1600	610.2	1700	612.3	1800	614.9	1900	617
1990	620.4								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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1000 .1 1275 .06 1300 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1275 1300 1760 1760 1760 .1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 16030

INPUT
 Description: ** ATC-18 **

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	621.3	1100	617.3	1200	611.9	1300	602.9	1400	594.4
1429	589.8	1442	589.3	1445	585.5	1451	586	1457	585.9
1464	589.1	1500	597.3	1508	597.6	1520	602.3	1550	610.1
1600	611.5	1700	618.5	1750	620.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1442	.06	1464	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1442 1464 16261 16143 16001 .2 .4

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach n6	River Sta.	n1	n2	n3	n4	n5
Reach-1	27950	.09	.06	.1		
Reach-1	27770	.09	.06	.1		
Reach-1	26840	.09	.06	.1		
Reach-1	26070	.1	.06	.11		

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Reach-1	25340	.11	.06	.11		
Reach-1	23335	.11	.06	.11		
Reach-1	23245	.11	.06	.11		
Reach-1	23201	.1	.06	.1		
Reach-1	23180.5	Culvert				
Reach-1	23160	.1	.06	.1		
Reach-1	23110	.1	.06	.1		
Reach-1	22970	.1	.06	.1	.06	.1
Reach-1	22440	.1	.06	.1		
Reach-1	22110	.1	.06	.1		
Reach-1	21750	.1	.06	.11		
Reach-1	21270	.1	.1	.06	.11	
Reach-1	21250	.1	.1	.06	.1	
Reach-1	21085	.1	.11	.06	.11	.06
Reach-1	21075	.1	.1	.06	.1	
Reach-1	21030	.1	.1	.06	.1	.06
Reach-1	20970	.1	.06	.11		
Reach-1	20230	.09	.06	.11		
Reach-1	19430	.09	.06	.11		
Reach-1	17790	.1	.06	.1		
Reach-1	16030	.1	.06	.1		

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SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	27950	180	180	180
Reach-1	27770	930	930	930
Reach-1	26840	600	770	770
Reach-1	26070	730	730	640
Reach-1	25340	2005	2005	2005
Reach-1	23335	90	90	90
Reach-1	23245	44	44	44
Reach-1	23201	41	41	41
Reach-1	23180.5	Culvert		
Reach-1	23160	50	50	50
Reach-1	23110	346	357	324
Reach-1	22970	216	209	206
Reach-1	22440	309	313	310
Reach-1	22110	375	381	390
Reach-1	21750	311	302	297
Reach-1	21270	21	21	21
Reach-1	21250	127	134	141
Reach-1	21085	11	11	11
Reach-1	21075	66	61	50
Reach-1	21030	68	61	61
Reach-1	20970	682	716	744
Reach-1	20230	800	800	800
Reach-1	19430	1640	1640	1640
Reach-1	17790	1760	1760	1760
Reach-1	16030	16261	16143	16001

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	27950	.2	.4
Reach-1	27770	.2	.4
Reach-1	26840	.2	.4
Reach-1	26070	.2	.4
Reach-1	25340	.2	.4
Reach-1	23335	.2	.4

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Reach-1	23245	.3	.5
Reach-1	23201	.3	.5
Reach-1	23180.5	Culvert	
Reach-1	23160	.3	.5
Reach-1	23110	.1	.3
Reach-1	22970	.1	.3
Reach-1	22440	.1	.3
Reach-1	22110	.1	.3
Reach-1	21750	.1	.3
Reach-1	21270	.1	.3
Reach-1	21250	.1	.3
Reach-1	21085	.1	.3
Reach-1	21075	.1	.3
Reach-1	21030	.1	.3
Reach-1	20970	.1	.3
Reach-1	20230	.1	.3
Reach-1	19430	.1	.3
Reach-1	17790	.1	.3
Reach-1	16030	.2	.4

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Plan	Q Total	Min Ch El
W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Flow Area	Top Width
Froude #	Chl				
(ft)	(ft)	(ft)	(ft/ft)	(cfs) (sq ft)	(ft)
Reach-1	27950	10-Yr	Prop Mult Trunc	625.00	613.30
618.00		618.37	0.00743 5.66	166.69	64.20
0.48					
Reach-1	27950	10-Yr	Corr Eff Mult Tr	625.00	613.30
618.00		618.37	0.00743 5.66	166.69	64.20
0.48					
Reach-1	27950	10-Yr	Dup Eff Mult	625.00	613.30
618.00		618.37	0.00743 5.66	166.69	64.20
0.48					
Reach-1	27950	50-Yr	Prop Mult Trunc	1180.00	613.30
619.15		619.77	0.00979 7.60	247.98	76.38
0.57					
Reach-1	27950	50-Yr	Corr Eff Mult Tr	1180.00	613.30

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619.15		619.77	0.00979	7.60	247.98	76.38
0.57						
Reach-1	27950	50-Yr	Dup Eff Mult		1180.00	613.30
619.14		619.76	0.00988	7.62	247.11	76.26
0.57						
Reach-1	27950	100-Yr	Prop Mult Trunc		1500.00	613.30
619.67		620.41	0.01079	8.47	288.64	81.60
0.61						
Reach-1	27950	100-Yr	Corr Eff Mult Tr		1500.00	613.30
619.67		620.41	0.01079	8.47	288.64	81.60
0.61						
Reach-1	27950	100-Yr	Dup Eff Mult		1500.00	613.30
619.67		620.41	0.01078	8.47	288.79	81.62
0.61						
Reach-1	27950	500-Yr	Prop Mult Trunc		2520.00	613.30
621.12		622.14	0.01200	10.32	417.66	96.31
0.67						
Reach-1	27950	500-Yr	Corr Eff Mult Tr		2520.00	613.30
621.12		622.14	0.01200	10.32	417.66	96.31
0.67						
Reach-1	27950	500-Yr	Dup Eff Mult		2520.00	613.30
621.13		622.14	0.01193	10.30	418.59	96.41
0.67						
Reach-1	27770	10-Yr	Prop Mult Trunc		625.00	612.90
617.49		617.57	0.00228	3.08	374.63	144.90
0.26						
Reach-1	27770	10-Yr	Corr Eff Mult Tr		625.00	612.90
617.49		617.57	0.00228	3.08	374.63	144.90
0.26						
Reach-1	27770	10-Yr	Dup Eff Mult		625.00	612.90
617.49		617.57	0.00228	3.08	374.61	144.90
0.26						
Reach-1	27770	50-Yr	Prop Mult Trunc		1180.00	612.90
618.56		618.68	0.00298	4.09	539.13	164.07
0.31						
Reach-1	27770	50-Yr	Corr Eff Mult Tr		1180.00	612.90
618.56		618.68	0.00298	4.09	539.13	164.07
0.31						
Reach-1	27770	50-Yr	Dup Eff Mult		1180.00	612.90
618.53		618.66	0.00304	4.12	535.02	163.61
0.32						
Reach-1	27770	100-Yr	Prop Mult Trunc		1500.00	612.90
619.05		619.19	0.00325	4.54	621.83	172.90
0.33						

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Reach-1	27770	100-Yr	Corr Eff Mult Tr	1500.00	612.90
619.05		619.19	0.00325 4.54	621.83	172.90
0.33					
Reach-1	27770	100-Yr	Dup Eff Mult	1500.00	612.90
619.05		619.20	0.00324 4.54	622.46	172.97
0.33					
Reach-1	27770	500-Yr	Prop Mult Trunc	2520.00	612.90
620.58		620.77	0.00338 5.41	908.74	206.74
0.35					
Reach-1	27770	500-Yr	Corr Eff Mult Tr	2520.00	612.90
620.58		620.77	0.00338 5.41	908.74	206.74
0.35					
Reach-1	27770	500-Yr	Dup Eff Mult	2520.00	612.90
620.59		620.78	0.00335 5.40	911.99	207.20
0.35					
Reach-1	26840	10-Yr	Prop Mult Trunc	625.00	609.80
615.12		615.20	0.00286 3.35	428.28	273.10
0.28					
Reach-1	26840	10-Yr	Corr Eff Mult Tr	625.00	609.80
615.12		615.20	0.00286 3.35	428.28	273.10
0.28					
Reach-1	26840	10-Yr	Dup Eff Mult	625.00	609.80
615.12		615.20	0.00286 3.35	428.40	273.11
0.28					
Reach-1	26840	50-Yr	Prop Mult Trunc	1180.00	609.80
616.35		616.41	0.00199 3.28	782.89	303.83
0.24					
Reach-1	26840	50-Yr	Corr Eff Mult Tr	1180.00	609.80
616.35		616.41	0.00199 3.28	782.89	303.83
0.24					
Reach-1	26840	50-Yr	Dup Eff Mult	1180.00	609.80
616.49		616.55	0.00171 3.09	826.13	307.37
0.22					
Reach-1	26840	100-Yr	Prop Mult Trunc	1500.00	609.80
617.34		617.39	0.00125 2.88	1095.13	328.52
0.20					
Reach-1	26840	100-Yr	Corr Eff Mult Tr	1500.00	609.80
617.34		617.39	0.00125 2.88	1095.13	328.52
0.20					
Reach-1	26840	100-Yr	Dup Eff Mult	1500.00	609.80
617.42		617.46	0.00117 2.81	1120.14	330.42
0.19					
Reach-1	26840	500-Yr	Prop Mult Trunc	2520.00	609.80
619.14		619.18	0.00096 2.97	1726.38	373.48

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0.18						
Reach-1	26840	500-Yr	Corr Eff Mult Tr	2520.00	609.80	
619.14		619.18	0.00096	2.97	1726.38	373.48
0.18						
Reach-1	26840	500-Yr	Dup Eff Mult	2520.00	609.80	
619.19		619.23	0.00093	2.94	1745.24	374.74
0.18						
Reach-1	26070	10-Yr	Prop Mult Trunc	655.00	607.70	
613.72		613.76	0.00141	2.59	646.03	320.11
0.20						
Reach-1	26070	10-Yr	Corr Eff Mult Tr	655.00	607.70	
613.72		613.76	0.00141	2.59	646.03	320.11
0.20						
Reach-1	26070	10-Yr	Dup Eff Mult	655.00	607.70	
613.71		613.75	0.00143	2.60	642.13	319.22
0.20						
Reach-1	26070	50-Yr	Prop Mult Trunc	1235.00	607.70	
615.56		615.59	0.00073	2.28	1286.62	370.89
0.15						
Reach-1	26070	50-Yr	Corr Eff Mult Tr	1235.00	607.70	
615.56		615.59	0.00073	2.28	1286.62	370.89
0.15						
Reach-1	26070	50-Yr	Dup Eff Mult	1235.00	607.70	
615.85		615.87	0.00058	2.08	1395.38	378.28
0.14						
Reach-1	26070	100-Yr	Prop Mult Trunc	1570.00	607.70	
616.85		616.87	0.00046	2.02	1784.55	403.59
0.12						
Reach-1	26070	100-Yr	Corr Eff Mult Tr	1570.00	607.70	
616.85		616.87	0.00046	2.02	1784.55	403.59
0.12						
Reach-1	26070	100-Yr	Dup Eff Mult	1570.00	607.70	
616.96		616.98	0.00043	1.97	1828.69	406.18
0.12						
Reach-1	26070	500-Yr	Prop Mult Trunc	2635.00	607.70	
618.70		618.72	0.00046	2.31	2571.12	455.22
0.13						
Reach-1	26070	500-Yr	Corr Eff Mult Tr	2635.00	607.70	
618.70		618.72	0.00046	2.31	2571.12	455.22
0.13						
Reach-1	26070	500-Yr	Dup Eff Mult	2635.00	607.70	
618.76		618.78	0.00045	2.29	2600.17	458.27
0.13						

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Reach-1	25340	10-Yr	Prop Mult Trunc	905.00	606.70
613.11		613.13	0.00071	1.91	1085.41
0.15					403.69
Reach-1	25340	10-Yr	Corr Eff Mult Tr	905.00	606.70
613.11		613.13	0.00071	1.91	1085.41
0.15					403.69
Reach-1	25340	10-Yr	Dup Eff Mult	905.00	606.70
613.08		613.10	0.00073	1.93	1074.81
0.15					402.21
Reach-1	25340	50-Yr	Prop Mult Trunc	1690.00	606.70
615.20		615.22	0.00045	1.88	2054.40
0.12					515.37
Reach-1	25340	50-Yr	Corr Eff Mult Tr	1690.00	606.70
615.20		615.22	0.00045	1.88	2054.40
0.12					515.37
Reach-1	25340	50-Yr	Dup Eff Mult	1690.00	606.70
615.57		615.59	0.00035	1.71	2246.38
0.11					525.15
Reach-1	25340	100-Yr	Prop Mult Trunc	2145.00	606.70
616.61		616.63	0.00030	1.72	2808.07
0.10					552.77
Reach-1	25340	100-Yr	Corr Eff Mult Tr	2145.00	606.70
616.61		616.63	0.00030	1.72	2808.07
0.10					552.77
Reach-1	25340	100-Yr	Dup Eff Mult	2145.00	606.70
616.74		616.75	0.00028	1.67	2877.31
0.10					556.08
Reach-1	25340	500-Yr	Prop Mult Trunc	3570.00	606.70
618.45		618.46	0.00033	2.05	3865.27
0.11					601.32
Reach-1	25340	500-Yr	Corr Eff Mult Tr	3570.00	606.70
618.45		618.46	0.00033	2.05	3865.27
0.11					601.32
Reach-1	25340	500-Yr	Dup Eff Mult	3570.00	606.70
618.52		618.54	0.00032	2.03	3908.21
0.11					603.21
Reach-1	23335	10-Yr	Prop Mult Trunc	950.00	604.50
610.99		611.06	0.00156	3.01	595.83
0.23					165.35
Reach-1	23335	10-Yr	Corr Eff Mult Tr	950.00	604.50
610.99		611.06	0.00156	3.01	595.83
0.23					165.35

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Reach-1	23335	10-Yr	Dup Eff Mult	950.00	604.50
610.76		610.85	0.00186	559.15	162.11
0.25					
Reach-1	23335	50-Yr	Prop Mult Trunc	1770.00	604.50
613.87		613.94	0.00095	1135.12	210.72
0.19					
Reach-1	23335	50-Yr	Corr Eff Mult Tr	1770.00	604.50
613.87		613.94	0.00095	1135.12	210.72
0.19					
Reach-1	23335	50-Yr	Dup Eff Mult	1770.00	604.50
614.56		614.61	0.00069	1284.20	226.07
0.16					
Reach-1	23335	100-Yr	Prop Mult Trunc	2240.00	604.50
615.68		615.74	0.00070	1554.21	256.15
0.17					
Reach-1	23335	100-Yr	Corr Eff Mult Tr	2240.00	604.50
615.68		615.74	0.00070	1554.21	256.15
0.17					
Reach-1	23335	100-Yr	Dup Eff Mult	2240.00	604.50
615.87		615.93	0.00065	1603.18	261.23
0.16					
Reach-1	23335	500-Yr	Prop Mult Trunc	3735.00	604.50
617.23		617.34	0.00107	1984.93	297.91
0.21					
Reach-1	23335	500-Yr	Corr Eff Mult Tr	3735.00	604.50
617.23		617.34	0.00107	1984.93	297.91
0.21					
Reach-1	23335	500-Yr	Dup Eff Mult	3735.00	604.50
617.34		617.45	0.00103	2018.81	300.95
0.21					
Reach-1	23245	10-Yr	Prop Mult Trunc	950.00	604.40
610.84		610.92	0.00161	588.38	164.70
0.23					
Reach-1	23245	10-Yr	Corr Eff Mult Tr	950.00	604.40
610.84		610.92	0.00161	588.38	164.70
0.23					
Reach-1	23245	10-Yr	Dup Eff Mult	950.00	604.40
610.59		610.67	0.00198	546.68	160.99
0.25					
Reach-1	23245	50-Yr	Prop Mult Trunc	1770.00	604.40
613.79		613.86	0.00094	1138.34	210.98
0.19					
Reach-1	23245	50-Yr	Corr Eff Mult Tr	1770.00	604.40
613.79		613.86	0.00094	1138.34	210.98

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0.19						
Reach-1	23245	50-Yr	Dup Eff Mult	1770.00	604.40	
614.45		614.53	0.00092 3.22	945.86	120.00	
0.19						
Reach-1	23245	100-Yr	Prop Mult Trunc	2240.00	604.40	
615.61		615.68	0.00069 3.03	1563.94	257.17	
0.17						
Reach-1	23245	100-Yr	Corr Eff Mult Tr	2240.00	604.40	
615.61		615.68	0.00069 3.03	1563.94	257.17	
0.17						
Reach-1	23245	100-Yr	Dup Eff Mult	2240.00	604.40	
615.75		615.85	0.00091 3.51	1101.63	120.00	
0.19						
Reach-1	23245	500-Yr	Prop Mult Trunc	3735.00	604.40	
617.14		617.24	0.00107 4.13	1986.05	298.01	
0.21						
Reach-1	23245	500-Yr	Corr Eff Mult Tr	3735.00	604.40	
617.14		617.24	0.00107 4.13	1986.05	298.01	
0.21						
Reach-1	23245	500-Yr	Dup Eff Mult	3735.00	604.40	
617.25		617.36	0.00102 4.07	2021.16	301.16	
0.21						
Reach-1	23201	10-Yr	Prop Mult Trunc	950.00	604.60	
610.01	607.90	610.62	0.00800 6.27	151.49	152.66	
0.48						
Reach-1	23201	10-Yr	Corr Eff Mult Tr	950.00	604.60	
610.01	607.90	610.62	0.00800 6.27	151.49	152.66	
0.48						
Reach-1	23201	10-Yr	Dup Eff Mult	950.00	604.60	
609.70	607.90	610.39	0.00974 6.65	142.82	148.18	
0.52						
Reach-1	23201	50-Yr	Prop Mult Trunc	1770.00	604.60	
612.49	609.60	613.49	0.00790 8.01	220.89	188.53	
0.50						
Reach-1	23201	50-Yr	Corr Eff Mult Tr	1770.00	604.60	
612.49	609.60	613.49	0.00790 8.01	220.89	188.53	
0.50						
Reach-1	23201	50-Yr	Dup Eff Mult	1770.00	604.60	
613.54	609.60	614.32	0.00521 7.07	250.31	206.61	
0.42						
Reach-1	23201	100-Yr	Prop Mult Trunc	2240.00	604.60	
614.23	610.44	615.30	0.00650 8.30	269.75	219.77	
0.47						
Reach-1	23201	100-Yr	Corr Eff Mult Tr	2240.00	604.60	

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614.23	610.44	615.30	0.00650	8.30	269.75	219.77
0.47						
Reach-1	23201	100-Yr	Dup Eff Mult		2240.00	604.60
614.57	610.44	615.57	0.01001	8.02	279.28	28.00
0.45						
Reach-1	23201	500-Yr	Prop Mult Trunc		3735.00	604.60
617.10	612.82	617.19	0.00089	3.65	1998.71	294.34
0.18						
Reach-1	23201	500-Yr	Corr Eff Mult Tr		3735.00	604.60
617.10	612.82	617.19	0.00089	3.65	1998.71	294.34
0.18						
Reach-1	23201	500-Yr	Dup Eff Mult		3735.00	604.60
617.22	612.82	617.31	0.00085	3.59	2034.28	297.66
0.18						
Reach-1	23180.5				Culvert	
Reach-1	23160	10-Yr	Prop Mult Trunc		950.00	604.70
608.00	608.00	609.64	0.04113	10.27	92.46	147.48
1.00						
Reach-1	23160	10-Yr	Corr Eff Mult Tr		950.00	604.70
608.00	608.00	609.64	0.04113	10.27	92.46	147.48
1.00						
Reach-1	23160	10-Yr	Dup Eff Mult		950.00	604.70
609.55	608.00	610.31	0.01142	7.00	135.81	179.05
0.56						
Reach-1	23160	50-Yr	Prop Mult Trunc		1770.00	604.70
609.70	609.70	612.18	0.03593	12.66	139.86	182.00
1.00						
Reach-1	23160	50-Yr	Corr Eff Mult Tr		1770.00	604.70
609.70	609.70	612.18	0.03593	12.66	139.86	182.00
1.00						
Reach-1	23160	50-Yr	Dup Eff Mult		1770.00	604.70
611.40	609.70	612.78	0.01351	9.44	187.55	216.74
0.64						
Reach-1	23160	100-Yr	Prop Mult Trunc		2240.00	604.70
610.55	610.55	613.45	0.03409	13.69	163.66	199.34
1.00						
Reach-1	23160	100-Yr	Corr Eff Mult Tr		2240.00	604.70
610.55	610.55	613.45	0.03409	13.69	163.66	199.34
1.00						

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Reach-1	23160	100-Yr	Dup Eff Mult	2240.00	604.70
612.07	610.54	613.90	0.02351 10.85	206.45	28.00
0.70					
Reach-1	23160	500-Yr	Prop Mult Trunc	3735.00	604.70
612.61	612.61	612.89	0.00457 6.13	1126.65	242.03
0.38					
Reach-1	23160	500-Yr	Corr Eff Mult Tr	3735.00	604.70
612.61	612.61	612.89	0.00457 6.13	1126.65	242.03
0.38					
Reach-1	23160	500-Yr	Dup Eff Mult	3735.00	604.70
613.28	612.61	613.49	0.00324 5.45	1295.50	262.75
0.33					
Reach-1	23110	10-Yr	Prop Mult Trunc	950.00	596.04
603.51		603.62	0.00206 3.34	553.59	258.00
0.25					
Reach-1	23110	10-Yr	Corr Eff Mult Tr	950.00	596.04
603.67		603.77	0.00175 3.13	597.86	271.88
0.23					
Reach-1	23110	10-Yr	Dup Eff Mult	950.00	604.30
609.68		609.78	0.00305 3.62	485.97	181.65
0.30					
Reach-1	23110	50-Yr	Prop Mult Trunc	1770.00	596.04
605.29		605.38	0.00145 3.35	1109.42	353.95
0.22					
Reach-1	23110	50-Yr	Corr Eff Mult Tr	1770.00	596.04
605.46		605.54	0.00126 3.18	1172.07	359.80
0.20					
Reach-1	23110	50-Yr	Dup Eff Mult	1770.00	604.30
611.19		611.94	0.01024 8.08	309.26	60.00
0.59					
Reach-1	23110	100-Yr	Prop Mult Trunc	2240.00	596.04
606.17		606.25	0.00121 3.29	1435.76	382.15
0.20					
Reach-1	23110	100-Yr	Corr Eff Mult Tr	2240.00	596.04
606.34		606.41	0.00107 3.15	1501.10	386.38
0.19					
Reach-1	23110	100-Yr	Dup Eff Mult	2240.00	604.30
611.78		612.75	0.01177 9.23	344.47	60.00
0.64					
Reach-1	23110	500-Yr	Prop Mult Trunc	3735.00	596.04
608.52		608.58	0.00086 3.28	2412.23	455.43
0.18					
Reach-1	23110	500-Yr	Corr Eff Mult Tr	3735.00	596.04
608.67		608.74	0.00080 3.20	2483.04	462.08

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0.17						
Reach-1	23110	500-Yr	Dup Eff Mult	3735.00	604.30	
613.07		613.31	0.00391	1220.17	256.26	
0.38						
Reach-1	22970	10-Yr	Prop Mult Trunc	990.00	595.51	
602.95		603.01	0.00146	708.58	293.56	
0.20						
Reach-1	22970	10-Yr	Corr Eff Mult Tr	990.00	595.51	
603.24		603.29	0.00107	796.12	297.43	
0.18						
Reach-1	22970	10-Yr	Dup Eff Mult	990.00	603.80	
609.22		609.32	0.00320	536.54	227.01	
0.31						
Reach-1	22970	50-Yr	Prop Mult Trunc	1840.00	595.51	
604.93		604.97	0.00092	1314.67	319.84	
0.17						
Reach-1	22970	50-Yr	Corr Eff Mult Tr	1840.00	595.51	
605.15		605.19	0.00079	1386.97	323.76	
0.16						
Reach-1	22970	50-Yr	Dup Eff Mult	1840.00	603.80	
610.63		610.83	0.00420	629.61	150.00	
0.37						
Reach-1	22970	100-Yr	Prop Mult Trunc	2335.00	595.51	
605.86		605.91	0.00083	1619.90	336.38	
0.16						
Reach-1	22970	100-Yr	Corr Eff Mult Tr	2335.00	595.51	
606.06		606.11	0.00074	1689.27	340.03	
0.15						
Reach-1	22970	100-Yr	Dup Eff Mult	2335.00	603.80	
611.24		611.49	0.00442	722.39	150.00	
0.39						
Reach-1	22970	500-Yr	Prop Mult Trunc	3880.00	595.51	
608.27		608.32	0.00068	2517.37	442.10	
0.15						
Reach-1	22970	500-Yr	Corr Eff Mult Tr	3880.00	595.51	
608.44		608.49	0.00064	2593.94	453.32	
0.15						
Reach-1	22970	500-Yr	Dup Eff Mult	3880.00	603.80	
612.57		612.75	0.00331	1413.99	297.95	
0.35						
Reach-1	22440	10-Yr	Prop Mult Trunc	990.00	595.14	

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602.65		602.73	0.00116	2.95	617.13	177.51
0.20						
Reach-1	22440	10-Yr	Corr Eff Mult Tr		990.00	594.40
602.85		602.94	0.00139	2.95	585.08	182.23
0.20						
Reach-1	22440	10-Yr	Dup Eff Mult		990.00	601.20
606.65		606.93	0.00663	5.29	354.48	184.03
0.45						
Reach-1	22440	50-Yr	Prop Mult Trunc		1840.00	595.14
604.65		604.75	0.00115	3.49	1009.18	212.83
0.21						
Reach-1	22440	50-Yr	Corr Eff Mult Tr		1840.00	594.40
604.79		604.90	0.00132	3.42	972.34	215.22
0.21						
Reach-1	22440	50-Yr	Dup Eff Mult		1840.00	601.20
608.02		608.29	0.00549	5.76	616.28	200.11
0.42						
Reach-1	22440	100-Yr	Prop Mult Trunc		2335.00	595.14
605.58		605.69	0.00115	3.73	1215.08	228.28
0.21						
Reach-1	22440	100-Yr	Corr Eff Mult Tr		2335.00	594.40
605.71		605.82	0.00129	3.63	1177.05	230.41
0.21						
Reach-1	22440	100-Yr	Dup Eff Mult		2335.00	601.20
608.63		608.92	0.00534	6.08	740.53	207.31
0.43						
Reach-1	22440	500-Yr	Prop Mult Trunc		3880.00	595.14
608.00		608.13	0.00109	4.21	1808.81	259.01
0.21						
Reach-1	22440	500-Yr	Corr Eff Mult Tr		3880.00	594.40
608.11		608.23	0.00119	4.05	1768.36	260.36
0.21						
Reach-1	22440	500-Yr	Dup Eff Mult		3880.00	601.20
610.30		610.62	0.00484	6.77	1103.18	227.01
0.42						
Reach-1	22110	10-Yr	Prop Mult Trunc		990.00	594.72
602.30		602.35	0.00125	2.75	733.24	234.12
0.19						
Reach-1	22110	10-Yr	Corr Eff Mult Tr		990.00	594.72
602.49		602.54	0.00105	2.57	778.27	236.19
0.18						
Reach-1	22110	50-Yr	Prop Mult Trunc		1840.00	594.72
604.36		604.41	0.00095	2.88	1235.51	252.67
0.17						

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Reach-1	22110	50-Yr	Corr Eff Mult Tr	1840.00	594.72
604.49		604.54	0.00088 2.80	1267.91	253.83
0.17					
Reach-1	22110	100-Yr	Prop Mult Trunc	2335.00	594.72
605.31		605.36	0.00090 3.01	1478.63	261.19
0.17					
Reach-1	22110	100-Yr	Corr Eff Mult Tr	2335.00	594.72
605.42		605.47	0.00085 2.95	1507.99	262.21
0.17					
Reach-1	22110	500-Yr	Prop Mult Trunc	3880.00	594.72
607.75		607.82	0.00085 3.42	2152.58	295.18
0.18					
Reach-1	22110	500-Yr	Corr Eff Mult Tr	3880.00	594.72
607.83		607.90	0.00083 3.38	2178.32	296.61
0.17					
Reach-1	21750	10-Yr	Prop Mult Trunc	990.00	593.33
602.06		602.09	0.00042 1.80	1065.85	275.06
0.12					
Reach-1	21750	10-Yr	Corr Eff Mult Tr	990.00	594.25
602.19		602.23	0.00075 2.32	923.14	285.10
0.16					
Reach-1	21750	10-Yr	Dup Eff Mult	990.00	598.00
604.56		604.65	0.00187 3.27	649.96	253.16
0.25					
Reach-1	21750	50-Yr	Prop Mult Trunc	1840.00	593.33
604.14		604.18	0.00042 2.15	1713.00	333.47
0.13					
Reach-1	21750	50-Yr	Corr Eff Mult Tr	1840.00	594.25
604.24		604.28	0.00063 2.53	1569.46	336.68
0.15					
Reach-1	21750	50-Yr	Dup Eff Mult	1840.00	598.00
605.91		606.02	0.00208 3.99	1024.63	306.64
0.27					
Reach-1	21750	100-Yr	Prop Mult Trunc	2335.00	593.33
605.10		605.13	0.00042 2.30	2039.31	352.13
0.13					
Reach-1	21750	100-Yr	Corr Eff Mult Tr	2335.00	594.25
605.18		605.23	0.00060 2.64	1895.51	355.14
0.15					
Reach-1	21750	100-Yr	Dup Eff Mult	2335.00	598.00
606.62		606.73	0.00199 4.16	1247.63	326.57
0.27					
Reach-1	21750	500-Yr	Prop Mult Trunc	3880.00	593.33
607.54		607.59	0.00042 2.67	2965.29	405.26

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0.13						
Reach-1	21750	500-Yr	Corr Eff Mult Tr	3880.00	594.25	
607.62		607.66	0.00056	2.94	2823.55	407.92
0.15						
Reach-1	21750	500-Yr	Dup Eff Mult	3880.00	598.00	
608.62		608.74	0.00163	4.41	1960.08	383.36
0.25						
Reach-1	21270	10-Yr	Prop Mult Trunc	990.00	593.72	
601.95		601.97	0.00034	1.48	1211.67	326.18
0.09						
Reach-1	21270	10-Yr	Corr Eff Mult Tr	990.00	593.42	
602.01		602.03	0.00027	1.59	1335.78	327.87
0.10						
Reach-1	21270	10-Yr	Dup Eff Mult	990.00	598.00	
602.93		603.11	0.00638	4.77	440.36	247.93
0.43						
Reach-1	21270	50-Yr	Prop Mult Trunc	1840.00	593.72	
604.04		604.06	0.00032	1.68	1944.88	366.52
0.10						
Reach-1	21270	50-Yr	Corr Eff Mult Tr	1840.00	593.42	
604.07		604.09	0.00028	1.89	2060.06	366.91
0.11						
Reach-1	21270	50-Yr	Dup Eff Mult	1840.00	598.00	
604.75		604.86	0.00284	4.12	963.46	319.61
0.30						
Reach-1	21270	100-Yr	Prop Mult Trunc	2335.00	593.72	
604.99		605.02	0.00032	1.79	2299.09	379.64
0.10						
Reach-1	21270	100-Yr	Corr Eff Mult Tr	2335.00	593.42	
605.01		605.03	0.00029	2.04	2410.84	379.95
0.11						
Reach-1	21270	100-Yr	Dup Eff Mult	2335.00	598.00	
605.62		605.72	0.00222	4.00	1250.90	343.48
0.28						
Reach-1	21270	500-Yr	Prop Mult Trunc	3880.00	593.72	
607.44		607.47	0.00032	2.07	3291.12	428.81
0.10						
Reach-1	21270	500-Yr	Corr Eff Mult Tr	3880.00	593.42	
607.44		607.47	0.00031	2.42	3396.29	428.75
0.12						
Reach-1	21270	500-Yr	Dup Eff Mult	3880.00	598.00	
607.91		607.99	0.00144	3.94	2107.49	405.74
0.23						

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Reach-1 601.95 0.08	21250	10-Yr 601.96	Prop Mult Trunc 0.00031	1.22	990.00 1287.61	593.66 337.83
Reach-1 602.01 0.09	21250	10-Yr 602.02	Corr Eff Mult Tr 0.00022	1.45	990.00 1475.17	593.44 339.07
Reach-1 602.96 0.19	21250	10-Yr 603.02	Dup Eff Mult 0.00120	2.19	990.00 600.43	598.00 249.10
Reach-1 604.04 0.08	21250	50-Yr 604.05	Prop Mult Trunc 0.00029	1.38	1840.00 2040.08	593.66 374.20
Reach-1 604.06 0.10	21250	50-Yr 604.08	Corr Eff Mult Tr 0.00024	1.75	1840.00 2217.25	593.44 374.40
Reach-1 604.74 0.18	21250	50-Yr 604.82	Dup Eff Mult 0.00094	2.46	1840.00 1114.45	598.00 319.30
Reach-1 604.99 0.08	21250	100-Yr 605.01	Prop Mult Trunc 0.00029	1.47	2335.00 2401.85	593.66 387.57
Reach-1 605.01 0.10	21250	100-Yr 605.03	Corr Eff Mult Tr 0.00025	1.90	2335.00 2575.39	593.44 387.89
Reach-1 605.61 0.17	21250	100-Yr 605.68	Dup Eff Mult 0.00085	2.56	2335.00 1400.19	598.00 343.10
Reach-1 607.44 0.08	21250	500-Yr 607.46	Prop Mult Trunc 0.00030	1.71	3880.00 3414.81	593.66 437.76
Reach-1 607.44 0.11	21250	500-Yr 607.46	Corr Eff Mult Tr 0.00028	2.28	3880.00 3581.64	593.44 437.73
Reach-1 607.89 0.16	21250	500-Yr 607.97	Dup Eff Mult 0.00069	2.81	3880.00 2254.17	598.00 405.25
Reach-1 601.92 0.07	21085	10-Yr 601.93	Prop Mult Trunc 0.00020	1.11	990.00 1535.72	593.43 376.43
Reach-1 601.96 0.10	21085	10-Yr 601.97	Corr Eff Mult Tr 0.00028	1.66	990.00 1450.82	592.75 377.55

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Reach-1	21085	10-Yr	Dup Eff Mult	990.00	598.00
602.77		602.84	0.00142	2.31	565.88
0.20					249.37
Reach-1	21085	50-Yr	Prop Mult Trunc	1840.00	593.43
604.01		604.02	0.00020	1.31	2366.54
0.07					409.80
Reach-1	21085	50-Yr	Corr Eff Mult Tr	1840.00	592.75
604.02		604.04	0.00027	1.89	2269.78
0.10					409.91
Reach-1	21085	50-Yr	Dup Eff Mult	1840.00	598.00
604.61		604.68	0.00101	2.52	1111.66
0.18					344.68
Reach-1	21085	100-Yr	Prop Mult Trunc	2335.00	593.43
604.96		604.98	0.00021	1.41	2763.62
0.08					425.98
Reach-1	21085	100-Yr	Corr Eff Mult Tr	2335.00	592.75
604.96		604.98	0.00028	2.02	2662.46
0.11					425.94
Reach-1	21085	100-Yr	Dup Eff Mult	2335.00	598.00
605.49		605.57	0.00088	2.58	1432.58
0.18					378.21
Reach-1	21085	500-Yr	Prop Mult Trunc	3880.00	593.43
607.41		607.43	0.00022	1.69	3869.97
0.08					481.96
Reach-1	21085	500-Yr	Corr Eff Mult Tr	3880.00	592.75
607.39		607.41	0.00029	2.36	3760.00
0.11					481.65
Reach-1	21085	500-Yr	Dup Eff Mult	3880.00	598.00
607.80		607.88	0.00066	2.72	2379.32
0.16					440.65
Reach-1	21075	10-Yr	Prop Mult Trunc	990.00	592.41
601.92		601.93	0.00022	1.18	1547.91
0.08					379.45
Reach-1	21075	10-Yr	Corr Eff Mult Tr	990.00	592.89
601.96		601.97	0.00026	1.22	1486.58
0.08					381.90
Reach-1	21075	10-Yr	Dup Eff Mult	990.00	598.40
602.64		602.80	0.00749	4.49	422.90
0.43					253.71
Reach-1	21075	50-Yr	Prop Mult Trunc	1840.00	592.41
604.01		604.02	0.00022	1.38	2386.28
0.08					413.19
Reach-1	21075	50-Yr	Corr Eff Mult Tr	1840.00	592.89
604.02		604.03	0.00025	1.40	2315.41
					414.45

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0.08						
Reach-1	21075	50-Yr	Dup Eff Mult	1840.00	598.40	
604.60		604.67	0.00234	3.35	1128.53	423.70
0.25						
Reach-1	21075	100-Yr	Prop Mult Trunc	2335.00	592.41	
604.96		604.97	0.00022	1.49	2788.86	432.53
0.08						
Reach-1	21075	100-Yr	Corr Eff Mult Tr	2335.00	592.89	
604.96		604.97	0.00026	1.50	2714.76	433.73
0.08						
Reach-1	21075	100-Yr	Dup Eff Mult	2335.00	598.40	
605.49		605.55	0.00166	3.12	1524.36	459.68
0.22						
Reach-1	21075	500-Yr	Prop Mult Trunc	3880.00	592.41	
607.40		607.42	0.00024	1.78	3913.00	491.80
0.09						
Reach-1	21075	500-Yr	Corr Eff Mult Tr	3880.00	592.89	
607.39		607.41	0.00027	1.75	3833.23	492.45
0.08						
Reach-1	21075	500-Yr	Dup Eff Mult	3880.00	598.40	
607.81		607.86	0.00092	2.87	2673.14	529.37
0.17						
Reach-1	21030	10-Yr	Prop Mult Trunc	990.00	593.34	
601.91		601.91	0.00012	0.79	1934.05	415.29
0.05						
Reach-1	21030	10-Yr	Corr Eff Mult Tr	990.00	592.53	
601.95		601.96	0.00015	1.19	1738.03	416.77
0.07						
Reach-1	21030	10-Yr	Dup Eff Mult	990.00	594.70	
602.60		602.63	0.00053	1.88	995.44	317.82
0.12						
Reach-1	21030	50-Yr	Prop Mult Trunc	1840.00	593.34	
604.00		604.01	0.00013	0.97	2846.73	452.42
0.05						
Reach-1	21030	50-Yr	Corr Eff Mult Tr	1840.00	592.53	
604.01		604.02	0.00016	1.43	2638.12	452.86
0.08						
Reach-1	21030	50-Yr	Dup Eff Mult	1840.00	594.70	
604.55		604.58	0.00050	2.15	1716.17	421.20
0.13						
Reach-1	21030	100-Yr	Prop Mult Trunc	2335.00	593.34	
604.95		604.96	0.00014	1.06	3285.29	471.74
0.06						
Reach-1	21030	100-Yr	Corr Eff Mult Tr	2335.00	592.53	

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604.95		604.96	0.00017	1.56	3072.01	472.01
0.08						
Reach-1	21030	100-Yr	Dup Eff Mult		2335.00	594.70
605.45		605.48	0.00048	2.24	2112.43	458.40
0.13						
Reach-1	21030	500-Yr	Prop Mult Trunc		3880.00	593.34
607.40		607.41	0.00016	1.29	4513.39	536.16
0.06						
Reach-1	21030	500-Yr	Corr Eff Mult Tr		3880.00	592.53
607.38		607.39	0.00019	1.87	4291.06	536.03
0.09						
Reach-1	21030	500-Yr	Dup Eff Mult		3880.00	594.70
607.78		607.81	0.00042	2.42	3263.98	528.42
0.12						
Reach-1	20970	10-Yr	Prop Mult Trunc		1240.00	593.21
601.90		601.90	0.00016	1.23	2225.60	522.50
0.08						
Reach-1	20970	10-Yr	Corr Eff Mult Tr		1240.00	592.32
601.93		601.94	0.00031	0.25	2125.85	523.38
0.01						
Reach-1	20970	10-Yr	Dup Eff Mult		1240.00	594.00
602.52		602.59	0.00098	2.77	999.80	356.20
0.18						
Reach-1	20970	50-Yr	Prop Mult Trunc		2300.00	593.21
603.99		604.00	0.00017	1.49	3400.10	595.07
0.08						
Reach-1	20970	50-Yr	Corr Eff Mult Tr		2300.00	592.32
603.99		604.00	0.00029	0.27	3284.30	595.13
0.01						
Reach-1	20970	50-Yr	Dup Eff Mult		2300.00	594.00
604.49		604.55	0.00083	2.97	1808.13	466.27
0.17						
Reach-1	20970	100-Yr	Prop Mult Trunc		2910.00	593.21
604.94		604.95	0.00018	1.60	3977.56	618.44
0.08						
Reach-1	20970	100-Yr	Corr Eff Mult Tr		2910.00	592.32
604.93		604.94	0.00028	0.29	3855.43	618.25
0.01						
Reach-1	20970	100-Yr	Dup Eff Mult		2910.00	594.00
605.39		605.45	0.00076	3.03	2249.70	507.45
0.17						
Reach-1	20970	500-Yr	Prop Mult Trunc		4810.00	593.21
607.38		607.40	0.00019	1.87	5556.87	674.24
0.09						

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Reach-1	20970	500-Yr	Corr Eff Mult Tr	4810.00	592.32
607.36		607.37	0.00027	5422.98	673.67
0.01					
Reach-1	20970	500-Yr	Dup Eff Mult	4810.00	594.00
607.74		607.79	0.00062	3528.31	582.53
0.15					
Reach-1	20230	10-Yr	Prop Mult Trunc	1300.00	592.20
601.47		601.61	0.00167	664.59	210.81
0.23					
Reach-1	20230	10-Yr	Corr Eff Mult Tr	1300.00	592.20
601.47		601.61	0.00167	664.59	210.81
0.23					
Reach-1	20230	10-Yr	Dup Eff Mult	1300.00	592.80
601.51		601.66	0.00171	667.84	211.78
0.24					
Reach-1	20230	50-Yr	Prop Mult Trunc	2410.00	592.20
603.54		603.69	0.00159	1145.87	254.27
0.24					
Reach-1	20230	50-Yr	Corr Eff Mult Tr	2410.00	592.20
603.54		603.69	0.00159	1145.87	254.27
0.24					
Reach-1	20230	50-Yr	Dup Eff Mult	2410.00	592.80
603.58		603.73	0.00161	1149.36	255.10
0.24					
Reach-1	20230	100-Yr	Prop Mult Trunc	3045.00	592.20
604.48		604.64	0.00156	1394.97	274.07
0.24					
Reach-1	20230	100-Yr	Corr Eff Mult Tr	3045.00	592.20
604.48		604.64	0.00156	1394.97	274.07
0.24					
Reach-1	20230	100-Yr	Dup Eff Mult	3045.00	592.80
604.52		604.68	0.00158	1398.70	274.86
0.24					
Reach-1	20230	500-Yr	Prop Mult Trunc	5030.00	592.20
606.90		607.08	0.00150	2138.65	343.97
0.24					
Reach-1	20230	500-Yr	Corr Eff Mult Tr	5030.00	592.20
606.90		607.08	0.00150	2138.65	343.97
0.24					
Reach-1	20230	500-Yr	Dup Eff Mult	5030.00	592.80
606.94		607.12	0.00151	2146.52	345.27
0.24					

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Reach-1	19430	10-Yr	Prop Mult Trunc	1300.00	591.10
599.67		599.93	0.00270	4.62	454.22
0.30					160.56
Reach-1	19430	10-Yr	Corr Eff Mult Tr	1300.00	591.10
599.67		599.93	0.00270	4.62	454.22
0.30					160.56
Reach-1	19430	10-Yr	Dup Eff Mult	1300.00	591.10
599.68		599.94	0.00267	4.60	456.46
0.29					161.11
Reach-1	19430	50-Yr	Prop Mult Trunc	2410.00	591.10
601.82		602.10	0.00250	5.25	874.87
0.30					224.10
Reach-1	19430	50-Yr	Corr Eff Mult Tr	2410.00	591.10
601.82		602.10	0.00250	5.25	874.87
0.30					224.10
Reach-1	19430	50-Yr	Dup Eff Mult	2410.00	591.10
601.85		602.13	0.00246	5.22	881.33
0.29					224.86
Reach-1	19430	100-Yr	Prop Mult Trunc	3045.00	591.10
602.85		603.12	0.00232	5.41	1118.37
0.29					250.94
Reach-1	19430	100-Yr	Corr Eff Mult Tr	3045.00	591.10
602.85		603.12	0.00232	5.41	1118.37
0.29					250.94
Reach-1	19430	100-Yr	Dup Eff Mult	3045.00	591.10
602.88		603.15	0.00229	5.38	1125.95
0.29					251.73
Reach-1	19430	500-Yr	Prop Mult Trunc	5030.00	591.10
605.43		605.70	0.00200	5.79	1854.64
0.28					322.45
Reach-1	19430	500-Yr	Corr Eff Mult Tr	5030.00	591.10
605.43		605.70	0.00200	5.79	1854.64
0.28					322.45
Reach-1	19430	500-Yr	Dup Eff Mult	5030.00	591.10
605.47		605.73	0.00196	5.75	1867.98
0.28					323.90
Reach-1	17790	10-Yr	Prop Mult Trunc	1300.00	589.50
597.41		597.46	0.00092	2.64	909.38
0.17					210.65
Reach-1	17790	10-Yr	Corr Eff Mult Tr	1300.00	589.50
597.41		597.46	0.00092	2.64	909.38
0.17					210.65
Reach-1	17790	10-Yr	Dup Eff Mult	1300.00	589.50

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597.43		597.48	0.00091	2.62	913.88	210.80
0.17						
Reach-1	17790	50-Yr	Prop Mult Trunc		2410.00	589.50
599.68		599.74	0.00089	3.09	1405.44	226.42
0.17						
Reach-1	17790	50-Yr	Corr Eff Mult Tr		2410.00	589.50
599.68		599.74	0.00089	3.09	1405.44	226.42
0.17						
Reach-1	17790	50-Yr	Dup Eff Mult		2410.00	589.50
599.73		599.80	0.00087	3.06	1418.68	226.82
0.17						
Reach-1	17790	100-Yr	Prop Mult Trunc		3045.00	589.50
600.78		600.86	0.00088	3.29	1659.39	234.08
0.18						
Reach-1	17790	100-Yr	Corr Eff Mult Tr		3045.00	589.50
600.78		600.86	0.00088	3.29	1659.39	234.08
0.18						
Reach-1	17790	100-Yr	Dup Eff Mult		3045.00	589.50
600.83		600.90	0.00086	3.27	1670.73	234.41
0.17						
Reach-1	17790	500-Yr	Prop Mult Trunc		5030.00	589.50
603.39		603.49	0.00093	3.91	2293.77	252.20
0.19						
Reach-1	17790	500-Yr	Corr Eff Mult Tr		5030.00	589.50
603.39		603.49	0.00093	3.91	2293.77	252.20
0.19						
Reach-1	17790	500-Yr	Dup Eff Mult		5030.00	589.50
603.45		603.55	0.00091	3.88	2309.08	252.88
0.19						
Reach-1	16030	10-Yr	Prop Mult Trunc		1300.00	585.50
593.23	591.46	593.85	0.00745	7.02	268.53	74.76
0.48						
Reach-1	16030	10-Yr	Corr Eff Mult Tr		1300.00	585.50
593.23	591.46	593.85	0.00745	7.02	268.53	74.76
0.48						
Reach-1	16030	10-Yr	Dup Eff Mult		1300.00	585.50
593.27		593.88	0.00727	6.96	271.51	75.18
0.47						
Reach-1	16030	50-Yr	Prop Mult Trunc		2410.00	585.50
595.15	593.32	596.06	0.00864	8.95	433.31	99.38
0.54						
Reach-1	16030	50-Yr	Corr Eff Mult Tr		2410.00	585.50
595.15	593.32	596.06	0.00864	8.95	433.31	99.38
0.54						

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Reach-1	16030	50-Yr	Dup Eff Mult	2410.00	585.50
595.48		596.28	0.00731 8.45	467.43	104.78
0.50					
Reach-1	16030	100-Yr	Prop Mult Trunc	3045.00	585.50
596.61	594.13	597.43	0.00683 8.84	595.62	122.97
0.49					
Reach-1	16030	100-Yr	Corr Eff Mult Tr	3045.00	585.50
596.61	594.13	597.43	0.00683 8.84	595.62	122.97
0.49					
Reach-1	16030	100-Yr	Dup Eff Mult	3045.00	585.50
596.71		597.50	0.00654 8.71	607.38	124.51
0.48					
Reach-1	16030	500-Yr	Prop Mult Trunc	5030.00	585.50
598.89	596.23	599.88	0.00704 10.29	926.09	164.12
0.52					
Reach-1	16030	500-Yr	Corr Eff Mult Tr	5030.00	585.50
598.89	596.23	599.88	0.00704 10.29	926.09	164.12
0.52					
Reach-1	16030	500-Yr	Dup Eff Mult	5030.00	585.50
599.01		599.96	0.00670 10.11	945.48	165.80
0.51					
Reach-1	15580	10-Yr	Dup Eff Mult	1300.00	584.20
591.91		592.07	0.00217 3.89	581.85	198.60
0.26					
Reach-1	15580	50-Yr	Dup Eff Mult	2410.00	584.20
594.88		594.99	0.00109 3.51	1239.09	243.23
0.20					
Reach-1	15580	100-Yr	Dup Eff Mult	3045.00	584.20
596.27		596.37	0.00089 3.47	1590.34	261.55
0.18					
Reach-1	15580	500-Yr	Dup Eff Mult	5030.00	584.20
598.59		598.72	0.00096 4.10	2231.82	291.69
0.20					
Reach-1	14880	10-Yr	Dup Eff Mult	1300.00	582.20
591.58		591.60	0.00031 1.70	1540.43	384.14
0.10					
Reach-1	14880	50-Yr	Dup Eff Mult	2410.00	582.20
594.69		594.71	0.00020 1.69	2875.12	475.98
0.09					
Reach-1	14880	100-Yr	Dup Eff Mult	3045.00	582.20
596.11		596.13	0.00018 1.73	3583.72	522.20

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0.08							
Reach-1	14880	500-Yr	Dup	Eff	Mult	5030.00	582.20
598.41		598.44	0.00021		2.10	4869.70	590.12
0.10							
Reach-1	14435	10-Yr	Dup	Eff	Mult	1530.00	581.50
591.26		591.35	0.00094		3.06	981.15	249.12
0.18							
Reach-1	14435	50-Yr	Dup	Eff	Mult	2825.00	581.50
594.37		594.50	0.00098		3.83	1237.81	145.00
0.20							
Reach-1	14435	100-Yr	Dup	Eff	Mult	3565.00	581.50
595.78		595.93	0.00099		4.14	1441.98	145.00
0.20							
Reach-1	14435	500-Yr	Dup	Eff	Mult	5870.00	581.50
598.16		598.26	0.00070		3.88	3468.06	481.99
0.17							
Reach-1	14385	10-Yr	Dup	Eff	Mult	1530.00	581.30
591.17	584.82	591.30	0.00087		2.86	534.92	246.25
0.18							
Reach-1	14385	50-Yr	Dup	Eff	Mult	2825.00	581.30
594.20	586.83	594.44	0.00105		3.86	732.17	340.33
0.20							
Reach-1	14385	100-Yr	Dup	Eff	Mult	3565.00	581.30
595.55	587.48	595.85	0.00156		4.35	819.71	65.00
0.22							
Reach-1	14385	500-Yr	Dup	Eff	Mult	5870.00	581.30
598.13	589.26	598.23	0.00049		3.22	3544.43	482.02
0.15							
Reach-1	14365	10-Yr	Dup	Eff	Mult	1530.00	581.30
591.12	584.81	591.26	0.00100		2.96	516.82	194.82
0.19							
Reach-1	14365	50-Yr	Dup	Eff	Mult	2825.00	581.30
594.04	586.67	594.29	0.00120		4.00	706.29	252.66
0.21							
Reach-1	14365	100-Yr	Dup	Eff	Mult	3565.00	581.30
595.24	587.39	595.56	0.00172		4.55	784.26	65.00
0.23							
Reach-1	14365	500-Yr	Dup	Eff	Mult	5870.00	581.30

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597.92 0.17	589.33	598.07	0.00070	3.74	2833.86	397.14
Reach-1 591.07 0.23	14320	10-Yr 591.20	Dup 0.00173	Eff 3.82	Mult 1530.00 795.81	581.20 194.51
Reach-1 593.74 0.34	14320	50-Yr 594.17	Dup 0.00352	Eff 6.51	Mult 2825.00 706.81	581.20 95.00
Reach-1 594.92 0.35	14320	100-Yr 595.42	Dup 0.00369	Eff 7.12	Mult 3565.00 818.88	581.20 95.00
Reach-1 597.87 0.23	14320	500-Yr 598.02	Dup 0.00140	Eff 5.03	Mult 5870.00 2667.46	581.20 395.97
Reach-1 590.19 0.26	13900	10-Yr 590.36	Dup 0.00227	Eff 4.34	Mult 1560.00 713.31	580.50 193.44
Reach-1 592.91 0.24	13900	50-Yr 593.06	Dup 0.00171	Eff 4.52	Mult 2870.00 1305.94	580.50 242.39
Reach-1 594.17 0.23	13900	100-Yr 594.32	Dup 0.00156	Eff 4.64	Mult 3625.00 1625.01	580.50 265.03
Reach-1 597.29 0.22	13900	500-Yr 597.44	Dup 0.00136	Eff 5.02	Mult 5965.00 2550.09	580.50 330.35
Reach-1 588.69 0.17	12770	10-Yr 588.75	Dup 0.00093	Eff 2.89	Mult 1560.00 986.77	578.50 193.93
Reach-1 591.69 0.16	12770	50-Yr 591.76	Dup 0.00079	Eff 3.22	Mult 2870.00 1603.05	578.50 216.84
Reach-1 592.99 0.17	12770	100-Yr 593.07	Dup 0.00079	Eff 3.44	Mult 3625.00 1891.68	578.50 226.78
Reach-1 596.13 0.18	12770	500-Yr 596.24	Dup 0.00083	Eff 4.05	Mult 5965.00 2642.79	578.50 250.81

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Reach-1	11140	10-Yr	Dup Eff Mult	1560.00	576.70
586.73		586.85	0.00148 3.71	739.98	146.14
0.21					
Reach-1	11140	50-Yr	Dup Eff Mult	2870.00	576.70
590.06		590.19	0.00118 4.05	1282.39	179.01
0.20					
Reach-1	11140	100-Yr	Dup Eff Mult	3625.00	576.70
591.35		591.49	0.00120 4.35	1520.42	192.18
0.20					
Reach-1	11140	500-Yr	Dup Eff Mult	5965.00	576.70
594.35		594.54	0.00133 5.21	2149.26	226.28
0.22					
Reach-1	10400	10-Yr	Dup Eff Mult	2000.00	575.40
585.70		585.84	0.00128 3.71	976.93	223.33
0.21					
Reach-1	10400	50-Yr	Dup Eff Mult	3670.00	575.40
589.37		589.48	0.00082 3.65	1924.75	293.07
0.17					
Reach-1	10400	100-Yr	Dup Eff Mult	4620.00	575.40
590.65		590.77	0.00082 3.89	2317.27	325.15
0.18					
Reach-1	10400	500-Yr	Dup Eff Mult	7565.00	575.40
593.61		593.75	0.00088 4.54	3414.47	416.83
0.19					
Reach-1	9910	10-Yr	Dup Eff Mult	2070.00	574.50
585.27		585.34	0.00075 2.92	1308.26	244.09
0.16					
Reach-1	9910	50-Yr	Dup Eff Mult	3780.00	574.50
589.08		589.14	0.00053 3.04	2339.78	300.35
0.14					
Reach-1	9910	100-Yr	Dup Eff Mult	4760.00	574.50
590.34		590.42	0.00056 3.30	2733.40	321.07
0.15					
Reach-1	9910	500-Yr	Dup Eff Mult	7790.00	574.50
593.26		593.37	0.00066 4.01	3738.70	368.74
0.16					

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Reach-1	8610	10-Yr	Dup	Eff	Mult	2070.00	571.60
584.63		584.66	0.00037		2.22	1860.75	303.37
0.11							
Reach-1	8610	50-Yr	Dup	Eff	Mult	3780.00	571.60
588.62		588.65	0.00027		2.32	3277.95	410.18
0.10							
Reach-1	8610	100-Yr	Dup	Eff	Mult	4760.00	571.60
589.85		589.89	0.00029		2.52	3803.13	437.60
0.11							
Reach-1	8610	500-Yr	Dup	Eff	Mult	7790.00	571.60
592.68		592.73	0.00035		3.07	5120.33	494.93
0.12							
Reach-1	8569	10-Yr	Dup	Eff	Mult	2070.00	571.60
584.34	576.41	584.59	0.00138		4.05	510.56	298.25
0.21							
Reach-1	8569	50-Yr	Dup	Eff	Mult	3780.00	571.60
588.60	578.71	588.64	0.00027		2.20	3381.37	409.79
0.10							
Reach-1	8569	100-Yr	Dup	Eff	Mult	4760.00	571.60
589.83	579.80	589.88	0.00029		2.43	3904.79	437.15
0.10							
Reach-1	8569	500-Yr	Dup	Eff	Mult	7790.00	571.60
592.65	582.75	592.72	0.00037		3.03	5216.81	494.36
0.12							
Reach-1	8550	10-Yr	Dup	Eff	Mult	2070.00	571.60
584.29	576.39	584.54	0.00140		4.07	508.28	213.06
0.21							
Reach-1	8550	50-Yr	Dup	Eff	Mult	3780.00	571.60
587.81	578.72	587.91	0.00058		3.15	2199.53	301.10
0.14							
Reach-1	8550	100-Yr	Dup	Eff	Mult	4760.00	571.60
589.42	579.80	589.52	0.00057		3.32	2715.23	338.54
0.14							
Reach-1	8550	500-Yr	Dup	Eff	Mult	7790.00	571.60
592.49	582.77	592.62	0.00066		4.01	3850.08	400.87
0.16							
Reach-1	8500	10-Yr	Dup	Eff	Mult	2070.00	571.50

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584.32		584.43	0.00101	3.63	1202.38	213.38	
0.19							
Reach-1	8500	50-Yr	Dup	Eff	Mult	3780.00	571.50
587.75		587.87	0.00090	4.07	2072.63	299.36	
0.18							
Reach-1	8500	100-Yr	Dup	Eff	Mult	4760.00	571.50
589.36		589.48	0.00083	4.18	2589.06	337.37	
0.18							
Reach-1	8500	500-Yr	Dup	Eff	Mult	7790.00	571.50
592.44		592.58	0.00089	4.87	3722.12	399.84	
0.19							
Reach-1	8310	10-Yr	Dup	Eff	Mult	2070.00	571.50
584.12		584.23	0.00103	3.62	1033.00	151.18	
0.19							
Reach-1	8310	50-Yr	Dup	Eff	Mult	3780.00	571.50
587.52		587.67	0.00107	4.41	1584.44	175.59	
0.20							
Reach-1	8310	100-Yr	Dup	Eff	Mult	4760.00	571.50
589.11		589.29	0.00109	4.75	1875.62	188.84	
0.21							
Reach-1	8310	500-Yr	Dup	Eff	Mult	7790.00	571.50
592.05		592.33	0.00152	6.25	2486.35	230.81	
0.25							
Reach-1	7610	10-Yr	Dup	Eff	Mult	2070.00	572.20
583.16		583.34	0.00158	4.13	789.34	145.39	
0.22							
Reach-1	7610	50-Yr	Dup	Eff	Mult	3780.00	572.20
586.63		586.83	0.00134	4.60	1363.37	185.41	
0.22							
Reach-1	7610	100-Yr	Dup	Eff	Mult	4760.00	572.20
588.27		588.47	0.00126	4.79	1681.89	204.26	
0.21							
Reach-1	7610	500-Yr	Dup	Eff	Mult	7790.00	572.20
590.96		591.25	0.00157	5.96	2273.87	235.32	
0.24							
Reach-1	6150	10-Yr	Dup	Eff	Mult	2070.00	570.10
580.63		580.83	0.00187	4.57	857.19	202.29	
0.26							

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Reach-1	6150	50-Yr	Dup	Eff	Mult	3780.00	570.10
585.15		585.26	0.00084		3.94	2034.50	313.60
0.18							
Reach-1	6150	100-Yr	Dup	Eff	Mult	4760.00	570.10
586.97		587.08	0.00071		3.92	2651.17	363.25
0.17							
Reach-1	6150	500-Yr	Dup	Eff	Mult	7790.00	570.10
589.32		589.47	0.00092		4.89	3580.59	428.33
0.20							
Reach-1	5930	10-Yr	Dup	Eff	Mult	2070.00	569.30
580.15		580.39	0.00203		4.86	787.66	188.78
0.27							
Reach-1	5930	50-Yr	Dup	Eff	Mult	3780.00	569.30
584.89		585.05	0.00098		4.36	1545.48	165.00
0.20							
Reach-1	5930	100-Yr	Dup	Eff	Mult	4760.00	569.30
586.71		586.89	0.00093		4.58	1845.80	165.00
0.20							
Reach-1	5930	500-Yr	Dup	Eff	Mult	7790.00	569.30
589.10		589.26	0.00094		5.04	3511.10	422.21
0.20							
Reach-1	5867	10-Yr	Dup	Eff	Mult	2200.00	569.00
579.76	574.48	580.20	0.00320		5.32	413.44	179.40
0.30							
Reach-1	5867	50-Yr	Dup	Eff	Mult	4025.00	569.00
584.16	576.64	584.85	0.00306		6.68	602.42	290.37
0.31							
Reach-1	5867	100-Yr	Dup	Eff	Mult	5065.00	569.00
586.71	577.71	586.81	0.00069		3.54	2650.77	355.59
0.15							
Reach-1	5867	500-Yr	Dup	Eff	Mult	8275.00	569.00
589.04	580.62	589.21	0.00092		4.48	3558.53	420.49
0.18							
Reach-1	5810	10-Yr	Dup	Eff	Mult	2200.00	569.00
579.68	574.49	580.13	0.00347		5.37	409.81	244.91
0.31							
Reach-1	5810	50-Yr	Dup	Eff	Mult	4025.00	569.00
582.58	576.64	583.46	0.00480		7.53	534.38	295.60

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0.38							
Reach-1	5810	100-Yr	Dup	Eff	Mult	5065.00	569.00
583.75	577.71	584.92	0.00562		8.66	584.94	319.25
0.41							
Reach-1	5810	500-Yr	Dup	Eff	Mult	8275.00	569.00
587.33	580.64	587.50	0.00119		4.66	3458.19	470.77
0.20							
Reach-1	5770	10-Yr	Dup	Eff	Mult	2200.00	569.00
579.84		579.93	0.00068		2.67	1141.28	247.69
0.15							
Reach-1	5770	50-Yr	Dup	Eff	Mult	4025.00	569.00
582.83		583.12	0.00147		4.33	928.74	75.00
0.22							
Reach-1	5770	100-Yr	Dup	Eff	Mult	5065.00	569.00
584.11		584.49	0.00174		4.94	1024.39	75.00
0.24							
Reach-1	5770	500-Yr	Dup	Eff	Mult	8275.00	569.00
587.29		587.46	0.00072		4.04	3634.24	469.27
0.17							
Reach-1	5110	10-Yr	Dup	Eff	Mult	2245.00	567.70
579.26		579.37	0.00107		3.50	1255.07	261.65
0.19							
Reach-1	5110	50-Yr	Dup	Eff	Mult	4100.00	567.70
582.12		582.25	0.00104		4.05	2093.01	327.98
0.20							
Reach-1	5110	100-Yr	Dup	Eff	Mult	5150.00	567.70
583.38		583.52	0.00104		4.30	2526.52	359.50
0.20							
Reach-1	5110	500-Yr	Dup	Eff	Mult	8420.00	567.70
586.77		586.91	0.00094		4.70	3877.91	433.56
0.20							
Reach-1	4540	10-Yr	Dup	Eff	Mult	2245.00	566.60
578.28		578.55	0.00190		4.70	813.11	187.32
0.25							
Reach-1	4540	50-Yr	Dup	Eff	Mult	4100.00	566.60
581.15		581.45	0.00184		5.42	1421.35	228.06
0.26							
Reach-1	4540	100-Yr	Dup	Eff	Mult	5150.00	566.60

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582.41		582.72	0.00181	5.71	1714.62	236.89
0.26						
Reach-1	4540	500-Yr	Dup	Eff	Mult	8420.00
585.71		586.11	0.00199	6.85	2556.61	566.60
0.28						327.09
Reach-1	2825	10-Yr	Dup	Eff	Mult	2245.00
575.79		575.97	0.00118	3.98	988.00	562.90
0.20						193.39
Reach-1	2825	50-Yr	Dup	Eff	Mult	4100.00
578.39		578.64	0.00145	5.03	1535.16	562.90
0.23						228.54
Reach-1	2825	100-Yr	Dup	Eff	Mult	5150.00
579.56		579.85	0.00154	5.47	1813.60	562.90
0.24						244.49
Reach-1	2825	500-Yr	Dup	Eff	Mult	8420.00
582.43		582.81	0.00185	6.70	2582.97	562.90
0.27						304.11
Reach-1	1650	10-Yr	Dup	Eff	Mult	2245.00
574.64		574.78	0.00086	3.61	1275.98	560.10
0.17						267.89
Reach-1	1650	50-Yr	Dup	Eff	Mult	4100.00
576.81		577.02	0.00128	4.86	1964.10	560.10
0.21						375.05
Reach-1	1650	100-Yr	Dup	Eff	Mult	5150.00
577.89		578.12	0.00137	5.24	2400.67	560.10
0.22						432.58
Reach-1	1650	500-Yr	Dup	Eff	Mult	8420.00
580.64		580.88	0.00139	5.84	3782.57	560.10
0.23						559.54
Reach-1	1020	10-Yr	Dup	Eff	Mult	2245.00
574.25		574.35	0.00052	3.04	1223.08	558.10
0.14						174.48
Reach-1	1020	50-Yr	Dup	Eff	Mult	4100.00
576.08		576.30	0.00103	4.62	1573.18	558.10
0.20						214.09
Reach-1	1020	100-Yr	Dup	Eff	Mult	5150.00
577.00		577.28	0.00127	5.31	1781.30	558.10
0.22						238.90

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Reach-1	1020	500-Yr	Dup	Eff	Mult	8420.00	558.10
579.42		579.85	0.00178		6.84	2440.63	304.43
0.27							
Reach-1	961	10-Yr	Dup	Eff	Mult	2245.00	558.00
574.25	564.41	574.31	0.00034		2.00	1122.46	174.46
0.12							
Reach-1	961	50-Yr	Dup	Eff	Mult	4100.00	558.00
576.08	566.52	576.22	0.00063		3.06	1341.96	214.65
0.16							
Reach-1	961	100-Yr	Dup	Eff	Mult	5150.00	558.00
576.99	567.65	577.19	0.00088		3.55	1451.30	120.00
0.18							
Reach-1	961	500-Yr	Dup	Eff	Mult	8420.00	558.00
579.44	569.74	579.72	0.00092		4.38	2459.10	305.53
0.20							
Reach-1	935	10-Yr	Dup	Eff	Mult	2245.00	558.00
574.25	564.39	574.30	0.00031		1.94	1155.17	223.05
0.11							
Reach-1	935	50-Yr	Dup	Eff	Mult	4100.00	558.00
575.90	566.50	576.05	0.00061		3.03	1354.26	251.23
0.16							
Reach-1	935	100-Yr	Dup	Eff	Mult	5150.00	558.00
576.68	567.83	576.88	0.00090		3.56	1447.64	120.00
0.18							
Reach-1	935	500-Yr	Dup	Eff	Mult	8420.00	558.00
578.82	569.62	579.05	0.00084		4.13	2689.80	303.84
0.19							
Reach-1	850	10-Yr	Dup	Eff	Mult	2245.00	557.10
574.20		574.27	0.00035		2.61	1521.58	222.90
0.11							
Reach-1	850	50-Yr	Dup	Eff	Mult	4100.00	557.10
575.82		575.99	0.00074		4.04	1705.04	180.00
0.17							
Reach-1	850	100-Yr	Dup	Eff	Mult	5150.00	557.10
576.58		576.80	0.00095		4.70	1841.35	180.00
0.19							
Reach-1	850	500-Yr	Dup	Eff	Mult	8420.00	557.10
578.63		578.94	0.00136		6.03	2672.44	298.67

TravisCreek-FEMA Multiple Flow Report.txt

0.23

Reach-1	120	10-Yr	Dup	Eff	Mult	2245.00	555.90
574.07		574.10	0.00015		1.86	2873.06	631.71
0.08							
Reach-1	120	50-Yr	Dup	Eff	Mult	4100.00	555.90
575.60		575.64	0.00025		2.55	3873.32	675.21
0.10							
Reach-1	120	100-Yr	Dup	Eff	Mult	5150.00	555.90
576.32		576.37	0.00030		2.83	4368.34	695.73
0.11							
Reach-1	120	500-Yr	Dup	Eff	Mult	8420.00	555.90
578.29		578.36	0.00039		3.45	5796.39	752.76
0.13							
Reach-1	50	10-Yr	Dup	Eff	Mult	10340.00	554.00
573.50	562.04	573.87	0.00108		5.00	2471.63	299.50
0.21							
Reach-1	50	50-Yr	Dup	Eff	Mult	12200.00	554.00
575.00	562.87	575.41	0.00107		5.28	2951.25	340.00
0.22							
Reach-1	50	100-Yr	Dup	Eff	Mult	13250.00	554.00
575.70	563.31	576.13	0.00109		5.45	3193.67	352.60
0.22							
Reach-1	50	500-Yr	Dup	Eff	Mult	16520.00	554.00
577.60	564.64	578.09	0.00114		5.94	3904.62	397.47
0.23							

Appendix G
Performance Bond

PERFORMANCE BOND

The Hartford, Bond, T-4
One Hartford Plaza, Hartford, Connecticut 06155

Bond No. 22BSBHC3713

KNOW ALL MEN BY THESE PRESENTS, that we, Restoration Systems, LLC, as Principal, and Hartford Fire Insurance Company, licensed to do business in the State of North Carolina as Surety, are held and firmly bound unto North Carolina Department of Environment and Natural Resources – Division of Water Resources (Obligee), in the penal sum of One Million Three Hundred Thirty-one Thousand Four Hundred Thirty & 00/100 Dollars (\$1,331,430.00), lawful money of the United States of America, for the payment of which sum, well and truly to be made, the Principal and Surety do bind themselves, their heirs, executors, administrators, and successors and assigns, jointly and severally, firmly by these presents.

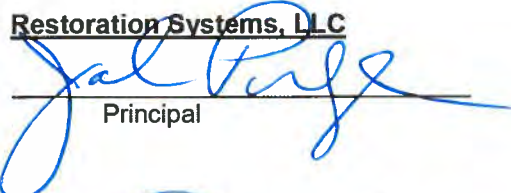
THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above bounden Principal has entered into certain written Agreement with the above named Obligee, effective the 1st day of March, 2015, for Contract No. 5791, Aycock Springs Site in the Cape Fear River Basin, Cataloging Unit 0303002 and more fully described in said Agreement, a copy of which is attached, which Agreement is made a part hereof and incorporated herein by reference, except that nothing said therein shall alter, enlarge, expand or otherwise modify the term of the bond as set out below.

NOW, THEREFORE, if Principal, its executors, administrators, successors and assigns shall promptly and faithfully perform the Contract, according to the terms, stipulations or conditions thereof, then this obligation shall become null and void, otherwise to remain in full force and effect. This bond is executed by the Surety and accepted by the Obligee subject to the following express condition:

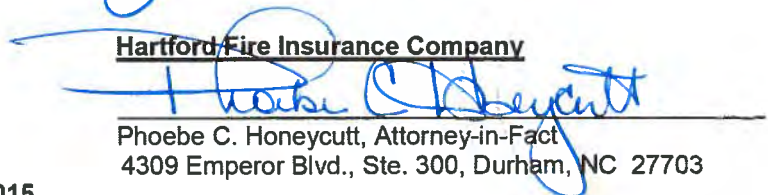
Notwithstanding the provisions of the Agreement, this bond will commence on the date of approval of the Aycock Springs Bank Parcel Development Plan with term of bond from 3/1/2015 to 3/1/2018 or upon approval of Task 6 by the North Carolina Department of Environment and Natural Resources, but may be extended by the Surety at its sole option by a replacement bond or Continuation Certificate. However, neither nonrenewal by the Surety, nor the failure or inability of the Principal to file a replacement bond, shall itself constitute a loss to the Obligee recoverable under this bond or any renewal or continuation thereof. The liability of the Surety under this bond or any Continuation Certificates issued in connection therewith shall not be cumulative and shall in no event exceed the amount as set forth in this bond or in any additions, riders, or endorsements properly issued by the Surety as supplements thereto.

Sealed with our seals and dated this 11 day of March, 2015


Witness

Restoration Systems, LLC

Principal


Witness

Hartford Fire Insurance Company

Phoebe C. Honeycutt, Attorney-in-Fact
4309 Emperor Blvd., Ste. 300, Durham, NC 27703

Agreed and acknowledged this ___ day of _____, 2015

By: _____
Obligee

POWER OF ATTORNEY

Direct Inquiries/Claims to:

THE HARTFORD

Bond T-4

One Hartford Plaza

Hartford, Connecticut 06155

call: 888-266-3488 or fax: 860-757-5835)

KNOW ALL PERSONS BY THESE PRESENTS THAT:

Agency Code: 22-270197

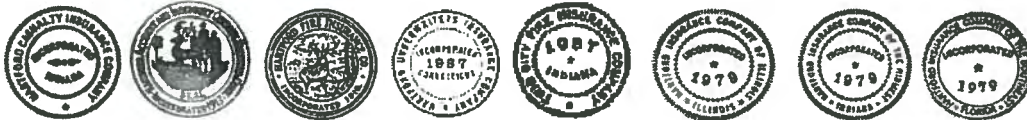
- Hartford Fire Insurance Company, a corporation duly organized under the laws of the State of Connecticut
- Hartford Casualty Insurance Company, a corporation duly organized under the laws of the State of Indiana
- Hartford Accident and Indemnity Company, a corporation duly organized under the laws of the State of Connecticut
- Hartford Underwriters Insurance Company, a corporation duly organized under the laws of the State of Connecticut
- Twin City Fire Insurance Company, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of Illinois, a corporation duly organized under the laws of the State of Illinois
- Hartford Insurance Company of the Midwest, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of the Southeast, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, **up to the amount of Unlimited** :

Bobbi D. Pendleton of Chapel Hill NC, Kenneth J. Peeples of Raleigh NC, Neil B. Biller, Angela B. Britt, Heather K. Burroughs, Phoebe Honeycutt, Christopher Lydick, Julie C. McElligott, Kitara A. Smith of DURHAM, North Carolina

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by , and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on August 1, 2009, the Companies have caused these presents to be signed by its Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.



Wesley W. Cowling

Wesley W. Cowling, Assistant Secretary

M. Ross Fisher

M. Ross Fisher, Vice President

STATE OF CONNECTICUT }
COUNTY OF HARTFORD } ss. Hartford

On this 12th day of July, 2012, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.



CERTIFICATE

Kathleen T. Maynard

Kathleen T. Maynard
Notary Public

My Commission Expires July 31, 2016

I, the undersigned, Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of **March 11, 2015**
Signed and sealed at the City of Hartford.



Gary W. Stumper

Gary W. Stumper, Vice President