

BASELINE MONITORING DOCUMENT AND
AS-BUILT BASELINE REPORT

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AYCOCK SPRINGS
STREAM AND WETLAND MITIGATION
SITE

Alamance County, North Carolina
Full Delivery Contract No. 5791

Data Collection: April 2016
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Cape Fear River Basin
Cataloging Unit 03030002



PREPARED FOR:

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STREAM AND WETLAND MITIGATION SITE

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Cape Fear River Basin
Cataloging Unit 03030002



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EXECUTIVE SUMMARY

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

Prior to construction, the Site encompassed approximately 13 acres of agricultural land used for livestock grazing and timber production. The Site is situated along Travis Creek and four unnamed tributaries (UTs) to Travis Creek. Existing streams were cleared, dredged, trampled by livestock, eroded vertically and laterally, and received extensive sediment and nutrient inputs from livestock and adjacent runoff. A breached dam was located at the downstream extent of Travis Creek which didn't effectively pass storm flows and impounded water during rain events. In addition, streamside wetlands were cleared and drained by channel downcutting and land uses. The Site was identified to assist the North Carolina Division of Mitigation Services (NCDMS) in meeting its stream and wetland restoration goals.

The following table summarizes the project goals/objectives and proposed functional uplift based on proposed Site restoration activities and observations of two reference areas located in the vicinity of the Site.

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 UTs 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	

Positive aspects supporting 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 NCDMS 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

Project construction and planting was completed between February 3, 2016 and April 8, 2016. Site activities included the restoration of perennial and intermittent stream channels, enhancement (Level II) of 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 **3581 Stream Mitigation Units (SMUs) and 0.5 Riparian Wetland Mitigation Units (WMUs)** are being provided as depicted in the following table.

Stream Mitigation Type	Perennial Stream (linear feet)	Intermittent Stream (linear feet)	Ratio	Stream Mitigation Units
Restoration	3147	90	1:1	3237
Restoration (See Notes below)**		122	1.5:1	81
Enhancement (Level II)	657	--	2.5:1	263
TOTAL	3804	212		3581
Wetland Mitigation Type	Acreage	Ratio	Riparian Wetland Mitigation Units	
Riparian Re-establishment	0.5	1:1	0.5	
Riparian Enhancement	1.5*		--	
TOTAL	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.

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1.0 PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

1.1 Location and Setting

Restoration Systems, LLC has established the Aycock Springs Stream and Wetland Mitigation Site (Site) located approximately 1.5 miles north of Elon and Gibsonville in western Alamance County (Figure 1, Appendix A). Prior to construction, the Site encompassed approximately 13 acres of agricultural land used for livestock grazing, hay production, and timber harvest. Streams were cleared, trampled by livestock, eroded vertically and laterally, and received extensive sediment and nutrient inputs from livestock and timber harvest activities. Stream impacts in Travis Creek also occurred due to a breached dam that impounded water during storm events. In addition, streamside wetlands were drained by channel incision, soil compaction, the loss of forest vegetation, and land uses.

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 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 the eight priority goals of the Travis, Tickle, Little Alamance Local Watershed Plan (LWP) including 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
- 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 following table summarizes the project goals/objectives and proposed functional uplift based on 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 on 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 UTs 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	

1.3 Project Structure, Restoration Type, and Approach

1.3.1 Project Structure

Prior to construction, Site UTs were cleared, dredged of cobble substrate, trampled by livestock, eroded vertically and laterally, and received extensive sediment and nutrient inputs from livestock. Approximately 95 percent of the UT stream channels were degraded contributing to sediment and nutrient export from the Site. In addition, streamside wetlands were cleared and drained by channel downcutting and land uses.

Two outer bends of Travis Creek targeted for restoration were characterized by excessive shear and tight meander radii. In addition, the downstream reach characterized by a partially breached dam, which impeded stormwater pulses, resulting in hydrologic stacking of water upstream from the breached area. Approximately 30 percent of the Travis Creek stream channel was degraded by vegetative clearing, erosion of channel banks, and impediment of stormwater flows.

Prior Site conditions 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 restored riffle-pool morphology, aided in energy dissipation, increased aquatic habitat, stabilized channel banks, and greatly reduced sediment loss from channel banks.

1.3.2 Restoration Type and Approach

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. Site construction was completed on April 6, 2016 and Site planting was completed on April 8, 2016. A summary of mitigation activities includes the following.

- Providing a minimum of 3581 SMUs, as calculated in accordance with the requirements stipulated in RFP #16-005568.
 - Restoring approximately 3359 linear feet of stream channel through construction of stable stream channels in the historic floodplain location and elevation.
 - Enhancing (Level II) approximately 657 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.

Completed project activities, reporting history, completion dates, project contacts, and project attributes are summarized in Tables 1-4 (Appendix A).

2.0 SUCCESS CRITERIA

2.1 Streams

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.

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 2.2).
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 2.3 and 2.2).
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 UTs 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 2.3 and 2.2)
Increase Thermoregulation	Attaining Vegetation Success Criteria (Section 2.2).
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 2.2)
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Documentation of two overbank events in separate monitoring years and attaining Vegetation Success Criteria (Section 2.2)
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 2.2)
Restore Stream-side Habitat	Attaining Vegetation Success Criteria (Section 2.2)
Improve Vegetation Composition and Structure	Attaining Vegetation Success Criteria (Section 2.2)

2.2 Vegetation

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.

2.3 Wetland Hydrology

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.

Wetland Goals and Success Criteria

Project Goal/Objective	Wetland Success Criteria
Improve Hydrology	
Restore Wooded Riparian Buffer	Attaining Vegetation Success Criteria (Section 2.2).
Increase Surface Storage and Retention	Two overbank events in separate monitoring years, and attaining Wetland and Vegetation Success Criteria (Sections 2.3 and 2.2).
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	
Improve Water Quality	
Increase Upland Pollutant Filtration	Attaining Wetland and Vegetation Success Criteria (Sections 2.3 and 2.2).
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 2.2).
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria (Section 2.2).
Restore Habitat	
Restore Stream-side Habitat	Attaining Vegetation Success Criteria (Section 2.2).
Improve Vegetation Composition and Structure	

3.0 MONITORING PLAN

Monitoring requirements and success criteria outlined in the latest guidance by US Army Corps of Engineers (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 NCDMS by Restoration Systems no later than December 31 of each monitoring year data is collected.

3.1 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 *NCDMS 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.

3.2 Vegetation

After planting was completed on April 8, 2016, an initial evaluation was 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) were 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. Baseline vegetation plot information can be found in Appendix C. Initial stem count measurements indicate an average of 593 planted stems per acre across the Site. In addition, each vegetation plot exceeded the minimum criteria for success.

3.3 Wetland Hydrology

Three groundwater monitoring gauges were installed to take measurements after hydrological modifications were 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, a surface water gauge has been installed in Tributary 3 to monitor flow regime of the tributary. Approximate locations of gauges are depicted on Figure 2 (Appendix A) and Asbuilt Plan Sheets (Appendix D).

4.0 MAINTENANCE AND CONTINGENCY

In the event that success criteria are not fulfilled, a mechanism for contingency will be implemented.

Stream

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.

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 ratio 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.

Vegetation

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.

Hydrology

Hydrological contingency will require consultation with hydrologists and regulatory agencies if wetland hydrology enhancement 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.

5.0 REFERENCES

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Appendix A.
General Tables and Figures

Table 1. Project Components and Mitigation Credits

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

Table 4. Project Attributes Table

Figure 1. Site Location

Figure 2. Current Conditions Plan View

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

Mitigation Credits							
Stream	Stream	Riparian Wetland			Nonriparian Wetland		
Restoration	Enhancement	Re-establishment			Re-establishment		
3318	263	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 10+04 to 23+21	1173	PI	Restoration	$1317-24=1293$	1:1	1293	24 lf of UT 1 is located outside of easement and is not credit generating
UT 2 Station 10+00 to 16+75	723	PI	Restoration	675	1:1	675	
UT 3 Station 10+00 to 11+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 11+22 to 12+12	16	PI	Restoration	90	1:1	90	
UT 4 Station 10+00 to 14+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 10+00 to 15+78	578		EII	$578-20=558$	2.5:1	223	The upper 20 linear feet of Travis Creek is within a powerline easement and is not credit generating
Travis Creek Station 15+78 to 17+87	274	PII	Restoration	209	1:1	209	
Travis Creek Station 17+87 to 18+86	99		EII	99	2.5:1	40	
Travis Creek Station 23+71 to 30+35	936	PI	Restoration	664	1:1	664	

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

Component Summation			
Restoration Level	Stream (linear footage)	Riparian Wetland (acreage)	Nonriparian Wetland (acreage)
Restoration	3359	0.5	--
Enhancement (Level I)	--	--	--
Enhancement (Level II)	657	--	
Enhancement	--	1.5**	
Totals	4016	--	--
Mitigation Units	3581 SMUs	0.5 Riparian WMUs	0.00 Nonriparian WMUs

**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 – UT 4 begins credit generation at Station 11+07).

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

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Technical Proposal (RFP No. 16-005568)	--	October 2013
DMS Contract No. 5791	--	February 2014
Mitigation Plan	October 2014	May 2015
Construction Plans	--	June 2015
Construction Earthwork	--	April 6, 2016
Planting	--	April 8, 2016
As-Built Documentation	April 2016	May 2016

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

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

**Table 4. Project Attribute Table
Aycock Springs Mitigation 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
NCDEQ 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 Mitigation 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 (Cedarock 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	Resolved	404 Permit	
Waters of the United States-Section 404	Yes	Resolved	401 Certification	
Endangered Species Act	No	--	CE Doc.	
Historic Preservation Act	No	--	CE Doc.	
Coastal Zone Management Act	No	--	NA	
FEMA Floodplain Compliance	Yes	In progress	CLOMR/LOMR	
Essential Fisheries Habitat	No	--	NA	



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: May 2016

Scale: As Shown

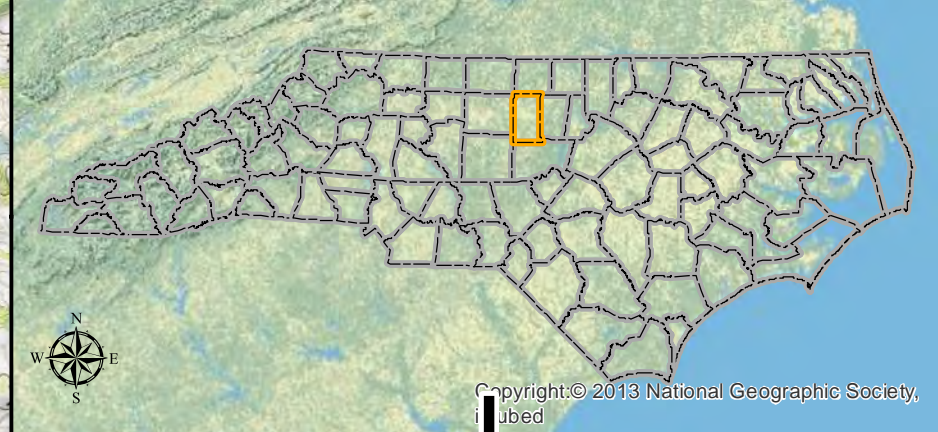
Project No.: 14-006

FIGURE

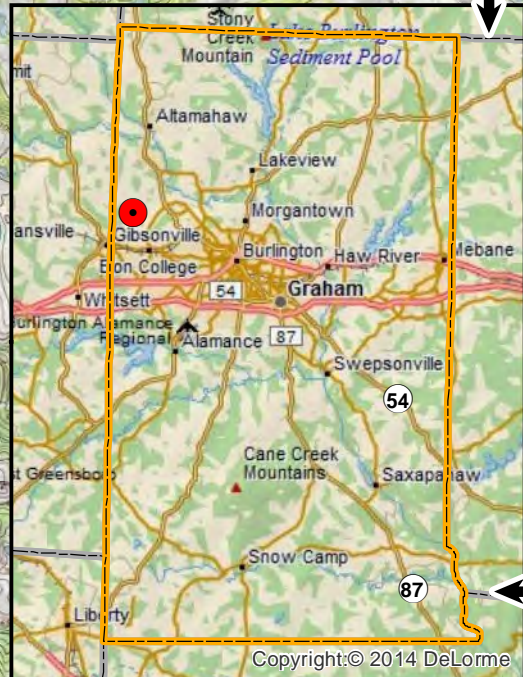
1

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



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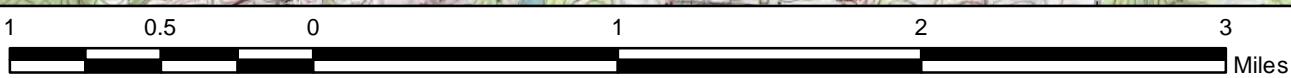
Copyright © 2014 DeLorme

Aycock Springs Stream and Wetland Mitigation Site

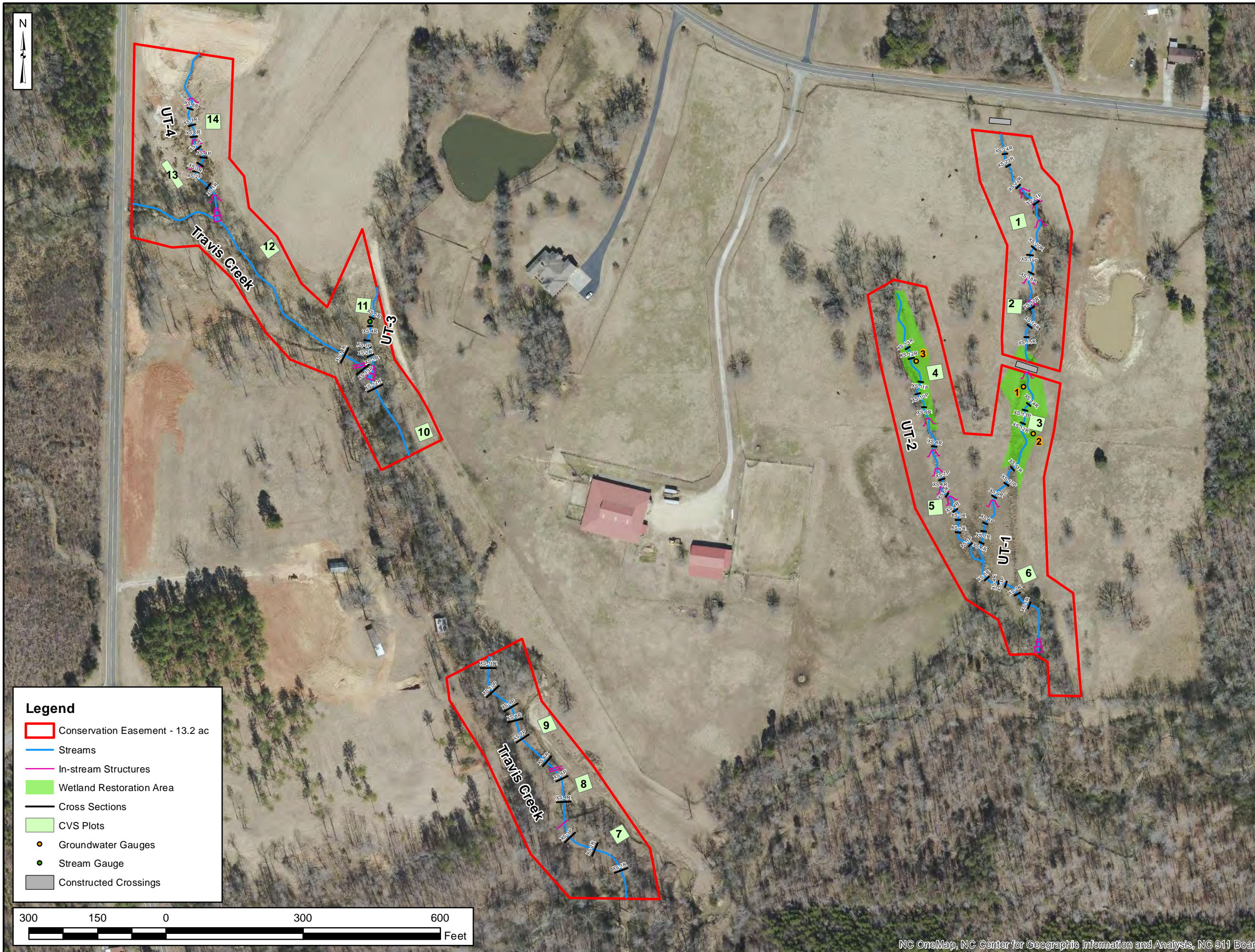
36.127271 N
-79.525214 W


Legend

- Aycock Springs Stream and Wetland Mitigation Site
- County lines



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Prepared for:

 RESTORATION SYSTEMS LLC

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

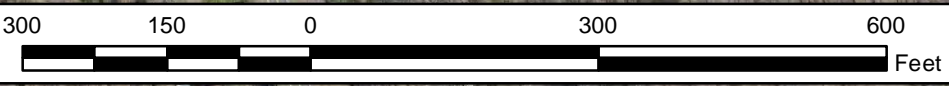
Title:
Current Conditions Plan View

Notes:
 1. Background Imagery source: 2014 aerial photography provided by the NC OneMap Program (online, supported by the NC Geographic Information Coordination Council).

Drawn by: KRJ
 Date: MAY 2016
 Scale: 1:2400
 Project No.: 14-006

FIGURE 2

- Legend**
- Conservation Easement - 13.2 ac
 - Streams
 - In-stream Structures
 - Wetland Restoration Area
 - Cross Sections
 - CVS Plots
 - Groundwater Gauges
 - Stream Gauge
 - Constructed Crossings



Appendix B
Morphological Summary Data and Plots

Tables 5A-5E. Baseline Stream Data Summary
Tables 6A-6L. Monitoring Data-Dimensional Data Summary
Substrate Plots

**Table 5A. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 1**

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarrock Park			Project Reference Cripple Creek			Design			As-built					
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med			
Dimension	USGS gage data is unavailable for this project			3.8	9.6	6.7	8	12.1	8.1	3	6.1	4.6	7.2	8.3	7.8	6.4	9.6	8.0			
BF Width (ft)				8	73	30	15	25	18	150	150	150	20	70	50					90	
Floodprone Width (ft)						4.3			8						5.9			4.3	3	6.6	3.9
BF Cross Sectional Area (ft ²)				0.8	1	0.8	0.8	1	0.8	0.7	1.5	1.1	0.5	0.7	0.6	0.4	0.7	0.5			
BF Mean Depth (ft)				1.1	1.4	1.4	1.1	1.4	1.4	1	2.3	1.7	0.7	0.9	0.8	0.6	1.1	0.7			
BF Max Depth (ft)				8	15.1	10.1	8	15.1	10.1	4	4.3	4.2	12	16	14	11	19	15			
Width/Depth Ratio				1.9	2.2	2.1	1.9	2.2	2.1	24.6	50	37.3	2.6	9	6.4	9	14	11.3			
Entrenchment Ratio				1	1.8	1	1	1.8	1	1	1.5	1.3	1	1.2	1			1			
Bank Height Ratio						===			===			===			===			===			===
Wetted Perimeter(ft)						===			===			===			===			===			===
Hydraulic radius (ft)			===			===			===			===			===			===			
Pattern																					
Channel Beltwidth (ft)	No pattern of riffles and pools due to straightening activities			20	38	22.8	15.1	29.2	24.3	23	47	31	23	47	31						
Radius of Curvature (ft)				11	27	16.5	8.9	19.4	13.2	14	31	23	14	31	23	14	31	23			
Meander Wavelength (ft)				44	116	68.4	31	74	47.8	47	94	66	47	94	66	47	94	66			
Meander Width ratio				2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4	3	6	4			
Profile																					
Riffle length (ft)	No pattern of riffles and pools due to straightening activities					===			===			===			===	9	70	16			
Riffle slope (ft/ft)				1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	2.77%	6.47%	4.16%	0.01%	4.33%	2.23%						
Pool length (ft)						===			===			===			===	4	23	9			
Pool spacing (ft)				25	69	37.2	14	39.6	32.4	23	62	31	23	62	31						
Substrate																					
d50 (mm)			===			===			===			===			===			===			
d84 (mm)			===			===			===			===			===			===			
Additional Reach Parameters																					
Valley Length (ft)			===			===			===			===			===			===			
Channel Length (ft)			===			===			===			===			===			===			
Sinuosity			1.02			1.2			1.22			1.1			1.1			1.1			
Water Surface Slope (ft/ft)			1.37% - 3.61%			2.58%			0.50%			1.27% - 3.35%			1.89%						
BF slope (ft/ft)			===			===			===			===			===			===			
Rosgen Classification			Cg			E			E			E/C			E/C			E/C			

**Table 5B. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 2**

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarrock Park			Project Reference Cripple Creek			Design			As-built				
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med		
Dimension	USGS gage data is unavailable for this project			3.8	9.6	6.7	8	12.1	8.1	3	6.1	4.6	7.2	8.3	7.8	4.8	8.6	7.2		
BF Width (ft)				8	73	30	15	25	18	150	150	150	20	70	50					90
Floodprone Width (ft)						4.3			8						4.3			1	4.2	2.3
BF Cross Sectional Area (ft ²)				0.8	1	0.8	0.8	1	0.8	0.7	1.5	1.1	0.5	0.7	0.6	0.2	0.6	0.3		
BF Mean Depth (ft)				1.1	1.4	1.4	1.1	1.4	1.4	1	2.3	1.7	0.7	0.9	0.8	0.3	0.8	0.6		
BF Max Depth (ft)				8	15.1	10.1	8	15.1	10.1	4	4.3	4.2	12	16	14	12	32	22		
Width/Depth Ratio				1.9	2.2	2.1	1.9	2.2	2.1	24.6	50	37.3	2.6	9	6.4	11	19	13		
Entrenchment Ratio				1	1.8	1	1	1.8	1	1	1.5	1.3	1	1.2	1			1		
Bank Height Ratio						===			===			===			===			===		
Wetted Perimeter(ft)						===			===			===			===			===		
Hydraulic radius (ft)			===			===			===			===			===					
Pattern																				
Channel Beltwidth (ft)	No pattern of riffles and pools due to straightening activities						20	38	22.8	15.1	29.2	24.3	23	47	31	23	47	31		
Radius of Curvature (ft)							11	27	16.5	8.9	19.4	13.2	14	31	23	14	31	23		
Meander Wavelength (ft)							44	116	68.4	31	74	47.8	47	94	66	47	94	66		
Meander Width ratio							2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4		
Profile																				
Riffle length (ft)	No pattern of riffles and pools due to straightening activities								===			===			===	9	23	14		
Riffle slope (ft/ft)							1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	2.77%	6.47%	4.16%	0.00%	5.24%	2.88%		
Pool length (ft)									===			===			===			5	17	10
Pool spacing (ft)	25	69	37.2	14	39.6	32.4	23	62	31	23	62	31								
Substrate																				
d50 (mm)			===			===			===			===			===					
d84 (mm)			===			===			===			===			===					
Additional Reach Parameters																				
Valley Length (ft)			===			===			===			===			===					
Channel Length (ft)			===			===			===			===			===					
Sinuosity			1.02			1.2			1.22			1.1			1.1					
Water Surface Slope (ft/ft)			1.37% - 3.61%			2.58%			0.50%			1.27% - 3.35%					3.01%			
BF slope (ft/ft)			===			===			===			===			===					
Rosgen Classification			Cg			E			E			E/C			E/C					

Note: UT 2 is characterized by a spring/seep, with a very small watershed. The channel was constructed with a smaller Bankfull Cross Sectional area to account for the smaller stormwater pulses and controlled discharge. In addition, the lower reaches of the channel are low slope wetlands that elevate the width-to-depth ratio in post construction measurements.

**Table 5C. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 3**

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarrock Park			Project Reference Cripple Creek			Design			As-built				
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med		
Dimension																				
BF Width (ft)	USGS gage data is unavailable for this project			4.1	5	4.5	8	12.1	8.1	3	6.1	4.6	7.2	8.3	7.8	4.7	7	5.9		
Floodprone Width (ft)				7	18	12	15	25	18	150	150	150	20	70	50	10	20	20		
BF Cross Sectional Area (ft ²)						2.2			8					5.9			4.3	1.2	2.7	2.1
BF Mean Depth (ft)				0.4	0.5	0.5	0.8	1	0.8	0.7	1.5	1.1	0.5	0.7	0.6	0.2	0.4	0.4		
BF Max Depth (ft)				0.8	1.1	1	1.1	1.4	1.4	1	2.3	1.7	0.7	0.9	0.8	0.5	0.6	0.6		
Width/Depth Ratio				8.2	12.5	9.9	8	15.1	10.1	4	4.3	4.2	12	16	14	12	26	20		
Entrenchment Ratio				1.7	3.6	2.5	1.9	2.2	2.1	24.6	50	37.3	2.6	9	6.4	2	4	3.3		
Bank Height Ratio				1	3	2	1	1.8	1	1	1.5	1.3	1	1.2	1			1		
Wetted Perimeter(ft)						===			===			===			===			===		
Hydraulic radius (ft)						===			===			===			===			===		
Pattern																				
Channel Beltwidth (ft)	No pattern of riffles and pools due to straightening activities			20	38	22.8	15.1	29.2	24.3	23	47	31	23	47	31					
Radius of Curvature (ft)				11	27	16.5	8.9	19.4	13.2	14	31	23	14	31	23					
Meander Wavelength (ft)				44	116	68.4	31	74	47.8	47	94	66	47	94	66					
Meander Width ratio				2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4					
Profile																				
Riffle length (ft)	No pattern of riffles and pools due to straightening activities					===			===			===			===	8	24	14		
Riffle slope (ft/ft)				1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	2.77%	6.47%	4.16%	0.52%	2.54%	1.71%					
Pool length (ft)						===			===			===			===	6	10	8		
Pool spacing (ft)				25	69	37.2	14	39.6	32.4	23	62	31	23	62	31					
Substrate																				
d50 (mm)			===			===			===			===			===					
d84 (mm)			===			===			===			===			===					
Additional Reach Parameters																				
Valley Length (ft)			===			===			===			===			===					
Channel Length (ft)			===			===			===			===			===					
Sinuosity			1.01			1.2			1.22			1.1			1.1					
Water Surface Slope (ft/ft)			1.53%			2.58%			0.50%			1.27% 3.35%			0.92%					
BF slope (ft/ft)			===			===			===			===			===					
Rosgen Classification			Eg			E			E			E/C			E/C					

Note: UT 3 is characterized by a pond in the headwaters; therefore, the channel was constructed with a smaller Bankfull Cross Sectional area than other tributaries associated with the project.

**Table 5D. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 4**

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarrock Park			Project Reference Cripple Creek			Design			As-built		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension	USGS gage data is unavailable for this project			4.8	11.7	8.3	8	12.1	8.1	3	6.1	4.6	8.7	10	9.4	8	10.9	8.5
BF Width (ft)				8	70	39	15	25	18	150	150	150	70	200	150			50
Floodprone Width (ft)						6.3			8			5.9			6.3	3.5	5.6	4.3
BF Cross Sectional Area (ft ²)				0.5	1.3	0.8	0.8	1	0.8	0.7	1.5	1.1	0.6	0.8	0.7	0.4	0.6	0.5
BF Mean Depth (ft)				0.9	2	1.5	1.1	1.4	1.4	1	2.3	1.7	0.8	1.1	1	0.6	0.9	0.8
BF Max Depth (ft)				3.7	23.4	12.4	8	15.1	10.1	4	4.3	4.2	12	16	14	16	22	19
Width/Depth Ratio				1.2	11.5	4.9	1.9	2.2	2.1	24.6	50	37.3	7.5	21.3	16	5	6	6
Entrenchment Ratio				1.2	2.4	1.8	1	1.8	1	1	1.5	1.3	1	1.2	1			1
Bank Height Ratio						===			===			===			===			===
Wetted Perimeter (ft)						===			===			===			===			===
Hydraulic radius (ft)						===			===			===			===			===
Pattern																		
Channel Beltwidth (ft)				No pattern of riffles and pools due to straightening activities	20	38	22.8	15.1	29.2	24.3	28	56	38	28	56	38		
Radius of Curvature (ft)					11	27	16.5	8.9	19.4	13.2	17	38	28	17	38	28		
Meander Wavelength (ft)					44	116	68.4	31	74	47.8	56	113	80	56	113	80		
Meander Width ratio					2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4		
Profile																		
Riffle length (ft)				No pattern of riffles and pools due to straightening activities			===			===			===	12	35	16		
Riffle slope (ft/ft)					1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	1.12%	2.60%	1.67%	0.61%	2.42%	1.28%		
Pool length (ft)							===			===			===	14	42	22		
Pool spacing (ft)					25	69	37.2	14	39.6	32.4	28	75	38	28	75	38		
Substrate																		
d50 (mm)						===			===			===			===			===
d84 (mm)						===			===			===			===			===
Additional Reach Parameters																		
Valley Length (ft)						===			===			===			===			===
Channel Length (ft)						===			===			===			===			===
Sinuosity						1.1			1.2			1.22			1.1			1.1
Water Surface Slope (ft/ft)						0.93%			2.58%			0.50%			0.93%			0.66%
BF slope (ft/ft)						===			===			===			===			===
Rosgen Classification						Eg			E			E			E/C			E/C

**Table 5E. Baseline Morphology and Hydraulic Summary
Aycock Springs Travis Creek**

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarrock Park			Project Reference Cripple Creek			Design			As-built				
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med		
Dimension																				
BF Width (ft)	USGS gage data is unavailable for this project			30	51.7	41.4	8	12.1	8.1	3	6.1	4.6	25.7	29.6	27.7	25.2	30.3	26.7		
Floodprone Width (ft)				68	160	122	15	25	18	150	150	150	200	300	250					150
BF Cross Sectional Area (ft ²)						54.9			8					5.9			54.9	41.3	73.9	51.2
BF Mean Depth (ft)				1.1	1.8	1.4	0.8	1	0.8	0.7	1.5	1.1	1.9	2.1	2	1.6	2.4	2		
BF Max Depth (ft)				3.3	4.1	3.7	1.1	1.4	1.4	1	2.3	1.7	2.7	3	2.8	2.3	3.4	2.8		
Width/Depth Ratio				16.7	47	32.1	8	15.1	10.1	4	4.3	4.2	12	16	14	12	16	13		
Entrenchment Ratio				1.6	5.3	3.2	1.9	2.2	2.1	24.6	50	37.3	7.2	10.8	9	5	6	5.6		
Bank Height Ratio				1	1.1	1	1	1.8	1	1	1.5	1.3	1	1.2	1			1		
Wetted Perimeter(ft)						===			===			===			===			===		
Hydraulic radius (ft)						===			===			===			===			===		
Pattern																				
Channel Beltwidth (ft)	No pattern of riffles and pools due to straightening activities			20	38	22.8	15.1	29.2	24.3	83	166	111	83	166	111					
Radius of Curvature (ft)				11	27	16.5	8.9	19.4	13.2	55	111	83	55	111	83					
Meander Wavelength (ft)				44	116	68.4	31	74	47.8	166	332	236	166	332	236					
Meander Width ratio				2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4					
Profile																				
Riffle length (ft)	No pattern of riffles and pools due to straightening activities					===			===			===			===	16	87	54		
Riffle slope (ft/ft)				1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	0.28%	0.64%	0.41%	0.00%	0.70%	0.19%					
Pool length (ft)						===			===			===			===	27	70	43		
Pool spacing (ft)				25	69	37.2	14	39.6	32.4	83	222	111	83	222	111					
Substrate																				
d50 (mm)			===			===			===			===			===					
d84 (mm)			===			===			===			===			===					
Additional Reach Parameters																				
Valley Length (ft)			===			===			===			===			===					
Channel Length (ft)			===			===			===			===			===					
Sinuosity			1.05			1.2			1.22			1.05			1.05					
Water Surface Slope (ft/ft)			NA			2.58%			0.50%			0.23%			0.10%					
BF slope (ft/ft)			===			===			===			===			===					
Rosgen Classification			Fc			E			E			E/C			E/C					

**Table 6A. Morphology and Hydraulic Monitoring Summary
Aycock Travis Creek (Downstream) - Stream and Wetland Restoration Site**

Parameter	XS 1 Riffle (Travis Down)					XS 2 Riffle (Travis Down)					XS 3 Pool (Travis Down)					XS 4 Riffle (Travis Down)					XS 5 Pool (Travis Down)					XS 6 Riffle (Travis Down)												
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5		
Dimension																																						
BF Width (ft)	26						25.2						33.7						25.5							26							27.3					
Floodprone Width (ft)	150						150						---						150							---							150					
BF Cross Sectional Area (ft ²)	41.3						47.5						58.7						47.2							61.4							54.9					
BF Mean Depth (ft)	1.6						1.9						1.7						1.9							2.4							2.0					
BF Max Depth (ft)	2.3						2.5						3.7						2.5							4							3					
Width/Depth Ratio	16.368						13.4						---						13.8							---							13.6					
Entrenchment Ratio	5.76923						5.95						---						5.88							---							5.5					
Bank Height Ratio	1						1						---						1							---							1					
Wetted Perimeter (ft)	27.1						26.4						34.8						26.6							27.6							28.7					
Hydraulic Radius (ft)	1.5						1.8						1.7						1.8							2.2							1.9					
Substrate																																						
d50 (mm)	---						---						---						---							---							---					
d84 (mm)	---						---						---						---							---							---					

Parameter	XS 7 Pool (Travis Down)					XS 8 Riffle (Travis Down)					XS 9 Pool (Travis Down)					XS 10 Pool (Travis Down)					XS 11 Riffle (Travis Down)											
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5		
Dimension																																
BF Width (ft)	25.9						28.1						29.3						38.6							30.3						
Floodprone Width (ft)	---						150						---						---							150						
BF Cross Sectional Area (ft ²)	60						64.6						65.9						100							73.9						
BF Mean Depth (ft)	2.3						2.3						2.2						2.6							2.4						
BF Max Depth (ft)	3.9						3.3						3.7						4.3							3.4						
Width/Depth Ratio	---						12.2						---						---							12.4						
Entrenchment Ratio	---						5.3						---						---							5.0						
Bank Height Ratio	---						1						---						---							1						
Wetted Perimeter (ft)	27.5						29.5						30.6						40.2							31.8						
Hydraulic Radius (ft)	2.2						2.2						2.2						2.5							2.3						
Substrate																																
d50 (mm)	---						---						---						---							---						
d84 (mm)	---						---						---						---							---						

**Table 6B. Morphology and Hydraulic Monitoring Summary
Aycock Travis Creek (Downstream) - Stream and Wetland Restoration Site**

Parameter	MY-00 (2016)								
	Min	Max	Med	Min	Max	Med	Min	Max	Med
Pattern									
Channel Beltwidth (ft)	83	166	111						
Radius of Curvature (ft)	55	111	83						
Meander Wavelength (ft)	166	332	236						
Meander Width Ratio	3	6	4						
Profile									
Riffle Length (ft)	16	87	54						
Riffle Slope (ft/ft)	0.00%	0.70%	0.19%						
Pool Length (ft)	27	70	43						
Pool Spacing (ft)	83	222	111						
Additional Reach Parameters									
Valley Length (ft)		632							
Channel Length (ft)		664							
Sinuosity		1.05							
Water Surface Slope (ft/ft)		0.001							
BF Slope (ft/ft)		-----							
Rosgen Classification		C/E							

Table 6C. Morphology and Hydraulic Monitoring Summary
Aycock Travis Creek (Upstream) - Stream and Wetland Restoration Site

Parameter	XS 12 Riffle (Travis Up)						XS 13 Pool (Travis Up)						XS 14 Riffle (Travis Up)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																		
BF Width (ft)	29						26.9						32.8					
Floodprone Width (ft)	----						----						150					
BF Cross Sectional Area (ft ²)	68.7						64.0						104.5					
BF Mean Depth (ft)	2.4						2.4						3.2					
BF Max Depth (ft)	3.4						3.9						4.8					
Width/Depth Ratio	----						----						10.3					
Entrenchment Ratio	----						----						4.6					
Bank Height Ratio	----						----						1.0					
Wetted Perimeter (ft)	30.4						28.8						35.0					
Hydraulic Radius (ft)	2.3						2.2						3.0					
Substrate																		
d50 (mm)	----						----						----					
d84 (mm)	----						----						----					

Table 6D. Morphology and Hydraulic Monitoring Summary
Aycock Travis Creek (Upstream) - Stream and Wetland Restoration Site

Parameter	MY-00 (2016)																	
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Pattern																		
Channel Beltwidth (ft)	83	166	111															
Radius of Curvature (ft)	55	111	83															
Meander Wavelength (ft)	166	332	236															
Meander Width Ratio	3	6	4															
Profile																		
Riffle Length (ft)	16	87	54															
Riffle Slope (ft/ft)	0.00%	0.70%	0.19%															
Pool Length (ft)	27	70	43															
Pool Spacing (ft)	83	222	111															
Additional Reach Parameters																		
Valley Length (ft)	199																	
Channel Length (ft)	209																	
Sinuosity	1.05																	
Water Surface Slope (ft/ft)	0.0009																	
BF Slope (ft/ft)	-----																	
Rosgen Classification	C/E																	

**Table 6E. Morphology and Hydraulic Monitoring Summary
Aycock UT-1 - Stream and Wetland Restoration Site**

Parameter	XS 1 Riffle (UT 1)						XS 2 Riffle (UT 1)						XS 3 Pool (UT 1)						XS 4 Riffle (UT 1)						XS 5 Riffle (UT 1)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																														
BF Width (ft)	9.3						8.8						8.4						9.3						9.6					
Floodprone Width (ft)	90						90						---						90						90					
BF Cross Sectional Area (ft2)	5.6						4.6						6.7						6.2						6.6					
BF Mean Depth (ft)	0.6						0.5						0.8						0.7						0.7					
BF Max Depth (ft)	1.1						0.7						1.3						1						1.1					
Width/Depth Ratio	15.4						16.8						---						14.0						14.0					
Entrenchment Ratio	9.7						10.2						---						9.7						9.4					
Bank Height Ratio	1.0						1.0						---						1.0						1.0					
Wetted Perimeter (ft)	9.7						9						8.9						9.7						10					
Hydraulic Radius (ft)	0.6						0.5						0.7						0.6						0.7					
Substrate																														
d50 (mm)	---						---						---						---						---					
d84 (mm)	---						---						---						---						---					

Parameter	XS 6 Riffle (UT 1)						XS 7 Riffle (UT 1)						XS 8 Pool (UT 1)						XS 9 Riffle (UT 1)						XS 10 Pool (UT 1)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																														
BF Width (ft)	6.9						7.5						7.8						7.9						7.6					
Floodprone Width (ft)	90						90						---						90						---					
BF Cross Sectional Area (ft2)	3.6						3.9						5.7						3						4.7					
BF Mean Depth (ft)	0.5						0.5						0.7						0.4						0.6					
BF Max Depth (ft)	0.7						0.7						1.2						0.7						1.1					
Width/Depth Ratio	13.2						14.4						---						20.8						---					
Entrenchment Ratio	13.0						12.0						---						11.4						---					
Bank Height Ratio	1.0						1.0						---						1.0						---					
Wetted Perimeter (ft)	7.2						7.8						8.3						8						8					
Hydraulic Radius (ft)	0.5						0.5						0.7						0.4						0.6					
Substrate																														
d50 (mm)	---						---						---						---						---					
d84 (mm)	---						---						---						---						---					

Parameter	XS 11 Riffle (UT 1)						XS 12 Riffle (UT 1)						XS 13 Pool (UT 1)						XS 14 Riffle (UT 1)						XS 15 Riffle (UT 1)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																														
BF Width (ft)	7.4						8						8.6						6.4						7.1					
Floodprone Width (ft)	90						90						---						90						90					
BF Cross Sectional Area (ft2)	3.5						3.7						6.5						3.1						4					
BF Mean Depth (ft)	0.5						0.5						0.8						0.5						0.6					
BF Max Depth (ft)	0.8						0.7						1.2						0.7						0.9					
Width/Depth Ratio	15.6						17.3						---						13.2						12.6					
Entrenchment Ratio	12.2						11.3						---						14.1						12.7					
Bank Height Ratio	1.0						1.0						---						1.0						1.0					
Wetted Perimeter (ft)	7.8						8.5						9.2						6.8						7.4					
Hydraulic Radius (ft)	0.4						0.4						0.7						0.5						0.5					
Substrate																														
d50 (mm)	---						---						---						---						---					
d84 (mm)	---						---						---						---						---					

**Table 6E continued. Morphology and Hydraulic Monitoring Summary
Aycock UT-1 - Stream and Wetland Restoration Site**

Parameter	XS 16 Riffle (UT 1)						XS 17 Riffle (UT 1)						XS 18 Riffle (UT 1)						XS 19 Pool (UT 1)						XS 20 Riffle (UT 1)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																														
BF Width (ft)	9						8.5						7.1						7.6						9.1					
Floodprone Width (ft)	90						90						90						---						90					
BF Cross Sectional Area (ft ²)	4.6						3.9						3.5						6.5						5.3					
BF Mean Depth (ft)	0.5						0.5						0.5						0.9						0.6					
BF Max Depth (ft)	0.8						0.7						0.6						1.3						0.9					
Width/Depth Ratio	17.6						18.5						14.4						---						15.6					
Entrenchment Ratio	10.0						10.6						12.7						---						9.9					
Bank Height Ratio	1.0						1.0						1.0						---						1.0					
Wetted Perimeter (ft)	9.3						8.7						7.4						8.2						9.4					
Hydraulic Radius (ft)	0.5						0.5						0.5						0.8						0.6					
Substrate																														
d50 (mm)	---						---						---						---						---					
d84 (mm)	---						---						---						---						---					

Parameter	XS 21 Pool (UT 1)						XS 22 Riffle (UT 1)						XS 23 Riffle (UT 1)						XS 24 Riffle (UT 1)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																								
BF Width (ft)	8.3						7.2						7.6						8					
Floodprone Width (ft)	---						90						90						90					
BF Cross Sectional Area (ft ²)	9.3						3.6						3.2						4					
BF Mean Depth (ft)	1.1						0.5						0.4						0.5					
BF Max Depth (ft)	2.1						0.7						0.6						0.7					
Width/Depth Ratio	---						14.4						18.1						16.0					
Entrenchment Ratio	---						12.5						11.8						11.3					
Bank Height Ratio	---						1.0						1.0						1.0					
Wetted Perimeter (ft)	9.5						7.5						9.3						9.3					
Hydraulic Radius (ft)	1						0.5						0.5						0.5					
Substrate																								
d50 (mm)	---						---						---						---					
d84 (mm)	---						---						---						---					

**Table 6F. Morphology and Hydraulic Monitoring Summary
Aycock UT-1 - Stream and Wetland Restoration Site**

Parameter	MY-00 (2016)																	
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Pattern																		
Channel Beltwidth (ft)	23	47	31															
Radius of Curvature (ft)	14	31	23															
Meander Wavelength (ft)	47	94	66															
Meander Width Ratio	3	6	4															
Profile																		
Riffle Length (ft)	9	70	16															
Riffle Slope (ft/ft)	0.01%	4.33%	2.23%															
Pool Length (ft)	4	23	9															
Pool Spacing (ft)	23	62	31															
Additional Reach Parameters																		
Valley Length (ft)	1174																	
Channel Length (ft)	1,291																	
Sinuosity	1.1																	
Water Surface Slope (ft/ft)	0.0189																	
BF Slope (ft/ft)	-----																	
Rosgen Classification	C/E																	

**Table 6G. Morphology and Hydraulic Monitoring Summary
Aycock UT-2 - Stream and Wetland Restoration Site**

Parameter	XS 1 Pool (UT 2)					XS 2 Riffle (UT 2)					XS 3 Riffle (UT 2)					XS 4 Riffle (UT 2)					XS 5 Riffle (UT 2)					XS 6 Riffle (UT 2)					XS 7 Pool (UT 2)											
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																																										
BF Width (ft)	6.5						4.8						5.7						6.4						8.4						6.9						8.3					
Floodprone Width (ft)	----						90						90						90						90						90						----					
BF Cross Sectional Area (ft ²)	3.8						1						1.7						1						3.1						2.3						5.1					
BF Mean Depth (ft)	0.6						0.2						0.3						0.2						0.4						0.3						0.6					
BF Max Depth (ft)	1						0.3						0.5						0.4						0.7						0.6						1.1					
Width/Depth Ratio	----						23.0						19.1						41.0						22.8						20.7						----					
Entrenchment Ratio	----						18.8						15.8						14.1						10.7						13.0						----					
Bank Height Ratio	----						1.0						1.0						1.0						1.0						1.0						----					
Wetted Perimeter (ft)	6.9						4.9						5.8						6.5						8.6						7.0						8.8					
Hydraulic Radius (ft)	0.6						0.2						0.3						0.2						0.4						0.3						0.6					
Substrate																																										
d50 (mm)	----						----						----						----						----						----						----					
d84 (mm)	----						----						----						----						----						----						----					

Parameter	XS 8 Riffle (UT 2)					XS 9 Riffle (UT 2)					XS 10 Pool (UT 2)					XS 11 Pool (UT 2)					XS 12 Riffle (UT 2)					XS 13 Riffle (UT 2)										
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																																				
BF Width (ft)	8.6						7.4						7.5						6.2						8.3						7.2					
Floodprone Width (ft)	90						90						----						----						90						90					
BF Cross Sectional Area (ft ²)	3.6						4.2						5.2						3.5						3.2						2.1					
BF Mean Depth (ft)	0.4						0.6						0.7						0.6						0.4						0.3					
BF Max Depth (ft)	0.6						0.8						1.3						0.8						0.7						0.4					
Width/Depth Ratio	20.5						13.0						----						----						21.5						24.7					
Entrenchment Ratio	10.5						12.2						----						----						10.8						12.5					
Bank Height Ratio	1.0						1.0						----						----						1.0						1.0					
Wetted Perimeter (ft)	8.8						7.7						8.1						6.6						8.6						7.3					
Hydraulic Radius (ft)	0.4						0.5						0.7						0.5						0.4						0.3					
Substrate																																				
d50 (mm)	----						----						----						----						----						----					
d84 (mm)	----						----						----						----						----						----					

**Table 6H. Morphology and Hydraulic Monitoring Summary
Aycock UT-2 - Stream and Wetland Restoration Site**

Parameter	MY-00 (2016)																	
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Pattern																		
Channel Beltwidth (ft)	23	47	31															
Radius of Curvature (ft)	14	31	23															
Meander Wavelength (ft)	47	94	66															
Meander Width Ratio	3	6	4															
Profile																		
Riffle Length (ft)	9	23	14															
Riffle Slope (ft/ft)	0.00%	5.24%	2.88%															
Pool Length (ft)	5	17	10															
Pool Spacing (ft)	23	62	31															
Additional Reach Parameters																		
Valley Length (ft)	614																	
Channel Length (ft)	675																	
Sinuosity	1.1																	
Water Surface Slope (ft/ft)	0.0301																	
BF Slope (ft/ft)	-----																	
Rosgen Classification	C/E																	

**Table 6I. Morphology and Hydraulic Monitoring Summary
Aycok UT-3 - Stream and Wetland Restoration Site**

Parameter	XS 1 Riffle (UT 3)					XS 2 Riffle (UT 3)					XS 3 Pool (UT 3)					XS 4 Riffle (UT 3)					XS 5 Riffle (UT 3)									
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																														
BF Width (ft)	6.5						4.7						5						7						5.3					
Floodprone Width (ft)	10						20						----						20						20					
BF Cross Sectional Area (ft2)	2.7						1.9						3.6						2.2						1.2					
BF Mean Depth (ft)	0.4						0.4						0.7						0.3						0.2					
BF Max Depth (ft)	0.6						0.6						1						0.5						0.5					
Width/Depth Ratio	15.6						11.6						----						22.3						23.4					
Entrenchment Ratio	1.5						4.3						----						2.9						3.8					
Bank Height Ratio	1.0						1.0						----						1.0						1.0					
Wetted Perimeter (ft)	6.8						5.0						5.7						7.1						5.7					
Hydraulic Radius (ft)	0.4						0.4						0.6						0.3						0.2					
Substrate																														
d50 (mm)	----						----						----						----						----					
d84 (mm)	----						----						----						----						----					

**Table 6J. Morphology and Hydraulic Monitoring Summary
Aycok UT-3 - Stream and Wetland Restoration Site**

Parameter	MY-00 (2016)																	
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Pattern																		
Channel Beltwidth (ft)	23	47	31															
Radius of Curvature (ft)	14	31	23															
Meander Wavelength (ft)	47	94	66															
Meander Width Ratio	3	6	4															
Profile																		
Riffle Length (ft)	8	24	14															
Riffle Slope (ft/ft)	0.52%	2.54%	1.71%															
Pool Length (ft)	6	10	8															
Pool Spacing (ft)	23	62	31															
Additional Reach Parameters																		
Valley Length (ft)		193																
Channel Length (ft)		212																
Sinuosity		1.1																
Water Surface Slope (ft/ft)		0.0092																
BF Slope (ft/ft)		-----																
Rosgen Classification		C/E																

**Table 6K. Morphology and Hydraulic Monitoring Summary
Aycock UT-4 - Stream and Wetland Restoration Site**

Parameter	XS 1 Riffle (UT 4)						XS 2 Pool (UT 4)						XS 3 Riffle (UT 4)						XS 4 Pool (UT 4)						XS 5 Riffle (UT 4)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																														
BF Width (ft)	8.3						8.5						8.6						8.5						8					
Floodprone Width (ft)	50						---						50						---						50					
BF Cross Sectional Area (ft ²)	3.7						6.4						4.3						6.2						4.3					
BF Mean Depth (ft)	0.4						0.8						0.5						0.7						0.5					
BF Max Depth (ft)	0.6						1.5						0.8						1.2						0.7					
Width/Depth Ratio	18.6						---						17.2						---						14.9					
Entrenchment Ratio	6.0						---						5.8						---						6.3					
Bank Height Ratio	1.0						---						1.0						---						1.0					
Wetted Perimeter (ft)	8.6						9.2						9.0						9.1						8.3					
Hydraulic Radius (ft)	0.4						0.7						0.5						0.7						0.5					
Substrate																														
d50 (mm)	---						---						---						---						---					
d84 (mm)	---						---						---						---						---					

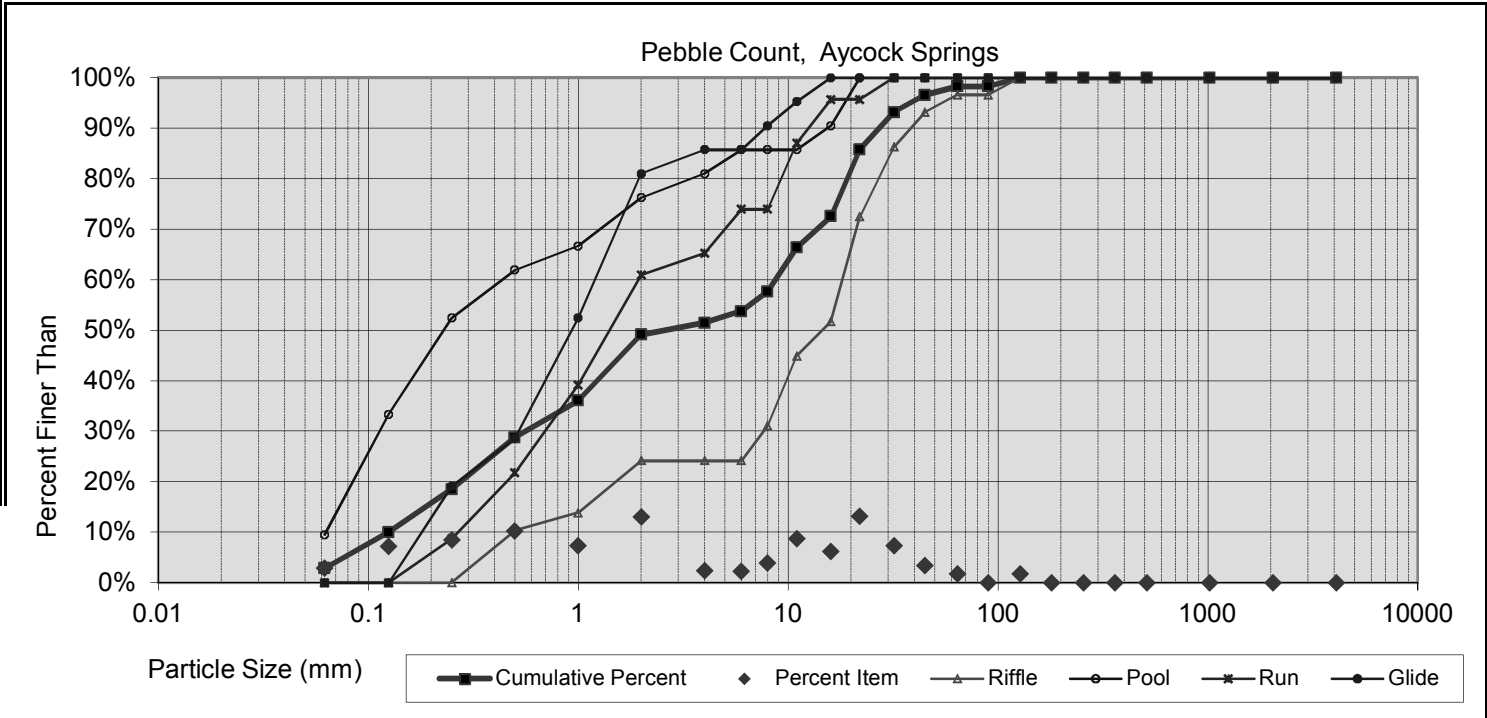
Parameter	XS 6 Riffle (UT 4)						XS 7 Riffle (UT 4)						XS 8 Riffle (UT 4)					
	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5	MY 0	MY1	MY2	MY3	MY4	MY5
Dimension																		
BF Width (ft)	8.1						9.9						10.9					
Floodprone Width (ft)	50						50						50					
BF Cross Sectional Area (ft ²)	3.5						5.6						5.6					
BF Mean Depth (ft)	0.4						0.6						0.5					
BF Max Depth (ft)	0.6						0.9						0.8					
Width/Depth Ratio	18.7						17.5						21.2					
Entrenchment Ratio	6.2						5.1						4.6					
Bank Height Ratio	1.0						1.0						1.0					
Wetted Perimeter (ft)	8.4						10.2						11.1					
Hydraulic Radius (ft)	0.4						0.6						0.5					
Substrate																		
d50 (mm)	---						---						---					
d84 (mm)	---						---						---					

**Table 6L. Morphology and Hydraulic Monitoring Summary
Aycock UT-4 - Stream and Wetland Restoration Site**

Parameter	MY-00 (2016)																	
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Pattern																		
Channel Beltwidth (ft)	28	56	38															
Radius of Curvature (ft)	17	38	28															
Meander Wavelength (ft)	56	113	80															
Meander Width Ratio	3	6	4															
Profile																		
Riffle Length (ft)	12	35	16															
Riffle Slope (ft/ft)	0.61%	2.42%	1.28%															
Pool Length (ft)	14	42	22															
Pool Spacing (ft)	28	75	38															
Additional Reach Parameters																		
Valley Length (ft)		278																
Channel Length (ft)		306																
Sinuosity		1.1																
Water Surface Slope (ft/ft)		0.0066																
BF Slope (ft/ft)		-----																
Rosgen Classification		C/E																

10	Pebble Count,
10	
Aycok Springs	
Cape Fear	

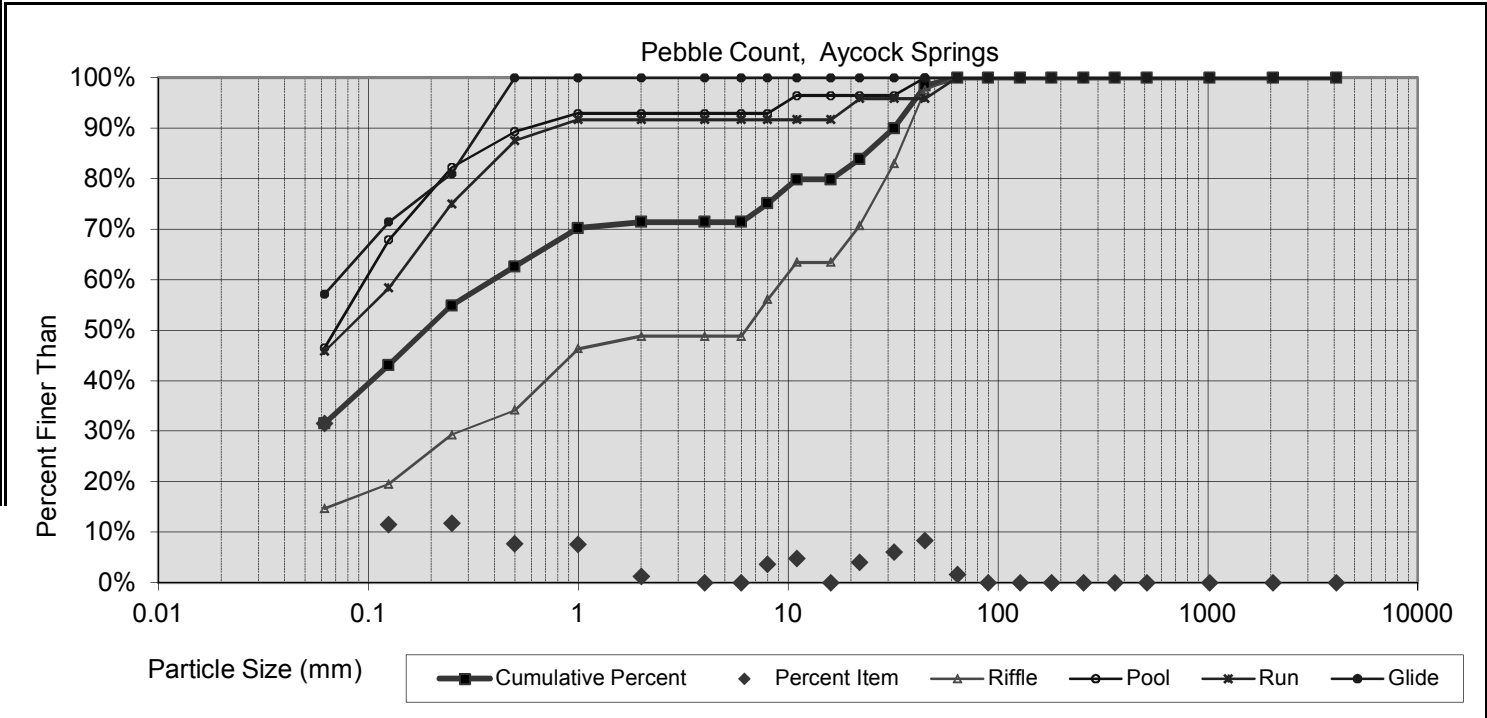
Note:	UT-1 - Reach-wide



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
0.204	0.90	2.6	21	39	3%	46%	49%	2%	0%	0%

10	Pebble Count,
10	
Aycok Springs	
Cape Fear	

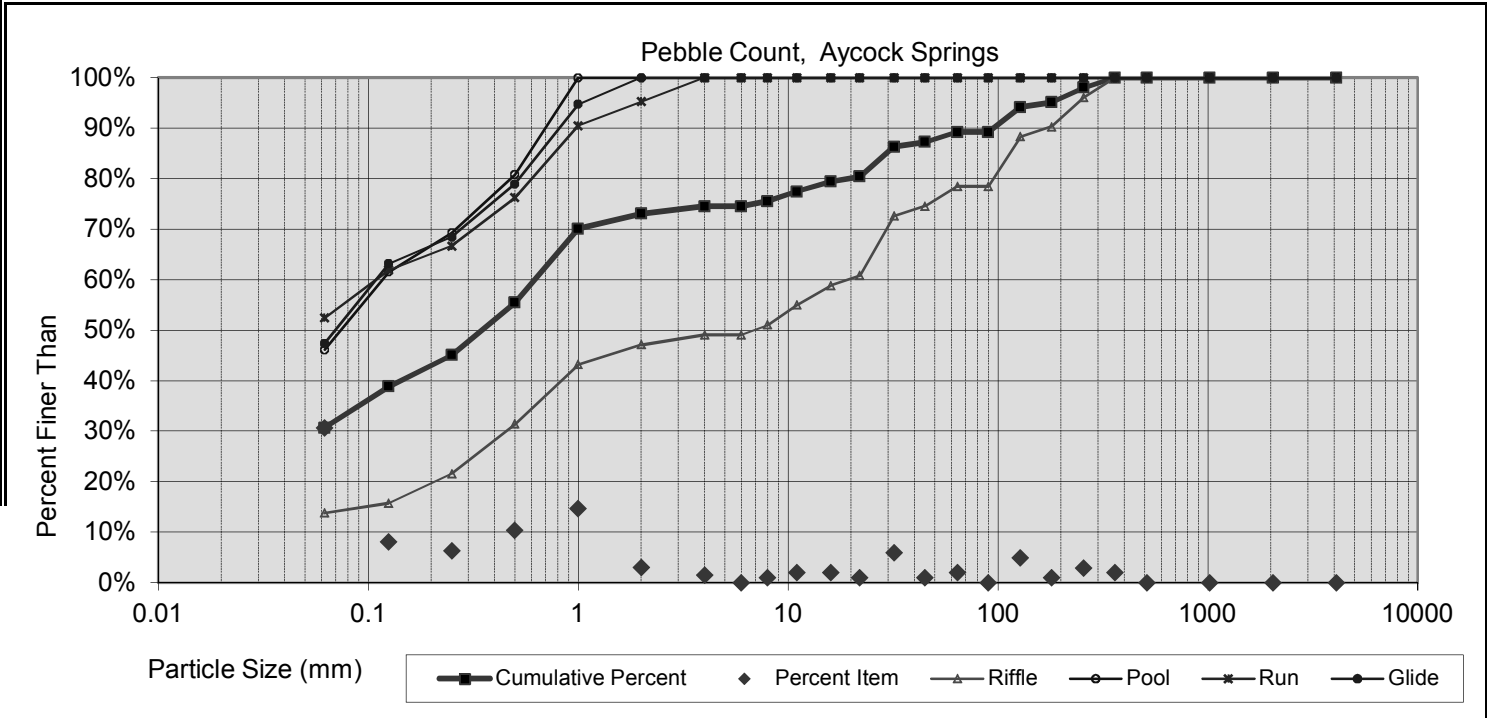
Note: UT-2 - Reach-wide	



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	0.08	0.2	22	39	32%	40%	29%	0%	0%	0%

10	Pebble Count,
10	
	Aycock Springs
	Cape Fear

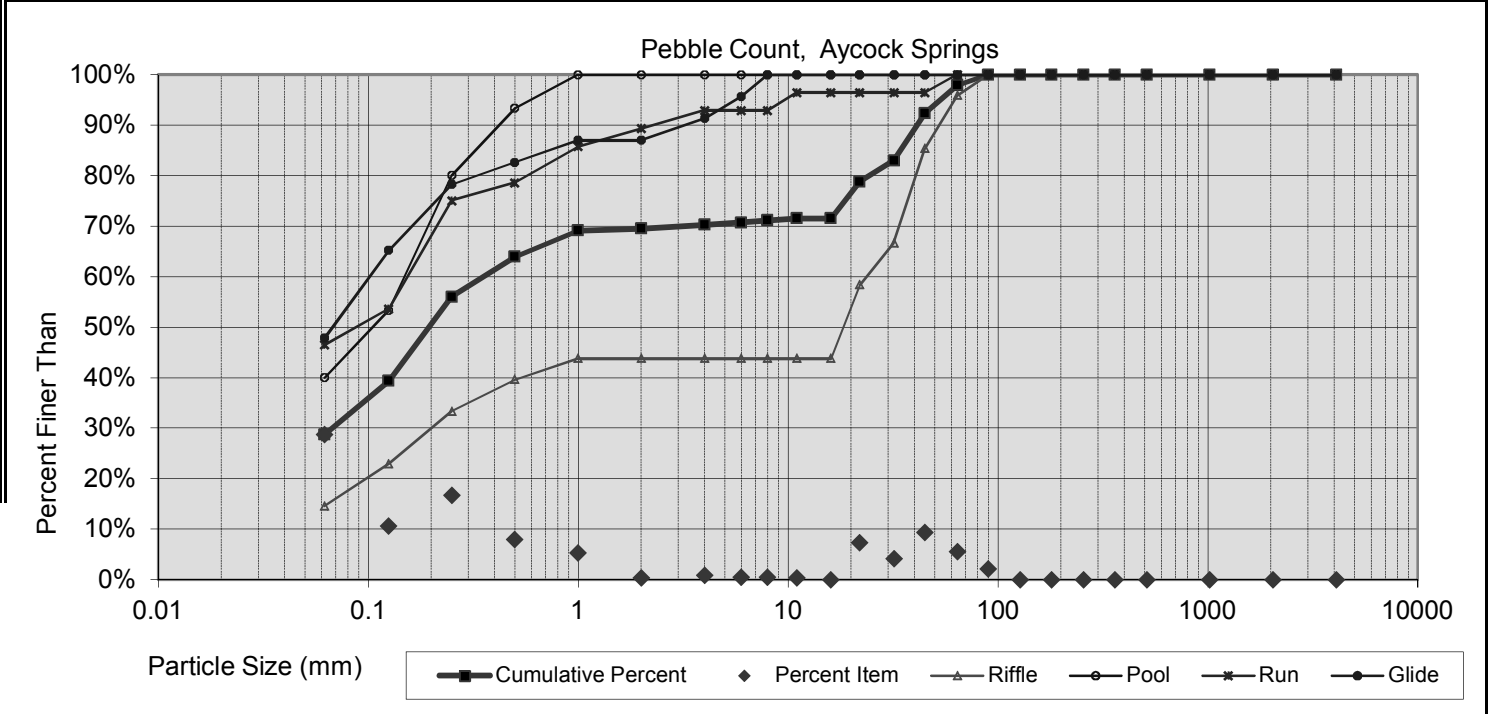
	Note: UT-3 - Reach-wide



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	0.09	0.3	28	174	31%	42%	16%	9%	2%	0%

10	Pebble Count,
10	
Aycok Springs	
Cape Fear	

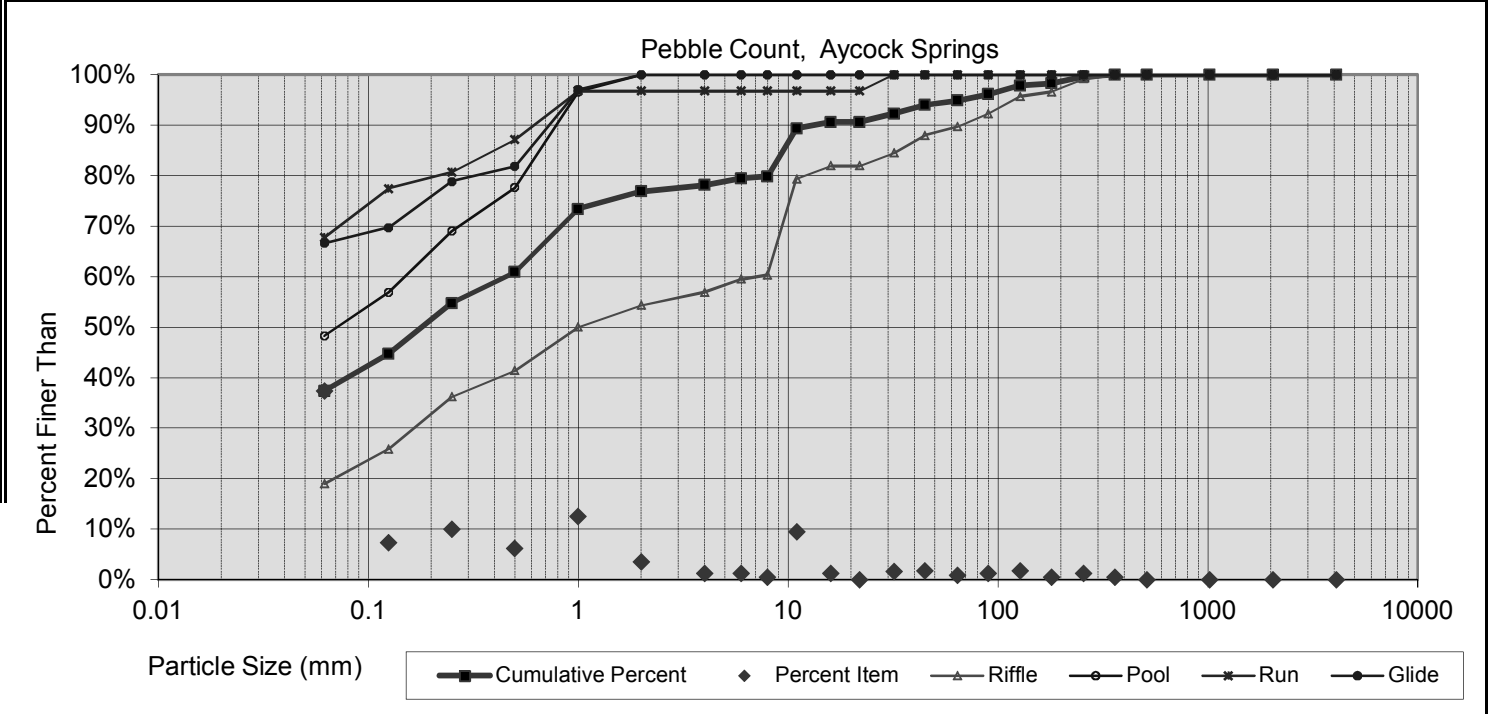
Note:	UT-4 - Reach-wide



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	0.09	0.2	33	53	29%	41%	28%	2%	0%	0%

10	Pebble Count,
10	
Aycok Springs	
Cape Fear	

Note: Travis Cr - Reach-wide	



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	#N/A	0.2	9	67	37%	39%	18%	5%	0%	0%

Appendix C.
Vegetation Data

- Table 7. Planted Woody Vegetation
Table 8. Total Planted Stems by Plot and Species
Vegetation Plot Photographs

Table 7. Planted Bare Root Woody Vegetation

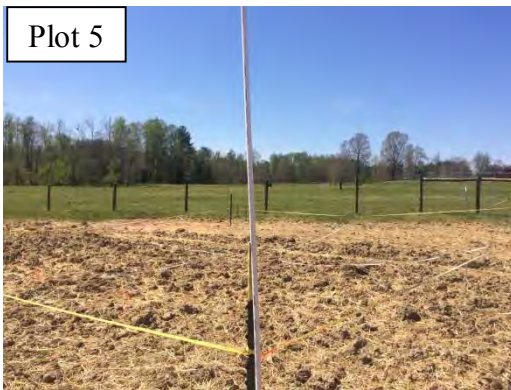
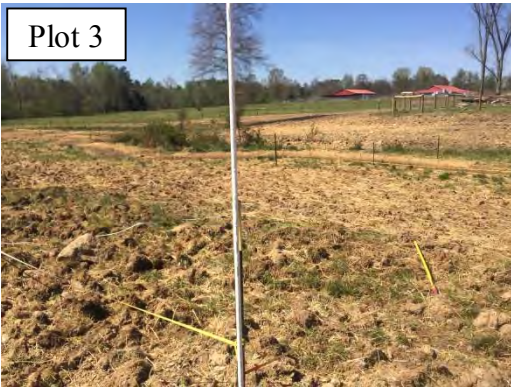
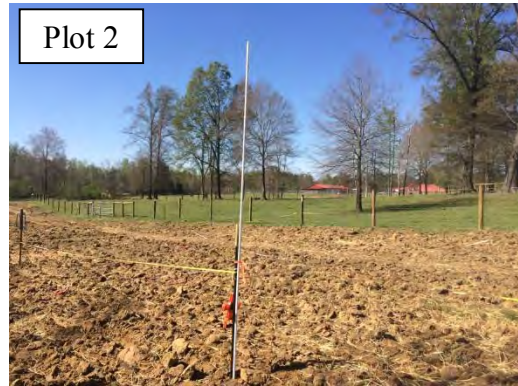
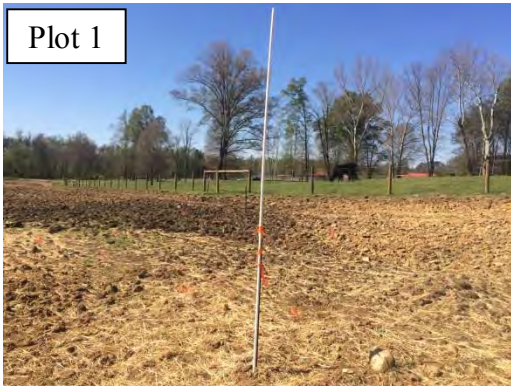
Species	Quantity
River birch (<i>Betula nigra</i>)	400
Ironwood (<i>Carpinus caroliniana</i>)	1000
Beautyberry (<i>Callicarpa americana</i>)	600
Flowering dogwood (<i>Cornus florida</i>)	200
Silky dogwood (<i>Cornus amomum</i>)	2000
Persimmon (<i>Diospyros virginiana</i>)	200
Black gum (<i>Nyssa sylvatica</i> var. <i>biflora</i>)	400
Sycamore (<i>Platanus occidentalis</i>)	400
White oak (<i>Quercus alba</i>)	400
Cherrybark oak (<i>Quercus falcata</i> var. <i>pagodifolia</i>)	600
Swamp chestnut oak (<i>Quercus michauxii</i>)	500
Water oak (<i>Quercus nigra</i>)	300
Willow oak (<i>Quercus phellos</i>)	700
Northern red oak (<i>Quercus rubra</i>)	400
Elderberry (<i>Sambucus canadensis</i>)	2500
TOTAL	10,600

Table 8. Planted Stems by Plot and Species

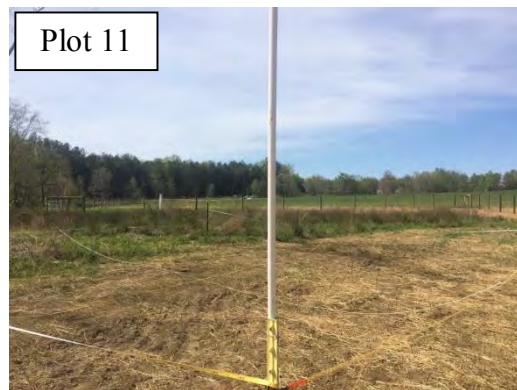
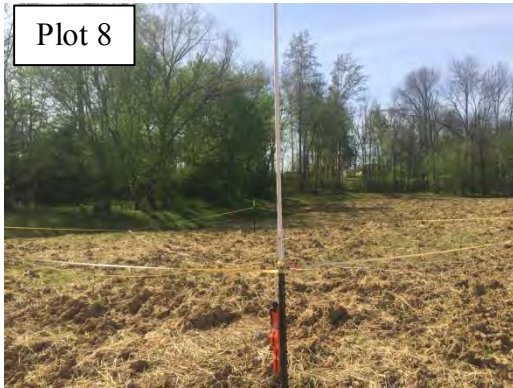
Species	CommonName	Total Planted Stems*	# plots	avg# stems	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Betula nigra	river birch	9	4	2.25					1	5		1						2
Carpinus caroliniana	American hornbeam	7	3	2.33								2			1	4		
Cornus amomum	silky dogwood	57	12	4.75	9	3	3	3	4	10	10	4	4	4	2		1	
Cornus florida	flowering dogwood	4	1	4											4			
Diospyros virginiana	common persimmon	2	2	1								1		1				
Fraxinus pennsylvanica	green ash	3	2	1.5												2		1
Nyssa sylvatica	blackgum	6	3	2							1	1				4		
Platanus occidentalis	American sycamore	5	3	1.67		1		3				1						
Quercus	oak	11	6	1.83			1					1	1	2			4	2
Quercus alba	white oak	2	1	2	2													
Quercus pagoda	cherrybark oak	6	5	1.2					2						1	1	1	1
Quercus phellos	willow oak	18	8	2.25	3	2	2	1	1					3	2		4	
Quercus rubra	northern red oak	13	6	2.17	2	1	4	3		2								1
Sambucus canadensis	Common Elderberry	62	13	4.77		11	3	2	3	3	1	4	7	4	5	13	2	4
14	14	205	14		16	18	13	12	11	20	12	15	12	14	15	24	12	11
Stems per Acre					648	729	526	486	445	810	486	607	486	567	607	972	486	445
Total Stems per Acre					593													

* All stems reported are planted bare root stems, no livestock occur within the plots.

**Aycock Springs
Baseline Vegetation Monitoring Photographs
Taken April 2016**



**Aycock Springs
Baseline Vegetation Monitoring Photographs
Taken April 2016
(continued)**



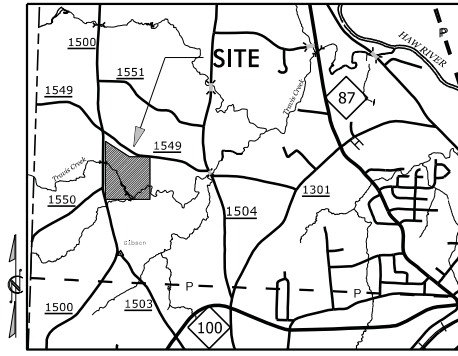
Appendix D.
As-built Plan Sheets

Sheet Number	Sheet Name
01	Title Sheet
02	Legend
03	Key Sheet – Blank
04 Thru 4H	Plan Construction
5A (1 Thru 78)	As-Built Plan Survey
6 Thru 6H	As-Built Plan Overlay

09/08/16

AS-BUILT SURVEY AND RECORD DRAWINGS AYCOCK SPRINGS SITE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	AYCOCK SPRINGS SITE	1	

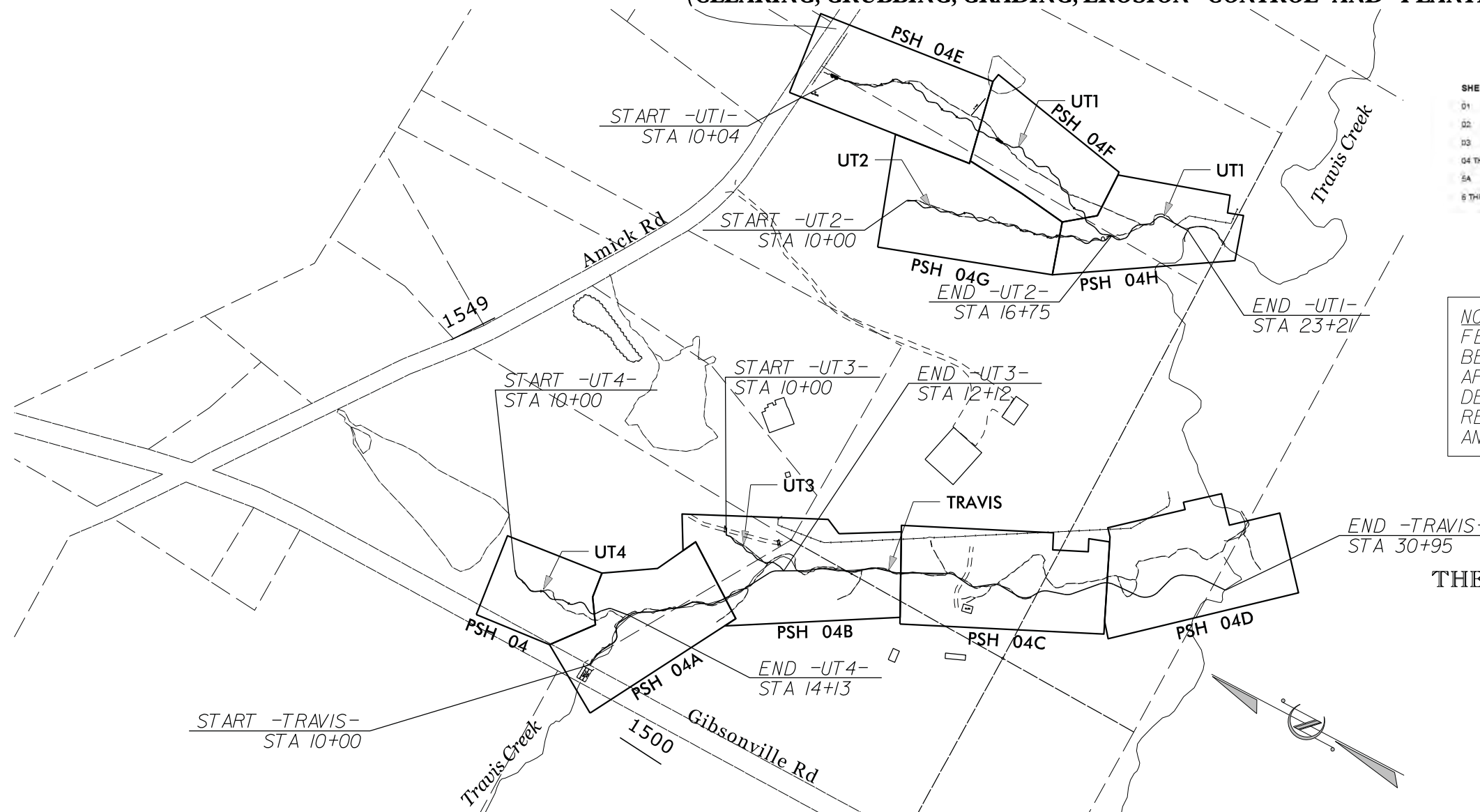


VICINITY MAP
Not to Scale

LOCATION: ALAMANCE COUNTY, NORTH CAROLINA

TYPE OF WORK: STREAM AND WETLAND RESTORATION AND ENHANCEMENT
(CLEARING, GRUBBING, GRADING, EROSION CONTROL AND PLANTING)

CONTRACT: AYCOCK SPRINGS SITE



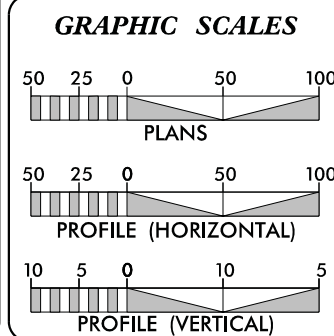
INDEX OF SHEETS

SHEET NUMBER	SHEET
01	Title Sheet
02	Legend
03	Key Sheet
04 THRU 04H	Plan Construction
05A	As-Built Plan Provided by Surveyor
06 THRU 06H	As-Built Plan Overlay

NOTE: TRAVIS CREEK IS LOCATED IN A FEMA DETAILED STUDY AREA. PROJECT TO BE CONSTRUCTED ACCORDING TO APPROVED CONSTRUCTION DOCUMENTS. ANY DEVIATIONS FROM THE PLANS WILL REQUIRE APPROVAL FROM THE ENGINEER AND FLOODPLAIN ADMINISTRATOR

THE STATE OF NORTH CAROLINA,
DIVISION OF
MITIGATION SERVICES

DMS PROJECT ID# 96312
SPO FILE # 01-AA
NC DMS CONTRACT # 5791
RFP# 16-005568
LAT 36.127271 N
LONG 79.525214 W



PROPOSED LENGTH OF TRAVIS = 1550 LF			
PROPOSED LENGTH OF UT1 = 1315 LF	PROPOSED LENGTH OF UT2 = 675 LF	PROPOSED LENGTH OF UT3 = 212 LF	PROPOSED LENGTH OF UT4 = 413 LF
TOTAL STREAM LENGTH = 4165 LF			
RESTORATION LEVEL	STREAM (linear footage)	RIPARIAN WETLAND (acreage)	NONRIPARIAN WETLAND (acreage)
RESTORATION	3357	0.5	0.0
ENHANCEMENT	677	1.5	0.0
TOTALS	4034	2.0	0.0
MITIGATION UNITS	3628 SMUs	0.5 RIPARIAN WMUs	0.0 NONRIPARIAN WMUs

Designed By:

GRANT LEWIS
PROJECT DESIGNER

WORTH CREECH
SITE CONSTRUCTION MANAGER

Axiom Environmental
218 Snow Ave
Raleigh, NC 27603

Restoration Systems
1101 Haynes St.
Suite 211
Raleigh, NC 27604

Prepared In the Office of:

SUNGATE DESIGN GROUP, P.A.

915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890
L.A. FIRM LICENSE NO. C-91

JOSHUA G. DALTON, P.E.
PROJECT ENGINEER

DocuSigned by:

Joshua G. Dalton

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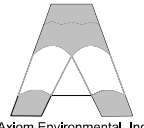

SEAL # 26971

ENGINEER
JOSHUA G. DALTON

7/26/2016

DATE:

7/25/2016
Aycock_Stream_PSH_01.tsh.dgn
jasonharvey

SHEET NAME		SHEET NUMBER
KEY SHEET		03
PROJECT NAME:	AYCOCK STREAM AND WETLAND RESTORATION SITE	
COUNTY:	ALAMANCE	DATE: 2016
		
Axiom Environmental, Inc.		SUNGATE DESIGN GROUP, P.A. <small>915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2243 FAX (919) 859-6288 ENG FIRM LICENSE NO. C-890</small>


REVISIONS

PURPOSELY LEFT BLANK


-UT4- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	11+10.2	0	866,594.0651	1,844,231.7465
CROSS VANE	12+05.8	0	866,502.8311	1,844,237.7005
LOG VANE	12+36.5	0	866,478.2554	1,844,314.1306
LOG VANE	12+90.2	0	866,430.0667	1,844,332.9390

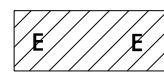
DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 DATE: 7/13/2016

SHEET NAME STRUCTURES	SHEET NUMBER 04
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

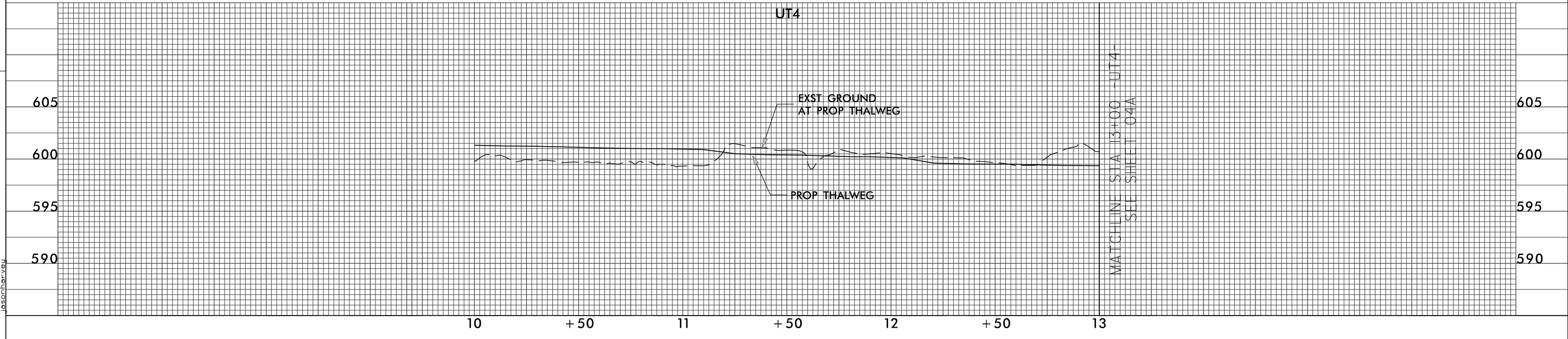
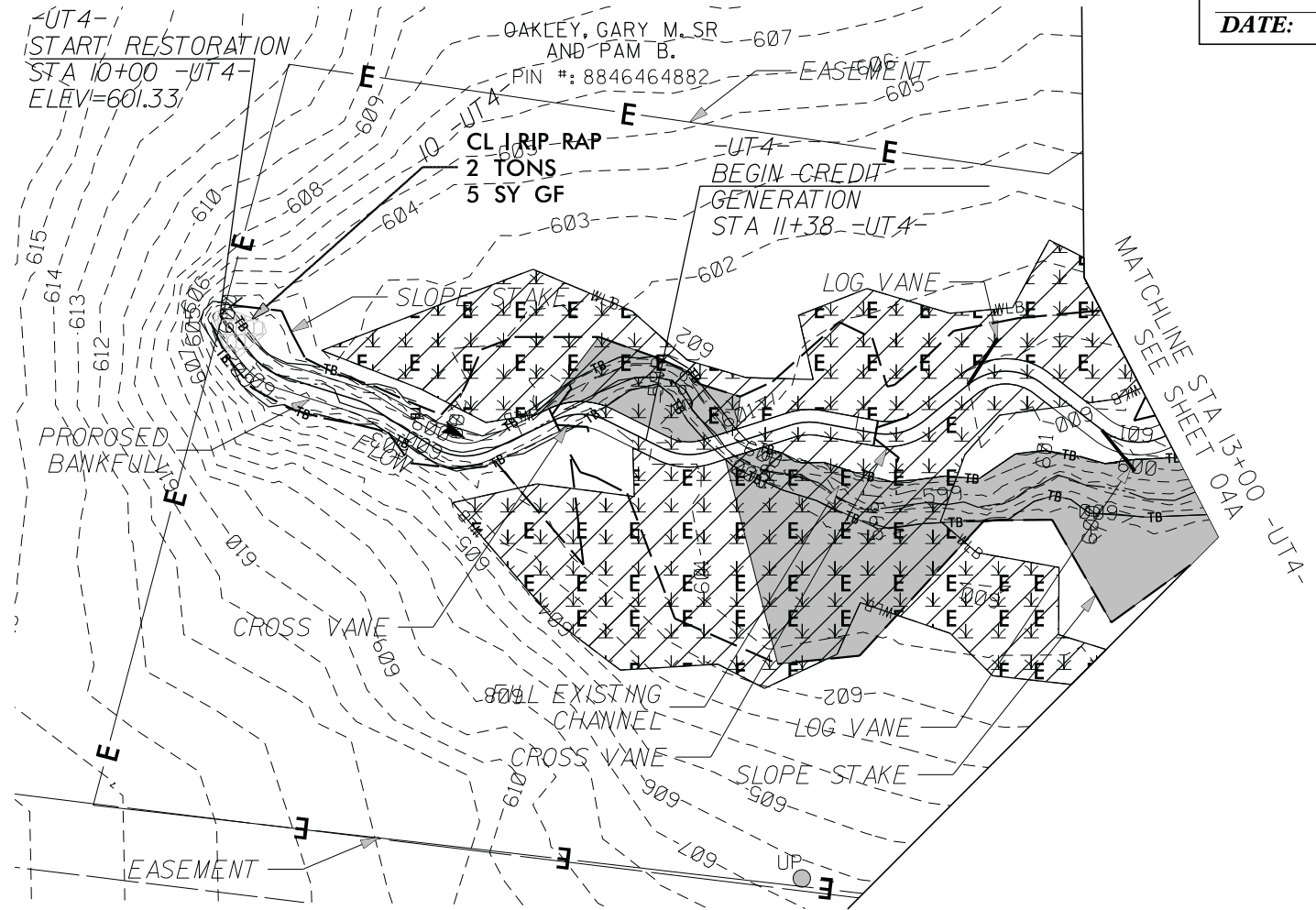
Axiom Environmental, Inc. 

SUNGATE DESIGN GROUP, P.A.
 915 JONES FRANKLIN ROAD
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 ENG FIRM LICENSE NO. C-890



 **WETLAND ENHANCEMENT**

REVISIONS



7/13/2016 Stream_PSH_04.dgn
 Aycock
 jason@axiom.com

-TRAVIS- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
BRUSHMATTRESS	12+50.8	16' LT	865,677.7922	1,844,835.0239
BRUSHMATTRESS	13+33.2	6' RT	866,222.7148	1,844,428.5516
BRUSHMATTRESS	14+21.6	8' RT	866,154.6507	1,844,481.8573

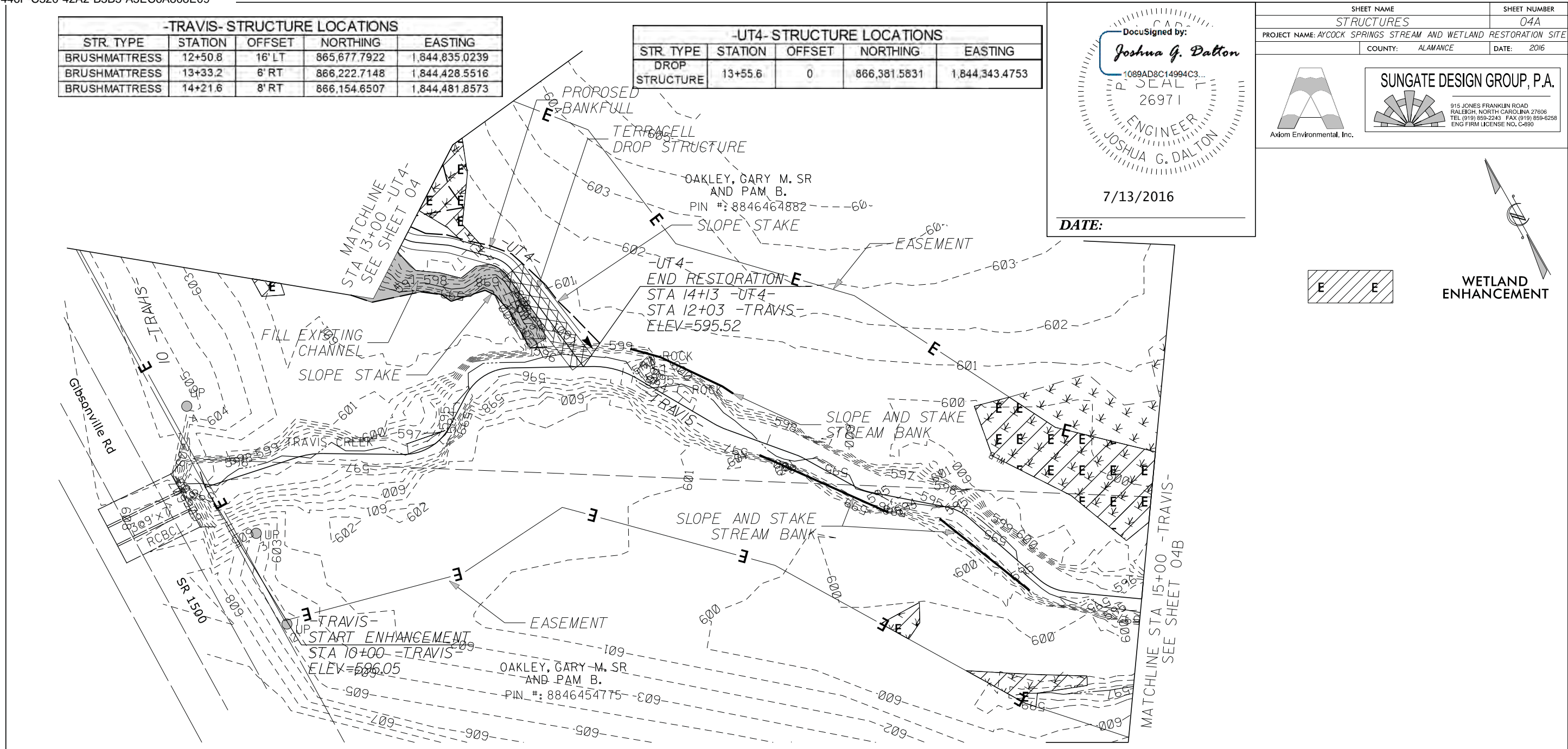
-UT4- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
DROP STRUCTURE	13+55.6	0	866,381.5831	1,844,343.4753

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Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 DATE: 7/13/2016

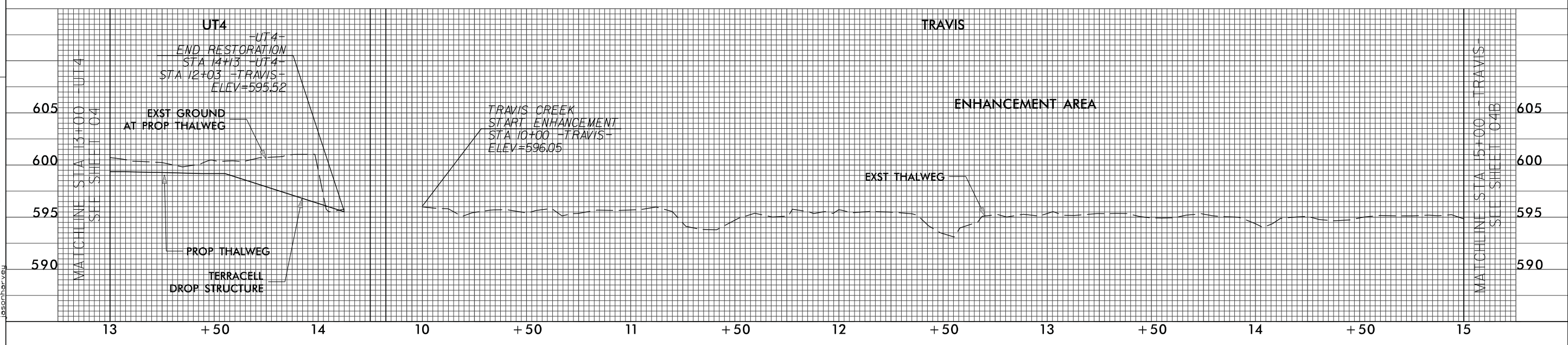
SHEET NAME STRUCTURES	SHEET NUMBER 04A
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.
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 ENG FIRM LICENSE NO. C-890



REVISIONS



7/13/2016 Stream_PSH_04A.dgn
 Aycock
 Gibsonville


Note: Not to Scale

*S.U.E. = *Subsurface Utility Engineering*
 Not all Symbols used in Plans

LEGEND

DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/26/2016

SHEET NAME	LEGEND	SHEET NUMBER	02
PROJECT NAME:	AYCOCK STREAM AND WETLAND RESTORATION SITE		
COUNTY:	ALAMANCE	DATE:	2016

Axiom Environmental, Inc.  **SUNGATE DESIGN GROUP, P.A.**
 915 JONES FRANKLIN ROAD
 RALEIGH, NORTH CAROLINA 27606
 TEL (919) 859-2243 FAX (919) 859-6258
 ENG FIRM LICENSE NO. C-989

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	-----
Property Monument	□ ECM
Temporary Fence	-x-x-x-
Proposed Woven Wire Fence	○-----
Proposed Chain Link Fence	□-----
Proposed Barbed Wire Fence	◇-----
Tree Protection Fence	○-----○
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Proposed Conservation Easement	----- E
Construction Limits	-----
Limits Of Disturbance	-----
Gate	┌ G ─┘
Benchmark	┌ ─┘

BUILDINGS AND OTHER CULTURE:

Sign	○ S
Well	○ W
Foundation	▭
Area Outline	▭
Recreational Structure	▭
Building	▭
School	▭
Church	▭

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	▭
River Basin Buffer	----- RBB
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Bankfull	-----
Thalweg	-----
Top Of Bank	-----
Vernal Pool	▭
Swamp Marsh	▭
Proposed Lateral, Tail, Head Ditch	----- FLOW
False Sump	▭

RAILROADS:

Standard Guage	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Existing Metal Guardrail	-----
Existing Cable Guiderail	-----

VEGETATION:

Single Tree	✻
Single Shrub	✻
Hedge	-----
Woods Line	-----
Orchard	✻ ✻ ✻ ✻
Vineyard	▭ Vineyard

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	▭ CONC
Bridge Wing Wall, Head Wall and End Wall	┌ CONC WW ┘
MINOR:	
Head and End Wall	▭ CONC HW
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	□ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	○
Storm Sewer	----- S
SANITARY SEWER:	
Sanitary Sewer Manhole (Located By Others)	○
Sanitary Sewer Cleanout	○
U/G Sanitary Sewer Line (Located By Others)	-----
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
Recorded SS Forced Main Line	----- FSS

STREAM WORK:

STREAM STRUCTURES:	
Rock Crossvane	-----
Rock Vane	-----

STREAM FEATURES:

Cross Vane	-----
Constructed Riffle	-----
Root Wad	-----
Log Vane	-----
Log Vane/Root Wad Combo	-----
Structure Number	②
Culvert Pipe	18"
Stream Plug	-----
Coir Log	-----
Floodplain Interceptor	-----
Terracell	-----

EROSION CONTROL FEATURES:

Stream Crossing	-----
Temporary Construction Entrance/Exit	-----
Silt Fence	-----
Special Sediment Control Fence Break	-----
Haul Road	-----
Impervious Dike	-----

PLANTING ZONES:

Stream-Side Assemblage	-----
Piedmont/Low Mountain Alluvial Forest	-----
Dry-Mesic Oak Hickory Forest	-----
Marsh Treatment	-----

REVISIONS

7/26/2016
 Aycock Stream_PSH_02.dgn
 jasonharvey



**WETLAND
ENHANCEMENT**

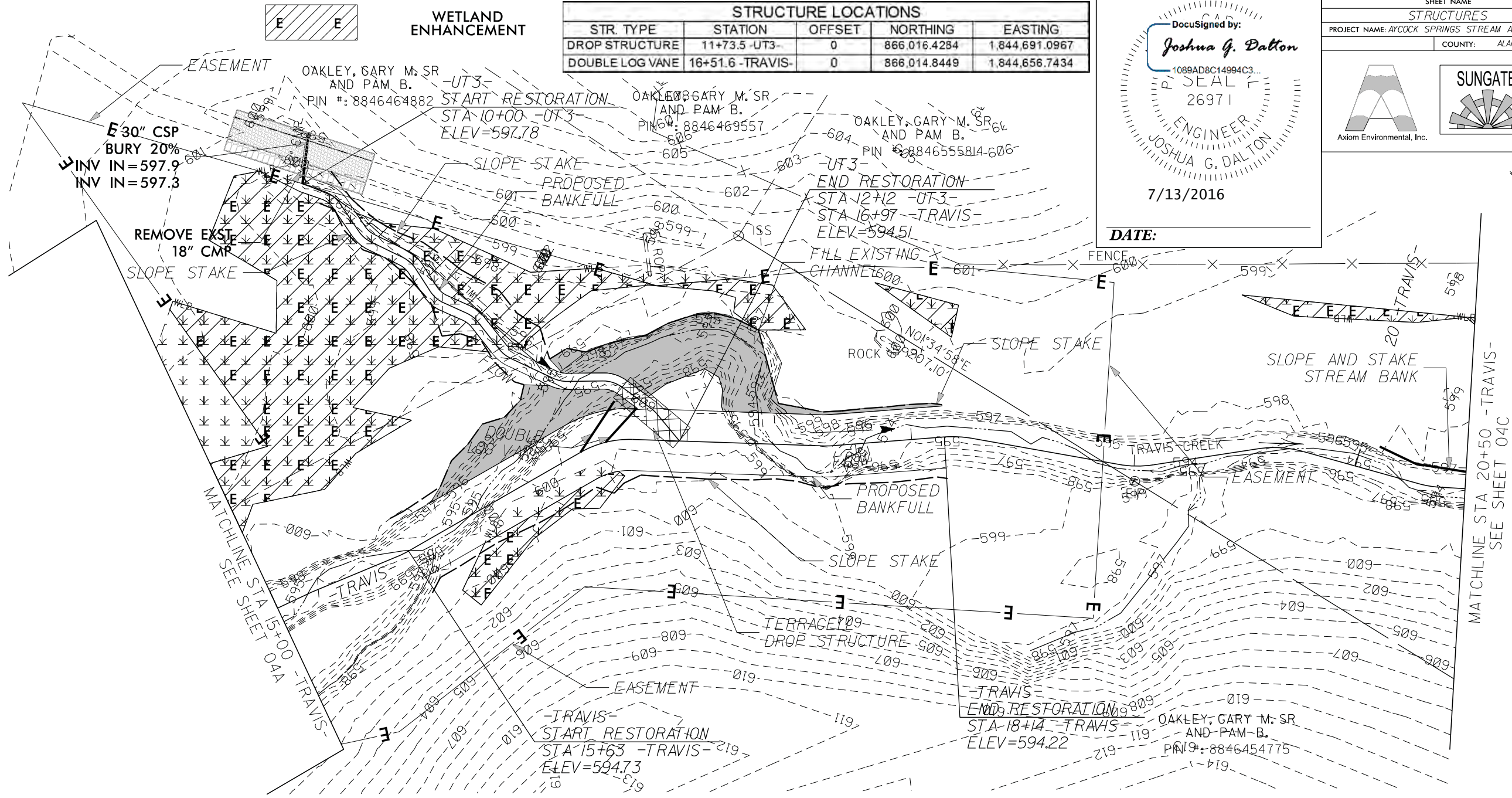
STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
DROP STRUCTURE	11+73.5 -UT3-	0	866,016.4284	1,844,691.0967
DOUBLE LOG VANE	16+51.6 -TRAVIS-	0	866,014.8449	1,844,656.7434

DocuSigned by:
Joshua G. Dalton
1089AD8C14994C3...
26971
ENGINEER
JOSHUA G. DALTON
7/13/2016
DATE:

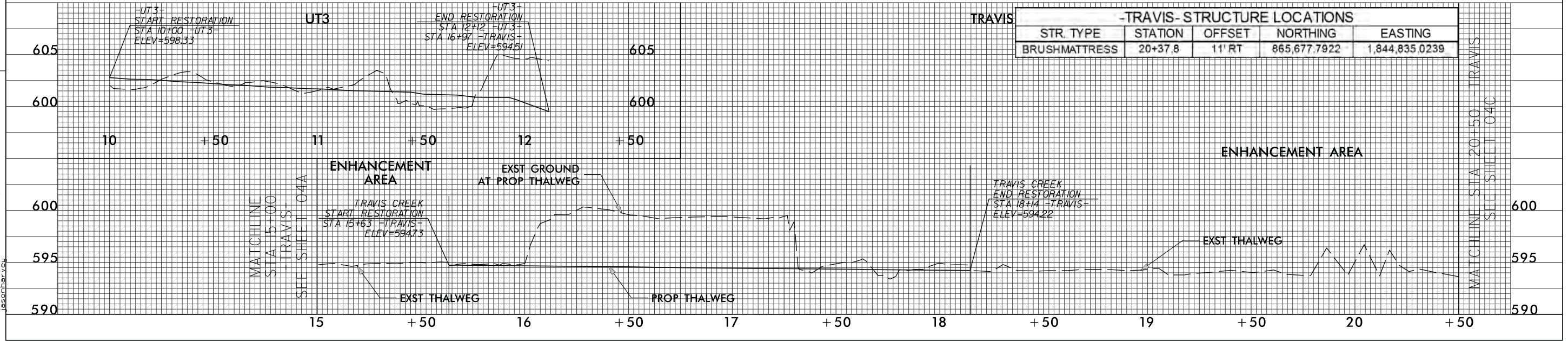
SHEET NAME: STRUCTURES
SHEET NUMBER: 04B
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE
COUNTY: ALAMANCE
DATE: 2016

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27608
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.



REVISIONS



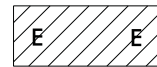
-TRAVIS- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
BRUSHMATTRESS	20+37.8	11' RT	865,677.7922	1,844,835.0239

7/13/2016 8:11:06 AM
Aycock_Springs_Stream_PSH_04B.dgn
JG Dalton

MATCHLINE
STA 5+00
-TRAVIS-
SEE SHEET 04A

MATCHLINE STA 20+50
-TRAVIS-
SEE SHEET 04C

-TRAVIS- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
BRUSHMATTRESS	22+09.0	12' LT	865,523.8699	1,844,909.0444
BRUSHMATTRESS	23+13.7	15' LT	865,425.7432	1,844,924.1878
DOUBLE LOG VANE	23+37.4	0	865,406.6695	1,844,938.2068
DOUBLE LOG VANE	26+77.4	0	865,125.1157	1,845,087.8083



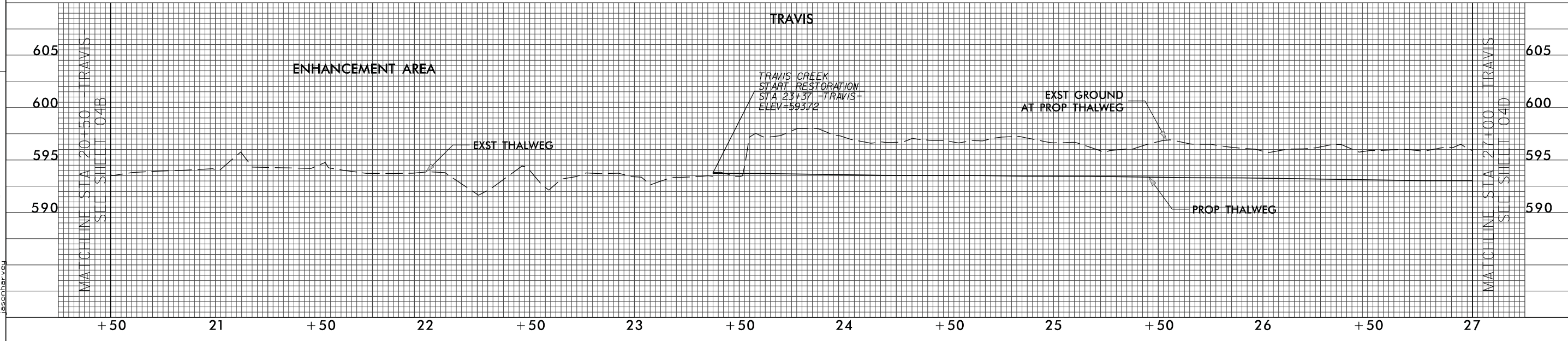
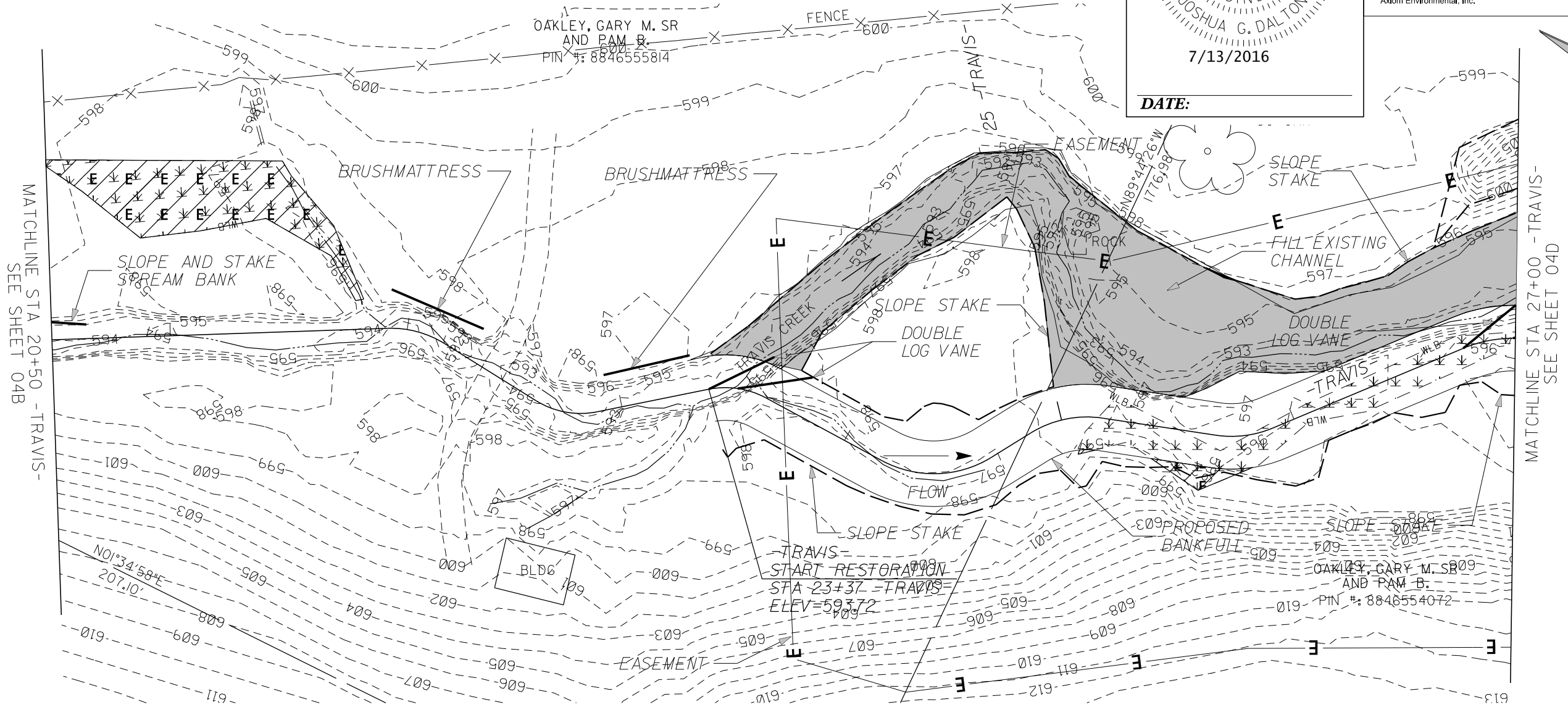
WETLAND
ENHANCEMENT

DocuSigned by:
Joshua G. Dalton
1089AD8C14994C3...
SEAL
26971
ENGINEER
JOSHUA G. DALTON
7/13/2016
DATE:

SHEET NAME STRUCTURES	SHEET NUMBER 04C
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

Axiom Environmental, Inc.

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7/13/2016
Aycock Stream_PSH_04C.dgn
jason@axiom.com

-TRAVIS- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
LOG VANE	27+98.4	0	865,009.2765	1,845,109.1185

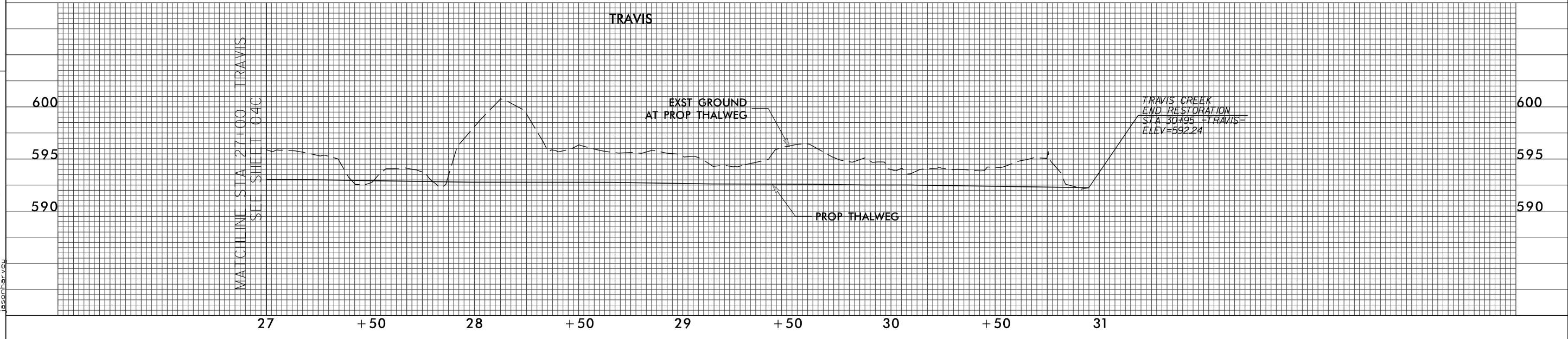
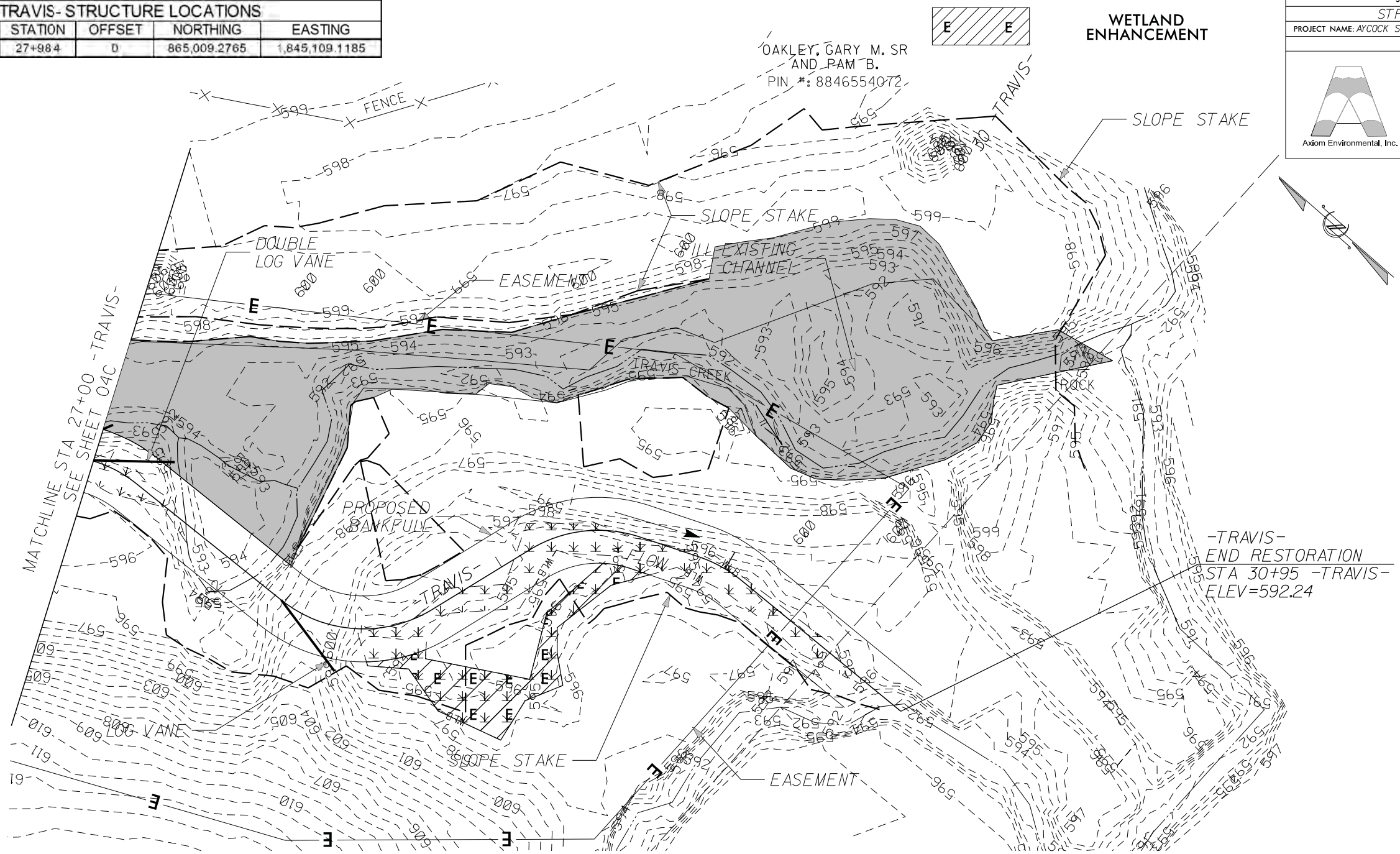
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PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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Joshua G. Dalton
 1089AD8C14994C3
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/13/2016

DATE:



REVISIONS

7/13/2016
 Aycock
 Stream_PSH_04D.dgn
 jason@aycock.com

-UT1- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	11+40.4	0	866,396.6736	1,846,107.0819
CROSS VANE	11+77.5	0	866,372.4780	1,846,134.1807
CROSS VANE	12+29.0	0	866,325.7719	1,846,148.2265
CROSS VANE	13+62.3	0	866,202.1508	1,846,124.7425
CROSS VANE	14+14.3	0	866,152.1113	1,846,125.2611

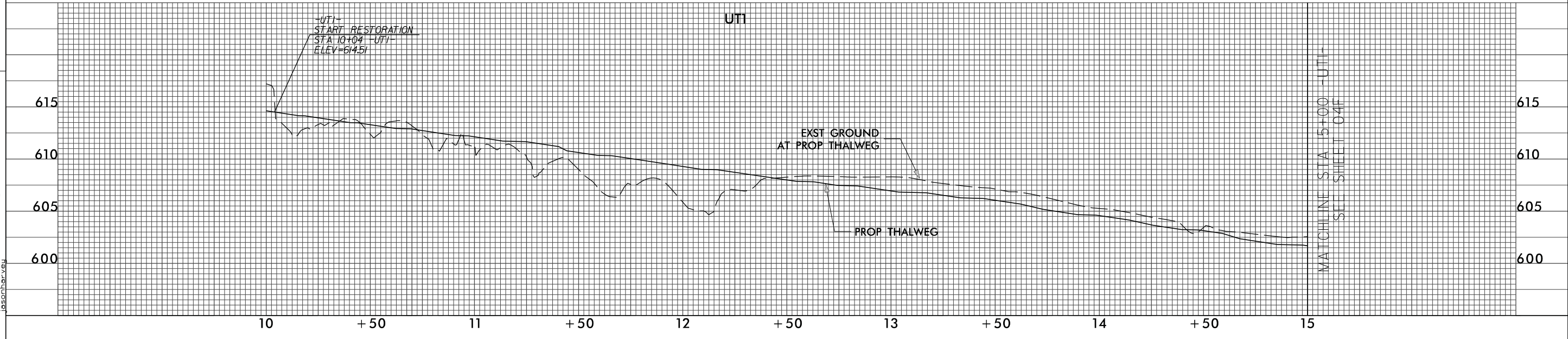
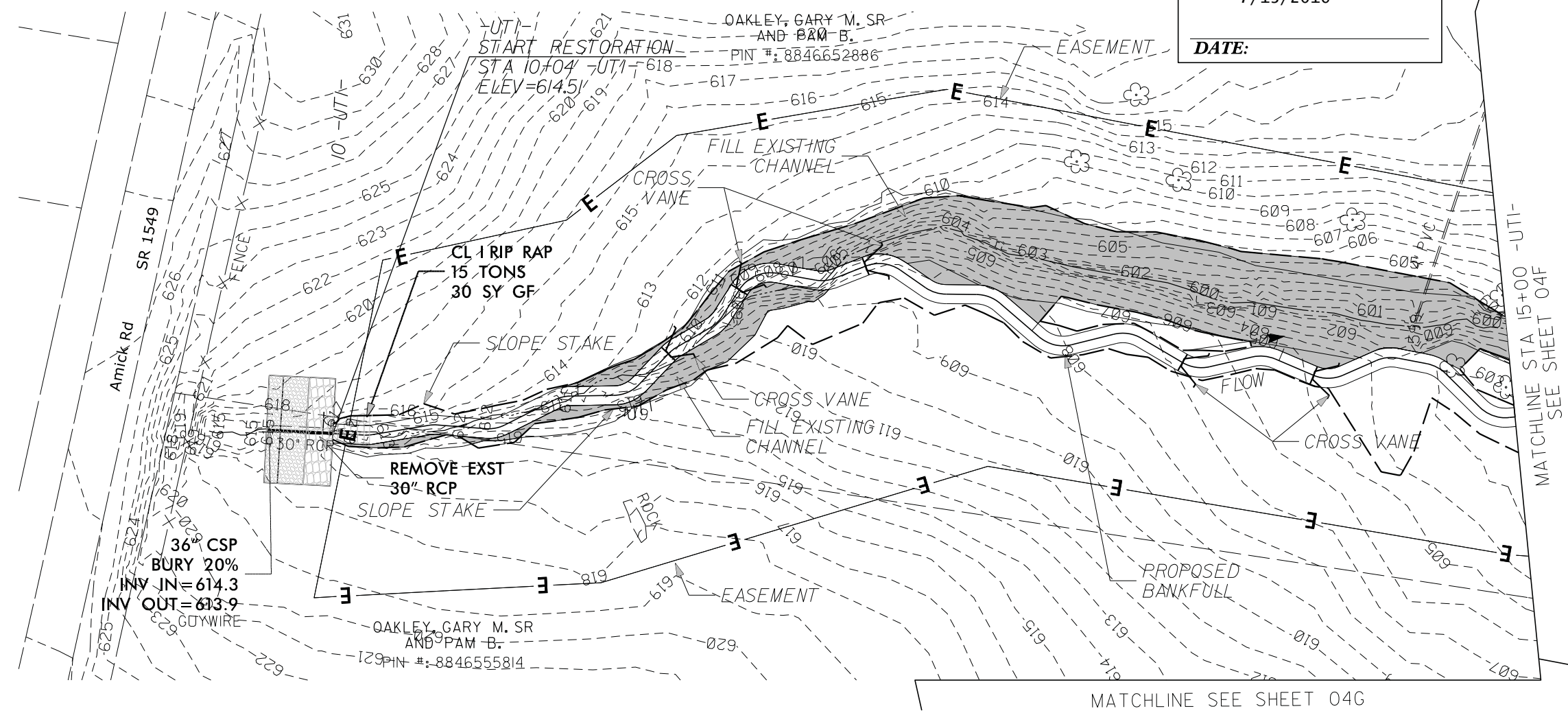
DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 DATE: 7/13/2016

SHEET NAME STRUCTURES	SHEET NUMBER 04E
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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 Aycock
 jason@aycock.com

-UT1- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	15+79.9	0	865,995.7329	1,846,120.0271
LOG VANE	16+30.6	0	865,947.9185	1,846,131.1892
CROSS VANE	19+01.1	0	865,714.7735	1,846,046.5660

DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/13/2016
 DATE:

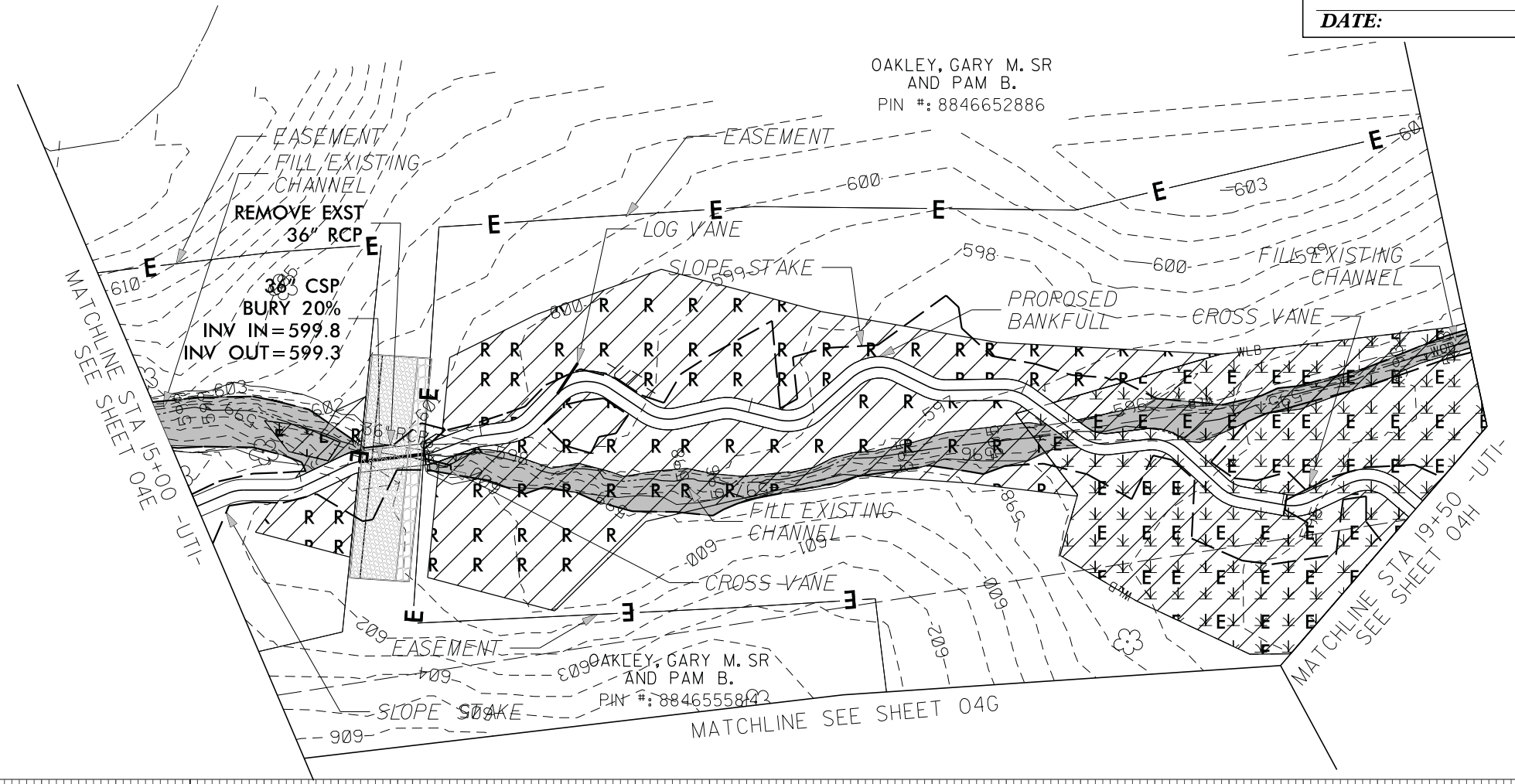
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PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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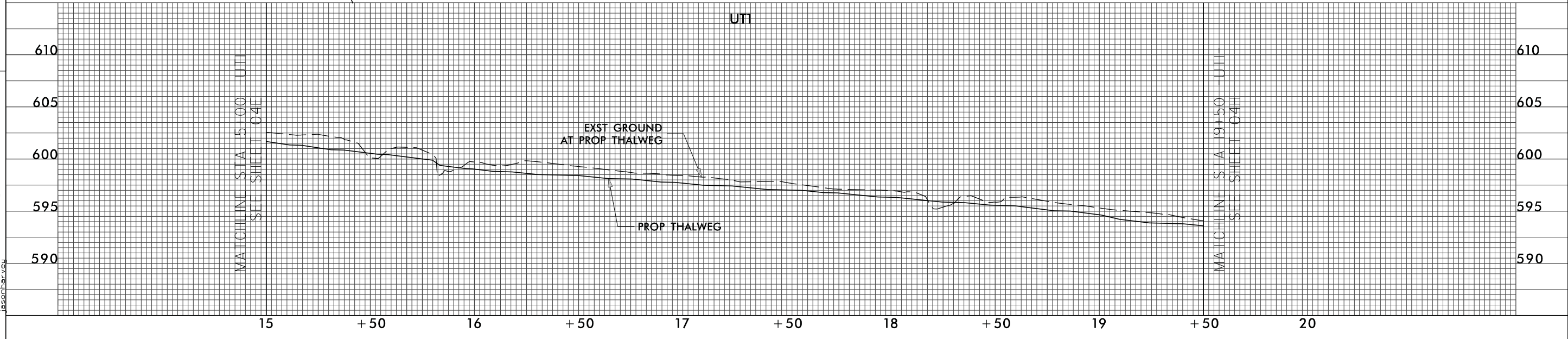
Axiom Environmental, Inc.



	WETLAND ENHANCEMENT
	WETLAND RESTORATION



REVISIONS

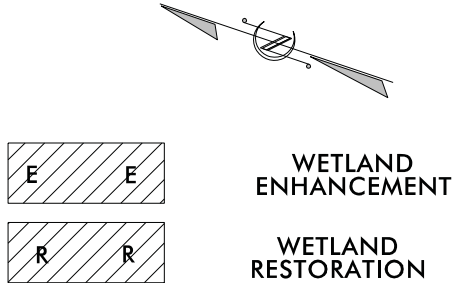


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 Aycock
 jason@aycock.com

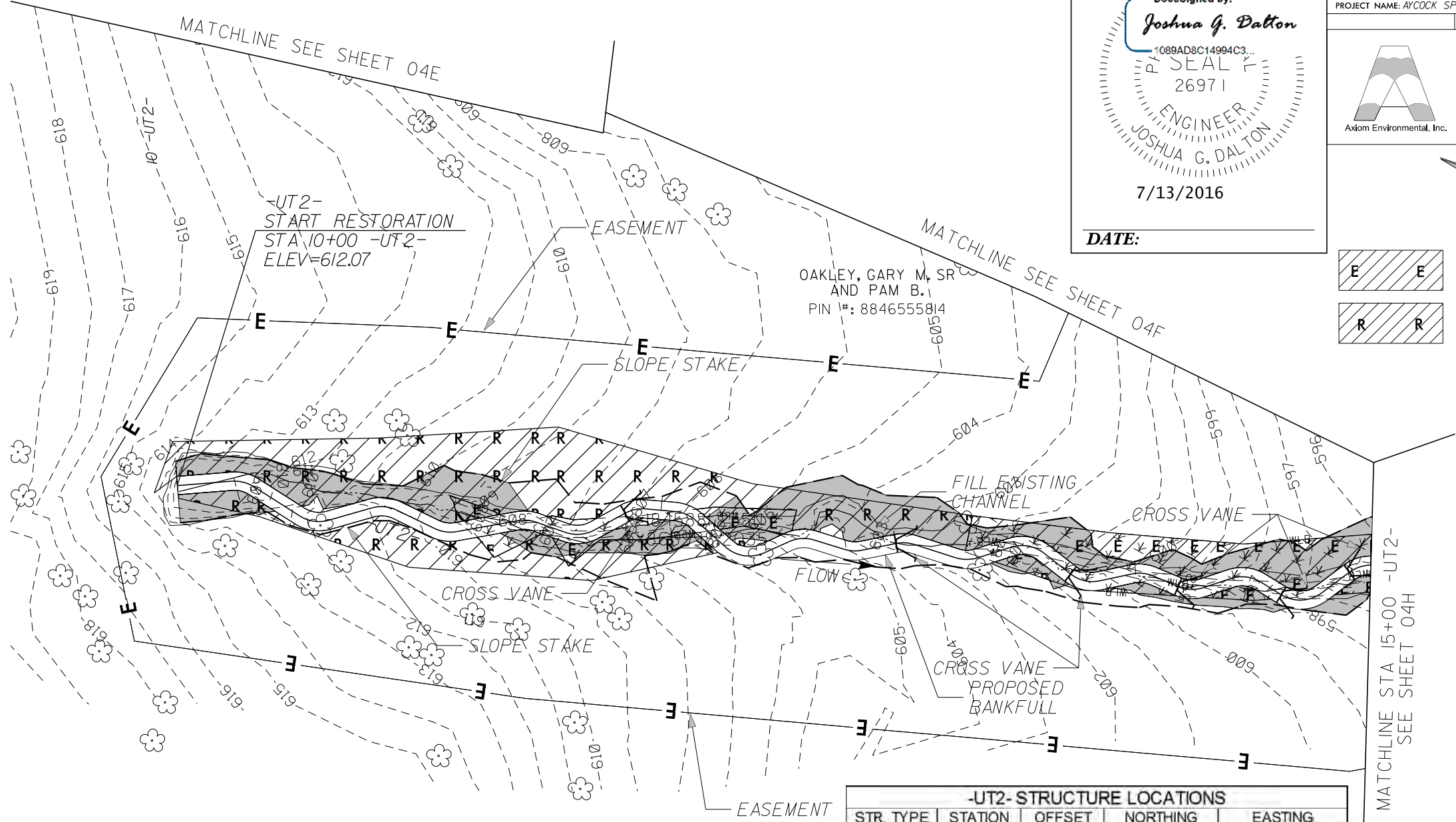
DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/13/2016
 DATE:

SHEET NAME STRUCTURES	SHEET NUMBER 04G
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

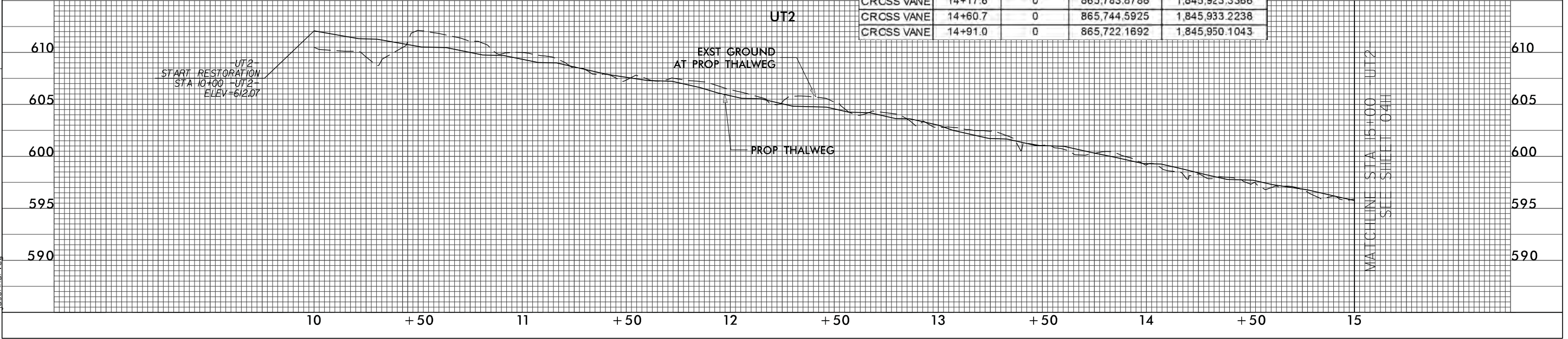
SUNGATE DESIGN GROUP, P.A.
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 ENG FIRM LICENSE NO. C-890



REVISIONS



STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	11+85.6	0	865,998.2035	1,845,831.2351
CROSS VANE	13+00.0	0	865,893.9045	1,845,933.9924
CROSS VANE	13+73.5	0	865,825.3488	1,845,914.5429
CROSS VANE	14+17.6	0	865,783.8788	1,845,923.3366
CROSS VANE	14+60.7	0	865,744.5925	1,845,933.2238
CROSS VANE	14+91.0	0	865,722.1692	1,845,950.1043



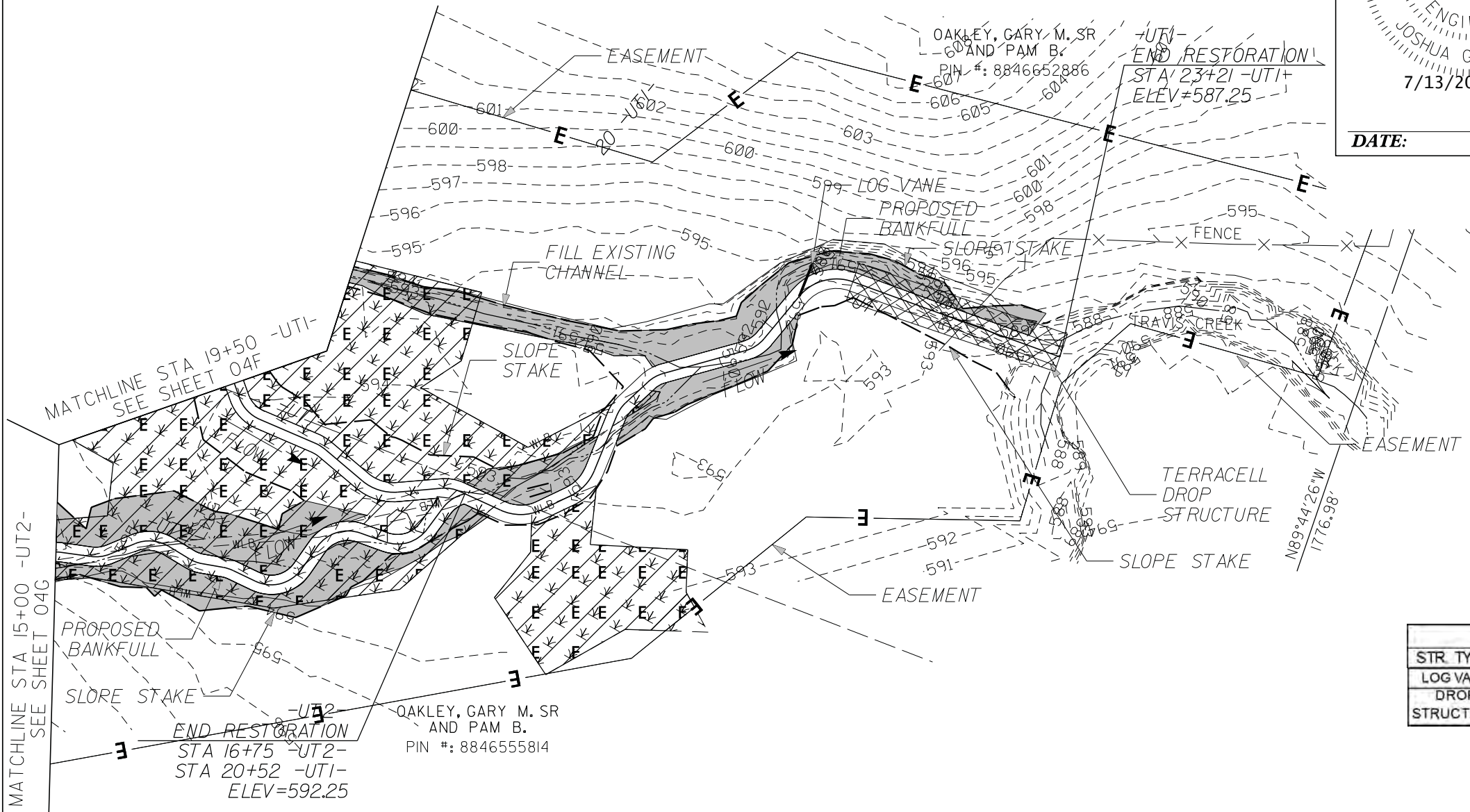
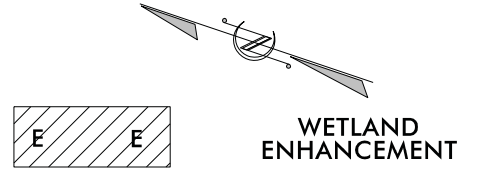
7/13/2016
 Aycock Stream_PSH_04G.dgn
 jason@sdg.com

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Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/13/2016
 DATE: _____

SHEET NAME STRUCTURES	SHEET NUMBER 04H
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

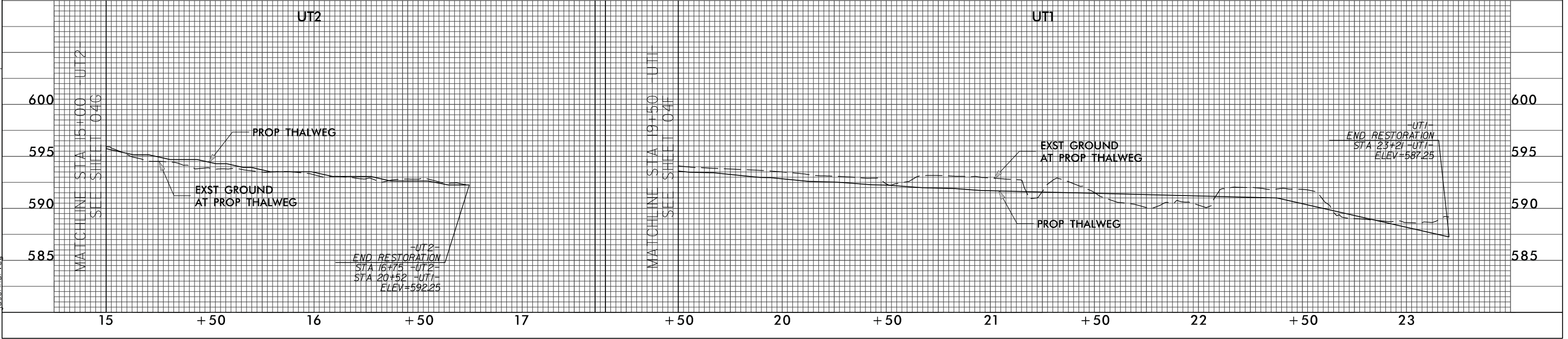
SUNGATE DESIGN GROUP, P.A.
 915 JONES FRANKLIN ROAD
 RALEIGH, NORTH CAROLINA 27608
 TEL (919) 859-2243 FAX (919) 859-6258
 ENG FIRM LICENSE NO. C-890

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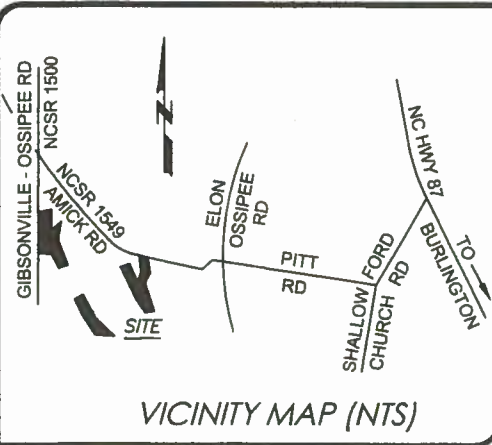


STR TYPE	STATION	OFFSET	NORTHING	EASTING
LOG VANE	22+15.7	0	865,481.7126	1,846,135.5161
DROP STRUCTURE	22+27.8	0	865,464.4941	1,846,147.0486

REVISIONS



7/13/2016
 Aycock Stream_PSH_04H.dgn
 jason@sdg.com



DEED REFERENCE(S):
 BEING A PORTION OF THE PROPERTY RECORDED IN D.B. 2468, PG. 268, D.B. 1832, PG. 729, D.B. 2832, PG. 522, D.B. 935, PG. 328 & D.B. 257, PG. 317 OF THE ALAMANCE COUNTY REGISTER OF DEEDS.

MAP REFERENCE(S):
 P.B. 11, PG. 22
 P.B. 136, PG. 98
 P.B. 18, PG. 36
 P.B. 38, PG. 98

CONSERVATION EASEMENT ACREAGE DATA:	
SECTION "A"	1.64 ACRES±
SECTION "B"	4.35 ACRES±
SECTION "C"	4.55 ACRES±
SECTION "D"	2.72 ACRES±
TOTAL CONSERVATION EASEMENT IS 13.26 ACRES± INCLUDING A PORTION OF THE 30' DUKE ENERGY CAROLINAS EASEMENT AND EXCLUDING ALL OTHER EASEMENTS AND RIGHT-OF-WAYS BY COORDINATE COMPUTATION	

CROSS-SECTIONS COORDINATE TABLE (RIGHT SIDE OF X-SECTIONS FACING UP-STREAM)		
X-SECTION #	NORTHING	EASTING
UT1 XS1	865477.99	1846123.15
UT1 XS2	865506.17	1846093.95
UT1 XS3	865524.30	1846071.52
UT1 XS4	865526.60	1846057.57
UT1 XS5	865539.10	1846027.81
UT1 XS6	865624.21	1846015.95
UT1 XS7	865647.64	1846020.31
UT1 XS8	865666.77	1846023.90
UT1 XS9	865724.40	1846044.15
UT1 XS10	865753.08	1846070.28
UT1 XS11	865787.07	1846085.09
UT1 XS12	865885.58	1846106.96
UT1 XS13	865913.32	1846110.57
UT1 XS14	865928.05	1846120.42
UT1 XS15	866070.96	1846114.15
UT1 XS16	866098.81	1846120.71
UT1 XS17	866131.99	1846125.26
UT1 XS18	866213.91	1846123.59
UT1 XS19	866252.20	1846119.44
UT1 XS20	866270.25	1846130.12
UT1 XS21	866361.34	1846134.22
UT1 XS22	866397.03	1846097.81
UT1 XS23	866443.72	1846074.50
UT1 XS24	866471.55	1846066.23
UT2 XS1	865814.09	1845993.04
UT2 XS2	865644.70	1845964.24
UT2 XS3	865671.76	1845964.52
UT2 XS4	865689.10	1845959.17
UT2 XS5	865721.71	1845942.33
UT2 XS6	865748.75	1845929.25
UT2 XS7	865758.81	1845928.31
UT2 XS8	865833.03	1845912.00
UT2 XS9	865917.77	1845890.85
UT2 XS10	865945.72	1845876.11
UT2 XS11	865974.64	1845883.14
UT2 XS12	866024.13	1845861.08
UT2 XS13	866045.17	1845854.01
TC XS1	864899.07	1845219.31
TC XS2	864936.82	1845169.12
TC XS3	864966.27	1845109.18
TC XS4	865054.51	1845092.52
TC XS5	865099.76	1845091.27
TC XS6	865132.66	1845061.06
TC XS7	865184.57	1845004.10
TC XS8	865228.55	1844984.69
TC XS9	865252.45	1844976.83
TC XS10	865283.48	1844938.53
TC XS11	865348.12	1844925.91
TC XS12	865951.17	1844679.00
TC XS13	865990.76	1844654.41
TC XS14	866015.20	1844619.34

CROSS-SECTIONS COORDINATE TABLE (RIGHT SIDE OF X-SECTIONS FACING UP-STREAM)		
X-SECTION #	NORTHING	EASTING
UT3 XS1	866027.96	1844677.32
UT3 XS2	866048.50	1844670.92
UT3 XS3	866065.02	1844670.86
UT3 XS4	866095.80	1844678.65
UT3 XS5	866115.76	1844683.13
UT4 XS1	866395.77	1844324.79
UT4 XS2	866433.74	1844295.83
UT4 XS3	866452.41	1844304.89
UT4 XS4	866465.19	1844312.40
UT4 XS5	866479.76	1844302.77
UT4 XS6	866508.79	1844290.93
UT4 XS7	866533.04	1844286.93
UT4 XS8	866572.27	1844283.32

CVS PLOTS COORDINATE TABLE (COORDINATE AT THE PLOT ORIGIN ▲)		
CVS PLOT #	NORTHING	EASTING
1	866304.98	1846088.66
2	866123.93	1846075.82
3	865871.13	1846120.69
4	865975.08	1845906.36
5	865680.90	1845904.97
6	865530.96	1846111.98
7	864962.11	1845223.58
8	865074.64	1845140.02
9	865203.00	1845062.38
10	865842.83	1844791.82
11	866126.70	1844650.57
12	866242.15	1844459.89
13	866396.00	1844262.15
14	866526.08	1844324.39

Table 7. Planted Bare Root Woody Vegetation	
Species	Quantity
River birch (Betula nigra)	400
Ironwood (Carpinus caroliniana)	1000
Beautyberry (Callicarpa americana)	600
Flowering dogwood (Cornus florida)	200
Silky dogwood (Cornus amomum)	2000
Persimmon (Diospyros virginiana)	200
Black gum (Nyssa sylvatica var. biflora)	400
Sycamore (Platanus occidentalis)	400
White oak (Quercus alba)	400
Cherrybark oak (Quercus pagoda var. pagodifolia)	600
Swamp chestnut oak (Quercus michauxii)	500
Water oak (Quercus nigra)	300
Willow oak (Quercus phellos)	700
Northern red oak (Quercus rubra)	400
Elderberry (Sambucus canadensis)	2500
TOTAL:	10,600

(VEGETATION TABLE PROVIDED BY AXIOM ENVIRONMENTAL)

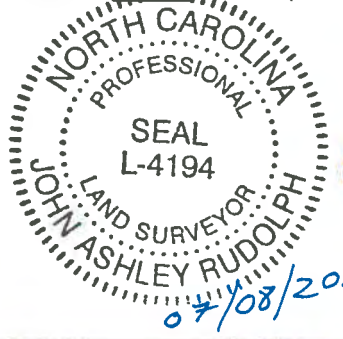
SURVEYORS CERTIFICATION(S)

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground or aboveground utilities or any other features above, or below ground other than those shown.

I certify that the survey is of another category (as-built survey), such as the recombination of existing parcels, a court-ordered survey, or other exception to the definition of subdivision.

I certify that this plat does not meet G.S. 47-30 as amended.

I, John A. Rudolph, certify that this project was completed under my direct and responsible charge from an actual survey made under my supervision; that this As-built survey was performed at the 95 percent confidence level to meet Federal Geographic Data Committee Standards; that this survey was performed to meet the requirements for a topographic/planimetric survey to the accuracy of Class B and vertical accuracy when applicable to the Class B standard, and that the original data was obtained on April, 2016; that the survey was completed on April 20, 2016; and all coordinates are based on NC Grid, NAD '83(2011) and all elevations are assumed elevations.



John A. Rudolph
 Surveyor L-4194



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

RESTORATION SYSTEMS, LLC

1101 HAYNES STREET
 SUITE 211
 RALEIGH, NC 27604



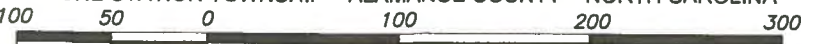
REVISIONS			
REVISION NUMBERS	DATE	DESCRIPTION	BY
▲ 1	06/02/16	PRE-CONSTRUCTION TRIBUTARIES CENTERLINES ADDED PER NC DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF MITIGATION SERVICES	J.A.R.

SHEET 5A (1 OF 78)
 AS-BUILT SURVEY
 FOR

**THE STATE OF NORTH CAROLINA,
 DIVISION OF
 MITIGATION SERVICES
 DMS PROJECT ID# 96312
 SPO FILE # 01-AA
 NC DMS CONTRACT # 5791
 RFP# 16-005568**

AYCOCK SPRINGS STREAM
 AND WETLAND RESTORATION SITE

BOONE STATION TOWNSHIP ALAMANCE COUNTY NORTH CAROLINA



GRAPHIC SCALE 1" = 100'

DRAWN BY: FGR
 DATE: 07/08/16
 DWG. NO.: RSS112AB16
 SURVEYED BY: J.A.R.



5688 U.S. Hwy. 70 East
 Goldsboro, NC 27534
 Tel.: (919) 751-0075
 k2design@suddenlink.net

LEGEND:

- ISS - IRON STAKE SET
- ECM - EXISTING CONCRETE MARKER
- EIP - EXISTING IRON PIPE
- EN - EXISTING NAIL
- MNS - MAG NAIL SET
- EIS - EXISTING IRON STAKE
- EPP - EXISTING PUMP PIPE
- PPS - PUMP PIPE SET
- PTI - PINCHED TOP IRON PIPE
- NMC - NON-MONUMENTED CORNER
- R/W - RIGHT OF WAY
- EOP - EDGE OF PAVEMENT
- CPP - CORRUGATED PLASTIC PIPE
- CMP - CORRUGATED METAL PIPE
- UP - UTILITY POLE
- BK - BOOK
- D.B. - DEED BOOK
- PG. - PAGE

No. 5 REBAR FLUSH WITH GRADE WITH AN ALUMINUM 3 1/4" CAP INSCRIBED: "STATE OF NORTH CAROLINA CONSERVATION EASEMENT"

▲ "FIXE" 3/8" BOLT SET IN ROCK OUTCROP

- CONSERVATION EASEMENT LINE
- TIE DOWN LINE
- RIGHT OF WAY LINE OR ADJOINER LINE

▨ ACCESS EASEMENTS

- POST-CONSTRUCTION MONITORING REACH CENTERLINE
- POST-CONSTRUCTION MODIFIED REACH CENTERLINE
- PRE-CONSTRUCTION TRIBUTARY CENTERLINE
- LOG CROSS VANE
- ROCK CROSS VANE
- LOG VANE
- DOUBLE LOG VANE
- ADDED LOG CROSS VANE
- ADDED ROCK CROSS VANE
- ADDED LOG VANE
- CROSS-SECTION
- ORIGIN POINT ON CVS PLOTS
- CVS PLOTS
- NOT CONSTRUCTED
- GROUNDWATER GAUGE
- STREAM GAUGE
- PERMANENT STREAM CROSSING
- TERRACELL
- WETLAND RESTORATION AREA

LINE DATA ALONG SECTION "A"		
LINE	BEARING	DISTANCE
L1	S18°26'06"E	73.17'
L2	S43°40'04"E	52.80'
L3	S15°51'03"E	104.35'
L4	S04°35'05"W	270.79'
L5	S07°10'25"W	36.12'
L6	N73°00'24"W	131.15'
L7	N01°54'04"W	36.36'
L8	N03°27'06"E	200.90'
L9	N22°53'28"W	153.44'
L10	N09°09'44"W	113.21'
L11	S83°37'05"E	131.12'

LINE DATA ALONG SECTION "C"		
LINE	BEARING	DISTANCE
L33	S81°17'19"E	218.68'
L34	S02°07'27"W	218.19'
L35	S39°40'04"E	50.16'
L36	S08°15'08"E	69.12'
L37	S44°22'35"E	89.21'
L38	S27°22'11"E	115.42'
L39	S46°50'51"E	76.15'
L40	N24°16'44"E	187.51'
L41	S14°06'19"E	293.34'
L42	S35°27'06"E	93.55'
L43	S29°03'24"E	47.04'
L44	S24°35'11"E	63.53'
L45	S63°22'36"W	79.75'
L46	S63°22'36"W	69.76'
L51	N26°37'24"W	226.42'
L52	N68°12'45"W	104.65'
L53	N42°21'17"W	78.81'
L54	N31°44'58"W	137.04'
L55	N45°20'00"W	105.89'
L56	S85°46'02"W	57.40'
L57	N75°27'59"W	92.55'
L58	N00°38'00"E	73.60'
L59	N00°58'03"E	251.17'
L60	N00°50'53"E	98.01'

LINE DATA ALONG SECTION "B"		
LINE	BEARING	DISTANCE
L12	S07°32'58"W	101.26'
L13	S11°54'22"W	108.00'
L14	S02°02'44"E	214.88'
L15	S55°47'00"E	68.23'
L16	S04°11'03"E	226.13'
L17	N88°34'04"W	69.47'
L18	N02°43'35"W	73.00'
L19	N59°32'04"W	34.24'
L20	S88°09'09"W	53.85'
L21	N17°39'00"W	80.16'
L22	N57°37'10"W	84.29'
L23	N28°59'07"W	227.76'
L24	N13°36'47"W	323.93'
L25	N10°19'58"W	154.68'
L26	N59°50'51"E	65.80'
L27	S77°18'23"E	72.59'
L28	S16°20'55"E	90.94'
L29	S13°37'32"E	239.62'
L30	S85°33'45"E	60.71'
L31	N08°13'11"E	155.29'
L32	S73°00'24"E	134.48'

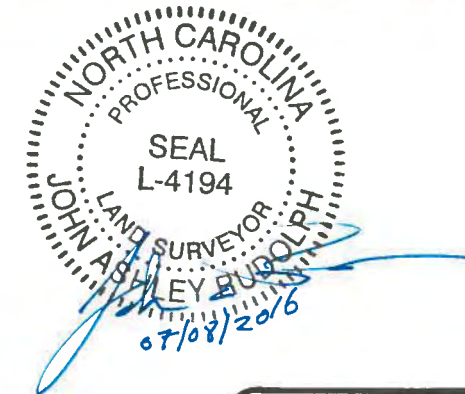
LINE DATA ALONG SECTION "D"		
LINE	BEARING	DISTANCE
L61	S17°35'36"E	141.46'
L62	S38°14'33"E	182.94'
L63	S34°41'46"E	217.90'
L64	S11°18'34"E	113.15'
L65	N89°21'48"W	197.37'
L66	N41°30'48"W	129.50'
L67	N25°08'41"W	234.94'
L68	N32°09'04"W	145.52'
L69	N08°20'51"W	49.53'
L70	N62°54'56"E	137.85'
L71	N62°54'56"E	47.95'

METADATA CORNER DESCRIPTIONS FOR CONSERVATION EASEMENT	
CORNER #	DESCRIPTION
(1) THRU (46) & (51) THRU (71)	No. 5 REBAR FLUSH WITH GRADE WITH AN ALUMINUM 3 1/4" CAP INSCRIBED: "STATE OF NORTH CAROLINA CONSERVATION EASEMENT"

GENERAL NOTES:

- 1) NOTE: NO ABSTRACT TITLE, NOR TITLE COMMITMENT, NOR RESULTS OF TITLE SEARCH WERE FURNISHED TO THE SURVEYOR. ALL DOCUMENTS OF RECORD REVIEWED ARE NOTED HEREON (SEE REFERENCES). THERE MAY EXIST OTHER DOCUMENTS OF RECORD THAT MAY AFFECT THIS SURVEYED PARCEL.
 - 2) NO HORIZONTAL CONTROL EXISTS WITHIN 2000 FT. ALL DISTANCES ARE GROUND HORIZONTAL DISTANCES AND ALL CROSS-SECTIONS HAVE ASSUMED ELEVATIONS.
 - 3) THE FOLLOWING LINE NUMBERS WERE NOT USED: L47 - L50 AND L72. THE FOLLOWING CORNER NUMBERS WERE NOT USED: 47 THROUGH 50
 - 4) ONLY IRON STAKE 110 HAS TRUE NORTH CAROLINA STATE PLANE COORDINATES. ALL OTHER COORDINATES ARE GROUND COORDINATES (NAD 83(2011)).
 - 5) SURVEYOR COULD NOT FIND A DEED REFERENCE FOR THE 30' DUKE ENERGY CAROLINAS EASEMENT. HOWEVER, A DEED WAS RECORDED FOR THE EASEMENT SOUTH OF THIS SECTION OF CONSERVATION EASEMENT AND SURVEYOR HAS HELD THE 30' WIDTH. SEE D.B. 3352, PG. 269 FOR THE DESCRIPTION SOUTH OF THE CONSERVATION EASEMENT.
- LAST OF CONSTRUCTION WAS APRIL 3, 2016 AND PLANTING WAS DONE ON APRIL 7, 2016. THIS INFORMATION WAS PROVIDED BY RESTORATION SYSTEMS, LLC.
- 6) THE NCSPC SHOWN ON POINT 110 (ISS) WAS OBTAINED FROM AN NGS OPUS SOLUTION. THIS OBSERVATION WAS STARTED ON 06/04/2014 15:26:00 AND ENDED ON 06/04/2014 17:29:00 USING A TOPCON HYPERLITE PLUS GPS UNIT. THE COMBINED FACTOR IS 0.99996471. THE DATUM IS NAD '83(2011). THE FOLLOWING BASE STATIONS WERE USED IN THE OPUS SOLUTION:

PID	DESIGNATION	LATITUDE (m)	LONGITUDE (m)
DF9213	NCBU BURLINGTON CORS ARP	N360529.586	W0792612.176
DM3527	NCRX ROXBORO CORS ARP	N362328.056	W0785954.418
DJ6107	NGC5 GREENSBORO 5 CORS ARP	N360403.612	W0794441.845



METADATA CORNER DESCRIPTIONS FOR PROPERTY LINES & TIE DOWNS	
CORNER #	DESCRIPTION
(101)	NON-MONUMENTED CORNER
(102)	3/4" O.D. IRON PIPE 1.5' ABOVE GRADE
(103) AND (104)	NON-MONUMENTED CORNER
(105)	3/4" O.D. IRON PIPE 0.4' ABOVE GRADE
(106)	No. 5 REBAR FLUSH WITH GRADE
(107)	1.0" O.D. IRON PIPE 1.6' ABOVE GRADE
(108)	1.0" O.D. IRON PIPE 0.8' BELOW GRADE
(109)	1.5" O.D. PINCHED TOP IRON 0.2' BELOW GRADE
(110)	No. 5 REBAR FLUSH WITH GRADE
(111)	1.0" O.D. IRON PIPE 0.1' ABOVE GRADE
(112) AND (114)	No. 5 REBAR FLUSH WITH GRADE

FEMA FLOOD STATEMENT:

THE AREA REPRESENTED BY THIS PLAT IS LOCATED IN A FLOOD HAZARD BOUNDARY ACCORDING TO FEMA MAP NUMBER(S) 3710884600K, ZONE(S): AE, FLOODWAY & X DATED: JUNE 18, 2007.

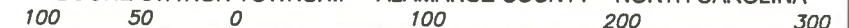
SHEET 5A (2 OF 78)

AS-BUILT SURVEY FOR

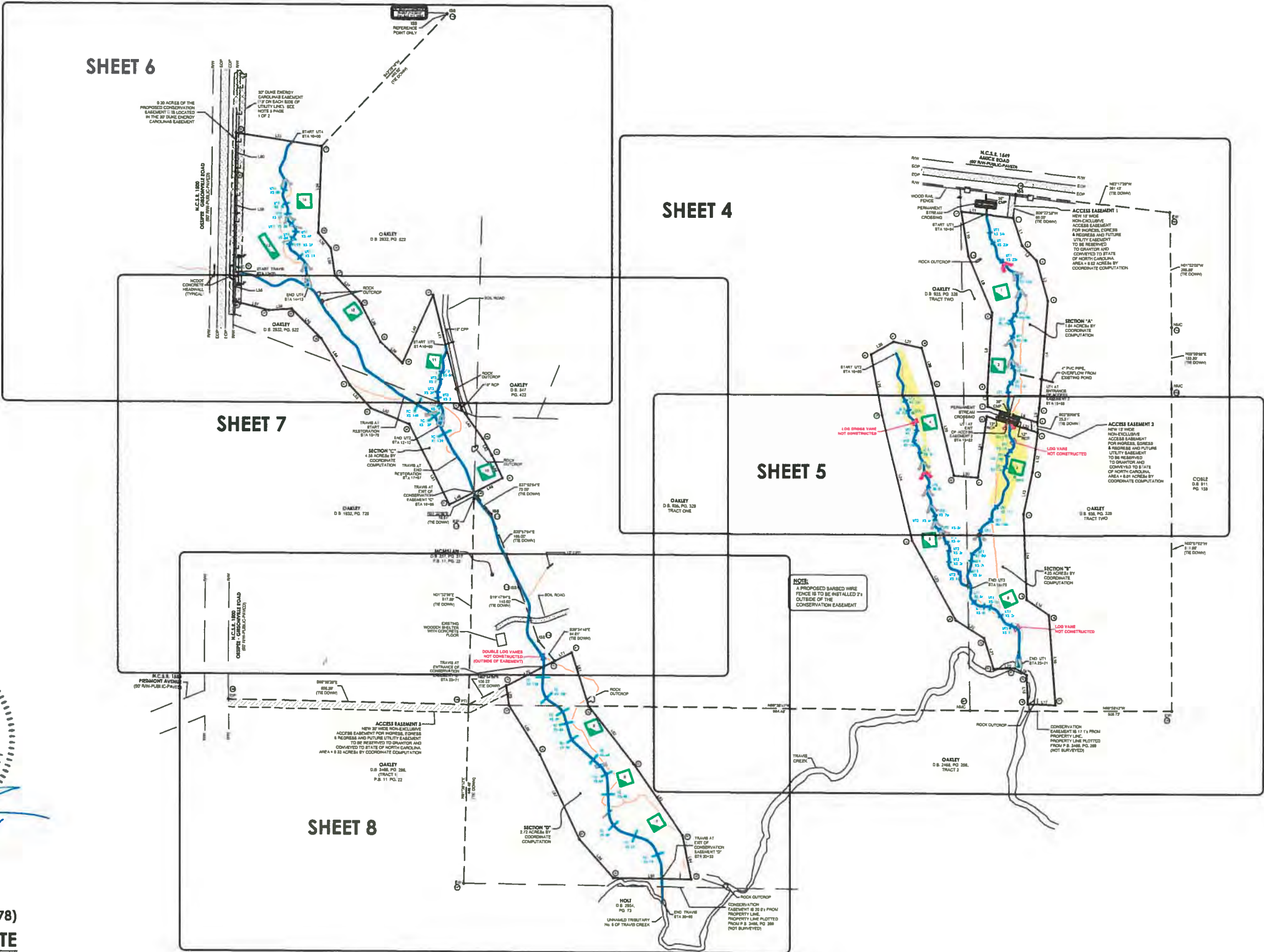
**THE STATE OF NORTH CAROLINA,
DIVISION OF
MITIGATION SERVICES
DMS PROJECT ID# 96312
SPO FILE # 01-AA
NC DMS CONTRACT # 5791
RFP# 16-005568**

AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE

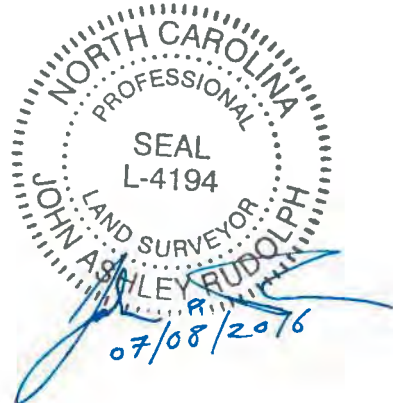
BOONE STATION TOWNSHIP ALAMANCE COUNTY NORTH CAROLINA



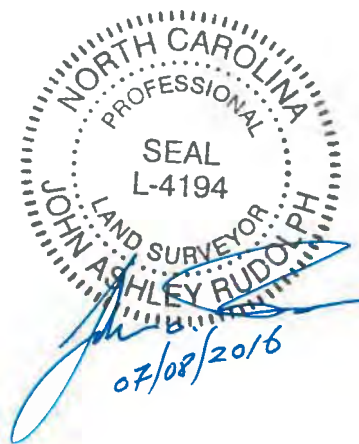
GRAPHIC SCALE 1" = 100'



NORTH
 NC GRID
 NAD '83(2011)

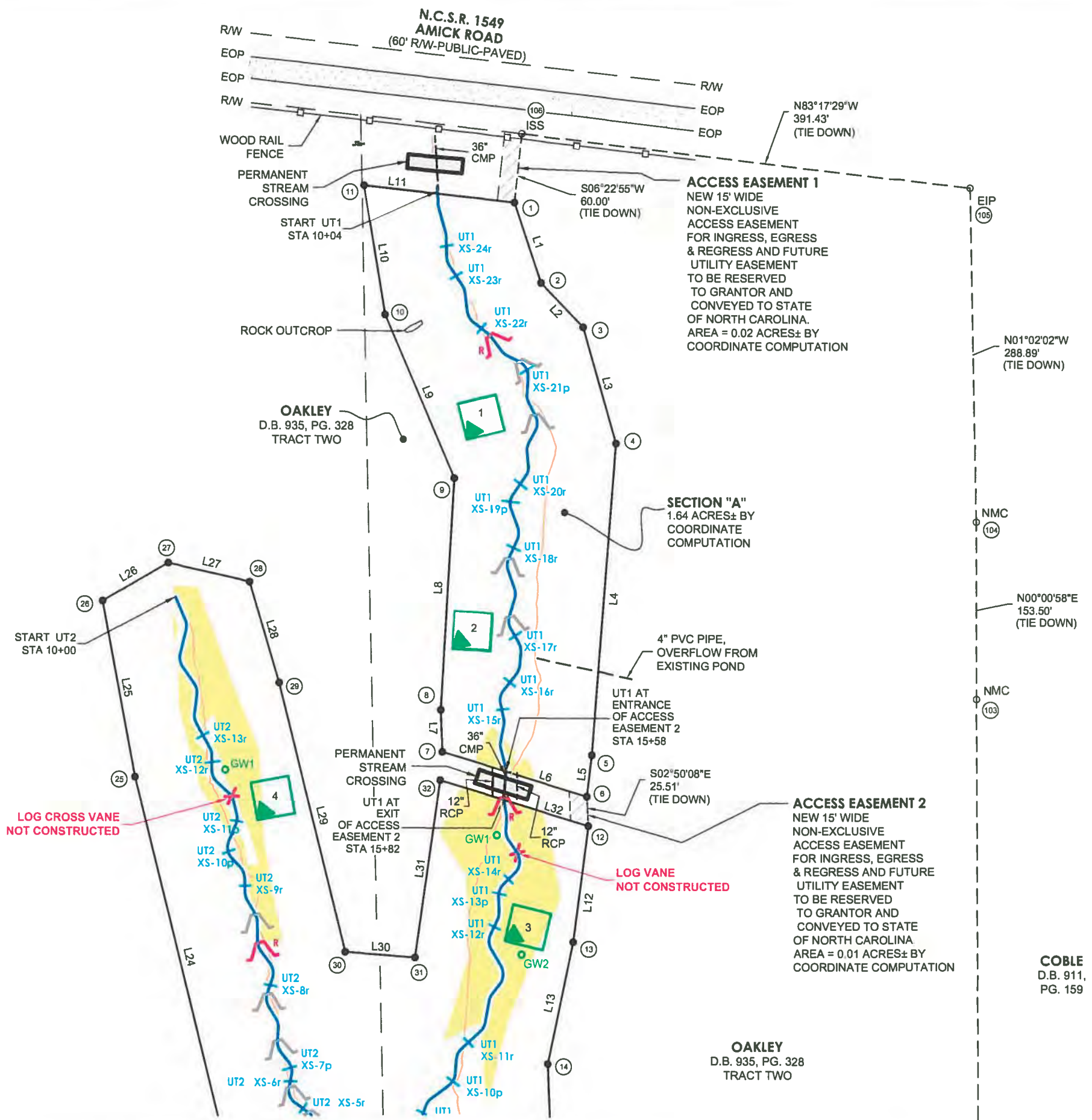
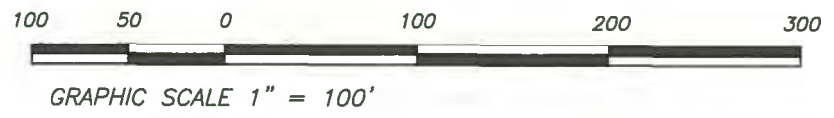


SHEET 5A (3 OF 78)
 OVERALL SITE
 (NOT TOO SCALE)



NOTE:
ALL WETLAND RESTORATION AREAS DETERMINED AND PROVIDED BY AXIOM ENVIRONMENTAL, INC.

SHEET 5A (4 OF 78)



OAKLEY
D.B. 935, PG. 328
TRACT TWO

OAKLEY
D.B. 935, PG. 328
TRACT ONE



NOTE:
A PROPOSED BARBED WIRE FENCE IS TO BE INSTALLED 2'± OUTSIDE OF THE CONSERVATION EASEMENT

NOTE:
ALL WETLAND RESTORATION AREAS DETERMINED AND PROVIDED BY AXIOM ENVIRONMENTAL, INC.

N89°38'42"W
964.45'

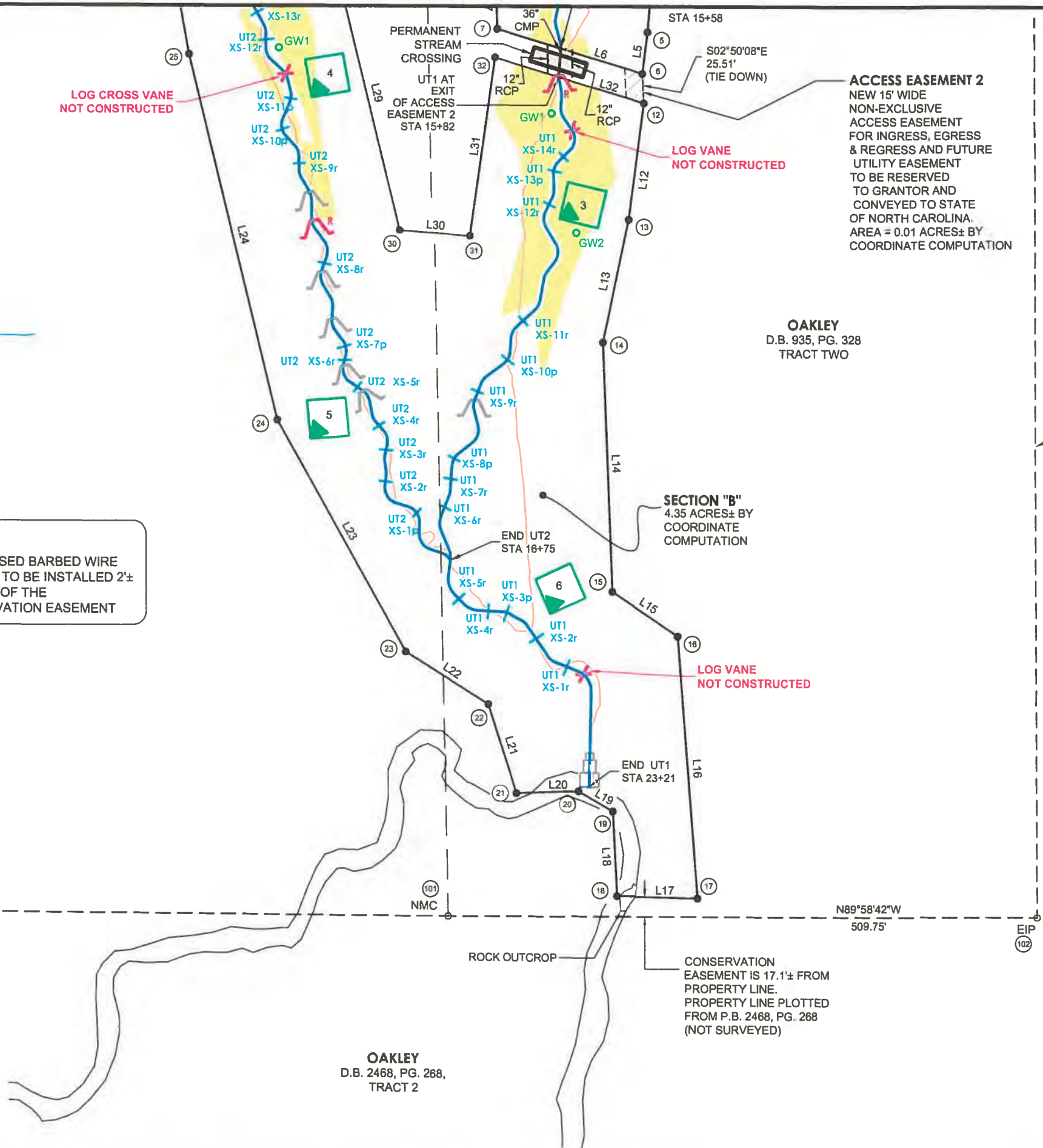
N89°58'42"W
509.75'

SHEET 5A (5 OF 78)

100 50 0 100 200 300

GRAPHIC SCALE 1" = 100'

OAKLEY
D.B. 2468, PG. 268,
TRACT 2



ACCESS EASEMENT 2
NEW 15' WIDE NON-EXCLUSIVE ACCESS EASEMENT FOR INGRESS, EGRESS & REGRESS AND FUTURE UTILITY EASEMENT TO BE RESERVED TO GRANTOR AND CONVEYED TO STATE OF NORTH CAROLINA. AREA = 0.01 ACRES± BY COORDINATE COMPUTATION

OAKLEY
D.B. 935, PG. 328
TRACT TWO

SECTION "B"
4.35 ACRES± BY COORDINATE COMPUTATION

LOG VANE NOT CONSTRUCTED

LOG CROSS VANE NOT CONSTRUCTED

LOG VANE NOT CONSTRUCTED

COBLE
D.B. 911,
PG. 159

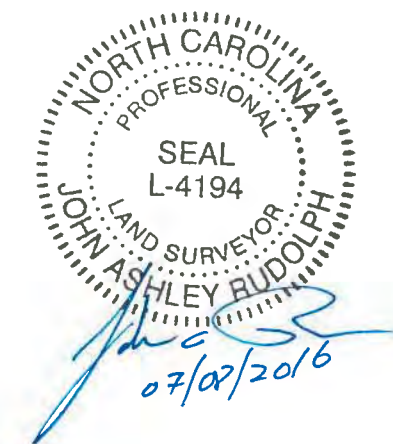
N00°07'02"W
811.60'
(TIE DOWN)

CONSERVATION EASEMENT IS 17.1'± FROM PROPERTY LINE. PROPERTY LINE PLOTTED FROM P.B. 2468, PG. 268 (NOT SURVEYED)

NC GRID COORDINATE
 N=867,014.5410'
 E=1,844,701.1891'

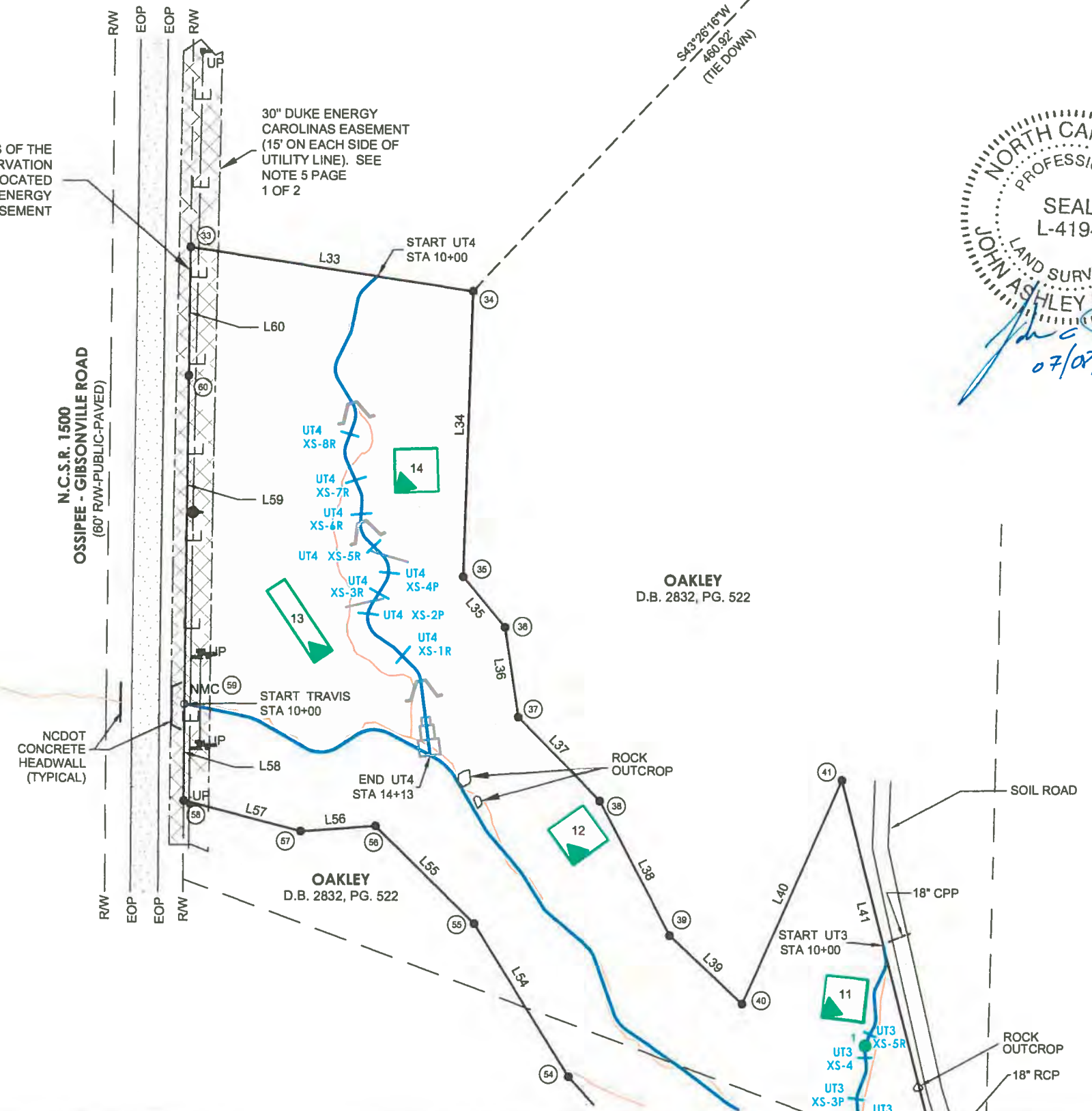
ISS
 (110)

ISS
 REFERENCE
 POINT ONLY



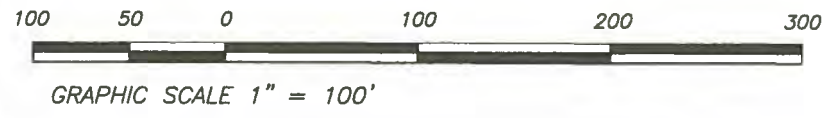
0.20 ACRES OF THE PROPOSED CONSERVATION EASEMENT C IS LOCATED IN THE 30' DUKE ENERGY CAROLINAS EASEMENT

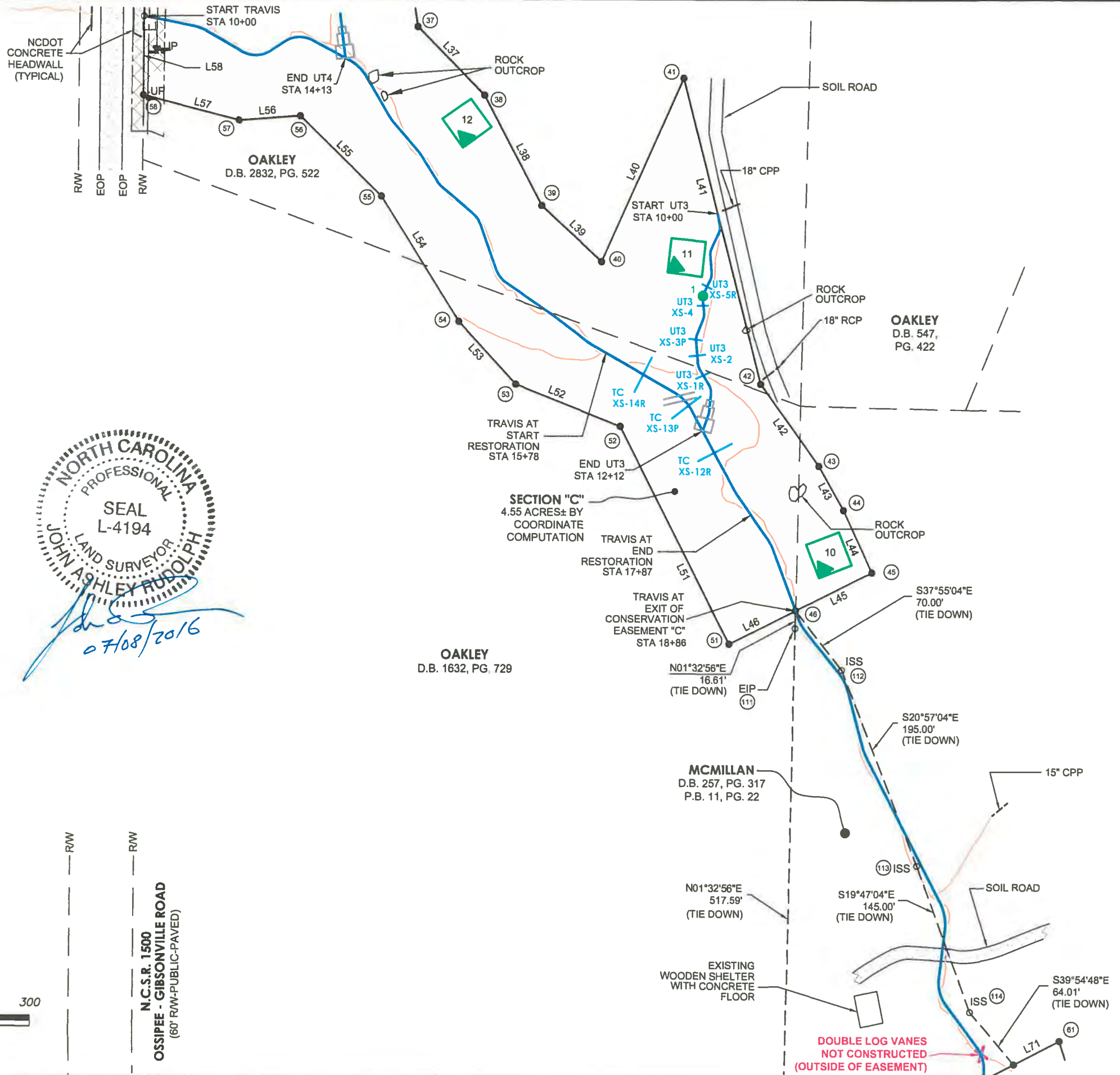
30" DUKE ENERGY CAROLINAS EASEMENT (15' ON EACH SIDE OF UTILITY LINE). SEE NOTE 5 PAGE 1 OF 2



NOTE:
 ALL WETLAND RESTORATION AREAS DETERMINED AND PROVIDED BY AXIOM ENVIRONMENTAL, INC.

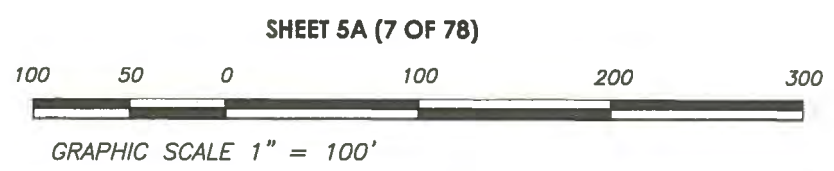
SHEET 5A (6 OF 78)





NORTH CAROLINA
 PROFESSIONAL
 SEAL
 L-4194
 LAND SURVEYOR
 JOHN ASHLEY RUDOLPH
07/08/2016

NOTE:
 ALL WETLAND RESTORATION AREAS
 DETERMINED AND PROVIDED BY AXIOM
 ENVIRONMENTAL, INC.



N.C.S.R. 1500
 OSSIPEE - GIBSONVILLE ROAD
 (60' R/W-PUBLIC-PAVED)



N.C.S.R. 1500
OSSEIPEE - GIBSONVILLE ROAD
(60' R/W-PUBLIC-PAVED)

MCMILLAN
D.B. 257, PG. 317
P.B. 11, PG. 22

N01°32'56"E
517.59'
(TIE DOWN)

S19°47'04"E
145.00'
(TIE DOWN)

15" CPP

SOIL ROAD

EXISTING
WOODEN SHELTER
WITH CONCRETE
FLOOR

S39°54'48"E
64.01'
(TIE DOWN)

DOUBLE LOG VANES
NOT CONSTRUCTED
(OUTSIDE OF EASEMENT)

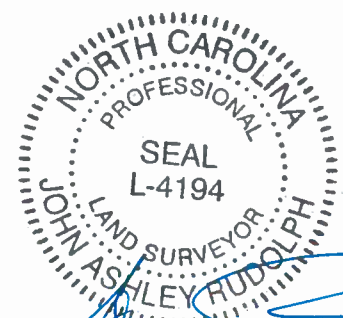
TRAVIS AT
ENTRANCE OF
CONSERVATION
EASEMENT "D"
STA 23+71

N62°54'56"E
106.25'
(TIE DOWN)

S88°56'26"E
606.30'
(TIE DOWN)

ACCESS EASEMENT 3
NEW 20' WIDE NON-EXCLUSIVE
ACCESS EASEMENT FOR INGRESS, EGRESS
& REGRESS AND FUTURE UTILITY EASEMENT
TO BE RESERVED TO GRANTOR AND
CONVEYED TO STATE OF NORTH CAROLINA.
AREA = 0.33 ACRES± BY COORDINATE COMPUTATION

OAKLEY
D.B. 2468, PG. 268,
(TRACT 1)
P.B. 11, PG. 22



07/08/2016

NOTE:
ALL WETLAND RESTORATION AREAS
DETERMINED AND PROVIDED BY AXIOM
ENVIRONMENTAL, INC.

SECTION "D"
2.72 ACRES± BY
COORDINATE
COMPUTATION

TRAVIS AT
EXIT OF
CONSERVATION
EASEMENT "D"
STA 30+35

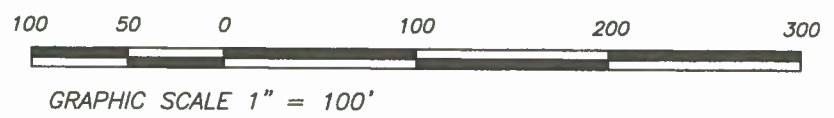
HOLT
D.B. 2954,
PG. 73

UNNAMED TRIBUTARY
No. 6 OF TRAVIS CREEK

END TRAVIS
STA 30+95

CONSERVATION
EASEMENT IS 20.0'± FROM
PROPERTY LINE.
PROPERTY LINE PLOTTED
FROM P.B. 2468, PG. 268
(NOT SURVEYED)

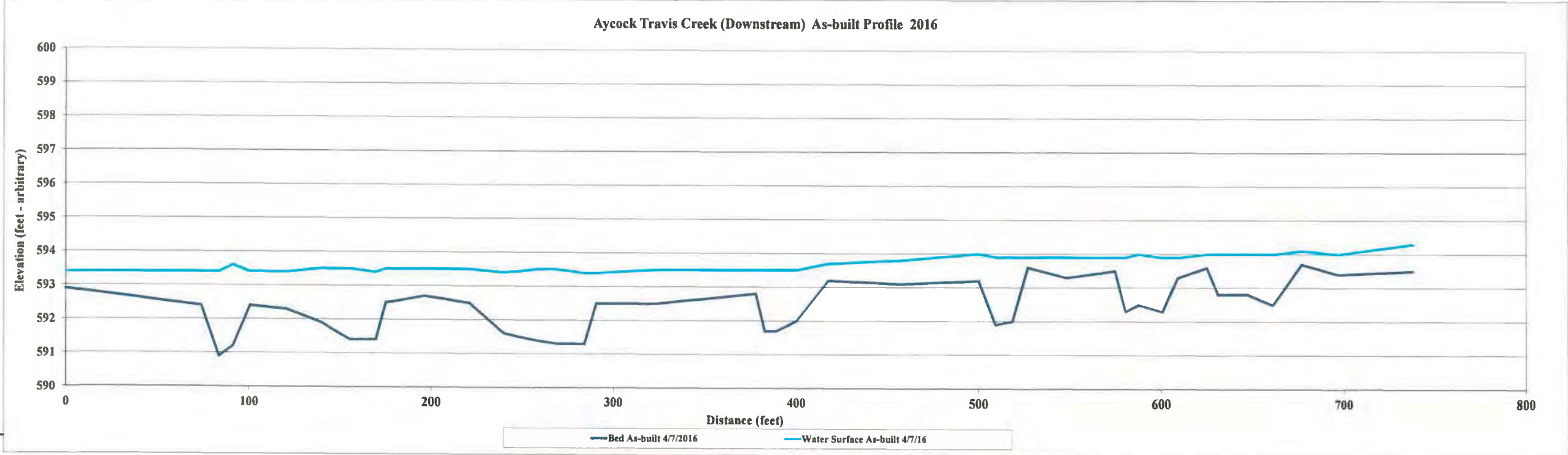
SHEET 5A (8 OF 78)



Project Name	Aycock - As-built (2016) Profile	
Reach	Travis Creek (Downstream)	
Feature	Profile	
Date	4/7/16	
Crew	Perkinson, Keith	

	As-built	As needed		
Avg. Water Surface Slope	0.0010			
Riffle Length	54			
Avg. Riffle Slope	0.0019			
Pool Length	43			

2016 As-built Survey			As needed			As needed			As needed		
Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation
0 0	592.9	593.4									
74.2	592.4	593.4									
83.8	590.9	593.4									
91.4	591.2	593.6									
100.9	592.4	593.4									
120.9	592.3	593.4									
140.1	591.9	593.5									
155.8	591.4	593.5									
169.9	591.4	593.4									
175.4	592.5	593.5									
196.3	592.7	593.5									
221.2	592.5	593.5									
240.0	591.6	593.4									
257.7	591.4	593.5									
269.4	591.3	593.5									
284.1	591.3	593.4									
290.7	592.5	593.4									
323.0	592.5	593.5									
378.1	592.8	593.5									
383.0	591.7	593.5									
389.2	591.7	593.5									
400.4	592.0	593.5									
417.9	593.2	593.7									
457.4	593.1	593.8									
500.3	593.2	594.0									
509.4	591.9	593.9									
518.6	592.0	593.9									
527.1	593.6	593.9									
548.1	593.3	593.9									
574.8	593.5	593.9									
580.6	592.3	593.9									
587.7	592.5	594.0									
600.8	592.3	593.9									
609.3	593.3	593.9									
625.2	593.6	594.0									
631.4	592.8	594.0									
647.7	592.8	594.0									
661.3	592.5	594.0									
677.2	593.7	594.1									
697.2	593.4	594.0									
737.9	593.5	594.3									



NORTH CAROLINA
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 L-4194
 LAND SURVEYOR
 JOHN ASHLEY RUDOLPH

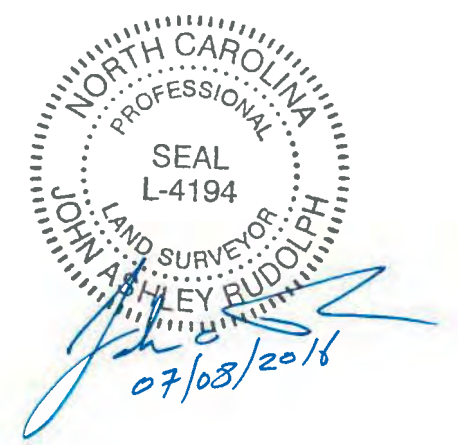
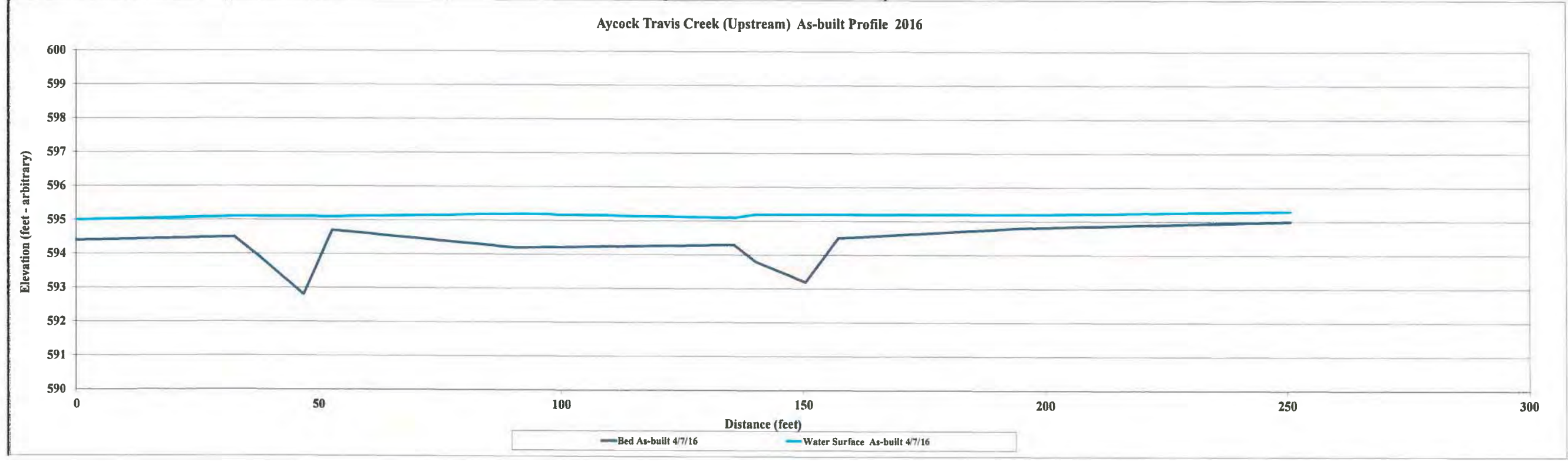
[Signature]
 07/08/2016

Project Name Aycock - As-built (2016) Profile
 Reach Travis Creek (Upstream)
 Feature Profile
 Date 4/7/16
 Crew Perkinson, Keith

2016 As-built Survey			As needed			As needed			As needed		
Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation
0 0	594.4	595.0									
32.6	594.5	595.1									
37.9	593.9	595.1									
46.9	592.8	595.1									
52.8	594.7	595.1									
90.8	594.2	595.2									
135.8	594.3	595.1									
140.3	593.8	595.2									
150.5	593.2	595.2									
157.3	594.5	595.2									
195.2	594.8	595.2									
250.7	595.0	595.3									

	As-built	As needed		
Avg. Water Surface Slope	0.0009			
Riffle Length	70			
Avg. Riffle Slope	0.0015			
Pool Length	21			

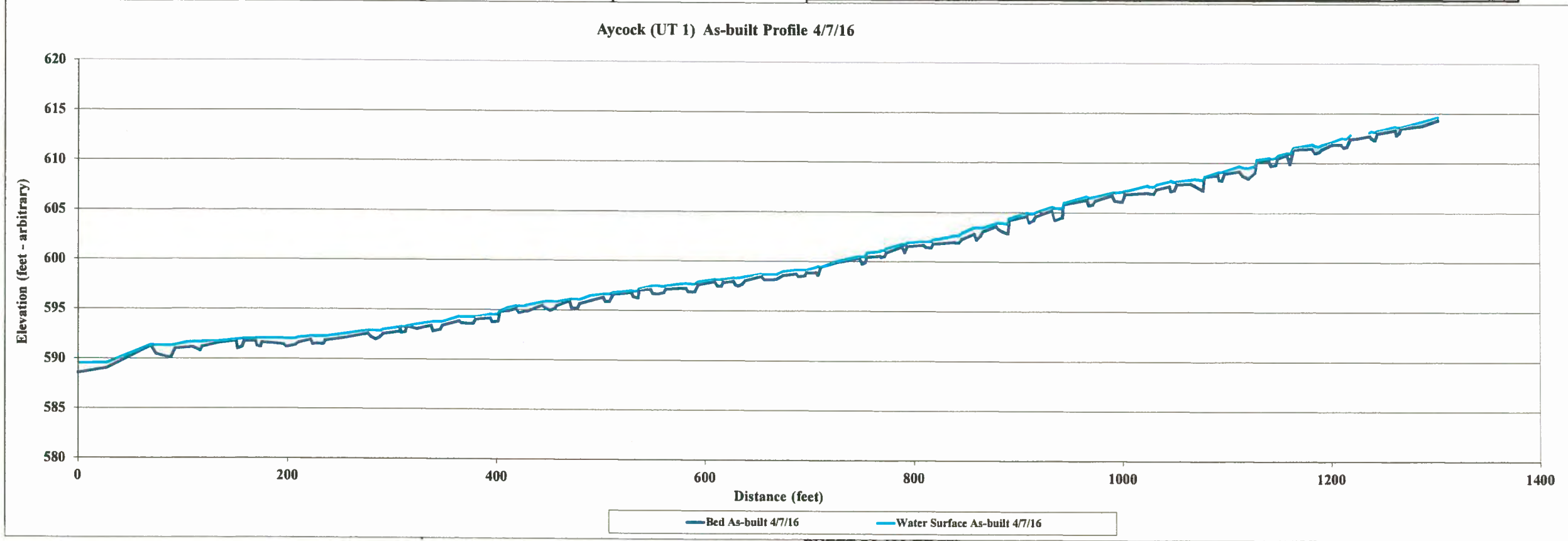
Aycock Travis Creek (Upstream) As-built Profile 2016



Project Name Aycock - As-built (2016) Profile
 Reach UT 1
 Feature Profile
 Date 4/7/16
 Crew Perkinson, Keith

Avg. Water Surface Slope	As-built	As needed	
Rifle Length	0.0189		
Avg. Rifle Slope	18		
Pool Length	0.0223		
	10		

2016 As-built Survey			2016 As-built Survey			2016 As-built Survey			2016 As-built Survey			2016 As-built Survey			2016 As-built Survey			2016 As-built Survey					
Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elev.	Water Elev.	Station	Bed Elev.	Water Elev.	Station	Bed Elev.	Water Elev.			
0.0	588.6	589.5	228.1	591.5	592.3	403.3	594.9	594.9	554.8	596.7	597.5	708.2	598.6	599.5	881.2	603.3	603.9	1050.6	607.2	608.0	1210.35	611.8665	612.4932
27.4	589.1	589.6	234.0	591.5	592.3	411.3	594.9	595.2	560.2	596.8	597.4	710.8	599.4	599.4	886.0	603.0	603.9	1053.0	607.8	608.1	1212.9	611.5697	612.4771
70.0	591.3	591.4	236.1	591.9	592.3	418.8	595.1	595.4	562.5	597.2	597.5	726.7	599.9	600.0	890.4	602.8	603.8	1066.2	607.9	608.3	1216.01	611.6157	612.4681
74.5	590.5	591.3	255.2	592.1	592.5	419.2	595.1	595.4	581.6	597.3	597.7	747.9	600.3	600.5	891.9	604.2	604.4	1069.5	607.8	608.4	1219.37	612.3984	612.8173
80.9	590.3	591.3	277.1	592.6	592.9	421.5	594.7	595.4	583.8	596.9	597.7	750.6	599.7	600.5	909.2	604.6	604.9	1078.1	607.2	608.3	1226.38	612.4988	
88.8	590.1	591.3	279.9	592.2	592.9	426.6	594.8	595.4	590.2	596.9	597.7	753.7	599.9	600.5	911.0	604.0	604.9	1079.6	608.6	608.6	1237.61	612.7154	613.0747
92.8	591.0	591.4	284.6	592.0	592.9	429.4	594.9	595.5	593.3	597.6	597.9	755.3	600.5	600.9	915.7	604.2	604.9	1092.3	608.8	609.1	1239.12	612.5301	613.2143
103.4	591.1	591.6	289.0	592.3	592.9	443.8	595.5	595.8	609.1	597.9	598.2	767.9	600.6	601.0	918.2	604.6	605.0	1093.4	608.3	609.1	1242.57	612.3088	613.1226
109.6	591.1	591.7	291.7	592.5	593.0	446.6	595.2	595.8	611.9	597.5	598.1	768.8	600.4	601.1	933.1	605.2	605.5	1096.2	608.2	609.1	1245.26	612.9595	613.2313
111.6	591.0	591.7	307.8	592.8	593.2	451.5	594.9	595.8	615.5	597.4	598.2	771.9	600.5	601.1	935.5	604.2	605.4	1098.7	608.9	609.2	1262.14	613.3293	613.6862
116.4	590.8	591.7	308.0	593.0	593.2	456.3	595.2	595.8	617.2	597.8	598.2	773.9	600.9	601.3	943.1	604.5	605.4	1112.8	609.2	609.7	1263.46	612.7936	613.6363
118.4	591.2	591.7	309.3	592.6	593.2	458.0	595.5	595.9	627.2	598.0	598.3	788.6	601.5	601.8	944.3	605.9	606.0	1116.0	608.7	609.5	1265.82	613	613.621
134.7	591.6	591.8	313.1	592.7	593.2	469.7	595.9	596.1	629.1	597.6	598.3	791.2	601.0	601.6	965.5	606.2	606.6	1121.6	608.4	609.5	1268.08	613.5114	613.6382
150.9	591.8	591.9	314.6	593.3	593.3	471.7	595.2	596.2	632.1	597.5	598.3	793.8	601.5	601.9	966.5	606.3	606.6	1128.0	609.1	609.7	1287.53	613.7245	614.1786
152.5	591.0	591.9	324.3	593.0	593.5	477.2	595.2	596.1	635.7	597.7	598.3	809.2	601.7	602.0	968.7	605.7	606.5	1129.4	610.2	610.4	1303.01	614.2808	614.6202
156.7	591.2	592.0	337.7	593.4	593.8	479.6	595.6	596.1	638.8	598.0	598.5	811.8	601.5	602.0	972.5	605.8	606.6	1141.2	610.2	610.5			
158.5	591.8	592.0	339.7	592.8	593.8	490.0	595.9	596.5	653.4	598.4	598.7	816.7	601.4	602.0	974.9	606.2	606.6	1143.5	609.7	610.4			
169.6	591.7	592.0	346.1	593.0	593.8	502.0	596.3	596.6	653.8	598.5	598.7	818.7	601.8	602.2	990.9	606.7	607.0	1147.9	609.8	610.5			
170.6	591.3	592.0	348.6	593.4	593.8	504.2	595.9	596.6	657.0	598.1	598.7	839.2	602.0	602.6	993.2	606.2	607.0	1149.7	610.5	610.8			
174.4	591.2	592.0	364.1	593.9	594.3	508.2	595.9	596.6	662.8	598.1	598.7	840.5	601.9	602.7	1000.6	606.1	607.1	1158.7	610.9	611.0			
175.6	591.6	592.1	366.2	593.7	594.3	511.5	596.6	596.8	668.4	598.2	598.7	843.4	601.9	602.6	1003.2	606.9	607.2	1161.6	609.9	610.9			
196.0	591.5	592.1	373.7	593.6	594.3	529.3	596.8	597.0	674.9	598.6	599.0	846.4	602.3	602.9	1024.6	607.0	607.7	1164.64	611.3515	611.537			
198.9	591.2	592.0	378.2	593.6	594.2	531.1	596.4	596.9	687.1	598.7	599.1	858.4	602.8	603.4	1026.7	606.9	607.6	1182.7	611.4489	611.8942			
207.3	591.4	592.0	380.6	594.0	594.3	535.5	596.3	597.0	689.4	598.4	599.1	860.5	602.2	603.5	1030.7	606.9	607.6	1185.48	610.9971	611.7508			
210.5	591.6	592.2	394.2	594.2	594.5	537.0	597.1	597.2	695.5	598.5	599.1	864.5	602.6	603.4	1033.2	607.3	607.8	1189.57	611.1215	611.6905			
222.1	591.9	592.3	395.9	593.8	594.5	547.8	597.1	597.4	697.5	598.8	599.1	867.2	603.1	603.4	1045.8	607.7	608.1	1192.15	611.4037	611.8504			
224.0	591.5	592.3	401.5	593.8	594.6	549.8	596.7	597.5	706.5	598.9	599.5	879.3	603.6	603.9	1047.1	607.2	608.2	1201.09	611.8506	612.1237			

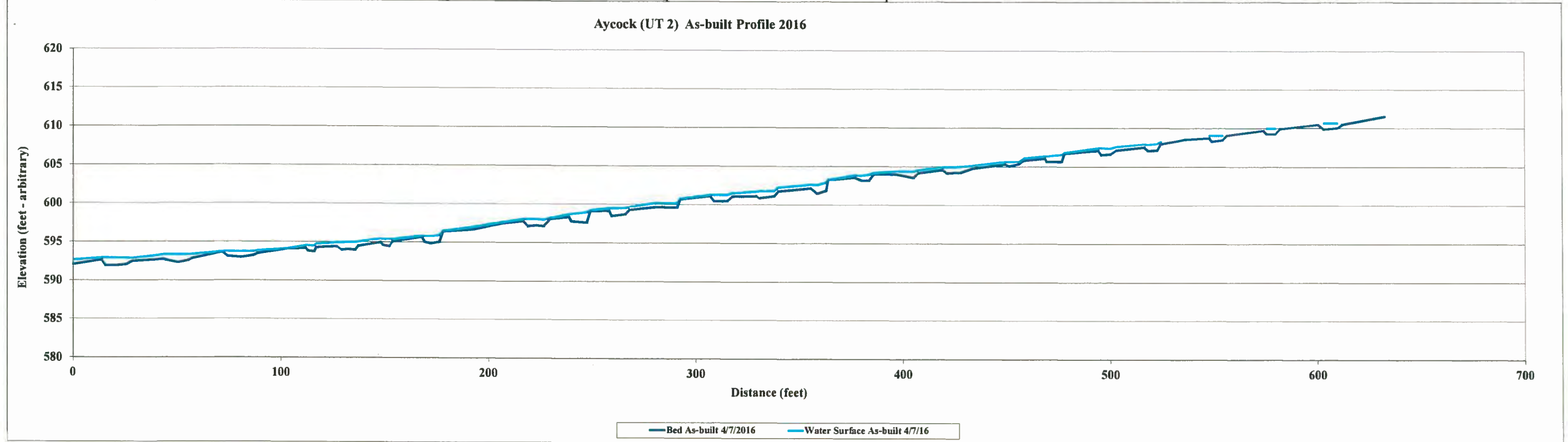
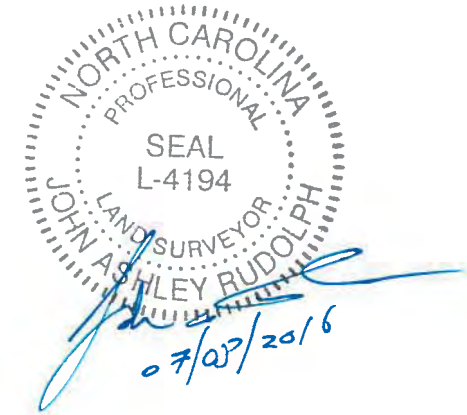


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 JOHN ASHLEY RUDOLPH
 07/03/2016

Project Name Aycock - As-built (2016) Profile
 Reach UT 2
 Feature Profile
 Date 4/7/16
 Crew Perkinson, Keith

2016 As-built Survey			2016 As-built Survey			2016 As-built Survey			2016 As-built Survey		
Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation
0.0	592.1	592.6	152.4	594.5	595.4	315.3	600.5	601.3	469.7	605.6	606.4
13.7	592.6	592.9	153.8	595.1	595.4	317.8	601.1	601.5	477.0	605.7	606.6
15.6	591.9	592.9	167.9	595.7	595.8	329.2	601.1	601.7	478.3	606.7	606.8
20.5	591.9	592.9	169.2	595.0	595.7	330.7	600.9	601.7	494.7	607.1	607.5
25.6	592.0	592.9	172.2	594.8	595.8	338.0	601.1	601.7	496.1	606.5	607.4
28.5	592.5	592.8	176.4	595.0	595.9	340.0	601.8	602.3	500.6	606.6	607.4
43.5	592.7	593.3	178.1	596.4	596.5	355.7	602.1	602.6	503.3	607.1	607.6
44.6	592.6	593.3	192.9	596.7	597.0	358.8	601.5	602.6	516.8	607.5	607.9
50.3	592.3	593.3	206.9	597.5	597.6	363.0	601.8	602.9	518.7	607.1	607.9
55.3	592.5	593.3	217.0	597.8	598.0	364.0	603.3	603.2	522.9	607.1	608.0
56.8	592.8	593.4	219.2	597.1	598.0	376.9	603.5	603.8	524.7	607.9	608.3
71.7	593.7	593.7	223.3	597.2	598.0	380.4	603.1	603.8	536.2	608.6	
74.3	593.1	593.7	226.8	597.1	597.9	383.7	603.2	603.9	548.0	608.7	609.1
81.1	593.0	593.7	230.0	598.1	598.2	386.0	604.0	604.2	549.2	608.3	609.1
86.6	593.2	593.7	239.0	598.3	598.7	396.4	604.0	604.4	554.4	608.5	609.1
88.7	593.5	593.8	240.2	597.8	598.7	398.6	603.9	604.4	556.5	609.1	
103.2	594.1	594.1	247.6	597.6	598.9	405.2	603.5	604.4	574.0	609.7	
112.0	594.2	594.5	249.3	599.1	599.2	407.6	604.2	604.5	575.5	609.3	610.0
113.2	593.8	594.5	258.4	599.1	599.5	419.0	604.6	604.9	579.8	609.3	610.0
116.2	593.7	594.5	259.4	598.5	599.5	421.2	604.2	605.0	582.2	609.9	
117.2	594.3	594.7	266.1	598.7	599.5	424.1	604.2	605.0	600.4	610.5	
126.9	594.4	594.9	268.2	599.3	599.6	427.6	604.2	605.0	603.2	609.9	610.7
129.3	594.0	594.9	281.3	599.6	600.2	433.4	604.7	605.1	609.8	610.1	610.7
132.2	594.1	594.9	283.8	599.6	600.2	449.5	605.3	605.7	612.2	610.5	
135.9	593.9	594.9	291.2	599.6	600.2	451.5	605.1	605.7	632.5	611.5	611.7
137.4	594.5	595.0	292.5	600.7	600.8	455.9	605.4	605.7			
148.2	595.0	595.4	307.0	601.1	601.3	458.5	605.8	606.1			
149.2	594.6	595.4	309.1	600.4	601.2	468.8	606.1	606.4			

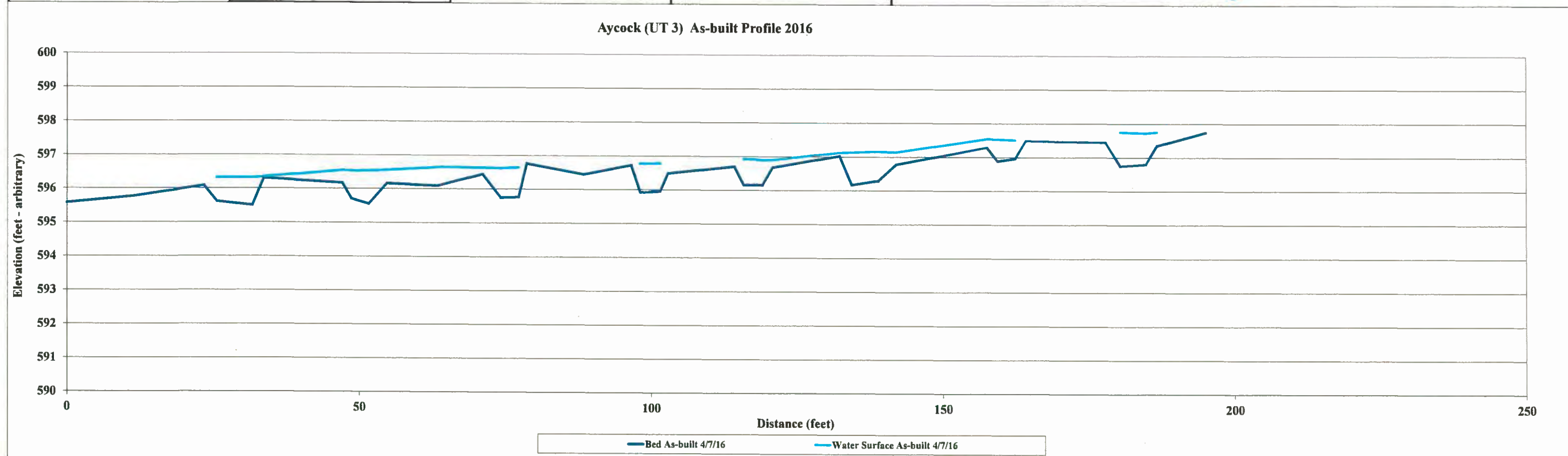
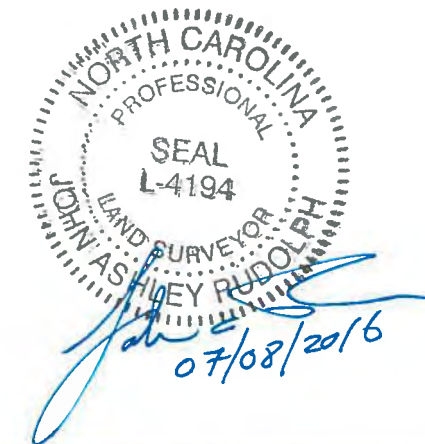
	As-built	As needed		
Avg. Water Surface Slope	0.0301			
Riffle Length	14			
Avg. Riffle Slope	0.0288			
Pool Length	10			



Project Name Aycock - As-built (2016) Profile
 Reach UT 3
 Feature Profile
 Date 4/7/16
 Crew Perkinson, Keith

2016 As-built Survey			2016 As-built Survey			As needed			As needed		
Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation
0.0	595.6		157.6	597.3	597.5						
11.4	595.8		159.4	596.9	597.5						
23.5	596.1		162.4	597.0	597.5						
25.7	595.6	596.3	164.3	597.5							
31.7	595.5	596.3	177.9	597.4							
33.7	596.3	596.3	180.4	596.8	597.8						
47.1	596.2	596.5	184.8	596.8	597.7						
48.7	595.7	596.5	186.7	597.4	597.8						
51.6	595.6	596.5	195.0	597.7							
54.7	596.2	596.6									
63.4	596.1	596.6									
71.2	596.4	596.6									
74.3	595.8	596.6									
77.3	595.8	596.6									
78.8	596.8										
88.4	596.4										
96.6	596.7										
98.1	595.9	596.8									
101.5	596.0	596.8									
102.9	596.5										
114.3	596.7										
115.9	596.2	596.9									
119.1	596.2	596.9									
120.9	596.7	596.9									
132.4	597.0	597.1									
134.4	596.2	597.1									
139.0	596.3	597.2									
142.0	596.8	597.1									

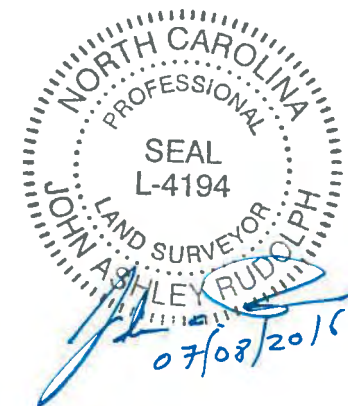
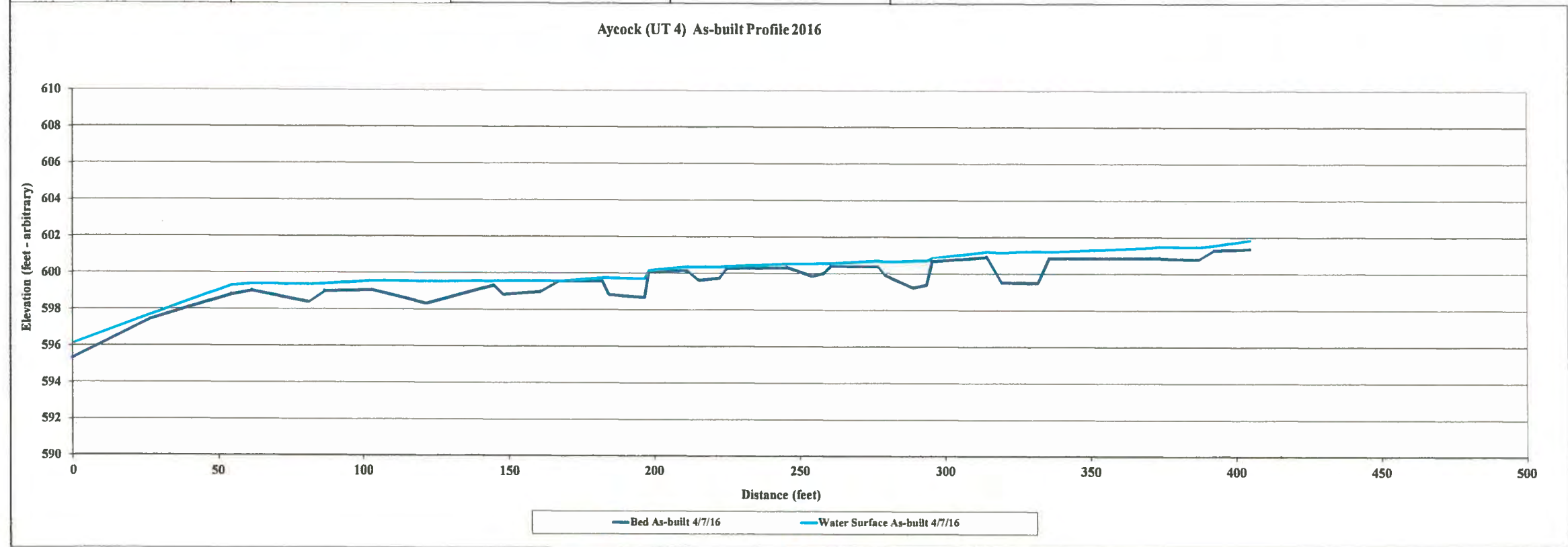
	As-built	As needed		
Avg. Water Surface Slope	0.0092			
Rifle Length	15			
Avg. Rifle Slope	0.0162			
Pool Length	8			



Project Name Aycok - As-built (2016) Profile
 Reach UT 4
 Feature Profile
 Date 4/7/16
 Crew Perkinson, Keith

2016 As-built Survey			2016 As-built Survey			2016 As-built Survey			As needed		
Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation
0.0	595.3	596.1	222.5	599.7	600.3	387.4	600.8	601.5			
26.7	597.4	597.7	224.9	600.3	600.4	392.5	601.3	601.6			
54.6	598.8	599.3	245.7	600.3	600.5	404.9	601.4	601.9			
61.6	599.0	599.4	254.2	599.9	600.5						
81.3	598.4	599.4	258.2	600.0	600.5						
86.8	599.0	599.4	260.8	600.4	600.5						
102.9	599.1	599.5	277.0	600.4	600.7						
121.5	598.3	599.5	279.4	599.9	600.7						
144.7	599.3	599.6	288.9	599.2	600.7						
148.0	598.8	599.6	293.6	599.4	600.7						
160.9	599.0	599.6	295.6	600.7	600.9						
167.0	599.5	599.6	314.4	600.9	601.2						
182.1	599.5	599.7	319.4	599.5	601.2						
184.3	598.8	599.7	325.6	599.5	601.2						
196.6	598.7	599.7	332.0	599.5	601.2						
198.1	600.1	600.1	335.9	600.9	601.2						
211.4	600.1	600.4	370.8	600.9	601.5						
215.3	599.6	600.4	373.9	600.9	601.5						

	As-built	As needed	
Avg. Water Surface Slope	0.0066		
Rifle Length	19		
Avg. Rifle Slope	0.0128		
Pool Length	22		



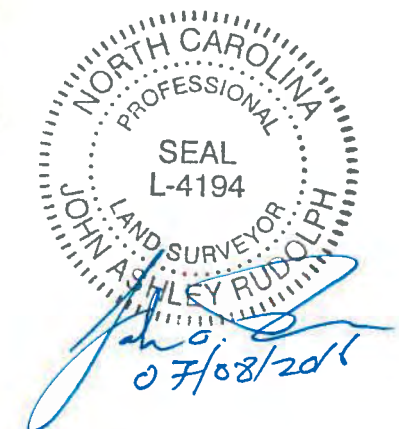
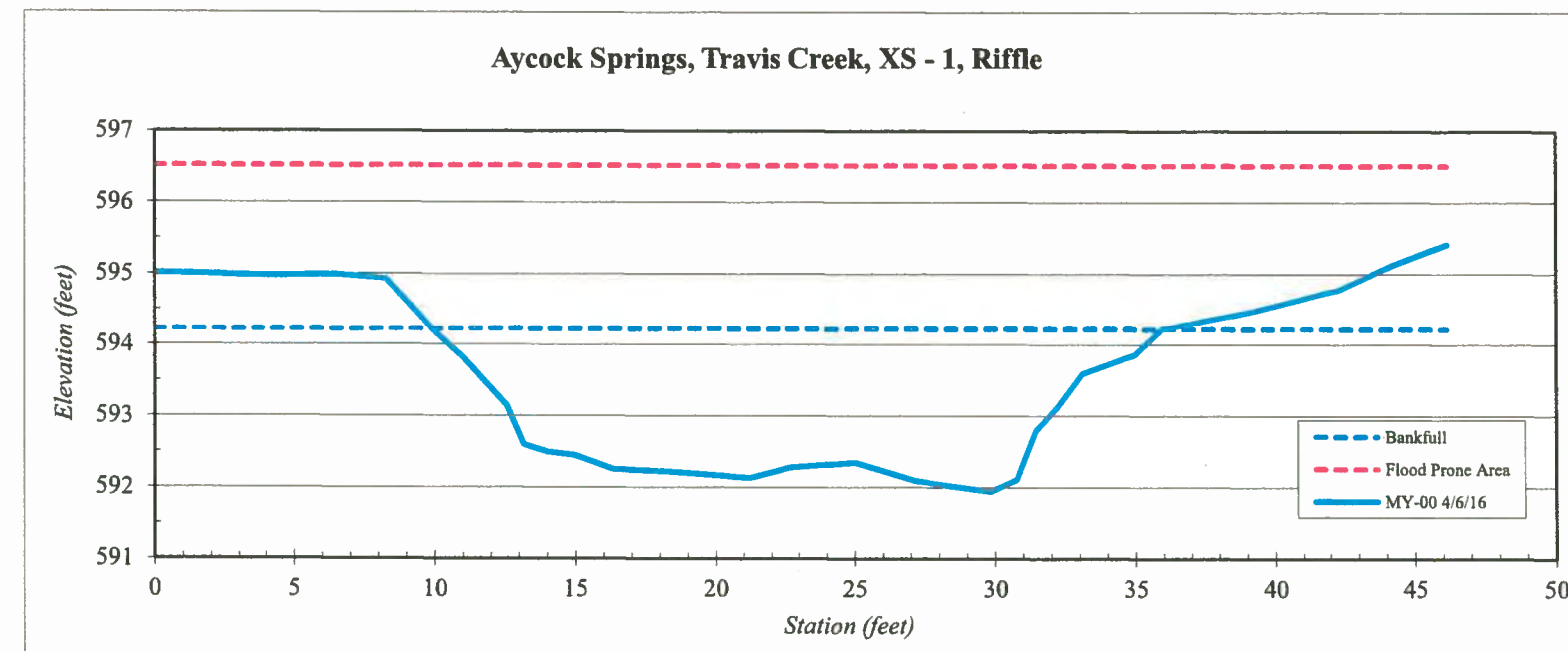
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 1, Riffle
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	595.01
4.3	594.97
6.5	594.99
8.3	594.93
10.0	594.19
11.0	593.83
12.6	593.14
13.2	592.60
14.0	592.50
15.0	592.45
16.4	592.25
18.2	592.22
21.2	592.13
22.7	592.28
25.0	592.35
27.2	592.09
29.8	591.94
30.8	592.11
31.5	592.80
32.2	593.12
33.1	593.6
35.0	593.9
36.0	594.2
39.2	594.5
42.3	594.8
44.2	595.1
46.1	595.4

SUMMARY DATA	
Bankfull Elevation:	594.2
Bankfull Cross-Sectional Area:	41.3
Bankfull Width:	26.0
Flood Prone Area Elevation:	596.5
Flood Prone Width:	150.0
Max Depth at Bankfull:	2.3
Mean Depth at Bankfull:	1.6
W / D Ratio:	16.4
Entrenchment Ratio:	5.8
Bank Height Ratio:	1.0

Stream Type C/E



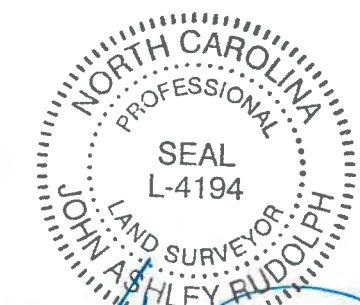
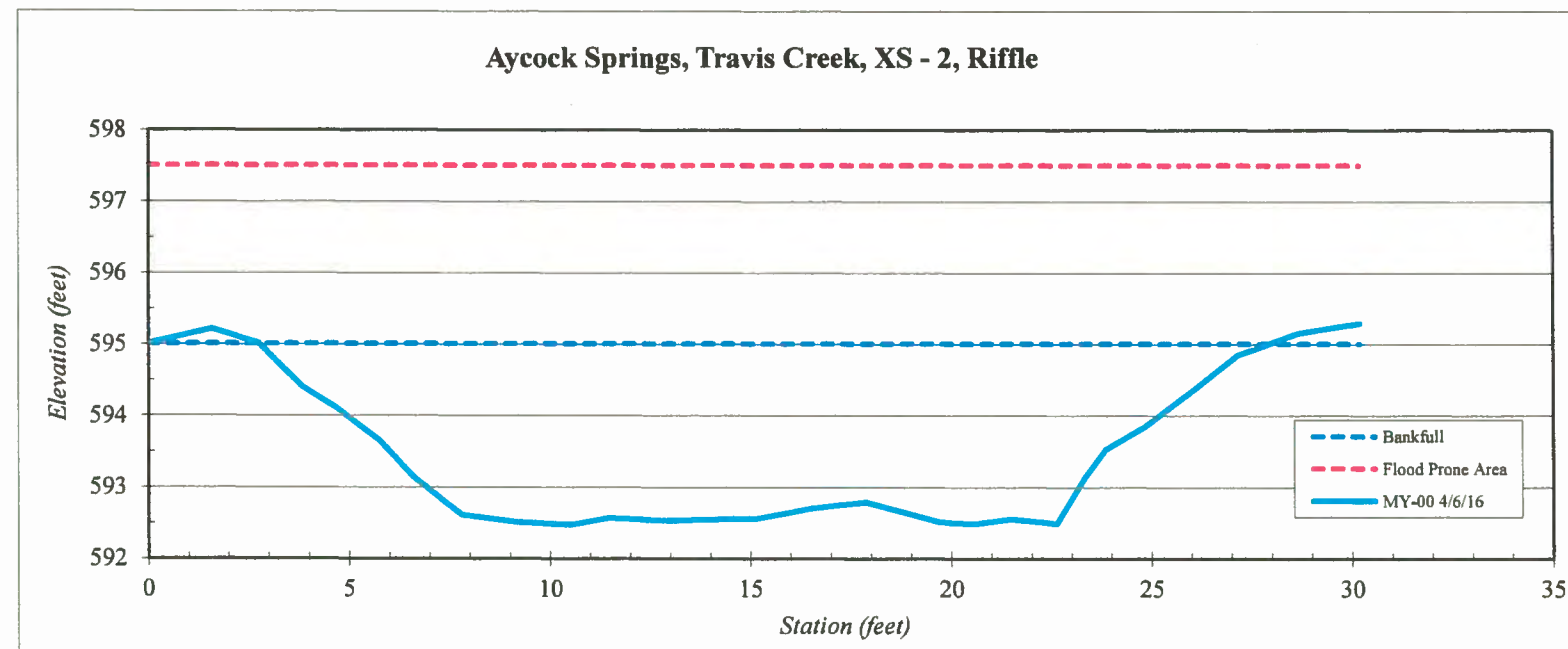
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 2, Riffle
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	595.01
1.6	595.22
2.8	595.02
3.8	594.41
4.7	594.09
5.8	593.66
6.6	593.14
7.2	592.89
7.8	592.62
9.2	592.51
10.5	592.47
11.5	592.57
12.9	592.53
15.2	592.56
16.5	592.70
17.9	592.79
19.7	592.52
20.6	592.49
21.5	592.56
22.6	592.50
23.3	593.1
23.9	593.5
24.8	593.8
26.1	594.4
27.2	594.9
28.7	595.2
30.2	595.3

SUMMARY DATA	
Bankfull Elevation:	595.0
Bankfull Cross-Sectional Area:	47.5
Bankfull Width:	25.2
Flood Prone Area Elevation:	597.5
Flood Prone Width:	150.0
Max Depth at Bankfull:	2.5
Mean Depth at Bankfull:	1.9
W / D Ratio:	13.4
Entrenchment Ratio:	6.0
Bank Height Ratio:	1.0

Stream Type C/E



John Ashley Rudolph
07/08/2016

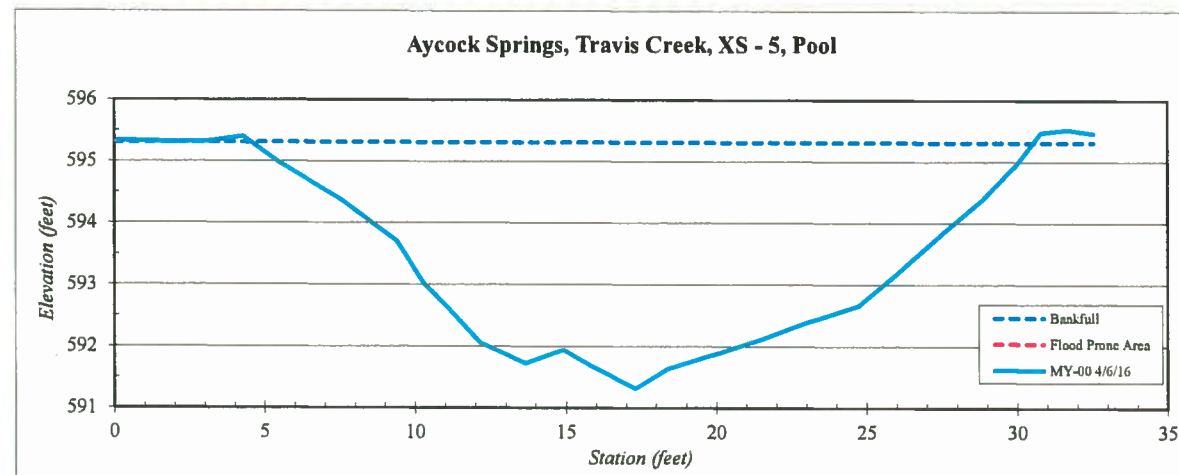
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 5, Pool
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	595.3
1.9	595.3
2.9	595.3
4.3	595.4
5.5	595.0
7.6	594.4
9.4	593.7
10.3	593.0
11.2	592.6
12.2	592.1
13.7	591.7
14.9	591.9
15.9	591.7
17.3	591.3
18.4	591.6
19.8	591.9
21.6	592.1
23.0	592.4
24.7	592.7
26.0	593.2
27.6	593.9
28.8	594.4
30.0	595.0
30.8	595.5
31.7	595.5
32.5	595.5

SUMMARY DATA	
Bankfull Elevation:	595.3
Bankfull Cross-Sectional Area:	61.4
Bankfull Width:	26.0
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	4.0
Mean Depth at Bankfull:	2.4
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type C/E



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 JOHN ASHLEY RUDOLPH
[Signature]
 07/09/2016

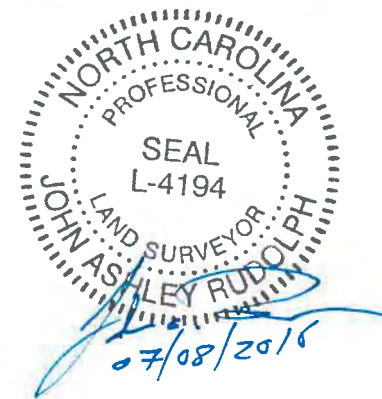
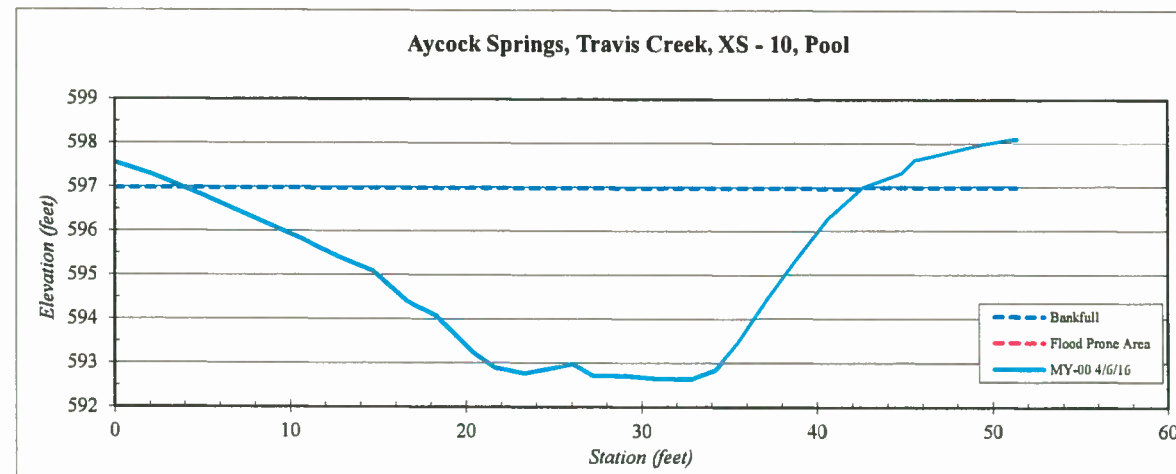
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 10, Pool
Feature	Pool
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	597.6
2.1	597.3
5.7	596.7
10.7	595.8
12.7	595.4
14.7	595.1
16.7	594.4
18.3	594.1
20.4	593.2
21.7	592.9
23.4	592.8
26.1	593.0
27.2	592.7
29.2	592.7
30.8	592.6
32.8	592.6
34.2	592.8
35.5	593.5
37.2	594.4
38.9	595.4
40.7	596.3
42.6	597.0
44.9	597.3
45.6	597.6
47.2	597.8
49.4	598.0
51.4	598.1

SUMMARY DATA	
Bankfull Elevation:	597.0
Bankfull Cross-Sectional Area:	100.1
Bankfull Width:	38.6
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	4.3
Mean Depth at Bankfull:	2.6
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type C/E



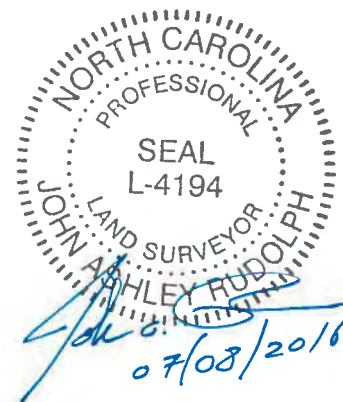
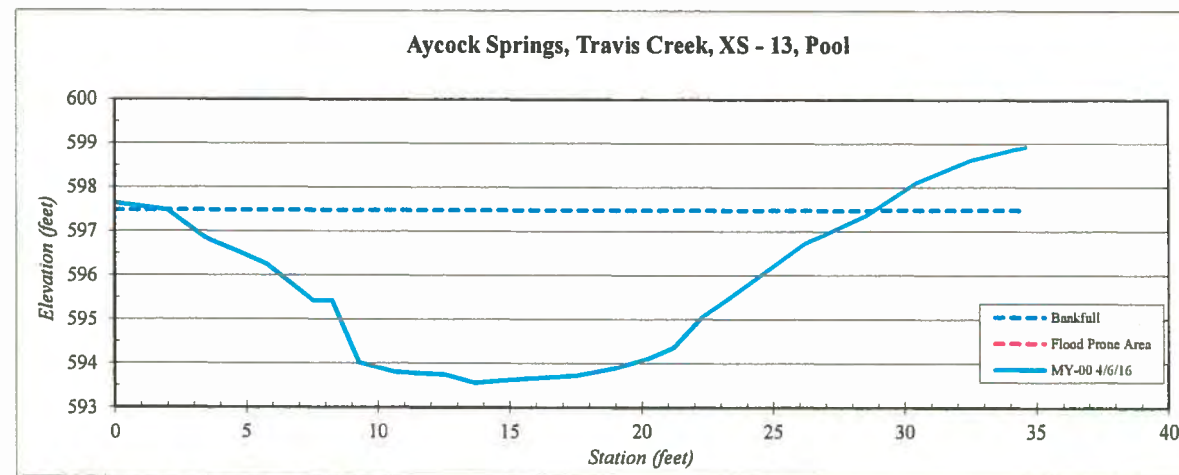
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 13, Pool
Feature	Pool
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	597.6
2.0	597.5
3.4	596.8
4.7	596.5
5.8	596.3
7.5	595.4
8.3	595.4
9.3	594.0
10.7	593.8
12.6	593.7
13.7	593.6
15.5	593.6
17.5	593.7
18.8	593.9
20.2	594.1
21.2	594.4
22.3	595.0
23.4	595.5
26.2	596.7
28.6	597.4
30.5	598.1
32.5	598.6
34.6	598.9

SUMMARY DATA	
Bankfull Elevation:	597.5
Bankfull Cross-Sectional Area:	64.0
Bankfull Width:	26.9
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	3.9
Mean Depth at Bankfull:	2.4
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type C/E



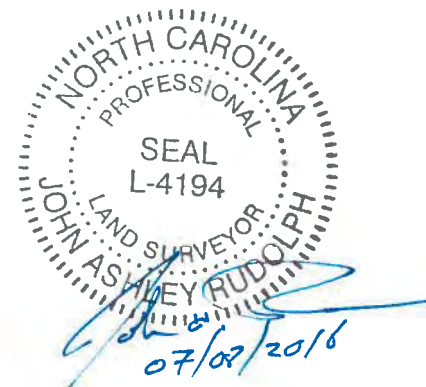
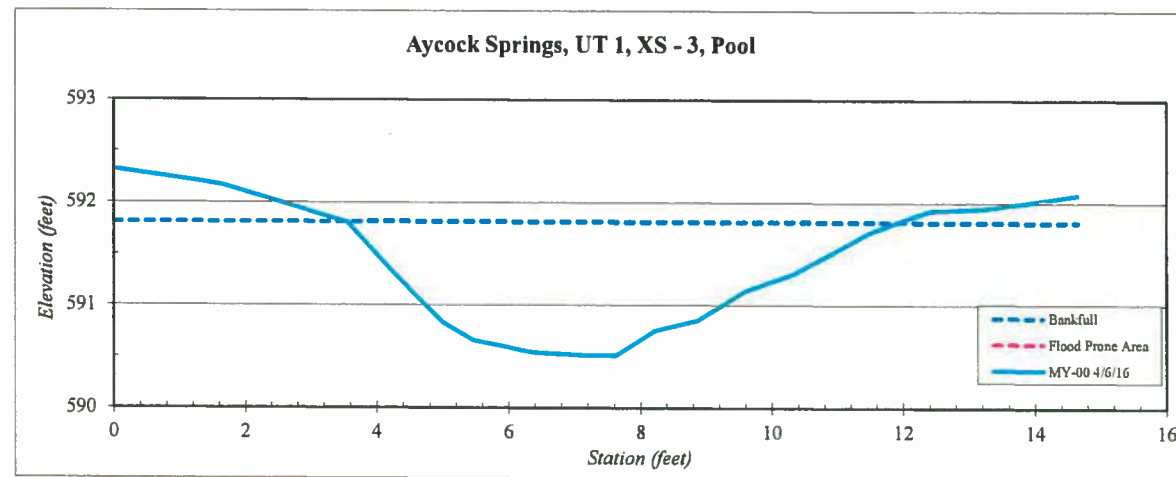
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 3, Pool
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	592.3
1.6	592.2
2.7	592.0
3.6	591.8
4.2	591.3
4.6	591.1
5.0	590.8
5.5	590.7
6.4	590.5
7.1	590.5
7.6	590.5
8.2	590.8
8.9	590.9
9.6	591.1
10.3	591.3
11.5	591.7
12.4	591.9
13.2	591.9
14.6	592.1

SUMMARY DATA	
Bankfull Elevation:	591.8
Bankfull Cross-Sectional Area:	6.7
Bankfull Width:	8.4
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.3
Mean Depth at Bankfull:	0.8
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type: C/E



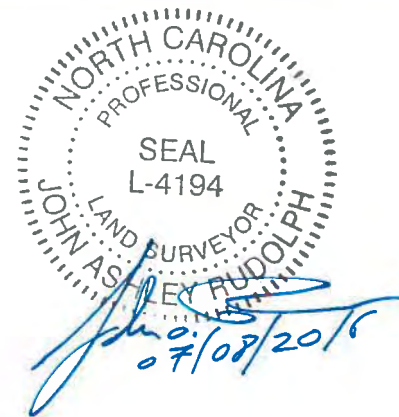
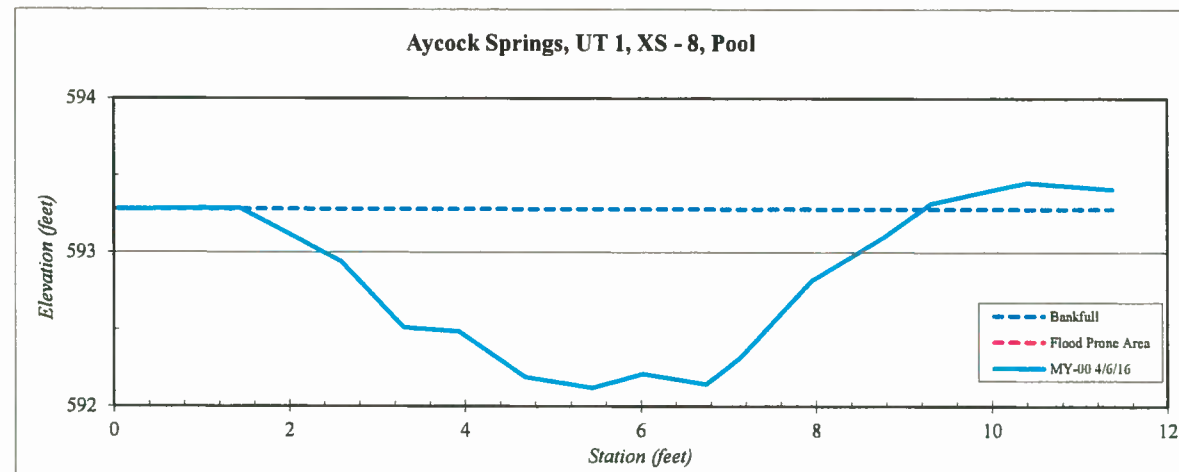
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 8, Pool
Feature	Pool
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	593.3
1.4	593.3
2.6	592.9
3.3	592.5
3.9	592.5
4.7	592.2
5.4	592.1
6.0	592.2
6.7	592.1
7.1	592.3
8.0	592.8
8.8	593.1
9.3	593.3
10.4	593.5
11.4	593.4

SUMMARY DATA	
Bankfull Elevation:	593.3
Bankfull Cross-Sectional Area:	5.4
Bankfull Width:	7.8
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.2
Mean Depth at Bankfull:	0.7
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type C/E



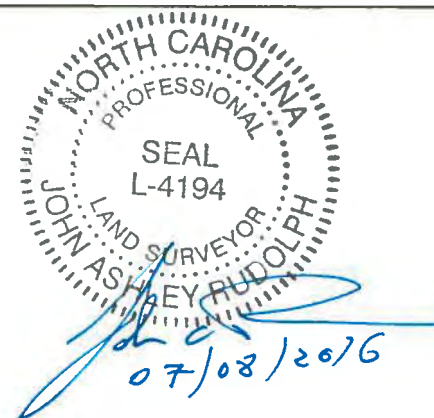
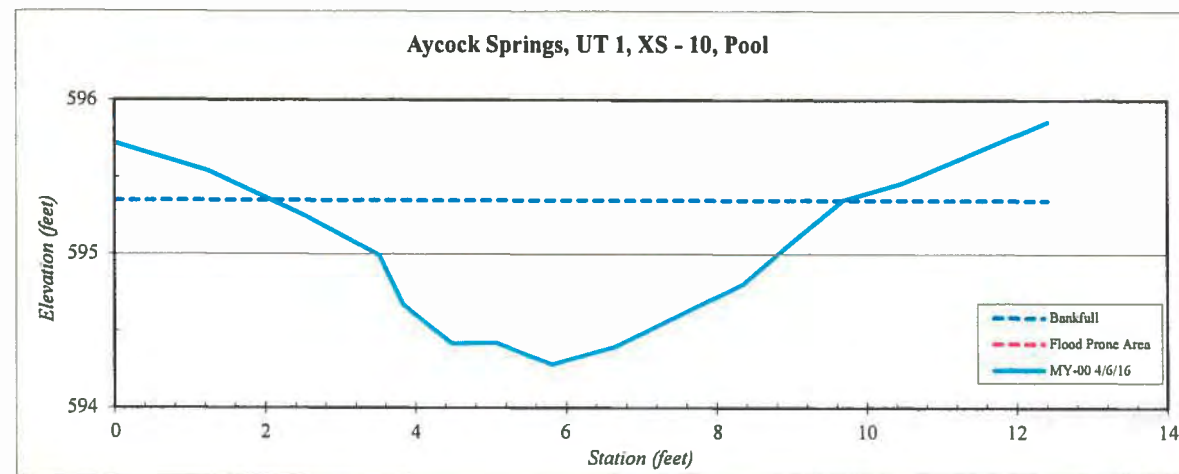
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 10, Pool
Feature	Pool
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	595.7
1.3	595.5
2.6	595.2
3.5	595.0
3.8	594.7
4.5	594.4
5.1	594.4
5.8	594.3
6.6	594.4
7.3	594.6
8.4	594.8
8.9	595.1
9.7	595.4
10.5	595.5
12.4	595.9

SUMMARY DATA	
Bankfull Elevation:	595.4
Bankfull Cross-Sectional Area:	4.7
Bankfull Width:	7.6
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type C/E



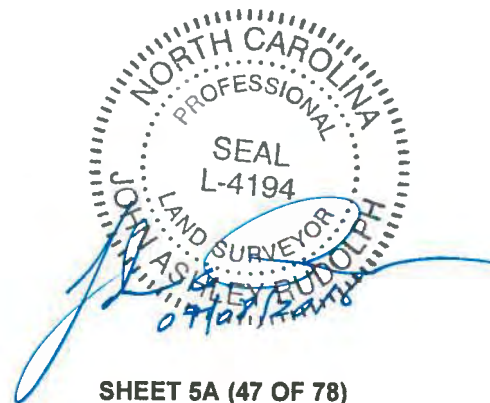
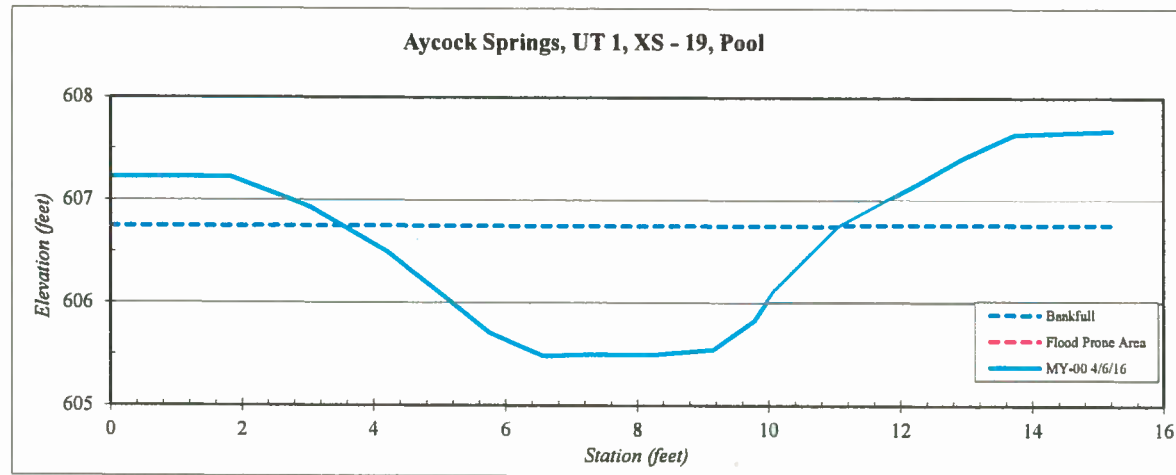
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 19, Pool
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	607.2
1.8	607.2
3.1	606.9
4.2	606.5
5.1	606.1
5.8	605.7
6.6	605.5
7.3	605.5
8.2	605.5
9.2	605.5
9.8	605.8
10.1	606.1
11.1	606.7
12.2	607.1
12.9	607.4
13.7	607.6
15.2	607.7

SUMMARY DATA	
Bankfull Elevation:	606.8
Bankfull Cross-Sectional Area:	6.5
Bankfull Width:	7.6
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.3
Mean Depth at Bankfull:	0.9
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type C/E



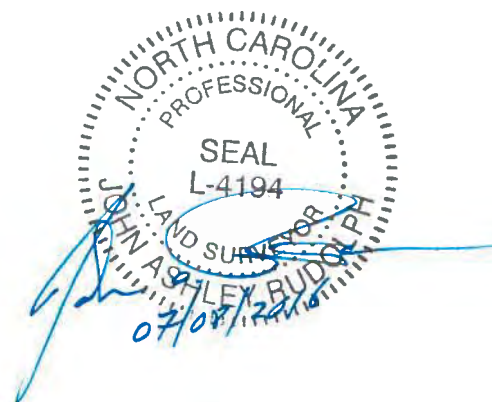
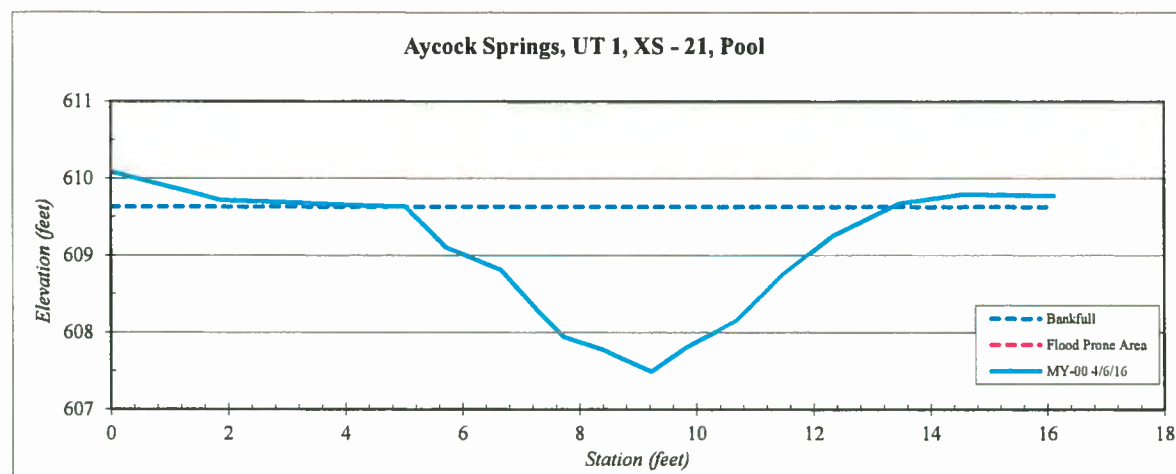
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 21, Pool
Feature	Pool
Date:	4/6/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	610.1
1.9	609.7
4.1	609.7
5.0	609.6
5.7	609.1
6.7	608.8
7.3	608.3
7.7	607.9
8.4	607.8
9.2	607.5
9.8	607.8
10.7	608.2
11.5	608.8
12.3	609.3
13.5	609.7
14.5	609.8
16.1	609.8

SUMMARY DATA	
Bankfull Elevation:	609.6
Bankfull Cross-Sectional Area:	9.3
Bankfull Width:	8.3
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	2.1
Mean Depth at Bankfull:	1.1
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0



Stream Type: C/E



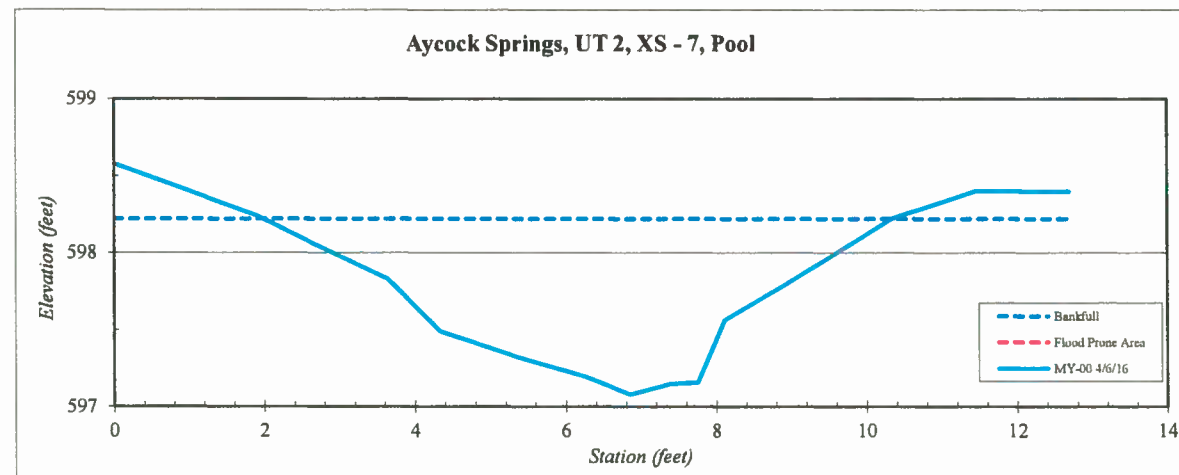
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 7, Pool
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	598.6
1.9	598.2
2.6	598.1
3.6	597.8
4.3	597.5
5.3	597.3
6.3	597.2
6.9	597.1
7.4	597.1
7.8	597.2
8.1	597.6
8.9	597.8
10.3	598.2
11.5	598.4
12.7	598.4

SUMMARY DATA	
Bankfull Elevation:	598.2
Bankfull Cross-Sectional Area:	5.1
Bankfull Width:	8.3
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type: C/E



NORTH CAROLINA
 PROFESSIONAL
 SEAL
 L-4104
 JOHN L. RUDOLPH
 LAND SURVEYOR
 07/08/2016

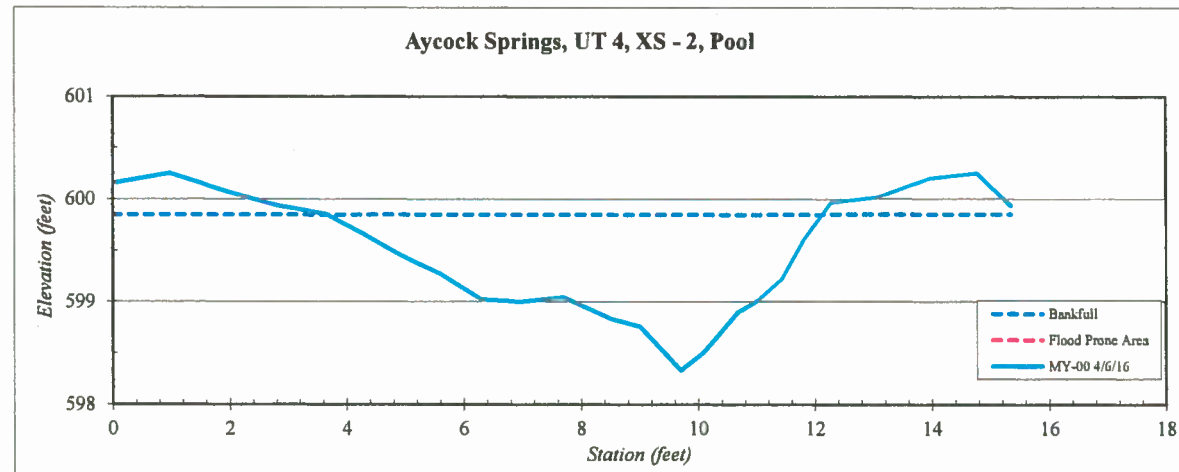
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 2, Pool
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	600.2
1.0	600.3
2.0	600.1
2.8	599.9
3.7	599.9
4.3	599.7
4.9	599.5
5.6	599.3
6.3	599.0
7.0	599.0
7.7	599.0
8.5	598.8
9.0	598.8
9.7	598.3
10.1	598.5
10.7	598.9
11.1	599.0
11.4	599.2
11.8	599.6
12.3	600.0
13.1	600.0
14.0	600.2
14.8	600.3
15.3	599.9

SUMMARY DATA	
Bankfull Elevation:	599.9
Bankfull Cross-Sectional Area:	6.4
Bankfull Width:	8.5
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.5
Mean Depth at Bankfull:	0.8
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type: C/E



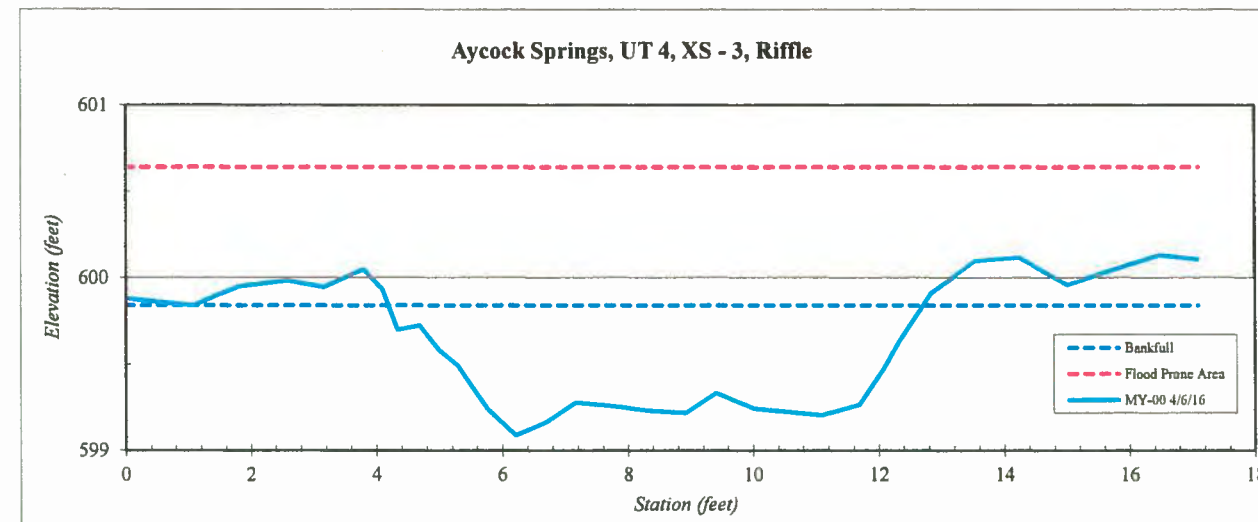
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 3, Riffle
Feature	Riffle
Date:	4/6/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.0	599.88
1.1	599.84
1.8	599.95
2.6	599.98
3.2	599.95
3.8	600.05
4.1	599.93
4.3	599.70
4.7	599.72
5.0	599.58
5.3	599.49
5.8	599.24
6.2	599.09
6.7	599.17
7.2	599.28
7.7	599.26
8.4	599.23
8.9	599.22
9.4	599.33
10.0	599.24
11.1	599.2
11.7	599.3
12.1	599.5
12.3	599.6
12.8	599.9
13.5	600.1
14.2	600.1
15.0	600.0
16.5	600.1
17.1	600.1

SUMMARY DATA	
Bankfull Elevation:	599.8
Bankfull Cross-Sectional Area:	4.3
Bankfull Width:	8.6
Flood Prone Area Elevation:	600.6
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.8
Mean Depth at Bankfull:	0.5
W / D Ratio:	17.2
Entrenchment Ratio:	5.8
Bank Height Ratio:	1.0

Stream Type C/E



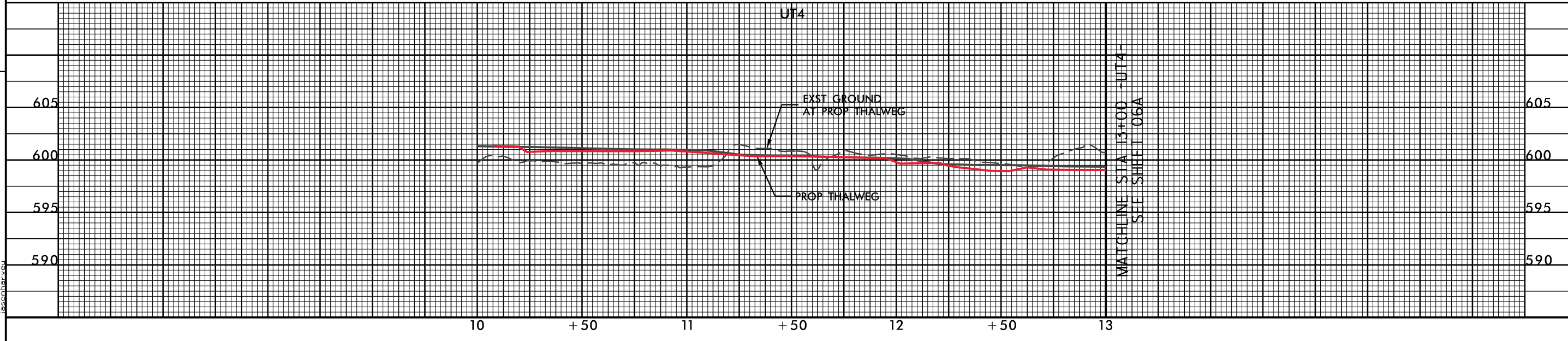
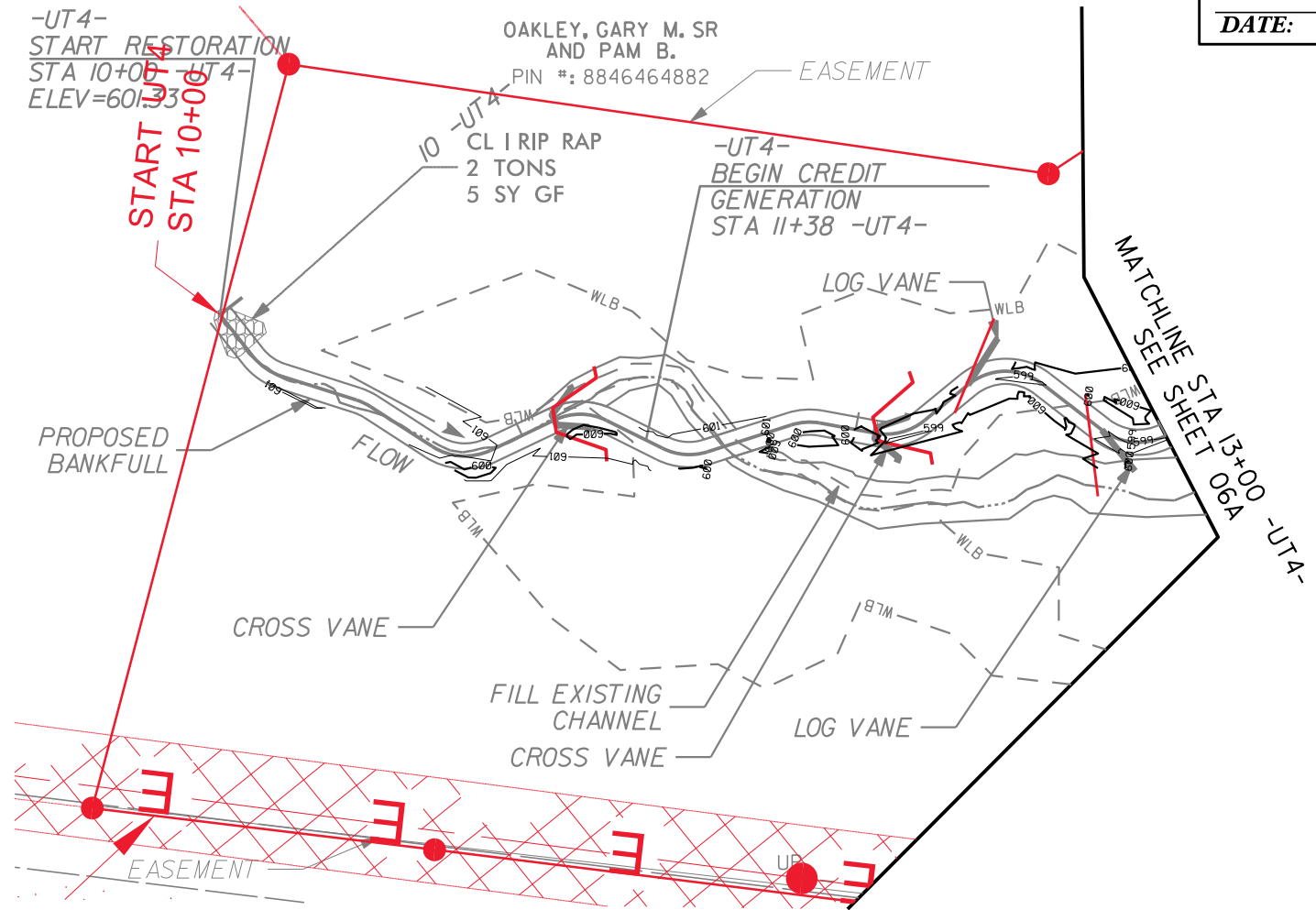
NORTH CAROLINA
 PROFESSIONAL
 SEAL
 L-4194
 LAND SURVEYOR
 JON ASHLEY RUDOLPH
 07/08/2016

DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/13/2016
 DATE: _____

SHEET NAME	SHEET NUMBER
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COUNTY: ALAMANCE	DATE: 2016

Axiom Environmental, Inc.

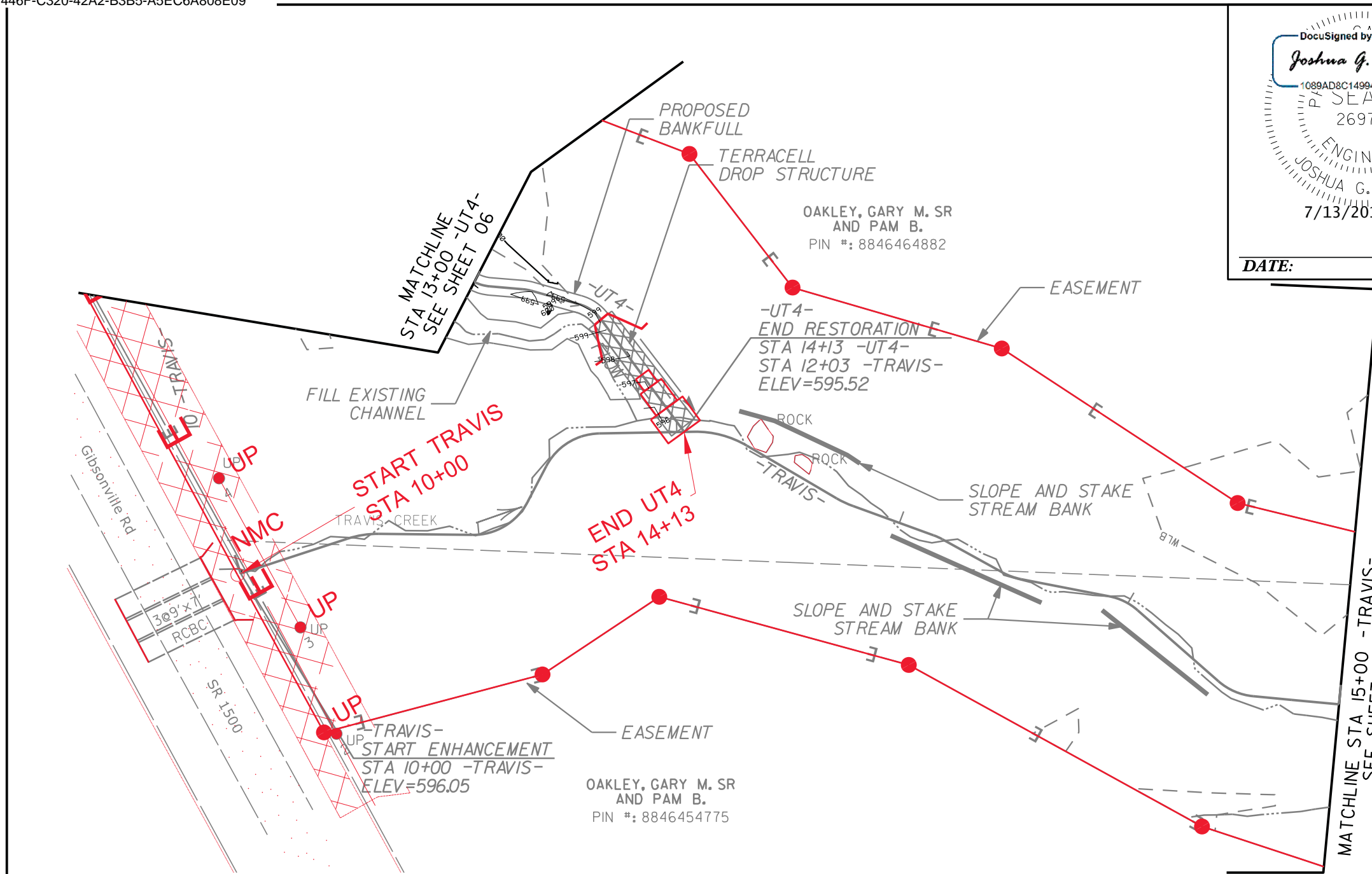
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 915 JONES FRANKLIN ROAD
 RALEIGH, NORTH CAROLINA 27608
 TEL (919) 859-2243 FAX (919) 859-6258
 ENG FIRM LICENSE NO. C-890



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jason@axiom.com

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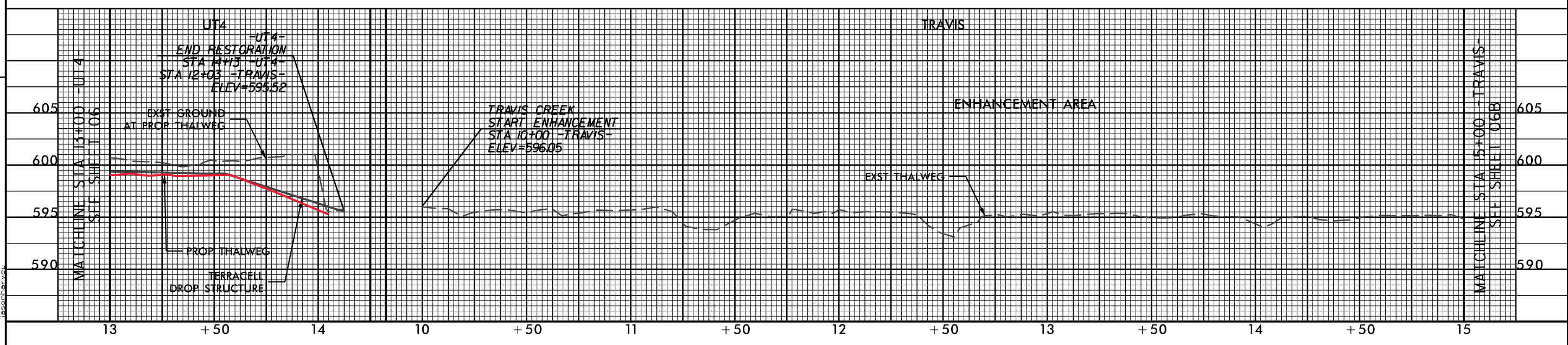


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COUNTY: ALAMANCE	DATE: 2016


Axiom Environmental, Inc.

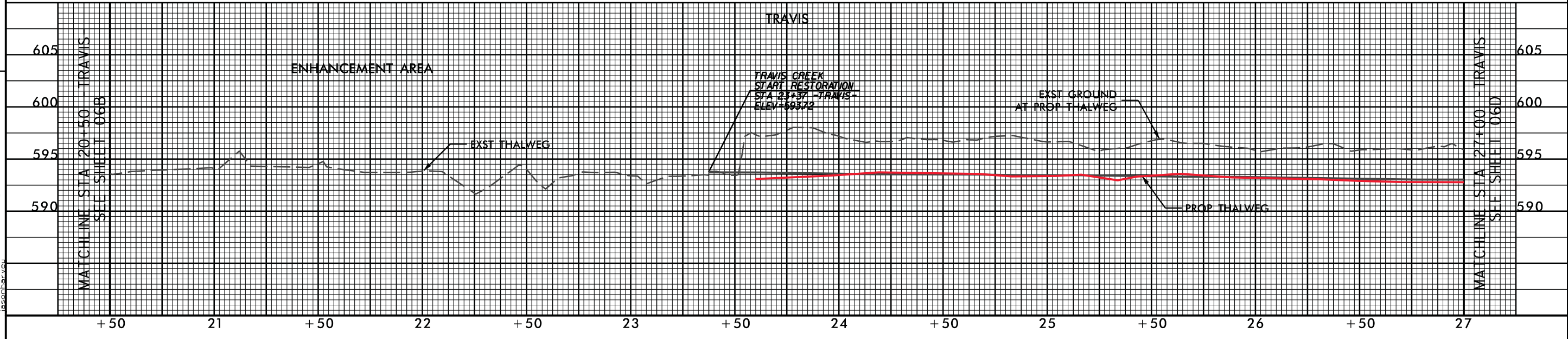
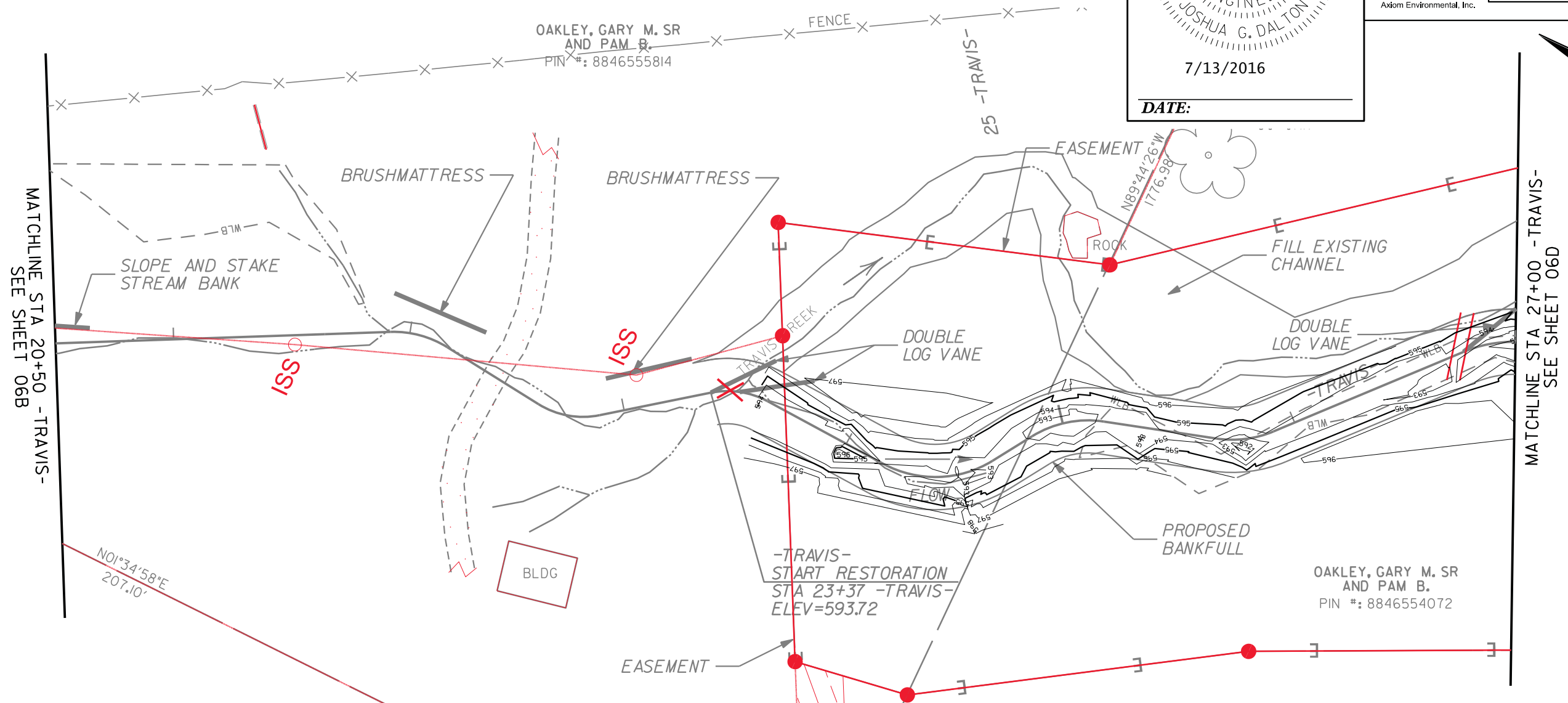
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 Aycock Springs
 Gibsonville

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 JOSHUA G. DALTON
 DATE: 7/13/2016

SHEET NAME STRUCTURES	SHEET NUMBER 06C
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016
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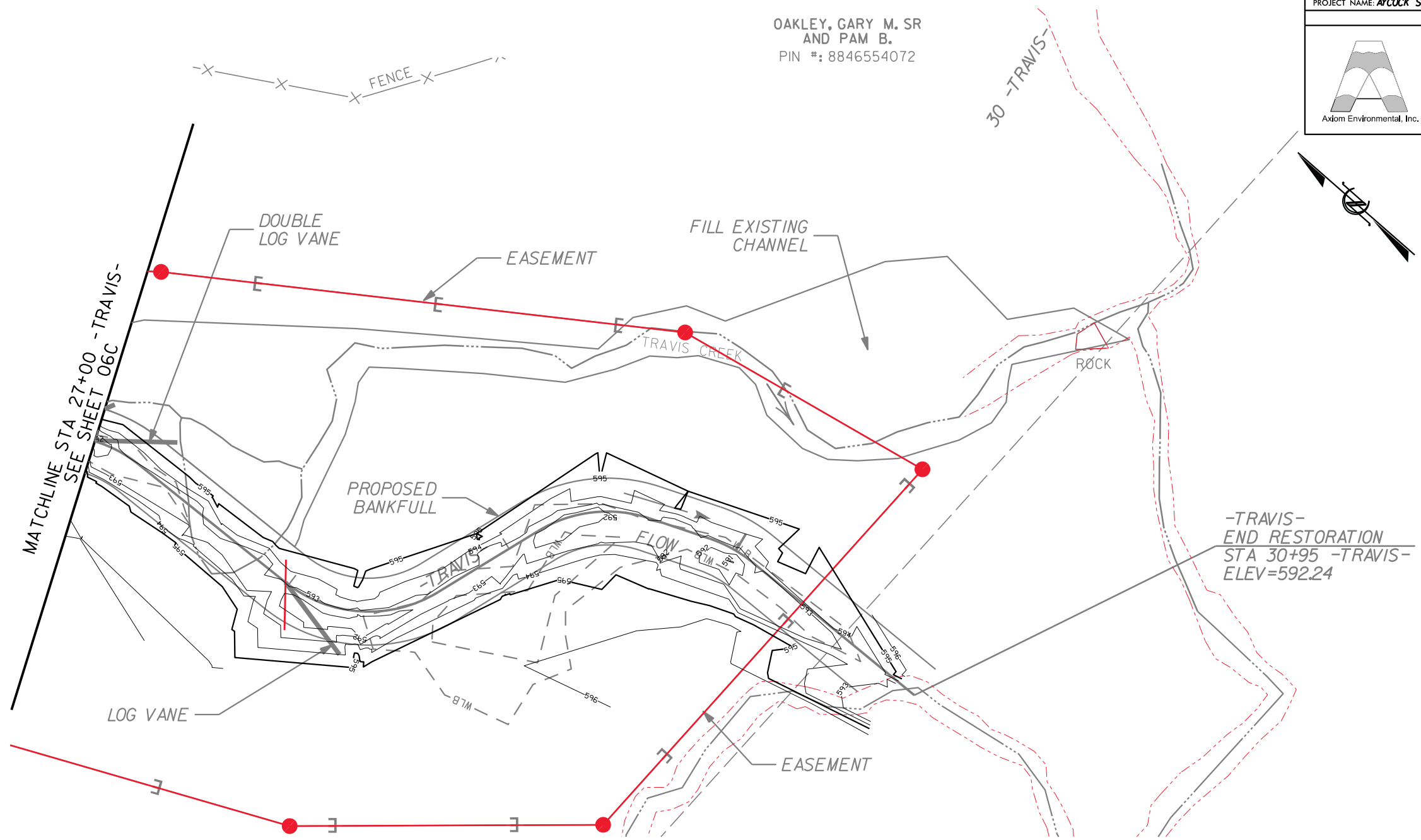
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JGALTON

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COUNTY: ALAMANCE	DATE: 2016

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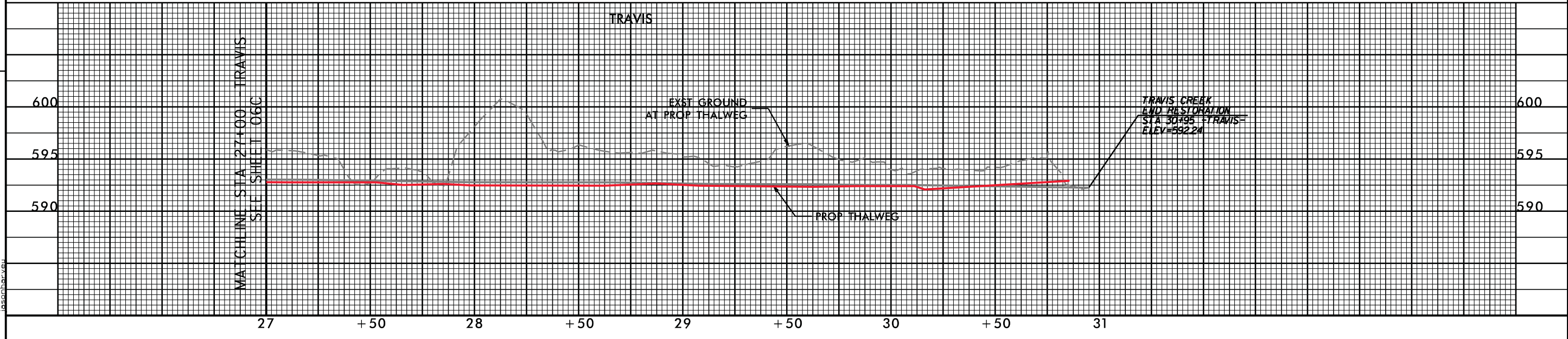
OAKLEY, GARY M. SR
AND PAM B.
PIN #: 8846554072



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Joshua G. Dalton
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 26971
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 JOSHUA G. DALTON
 7/13/2016

DATE:

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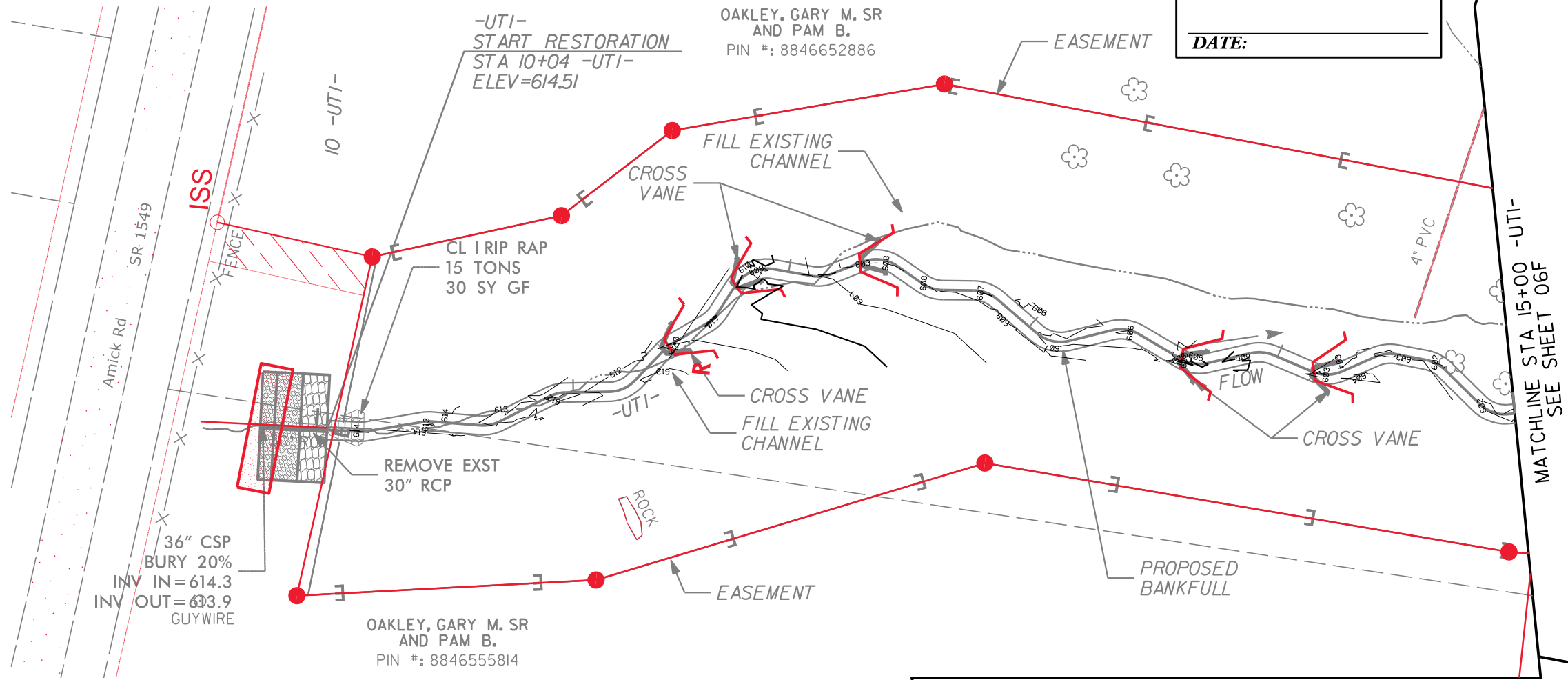
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 ENGINEER
 JOSHUA G. DALTON
 DATE: 7/13/2016

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COUNTY: ALAMANCE	DATE: 2016

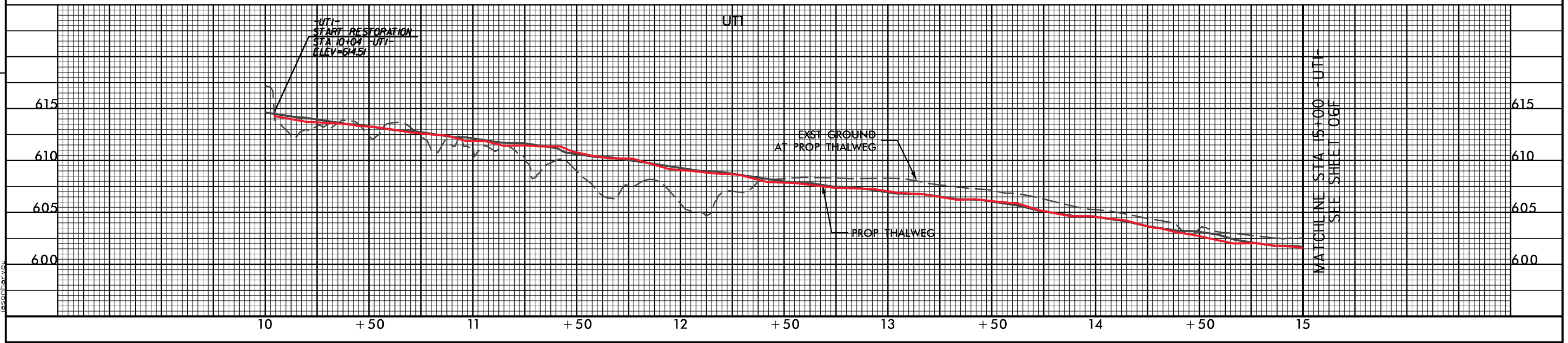
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MATCHLINE SEE SHEET 06G



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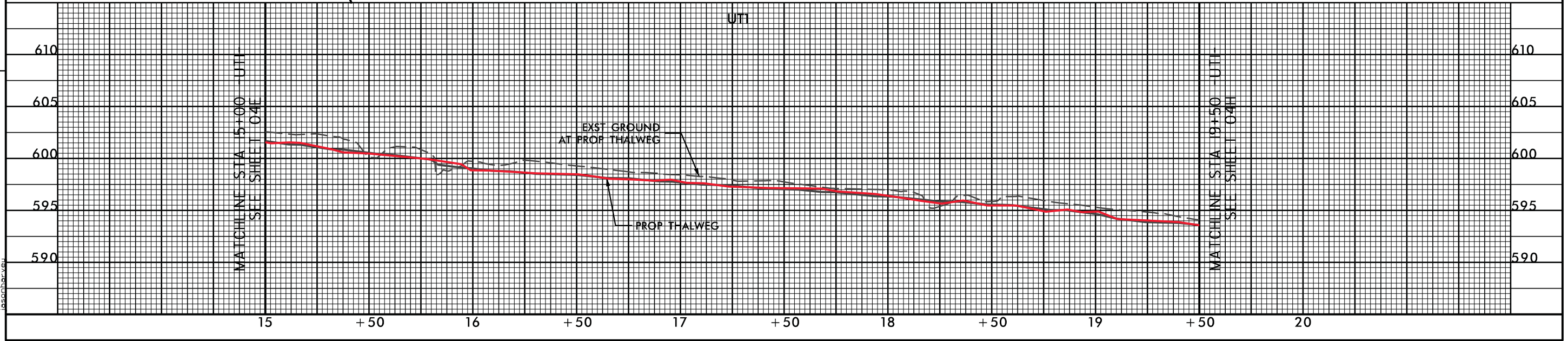
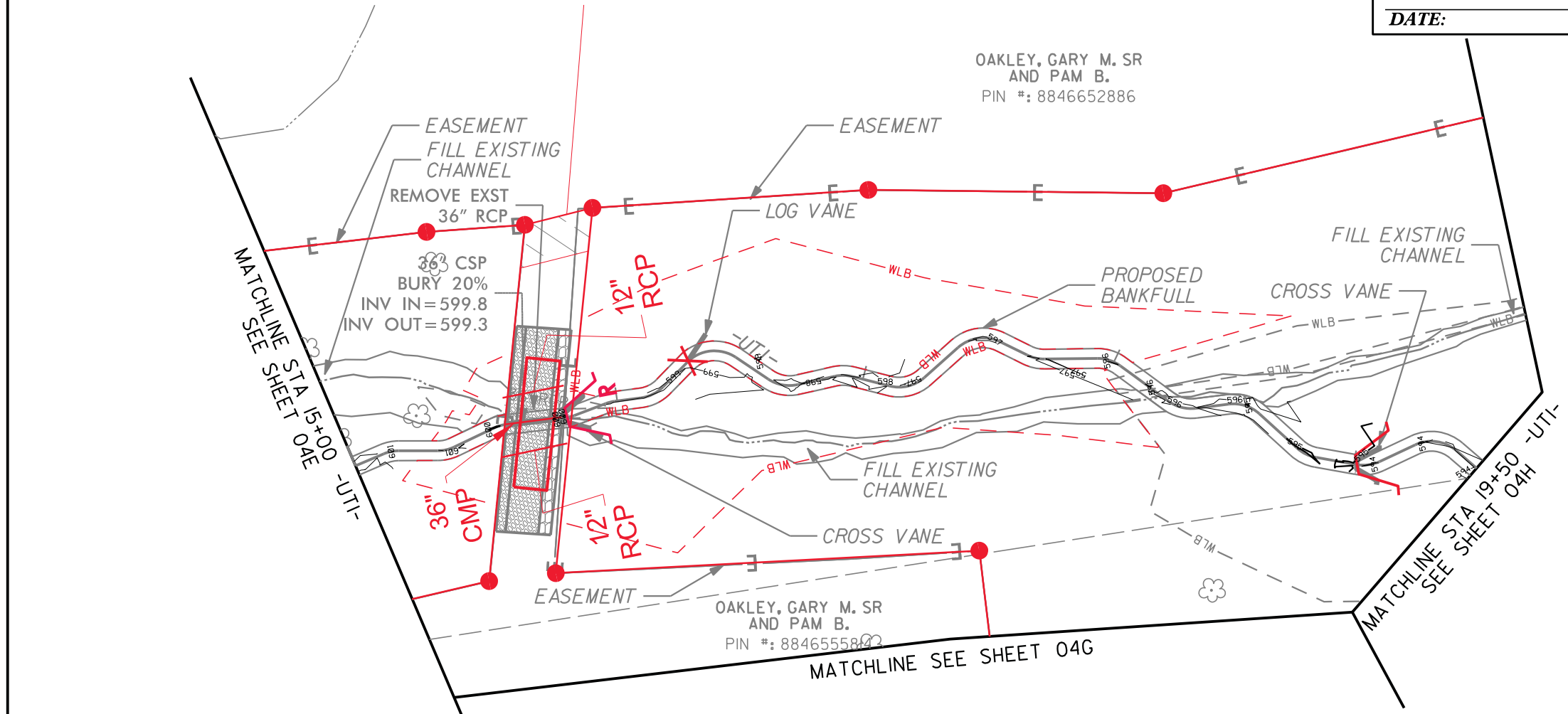
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 26971
 ENGINEER
 JOSHUA G. DALTON
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 DATE: _____

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COUNTY: ALAMANCE	DATE: 2016


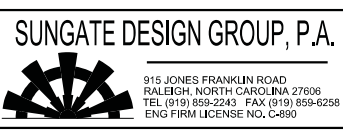
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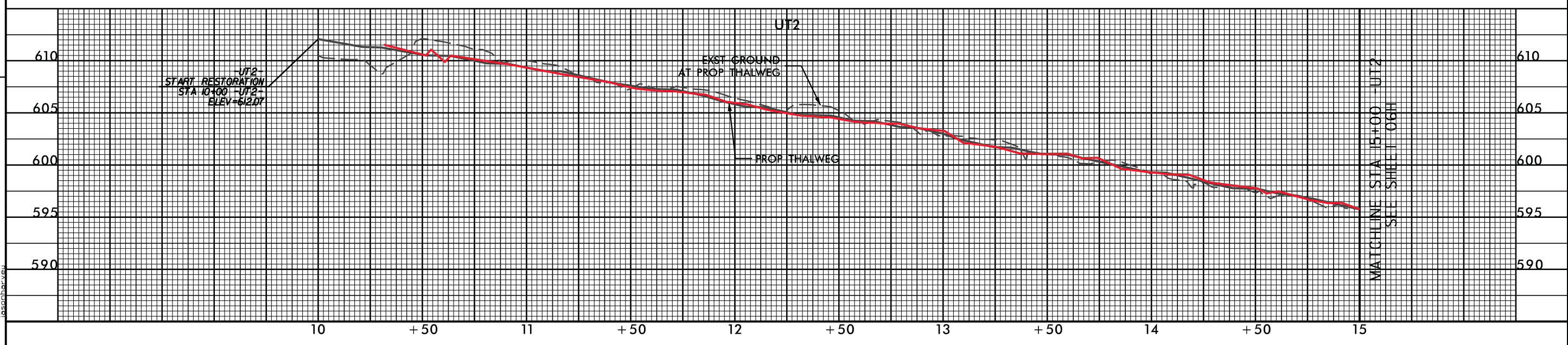
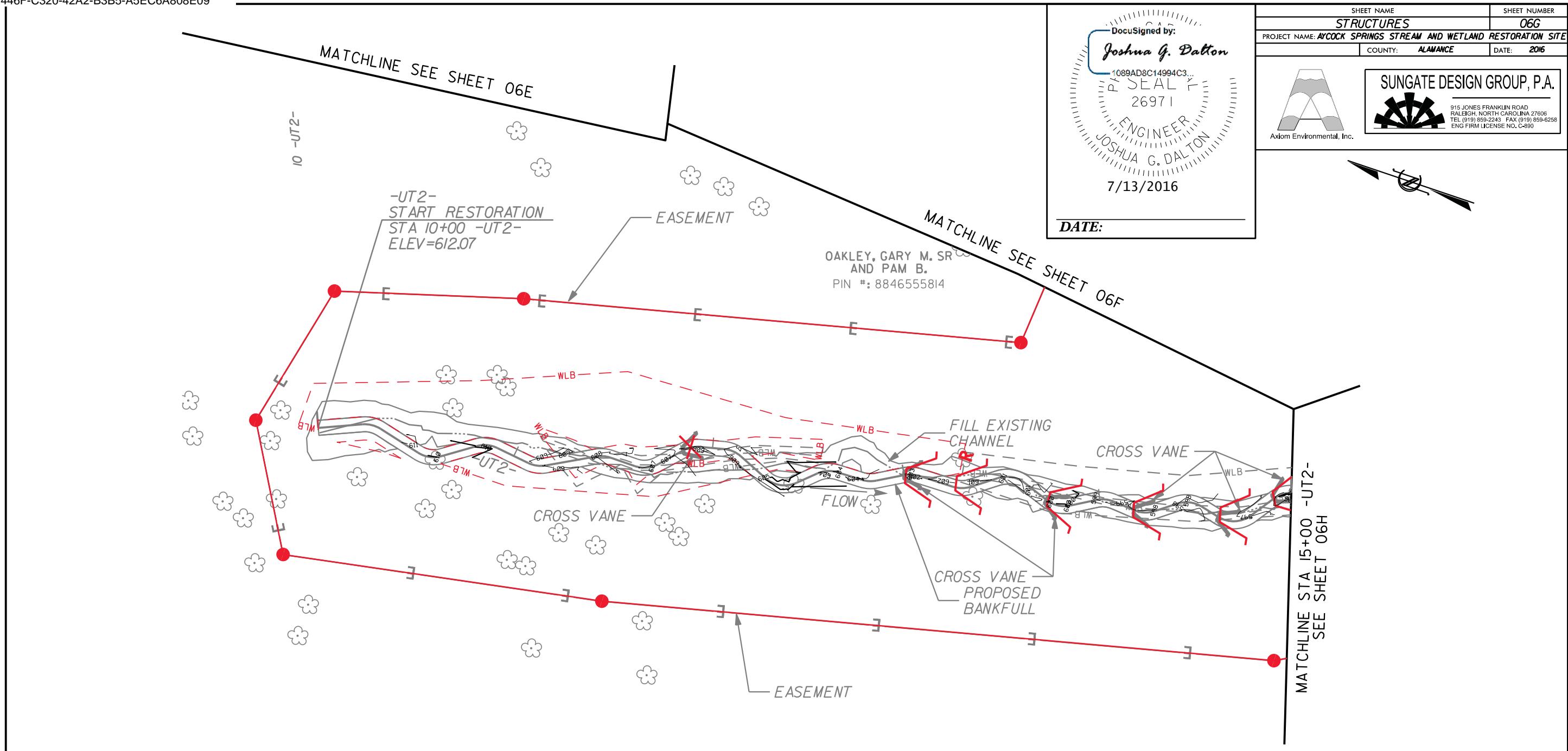
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COUNTY: ALAMANCE	DATE: 2016

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RALEIGH, NORTH CAROLINA 27608
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7/13/2016
DATE: _____


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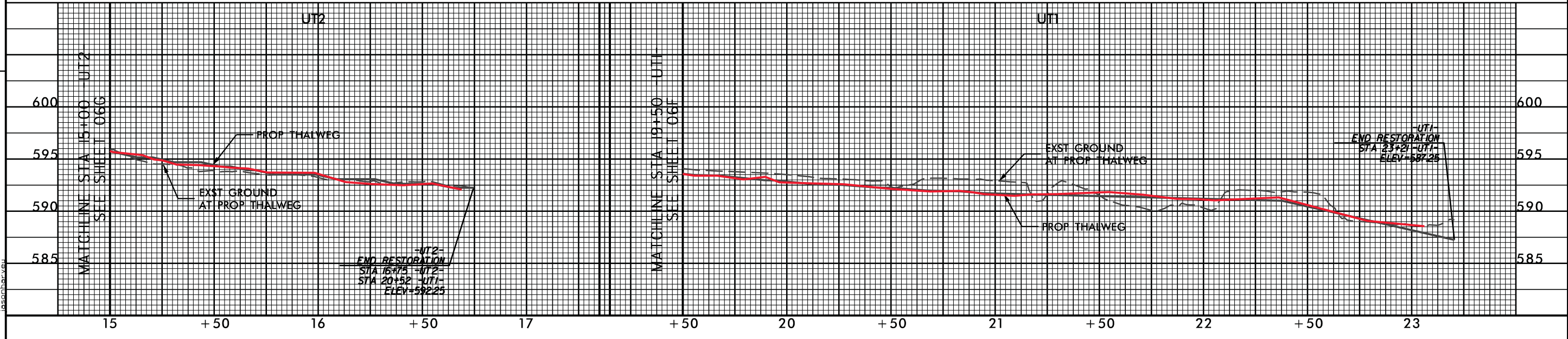
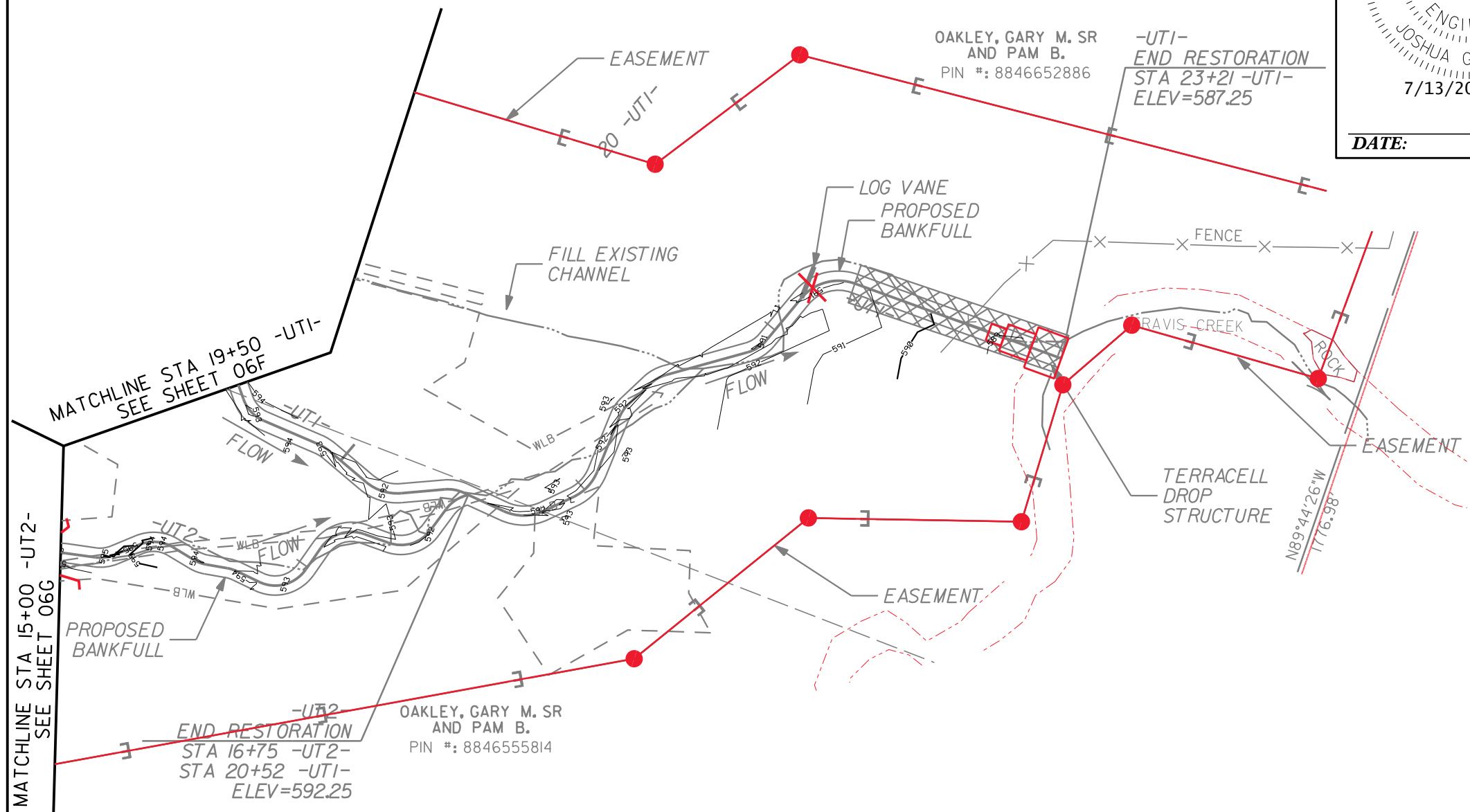
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COUNTY: ALAMANCE	DATE: 2016

SUNGATE DESIGN GROUP, P.A.	
	
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DocuSigned by:
Joshua G. Dalton
 1089AD8C14994C3...
 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 7/13/2016
 DATE: _____



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Appendix E.
FEMA Coordination – LOMR

LOMR
TRAVIS CREEK
ALAMANCE COUNTY

FOR
RESTORATION SYSTEMS, LLC



July 1, 2016

SUNGATE DESIGN GROUP, PA
915 Jones Franklin Road
Raleigh, N. C. 27606

LOMR for Travis Creek
Restoration Systems, LLC
Aycock Springs Stream Restoration

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SECTION 3	CONSTRUCTION PLANS
SECTION 4	EFFECTIVE MODEL, FIRM & FIS INFORMATION
	EFFECTIVE MODEL EFFECTIVE FIRM FIS REPORT
SECTION 5	PROJECT MODEL OUTPUT TABLES
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	HEC-RAS V. 4.1 REPORT TABLES
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SECTION 6	CROSS SECTIONS
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SECTION 7

MAPPING

WORK MAP – 500 SCALE
PROPOSED FIRM
FIS REVISIONS

SECTION 8

PROPERTY OWNER NOTIFICATION

PON LETTER
PROPERTY OWNERS
PON MAP

Travis Creek – Stream Restoration
Alamance County, North Carolina

Prepared by: Sungate Design Group, PA
915 Jones Franklin Road
Raleigh, N. C. 27606

For: Restoration Systems, LLC

Date: July 1, 2016

LOMR FOR TRAVIS CREEK – STREAM RESTORATION

INTRODUCTION

Restoration Systems, LLC has completed construction of a stream restoration, consisting of a 134 linear foot section and a 758 linear foot using channel geometry that has been derived from studying a healthy local reference reach and applying it to site conditions on Travis Creek. The restoration was proposed to stabilize bends and control velocity. The channel geometry and stream alignment have been optimized to promote healthy and sustainable geomorphology. In areas where channel realignment was required, the existing channel has been backfilled to the elevation of the floodplain. The abandoned road bed that crossed the floodplain has been removed to eliminate the obstruction it created in high flow events. The stream design was prepared by Axiom Environmental, Inc., Raleigh, North Carolina, and the plans were prepared by Sungate Design Group, PA, Raleigh, North Carolina.

The two sections of stream restoration extend from station 22378 to station 22709 and from station 21828 to station 20767. The project area is bounded by RS 23245 upstream and RS 19430 downstream. All surveys were performed in NAVD 88, and the vertical datum for the model is NGVD 29. All survey data was converted to the NGVD 29 datum before being input into the model. The datum correction for Alamance County is -0.80'.

On 10/30/14, Sungate Design Group (SDG) sent an e-mail to NC Floodplain Mapping (NCFMP) requesting the Effective model for Travis Creek in Alamance County. NCFMP responded by e-mail with the HEC 2 files attached. Sungate saved the attached HEC 2 files onto the SDG Server and used the files to create the model used for the Travis Creek No Rise Certification.

On 6/15/15 A No-Rise Certification study for the project was prepared and submitted to Alamance County that assessed the impacts to the 100-year flood elevation caused by the proposed restoration on Travis Creek. The No-Rise Certification was approved by Alamance County on 9/4/15.

DUPLICATE EFFECTIVE MODEL

The model received from NCFMP was used to create the Duplicate Effective model. HEC-2 Version 4.6.2 May 1991 was used to create the model. The 100-year water surface elevations in the Duplicate Effective model match the Effective model within a reasonable tolerance (+/- 0.1 ft). Floodway widths match exactly.

It was decided to import the HEC-2 model into HEC-RAS Version 4.1.0. After revising the distance from the upstream cross section to the bridge face from 0.0' to 0.5' on the one bridge in the model located at RS 23180.5, the model ran successfully. The 100-year elevations matched within a reasonable tolerance (+/- 0.5') at all sections except for RS 5867, RS 5930, RS 23160, and RS 23201, where variations as much as 1.6' were observed. Additionally, negative surcharges and surcharges greater than 1.0 were observed in these areas. The discrepancies in water surface elevation and the associated surcharges are likely the result of different computational methodologies used by the different models. The model was run in HEC-RAS Version 3.1.3, but very similar water surface elevations and surcharges were observed as in Version 4.1.0. Based on this information, the Duplicate Effective model Version 4.1.0 will be used and adjustments will be made in the Corrected Effective model. It was decided to truncate the model below RS 16030.

CORRECTED EFFECTIVE MODEL

The imported and truncated Duplicate Effective model was used to create the Corrected Effective model. Contraction and expansion coefficients were revised from 0.2 and 0.4, respectively, to 0.1 and 0.3, respectively, at all cross sections except for Sections 2,3, and 4 of the bridge routine, which were revised to 0.3 and 0.5, respectively. The elevations of the ineffective flow limits at RS 23160 were reduced because the structure just upstream at RS 23180.5 overtops in the 100-year event. This eliminated the surcharge greater than 1.0 at RS 23160 and the negative surcharge above the structure at RS 23201. This change resulted in surcharges greater than 1.0 at three sections above the structure. Method 4 was used to set the encroachment stations from RS 23245 to RS 23110, and Method 1 was used to finalize the encroachment station. After minor adjustments to the floodway in this area, no negative surcharges or surcharges greater than 1.0 were present.

EXISTING CONDITIONS MODEL

The Corrected Effective model was used to create the Existing Conditions model. A section was added at RS 22110 to better reflect the hydraulic transition between the two proposed sections of stream restoration. Floodway stations were estimated using method 4 and finalized using method 1. Sections located in the project area (RS 23110 to RS 20970) were revised based on a field survey conducted by K2 Design Group, PA and supplemented by NCFMP bare earth topographic data. Downstream reach lengths were adjusted to represent the existing conditions. It was decided to measure the downstream

reach length of RS 20970 along the general path of the floodplain instead of the existing channel alignment to reflect the condition that the vast majority of flow in the 100-year event will short-circuit the sharp bend in the existing channel just downstream of RS 20970. Since the Effective model was in HEC-2, no GIS cut lines were input. No changes to roughness coefficients or discharge were made.

PROPOSED MODEL

The Existing Conditions model was used to create the Proposed model. To reflect the upstream section of stream restoration, the channel geometry of RS 22440 was revised. The channel geometry of RS 21750, 21270, 021250, 21085, 21075, and 21030 was revised to reflect the downstream section of stream restoration. Reach lengths were adjusted to reflect the change in alignment of the new stream. It was decided that the vast majority of flow in the 100-year event would short-circuit the sharp bend in the proposed stream alignment downstream of RS 20970 due to the significant depth of flood waters of almost 12' versus the relatively shallow channel of 2.7' and the very wide proposed floodplain in this area. To reflect this condition, it was decided to measure the downstream reach length of RS 20970 along the general path of the floodplain instead of the proposed channel alignment. No changes to roughness coefficients or discharge were made.

AS-BUILT

The Proposed Truncated Models were saved as As-built Floodway and As-built Multiple. The as-built survey was compared to the information in the Proposed Model and it was found that the as-built stream cross sections were generally slightly wider and deeper than those shown on the approved CLOMR. The new channel geometry was input into the Hec-Ras model v4.1.0 for the As-built analysis.

RESULTS

As a result of the constructed stream restoration on Travis Creek, there are decreases in the 1% annual chance water surface elevation with the maximum decrease of 0.07 foot occurring at River Station 22970, when comparing the As-built with the Proposed. There are no increases in the 1% annual chance water surface elevation. When comparing the As-built with the Effective, there are decreases all along the reach with the maximum decrease being 5.68 feet at River Station 23110. The apparent cause for this decrease is the 8.3 foot difference in the stream bed elevation between the effective model and the field survey elevations in this area of the stream. Due to the realignment of the channel in some areas of the project, the floodway width on both sides of the channel in these areas has been adjusted slightly. However, the total floodway width did not change at any cross section between the Existing Conditions and As-built models, and the floodway

stations remained the same throughout the project between the Existing Conditions and As-built models.

The Hec-Ras models and the following Tables are in NGVD 29 and the Construction Plans included with the LOMR package are in NAVD 88.

Travis Branch Stream Restoration								7/15/2016
HEC-RAS River: First Broad River Reach: First Broad River Profile: 100 Yr.								
River Sta	Plan	W.S. Elev 100 yr. (ft)	W.S. Elev 100 yr w/FW (ft)	Prof Delta WS (ft)	Top Width Act (ft)	Encro. Sta LT (ft)	Encro. Sta RT (ft)	Project Impact 100-yr Elevation AsBuilt - Revised (ft)
27950	Prop FW Trunc	619.6	620.1	0.5	70	1330	1400	0
27950	Prop FW AS BUIL	619.6	620.1	0.5	70	1330	1400	
27770	Prop FW Trunc	619.05	619.53	0.48	100	1327	1427	0
27770	Prop FW AS BUIL	619.05	619.53	0.48	100	1327	1427	
26840	Prop FW Trunc	617.47	618.03	0.56	200	1530	1730	0
26840	Prop FW AS BUIL	617.47	618.03	0.56	200	1530	1730	
26070	Prop FW Trunc	617.03	617.61	0.58	250	1600	1850	0
26070	Prop FW AS BUIL	617.03	617.61	0.58	250	1600	1850	
25340	Prop FW Trunc	616.82	617.25	0.43	200	1745	1945	0
25340	Prop FW AS BUIL	616.82	617.25	0.43	200	1745	1945	
23335	Prop FW Trunc	615.99	616.08	0.09	180	1610	1790	0
23335	Prop FW AS BUIL	615.99	616.08	0.09	180	1610	1790	
23245	Prop FW Trunc	615.94	615.97	0.03	120	1635	1755	0
23245	Prop FW AS BUIL	615.94	615.97	0.03	120	1635	1755	
23201	Prop FW Trunc	615.92	615.96	0.04	143	1617	1760	0
23201	Prop FW AS BUIL	615.92	615.96	0.04	143	1617	1760	
23180.5 BR U	Prop FW Trunc	615.92	615.96	0.04	128.17	1617	1760	
23180.5 BR U	Prop FW AS BUIL	615.92	615.96	0.04	128.17	1617	1760	
23180.5 BR D	Prop FW Trunc	615.79	615.8	0.01	115.41	1617	1760	
23180.5 BR D	Prop FW AS BUIL	615.79	615.8	0.01	115.41	1617	1760	
23160	Prop FW Trunc	610.21	610.21	0	143	1617	1760	0
23160	Prop FW AS BUIL	610.21	610.21	0	143	1617	1760	
23110	Prop FW Trunc	606.15	606.91	0.75	142	1618	1760	-0.06
23110	Prop FW AS BUIL	606.09	606.82	0.73	142	1618	1760	
22970	Prop FW Trunc	605.84	606.47	0.63	160	1585	1745	-0.07
22970	Prop FW AS BUIL	605.77	606.37	0.6	160	1585	1745	
22440	Prop FW Trunc	605.55	606.21	0.66	145	1573	1718	-0.06
22440	Prop FW AS BUIL	605.49	606.13	0.64	145	1573	1718	
22110	Prop FW Trunc	605.26	605.9	0.64	160	1536	1696	-0.04
22110	Prop FW AS BUIL	605.22	605.84	0.62	160	1536	1696	
21750	Prop FW Trunc	605.04	605.62	0.58	160	1629	1789	-0.02
21750	Prop FW AS BUIL	605.02	605.58	0.57	160	1629	1789	
21270	Prop FW Trunc	604.94	605.45	0.52	150	1189	1339	-0.02
21270	Prop FW AS BUIL	604.92	605.43	0.51	150	1189	1339	

Travis Branch Stream Restoration								7/15/2016
HEC-RAS River: First Broad River Reach: First Broad River Profile: 100 Yr.								
River Sta	Plan	W.S. Elev 100 yr. (ft)	W.S. Elev 100 yr w/FW (ft)	Prof Delta WS (ft)	Top Width Act (ft)	Encro. Sta LT (ft)	Encro. Sta RT (ft)	Project Impact 100-yr Elevation Revised-Effective (ft)
27950	Effective HEC2	619.57	620.12	0.55	70	1330	1400	0.03
27950	Prop FW AS BUIL	619.6	620.1	0.5	70	1330	1400	
27770	Effective HEC2	618.95	619.52	0.57	100	1327	1427	0.1
27770	Prop FW AS BUIL	619.05	619.53	0.48	100	1327	1427	
26840	Effective HEC2	617.27	617.99	0.72	200	1530	1730	0.2
26840	Prop FW AS BUIL	617.47	618.03	0.56	200	1530	1730	
26070	Effective HEC2	616.8	617.57	0.77	250	1600	1850	0.23
26070	Prop FW AS BUIL	617.03	617.61	0.58	250	1600	1850	
25340	Effective HEC2	616.58	617.21	0.63	200	1745	1945	0.24
25340	Prop FW AS BUIL	616.82	617.25	0.43	200	1745	1945	
23335	Effective HEC2	615.77	616.05	0.28	180	1610	1790	0.22
23335	Prop FW AS BUIL	615.99	616.08	0.09	180	1610	1790	
23245	Effective HEC2	615.65	615.94	0.29	120	1635	1755	0.29
23245	Prop FW AS BUIL	615.94	615.97	0.03	120	1635	1755	
23201	Effective HEC2	614.44	614.82	0.48	28	1679	1707	1.48
23201	Prop FW AS BUIL	615.92	615.96	0.04	143	1617	1760	
23180.5 BR U	Effective HEC2							
23180.5 BR U	Prop FW AS BUIL	615.92	615.96	0.04	128.17	1617	1760	
23180.5 BR D	Effective HEC2							
23180.5 BR D	Prop FW AS BUIL	615.79	615.8	0.01	115.41	1617	1760	
23160	Effective HEC2	612.06	612.42	0.36	28	1679	1707	-1.85
23160	Prop FW AS BUIL	610.21	610.21	0	143	1617	1760	
23110	Effective HEC2	611.77	612.26	0.49	60	1665	1725	-5.68
23110	Prop FW AS BUIL	606.09	606.82	0.73	142	1618	1760	
22970	Effective HEC2	611.22	611.68	0.46	120	1645	1765	-5.45
22970	Prop FW AS BUIL	605.77	606.37	0.6	160	1585	1745	
22440	Effective HEC2	608.46	609.19	0.73	140	1602	1742	-2.97
22440	Prop FW AS BUIL	605.49	606.13	0.64	145	1573	1718	
22110	Prop FW AS BUIL	605.22	605.84	0.62	160	1536	1696	
21750	Effective HEC2	606.45	607.27	0.82	160	1595	1755	-1.43
21750	Prop FW AS BUIL	605.02	605.58	0.57	160	1629	1789	
21270	Effective HEC2	605.45	605.98	0.53	150	1210	1360	-0.53
21270	Prop FW AS BUIL	604.92	605.43	0.51	150	1189	1339	
21250	Effective HEC2	605.44	606	0.56	160	1200	1360	-0.52

Travis Branch Stream Restoration								7/15/2016
HEC-RAS River: First Broad River Reach: First Broad River Profile: 100 Yr.								
River Sta	Plan	W.S. Elev 100 yr. (ft)	W.S. Elev 100 yr w/FW (ft)	Prof Delta WS (ft)	Top Width Act (ft)	Encro. Sta LT (ft)	Encro. Sta RT (ft)	Project Impact Floodway Width Revised-Effective (ft)
27950	Effective HEC2	619.57	620.12	0.55	70	1330	1400	0
27950	Prop FW AS BUIL	619.6	620.1	0.5	70	1330	1400	
27770	Effective HEC2	618.95	619.52	0.57	100	1327	1427	0
27770	Prop FW AS BUIL	619.05	619.53	0.48	100	1327	1427	
26840	Effective HEC2	617.27	617.99	0.72	200	1530	1730	0
26840	Prop FW AS BUIL	617.47	618.03	0.56	200	1530	1730	
26070	Effective HEC2	616.8	617.57	0.77	250	1600	1850	0
26070	Prop FW AS BUIL	617.03	617.61	0.58	250	1600	1850	
25340	Effective HEC2	616.58	617.21	0.63	200	1745	1945	0
25340	Prop FW AS BUIL	616.82	617.25	0.43	200	1745	1945	
23335	Effective HEC2	615.77	616.05	0.28	180	1610	1790	0
23335	Prop FW AS BUIL	615.99	616.08	0.09	180	1610	1790	
23245	Effective HEC2	615.65	615.94	0.29	120	1635	1755	0
23245	Prop FW AS BUIL	615.94	615.97	0.03	120	1635	1755	
23201	Effective HEC2	614.44	614.82	0.48	28	1679	1707	115
23201	Prop FW AS BUIL	615.92	615.96	0.04	143	1617	1760	
23180.5 BR U	Effective HEC2							
23180.5 BR U	Prop FW AS BUIL	615.92	615.96	0.04	128.17	1617	1760	
23180.5 BR D	Effective HEC2							
23180.5 BR D	Prop FW AS BUIL	615.79	615.8	0.01	115.41	1617	1760	
23160	Effective HEC2	612.06	612.42	0.36	28	1679	1707	115
23160	Prop FW AS BUIL	610.21	610.21	0	143	1617	1760	
23110	Effective HEC2	611.77	612.26	0.49	60	1665	1725	82
23110	Prop FW AS BUIL	606.09	606.82	0.73	142	1618	1760	
22970	Effective HEC2	611.22	611.68	0.46	120	1645	1765	40
22970	Prop FW AS BUIL	605.77	606.37	0.6	160	1585	1745	
22440	Effective HEC2	608.46	609.19	0.73	140	1602	1742	5
22440	Prop FW AS BUIL	605.49	606.13	0.64	145	1573	1718	
22110	Prop FW AS BUIL	605.22	605.84	0.62	160	1536	1696	
21750	Effective HEC2	606.45	607.27	0.82	160	1595	1755	0
21750	Prop FW AS BUIL	605.02	605.58	0.57	160	1629	1789	
21270	Effective HEC2	605.45	605.98	0.53	150	1210	1360	0
21270	Prop FW AS BUIL	604.92	605.43	0.51	150	1189	1339	
21250	Effective HEC2	605.44	606	0.56	160	1200	1360	0

PHOTO UPSTREAM OF SECTION 21030



PHOTO UPSTREAM OF SECTION 21000



PHOTO AT SECTION 21270



PHOTO AT SECTION 21800



PHOTO UPSTREAM OF SECTION 22400



ENGINEER'S AS-BUILT CERTIFICATION

I, W. Henry Wells, Jr., PE, being duly registered to practice engineering in the State of North Carolina do hereby certify, based on the as-built survey information that was supplied to Sungate Design Group by K-2 Design Group, that the as-built Stream Restoration on Travis Creek in Alamance County was found to be in basic conformance with the alignment, profile and geometry shown in the approved CLOMR for the project.



W. Henry Wells, Jr., PE



7/14/16

ENGINEER'S STRUCTURE CERTIFICATION

I, W. Henry Wells, Jr., PE, being duly registered to practice engineering in the State of North Carolina do hereby certify that no structures were observed within the floodplain of Travis Creek that would be adversely impacted by the proposed decrease in the 1% annual chance water surface elevation caused by the Stream Restoration Construction.



W. Henry Wells, Jr., PE



7/14/16

U.S. DEPARTMENT OF HOMELAND SECURITY
 FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

*O.M.B No. 1660-0016
 Expires February 28, 2014*

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

- CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
370001	Alamance County	NC	3710	8846	6/18/07

2. a. Flooding Source: Travis Creek

- b. Types of Flooding: Riverine Coastal Shallow Flooding (e.g., Zones AO and AH)
 Alluvial fan Lakes Other (Attach Description)

3. Project Name/Identifier: Aycok

4. FEMA zone designations affected: AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

- Physical Change Improved Methodology/Data Regulatory Floodway Revision Base Map Changes
 Coastal Analysis Hydraulic Analysis Hydrologic Analysis Corrections
 Weir-Dam Changes Levee Certification Alluvial Fan Analysis Natural Changes
 New Topographic Data Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: Channelization Levee/Floodwall Bridge/Culvert
 Dam Fill Other (Attach Description)

6. Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? Yes Fee amount: \$8000
 No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/fm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Raymond Holz		Company: Restoration Systems, LLC	
Mailing Address: 1011 Haynes Street #211 Raleigh, NC 27604		Daytime Telephone No.: 919-755-9490	Fax No.:
		E-Mail Address: <i>rholz@restorationsystems.com</i>	
Signature of Requester (required) <i>Raymond Holz</i>		Date: <i>7-14-2016</i>	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title:		Community Name:	
Mailing Address:		Daytime Telephone No.:	Fax No.:
		E-Mail Address:	
Community Official's Signature (required):		Date:	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: W. Henry Wells, Jr.		License No.: 9334	Expiration Date: 12/31/16
Company Name: Sungate Design Group, PA		Telephone No.: 919-859-2243	Fax No.: 909-859-6258
Signature: <i>[Signature]</i>		Date: 7-14-16	E-Mail Address: hwells@sungatedesign.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)

Required if ...

- | | |
|---|---|
| <input checked="" type="checkbox"/> Riverine Hydrology and Hydraulics Form (Form 2) | New or revised discharges or water-surface elevations |
| <input checked="" type="checkbox"/> Riverine Structures Form (Form 3) | Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam |
| <input type="checkbox"/> Coastal Analysis Form (Form 4) | New or revised coastal elevations |
| <input type="checkbox"/> Coastal Structures Form (Form 5) | Addition/revision of coastal structure |
| <input type="checkbox"/> Alluvial Fan Flooding Form (Form 6) | Flood control measures on alluvial fans |



U.S. DEPARTMENT OF HOMELAND SECURITY
 FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE HYDROLOGY & HYDRAULICS FORM

*O.M.B No. 1660-0016
 Expires February 28, 2014*

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Travis Creek

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

- | | | |
|--|--|--|
| <input type="checkbox"/> Not revised (skip to section B) | <input type="checkbox"/> No existing analysis | <input type="checkbox"/> Improved data |
| <input type="checkbox"/> Alternative methodology | <input type="checkbox"/> Proposed Conditions (CLOMR) | <input type="checkbox"/> Changed physical condition of watershed |

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
----------	-------------------------	---------------------	---------------

3. Methodology for New Hydrologic Analysis (check all that apply)

- | | |
|---|--|
| <input type="checkbox"/> Statistical Analysis of Gage Records | <input type="checkbox"/> Precipitation/Runoff Model → Specify Model: _____ |
| <input type="checkbox"/> Regional Regression Equations | <input type="checkbox"/> Other (please attach description) |

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? Yes No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	<u>Trib to Travis Creek</u>	<u>20230</u>	<u>604.34</u>	<u>604.48</u>
Upstream Limit*	<u>Upstr Gibsonville Ossippee Rd</u>	<u>23245</u>	<u>615.65</u>	<u>615.94</u>

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC RAS Version 4.1

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

<u>Models Submitted</u>	<u>Natural Run</u>		<u>Floodway Run</u>		<u>Datum</u>
Duplicate Effective Model*	File Name: _____	Plan Name: DupEffMultTrunc	File Name: _____	Plan Name: DupEffFWTrunc	NGVD 29
Corrected Effective Model*	File Name: _____	Plan Name: CorrEffMultTrunc	File Name: _____	Plan Name: CorrEffFWTrunc	NGVD 29
Existing or Pre-Project Conditions Model	File Name: _____	Plan Name: ExCondMultTrunc	File Name: _____	Plan Name: EcCondFWTrunc	NGVD 29
Revised or Post-Project Conditions Model	File Name: _____	Plan Name: ProMultTrunc	File Name: _____	Plan Name: ProFWTrunc	NGVD 29
Other - (attach description)	File Name: _____	Plan Name: ProMultAsbuilt	File Name: _____	Plan Name: ProFWAsbuilt	NGVD 29

* For details, refer to the corresponding section of the instructions.

Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: Merged Bare Earth Contours and Field Survey

Source: NCFMP Date: 6/6/14

Accuracy: 1.6

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? Yes No
- a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
 - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.
- b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? Yes No
If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.
2. Does the request involve the placement or proposed placement of fill? Yes No
- If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.
3. For LOMR requests, is the regulatory floodway being revised? Yes No
- If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)
4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program; Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Travis Creek

Note: Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

- Channelization.....complete Section B
- Bridge/Culvert.....complete Section C
- Dam.....complete Section D
- Levee/Floodwall.....complete Section E
- Sediment Transport.....complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: _____
Type (check one): Channelization Bridge/Culvert Levee/Floodwall Dam
Location of Structure: _____
Downstream Limit/Cross Section: _____
Upstream Limit/Cross Section: _____
2. Name of Structure: _____
Type (check one): Channelization Bridge/Culvert Levee/Floodwall Dam
Location of Structure: _____
Downstream Limit/Cross Section: _____
Upstream Limit/Cross Section: _____
3. Name of Structure: _____
Type (check one) Channelization Bridge/Culvert Levee/Floodwall Dam
Location of Structure: _____
Downstream Limit/Cross Section: _____
Upstream Limit/Cross Section: _____

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: Travis Creek

Name of Structure: Stream Restoration

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the 2-year flood.

The design elevation in the channel is based on (check one):

- Subcritical flow
- Critical flow
- Supercritical flow
- Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

- Inlet to channel
- Outlet of channel
- At Drop Structures
- At Transitions
- Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

- Levees [Attach Section E (Levee/Floodwall)]
- Drop structures
- Superelevated sections
- Transitions in cross sectional geometry
- Debris basin/detention basin [Attach Section D (Dam/Basin)]
- Energy dissipator
- Weir
- Other (Describe): _____

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? Yes No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: _____

Name of Structure: _____

1. This revision reflects (check one):

- Bridge/culvert not modeled in the FIS
- Modified bridge/culvert previously modeled in the FIS
- Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): _____

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- Dimensions (height, width, span, radius, length)
- Distances Between Cross Sections
- Shape (culverts only)
- Erosion Protection
- Material
- Low Chord Elevations – Upstream and Downstream
- Beveling or Rounding
- Top of Road Elevations – Upstream and Downstream
- Wing Wall Angle
- Structure Invert Elevations – Upstream and Downstream
- Skew Angle
- Stream Invert Elevations – Upstream and Downstream
- Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? Yes No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

D. DAM/BASIN

Flooding Source: _____
 Name of Structure: _____

1. This request is for (check one): Existing dam/basin New dam/basin Modification of existing dam/basin
2. The dam/basin was designed by (check one): Federal agency State agency Private organization Local government agency

Name of the agency or organization: _____

3. The Dam was permitted as (check one): Federal Dam State Dam

Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

Permit or ID number _____ Permitting Agency or Organization _____

- a. Local Government Dam Private Dam

Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? Yes No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

- Yes, provide supporting documentation with your completed Form 2.
 No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? Yes No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? Yes No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin	
	FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	_____	_____
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- upgrading of an existing levee/floodwall system a newly constructed levee/floodwall system reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

- earthen embankment, dike, berm, etc. Station _____ to _____
 structural floodwall Station _____ to _____
 Other (describe): _____ Station _____ to _____

c. Structural Type (check one): monolithic cast-in place reinforced concrete reinforced concrete masonry block sheet piling
 Other (describe): _____

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

Yes No

If Yes, by which agency? _____

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

- 1. Plan of the levee embankment and floodwall structures. Sheet Numbers: _____
- 2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: _____
- 3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers: _____
- 4. A layout detail for the embankment protection measures. Sheet Numbers: _____
- 5. Location, layout, and size and shape of the levee embankment features, foundation treatment, Floodwall structure, closure structures, and pump stations. Sheet Numbers: _____

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

- 3.0 feet or more at the downstream end and throughout Yes No
- 3.5 feet or more at the upstream end Yes No
- 4.0 feet within 100 feet upstream of all structures and/or constrictions Yes No

Coastal

- 1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater). Yes No
- 2.0 feet above the 1%-annual-chance stillwater surge elevation Yes No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? Yes No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): exists does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

- a. The maximum levee slope land side is: _____
- b. The maximum levee slope flood side is: _____
- c. The range of velocities along the levee during the base flood is: _____ (min.) to _____ (max.)
- d. Embankment material is protected by (describe what kind): _____
- e. Riprap Design Parameters (check one): Velocity Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D ₁₀₀	D ₅₀	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

- f. Is a bedding/filter analysis and design attached? Yes No
- g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

- a. Identify locations and describe the basis for selection of critical location for analysis:

 - Overall height: Sta.: _____, height _____ ft.
 - Limiting foundation soil strength:
 Strength ϕ = _____ degrees, c = _____ psf
 Slope: SS = _____ (h) to _____ (v)
 (Repeat as needed on an added sheet for additional locations)
- b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

- c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

- d. Was a seepage analysis for the embankment performed? Yes No
 If Yes, describe methodology used:
- e. Was a seepage analysis for the foundation performed? Yes No
- f. Were uplift pressures at the embankment landside toe checked? Yes No
- g. Were seepage exit gradients checked for piping potential? Yes No
- h. The duration of the base flood hydrograph against the embankment is _____ hours.

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

- a. Describe analysis submittal based on Code (check one): UBC (1988) Other (specify): _____
- b. Stability analysis submitted provides for: Overturning Sliding If not, explain: _____
- c. Loading included in the analyses were: Lateral earth @ $P_A =$ _____ psf; $P_P =$ _____ psf
 Surcharge-Slope @ _____, surface _____ psf
 Wind @ $P_w =$ _____ psf
 Seepage (Uplift); _____ Earthquake @ $P_{eq} =$ _____ %g
- 1%-annual-chance significant wave height: _____ ft.
- 1%-annual-chance significant wave period: _____ sec.
- d. Summary of Stability Analysis Results: Factors of Safety.
 Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection is, is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? Yes No

b. The computed range of settlement is _____ ft. to _____ ft.

c. Settlement of the levee crest is determined to be primarily from : Foundation consolidation Embankment compression
 Other (Describe): _____

d. Differential settlement of floodwalls has has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: _____ acres

Draining to ponding area: _____ acres

b. Relationships Established

Ponding elevation vs. storage Yes No

Ponding elevation vs. gravity flow Yes No

Differential head vs. gravity flow Yes No

c. The river flow duration curve is enclosed: Yes No

d. Specify the discharge capacity of the head pressure conduit: _____ cfs

e. Which flooding conditions were analyzed?

- Gravity flow (Interior Watershed) Yes No
- Common storm (River Watershed) Yes No
- Historical ponding probability Yes No
- Coastal wave overtopping Yes No

If No for any of the above, attach explanation.

e. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. Yes No If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is _____ cfs

h. The length of levee system used to drive this seepage rate in item g: _____ ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? Yes No

If Yes, include the number of pumping plants: _____ For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? Yes No

If the pumps are electric, are there backup power sources? Yes No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction is is not a problem

Hydrocompaction is is not a problem

Heave differential movement due to soils of high shrink/swell is is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
 Yes No Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? Yes No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? Yes No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
 Yes No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
 Yes No If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan
Please attach a copy of the formal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan
Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

CERTIFICATION OF THE LEVEE DOCUMENTATION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: _____ License No.: _____ Expiration Date: _____

Company Name: _____ Telephone No.: _____ Fax No.: _____

Signature: _____ Date: _____ E-Mail Address: _____

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume _____ acre-feet

Debris load associated with the base flood discharge: Volume _____ acre-feet

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition: _____

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: _____

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

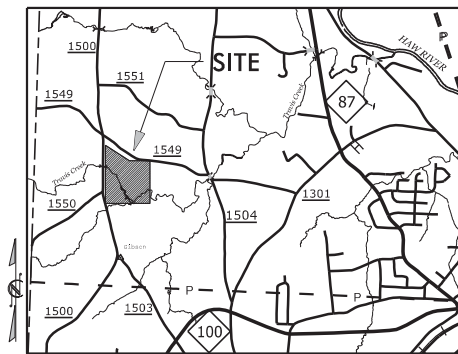
If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	AYCOCK SPRINGS SITE	1	

AS-BUILT SURVEY AND RECORD DRAWINGS AYCOCK SPRINGS SITE

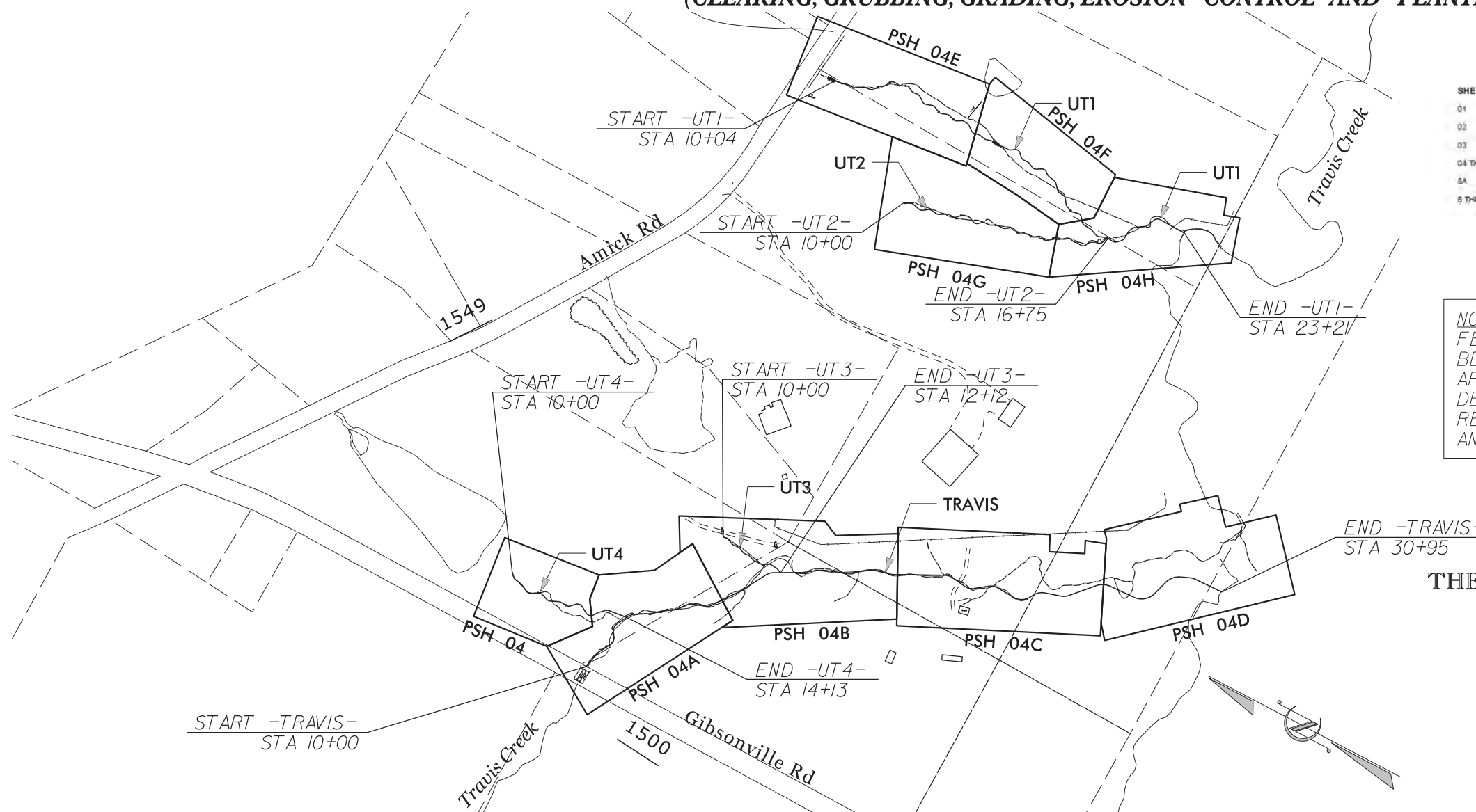
LOCATION: ALAMANCE COUNTY, NORTH CAROLINA

TYPE OF WORK: STREAM AND WETLAND RESTORATION AND ENHANCEMENT
(CLEARING, GRUBBING, GRADING, EROSION CONTROL AND PLANTING)



VICINITY MAP
Not to Scale

CONTRACT: AYCOCK SPRINGS SITE



INDEX OF SHEETS

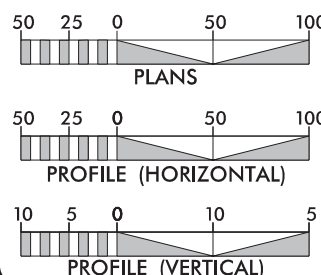
SHEET NUMBER	SHEET
01	Title Sheet
02	Legend
03	Key Sheet
04 THRU 04H	Plan Construction
05A	As-Built Plan Provided by Surveyor
06 THRU 06H	As-Built Plan Overlay

NOTE: TRAVIS CREEK IS LOCATED IN A FEMA DETAILED STUDY AREA. PROJECT TO BE CONSTRUCTED ACCORDING TO APPROVED CONSTRUCTION DOCUMENTS. ANY DEVIATIONS FROM THE PLANS WILL REQUIRE APPROVAL FROM THE ENGINEER AND FLOODPLAIN ADMINISTRATOR

THE STATE OF NORTH CAROLINA,
DIVISION OF
MITIGATION SERVICES

DMS PROJECT ID# 96312
SPO FILE # 01-AA
NC DMS CONTRACT # 5791
RFP# 16-005568
LAT 36.127271 N
LONG 79.525214 W

GRAPHIC SCALES



PROPOSED LENGTH OF UT1= 1315 LF	PROPOSED LENGTH OF UT3= 212 LF
PROPOSED LENGTH OF UT2= 675 LF	PROPOSED LENGTH OF UT4= 413 LF
TOTAL STREAM LENGTH= 4165 LF	

RESTORATION LEVEL	STREAM (linear footage)	RIPARIAN WETLAND (acreage)	NONRIPARIAN WETLAND (acreage)
RESTORATION	3357	0.5	0.0
ENHANCEMENT	677	1.5	0.0
TOTALS	4034	2.0	0.0
MITIGATION UNITS	3628 SMUs	0.5 RIPARIAN WMUs	0.0 NONRIPARIAN WMUs

Designed By:

Axiom Environmental
218 Snow Ave
Raleigh, NC 27603

GRANT LEWIS
PROJECT DESIGNER

Restoration Systems
1101 Haynes St.
Suite 211
Raleigh, NC 27604

WORTH CREECH
SITE CONSTRUCTION MANAGER

Prepared In the Office of:

SUNGATE DESIGN GROUP, P.A.

915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890
L.A. FIRM LICENSE NO. C-91

JOSHUA G. DALTON, P.E.
PROJECT ENGINEER

DocuSigned by:

Joshua G. Dalton

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SEAL

26971


ENGINEER

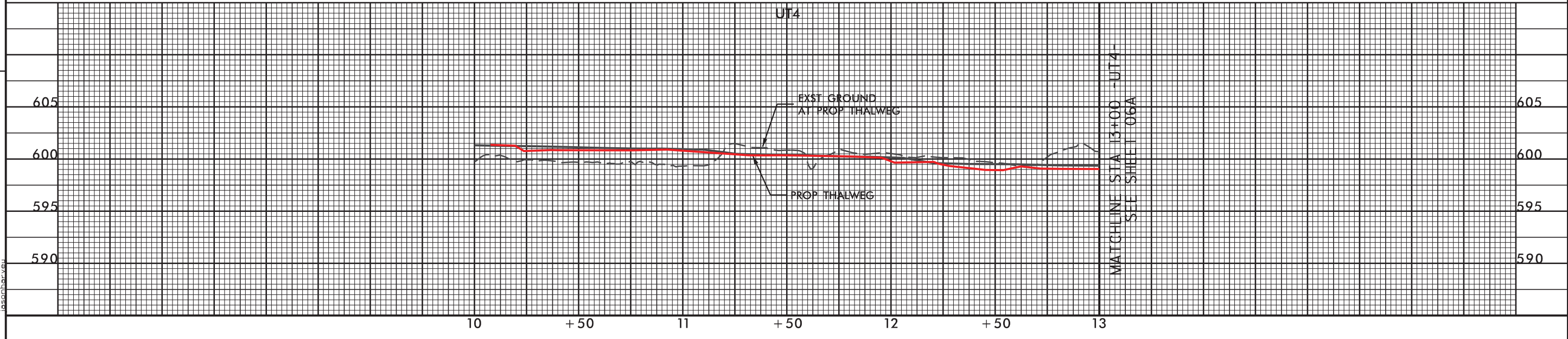
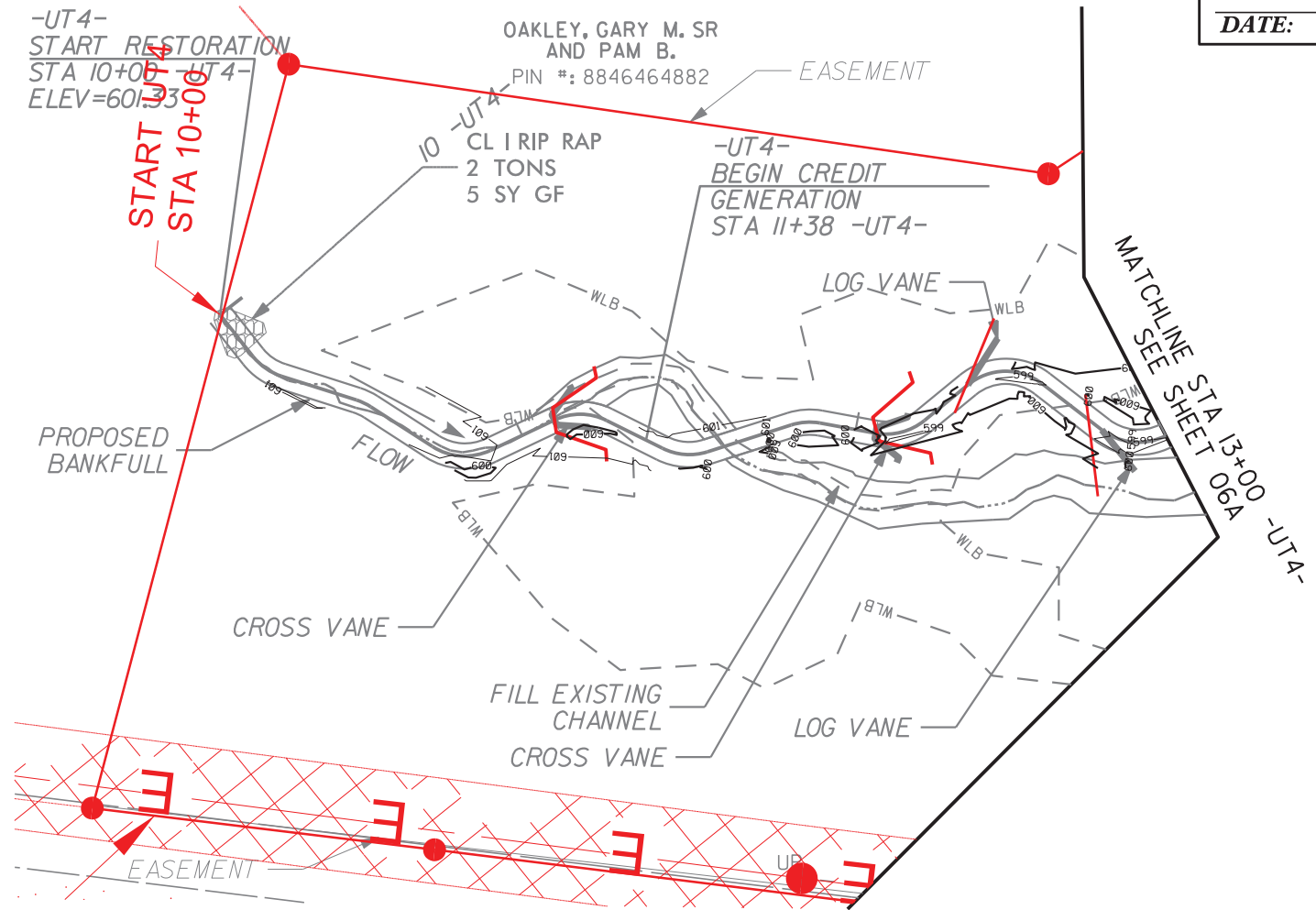
JOSHUA G. DALTON

7/26/2016

DATE:

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Joshua G. Dalton
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 SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 DATE: 7/13/2016

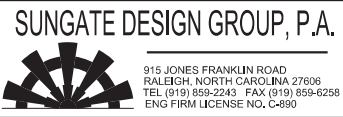
SHEET NAME	SHEET NUMBER
STRUCTURES	06
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016
 SUNGATE DESIGN GROUP, P.A. <small>915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 859-2243 FAX (919) 859-6258 ENG FIRM LICENSE NO. C-890</small>	



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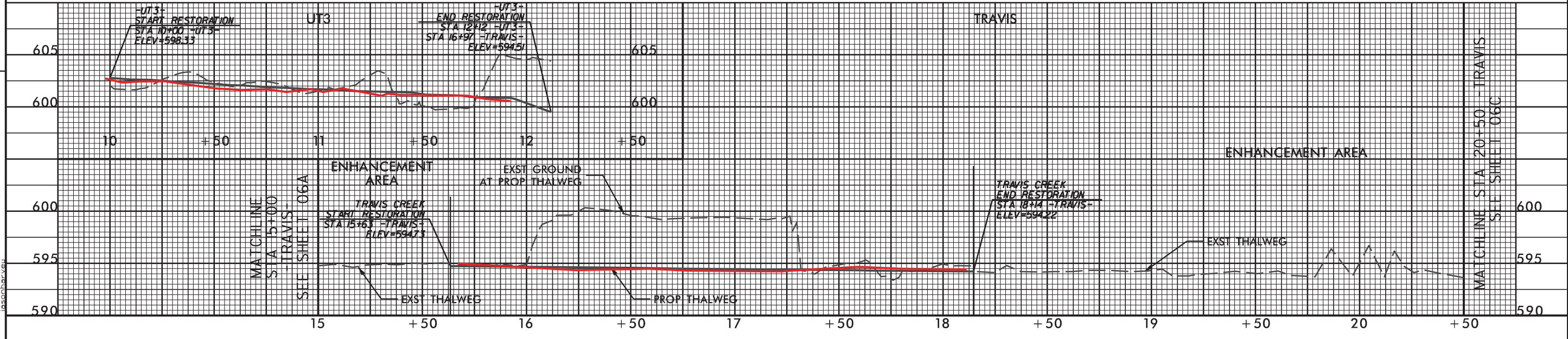
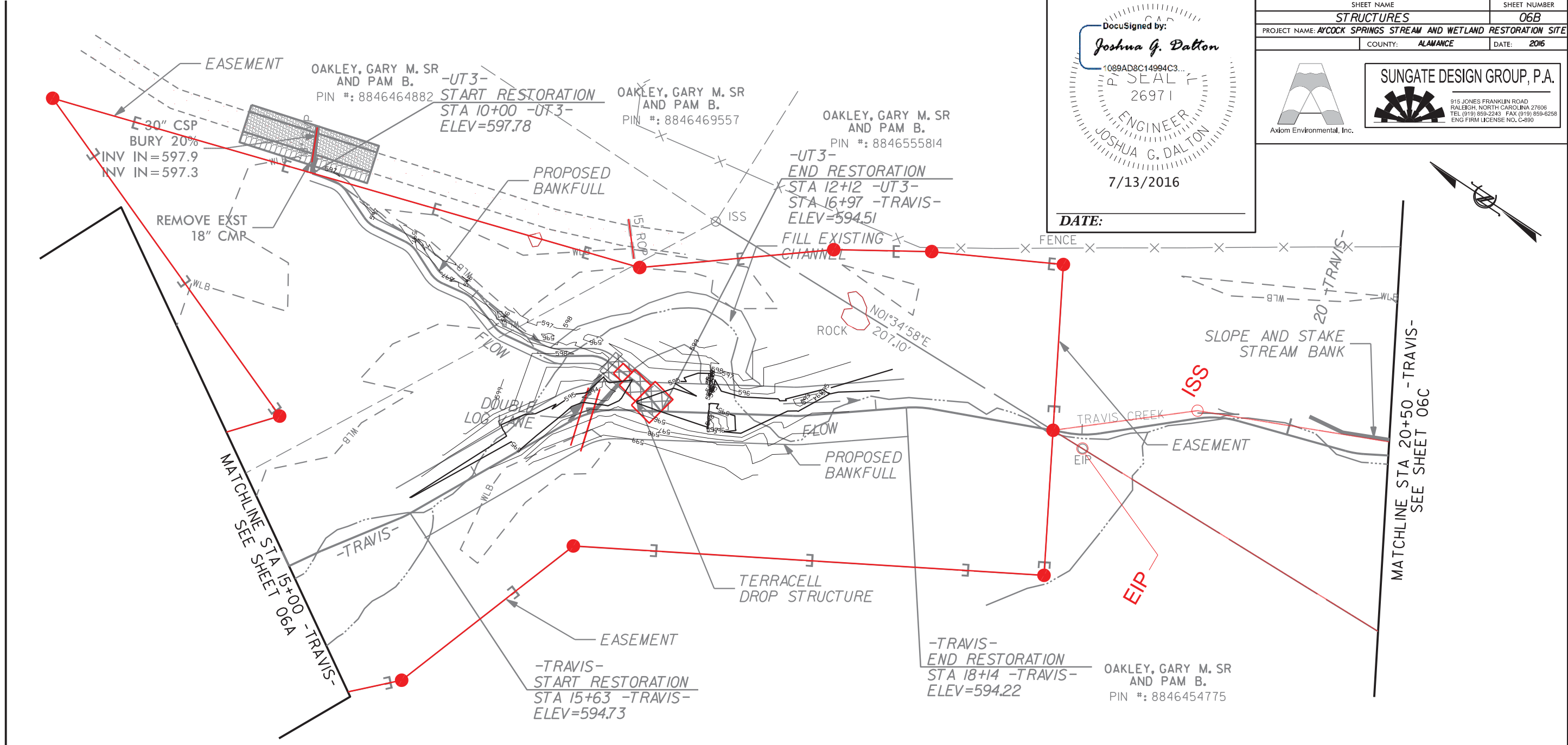
7/13/2016
Aycock Stream_PSH_06.dgn
JSD

SHEET NAME STRUCTURES	SHEET NUMBER 06B
PROJECT NAME: AVCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016



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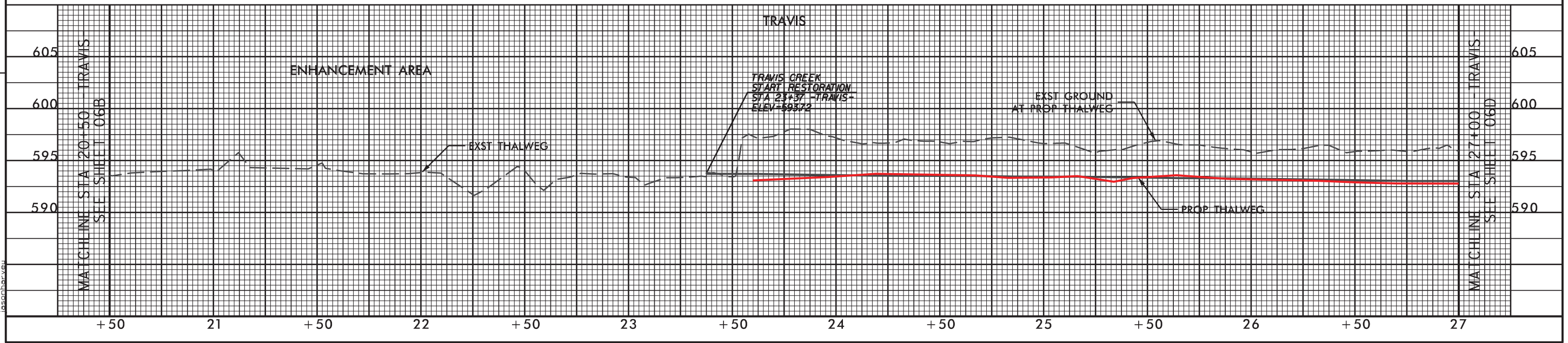
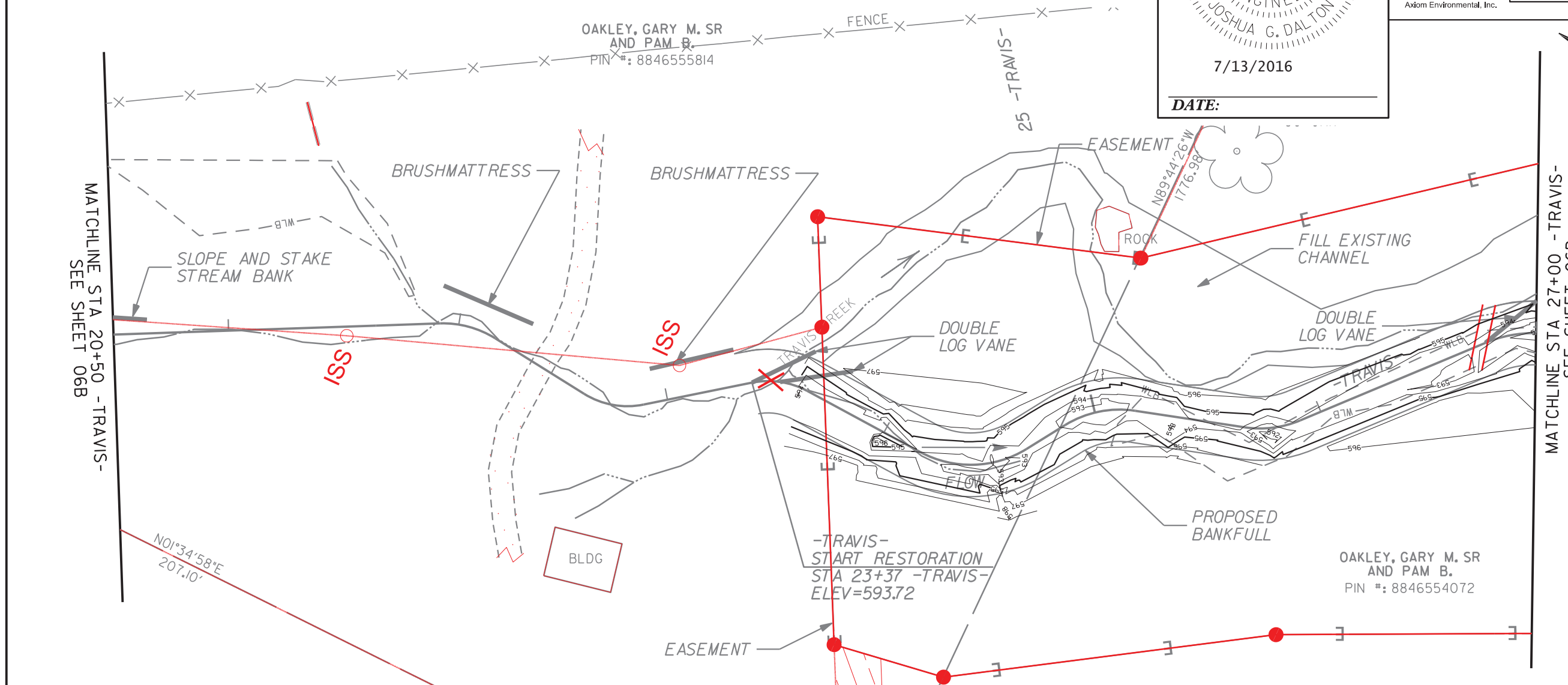
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SHEET NAME STRUCTURES	SHEET NUMBER 06C
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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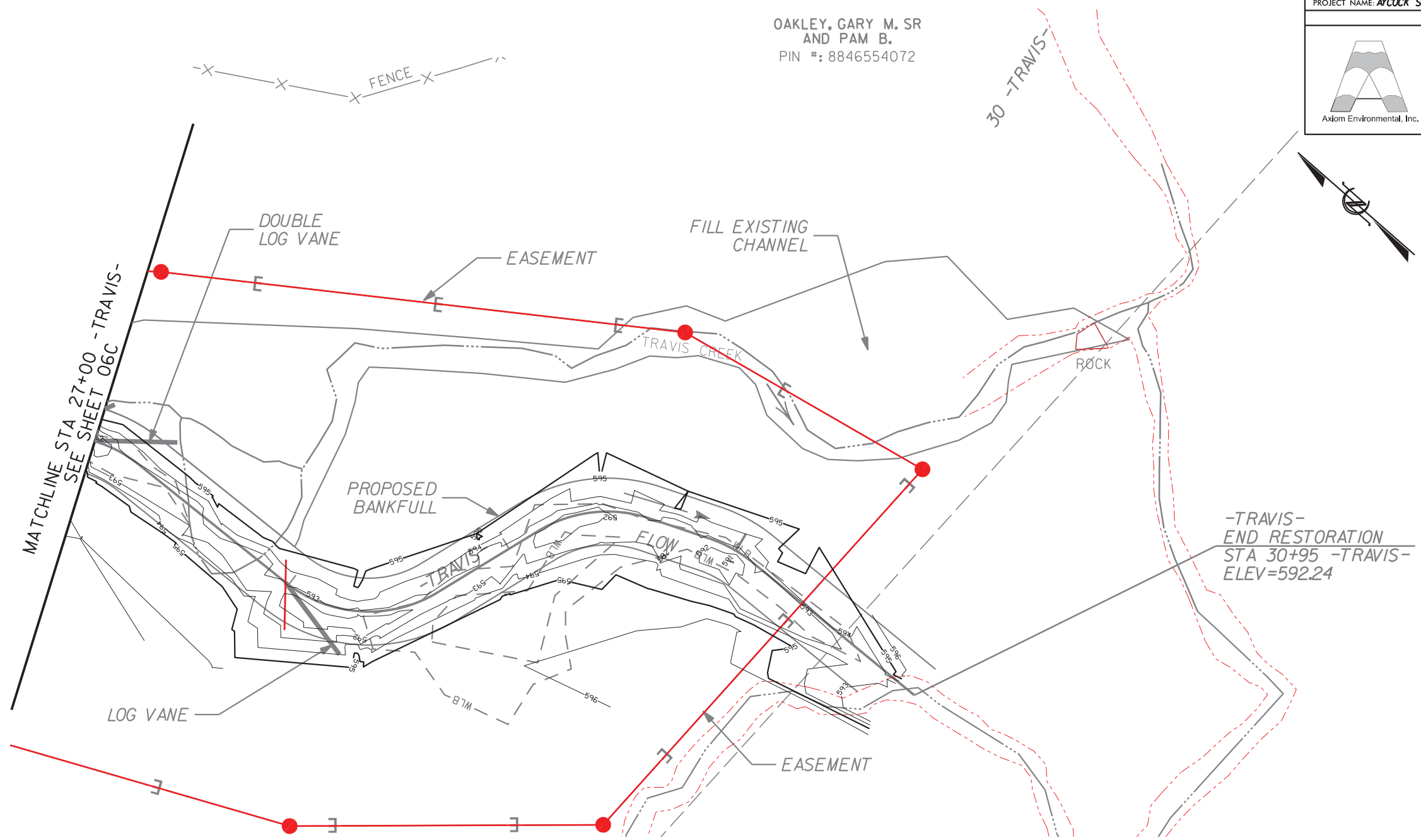
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Aycock Stream_PSH_06C.dgn
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SHEET NAME	SHEET NUMBER
STRUCTURES	06D
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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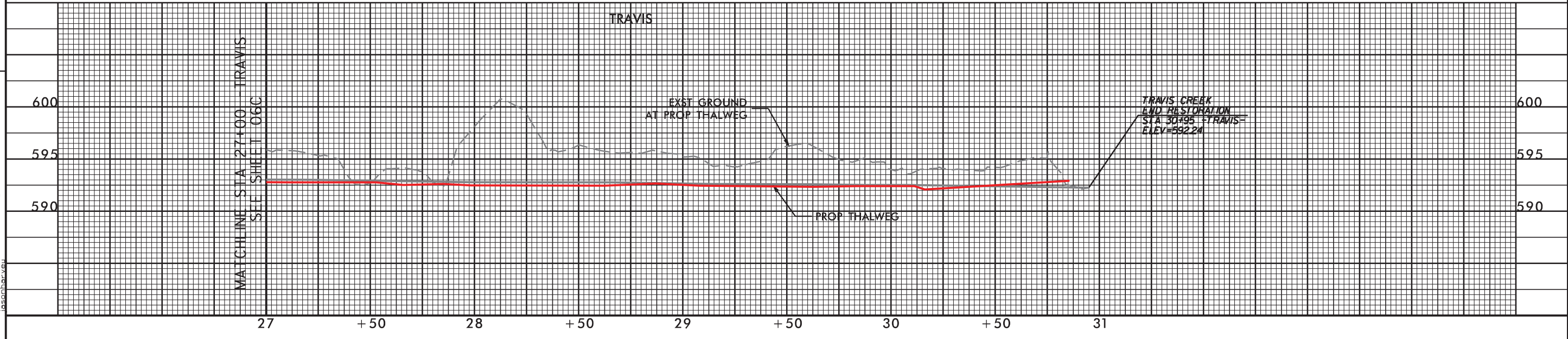
OAKLEY, GARY M. SR
AND PAM B.
PIN #: 8846554072



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Joshua G. Dalton
 1089AD8C14994C3...
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 ENGINEER
 JOSHUA G. DALTON
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jason@axiom.com

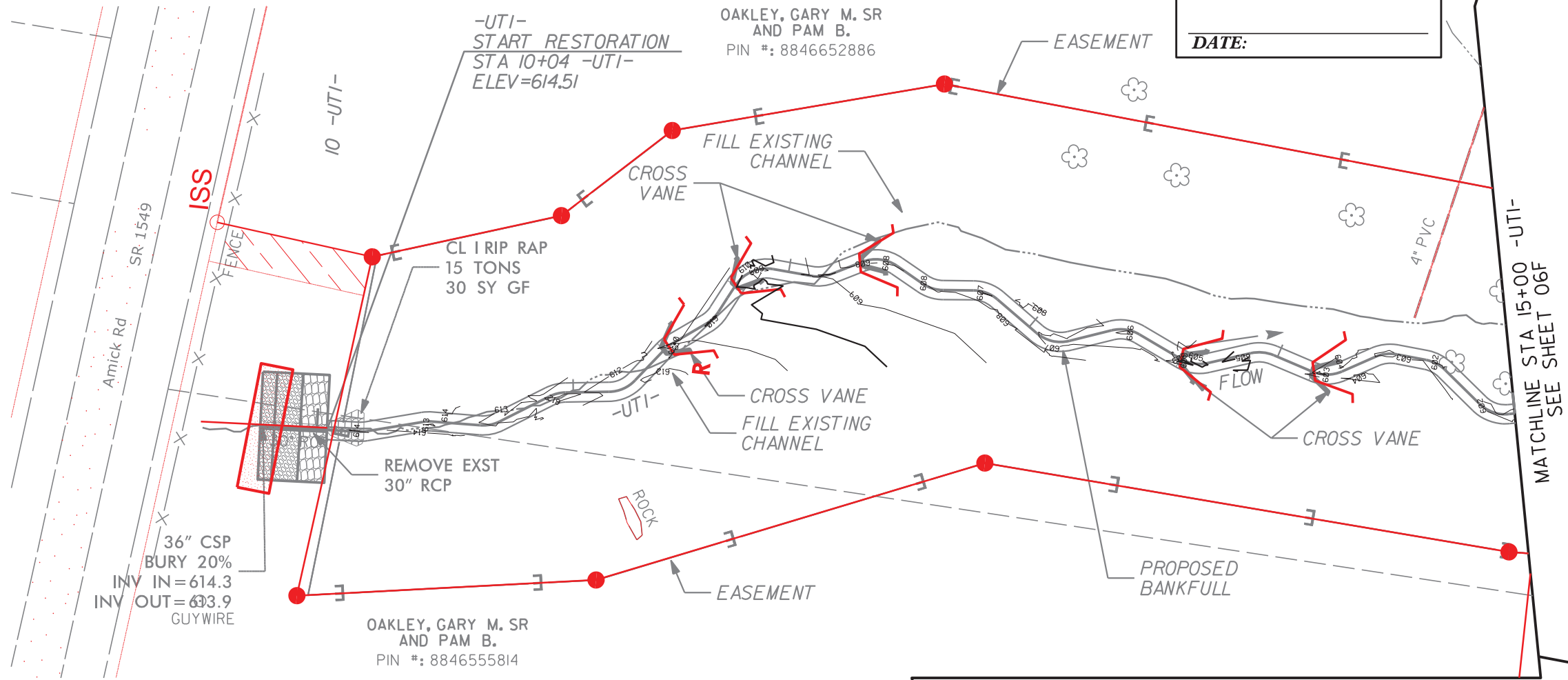
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 PRO SEAL
 26971
 ENGINEER
 JOSHUA G. DALTON
 DATE: 7/13/2016

SHEET NAME	SHEET NUMBER
STRUCTURES	06E
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

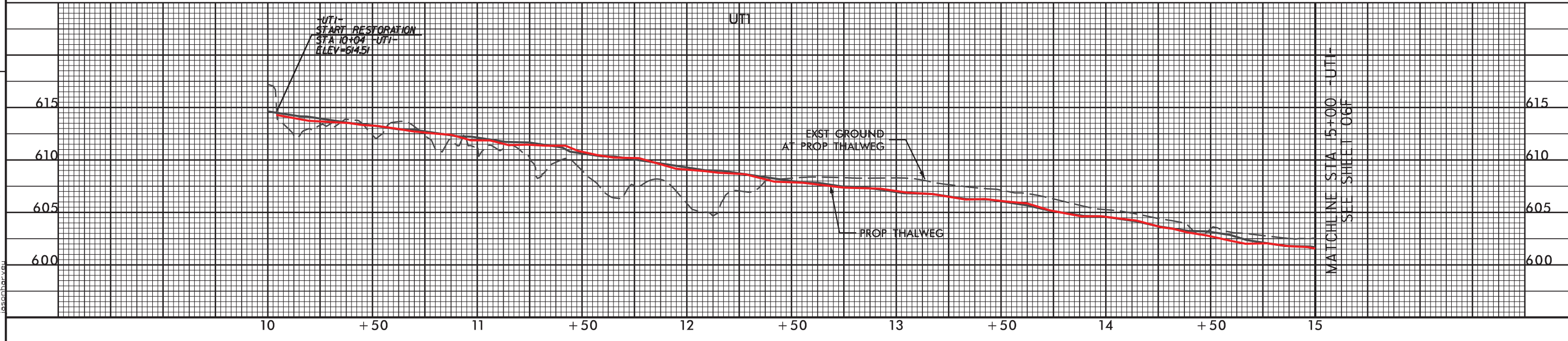
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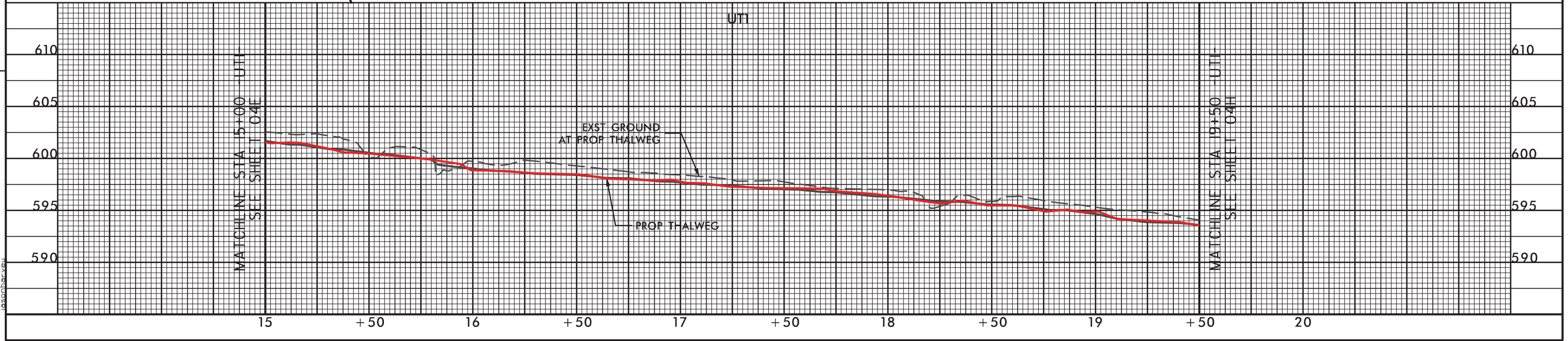
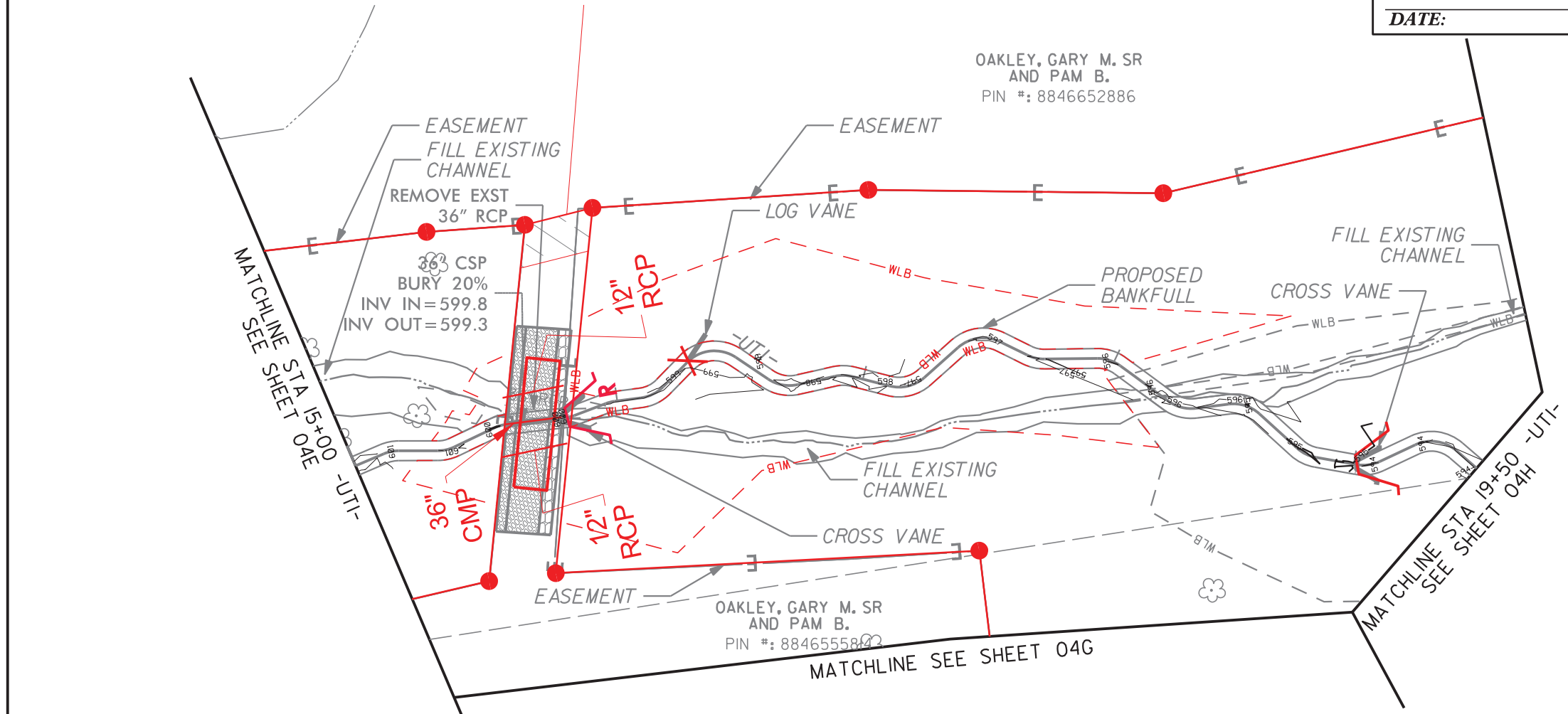
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 ENGINEER
 JOSHUA G. DALTON
 7/13/2016
 DATE: _____

SHEET NAME	SHEET NUMBER
STRUCTURES	04F
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016


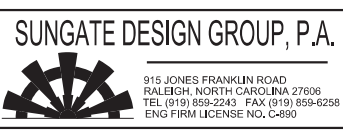
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SHEET NAME	SHEET NUMBER
STRUCTURES	06G
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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RALEIGH, NORTH CAROLINA 27608
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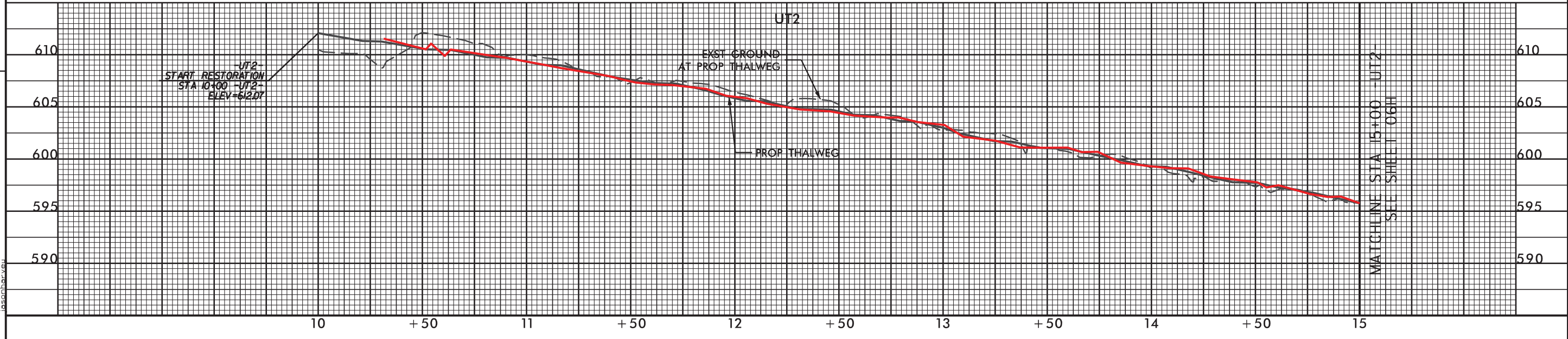
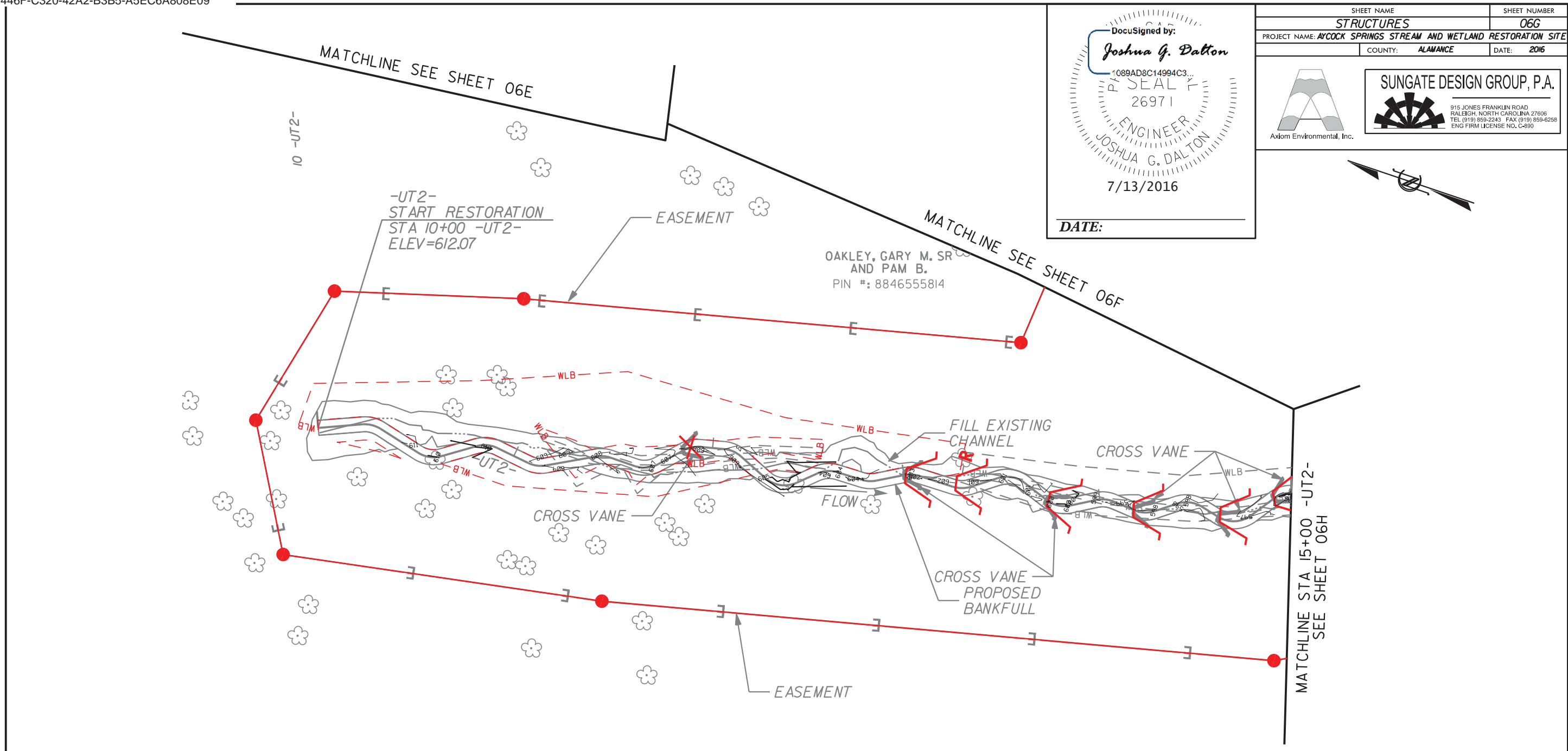
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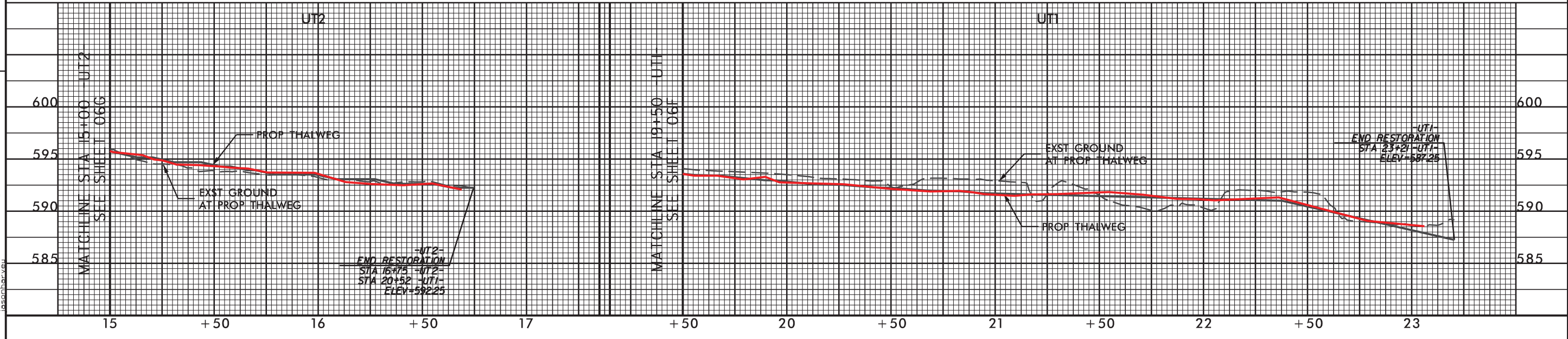
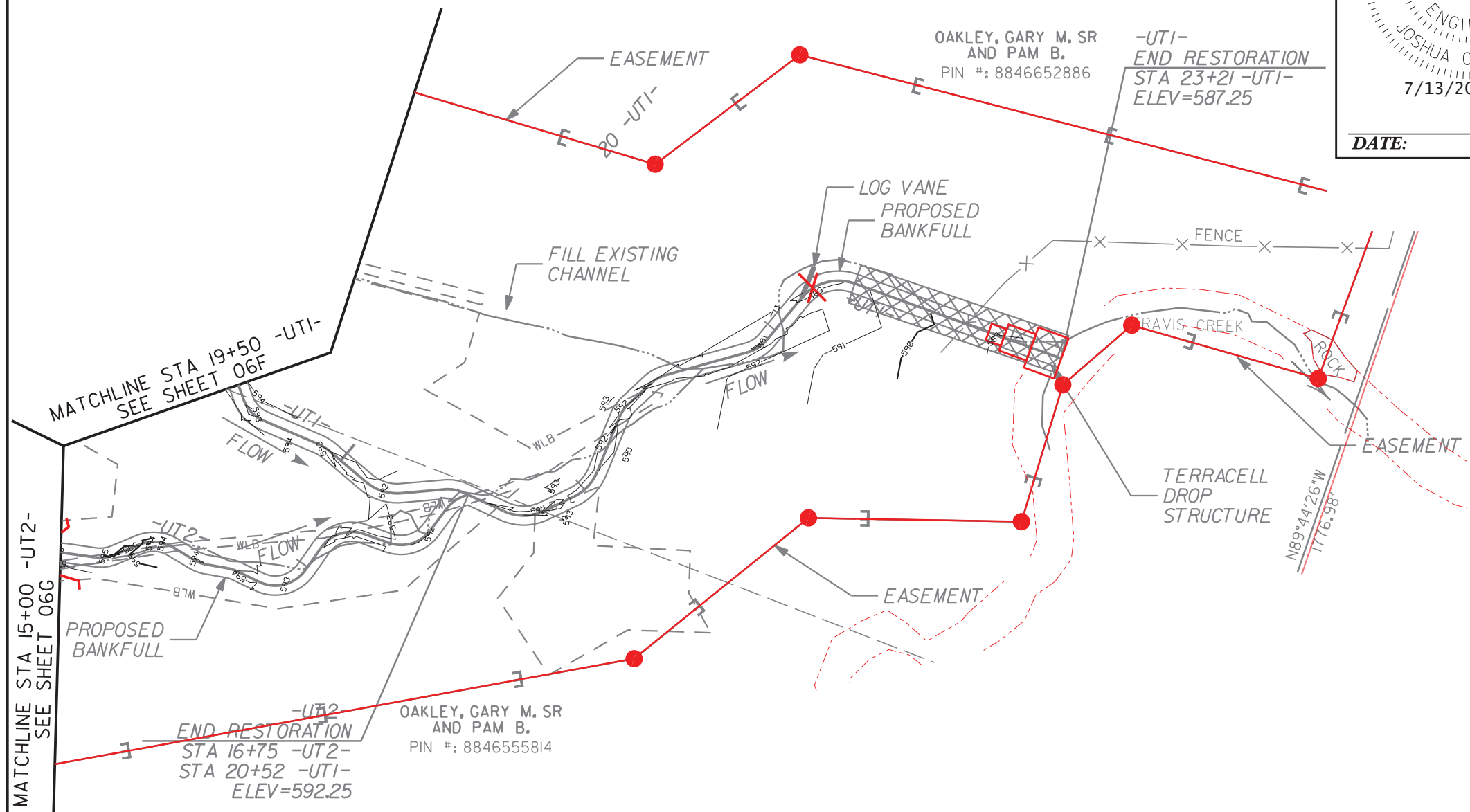
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SHEET NAME	SHEET NUMBER
STRUCTURES	06H
PROJECT NAME: AYCOCK SPRINGS STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2016

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 7/13/2016
 DATE: _____



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\$JOB,72202ZTRAVIS,2084HA,HA,OUT=2084HA*TRAVISNA,PR=6
\$*B72202Z

C ** FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW
C 52
C 274870** TOPO SEC ON HAW R , MOD BY SEC "AA"; NON-EFF FLOW (NEF) **
C 120 ** SURVEY SEC ATC-1 **
C 850 ** SEC ATC-2 **
C 935 ** SR 1593 OSSIPEE RD; SEC ATC-3; OVBKS FM ATC-2 **
C 961 ** SR 1593 ; OVBKS FM TOPO **
C 1020 ** TOPO SEC; CHAN FM ATC-3 **
C 1650 ** ATC-4 WITH NEF
C 2825 ** ATC-5 **
C 4540 ** TOPO; CHAN FM ATC-5 **
C 5110 ** TOPO; CHAN FM ATC-5 **
C 5770 ** ATC-6 , MOD FOR NEF **
C 5810 ** NC 87 , SEC ATC-7 **
C 5930 ** ATC-8 TRSF & MOD FOR NEF ROB **
C 6150 ** ATC-8 MOD FOR NEF ROB **
C 7610 ** ATC-9 , MOD FOR NEF AT HIGHER ELEV LOB **
C 8310 ** ATC-10 **
C 8500 ** TOPO SEC;NEF LOB & PORTIONS OF ROB FM RDWAY; CHAN FM ATC-10**
C 8550 ** PRIVATE RD **
C 8569 ** TOPO WITH NEF; PORTIONS OF ROB FM ROADWAY **
C 9910 ** ATC-12 **
C 10400 ** TOPO **
C 11140 ** ATC-13, MOD FOR NEF AT HIGHER ELEV LOB **
C 12770 ** ATC-14 **
C 13900 ** TOPO WITH CHAN FM ATC-14 **
C 14320 ** ATC-15; CHAN FM ATC-14 **
C 14365 ** SR 1504; SEC ATC-16 **
C 14385 ** SR 1504; OVBKS FM TOPO, WITH NEF **
C 14435 ** TOPO; CHAN FM 17 **
C 14880 ** ATC-17 **
C 15580 ** TOPO SEC; CHAN FM SEC ATC-17 **
C 16030 ** ATC-18 **
C 17790 ** ATC-19 **
C 19430 ** ATC-20, MOD FOR NEF LOB **
C 20230 ** TOPO SEC; CHAN FM ATC-20 **
C 20970 ** TOPO SEC; CHAN FM ATC-20 **
C 21030 ** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **
C 21075 ** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**
C 21085 ** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **
C 21250 ** SEC 20-A EXTENDED ON LOB **
C 21270 ** SEC 20-A W/CHAN FM SEC 21 **
C 21750 ** SEC 21 **
C 22440 ** TOPO,ADJ. BASED ON 23;NR OVBK & CHAN FM 21; NEF LOB **
C 22970 ** TOPO MOD BY SEC 23; CHAN FM ATC-21 **
C 23160 ** SR 1500; SEC ATC-22, MOD BY SEC 23 **
C 23201 ** SR 1500; OVBKS FM SEC 23 **
C 23245 ** SEC 23; OVBK FM 21 **
C 23335 ** PREVIOUS SEC TRANSFERRED **
C 25340 ** SEC 24 WITH NEF **

GR	571.4	1878	570	1885	567.2	1894	567.0	1904	558.0	1932
GR	558.0	1943	570.0	1982	570.0	1998	575	2050	578.6	2100
GR	580	2120	585	2295	590	2365				
ET		3.11	1880	2000						
X1	1020	19	1925	1958	59	59	59			
GR	590	1610	585	1710	580	1800	575	1865	570	1885
GR	567.2	1894	566.9	1914	564.9	1925	559.3	1927	558.1	1931
GR	558.3	1943	558.2	1952	564.7	1958	566.5	1980	570	2000
GR	575	2050	580	2120	585	2295	590	2365		
NC	.10	.12	.06							
ET		3.11	1108	1278						
X1	1650	20	1118	1148	630	630	630			
GR	599.4	1000	590.9	1040	572.2	1100	568.7	1112	565.1	1118
GR	560.6	1120	560.3	1134	560.1	1145	567.0	1148	570.8	1150
GR	569.1	1200	569.7	1209	571.5	1300	574.9	1365	577.6	1500
GR	579.6	1600	582.8	1700	588.7	1800	596.2	1900	599.3	1950
NC	.11	.11	.06							
ET		3.11	1460	1640						
X1	2825	17	1585	1619	1175	1175	1175			
GR	598.6	1000	594.5	1100	590.4	1200	584.9	1300	581.1	1400
GR	571.7	1500	571.3	1580	569.1	1585	564.2	1586	562.9	1603
GR	563.8	1614	568.3	1619	570.8	1624	570.7	1635	583.4	1672
GR	587.0	1700	596.4	1800						
ET		3.11	1525	1695						
X1	4540	16	1585	1619	1715	1715	1717			
GR	590	1010	585	1485	580	1500	575	1545	574	1580
GR	572.8	1585	567.9	1586	566.6	1603	567.5	1614	572.0	1619
GR	574.5	1624	574.4	1635	575	1670	580	1720	585	1740
GR	590	1775								
ET		3.11	1475	1625						
X1	5110	16	1585	1619	570	570	570			
GR	600	1210	595	1240	590	1300	585	1340	580	1410
GR	575	1455	573.9	1585	569.0	1586	567.7	1603	568.6	1614
GR	573.1	1619	575	1640	580	1685	585	1740	590	1795
GR	594	1900								
NC	.10	.10	.06							
QT	7	5065	5065	5065	5065	2200	4025	8275		
ET		9.1	9.1	9.1	9.1	9.1	9.1		2035	2110
X1	5770	22	2035	2110	660	660	660			
GR	600.0	1555	595.0	1615	590	1715	586.2	1800	583.6	1870
GR	579.0	1900	575.4	2000	577.2	2035	569.2	2037	569.5	2050
GR	570.5	2060	570.6	2070	570.0	2080	569.9	2090	569.0	2093
GR	569.8	2100	576.9	2110	585.1	2200	590	2300	590.9	2400
GR	595.4	2500	597.1	2600						
ET		3.11	2049	2094						
X1	5810	22	2050	2093	40	40	40			
X3	10							586.0	586.0	
GR	600	1555	595.0	1615	590	1715	586.2	1800	583.6	1870
GR	579.0	1900	575.4	2000	577.2	2035	576.7	2050	569.5	2050
GR	570.5	2060	570.6	2070	570.0	2080	569.9	2090	569.0	2093
GR	576.7	2093	576.9	2110	585.1	2200	590	2300	590.9	2400
GR	595.4	2500	597.1	2600						

SB	1.25	1.62	2.5		43	3.0	520	0	567.7	567.0
ET		3.11	2049	2094						
X1	5867	19	2050	2093	57	57	57			
X2			1	580.7	586.0					
X3	10							586.3	586.3	
BT	13	1750	599.5		1850	591.7		1905	586.5	
BT	2000	586.1		2050	586.0		2050	586.0	580.7	2093
BT	586.0	580.7	2093	586.0		2200	586.3		2260	586.8
BT		2315	590		2395	595		2510	600	
GR	599.5	1750	591.7	1850	586.5	1905	582.2	1950	576.0	2050
GR	569.5	2050	570.5	2060	570.6	2070	570.0	2080	569.9	2090
GR	569.0	2093	575.2	2093	576.3	2150	580	2170	585	2230
GR	586.8	2260	590	2315	595	2395	600	2510		
QT	7	4760	4760	4760	4760	2070	3780	7790		
ET		3.11	2025	2135	9.1	9.1	9.1		1990	2155
X1	5930	19	2055	2081	83	33	63			
GR	607.0	1590	603.5	1650	599.5	1750	591.7	1850	582.2	1950
GR	576.0	2050	573.9	2055	570.2	2058	569.4	2068	569.3	2078
GR	572.3	2081	575.0	2085	576.3	2150	580	2170	585	2230
GR	586.8	2260	590	2315	595	2395	600	2510		
ET		3.11	2015	2155						
X1	6150	19	2055	2081	220	220	220			
GR	607.0	1590	603.5	1650	599.5	1750	591.7	1850	582.2	1950
GR	576.0	2050	574.7	2055	571.0	2058	570.2	2068	570.1	2078
GR	573.1	2081	575.0	2085	576.3	2150	580	2170	585	2230
GR	586.8	2260	590	2315	595	2395	600	2510		
NC	.09	.10	.06							
ET		3.11	1170	1330						
X1	7610	12	1257	1285	1460	1460	1460			
GR	610	1020	599.4	1100	577.6	1200	577.4	1257	572.2	1259
GR	572.2	1271	572.2	1283	576.7	1285	580.3	1300	594.7	1400
GR	605.6	1500	611.3	1600						
NC	.12	.11	.06							
ET		3.11	1145	1305						
X1	8310	15	1166	1190	700	700	700			
GR	607.8	1000	601.0	1069	595.2	1100	585.5	1147	576.5	1166
GR	572.3	1172	571.5	1180	572.3	1188	576.5	1190	576.6	1200
GR	577.6	1278	583.8	1300	589.6	1320	597.1	1400	605.9	1500
ET		3.11	1015	1255		9.1			1138	1218
X1	8500	18	1166	1190	190	190	190			
GR	605	875	600	925	595	955	590	975	585	1000
GR	580	1060	578	1085	576.5	1166	572.3	1172	571.5	1180
GR	572.3	1188	576.5	1190	580	1200	585	1225	588.4	1300
GR	594.6	1400	600.2	1500	604.5	1600				
ET		3.11	1000	1240						
X1	8550	18	1161	1206	50	50	50			
X3	10							585.0	585.0	
GR	605	875	600	925	595	955	590	975	585	1000
GR	580	1060	578	1085	576.7	1161	576.5	1165	571.6	1166
GR	571.6	1200	580.3	1203	581.0	1206	585	1225	588.4	1300
GR	594.6	1400	600.2	1500	604.5	1600				
SB	1.1	1.47	2.5		34	4.8	509	0.37	571.6	571.6

ET		3.11	980	1230						
X1	8569	18	1161	1206	19	19	19			
X2			1	586.5	587.7					
X3	10							587.7	587.9	
BT	14	785	605		835	600		863	595.4	
BT	900	592.5		1000	587.8		1100	587.5		1161
BT	587.7		1161	587.7	586.4	1206	587.9	586.5	1206	587.9
BT		1300	588.4		1400	594.6		1500	600.2	
BT	1600	604.5								
GR	605	785	600	835	595.4	863	590	885	585	915
GR	580	980	578	1005	576.7	1161	576.5	1165	571.6	1166
GR	571.6	1200	580.3	1203	581.0	1206	585	1225	588.4	1300
GR	594.6	1400	600.2	1500	604.5	1600				
NC	.10	.10	.06							
ET		3.11	960	1220		9.1			1125	1230
X1	8610	18	1166	1190	41	41	41			
GR	605	785	600	835	595.4	863	590	885	585	915
GR	580	980	578	1005	576.6	1166	572.4	1172	571.6	1180
GR	572.4	1188	576.6	1190	580	1200	585	1225	588.4	1300
GR	594.6	1400	600.2	1500	604.5	1600				
NC	.09	.11	.06							
ET		3.11	1520	1720						
X1	9910	19	1618	1650	1300	1300	1300			
GR	612.9	1000	606.8	1100	601.8	1200	598.3	1300	594.0	1400
GR	585.8	1500	581.6	1534	580.1	1600	579.0	1618	574.5	1621
GR	574.5	1634	574.5	1648	578.9	1650	580.7	1657	578.7	1700
GR	579.1	1730	588.5	1758	598.6	1800	608.3	1850		
QT	7	4620	4620	4620	4620	2000	3670	7565		
ET		3.11	1515	1695						
X1	10400	14	1618	1650	490	490	490			
GR	600	1375	595	1410	590	1455	585	1500	579.9	1618
GR	575.4	1621	575.4	1634	575.4	1648	579.8	1650	580	1680
GR	585.0	1710	590	1760	595	1870	600	1950		
NC	.10	.10	.06							
QT	7	3625	3625	3625	3625	1560	2870	5965		
ET		3.11	1415	1580						
X1	11140	16	1527	1548	740	740	740			
GR	610	1150	605	1245	601.1	1300	596.2	1359	591.0	1400
GR	581.3	1462	581.2	1500	581.3	1527	577.0	1529	576.8	1538
GR	576.7	1546	580.4	1548	581.4	1555	594.4	1600	606.8	1700
GR	613.1	1800								
ET		3.11	1185	1350						
X1	12770	15	1208	1230	1630	1630	1630			
GR	611.6	1000	602.8	1100	599.6	1135	584.4	1182	583.5	1200
GR	583.4	1208	578.9	1210	579.3	1219	578.5	1225	583.1	1230
GR	583.6	1300	583.7	1340	596.9	1400	604.1	1500	609.8	1600
NC	.11	.10	.06							
ET		3.11	1130	1270						
X1	13900	17	1208	1230	1130	1130	1130			
GR	610	900	605	960	600	1010	595	1055	590	1105
GR	586	1172	585.4	1208	580.9	1210	581.3	1219	580.5	1225
GR	585.1	1230	586	1260	590	1295	595	1335	600	1400

GR	605	1550	610	1620						
QT	7	3565	3565	3565	3565	1530	2825	5870		
ET		9.1	9.1	9.1	9.1	9.1	9.1		1641	1736
X1	14320	19	1678	1700	420	420	420			
GR	617.0	1000	610.9	1100	608.1	1200	604.7	1300	599.2	1400
GR	594.7	1489	586.4	1600	586.1	1678	581.6	1680	582.0	1689
GR	581.2	1695	586.0	1700	595.2	1758	601.1	1900	602.6	2000
GR	604.3	2100	606.6	2200	611.3	2300	615.1	2400		
ET		9.11	9.11	9.11	9.11				1660	1725
X1	14365	22	1660	1725	45	45	45			
X3	10							595.1	595.1	
GR	617.0	1000	610.9	1100	608.1	1200	604.7	1300	600.8	1372
GR	599.2	1400	594.7	1489	586.4	1600	586.3	1660	586.3	1668
GR	581.3	1674	581.3	1713	589.5	1721	590.1	1725	595.2	1758
GR	595.7	1768	601.1	1900	602.6	2000	604.3	2100	606.6	2200
GR	611.3	2300	615.1	2400						
SB	0.95	1.44	2.7		39	1.44	639	1.04	581.3	581.3
ET		9.11	9.11	9.11	9.11				1660	1725
X1	14385	19	1660	1725	21	21	21			
X2			1	593.8	595.1					
X3	10							595.1	595.1	
BT	19	1000	617.0		1100	612.2		1200	608.2	
BT	1295	605		1450	600		1520	596.2		1595
BT	595.2		1600	595.1		1660	595.2		1660	595.2
BT	593.8	1725	595.2	593.7	1725	595.2		1768	595.7	
BT	1900	599.2		2000	601.5		2100	603.8		2200
BT	605.9		2300	611.3		2400	615.1			
GR	617	1000	610.9	1100	608.1	1200	605	1295	600	1450
GR	596.2	1520	595	1545	590	1590	586.4	1623	586.3	1660
GR	586.3	1668	581.3	1674	581.3	1713	586.3	1717	586.7	1725
GR	590	1800	595	1910	600	2000	605	2220		
ET		3.11	1635	1735	9.1	9.1	9.1		1627	1772
X1	14435	18	1675	1707	50	50	50			
GR	617	1000	610.9	1100	608.1	1200	605	1295	600	1450
GR	595	1545	590	1590	586.6	1623	585.4	1675	581.9	1680
GR	581.9	1690	581.5	1701	586.3	1707	586.7	1725	590	1800
GR	595	1910	600	2000	605	2220				
NC	.11	.09	.06							
QT	7	3045	3045	3045	3045	1300	2410	5030		
ET		3.11	1300	1570						
X1	14880	25	1366	1398	445	445	445			
GR	614.2	1000	612.9	1040	608.6	1053	610.5	1077	608.1	1100
GR	608.5	1121	591.4	1280	589.5	1300	586.1	1366	582.6	1371
GR	582.6	1381	582.2	1392	587.0	1398	586.8	1400	586.8	1500
GR	588.2	1600	593.6	1700	597.9	1800	608.3	1900	605.5	2000
GR	606.9	2100	608.2	2200	611.6	2300	616.2	2400	618.7	2450
ET		3.11	1345	1555						
X1	15580	15	1366	1398	700	550	700			
GR	615	1240	610	1285	605	1300	600	1315	595	1335
GR	590	1350	588.1	1366	584.6	1371	584.6	1381	584.2	1392
GR	589.0	1398	590	1520	595	1580	600	1625	606	1780
NC	.10	.10	.06							

ET	3.11	1367	1497						
X1 16030	18	1442	1464	450	450	450			
GR 621.3	1000	617.3	1100	611.9	1200	602.9	1300	594.4	1400
GR 589.8	1429	589.3	1442	585.5	1445	586.0	1451	585.9	1457
GR 589.1	1464	597.3	1500	597.6	1508	602.3	1520	610.1	1550
GR 611.5	1600	618.5	1700	620.1	1750				
ET	3.11	1265	1415						
X1 17790	21	1275	1300	1760	1760	1760			
GR 626.1	1000	622.4	1100	622.3	1152	619.5	1200	618.8	1220
GR 593.8	1265	593.1	1275	589.5	1277	589.8	1289	589.5	1299
GR 592.0	1300	593.4	1317	593.2	1400	593.1	1447	603.4	1500
GR 609.6	1565	610.2	1600	612.3	1700	614.9	1800	617.0	1900
GR 620.4	1990								
NC .09	.11	.06							
ET	3.11	2030	2210						
X1 19430	18	2067	2096	1640	1640	1640			
GR 625	1245	620	1370	615	1570	610	1895	605	1980
GR 600	2020	596	2053	595.6	2067	591.8	2070	591.1	2080
GR 592.0	2092	595.8	2096	597.0	2100	600.2	2200	605.7	2300
GR 612.3	2400	618.1	2500	622.8	2600				
ET	3.11	2050	2220						
X1 20230	17	2067	2096	800	800	800			
GR 625	1210	620	1320	615	1740	610	1890	605	1990
GR 600	2050	597.3	2067	593.5	2070	592.8	2080	593.7	2092
GR 597.5	2096	600	2230	605	2275	610	2330	615	2365
GR 620	2400	625	2440						
QT 7	2910	2910	2910	2910	1240	2300	4810		
NC .10	.11	.06							
ET	3.11	1885	2145						
X1 20970	17	2067	2096	600	740	740			
GR 625	960	620	1075	615	1490	610	1580	605	1700
GR 600	1940	598.5	2067	594.7	2070	594.0	2080	594.9	2092
GR 598.7	2096	600	2155	605	2195	610	2235	615	2260
GR 620	2300	625	2350						
QT 7	2335	2335	2335	2335	990	1840	3880		
NH 5	.10	1294	.06	1306	.10	1374	.06	1398	.11
NH 1525									
ET	3.11	1178	1413						
X1 21030	21	1374	1398	10	150	60			
GR 620	385	615	795	610	885	605	1005	600	1245
GR 596.0	1294	595.1	1295	594.1	1300	595.1	1305	597.1	1306
GR 599.7	1346	599.3	1374	595.7	1376	594.7	1388	595.7	1396
GR 599.0	1398	600	1405	600	1425	605	1450	610	1480
GR 615	1525								
NH 5	.10	1294	.06	1306	.10	1370	.06	1398	.11
NH 1525									
ET	3.11	1200	1425						
X1 21075	19	1370	1398	45	45	165			
GR 620	385	615	795	610	885	605	1005	600	1245
GR 601.8	1294	600.9	1295	599.9	1300	600.9	1305	602.9	1306
GR 603.1	1370	599.4	1372	598.4	1388	599.4	1396	602.8	1398
GR 600	1425	605	1450	610	1480	615	1525		

NC	.10	.11	.06							
ET		3.11	1160	1350						
X1	21085	14	1253	1348	10	10	10			
GR	620	340	615	780	610	885	605	1000	600.8	1200
GR	601.3	1253	599.3	1255	598.0	1300	599.7	1346	601.0	1348
GR	605	1365	610	1385	615	1425	620	1485		
ET		3.11	1200	1360						
X1	21250	13	1253	1348	135	135	135			
GR	620	500	615	850	608.9	1000	603.7	1100	600.8	1200
GR	601.3	1253	599.3	1255	598.0	1300	599.7	1346	601.0	1348
GR	604.8	1400	617.3	1500	620.9	1550				
ET		3.11	1210	1360						
X1	21270	15	1288	1313	20	20	20			
GR	620	500	615	850	608.9	1000	603.7	1100	600.8	1200
GR	601.3	1253	600.7	1288	599.5	1293	598.0	1300	599.1	1310
GR	600.7	1313	601.0	1348	604.8	1400	617.3	1500	620.9	1550
ET		3.11	1595	1755						
X1	21750	23	1652	1677	480	480	480			
GR	625.5	1000	623.4	1100	621.0	1200	618.1	1300	610.1	1400
GR	605.9	1500	604.9	1540	603.2	1576	601.5	1600	600.7	1652
GR	599.5	1657	598.0	1664	599.1	1674	600.7	1677	602.4	1700
GR	602.6	1785	604.5	1800	610.3	1826	619.7	1900	621.4	2000
GR	620.8	2100	624.0	2200	629.6	2300				
NC	.10	.10	.06							
ET		3.11	1602	1742						
X1	22440	16	1652	1677	690	690	690			
GR	628.5	1245	622.0	1350	618.5	1435	613.3	1530	604.7	1600
GR	603.9	1652	602.7	1657	601.2	1664	602.3	1674	603.9	1677
GR	605.6	1700	605.8	1765	614.0	1795	618.0	1830	622.5	1870
GR	627.5	1920								
ET		3.11	1645	1765	9.1	9.1	9.1		1620	1770
X1	22970	16	1682	1707	530	530	530			
GR	632.7	1130	623.7	1270	617.5	1430	612.5	1540	607	1610
GR	606.5	1682	605.3	1687	603.8	1694	604.9	1704	606.5	1707
GR	607.2	1792	613.0	1840	618.0	1880	621.0	1960	624.8	2050
GR	629.4	2230								
QT	7	2240	2240	2240	2240	950	1770	3735		
ET		9.1	9.1	9.1	9.1	9.1	9.1		1665	1725
X1	23110	16	1682	1707	210	90	140			
GR	632.7	1155	622.0	1340	617.5	1470	612.5	1560	606.9	1630
GR	606.5	1682	605.8	1687	604.3	1694	605.4	1704	606.5	1707
GR	606.9	1755	612.6	1800	618.0	1870	621.0	1950	624.8	2050
GR	629.4	2230								
ET		9.11	9.11	9.11	9.11				1679	1707
X1	23160	15	1679	1707	50	50	50			
X3	10							612.6	612.6	
GR	632.7	1155	622.0	1340	617.5	1470	612.5	1560	606.9	1630
GR	606.5	1679	604.7	1679	604.7	1707	606.5	1707	606.9	1755
GR	612.6	1800	618.0	1870	621.0	1950	624.8	2050	629.4	2230
SB	1.25	1.57	2.7		28	1	189	0	604.6	604.7
ET		9.11	9.11	9.11	9.11				1679	1707
X1	23201	20	1679	1707	41	41	41			

X2		1	611.6	615.2					
X3	10						615.2	615.5	
BT	18	1000	636.6		1100	631.7	1200	627.8	
BT	1300	624.0		1400	623.4		1500	620.4	1575
BT	615.9		1600	615.5		1679	615.2		1679
BT	611.6	1707	615.5	611.6	1707	615.5		1800	616.6
BT	1857	617.8		1900	621.7		2000	626.8	
BT	625.6		2200	629.4					2100
GR	636.6	1000	631.7	1100	627.8	1200	624.0	1300	623.4
GR	620.4	1500	615.9	1575	614.1	1600	606.8	1648	606.5
GR	604.6	1679	604.6	1707	606.5	1707	606.9	1755	612.6
GR	617.8	1857	621.7	1900	626.8	2000	625.6	2100	629.4
NC	.11	.11	.06						2200
ET		9.1	9.1	9.1	9.1	9.1			1635
X1	23245	19	1682	1707	44	44			1755
GR	636.6	1000	631.7	1100	627.8	1200	624.0	1300	623.4
GR	620.4	1500	614.1	1600	606.8	1648	606.6	1682	605.9
GR	604.4	1694	605.5	1704	606.6	1707	606.9	1755	612.6
GR	621.7	1900	626.8	2000	625.6	2100	629.4	2200	
ET		3.11	1610	1790					
X1	23335				90	90	90		0.1
QT	7	2145	2145	2145	2145	905	1690	3570	
ET		3.11	1745	1945					
X1	25340	19	1764	1785	2005	2005	2005		
GR	640.9	1000	637.0	1100	631.0	1200	625.5	1300	620.0
GR	615	1540	610.9	1730	610.1	1764	606.7	1767	607.0
GR	607.3	1778	609.9	1785	609.7	1800	609.7	1900	609.9
GR	615	2050	625	2115	634.5	2200	644.3	2300	2000
NC	.10	.11	.06						
QT	7	1570	1570	1570	1570	655	1235	2635	
ET		3.11	1600	1850					
X1	26070	21	1642	1658	730	640	730		
GR	640.6	1000	637.7	1100	636.3	1120	632.5	1200	625.9
GR	620.8	1400	618.3	1500	616.9	1520	612.3	1600	611.0
GR	607.7	1645	608.1	1650	608.0	1654	610.1	1658	610.7
GR	612.0	1800	613.8	1900	625	1990	630	2055	635
GR	640	2215							2150
NC	.09	.10	.06						
QT	7	1500	1500	1500	1500	625	1180	2520	
ET		3.11	1530	1730					
X1	26840	17	1642	1658	600	770	770		
GR	640.6	950	637.7	1100	632	1200	625	1285	620
GR	615	1490	613.1	1642	609.8	1645	610.2	1650	610.1
GR	612.2	1658	614	1750	615	1760	620	1795	625
GR	630	1910	635	2070					1835
ET		3.11	1327	1427					
X1	27770	15	1353	1371	930	930	930		
GR	635	900	630	1000	625	1200	620	1270	615
GR	614.6	1349	613.0	1353	612.9	1358	613.3	1364	614.0
GR	615	1430	620	1460	625	1535	630	1605	635
ET		3.11	1330	1400					1635
X1	27950	14	1353	1371	180	180	180		

GR	638.8	1000	631.9	1100	630.3	1200	629.7	1271	625.4	1300
GR	616.9	1335	615.0	1349	613.4	1353	613.3	1358	613.7	1364
GR	614.4	1371	618.8	1400	635.4	1500	643.3	1539		

EJ

T1		FPMS BR FIA STUDY		TRAVIS CR		ALAMANCE CO, NC		BLW		
T2		50 YR NATURAL								
T3		TRAVIS CR								
J1		7							575.0	
J2	2		-1							

T1		FPMS BR FIA STUDY		TRAVIS CR		ALAMANCE CO., NC		BLW		
T2		100 YR NATURAL								
T3		TRAVIS CR								
J1		5							575.7	
J2	3		-1							

T1		FPMS BR FIA STUDY		TRAVIS CR		ALAMANCE CO., NC		BLW		
T2		500 YR NATURAL								
T3		TRAVIS CR								
J1		8							577.6	
J2	15		-1							

ER



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map flood hazard areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://FRIS.NC.GOV/FRIS](http://FRIS.NC.GOV/FRIS)

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE)
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
 - 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee See Notes Zone X
- OTHER AREAS OF FLOOD HAZARD**
 - Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- OTHER AREAS**
 - Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall
 - Non-accredited Levee, Dike, or Floodwall
- GENERAL STRUCTURES**
 - North Carolina Geodetic Survey bench mark
 - National Geodetic Survey bench mark
 - Contractor Est. NCFM Survey bench mark
 - Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
 - Coastal Transect
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
 - Limit of Study
 - Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at <http://www.ncfloodmaps.com> or contact the FEMA Map Service Center.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These maps are ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the North Carolina Floodplain Mapping Program (NCFMP). The source of this information can be determined from the metadata available in the digital FLOOD database and in the Technical Support Data Notebook (TSDN).

ACCREDITED LEVEE NOTES TO USERS: If an accredited levee note appears on this panel check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/nfip/index.shtm>.

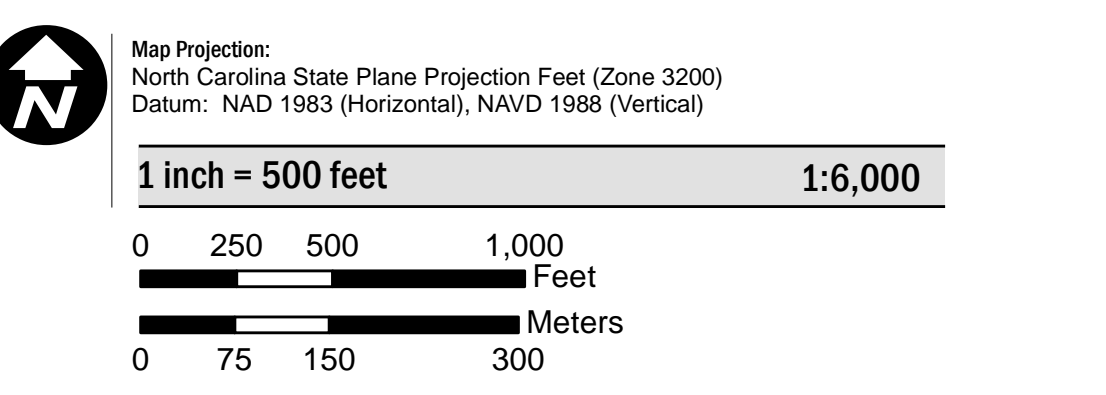
PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS: If a Provisionally Accredited Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicates the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/nfip/index.shtm>.

LIMIT OF MODERATE WAVE ACTION NOTES TO USERS: For some coastal flooding zones the AE Zone category has been divided by a Limit of Moderate Wave Action (LMWA). The LMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE, Zone and the LMWA (or between the shoreline and the LMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) NOTE
This map may include approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) indicated on the map. For more information see http://www.fws.gov/habitatconservation/coastal_barrier.html, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-WILD.

CBRS Area Otherwise Protected Area

SCALE



PANEL LOCATOR

ROCKINGHAM COUNTY	8940	8950	8980	9900	9910	9920
	8849 8859 8869 8879		8888	9806		9828
	8848 8858 8868 8878					
	8847 8857 8867 8877		8887 8897	9807 9817		9827
	8846 8856 8866 8876		8886 8896	9806 9816		9826
	8845 8855 8865 8875		8885 8895	9805 9815		9825
	8844 8854 8864 8874		8884 8894	9804 9814		9824
	8843 8853 8863 8873		8883 8893	9803 9813		9823
	8842 8852 8862 8872		8882 8892	9802 9812		9822
	8841 8851 8861 8871		8881 8891	9801 9811		9821
	8840 8850 8860 8870		8880 8890	9800 9810		9820
	8839 8849 8859 8869		8879 8889	9799 9809		9819
	8838 8848 8858 8868		8878 8888	9798 9808		9818
	8837 8847 8857 8867		8877 8887	9797 9807		9817
	8836 8846 8856 8866		8876 8886	9796 9806		9816
	8835 8845 8855 8865		8875 8885	9795 9805		9815
	8834 8844 8854 8864		8874 8884	9794 9804		9814
	8833 8843 8853 8863		8873 8883	9793 9803		9813
	8832 8842 8852 8862		8872 8882	9792 9802		9812
	8831 8841 8851 8861		8871 8881	9791 9801		9811
	8830 8840 8850 8860		8870 8880	9790 9800		9810
	8829 8839 8849 8859		8869 8879	9789 9799		9809
	8828 8838 8848 8858		8868 8878	9788 9798		9808
	8827 8837 8847 8857		8867 8877	9787 9797		9807
	8826 8836 8846 8856		8866 8876	9786 9796		9806
	8825 8835 8845 8855		8865 8875	9785 9795		9805
	8824 8834 8844 8854		8864 8874	9784 9794		9804
	8823 8833 8843 8853		8863 8873	9783 9793		9803
	8822 8832 8842 8852		8862 8872	9782 9792		9802
	8821 8831 8841 8851		8861 8871	9781 9791		9801
	8820 8830 8840 8850		8860 8870	9780 9790		9800
	8819 8829 8839 8849		8859 8869	9779 9789		9799
	8818 8828 8838 8848		8858 8868	9778 9788		9798
	8817 8827 8837 8847		8857 8867	9777 9787		9797
	8816 8826 8836 8846		8856 8866	9776 9786		9796
	8815 8825 8835 8845		8855 8865	9775 9785		9795
	8814 8824 8834 8844		8854 8864	9774 9784		9794
	8813 8823 8833 8843		8853 8863	9773 9783		9793
	8812 8822 8832 8842		8852 8862	9772 9782		9792
	8811 8821 8831 8841		8851 8861	9771 9781		9791
	8810 8820 8830 8840		8850 8860	9770 9780		9790
	8809 8819 8829 8839		8849 8859	9769 9779		9789
	8808 8818 8828 8838		8848 8858	9768 9778		9788
	8807 8817 8827 8837		8847 8857	9767 9777		9787
	8806 8816 8826 8836		8846 8856	9766 9776		9786
	8805 8815 8825 8835		8845 8855	9765 9775		9785
	8804 8814 8824 8834		8844 8854	9764 9774		9784
	8803 8813 8823 8833		8843 8853	9763 9773		9783
	8802 8812 8822 8832		8842 8852	9762 9772		9782
	8801 8811 8821 8831		8841 8851	9761 9771		9781
	8800 8810 8820 8830		8840 8850	9760 9770		9780
	8799 8809 8819 8829		8839 8849	9759 9769		9779
	8798 8808 8818 8828		8838 8848	9758 9768		9778
	8797 8807 8817 8827		8837 8847	9757 9767		9777
	8796 8806 8816 8826		8836 8846	9756 9766		9776
	8795 8805 8815 8825		8835 8845	9755 9765		9775
	8794 8804 8814 8824		8834 8844	9754 9764		9774
	8793 8803 8813 8823		8833 8843	9753 9763		9773
	8792 8802 8812 8822		8832 8842	9752 9762		9772
	8791 8801 8811 8821		8831 8841	9751 9761		9771
	8790 8800 8810 8820		8830 8840	9750 9760		9770
	8789 8799 8809 8819		8829 8839	9749 9759		9769
	8788 8798 8808 8818		8828 8838	9748 9758		9768
	8787 8797 8807 8817		8827 8837	9747 9757		9767
	8786 8796 8806 8816		8826 8836	9746 9756		9766
	8785 8795 8805 8815		8825 8835	9745 9755		9765
	8784 8794 8804 8814		8824 8834	9744 9754		9764
	8783 8793 8803 8813		8823 8833	9743 9753		9763
	8782 8792 8802 8812		8822 8832	9742 9752		9762
	8781 8791 8801 8811		8821 8831	9741 9751		9761
	8780 8790 8800 8810		8820 8830	9740 9750		9760
	8779 8789 8799 8809		8819 8829	9739 9749		9759
	8778 8788 8798 8808		8818 8828	9738 9748		9758
	8777 8787 8797 8807		8817 8827	9737 9747		9757
	8776 8786 8796 8806		8816 8826	9736 9746		9756
	8775 8785 8795 8805		8815 8825	9735 9745		9755
	8774 8784 8794 8804		8814 8824	9734 9744		9754
	8773 8783 8793 8803		8813 8823	9733 9743		9753
	8772 8782 8792 8802		8812 8822	9732 9742		9752
	8771 8781 8791 8801		8811 8821	9731 9741		9751
	8770 8780 8790 8800		8810 8820	9730 9740		9750
	8769 8779 8789 8799		8809 8819	9729 9739		9749
	8768 8778 8788 8798		8808 8818	9728 9738		9748
	8767 8777 8787 8797		8807 8817	9727 9737		9747
	8766 8776 8786 8796		8806 8816	9726 9736		9746
	8765 8775 8785 8795		8805 8815	9725 9735		9745
	8764 8774 8784 8794		8804 8814	9724 9734		9744
	8763 8773 8783 8793		8803 8813	9723 9733		9743
	8762 8772 8782 8792		8802 8812	9722 9732		9742
	8761 8771 8781 8791		8801 8811	9721 9731		9741
	8760 8770 8780 8790		8800 8810	9720 9730		9740
	8759 8769 8779 8789		8799 8809	9719 9729		9739
	8758 8768 8778 8788		8798 8808	9718 9728		9738
	8757 8767 8777 8787		8797 8807	9717 9727		9737
	8756 8766 8776 8786		8796 8806	9716 9726		9736
	8755 8765 8775 8785		8795 8805	9715 9725		9735
	8754 8764 8774 8784		8794 8804	9714 9724		9734
	8753 8763 8773 8783		8793 8803	9713 9723		9733
	8752 8762 8772 8782		8792 8802	9712 9722		9732
	8751 8761 8771 8781		8791 8801	9711 9721		9731
	8750 8760 8770 8780		8790 8800	9710 9720		9730
	8749 8759 8769 8779		8789 8799	9709 9719		9729
	8748 8758 8768 8778		8788 8798	9708 9718		9728
	8747 8757 8767 8777		8787 8797	9707 9717		9727
	8746 8756 8766 8776		8786 8796	9706 9716		9726
	8745 8755 8765 8775		8785 8795	9705 9715		9725
	8744 8754 8764 8774		8784 8794	9704 9714		9724
	8743 8753 8763 8773		8783 8793	9703 9713		9723
	8742 8752 8762 8772		8782 8792	9702 9712		9722
	8741 8751 8761 8771		8781 8791	9701 9711		9721
	8740 8750 8760 8770		8780 8790	9700 9710		9720
	8739 8749 8759 8769		8779 8789	9699 9709		9719
	8738 8748 8758 8768		8778 8788	9698 9708		9718
	8737 8747 8757 8767		8777 8787	9697 9707		9717
	8736 8746 8756 8766		8776 8786	9696 9706		9716

FLOOD INSURANCE STUDY

A Report of Flood Hazards in
**ALAMANCE COUNTY,
NORTH CAROLINA**
AND INCORPORATED AREAS



Community Name	Community Number	River Basin
Alamance County (Unincorporated Areas)	370001	Cape Fear
Alamance, Village of	370457	Cape Fear
Burlington, City of	370002	Cape Fear
Elon, Town of	370411	Cape Fear
Gibsonville, Town of	370387	Cape Fear
Graham, City of	370283	Cape Fear
Green Level, Town of	370482	Cape Fear
Haw River, Town of	370003	Cape Fear
Mebane, City of	370390	Cape Fear
Ossipee, Town of	370689	Cape Fear
Swepsonville, Town of	370073	Cape Fear



VOLUME 1 OF 2

September 6, 2006

**Federal Emergency Management Agency
State of North Carolina**

**Flood Insurance Study Number
37001CV001A**

www.fema.gov and www.ncfloodmaps.com



Section 4.0 – Area Studied

Table 5—Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communities
	From	To	
McAdams Creek	Confluence with East Back Creek (Overflow Path)	Approximately 0.6 mile upstream of confluence of McAdams Creek Tributary	City of Mebane, Alamance County (Unincorporated Areas)
Meadow Creek	Confluence with Haw River	Approximately 110 feet upstream of NC 54	Alamance County (Unincorporated Areas)
Mill Creek	Confluence with Graham-Mebane Lake	Approximately 100 feet upstream of the confluence of Lake Michael Tributary	City of Mebane, Alamance County (Unincorporated Areas)
Otter Creek	Confluence with Graham-Mebane Lake	Approximately 50 feet upstream of Mebane-Rogers Road	Town of Green Level, Alamance County (Unincorporated Areas)
Reedy Fork	Confluence with Haw River	Alamance/Guilford County boundary	Alamance County (Unincorporated Areas), Town of Ossipee
Rock Creek	Confluence with Stinking Quarter Creek	Mill Road	Alamance County (Unincorporated Areas)
Servis Creek	Confluence with Haw River	Approximately 1,630 feet downstream of Burch Bridge Road	City of Burlington, Alamance County (Unincorporated Areas)
Servis Creek Tributary A	Confluence with Servis Creek	Approximately 150 feet upstream of North Beaumont Avenue	City of Burlington, Alamance County (Unincorporated Areas)
Staley Creek	Confluence with Servis Creek	Approximately 100 feet upstream of Rauhut Street	City of Burlington, Alamance County (Unincorporated Areas)
Stinking Quarter Creek*	Confluence with Big Alamance Creek	Approximately 350 feet upstream of confluence of Rock Creek	Alamance County (Unincorporated Areas)
Stony Creek	Confluence with Haw River	Approximately 1,300 feet upstream of Stoney Creek Church Road	Alamance County (Unincorporated Areas)
Tickle Creek	Confluence with Travis Creek	Approximately 0.5 mile upstream of Gibsonville-Ossipee Road	Alamance County (Unincorporated Areas)
Town Branch	Confluence with Haw River	Approximately 1,050 feet upstream of Interstate 40/85	City of Graham, Alamance County (Unincorporated Areas)
Travis Creek	Confluence with Haw River	Approximately 1,000 feet upstream of confluence of Tributary A to Travis Creek	Alamance County (Unincorporated Areas)
Tributary A to Haw Creek	Confluence with Haw Creek	Approximately 75 feet upstream of Jones Drive	Alamance County (Unincorporated Areas)

Section 5.0 – Engineering Methods

Table 7—Summary of Discharges

Flooding Source	Location	Drainage Area (square miles)	Discharges (cfs)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Travis Creek	At mouth	15.7	2,245	4,095	5,155	8,420
	Below confluence of Tickle Creek	13.2	2,005	3,670	4,620	7,565
	Above confluence of Tickle Creek	9.0	1,560	2,870	3,625	5,965
	Above Tributary, approximately 150 feet upstream of State Route 1504 (Elon-Ossipee Road)	6.9	1,300	2,410	3,045	5,030
	At State Route 1500 (Gibsonville Ossipee Road)	4.0	905	1,690	2,145	3,572
	At Guilford County boundary	2.3	625	1,180	1,500	2,515
Travis Creek Tributary 2	At confluence with Travis Creek	2.0	*	*	1,400	*
	Approximately 1,400 feet downstream of Manning Avenue (SR 1503)	0.6	*	*	761	*
Tributary A to Haw Creek	At mouth	5.5	1,125	2,090	2,645	4,390
	At Jones Drive	4.9	1,045	1,945	2,460	4,090
	Approximately 220 feet upstream of Jones Drive	4.9	*	*	2,320	*
	Approximately 0.7 mile upstream of Jones Drive	2.6	*	*	1,570	*
Tributary A to Travis Creek	At mouth	1.5	480	915	1,170	1,970
	At Guilford County boundary	1.4	455	870	1,110	1,875

FLOODING SOURCE		FLOODWAY				BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE	
Travis Creek									
001	120	200	2,111	2.4	583.8	575.5 ²	575.5	0.0	
009	850	180	1,875	2.7	583.8	575.7 ²	575.9	0.2	
010	1,020	120	1,476	3.5	583.8	576.3 ²	576.5	0.2	
017	1,650	170	1,659	3.1	583.8	577.0 ²	577.3	0.3	
028	2,825	180	1,712	3.0	583.8	578.5 ²	579.1	0.6	
051	5,110	150	1,585	3.2	583.8	582.4 ²	582.9	0.5	
058	5,770	75	1,112	4.6	583.8	583.0 ²	583.7	0.7	
062	6,150	140	1,668	2.9	585.5	585.5	586.2	0.7	
076	7,610	160	1,643	2.9	586.9	586.9	587.8	0.9	
083	8,310	160	1,854	2.6	587.8	587.8	588.5	0.7	
099	9,910	200	2,249	2.1	589.3	589.3	589.9	0.6	
111	11,140	165	1,537	2.4	590.2	590.2	590.8	0.6	
128	12,770	165	1,668	2.2	591.9	591.9	592.4	0.5	
139	13,900	140	1,246	2.9	593.1	593.1	593.7	0.6	
143	14,320	95	854	4.2	593.8	593.8	594.5	0.7	
149	14,880	270	2,634	1.2	595.1	595.1	595.7	0.6	
156	15,580	210	1,581	1.9	595.3	595.3	595.9	0.6	
160	16,030	130	652	4.7	595.7	595.7	596.2	0.5	
178	17,790	150	1,299	2.3	599.8	599.8	600.5	0.7	
194	19,430	180	1,132	2.7	601.9	601.9	602.7	0.8	
210	21,030	235	1,672	1.4	604.5	604.5	605.1	0.6	
211	21,085	190	1,123	2.1	604.5	604.5	605.1	0.6	
213	21,250	160	1,000	2.3	604.6	604.6	605.2	0.6	

¹Feet above mouth

²Elevation computed without consideration of backwater effects from Haw River

FEDERAL EMERGENCY MANAGEMENT AGENCY

**ALAMANCE COUNTY, NC
AND INCORPORATED AREAS**

FLOODWAY DATA

TRAVIS CREEK

TABLE 13

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Travis Creek (continued)								
218	21,750 ¹	160	950	2.5	605.6	605.6	606.4	0.8
224	22,440 ¹	140	668	3.5	607.7	607.7	608.4	0.7
232	23,245 ¹	120	1,124	2.0	614.9	614.9	615.2	0.3
253	25,340 ¹	200	1,528	1.4	615.8	615.8	616.4	0.6
261	26,070 ¹	250	1,574	1.0	616.0	616.0	616.8	0.8
268	26,840 ¹	200	955	1.6	616.5	616.5	617.2	0.7
Tributary A to Haw Creek								
001	100 ¹	140	650	4.1	529.4	525.8 ⁴	526.4	0.6
016	1,600 ¹	105	595	4.4	532.7	532.7	533.5	0.8
036	3,600 ¹	105	525	5.0	543.2	543.2	543.3	0.1
039	3,900 ¹	130	735	3.6	544.5	544.5	545.1	0.6
045	4,516 ¹	170	1,450	1.7	551.1	551.1	551.6	0.5
Tributary A to Travis Creek								
001	100 ¹	120	321	3.6	616.0	613.9 ⁵	613.9	0.0
013	1,270 ¹	90	328	3.6	618.9	618.9	619.3	0.4
015	1,470 ¹	70	221	5.0	620.1	620.1	620.4	0.3
Tributary to Travis Creek								
010	1,019 ²	105 ³	612	2.9	607.2	607.2	608.2	1.0
011	1,111 ²	185	1,394	1.3	610.9	610.9	611.9	1.0
024	2,390 ²	65	441	4.0	613.1	613.1	614.0	0.9

¹Feet above mouth

²Feet above confluence with Travis Creek

³Value is inaccurate, as floodway has been adjusted in this area to match topographic-based Redelineation

⁴Elevation computed without consideration of backwater effects from Haw Creek

⁵Elevation computed without consideration of backwater effects from Travis Creek

FEDERAL EMERGENCY MANAGEMENT AGENCY

**ALAMANCE COUNTY, NC
AND INCORPORATED AREAS**

TABLE 13

FLOODWAY DATA

**TRAVIS CREEK – TRIBUTARY A TO HAW CREEK –
TRIBUTARY A TO TRAVIS CREEK – TRIBUTARY TO TRAVIS CREEK**

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	38	1	3	42	41	5	43	38	1
	53	21	22	54	4		200		
NC	.12	.12	.06	.2	.4				
QT	7	13250	13250	13250	13250	10340	12200	16520	
** TOPO SEC ON HAW R ; MOD BY SEC "AA"; NON-EFF FLOW (NEF) **									
X1	274870	24	1430	1548					
GR	590	1120	585	1175	580	1220	575	1260	570
1345									
GR	569.7	1370	569.6	1395	569.1	1430	557.5	1450	554.2
1462									
GR	554.1	1472	554.0	1502	555.3	1512	554.4	1522	554.7
1532									
GR	557.3	1542	570.6	1548	572.0	1560	573.5	1585	576.0
1610									
GR	579	1660	581.5	1755	585	1850	590	1935	
NC	.09	.11	.06						
QT	7	5150	5150	5150	5150	2245	4100	8420	
ET		3.11	1650	1850					
** SURVEY SEC ATC-1 **									
X1	120	20	1806	1840	330	270	230		
GR	585.3	1000	580.6	1100	576.9	1200	573.1	1300	571.3
1400									
GR	572.5	1500	572.1	1600	568.6	1700	568.3	1715	566.0
1800									
GR	562.4	1806	556.2	1812	555.9	1825	556.6	1837	560.4
1840									
GR	563.8	1875	571.1	1900	583.0	1925	591.0	1975	592.7
2000									
** SEC ATC-2 **									
ET		9.1	9.1	9.1	9.1	9.1	9.1	9.1	1372
1552									
X1	850	24	1445	1478	730	730	730		
GR	591.0	1000	588.0	1100	584.3	1200	578.5	1300	575.4
1323									
GR	569.1	1370	567.4	1400	566.9	1434	563.9	1445	558.3
1447									
GR	557.1	1451	557.3	1463	557.2	1472	563.7	1478	566.5
1500									
GR	570.4	1519	579.0	1600	580.2	1639	583.8	1656	585.1
1700									
1									

GR	587.6	1800	591.6	1900	595.0	2000	597.5	2033	
ET 1998		9.1	9.1	9.1	9.1				1878
X1	935	** SR 1593 16	OSSIPEE RD; 1878	SEC ATC-3; 1998	OVBKS FM 85	ATC-2 ** 85			
X3	10						576.7	576.7	576.7
GR	588.0	1580	584.3	1680	578.5	1780	575.4	1803	569.1
1850 GR	567.5	1878	567.0	1904	558.0	1932	558.0	1943	570.4
1984 GR	570.4	1998	579.0	2080	580.2	2119	583.8	2136	585.1
2180 GR	587.6	2280							
SB	1.0	1.60	2.5		11	3.0	1050	3.24	558.0
558.0 ET 1998		9.11	9.11	9.11	9.11				1878
X1	961	** SR 1593 ; 18	OVBKS FM 1878	TOPO ** 1998	26	26	26		
X2			1	574.9	577.4				
X3	10						577.4	577.4	577.4
BT	12	1610	590		1710	585	1800	580	580
BT 1998	1820	578.3		1878	577.4		1878	578.1	574.9
BT 580	578.1	574.8	1998	577.4		2100	578.6		2120
BT		2295	585		2365	590			
GR	590	1610	585	1710	580	1800	578.3	1820	575
1865 GR	571.4	1878	570	1885	567.2	1894	567.0	1904	558.0
1932 GR	558.0	1943	570.0	1982	570.0	1998	575	2050	578.6
2100 GR	580	2120	585	2295	590	2365			
ET		3.11	1880	2000					
X1	1020	** TOPO SEC; 19	CHAN FM 1925	ATC-3 ** 1958	59	59	59	59	

	590	1610	585	1710	TRAVISFW_DUP 580	1800	575	1865	570
GR 1885	567.2	1894	566.9	1914	564.9	1925	559.3	1927	558.1
GR 1931	558.3	1943	558.2	1952	564.7	1958	566.5	1980	570
GR 2000	575	2050	580	2120	585	2295	590	2365	
NC	.10	.12	.06						
ET	3.11	1108	1278						
X1	1650	** ATC-4 20	WITH NEF 1118	1148	630	630	630		
GR 1118	599.4	1000	590.9	1040	572.2	1100	568.7	1112	565.1
GR 1150	560.6	1120	560.3	1134	560.1	1145	567.0	1148	570.8
GR 1500	569.1	1200	569.7	1209	571.5	1300	574.9	1365	577.6
GR 1950	579.6	1600	582.8	1700	588.7	1800	596.2	1900	599.3
NC	.11	.11	.06						
ET	3.11	1460	1640						
X1	2825	** ATC-5 17	** 1585	1619	1175	1175	1175		
GR 1400	598.6	1000	594.5	1100	590.4	1200	584.9	1300	581.1
GR 1603	571.7	1500	571.3	1580	569.1	1585	564.2	1586	562.9
GR 1672	563.8	1614	568.3	1619	570.8	1624	570.7	1635	583.4
GR	587.0	1700	596.4	1800					
1	03NOV14	17:39:37							
PAGE	3								
ET	3.11	1525	1695						
X1	4540	** TOPO; 16	CHAN FM ATC-5 1585	** 1619	1715	1715	1717		
GR 1580	590	1010	585	1485	580	1500	575	1545	574
GR 1619	572.8	1585	567.9	1586	566.6	1603	567.5	1614	572.0
GR	574.5	1624	574.4	1635	575	1670	580	1720	585

SB	1.25	1.62	2.5	TRAVISFW_DUP 43	3.0	520	0	567.7
567.0 ET	3.11	2049	2094					
X1	5867	19	2050	2093	57	57		
X2		1	580.7	586.0				
X3	10						586.3	586.3
BT	13	1750	599.5	1850	591.7		1905	586.5
BT	2000	586.1	2050	586.0		2050	586.0	580.7
2093	586.0	580.7	2093	586.0	2200	586.3		2260
BT		2315	590	2395	595		2510	600
GR	599.5	1750	591.7	1850	1905	582.2	1950	576.0
2050	569.5	2050	570.5	2060	2070	570.0	2080	569.9
GR	2090	2093	575.2	2093	2150	580	2170	585
GR	586.8	2260	590	2315	2395	600	2510	
1								
03NOV14								
PAGE								
4								
17:39:37								
QT	7	4760	4760	4760	2070	3780	7790	
ET		3.11	2025	2135	9.1	9.1		1990
2155								
X1	5930	19	2055	2081	83	63		
GR	607.0	1590	603.5	1650	599.5	591.7	1850	582.2
1950	576.0	2050	573.9	2055	570.2	569.4	2068	569.3
GR	2078	2081	575.0	2085	576.3	580	2170	585
GR	572.3	2081	575.0	2085	576.3	580	2170	585
2230	586.8	2260	590	2315	595	600	2510	
GR								
ET		3.11	2015	2155				
X1	6150	19	2055	2081	220	220		
GR	607.0	1590	603.5	1650	599.5	591.7	1850	582.2
1950	576.0	2050	574.7	2055	571.0	570.2	2068	570.1
GR								

		TRAVISFW_DUP									
1000	580	1060	578	1085	576.7	1161	576.5	1165	571.6		
GR											
1166	571.6	1200	580.3	1203	581.0	1206	585	1225	588.4		
GR											
1300	594.6	1400	600.2	1500	604.5	1600					
GR											
1	03NOV14	17:39:37									
PAGE	5										
SB	1.1	1.47	2.5	34	4.8	509	0.37	571.6			
571.6											
ET		3.11	980	1230							
X1	8569	18	1161	1206	19	19					
X2		1	586.5	587.7							
X3	10							587.7	587.9		
BT	14	785	605	835	600			863	595.4		
BT	900	592.5		1000		1100		587.5			
1161											
BT	587.7		1161	587.7	1206	587.9		586.5	1206		
587.9											
BT		1300	588.4	1400	594.6			1500	600.2		
BT	1600	604.5									
GR	605	785	600	835	863	590		885	585		
915											
GR	580	980	578	1005	1161	576.5		1165	571.6		
1166											
GR	571.6	1200	580.3	1203	1206	585		1225	588.4		
1300											
GR	594.6	1400	600.2	1500	604.5	1600					
NC	.10	.10	.06								
ET		3.11	960	1220	9.1				1125		
1230											
X1	8610	18	1166	1190	41	41					
GR	605	785	600	835	595.4	863	590	885	585		
915											
GR	580	980	578	1005	576.6	1166	572.4	1172	571.6		
1180											
GR	572.4	1188	576.6	1190	580	1200	585	1225	588.4		
1300											
GR	594.6	1400	600.2	1500	604.5	1600					

NC	.09	.11	.06																
ET		3.11	1520	1720															
X1	9910	** ATC-12 ** 19	1618	1650	1300	1300	1300	1300											
GR	612.9	1000	606.8	1100	601.8	1200	598.3	1300											594.0
GR	585.8	1500	581.6	1534	580.1	1600	579.0	1618											574.5
GR	574.5	1634	574.5	1648	578.9	1650	580.7	1657											578.7
GR	579.1	1730	588.5	1758	598.6	1800	608.3	1850											
QT	7	4620	4620	4620	4620	2000	3670	7565											
ET		3.11	1515	1695															
X1	10400	** TOPO ** 14	1618	1650	490	490	490												
GR	600	1375	595	1410	590	1455	585	1500											579.9
GR	575.4	1621	575.4	1634	575.4	1648	579.8	1650											580
GR	585.0	1710	590	1760	595	1870	600	1950											
NC	.10	.10	.06																
QT	7	3625	3625	3625	3625	1560	2870	5965											
ET		3.11	1415	1580															
X1	11140	** ATC-13, MOD FOR NEF AT HIGHER ELEV LOB ** 16	1527	1548	740	740	740												
GR	610	1150	605	1245	601.1	1300	596.2	1359											591.0
GR	581.3	1462	581.2	1500	581.3	1527	577.0	1529											576.8
GR	576.7	1546	580.4	1548	581.4	1555	594.4	1600											606.8
GR	613.1	1800																	

X1	12770	** ATC-14 ** 15	1208	1230	1630	1630	1630	1630
GR	611.6	1000	602.8	1100	599.6	1135	584.4	1182
GR	583.4	1208	578.9	1210	579.3	1219	578.5	1225
GR	583.6	1300	583.7	1340	596.9	1400	604.1	1500
1600								609.8

NC	.11	.10	.06					
ET		3.11	1130	1270				

X1	13900	** TOPO WITH 17	CHAN FM 1208	ATC-14 ** 1230	1130	1130	1130	1130
GR	610	900	605	960	600	1010	595	1055
1105								590
GR	586	1172	585.4	1208	580.9	1210	581.3	1219
1225								580.5
GR	585.1	1230	586	1260	590	1295	595	1335
1400								600
GR	605	1550	610	1620				

QT	7	3565	3565	3565	1530	2825	5870	
ET		9.1	9.1	9.1	9.1	9.1	9.1	1641
1736								

X1	14320	** ATC-15; CHAN FM 19	ATC-14 ** 1678	1700	420	420	420	
GR	617.0	1000	610.9	1100	608.1	1200	604.7	1300
1400								599.2
GR	594.7	1489	586.4	1600	586.1	1678	581.6	1680
1689								582.0
GR	581.2	1695	586.0	1700	595.2	1758	601.1	1900
2000								602.6
GR	604.3	2100	606.6	2200	611.3	2300	615.1	2400

ET		9.11	9.11	9.11	9.11			1660
1725								

X1	14365	** SR 1504; SEC ATC-16 ** 22	1660	1725	45	45	45	
X3								595.1
GR	617.0	1000	610.9	1100	608.1	1200	604.7	1300
1372								600.8
GR	599.2	1400	594.7	1489	586.4	1600	586.3	1660
1668								586.3
GR	581.3	1674	581.3	1713	589.5	1721	590.1	1725
1758								595.2

GR	595.7	1768	601.1	1900	TRAVISFW_DUP	2000	604.3	2100	606.6
2200					602.6				
GR	611.3	2300	615.1	2400					
SB	0.95	1.44	2.7		39	1.44	639	1.04	581.3
581.3									
ET		9.11	9.11	9.11	9.11				1660
1725									
X1	14385	19	1660	1725	** SR 1504; OVBKS FM TOPO, WITH NEF **	21	21		
X2		1	593.8	595.1					
X3	10							595.1	595.1
BT	19	1000	617.0		1100	612.2		1200	608.2
BT	1295	605		1450	600		1520	596.2	
1595									
BT	595.2		1600	595.1		1660	595.2		1660
595.2									
BT	593.8	1725	595.2	593.7	1725	595.2		1768	595.7
BT	1900	599.2		2000	601.5		2100	603.8	
2200									
BT	605.9		2300	611.3		2400	615.1		
GR	617	1000	610.9	1100	608.1	1200	605	1295	600
1450									
GR	596.2	1520	595	1545	590	1590	586.4	1623	586.3
1660									
GR	586.3	1668	581.3	1674	581.3	1713	586.3	1717	586.7
1725									
GR	590	1800	595	1910	600	2000	605	2220	
1									
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ET	1772	3.11	1635	1735	9.1	9.1	9.1		1627
X1	14435	18	1675	1707	50	50	50		
GR	617	1000	610.9	1100	608.1	1200	605	1295	600
1450									
GR	595	1545	590	1590	586.6	1623	585.4	1675	581.9
1680									
GR	581.9	1690	581.5	1701	586.3	1707	586.7	1725	590
1800									
GR	595	1910	600	2000	605	2220			

GR	598.7	2096	600	2155	TRAVISFW_DUP 605	2195	610	2235	615
2260 GR	620	2300	625	2350					
QT	7	2335	2335	2335	2335	990	1840	3880	
NH .11 NH	5	.10	1294	.06	1306	.10	1374	.06	1398
ET		3.11	1178	1413					
X1	21030	21	1374	1398	10	150	60		
GR	620	385	615	795	610	885	605	1005	600
1245 GR	596.0	1294	595.1	1295	594.1	1300	595.1	1305	597.1
1306 GR	599.7	1346	599.3	1374	595.7	1376	594.7	1388	595.7
1396 GR	599.0	1398	600	1405	600	1425	605	1450	610
1480 GR	615	1525							
NH .11 NH	5	.10	1294	.06	1306	.10	1370	.06	1398
ET		3.11	1200	1425					
X1	21075	19	1370	1398	45	45	165		
GR	620	385	615	795	610	885	605	1005	600
1245 GR	601.8	1294	600.9	1295	599.9	1300	600.9	1305	602.9
1306 GR	603.1	1370	599.4	1372	598.4	1388	599.4	1396	602.8
1398 GR	600	1425	605	1450	610	1480	615	1525	
NC	.10	.11	.06						
ET		3.11	1160	1350					
X1	21085	14	1253	1348	10	10	10		
GR	620	340	615	780	610	885	605	1000	600.8
1200 GR	601.3	1253	599.3	1255	598.0	1300	599.7	1346	601.0
1348									

** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **

** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**

** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **

GR	605	1365	610	1385	TRAVISFW_DUP 615	1425	620	1485
1	03NOV14	17:39:37						
PAGE	9							
ET	21250	3.11	1200	1360				
X1	620	** SEC 20-A	EXTENDED ON	LOB **				
GR	601.3	13	1253	1348	135	135	135	
GR	604.8	500	615	850	608.9	1000	603.7	1100
GR	601.3	1253	599.3	1255	598.0	1300	599.7	1346
GR	604.8	1400	617.3	1500	620.9	1550		601.0
ET	21270	3.11	1210	1360				
X1	620	** SEC 20-A	W/CHAN FM	SEC 21 **				
GR	601.3	15	1288	1313	20	20	20	
GR	600.7	500	615	850	608.9	1000	603.7	1100
GR	601.3	1253	600.7	1288	599.5	1293	598.0	1300
GR	600.7	1313	601.0	1348	604.8	1400	617.3	1500
ET	21750	3.11	1595	1755				
X1	625.5	** SEC 21 **	1652	1677	480	480	480	
GR	605.9	23	623.4	1100	621.0	1200	618.1	1300
GR	599.5	1000	604.9	1540	603.2	1576	601.5	1600
GR	602.6	1500	598.0	1664	599.1	1674	600.7	1677
GR	620.8	1657	604.5	1800	610.3	1826	619.7	1900
GR	628.5	1785	624.0	2200	629.6	2300		621.4
NC	.10	2100						
ET	22440	.10	1602	1742				
X1	628.5	3.11	1620	1742				
GR	628.5	** TOPO,ADJ.	BASED ON	23;NR	OVBK & CHAN	FM 21; NEF	LOB **	
GR	628.5	16	1652	1677	690	690	690	
GR	628.5	1245	622.0	1350	618.5	1435	613.3	1530
GR	628.5	1245	622.0	1350	618.5	1435	613.3	1530

SB	1.25	1.57	2.7	9.11	9.11	9.11	9.11	9.11	TRAVISFW_DUP	1	189	0	604.6
604.7									28				
ET													1679
1707													
X1	23201	** SR 1500; 20	OVBKS FM SEC 23 ** 1679 1707	1	611.6	615.2	41	41	41				
X2													
X3	10												
BT	18	1000	636.6		1100	631.7		1500				615.2	615.5
BT	1300	624.0		1400	623.4							1200	627.8
1575													
BT	615.9		1600	615.5		1679		615.2					1679
615.2													
BT	611.6	1707	615.5	611.6	1707	615.5						1800	616.6
BT	1857	617.8		1900	621.7			2000				626.8	
2100													
BT	625.6		2200	629.4									
GR	636.6	1000	631.7	1100	627.8	1200		624.0				1300	623.4
1400													
GR	620.4	1500	615.9	1575	614.1	1600		606.8				1648	606.5
1679													
GR	604.6	1679	604.6	1707	606.5	1707		606.9				1755	612.6
1800													
GR	617.8	1857	621.7	1900	626.8	2000		625.6				2100	629.4
2200													
NC	.11	.11	.06										
ET													
1755		9.1	9.1	9.1	9.1	9.1		9.1					1635
X1	23245	** SEC 23; OVBK FM 21 ** 19	1682	1707	44	44		44					
GR	636.6	1000	631.7	1100	627.8	1200		624.0				1300	623.4
1400													
GR	620.4	1500	614.1	1600	606.8	1648		606.6				1682	605.9
1687													
GR	604.4	1694	605.5	1704	606.6	1707		606.9				1755	612.6
1800													
GR	621.7	1900	626.8	2000	625.6	2100		629.4				2200	
ET													
		3.11	1610	1790									
X1	23335	** PREVIOUS SEC TRANSFERRED **			90	90		90					0.1
QT	7	2145	2145	2145	2145	905		1690				3570	

ET		3.11	1745	1945				
X1	25340	** SEC 24 WITH NEF **	1764	1785	2005	2005	2005	
GR	640.9	1000	637.0	1100	631.0	1200	625.5	1300
1440								620.0
GR	615	1540	610.9	1730	610.1	1764	606.7	1767
1772								607.0
GR	607.3	1778	609.9	1785	609.7	1800	609.7	1900
2000								609.9
GR	615	2050	625	2115	634.5	2200	644.3	2300
NC	.10	.11	.06					
QT	7	1570	1570	1570	1570	655	1235	2635
ET		3.11	1600	1850				

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X1	26070	** SEC 25 , NEF AT HIGHER ELEV ROB **	1642	1658	730	640	730	
GR	640.6	1000	637.7	1100	636.3	1120	632.5	1200
1300								625.9
GR	620.8	1400	618.3	1500	616.9	1520	612.3	1600
1642								611.0
GR	607.7	1645	608.1	1650	608.0	1654	610.1	1658
1700								610.7
GR	612.0	1800	613.8	1900	625	1990	630	2055
2150								635
GR	640	2215						

NC	.09	.10	.06					
QT	7	1500	1500	1500	1500	625	1180	2520
ET		3.11	1530	1730				

X1	26840	** TOPO, WITH HIGHER ELEVRS TAKEN FM SEC 25 ROB; CHAN FM SEC 25**	1642	1658	600	770	770	
GR	640.6	950	637.7	1100	632	1200	625	1285
1400								620
GR	615	1490	613.1	1642	609.8	1645	610.2	1650
1654								610.1
GR	612.2	1658	614	1750	615	1760	620	1795
1835								625
GR	630	1910	635	2070				

** SURVEY SEC ATC-1 **
 120.000 20.42 576.32 .00 576.36 .05 .17 .07 562.40
 5150.0 2558.7 1747.1 844.2 2958.2 659.8 747.9 24.7 3.7 560.40
 .05 .86 2.65 1.13 .090 .060 .110 .000 555.90 1215.33
 .000259 330. 230. 270. 2 0 0 0 695.63 1910.96

FLOW DISTRIBUTION FOR SECNO= 120.00 CWSEL= 576.32
 STA= 1215. 1300. 1400. 1500. 1600. 1700. 1715. 1800. 1806. 1840. 1875. 1900.
 1911.

PER Q= 1.0 5.5 6.1 5.2 10.1 2.4 17.6 1.8 33.9 12.3 3.9
 .2 AREA= 136.2 411.8 441.8 401.8 596.8 118.0 779.2 72.7 659.8 497.6 221.7
 28.6 VEL= .4 .7 .7 .7 .9 1.1 1.2 1.3 2.6 1.3 .9
 .4 DEPTH= 1.6 4.1 4.4 4.0 6.0 7.9 9.2 12.1 19.4 14.2 8.9
 2.6

*SECNO 850.000
 3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .53

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3470 ENCROACHMENT STATIONS= 1372.0 1552.0 TYPE= 1 TARGET= 180.000
 ** SEC ATC-2 **
 850.000 19.44 576.54 .00 576.75 .21 .32 .06 563.90
 5150.0 1421.0 2807.2 921.9 675.7 608.6 550.4 76.6 11.0 563.70
 .11 2.10 4.61 1.67 .090 .110 .000 557.10 1372.00
 .000919 730. 730. 730. 2 0 0 0 180.00 1552.00

FLOW DISTRIBUTION FOR SECNO= 850.00 CWSEL= 576.54
 STA= 1372. 1400. 1434. 1445. 1478. 1500. 1519. 1552.

PER Q= 8.0 13.8 5.8 54.5 10.1 4.9 2.9
 AREA= 233.8 319.4 122.6 608.6 251.8 153.8 144.9
 VEL= 1.8 2.2 2.4 4.6 2.1 1.6 1.0
 DEPTH= 8.4 9.4 11.1 18.4 11.4 8.1 4.4

*SECNO 935.000
 3470 ENCROACHMENT STATIONS= 1878.0 1998.0 TYPE= 1 TARGET= 120.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 576.70 ELREA= 576.70 TRAVISFW_DUP

935.000 18.63 1593 OSSIPPEE RD; SEC ATC-3; OVBKS FM ATC-2 ** 576.83 567.50
 5150.0 .0 5150.0 .0 1441.0 .0 11.3 100000.00
 .11 .00 3.57 .00 .060 .000 558.00 1878.00
 .000838 85. 85. 2 0 0 120.00 1998.00

FLOW DISTRIBUTION FOR SECNO= 935.00 CWSEL= 576.63

STA= 1878. 1998.
 PER Q= 100.0
 AREA= 1441.0
 VEL= 3.6
 DEPTH= 12.0

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
961.000	19.03	577.03	.00	.00	577.23	.19	.40	.00	571.40
5150.0	.0	5150.0	.0	.0	1456.5	.0	80.7	11.4	100000.00
.12	.00	3.54	.00	.000	.060	.000	.000	558.00	1878.00
.000820	26.	26.	26.	2	0	0	.00	120.00	1998.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
1.00	1.60	2.50	.00	11.00	3.00	1050.00	3.24	558.00	558.00	558.00

*SECNO 961.000
 BTCARD, BRIDGE STENCL= 1878.00 STENCR= 1998.00
 PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
577.23	576.84	.01	0.	5150.	1050.	1061.	574.90	577.40	0.

3470 ENCROACHMENT STATIONS= 1878.0 1998.0 TYPE= 1 TARGET= 120.000
 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 577.40 ELREA= 577.40

STA= 1878. 1998.
 PER Q= 100.0
 AREA= 1456.5
 VEL= 3.5
 DEPTH= 12.1

*SECNO 1020.000 ** TOPO SEC; CHAN FM ATC-3 **

1020.000	18.97	577.07	.00	577.29	.23	.05	.01	564.90
5150.0	1127.8	2854.4	1167.8	593.1	687.7	82.9	11.7	564.70
.12	2.17	4.81	1.70	.060	.110	.000	558.10	1838.04
.001036	59.	59.	59.	0	0	.00	240.99	2079.03

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	I TRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 1020.00 CWSEL= 577.07

STA= 1838.	1865.	1885.	1894.	1914.	1925.	1958.	1980.	2000.	2050.	2079.
PER Q=	.3	2.5	3.2	9.6	6.3	55.4	10.8	6.3	5.3	.3
AREA=	28.0	91.5	76.3	200.5	122.9	593.1	252.4	176.5	228.7	30.1
VEL=	.5	1.4	2.1	2.5	2.6	4.8	2.2	1.8	1.2	.4
DEPTH=	1.0	4.6	8.5	10.0	11.2	18.0	11.5	8.8	4.6	1.0

*SECNO 1650.000 ** ATC-4 WITH NEF

1650.000	17.70	577.80	.00	577.99	.19	.70	.01	565.10
5150.0	363.1	2465.8	2321.0	509.2	1651.3	113.0	16.5	567.00
.18	1.78	4.84	1.41	.060	.120	.000	560.10	1082.02
.001178	630.	630.	630.	0	0	.00	428.11	1510.13

FLOW DISTRIBUTION FOR SECNO= 1650.00 CWSEL= 577.80

STA= 1082.	1100.	1112.	1118.	1148.	1150.	1200.	1209.	1300.	1365.	1500.	1510.
PER Q=	1.0	3.2	2.9	47.9	.4	12.8	20.2	6.8	2.3	.0	.0
AREA=	50.4	88.2	65.4	509.2	17.8	392.6	655.4	299.2	209.6	1.0	1.0
VEL=	1.0	1.9	2.3	4.8	1.1	1.7	1.6	1.2	.6	.1	.1
DEPTH=	2.8	7.4	10.9	17.0	8.9	7.9	7.2	4.6	1.6	1.6	.1

*SECNO 2825.000 ** ATC-5 **

2825.000	16.44	579.34	.00	579.62	.28	1.59	.04	569.10
5150.0	1824.9	2854.3	470.8	523.3	252.0	168.6	25.5	568.30
.26	1.86	5.45	1.87	.060	.110	.000	562.90	1418.77

FLOW DISTRIBUTION FOR SECNO= 2825.00 CWSEL= 579.34

STA= 1419. 1500. 1580. 1619. 1624. 1635. 1660.
 PER Q= 7.8 25.6 2.0 55.4 4.1 2.9
 AREA= 310.1 626.9 45.7 523.3 94.4 108.6
 VEL= 1.3 2.1 2.2 5.5 2.2 1.4
 DEPTH= 3.8 7.8 9.1 15.4 8.6 4.3

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	R-BANK
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

*SECNO 4540.000 ** TOPO; CHAN FM ATC-5 **

4540.000 15.62 582.22 .00 582.52 2.90 572.80
 5150.0 1063.7 2818.0 1268.3 533.8 495.5 639.0 236.1 34.9 572.00
 .38 1.99 5.69 1.98 .110 .060 .110 .000 566.60 1493.35
 .001828 1715. 1717. 1715. 2 0 0 235.52 1728.87

FLOW DISTRIBUTION FOR SECNO= 4540.00 CWSEL= 582.22

STA= 1493. 1500. 1545. 1580. 1619. 1624. 1635. 1670. 1720. 1729.
 PER Q= .1 6.7 11.8 11.8 2.1 54.7 2.0 3.8 11.3
 AREA= 7.4 212.3 270.1 44.1 495.5 44.8 85.4 263.1 235.8 9.8
 VEL= .6 1.6 2.3 2.3 2.4 5.7 2.3 2.2 1.6 .6
 DEPTH= 1.1 4.7 7.7 7.7 8.8 14.6 9.0 7.8 7.5 1.1

*SECNO 5110.000 ** TOPO; CHAN FM ATC-5 **

5110.000 15.47 583.17 .00 583.30 .74 573.90
 5150.0 2405.4 2020.6 723.9 1460.7 490.7 502.7 263.1 38.8 573.10
 .44 1.65 4.12 1.44 .110 .060 .110 .000 567.70 1365.52
 .000971 570. 570. 570. 1 0 0 354.43 1719.95

FLOW DISTRIBUTION FOR SECNO= 5110.00 CWSEL= 583.17

STA= 1366. 1410. 1455. 1585. 1619. 1640. 1685. 1720.
 PER Q= .8 6.6 39.3 39.2 6.8 6.6 55.5
 AREA= 70.7 255.5 1134.5 490.7 191.7 255.5
 VEL= .6 1.3 1.8 4.1 1.8 1.3 1.6
 DEPTH= 1.6 5.7 8.7 14.4 9.1 5.7 1.6

*SECNO 5770.000

3470 ENCROACHMENT STATIONS= 2035.0 2110.0 TYPE= 1 TARGET= 75.000 TRAVISFW_DUP
 ** ATC-6 MOD FOR NEF **
 5770.000 14.87 583.87 .00 .00 584.26 .39 .86 .11 577.20
 5065.0 .0 5065.0 .0 .0 1006.4 .0 289.3 42.0 100000.00
 .48 .00 5.03 .00 .060 .000 .000 569.00 2035.00
 .001834 660. 660. 660. 2 0 0 75.00 2110.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

FLOW DISTRIBUTION FOR SECNO= 5770.00 CWSEL= 583.87
 STA= 2035. 2110.
 PER Q= 100.0
 AREA= 1006.4
 VEL= 5.0
 DEPTH= 13.4
 *SECNO 5810.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 586.00 ELREA= 586.00
 ** NC 87, SEC ATC-7 **
 5810.000 14.50 583.50 .00 .00 584.71 1.21 .12 .33 576.70
 5065.0 .0 5065.0 .0 .0 574.2 .0 290.0 42.1 576.70
 .48 .00 8.82 .00 .060 .000 .000 569.00 2050.00
 .005981 40. 40. 40. 2 0 0 43.00 2093.00

FLOW DISTRIBUTION FOR SECNO= 5810.00 CWSEL= 583.50
 STA= 2050. 2093.
 PER Q= 100.0
 AREA= 574.2
 VEL= 8.8
 DEPTH= 13.4

SPECIAL BRIDGE
 SB XK XKOR COFQ RDLEN BWC BWP BAREA BSS ELCHU ELCHD

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	R-BANK
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

FLOW DISTRIBUTION FOR SECNO= 5930.00 CWSEL= 585.97

STA= 1990. 2050. 2055. 2081. 2085. 2150. 2155.
 PER Q= 19.0 2.7 42.1 2.4 32.8 1.1
 AREA= 486.6 55.1 415.2 49.3 670.8 46.0
 VEL= 1.9 2.3 4.8 2.3 2.3 1.1
 DEPTH= 8.1 11.0 16.0 12.3 10.3 9.2

*SECNO 6150.000 ** ATC-8 MOD FOR NEF ROB **

6150.000	16.17	586.27	.00	.00	586.38	.11	.20	.02	574.70
4760.0	1245.7	1570.8	1943.5	858.9	402.2	1141.4	302.8	43.6	573.10
.51	1.45	3.91	1.70	.100	.060	.100	.000	570.10	1907.15
.000748	220.	220.	220.	2	0	0	.00	344.03	2251.18

FLOW DISTRIBUTION FOR SECNO= 6150.00 CWSEL= 586.27

STA= 1907. 1950. 2050. 2055. 2081. 2085. 2150. 2170. 2230. 2251.
 PER Q= 1.2 22.7 2.2 33.0 2.1 28.5 5.5 4.7
 AREA= 87.2 717.1 54.6 402.2 48.9 690.4 162.4 226.2 13.5
 VEL= .7 1.5 2.0 3.9 2.0 2.0 1.6 1.0 .3
 DEPTH= 2.0 7.2 10.9 15.5 12.2 10.6 8.1 3.8

*SECNO 7610.000 ** ATC-9 MOD FOR NEF AT HIGHER ELEV LOB **

7610.000	15.46	587.66	.00	.00	587.88	.22	1.46	.04	577.40
4760.0	2095.3	2088.1	576.6	811.4	423.2	325.6	369.2	52.6	576.70
.63	2.58	4.93	1.77	.090	.060	.100	.000	572.20	1153.84
.001402	1460.	1460.	1460.	2	0	0	.00	197.28	1351.12

FLOW DISTRIBUTION FOR SECNO= 7610.00 CWSEL= 587.66

STA= 1154. 1200. 1257. 1285. 1300. 1351.
 PER Q= 8.7 35.3 43.9 6.9 5.2
 AREA= 232.2 579.2 423.2 137.4 188.2
 VEL= 1.8 2.9 4.9 2.4 1.3
 DEPTH= 5.0 10.2 15.1 9.2 3.7

Q QLOB QCH QROB ALOB XNL ITRIAL XNCH IDC AROB XNR ICONT VOL WTN CORAR TWA ELMIN TOPWID R-BANK ELEV SSTA ENDST

TRAVISFW_DUP

*SECNO 8310.000 ** ATC-10 **

8310.000	17.09	588.59	.00	.00	588.77	.18	.88	.01	576.50
4760.0	231.1	1814.6	2714.3	167.4	380.6	1230.1	396.0	55.7	576.50
.69	1.38	4.77	2.21	.120	.060	.110	.000	571.50	1132.02
.001145	700.	700.	700.	2	0	0	.00	184.51	1316.53

FLOW DISTRIBUTION FOR SECNO= 8310.00 CWSEL= 588.59

STA= 1132. 1147. 1166. 1190. 1200. 1278. 1300. 1317.

PER Q= .3 4.6 38.1 119. 6.1 43.8 6.4 39.6

AREA= 23.2 144.3 380.6 120.4 896.4 173.6

VEL= .6 1.5 4.8 2.4 2.3 1.8 .8

DEPTH= 1.5 7.6 15.9 12.0 11.5 7.9 2.4

*SECNO 8500.000 ** TOPO SEC;NEF LOB & PORTIONS OF ROB FM RDWAY; CHAN FM ATC-10**

8500.000	17.35	588.85	.00	.00	588.97	.12	.19	.01	576.50
4760.0	2640.0	1608.5	511.6	1602.8	386.7	427.0	405.2	56.8	576.50
.71	1.65	4.16	1.20	.120	.060	.110	.000	571.50	980.78
.000854	190.	190.	190.	1	0	0	.00	326.39	1307.16

FLOW DISTRIBUTION FOR SECNO= 8500.00 CWSEL= 588.85

STA= 981. 1000. 1060. 1085. 1166. 1190. 1200. 1225. 1300. 1307.

PER Q= .4 9.9 8.6 36.6 33.8 4.1 4.4 2.2

AREA= 36.9 380.7 246.1 939.1 386.7 105.9 158.6 160.8

VEL= .6 1.2 1.7 1.9 4.2 1.8 1.3 .7

DEPTH= 1.9 6.3 9.8 11.6 16.1 10.6 6.3 2.1

*SECNO 8550.000 ** PRIVATE RD **

8550.000	17.31	588.91	.00	.00	589.01	.10	.04	.00	576.70
4760.0	2137.5	2408.9	213.6	1548.1	716.0	279.5	408.0	57.2	581.00
.72	1.38	3.36	.76	.120	.060	.110	.000	571.60	980.48
.000607	50.	50.	50.	0	0	0	.00	327.65	1308.13

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SECNO DEPTH QLOB VLOB XLOBL CWSEL QCH VCH XLCH CRIWS QROB VROB XLOBR WSELK ALOB XNL ITRIAL EG ACH XNCH IDC HV AROB XNR ICONT HL VOL WTN CORAR OLOSS TWA ELMIN TOPWID L-BANK ELEV R-BANK ELEV SSTA ENDST

STA= 980. 1000. 1060. 1085. 1161. 1206. 1225. 1300. 1308.
 PER Q= .4 8.5 7.3 28.8 50.6 2.5 2.0 .0
 AREA= 38.1 384.3 247.6 878.1 716.0 112.2 165.3 2.0
 VEL= .5 1.0 1.4 1.6 3.4 1.1 .6 .1
 DEPTH= 2.0 6.4 9.9 11.6 15.9 5.9 2.2 .3

SPECIAL BRIDGE

SB	XK	XKOR	COFO	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
1.10		1.47	2.50	.00	34.00	4.80	509.00	.37	571.60	571.60

*SECNO 8569.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
590.90	589.01	.02	1913.	2823.	509.	517.	586.50	587.70	358.

** TOPO WITH NEF; PORTIONS OF ROB FM ROADWAY **

8569.000	17.97	589.57	.00	.00	589.61	.04	.60	.00	576.70
4760.0	2777.2	1782.2	200.6	2691.6	745.8	350.6	409.4	57.4	581.00
.72	1.03	2.39	.57	.120	.060	.110	.000	571.60	887.61
.000290	19.	19.	19.	2	0	2	.00	431.20	1318.80

FLOW DISTRIBUTION FOR SECNO= 8569.00 CWSEL= 589.57

STA= 888. 915. 980. 1005. 1161. 1206. 1225. 1300. 1319.
 PER Q= .5 7.5 5.6 44.8 37.4 2.1 2.1 .0
 AREA= 62.5 459.3 264.1 1905.7 745.8 124.7 214.9 11.0
 VEL= .4 .8 1.0 1.1 2.4 .8 .5 .2
 DEPTH= 2.3 7.1 10.6 12.2 16.6 6.6 2.9 .6

*SECNO	8610.000	8610.000	8610.000	8610.000	8610.000	8610.000	8610.000	8610.000	8610.000	8610.000
8610.000	17.99	589.59	.00	.00	589.62	.04	.01	.00	576.60	
4760.0	3373.7	980.2	406.2	2765.9	402.0	517.6	412.9	57.8	576.60	
.73	1.22	2.44	.78	.100	.060	.100	.000	571.60	887.49	
.000278	41.	41.	41.	0	0	0	.00	431.60	1319.10	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	ELEV
									SSTA

TRAVISFW_DUP

FLOW DISTRIBUTION FOR SECNO= 8610.00 CWSEL= 589.59

STA= 887. 915. 980. 1005. 1166. 1190. 1200. 1225. 1300. 1319.
 PER Q= .6 8.8 8.8 6.6 54.8 20.6 2.9 3.4 2.3 .0
 AREA= 63.0 460.5 264.6 1977.8 402.0 112.8 177.1 216.3 11.3
 VEL= .4 .9 1.2 1.3 2.4 1.2 .9 .5 .2
 DEPTH= 2.3 7.1 10.6 12.3 16.8 11.3 7.1 2.9 .6

*SECNO 9910.000 ** ATC-12 **
 9910.000 15.55 590.05 .00 590.13 .08 .49 .02 579.00
 4760.0 1727.1 1556.6 1476.3 1122.8 486.6 1031.7 507.3 68.9 578.90
 .91 1.54 3.20 1.43 .090 .060 .110 .000 574.50 1448.13
 .000542 1300. 1300. 1300. 2 0 0 0 316.33 1764.46

FLOW DISTRIBUTION FOR SECNO= 9910.00 CWSEL= 590.05

STA= 1448. 1500. 1534. 1600. 1618. 1650. 1657. 1700. 1730. 1758. 1764.
 PER Q= 1.5 6.0 21.5 7.3 32.7 2.2 14.0 11.0 3.8 .0
 AREA= 110.3 216.0 607.4 189.1 486.6 71.8 445.2 334.6 175.1 5.0
 VEL= .6 1.3 1.7 1.8 3.2 1.5 1.5 1.6 1.0 .3
 DEPTH= 2.1 6.4 9.2 10.5 15.2 10.3 10.4 11.2 6.3 .8

*SECNO 10400.000 ** TOPO **
 10400.000 14.95 590.35 .00 590.46 .11 .32 .01 579.90
 4620.0 1835.0 1757.0 1028.0 1061.0 467.3 692.9 534.7 72.5 579.80
 .96 1.73 3.76 1.48 .090 .060 .110 .000 575.40 1451.85
 .000791 490. 490. 490. 2 0 0 0 315.85 1767.70

FLOW DISTRIBUTION FOR SECNO= 10400.00 CWSEL= 590.35

STA= 1452. 1500. 1618. 1650. 1680. 1710. 1760. 1768.
 PER Q= 2.6 37.1 38.0 12.3 7.6 2.3 .0
 AREA= 128.8 932.2 467.3 313.5 235.5 142.5 1.3
 VEL= .9 1.8 3.8 1.8 1.5 .8 .1
 DEPTH= 2.7 7.9 14.6 10.5 7.9 2.9 .2

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIBL	IDC	ICONT	CORAR	TOPWID	ENDST

** ATC-13, MOD FOR NEF AT HIGHER ELEV LOB **
 11140.000 14.33 591.03 .00 591.17 .14 581.30
 3625.0 1962.9 1258.5 403.6 938.4 290.2 231.5 565.9
 1.03 2.09 4.34 1.74 .100 .060 .100 576.70
 .001226 740. 740. 740. 2 0 0 188.58 1588.34

FLOW DISTRIBUTION FOR SECNO= 11140.00 CWSEL= 591.03

STA= 1400. 1462. 1500. 1527. 1548. 1555. 1588.
 PER Q= 12.4 24.4 17.3 34.7 4.7 6.4
 AREA= 302.6 371.7 264.1 290.2 70.9 160.5
 VEL= 1.5 2.4 2.4 4.3 2.4 1.4
 DEPTH= 4.9 9.8 9.8 13.8 10.1 4.8

*SECNO 12770.000 ** ATC-14 **
 12770.000 14.21 592.71 .00 592.79 .08 583.40
 3625.0 533.5 988.0 2103.6 338.5 288.0 1201.9 583.10
 1.24 1.58 3.43 1.75 .100 .060 .100 578.50
 .000808 1630. 1630. 1630. 2 0 0 224.64 1380.95

FLOW DISTRIBUTION FOR SECNO= 12770.00 CWSEL= 592.71

STA= 1156. 1182. 1200. 1208. 1230. 1300. 1340. 1381.
 PER Q= 3.1 7.8 1200. 3.8 27.3 33.9 18.4 5.8
 AREA= 106.7 157.7 74.1 288.0 655.1 362.3 184.4
 VEL= 1.1 1.8 1.9 3.4 1.9 1.8 1.1
 DEPTH= 4.2 8.8 9.3 13.1 9.4 9.1 4.5

*SECNO 13900.000 ** TOPO WITH CHAN FM ATC-14 **
 13900.000 13.39 593.89 .00 594.04 .14 585.40
 3625.0 1370.3 1216.3 1038.4 765.7 270.1 517.3 585.10
 1.36 1.79 4.50 2.01 .110 .060 580.50 1066.06
 .001518 1130. 1130. 1130. 2 0 0 260.09 1326.15

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

FLOW DISTRIBUTION FOR SECNO= 13900.00 CWSEL= 593.89
 STA= 1066. 1105. 1172. 1208. 1230. 1260. 1295. 1326.
 PER Q= 1.7 18.7 17.4 33.6 16.4 10.7 1.5

AREA= 75.8 394.9 295.0 270.1 250.3 206.3 60.7
 VEL= .8 1.7 2.1 4.5 2.4 1.9 .9
 DEPTH= 1.9 5.9 8.2 12.3 8.3 5.9 1.9

I KAVISTFW_DUP

*SECNO 14320.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .60

3470 ENCROACHMENT STATIONS= 1641.0 1736.0 TYPE= 1 TARGET= 95.000
 ** ATC-15; CHAN FM ATC-14 **
 14320.000 13.44 594.64 .00 595.17 .98 .16 586.10
 3565.0 977.7 1988.8 598.4 313.3 270.6 208.2 682.6 92.5 586.00
 1.38 3.12 7.35 2.87 .110 .060 .100 581.20 1641.00
 .004060 420. 420. 2 0 0 95.00 1736.00

FLOW DISTRIBUTION FOR SECNO= 14320.00 CWSEL= 594.64

STA= 1641. 1678. 1700. 1736.
 PER Q= 27.4 55.8 16.8
 AREA= 313.3 270.6 208.2
 VEL= 3.1 7.4 2.9
 DEPTH= 8.5 12.3 5.8

*SECNO 14365.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

3470 ENCROACHMENT STATIONS= 1660.0 1725.0 TYPE= 1 TARGET= 65.000
 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 595.10 ELREA= 595.10
 14365.000 ** SR 1504; SEC ATC-16 **
 13.68 594.98 .00 595.32 .33 .04 586.30
 3565.0 .0 3565.0 .0 767.6 .0 92.6 100000.00
 1.38 .00 4.64 .00 .000 .060 .000 581.30 1660.00
 .001588 45. 45. 2 0 0 65.00 1725.00

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	R-BANK
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

FLOW DISTRIBUTION FOR SECNO= 14365.00 CWSEL= 594.98

STA= 1660. 1725.
 PER Q= 100.0

AREA= 767.6
 VEL= 4.6
 DEPTH= 11.8

SPECIAL BRIDGE

SB XK XKOR 1.44 COFQ 2.70 RDLEN .00 BWC 39.00 BWP 1.44 BAREA 639.00 SS 1.04 ELCHU 581.30 ELCHD 581.30

*SECNO 14385.000
 BTCARD, BRIDGE STENCL= 1660.00 STENCR= 1725.00
 PRESSURE AND WEIR FLOW, weir Submergence Based on TRAPEZOIDAL Shape

EGPRS EGLWC 595.32 H3 QWEIR 53. QPR 3486. BAREA 639. TRAPEZOID AREA 632. ELLC 593.80 ELTRD 595.10 WEIRLN 65.

3470 ENCROACHMENT STATIONS= 1660.0 1725.0 TYPE= 1 TARGET=
 ** SR 1504; OVBKS FM TOPO, WITH NEF **
 14385.000 14.04 595.34 .00 .00 595.65 .30
 3565.0 .0 3565.0 .0 .0 806.3 .0
 1.38 .00 4.42 .00 .000 .060 .000
 .001635 21. 21. 21. 2 0 3

FLOW DISTRIBUTION FOR SECNO= 14385.00 CWSEL= 595.34

STA= 1660. 1725.
 PER Q= 100.0
 AREA= 806.3
 VEL= 4.4
 DEPTH= 12.4

*SECNO 14435.000

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	R-BANK
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST
3470 ENCROACHMENT STATIONS=	1627.0	1772.0	TYPE=	1	TARGET=	145.000			
** TOPO; CHAN FM 17 **									
14435.000	14.08	595.58	.00	595.74	.16				585.40
3565.0	815.1	1767.6	982.3	462.0	419.2	532.1	685.1	92.7	586.30
1.39	1.76	4.22	1.85	.110	.060	.100	.000	581.50	1627.00
.001050	50.	50.	50.	2	0	0	.00	145.00	1772.00

FLOW DISTRIBUTION FOR SECNO= 14435.00 CWSEL= 595.58

STA= 1627. 1675. 1707. 1725. 1772.
PER Q= 22.9 49.6 9.6 18.0
AREA= 462.0 419.2 163.4 368.7
VEL= 1.8 4.2 2.1 1.7
DEPTH= 9.6 13.1 9.1 7.8

*SECNO 14880.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.16

** ATC-17 **
14880.000 13.71 595.91 .00 595.93 .02 .16 586.10
3045.0 460.3 666.6 1918.1 739.5 2334.5 710.1 96.1 587.00
1.51 .62 1.64 .82 .110 .060 .000 582.20 1238.03
.000164 445. 445. 2 0 0 0 515.79 1753.81

FLOW DISTRIBUTION FOR SECNO= 14880.00 CWSEL= 595.91

STA= 1238. 1280. 1300. 1366. 1398. 1400. 1500. 1600. 1700. 1754.
PER Q= .9 1.9 12.3 21.9 .5 27.6 24.2 10.2 .5
AREA= 94.7 109.3 535.5 407.5 18.0 911.4 841.4 501.4 62.3
VEL= .3 .5 1.6 .9 .9 .9
DEPTH= 2.3 5.5 8.1 12.7 9.0 9.1 8.4 5.0 1.2

*SECNO 15580.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .43

** TOPO SEC; CHAN FM SEC ATC-17 **

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
15580.000	11.86	596.06	.00	.00	596.16	.10	.20	.03	588.10
3045.0	214.5	1197.7	1632.9	167.9	348.3	1019.7	744.6	101.4	589.00
1.59	1.28	3.44	1.60	.110	.060	.090	.000	584.20	1330.74
.000893	700.	700.	550.	2	0	0	.00	258.83	1589.58

FLOW DISTRIBUTION FOR SECNO= 15580.00 CWSEL= 596.06

STA= 1331. 1335. 1350. 1366. 1398. 1520. 1580. 1590.
PER Q= .0 1.6 5.4 39.3 45.5 8.1 .1
AREA= 2.3 53.5 112.2 348.3 800.8 213.8 5.1

VEL= .3 .9 1.5 3.4 1.7 1.1 TRAVISFW_DUP
 DEPTH= .5 3.6 7.0 10.9 6.6 3.6 .3
 .5

*SECNO 16030.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .37

** ATC-18 **
 16030.000 11.02 596.52 .00 597.28 .76 589.30
 3045.0 836.5 1868.2 340.2 218.6 120.9 589.10
 1.61 3.41 8.55 2.81 .060 .100 1375.05
 .006459 450. 450. 450. 0 0 .00 121.53 1496.58

FLOW DISTRIBUTION FOR SECNO= 16030.00 CWSEL= 596.52

STA= 1375. 1400. 1429. 1442. 1464. 1497.
 PER Q= 1.1 13.4 13.0 61.4 11.2
 AREA= 26.5 128.2 90.6 218.6 120.9
 VEL= 1.2 3.2 4.4 8.5 2.8
 DEPTH= 1.1 4.4 7.0 9.9 3.7

*SECNO 17790.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.71

** ATC-19 **
 17790.000 11.14 600.64 .00 600.72 .08 593.10
 3045.0 156.8 884.8 2003.4 114.2 270.6 1244.2 800.3 110.5 592.00
 1.84 1.37 3.27 1.61 .100 .100 .000 589.50 1252.67
 .000880 1760. 1760. 1760. 3 0 233.17 1485.85

FLOW DISTRIBUTION FOR SECNO= 17790.00 CWSEL= 600.64

STA= 1253. 1265. 1275. 1300. 1317. 1400. 1447. 1486.
 PER Q= 1.3 3.9 29.1 7.8 33.4 19.6 5.1
 AREA= 42.2 72.0 270.6 135.1 610.0 352.5 146.6
 VEL= .9 1.6 3.3 1.8 1.7 1.7 1.1

*SECNO 19430.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

** ATC-20, MOD FOR NEF LOB **										
19430.000	11.62	602.72	.00	602.97	.26	2.18	.07	595.60		
3045.0	643.6	1628.5	773.0	282.2	309.1	494.9	119.6	595.80		
1.96	2.28	5.27	1.56	.090	.060	.110	591.10	1998.25		
.002239	1640.	1640.	1640.	3	0	0	247.55	2245.80		

FLOW DISTRIBUTION FOR SECNO= 19430.00 CWSEL= 602.72

STA=	1998.	2020.	2053.	2067.	2096.	2100.	2200.	2246.
PER Q=	.9	11.2	9.0	53.5	1.8	22.2	2200.	1.4
AREA=	29.6	155.7	96.9	309.1	25.3	411.9	57.7	
VEL=	1.0	2.2	2.8	5.3	2.1	1.6	.7	
DEPTH=	1.4	4.7	6.9	10.7	6.3	4.1	1.3	

*SECNO 20230.000 ** TOPO SEC; CHAN FM ATC-20 **

20230.000	11.54	604.34	.00	604.50	.16	1.51	.02	597.30		
3045.0	327.5	1362.9	1354.5	209.7	306.8	833.8	124.3	597.50		
2.04	1.56	4.44	1.62	.090	.060	.110	592.80	1997.92		
.001608	800.	800.	800.	2	0	0	271.14	2269.06		

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SECNO	DEPTH	CWSEL	CRIS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

FLOW DISTRIBUTION FOR SECNO= 20230.00 CWSEL= 604.34

STA=	1998.	2050.	2067.	2096.	2230.	2269.
PER Q=	4.1	6.6	44.8	42.0	2.5	
AREA=	113.0	96.7	306.8	749.1	84.8	
VEL=	1.1	2.1	4.4	1.7	.9	
DEPTH=	2.2	5.7	10.6	5.6	2.2	

*SECNO 20970.000 ** TOPO SEC; CHAN FM ATC-20 **

20970.000	11.21	605.21	.00	605.27	.05	.75	.02	598.50		
2910.0	1530.5	885.1	494.4	1407.6	297.2	454.2	130.2	598.70		
2.16	1.09	2.98	1.09	.100	.060	.110	594.00	1694.98		
.000754	600.	740.	740.	2	0	0	501.70	2196.67		

STA= 1695. 1940. 2067. 2096. 2155. 2195. 2197.
 PER Q= 17.7 34.9 30.4 14.3 2.7 .0
 AREA= 650.7 756.8 297.2 345.7 108.4 .2
 VEL= .8 1.3 3.0 1.2 .7 .1
 DEPTH= 2.7 6.0 10.2 5.9 2.7 .1

1490 NH CARD USED

*SECNO 21030.000 ** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **
 21030.000 11.17 605.27 .00 .00 605.30 .03 .01 599.30
 2335.0 1650.1 513.7 171.3 1582.8 232.7 215.1 902.8 130.6 599.00
 2.17 1.04 2.21 .80 .093 .060 .110 594.10 998.59
 .000474 10. 60. 150. 2 0 0 453.02 1451.60

FLOW DISTRIBUTION FOR SECNO= 21030.00 CWSEL= 605.27

STA= 999. 1245. 1294. 1300. 1305. 1346. 1374. 1398. 1425. 1452.
 PER Q= 18.1 18.5 6.7 5.9 14.3 7.2 22.0 5.6 1.7
 AREA= 665.0 356.1 63.1 53.3 283.9 161.5 232.7 145.7 69.4
 VEL= .6 1.2 2.5 2.6 1.2 1.0 2.2 2.9 .6
 DEPTH= 2.7 7.3 10.5 10.7 6.9 5.8 9.7 5.4 2.6

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	R-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA			ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA		
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST		

1490 NH CARD USED

*SECNO 21075.000 ** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**
 21075.000 6.91 605.31 .00 .00 605.37 .06 .01 603.10
 2335.0 1554.5 549.0 231.5 1097.4 170.5 176.3 905.2 131.1 602.80
 2.18 1.42 3.22 1.31 .096 .110 .000 997.47
 .001835 45. 165. 45. 1 0 0 454.42 1451.88

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .51

FLOW DISTRIBUTION FOR SECNO= 21075.00 CWSEL= 605.31

STA= 997. 1245. 1294. 1300. 1305. 1370. 1398. 1425. 1450. 1452.
 PER Q= 36.7 15.9 3.6 3.2 7.3 23.5 6.5 3.4 .0
 AREA= 676.5 216.3 28.5 24.6 151.5 170.5 105.7 70.3 .3
 VEL= 1.3 1.7 2.9 3.0 1.1 3.2 1.4 1.1 .2
 DEPTH= 2.7 4.4 4.8 4.9 2.3 6.1 3.9 2.8 .2

*SECNO 21085.000 ** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **

21085.000	7.31	605.31	.00	711.4	605.39	.08	.01	.01	601.30
2335.0	674.1	1632.5	28.4	711.4	617.7	39.6	905.5	131.2	601.00
2.18	.95	2.64	.72	.100	.060	.110	.000	598.00	992.65
.000955	10.	10.	10.	0	0	0	.00	373.63	1366.28

FLOW DISTRIBUTION FOR SECNO= 21085.00 CWSEL= 605.31

STA=	993.	1200.	1253.	1348.	1365.	1366.
PER Q=	17.2	11.7	69.9	1.2	.0	.0
AREA=	485.1	226.3	617.7	39.4	.2	.2
VEL=	.8	1.2	2.6	.7	.1	.1
DEPTH=	2.3	4.3	6.5	2.3	.2	.2

*SECNO 21250.000 ** SEC 20-A EXTENDED ON LOB **

21250.000	7.44	605.44	.00	580.3	605.52	.08	.13	.00	601.30
2335.0	598.6	1636.6	99.8	580.3	628.9	133.6	909.7	132.3	601.00
2.20	1.03	2.60	.75	.100	.060	.110	.000	598.00	1066.59
.000904	135.	135.	135.	2	0	0	.00	338.51	1405.10

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

FLOW DISTRIBUTION FOR SECNO= 21250.00 CWSEL= 605.44

STA=	1067.	1100.	1200.	1253.	1348.	1400.	1405.
PER Q=	.5	13.2	11.9	70.1	4.3	.0	.0
AREA=	29.0	318.7	232.5	628.9	131.9	1.6	1.6
VEL=	.4	1.0	1.2	2.6	.8	.2	.3
DEPTH=	.9	3.2	4.4	6.6	2.5	.3	.3

*SECNO 21270.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

** SEC 20-A W/CHAN FM SEC 21 **

21270.000	7.45	605.45	.00	739.7	605.55	.10	.03	.01	600.70
2335.0	1254.5	633.6	446.9	739.7	159.4	295.8	910.3	132.5	600.70
2.20	1.70	3.97	1.51	.100	.060	.110	.000	598.00	1066.23
.002265	20.	20.	20.	0	0	0	.00	339.01	1405.25

FLOW DISTRIBUTION FOR SECNO= 21270.00 CWSEL= 605.45

STA= 1066. 1100. 1200. 1253. 1288. 1313. 1348. 1400. 1405.
 TRAVISFW_DUP
 PER Q= .8 21.1 19.0 12.8 27.1 12.3 6.8
 AREA= 29.6 320.6 233.5 156.0 159.4 161.2 132.9
 VEL= .6 1.5 1.9 1.9 4.0 1.8 1.2
 DEPTH= .9 3.2 4.4 4.5 6.4 4.6 2.6

*SECNO 21750.000 ** SEC 21 **
 21750.000 8.45 606.45 .00 606.55 .11 1.00 600.70
 2335.0 847.3 742.6 745.1 508.0 184.2 500.0 923.4 136.1 600.70
 2.25 1.67 4.03 1.49 .100 .060 .110 .000 598.00 1486.99
 .001923 480. 480. 2 0 0 0.00 321.73 1808.73

FLOW DISTRIBUTION FOR SECNO= 21750.00 CWSEL= 606.45
 STA= 1487. 1500. 1540. 1576. 1600. 1652. 1677. 1700. 1785. 1800. 1809.
 PER Q= .0 1.2 4.3 4.3 7.0 23.7 31.8 8.2 21.3 2.2 8.2
 AREA= 3.6 41.9 86.3 98.3 278.0 184.2 112.6 335.4 43.4 8.5
 VEL= .3 .7 1.2 1.7 2.0 4.0 1.7 1.5 1.2 1.2 .6
 DEPTH= .3 1.0 2.4 4.1 5.3 7.4 4.9 3.9 2.9 1.0

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	R-BANK
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

*SECNO 22440.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58
 ** TOPO, ADJ. BASED ON 23; NR OVBK & CHAN FM 21; NEF LOB **
 22440.000 7.26 608.46 .00 608.76 .30 2.13 603.90
 2335.0 729.7 959.4 645.9 273.9 154.6 277.8 938.5 140.3 603.90
 2.30 2.66 6.21 2.33 .100 .060 .100 .000 601.20 1569.39
 .005760 690. 690. 2 0 0 0.00 205.35 1774.73

FLOW DISTRIBUTION FOR SECNO= 22440.00 CWSEL= 608.46
 STA= 1569. 1600. 1652. 1677. 1700. 1765. 1775.
 PER Q= 4.2 27.0 41.1 9.9 17.1 17.7
 AREA= 57.6 216.4 154.6 85.4 179.5 13.0
 VEL= 1.7 2.9 6.2 2.7 2.2 1.3
 DEPTH= 1.9 4.2 6.2 3.7 2.8 1.3

*SECNO 22970.000

3470 ENCROACHMENT STATIONS= 1620.0 1770.0 TYPE= 1 TARGET= 150.000
 ** TOPO MOD BY SEC 23; CHAN FM ATC-21 **

22970.000 7.42 611.22 .00 278.9 611.47 .25 2.69 606.50
 2335.0 725.2 883.8 726.0 158.4 142.4 947.2 606.50
 2.34 2.60 5.58 2.59 .100 .060 280.7 603.80
 .004505 530. 530. 530. 2 0 .100 150.00 1770.00

FLOW DISTRIBUTION FOR SECNO= 22970.00 CWSEL= 611.22

STA= 1620. 1682. 1707. 1770.
 PER Q= 31.1 37.9 31.1
 AREA= 278.9 158.4 280.7
 VEL= 2.6 5.6 2.6
 DEPTH= 4.5 6.3 4.5

*SECNO 23110.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .59

3470 ENCROACHMENT STATIONS= 1665.0 1725.0 TYPE= 1 TARGET= 60.000
 23110.000 7.47 611.77 .00 88.5 612.74 .97 948.9 606.50
 2240.0 360.3 1495.9 383.8 161.8 93.5 604.30 606.50
 2.35 4.07 9.25 4.11 .100 .060 .100 1665.00
 .011846 210. 140. 90. 2 0 60.00 1725.00

FLOW DISTRIBUTION FOR SECNO= 23110.00 CWSEL= 611.77

STA= 1665. 1682. 1707. 1725.
 PER Q= 16.1 66.8 17.1
 AREA= 88.5 161.8 93.5
 VEL= 4.1 9.2 4.1
 DEPTH= 5.2 6.5 5.2

*SECNO 23160.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 1679.0 1707.0 TYPE= 1 TARGET= 28.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 612.60 ELREA= 612.60
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23160.000 ** SR 1500; SEC ATC-22, MOD BY SEC 23 ** .36 606.50
 7.29 611.99 .00 613.86 1.87 .76 142.8 100000.00
 .0 2240.0 .0 204.1 .0 949.3 604.70 1679.00
 .00 10.97 .00 .060 .000 .000 28.00 1707.00
 .020196 50. 50. 0 0 .00

FLOW DISTRIBUTION FOR SECNO= 23160.00 CWSEL= 611.99

STA= 1679. 1707.
 PER Q= 100.0
 AREA= 204.1
 VEL= 11.0
 DEPTH= 7.3

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	IITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
1.25	1.57	2.70	.00	28.00	1.00	189.00	.00	604.60	604.70	

*SECNO 23201.000
 BTCARD, BRIDGE STENCL= 1679.00 STENCR= 1707.00

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.55

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID	ELLC	ELTRD	WEIRLN
615.41	614.11	.54	2.	2235.	189.	AREA	611.60	615.20	19.
						189.			

3470 ENCROACHMENT STATIONS= 1679.0 1707.0 TYPE= 1 TARGET= 28.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 615.20 ELREA= 615.50

23201.000 ** SR 1500; OVBKS FM SEC 23 ** .00 615.40 1.04 1.54 .00 606.50
 9.76 614.36 .00

2240.0 .0 2240.0 .0
 2.35 .00 8.20 .00
 .008365 41. 41. 41.

TRAVISFW_DUP
 .0 273.1 .0
 .000 .060 .000
 3 0 2

142.9 100000.00
 604.60 1679.00
 28.00 1707.00

FLOW DISTRIBUTION FOR SECNO= 23201.00 CWSEL= 614.36

STA= 1679. 1707.
 PER Q= 100.0
 AREA= 273.1
 VEL= 8.2
 DEPTH= 9.8

*SECNO 23245.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.97

3470 ENCROACHMENT STATIONS= 1635.0 1755.0 TYPE= 1 TARGET= 120.000

** SEC 23; OVBK FM 21 **
 23245.000 11.18 615.58 .00 615.68 .10 .09 606.60
 2240.0 663.6 901.7 674.8 403.1 254.5 423.8 950.2 142.9 606.60
 2.36 1.65 3.54 1.59 .110 .060 .110 604.40 1635.00
 .000950 44. 44. 44. 2 0 0 120.00 1755.00

FLOW DISTRIBUTION FOR SECNO= 23245.00 CWSEL= 615.58

STA= 1635. 1648. 1682. 1707. 1755.
 PER Q= 5.6 24.1 40.3 30.1
 AREA= 101.3 301.9 254.5 423.8
 VEL= 1.2 1.8 3.5 1.6
 DEPTH= 7.8 8.9 10.2 8.8

*SECNO 23335.000

** PREVIOUS SEC TRANSFERRED **

23335.000	11.21	615.71	.00	.00	615.76	.05	.07	.01	606.70
2240.0	659.4	700.0	880.6	568.2	255.2	738.2	952.9	143.3	606.70
2.37	1.16	2.74	1.19	.110	.060	.110	.000	604.50	1576.11
.000568	90.	90.	90.	2	0	0	.00	256.92	1833.03

STA= 1576. 1600. 1648. 1682. 1707. 1755. 1800. 1833.
 PER Q= .2 10.5 18.7 31.2 26.1 12.2 9
 AREA= 18.0 247.5 302.8 255.2 425.1 263.5 49.6
 VEL= .3 1.0 1.4 2.7 1.4 1.0 1.4
 DEPTH= .8 5.2 8.9 10.2 8.9 5.9 1.5

*SECNO 25340.000 ** SEC 24 WITH NEF **
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	
25340.000	9.84	616.54	.00	.00	616.55	.01	.79	.01	610.10	
2145.0	523.4	309.7	1311.9	909.3	184.6	1669.3	1052.4	161.9	609.90	
3.02	.58	1.68	.79	.110	.060	.110	.000	606.70	1509.35	
.000286	2005.	2005.	2005.	2	0	0	.00	550.62	2059.96	

FLOW DISTRIBUTION FOR SECNO= 25340.00 CWSEL= 616.54

STA= 1509. 1540. 1730. 1764. 1785. 1800. 1900. 2000. 2050. 2060.
 PER Q= .2 17.0 7.2 14.4 3.8 26.2 25.5 5.5
 AREA= 23.5 680.7 205.1 184.6 101.0 683.3 673.3 204.1 7.6
 VEL= .2 .5 1.7 .8 1.7 .8 .8 .6
 DEPTH= .8 3.6 6.0 8.8 6.7 6.8 6.7 4.1 .8

*SECNO 26070.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .59

SECNO	DEPTH	CWSEL	NEF AT HIGHER ELEV	ROB	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	
26070.000	9.07	616.77	.00	.00	616.78	.02	.23	.00	611.00	
1570.0	291.6	260.4	1018.1	388.3	132.3	1230.9	1087.3	169.3	610.10	
3.20	.75	1.97	.83	.100	.060	.110	.000	607.70	1522.34	
.000442	730.	730.	640.	2	0	0	.00	401.50	1923.83	

FLOW DISTRIBUTION FOR SECNO= 26070.00 CWSEL= 616.77

STA= 1522. 1600. 1642. 1658. 1700. 1800. 1900. 1924.
 PER Q= 5.9 12.7 16.6 16.6 30.2 17.2 8
 AREA= 173.4 214.9 132.3 267.4 541.6 386.6 35.3
 VEL= .5 .9 2.0 1.0 .9 .7 .4
 DEPTH= 2.2 5.1 8.3 6.4 5.4 3.9 1.5

*SECNO 26840.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .57

TRAVISFW_DUP

** TOPO, WITH HIGHER ELEVS TAKEN FM SEC 25 ROB; CHAN FM SEC 25**

26840.000	7.44	617.24	.00	617.29	.05	.49	.01	613.10
1500.0	642.0	304.1	553.9	106.3	426.1	1110.3	175.2	612.20
3.33	1.21	2.86	1.30	.060	.100	.000	609.80	1449.64
.001248	600.	770.	770.	2	0	.00	326.06	1775.70

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XLN	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

FLOW DISTRIBUTION FOR SECNO= 26840.00 CWSEL= 617.24

STA= 1450. 1490. 1642. 1658. 1750. 1760. 1776.

PER Q= 1.9 40.9 20.3 34.4 1.9 .7

AREA= 45.2 485.2 106.3 381.1 27.4 17.6

VEL= .6 1.3 2.9 1.4 1.0 1.6

DEPTH= 1.1 3.2 6.6 4.1 2.7 1.1

*SECNO 27770.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

** TOPO, WITH NEF; CHAN FM SEC 26 **

27770.000	6.05	618.95	.00	619.09	.14	1.77	.04	613.00
1500.0	383.1	456.5	660.4	192.7	102.1	1128.1	180.5	614.00
3.42	1.99	4.47	2.14	.090	.100	.000	612.90	1282.67
.003234	930.	930.	930.	2	0	.00	171.00	1453.67

FLOW DISTRIBUTION FOR SECNO= 27770.00 CWSEL= 618.95

STA= 1283. 1330. 1349. 1353. 1371. 1430. 1454.

PER Q= 9.2 12.7 3.7 30.4 39.9 4.1

AREA= 93.3 78.7 20.6 102.1 262.2 46.7

VEL= 1.5 2.4 2.7 4.5 2.3 1.3

DEPTH= 2.0 4.1 5.1 5.7 4.4 2.0

*SECNO 27950.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

** ATC-26 **

27950.000	6.27	619.57	.00	620.29	.72	.97	.23	613.40
-----------	------	--------	-----	--------	-----	-----	-----	--------

1500.0 340.1 886.5 273.4 87.0 88.1 1130.0 181.0 614.40
 3.43 3.91 8.34 3.10 .090 .100 .000 613.30 1323.99
 .010678 180. 180. 180. 2 .060 0 80.68 1404.67

TRAVISFW_DUP

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	ELEV
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 27950.00 CWSEL= 619.57

STA= 1324. 1335. 1349. 1353. 1371. 1400. 1405.
 PER Q= 2.0 13.5 7.1 7.1 59.1 18.1 .1
 AREA= 14.7 50.7 21.5 106.2 86.3 1.8
 VEL= 2.0 4.0 5.0 8.3 3.2 .8
 DEPTH= 1.3 3.6 5.4 5.9 3.0 .4

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T1 FPMS BR FIA STUDY TRAVIS CR ALAMANCE CO, NC BLW
 T2 ENCROACHED
 T3 TRAVIS CR

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE

15 -1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	ELEV
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2
 0

CCHV= .200 CEHV= .400
 *SECNO 274870.000
 ** TOPO SEC ON HAW R, MOD BY SEC "AA"; NON-EFF FLOW (NEF) **
 274870.000 21.70 575.70 576.12 576.12 .42 .00 .00 569.10
 13250.0 945.7 12175.1 129.2 793.7 2249.2 150.8 .0 570.60
 .00 1.19 5.41 .86 .120 .060 .120 .000 554.00 1254.40
 .001074 0. 0. 0. .120 .060 .120 .000 352.60 1607.00

*SECNO 120.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .50

3470 ENCROACHMENT STATIONS= 1650.0 TYPE= 1 TARGET= 200.000
 ** SURVEY SEC ATC-1 **
 120.000 20.34 576.24 .00 576.32 576.41 .17 .24 .05 562.40
 5150.0 2224.1 2748.4 177.5 1300.2 657.3 153.5 16.5 1.9 560.40
 .02 1.71 4.18 1.16 .090 .060 .110 .000 555.90 1650.00
 .000648 330. 230. 270. 2 0 0 .00 200.00 1850.00

*SECNO 850.000

3470 ENCROACHMENT STATIONS= 1372.0 TYPE= 1 TARGET= 180.000
 ** SEC ATC-2 **
 850.000 19.67 576.77 .00 576.54 576.96 .20 .54 .01 563.90
 5150.0 1433.5 2781.5 935.0 692.0 615.9 566.9 49.9 5.1 563.70
 .08 2.07 4.52 1.65 .090 .060 .110 .000 557.10 1372.00
 .000867 730. 730. 730. 2 0 0 .00 180.00 1552.00

*SECNO 935.000

3470 ENCROACHMENT STATIONS= 1878.0 TYPE= 1 TARGET= 120.000
 ** SR 1593 OSSIPPEE RD; SEC ATC-3; OVBKS FM ATC-2 **
 935.000 18.85 576.85 .00 576.63 577.04 .19 .07 .00 567.50
 5150.0 .0 5150.0 .0 1466.3 .0 53.2 5.3 100000.00
 .000869 85. 85. 85. 1 .060 .000 .000 558.00 1878.00
 .000869 85. 85. 85. 1 .060 .000 .000 120.00 1998.00

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	GLOSS	L-BANK
Q	QLOB	OCH	OROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SB XK 1.00 XKOR 1.60 COFQ 2.50 RDLEN .00 BWC 11.00 BWP 3.00 BAREA 1050.00 SS 3.24 ELCHU 558.00 ELCHD 558.00

*SECNO 961.000
BTCARD, BRIDGE STENCL= 1878.00 STENCR= 1998.00
PRESSURE AND WEIR FLOW, weir Submergence Based on TRAPEZOIDAL Shape

EGPRS EGLWC H3 QWEIR QPR BAREA TRAPEZOID AREA WEIRLN
577.44 577.05 .01 0. 5178. 1050. 1061. 574.90 577.40 0.

3470 ENCROACHMENT STATIONS= 1878.0 TYPE= 1998.0 TYPE= 1 TARGET= 120.000
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 577.40 ELREA= 577.40

** SR 1593 ; OVBKS FM TOPO **
961.000 19.26 577.26 .00 577.03 577.45 .19
5150.0 .0 5150.0 .0 1484.4 .0
.09 .00 3.47 .00 .060 .000
.000771 26. 26. 2 0 2

*SECNO 1020.000

3470 ENCROACHMENT STATIONS= 1880.0 TYPE= 2000.0 TYPE= 1 TARGET= 120.000
** TOPO SEC; CHAN FM ATC-3 **
1020.000 19.16 577.26 .00 577.07 577.55 .29
5150.0 1125.1 3116.8 908.1 440.2 599.2 436.7
.10 2.56 5.20 2.08 .090 .060 .110
.001193 59. 59. 2 0 0

*SECNO 1650.000

3470 ENCROACHMENT STATIONS= 1108.0 TYPE= 1278.0 TYPE= 1 TARGET= 170.000
** ATC-4 WITH NEF
1650.000 18.01 578.11 .00 577.80 578.42 .31
5150.0 222.5 2956.5 1971.0 102.5 518.4 1037.8
.14 2.17 5.70 1.90 .100 .060 .120
.001595 630. 630. 2 0 0

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SECNO O DEPTH QLOB VLOB XLOBL CWSEL QCH VCH XLCH WSELK ALOB XNL ITRIAL CRIWS OROB VROB XLOBR EG ACH XNCH IDC HV AROB XNR ICONT HL VOL WTN CORAR OLOSS TWA ELMIN TOPWID L-BANK ELEV R-BANK ELEV SSTA ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

3470 ENCROACHMENT STATIONS= 2049.0 2094.0 TYPE= 1 TARGET= 45.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 586.00 ELREA= 586.00

** NC 87 , SEC ATC-7 **									
5810.000	15.30	584.30	.00	583.50	585.37	1.08	.10	.29	576.70
5065.0	.0	5065.0	.0	608.4	.0	.0	229.5	23.1	576.70
.42	.00	8.33	.00	.060	.000	.000	.000	569.00	2050.00
.004932	40.	40.	40.	2	0	0	.00	43.00	2093.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
1.25	1.62	2.50	.00	43.00	3.00	520.00	.00	567.70	567.00	567.00

*SECNO 5867.000
 BTCARD, BRIDGE STENCIL= 2049.00 STENCR= 2094.00
 PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
586.68	585.58	.24	57.	5019.	520.	520.	580.70	586.00	45.

3470 ENCROACHMENT STATIONS= 2049.0 2094.0 TYPE= 1 TARGET= 45.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 586.30 ELREA= 586.30

5867.000	16.75	585.75	.00	584.90	586.64	.89	1.27	.00	576.00
5065.0	.0	5065.0	.0	670.8	.0	.0	230.3	23.2	575.20
.42	.00	7.55	.00	.060	.000	.000	.000	569.00	2050.00
.003382	57.	57.	57.	2	0	2	.00	43.00	2093.00

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5930.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 2025.0 2135.0 TYPE= 1 TARGET= 110.000
 ** ATC-8 TRSF & MOD FOR NEF ROB **
 5930.000 17.26 586.56 .00 585.97 586.88 .33 .13 573.90
 4760.0 693.2 2517.0 1549.8 302.6 430.5 604.5 231.6 23.3 572.30
 .43 2.29 5.85 2.56 .100 .060 .100 569.30 2025.00
 .001530 83. 63. 33. 2 0 0 110.00 2135.00

*SECNO 6150.000

3470 ENCROACHMENT STATIONS= 2015.0 2155.0 TYPE= 1 TARGET= 140.000
 ** ATC-8 MOD FOR NEF ROB **
 6150.000 16.89 586.99 .00 586.27 587.18 .19 .27 574.70
 4760.0 798.5 1996.7 1964.8 405.0 421.0 840.2 239.2 23.9 573.10
 .44 1.97 4.74 2.34 .100 .060 .100 570.10 2015.00
 .001037 220. 220. 220. 2 0 0 140.00 2155.00

*SECNO 7610.000

3470 ENCROACHMENT STATIONS= 1170.0 1330.0 TYPE= 1 TARGET= 160.000
 ** ATC-9 MOD FOR NEF AT HIGHER ELEV LOB **
 7610.000 16.35 588.55 .00 587.66 588.73 .18 1.55 577.40
 4760.0 2134.5 2016.3 609.2 860.2 448.1 333.4 294.7 29.0 576.70
 .57 2.48 4.50 1.83 .090 .060 .100 572.20 1170.00
 .001081 1460. 1460. 1460. 2 0 0 160.00 1330.00

*SECNO 8310.000

3470 ENCROACHMENT STATIONS= 1145.0 1305.0 TYPE= 1 TARGET= 160.000
 ** ATC-10 **
 8310.000 17.79 589.29 .00 588.59 589.45 .16 .71 576.50
 4760.0 234.7 1784.7 2740.6 164.7 397.4 1291.1 322.7 31.5 576.50
 .63 1.42 4.49 2.12 .120 .060 .110 571.50 1145.00
 .000959 700. 700. 700. 0 0 0 160.00 1305.00

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 8500.000

3470 ENCROACHMENT STATIONS= 1015.0 1255.0 TYPE= 1 TARGET= 240.000
 ** TOPO SEC;NEF LOB & PORTIONS OF ROB FM RDWAY; CHAN FM ATC-10**
 8500.000 18.01 589.51 .00 588.85 589.62 .11 .16 576.50

TRAVISFW_DUP

4760.0	2622.7	1606.4	530.9	1599.3	402.6	402.7	332.0	32.4	576.50
.66	1.64	3.99	1.32	.120	.060	.110	.000	571.50	1015.00
.000744	190.	190.	190.	2	0	0	.00	240.00	1255.00

*SECNO 8550.000

3470 ENCROACHMENT STATIONS= 1000.0 TYPE= 1 TARGET= 240.000
 ** PRIVATE RD **

8550.000	17.96	589.56	.00	588.91	589.65	.09	.03	.00	576.70
4760.0	2180.2	2402.5	177.3	1614.3	745.2	187.7	334.9	32.7	581.00
.66	1.35	3.22	.94	.120	.060	.110	.000	571.60	1000.00
.000528	50.	50.	50.	0	0	0	.00	240.00	1240.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
1.10	1.47	2.50	.00	34.00	4.80	509.00	.37	571.60	571.60	571.60

*SECNO 8569.000
 BTCARD, BRIDGE STENCIL= 980.00 STENCR= 1230.00
 PRESSURE AND WEIR FLOW, weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
591.55	589.65	.01	2283.	2516.	509.	517.	586.50	587.70	250.

3470 ENCROACHMENT STATIONS= 980.0 TYPE= 1 TARGET= 250.000
 ** TOPO WITH NEF; PORTIONS OF ROB FM ROADWAY **

8569.000	18.46	590.06	.00	589.57	590.12	.06	.46	.00	576.70
4760.0	2651.4	1979.1	129.5	2259.4	768.1	158.9	336.1	32.8	581.00
.67	1.17	2.58	.81	.120	.060	.110	.000	571.60	980.00
.000324	19.	19.	19.	2	0	3	.00	250.00	1230.00

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 8610.000

3470 ENCROACHMENT STATIONS= 960.0 TYPE= 1 TARGET= 260.000

8610.000	18.49	590.09	.00	589.59	590.13	.04	.01	.00	576.60
4760.0	3405.5	1065.1	289.4	2520.4	413.9	279.3	339.1	33.0	576.60

.67 1.35 2.57 1.04 .100 .060 .100 .000 571.60 960.00
 .000298 41. 41. 41. 0 0 0 .00 260.00 1220.00
 TRAVISFW_DUP

*SECNO 9910.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

3470 ENCROACHMENT STATIONS= 1520.0 1720.0 TYPE= 1 TARGET= 200.000
 ** ATC-12 **
 9910.000 16.10 590.60 .00 590.05 590.70 .10 .54 .02 579.00
 4760.0 1770.5 1781.2 1208.3 956.0 503.9 779.4 420.5 39.9 578.90
 .82 1.85 3.53 1.55 .090 .060 .110 .000 574.50 1520.00
 .000631 1300. 1300. 1300. 2 0 0 .00 200.00 1720.00

*SECNO 10400.000

3470 ENCROACHMENT STATIONS= 1515.0 1695.0 TYPE= 1 TARGET= 180.000
 ** TOPO **
 10400.000 15.53 590.93 .00 590.35 591.07 .14 .36 .02 579.90
 4620.0 1806.1 1966.5 847.4 907.1 485.9 476.2 443.6 42.0 579.80
 .87 1.99 4.05 1.78 .090 .060 .110 .000 575.40 1515.00
 .000869 490. 490. 490. 2 0 0 .00 180.00 1695.00

*SECNO 11140.000

3470 ENCROACHMENT STATIONS= 1415.0 1580.0 TYPE= 1 TARGET= 165.000
 ** ATC-13, MOD FOR NEF AT HIGHER ELEV LOB **
 11140.000 14.93 591.63 .00 591.03 591.76 .12 .68 .00 581.30
 3625.0 1994.6 1213.6 416.8 987.9 302.8 240.7 472.5 45.0 580.40
 .95 2.02 4.01 1.73 .100 .060 .100 .000 576.70 1415.00
 .000989 740. 740. 740. 2 0 0 .00 165.00 1580.00

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	R-BANK
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

*SECNO 12770.000

3470 ENCROACHMENT STATIONS= 1185.0 1350.0 TYPE= 1 TARGET= 165.000
 ** ATC-14 **
 12770.000 14.66 593.16 .00 592.71 593.26 .10 1.49 .01 583.40
 3625.0 348.3 1071.9 2204.9 216.8 297.8 1150.0 532.3 51.1 583.10
 1.14 1.61 3.60 1.92 .100 .060 .100 .000 578.50 1185.00
 .000851 1630. 1630. 1630. 1 0 0 .00 165.00 1350.00

*SECNO 13900.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

3470 ENCROACHMENT STATIONS= 1130.0 1270.0 TYPE= 1 TARGET= 140.000
 ** TOPO WITH CHAN FM ATC-14 **
 13900.000 13.94 594.44 .00 593.89 594.65 1.35 .04 585.40
 3625.0 1350.4 1419.9 854.7 282.1 345.4 570.0 55.1 585.10
 1.23 2.19 5.03 2.47 .110 .100 580.50 1130.00
 .001788 1130. 1130. 2 0 140.00 1270.00

*SECNO 14320.000

3470 ENCROACHMENT STATIONS= 1641.0 1736.0 TYPE= 1 TARGET= 95.000
 ** ATC-15; CHAN FM ATC-14 **
 14320.000 14.08 595.28 .00 594.64 595.74 .99 .10 586.10
 3565.0 983.9 1946.6 634.6 284.7 231.4 580.1 56.2 586.00
 1.25 2.92 6.84 2.74 .110 .100 581.20 1641.00
 .003281 420. 420. 2 0 95.00 1736.00

*SECNO 14365.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.43

3470 ENCROACHMENT STATIONS= 1660.0 1725.0 TYPE= 1 TARGET= 65.000
 ** SR 1504; SEC ATC-16 **
 14365.000 14.26 595.56 .00 594.98 595.87 .10 .03 586.30
 3565.0 .0 3565.0 .0 805.2 .0 581.0 56.3 100000.00
 1.26 4.43 .00 .060 .000 581.30 1660.00
 .001595 45. 45. 2 0 65.00 1725.00

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.95	1.44	2.70	.00	39.00	39.00	1.44	639.00	1.04	581.30	581.30

*SECNO 14385.000

BT CARD, BRIDGE STENCL= 1660.00 STENCR= 1725.00
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
596.26	595.87	.01	170.	3361.	639.	632.	593.80	595.10	65.

3470 ENCROACHMENT STATIONS= 1660.0 1725.0 TYPE= 1 TARGET= 65.000
 ** SR 1504; OVBKS FM TOPO, WITH NEF **
 14385.000 14.60 595.90 .00 595.34 596.18 .28 .31 .00 586.30
 3565.0 .0 3565.0 .0 842.6 .0 581.4 56.3 100000.00
 1.26 .00 4.23 .00 .000 .060 .000 581.30 1660.00
 .001436 21. 21. 21. 2 0 3 65.00 65.00 1725.00

*SECNO 14435.000

3470 ENCROACHMENT STATIONS= 1635.0 1735.0 TYPE= 1 TARGET= 100.000
 ** TOPO; CHAN FM I7 **
 14435.000 14.49 595.99 .00 595.58 596.26 .26 .07 .00 585.40
 3565.0 833.6 2159.5 571.9 405.0 432.2 261.4 582.5 56.4 586.30
 1.26 2.06 5.00 2.19 .110 .060 .100 581.50 1635.00
 .001415 50. 50. 50. 1 0 0 100.00 100.00 1735.00

*SECNO 14880.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.15

3470 ENCROACHMENT STATIONS= 1300.0 1570.0 TYPE= 1 TARGET= 270.000
 ** ATC-17 **
 14880.000 14.29 596.49 .00 595.91 596.52 .03 .22 .05 586.10
 3045.0 456.9 836.5 1751.6 573.6 426.0 1632.4 601.5 58.3 587.00
 1.36 .80 1.96 1.07 .110 .060 .090 582.20 1300.00
 .000223 445. 445. 445. 2 0 0 270.00 270.00 1570.00

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	ELEV
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

*SECNO 15580.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

3470 ENCROACHMENT STATIONS= 1345.0 1555.0 TYPE= 1 TARGET= 210.000
 ** TOPO SEC; CHAN FM SEC ATC-17 **
 15580.000 12.48 596.68 596.06 596.77 .23 588.10
 3045.0 192.2 1179.3 1673.5 368.2 1059.4 61.6 589.00
 1.44 1.27 3.20 1.58 .110 .060 584.20 1345.00
 .000720 700. 700. 550. 2 0 210.00 1555.00

*SECNO 16030.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .38

3470 ENCROACHMENT STATIONS= 1367.0 1497.0 TYPE= 1 TARGET= 130.000
 ** ATC-18 **
 16030.000 11.55 597.05 .00 596.52 597.66 .61 589.30
 3045.0 880.5 1795.5 369.0 282.3 230.2 138.3 589.10
 1.46 3.12 7.80 2.67 .100 .060 .100 1368.84
 .005020 450. 450. 450. 2 0 128.16 1497.00

*SECNO 17790.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.10

3470 ENCROACHMENT STATIONS= 1265.0 1415.0 TYPE= 1 TARGET= 150.000
 ** ATC-19 **
 17790.000 11.82 601.32 .00 600.64 601.44 3.68 593.10
 3045.0 107.1 1110.8 1827.0 78.6 287.1 933.0 592.00
 1.64 1.36 3.87 1.96 .100 .060 .100 1265.00
 .001139 1760. 1760. 1760. 2 0 150.00 1415.00

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SECNO	DEPTH	CWSEL	CRIMS	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 19430.000

3470 ENCROACHMENT STATIONS= 2030.0 2210.0 TYPE= 1 TARGET= 180.000
 ** ATC-20, MOD FOR NEF LOB **
 19430.000 12.42 603.52 .00 602.72 603.73 .22 595.60
 3045.0 568.6 1598.3 878.1 249.0 332.3 550.9 727.4 75.2 595.80
 1.78 2.28 4.81 1.59 .090 .060 .110 .000 591.10 2030.00

*SECNO 20230.000

3470 ENCROACHMENT STATIONS= 2050.0 2220.0 TYPE= 1 TARGET= 170.000
 ** TOPO SEC; CHAN FM ATC-20 **
 20230.000 12.07 604.87 .00 604.34 605.06 .18 1.32 .01 597.30
 3045.0 198.5 1475.7 1370.8 105.8 322.2 770.6 748.8 78.4 597.50
 1.85 1.88 4.58 1.78 .090 .060 .110 .000 592.80 2050.00
 .001600 800. 800. 2 0 0 170.00 2220.00

*SECNO 20970.000

3470 ENCROACHMENT STATIONS= 1885.0 2145.0 TYPE= 1 TARGET= 260.000
 ** TOPO SEC; CHAN FM ATC-20 **
 20970.000 11.77 605.77 .00 605.21 605.84 .07 .76 .02 598.50
 2910.0 1536.0 983.7 390.4 1113.7 313.4 319.9 771.9 81.7 598.70
 1.95 1.38 3.14 1.22 .100 .060 .110 .000 594.00 1885.00
 .000780 600. 740. 2 0 0 260.00 2145.00

1490 NH CARD USED

*SECNO 21030.000

3470 ENCROACHMENT STATIONS= 1178.0 1413.0 TYPE= 1 TARGET= 235.000
 ** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **
 21030.000 11.73 605.83 .00 605.27 605.87 .04 .02 .01 599.30
 2335.0 1697.3 562.8 74.9 1334.3 246.2 90.9 773.2 81.9 599.00
 1.95 1.27 2.29 .82 .092 .060 .110 .000 594.10 1178.00
 .000471 10. 60. 2 0 0 235.00 1413.00

1490 NH CARD USED

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	ELEV
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	SSTA
									ENDST

*SECNO 21075.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .46

3470 ENCROACHMENT STATIONS= 1200.0 1425.0 TYPE= 1 TARGET= 225.000
 ** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**
 21075.000 7.46 605.86 .00 605.31 605.96 .11 .07 .03 603.10
 2335.0 1455.4 697.7 181.9 731.3 185.7 120.4 775.2 82.2 602.80
 1.96 1.99 3.76 1.51 .094 .060 .110 .000 598.40 1200.00

.002229 45. 165. 45. 2 45. 0 0 225.00 1425.00

*SECNO 21085.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

3470 ENCROACHMENT STATIONS= 1160.0 1350.0 TYPE= 1 TARGET= 190.000
 ** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **
 21085.000 7.89 605.89 .00 605.31 605.98 .09 .01 .00 601.30
 2335.0 535.6 1794.7 4.7 442.4 671.0 9.3 775.5 82.3 601.00
 1.96 1.21 2.67 .51 .100 .060 .110 598.00 1160.00
 .000876 10. 10. 10. 1 0 190.00 1350.00

*SECNO 21250.000

3470 ENCROACHMENT STATIONS= 1200.0 1360.0 TYPE= 1 TARGET= 160.000
 ** SEC 20-A EXTENDED ON LOB **
 21250.000 8.00 606.00 .00 605.44 606.11 .11 .12 .01 601.30
 2335.0 332.8 1950.1 52.2 262.5 682.7 54.8 778.8 82.8 601.00
 1.98 1.27 2.86 .95 .100 .060 .110 598.00 1200.00
 .000976 135. 135. 2 0 160.00 1360.00

*SECNO 21270.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .53

3470 ENCROACHMENT STATIONS= 1210.0 1360.0 TYPE= 1 TARGET= 150.000
 ** SEC 20-A W/CHAN FM SEC 21 **
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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	
21270.000	7.98	605.98	.00	605.45	606.19	.21	.03	.04	600.70	
2335.0	928.6	887.8	518.6	384.0	172.5	233.9	779.2	82.9	600.70	
1.98	2.42	5.15	2.22	.100	.060	.110	.000	598.00	1210.00	
.003423	20.	20.	20.	2	0	0	.00	150.00	1360.00	

*SECNO 21750.000

3470 ENCROACHMENT STATIONS= 1595.0 1755.0 TYPE= 1 TARGET= 160.000
 ** SEC 21 **
 21750.000 9.27 607.27 .00 606.45 607.43 .15 1.23 84.6 600.70
 2335.0 751.3 901.2 682.5 349.0 204.9 396.1 788.8 84.6 600.70

2.03 2.15 4.40 1.72 .100 .110 .000 598.00 1595.00
 .001987 480. 480. 480. .060 0 .00 160.00 1755.00
 TRAVISFW_DUP
 2 0

*SECNO 22440.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

3470 ENCROACHMENT STATIONS= 1602.0 1742.0 TYPE= 1 TARGET= 140.000
 ** TOPO,ADJ. BASED ON 23;NR OVBK & CHAN FM 21; NEF LOB **
 22440.000 7.99 609.19 .00 608.46 609.50 .31 2.01 .06 603.90
 2335.0 680.5 1042.9 611.7 245.3 172.8 250.2 801.6 87.0 603.90
 2.07 2.77 6.03 2.44 .100 .060 .100 601.20 601.20 1602.00
 .004691 690. 690. 2 0 0 140.00 1742.00

*SECNO 22970.000

3470 ENCROACHMENT STATIONS= 1645.0 1765.0 TYPE= 1 TARGET= 120.000
 ** TOPO MOD BY SEC 23; CHAN FM ATC-21 **
 22970.000 7.88 611.68 .00 611.22 611.99 2.49 .00 606.50
 2335.0 515.5 1015.8 803.6 186.8 169.9 809.6 88.6 606.50
 2.11 2.76 5.98 2.81 .100 .060 603.80 603.80 1645.00
 .004707 530. 530. 2 0 0 120.00 1765.00

*SECNO 23110.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRISWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

3470 ENCROACHMENT STATIONS= 1665.0 1725.0 TYPE= 1 TARGET= 60.000
 23110.000 7.96 612.26 .00 611.77 613.09 .89 .21 606.50
 2240.0 363.6 1488.8 387.6 96.9 174.2 811.2 88.8 606.50
 2.11 3.75 8.55 3.79 .100 .060 .100 604.30 604.30 1665.00
 .009173 210. 140. 2 0 0 60.00 1725.00

*SECNO 23160.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 1679.0 1707.0 TYPE= 1 TARGET= 28.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 612.60 ELREA= 612.60

** SR 1500; SEC ATC-22, MOD BY SEC 23 **

23160.000	7.66	612.36	.00	611.99	614.06	1.70	.62	.35	606.50
2240.0	.0	2240.0	.0	.0	214.3	.0	811.5	88.9	100000.00
2.11	.00	10.45	.00	.000	.060	.000	.000	604.70	1679.00
.017391	50.	50.	50.	3	0	0	.00	28.00	1707.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
1.25	1.57	2.70	.00	.00	28.00	1.00	189.00	.00	604.60	604.70

*SECNO 23201.000
 BTCARD, BRIDGE STENCL= 1679.00 STENCR= 1707.00

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

PRESSURE AND WEIR FLOW, weir Submergence Based on TRAPEZOIDAL Shape

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	OCH	QROB	ALOB	ACH	AROB	VOI	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID	ELLC	ELTRD	WEIRLN
615.78	614.27	.43	17.	2220.	189.	AREA	611.60	615.20	28.
						189.			

3470 ENCROACHMENT STATIONS= 1679.0 1707.0 TYPE= 1 TARGET= 28.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 615.20 ELREA= 615.50

** SR 1500; OVBKS FM SEC 23 **

23201.000	10.16	614.76	.00	614.36	615.72	.96	1.67	.00	606.50
2240.0	.0	2240.0	.0	.0	284.5	.0	811.8	88.9	100000.00
2.12	.00	7.87	.00	.000	.060	.000	.000	604.60	1679.00
.007406	41.	41.	41.	3	0	2	.00	28.00	1707.00

*SECNO 23245.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.94

3470 ENCROACHMENT STATIONS= 1635.0 1755.0 TYPE= 1 TARGET= 120.000

** SEC 23; OVBK FM 21 **	11.48	615.88	615.58	615.98	438.4	812.5	89.0	606.60
23245.000	665.9	898.8	417.5	262.1	438.4	812.5	89.0	606.60
2240.0	2.12	3.43	1.10	.060	.110	.000	604.40	1635.00
.000856	44.	44.	2	0	0	.00	120.00	1755.00

*SECNO 23335.000

3470 ENCROACHMENT STATIONS= 1610.0 1790.0 TYPE= 1 TARGET= 180.000

** PREVIOUS SEC TRANSFERRED **	11.49	615.99	615.71	616.05	.05	.06	.01	606.70
23335.000	669.1	719.1	851.8	262.4	676.2	815.2	89.3	606.70
2240.0	2.14	2.74	1.26	.060	.110	.000	604.50	1610.00
.000546	90.	90.	2	0	0	.00	180.00	1790.00

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SECNO	DEPTH	CWSEL	CRIBS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

*SECNO 25340.000

3470 ENCROACHMENT STATIONS= 1745.0 1945.0 TYPE= 1 TARGET= 200.000

** SEC 24 WITH NEF **	10.48	617.18	616.54	617.22	.04	1.17	.00	610.10
25340.000	130.2	516.3	130.2	198.2	1192.7	884.4	98.1	609.90
2145.0	2.49	2.61	.110	.060	.110	.000	606.70	1745.00
.000627	2005.	2005.	2	0	0	.00	200.00	1945.00

*SECNO 26070.000

3470 ENCROACHMENT STATIONS= 1600.0 1850.0 TYPE= 1 TARGET= 250.000

** SEC 25 , NEF AT HIGHER ELEV ROB **	9.85	617.55	616.77	617.57	.02	.34	.00	611.00
26070.000	222.3	288.4	247.6	144.8	1174.5	907.8	101.5	610.10
1570.0	2.66	1.99	.100	.060	.110	.000	607.70	1600.00

.000401 730. 730. 640. 2 TRAVISFW_DUP 0 0 .00 250.00 1850.00

*SECNO 26840.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3470 ENCROACHMENT STATIONS= 1530.0 1730.0 TYPE= 1 TARGET= 200.000
 ** TOPO, WITH HIGHER ELEVS TAKEN FM SEC 25 ROB; CHAN FM SEC 25**
 26840.000 8.17 617.97 .00 617.24 618.02 .05 .44 01 613.10
 1500.0 650.0 339.7 510.3 467.3 118.0 364.9 928.7 105.1 612.20
 2.78 1.39 2.88 1.40 .090 .100 .000 609.80 1530.00
 .001101 600. 770. 770. 2 0 0 200.00 1730.00

*SECNO 27770.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .59

3470 ENCROACHMENT STATIONS= 1327.0 1427.0 TYPE= 1 TARGET= 100.000
 ** TOPO, WITH NEF; CHAN FM SEC 26 **
 27770.000 6.61 619.51 .00 618.95 619.69 .18 1.62 .05 613.00
 1500.0 315.6 528.3 656.1 125.5 112.3 281.9 944.4 108.3 614.00
 2.86 2.52 4.71 2.33 .090 .100 .000 612.90 1327.00
 .003155 930. 930. 2 0 0 100.00 1427.00

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 27950.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

3470 ENCROACHMENT STATIONS= 1330.0 1400.0 TYPE= 1 TARGET= 70.000
 ** ATC-26 **
 27950.000 6.82 620.12 .00 619.57 620.68 .56 .83 .15 613.40
 1500.0 347.9 859.6 292.6 95.1 116.1 102.1 946.1 108.7 614.40
 2.87 3.66 7.41 2.87 .090 .100 .000 613.30 1330.00
 .007474 180. 180. 2 0 0 70.00 1400.00

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 HEC-2 WATER SURFACE PROFILES
 Version 4.6.2; May 1991

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

TRAVIS CR

SUMMARY PRINTOUT

SECNO	CWSEL	EG	ELMIN	ELLC	10*KS	Q
274870.000	575.70	576.12	554.00	.00	10.74	13250.00
274870.000	575.70	576.12	554.00	.00	10.74	13250.00
* 120.000	576.32	576.36	555.90	.00	2.59	5150.00
120.000	576.24	576.41	555.90	.00	6.48	5150.00
* 850.000	576.54	576.75	557.10	.00	9.19	5150.00
850.000	576.77	576.96	557.10	.00	8.67	5150.00
935.000	576.63	576.83	558.00	.00	8.38	5150.00
935.000	576.85	577.04	558.00	.00	8.69	5150.00
961.000	577.03	577.23	558.00	574.90	8.20	5150.00
961.000	577.26	577.45	558.00	574.90	7.71	5150.00
1020.000	577.07	577.29	558.10	.00	10.36	5150.00
1020.000	577.26	577.55	558.10	.00	11.93	5150.00
1650.000	577.80	577.99	560.10	.00	11.78	5150.00
1650.000	578.11	578.42	560.10	.00	15.95	5150.00
2825.000	579.34	579.62	562.90	.00	15.63	5150.00
2825.000	579.91	580.18	562.90	.00	13.86	5150.00
4540.000	582.22	582.52	566.60	.00	18.28	5150.00
4540.000	582.59	582.91	566.60	.00	18.20	5150.00
5110.000	583.17	583.30	567.70	.00	9.71	5150.00
5110.000	583.62	583.90	567.70	.00	16.23	5150.00
5770.000	583.87	584.26	569.00	.00	18.34	5065.00
5770.000	584.63	584.98	569.00	.00	15.58	5065.00

SECNO	CWSEL	EG	ELMIN	ELLC	10*K5	Q
* 5810.000	583.50	584.71	569.00	.00	59.81	5065.00
* 5810.000	584.30	585.37	569.00	.00	49.32	5065.00
5867.000	584.90	585.89	569.00	580.70	40.72	5065.00
5867.000	585.75	586.64	569.00	580.70	33.82	5065.00
* 5930.000	585.97	586.16	569.30	.00	10.94	4760.00
5930.000	586.56	586.88	569.30	.00	15.30	4760.00
6150.000	586.27	586.38	570.10	.00	7.48	4760.00
6150.000	586.99	587.18	570.10	.00	10.37	4760.00
7610.000	587.66	587.88	572.20	.00	14.02	4760.00
7610.000	588.55	588.73	572.20	.00	10.81	4760.00
8310.000	588.59	588.77	571.50	.00	11.45	4760.00
8310.000	589.29	589.45	571.50	.00	9.59	4760.00
8500.000	588.85	588.97	571.50	.00	8.54	4760.00
8500.000	589.51	589.62	571.50	.00	7.44	4760.00
8550.000	588.91	589.01	571.60	.00	6.07	4760.00
8550.000	589.56	589.65	571.60	.00	5.28	4760.00
* 8569.000	589.57	589.61	571.60	586.50	2.90	4760.00
8569.000	590.06	590.12	571.60	586.50	3.24	4760.00
8610.000	589.59	589.62	571.60	.00	2.78	4760.00
8610.000	590.09	590.13	571.60	.00	2.98	4760.00
9910.000	590.05	590.13	574.50	.00	5.42	4760.00
9910.000	590.60	590.70	574.50	.00	6.31	4760.00
10400.000	590.35	590.46	575.40	.00	7.91	4620.00
10400.000	590.93	591.07	575.40	.00	8.69	4620.00
* 11140.000	591.03	591.17	576.70	.00	12.26	3625.00
11140.000	591.63	591.76	576.70	.00	9.89	3625.00
12770.000	592.71	592.79	578.50	.00	8.08	3625.00
12770.000	593.16	593.26	578.50	.00	8.51	3625.00
* 13900.000	593.89	594.04	580.50	.00	15.18	3625.00
13900.000	594.44	594.65	580.50	.00	17.88	3625.00
* 14320.000	594.64	595.17	581.20	.00	40.60	3565.00
14320.000	595.28	595.74	581.20	.00	32.81	3565.00
* 14365.000	594.98	595.32	581.30	.00	15.88	3565.00

* 14365.000 595.56 595.87 581.30 .00 15.95 3565.00

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SECNO	CWSEL	EG	ELMIN	ELLC	10*KS	Q
14385.000	595.34	595.65	581.30	593.80	16.35	3565.00
14385.000	595.90	596.18	581.30	593.80	14.36	3565.00
14435.000	595.58	595.74	581.50	.00	10.50	3565.00
14435.000	595.99	596.26	581.50	.00	14.15	3565.00
* 14880.000	595.91	595.93	582.20	.00	1.64	3045.00
* 14880.000	596.49	596.52	582.20	.00	2.23	3045.00
* 15580.000	596.06	596.16	584.20	.00	8.93	3045.00
* 15580.000	596.68	596.77	584.20	.00	7.20	3045.00
* 16030.000	596.52	597.28	585.50	.00	64.59	3045.00
* 16030.000	597.05	597.66	585.50	.00	50.20	3045.00
* 17790.000	600.64	600.72	589.50	.00	8.80	3045.00
* 17790.000	601.32	601.44	589.50	.00	11.39	3045.00
* 19430.000	602.72	602.97	591.10	.00	22.39	3045.00
* 19430.000	603.52	603.73	591.10	.00	16.94	3045.00
20230.000	604.34	604.50	592.80	.00	16.08	3045.00
20230.000	604.87	605.06	592.80	.00	16.00	3045.00
20970.000	605.21	605.27	594.00	.00	7.54	2910.00
20970.000	605.77	605.84	594.00	.00	7.80	2910.00
21030.000	605.27	605.30	594.10	.00	4.74	2335.00
21030.000	605.83	605.87	594.10	.00	4.71	2335.00
* 21075.000	605.31	605.37	598.40	.00	18.35	2335.00
* 21075.000	605.86	605.96	598.40	.00	22.29	2335.00
* 21085.000	605.31	605.39	598.00	.00	9.55	2335.00
* 21085.000	605.89	605.98	598.00	.00	8.76	2335.00
21250.000	605.44	605.52	598.00	.00	9.04	2335.00
21250.000	606.00	606.11	598.00	.00	9.76	2335.00
* 21270.000	605.45	605.55	598.00	.00	22.65	2335.00
* 21270.000	605.98	606.19	598.00	.00	34.23	2335.00
21750.000	606.45	606.55	598.00	.00	19.23	2335.00
21750.000	607.27	607.43	598.00	.00	19.87	2335.00
* 22440.000	608.46	608.76	601.20	.00	57.60	2335.00
* 22440.000	609.19	609.50	601.20	.00	46.91	2335.00

22970.000 611.22 611.47 603.80 .00 45.05 2335.00
22970.000 611.68 611.99 603.80 .00 47.07 2335.00

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SECNO	CWSEL	EG	ELMIN	ELLC	10*KS	Q
* 23110.000	611.77	612.74	604.30	.00	118.46	2240.00
* 23110.000	612.26	613.09	604.30	.00	91.73	2240.00
23160.000	611.99	613.86	604.70	.00	201.96	2240.00
23160.000	612.36	614.06	604.70	.00	173.91	2240.00
* 23201.000	614.36	615.40	604.60	611.60	83.65	2240.00
* 23201.000	614.76	615.72	604.60	611.60	74.06	2240.00
* 23245.000	615.58	615.68	604.40	.00	9.50	2240.00
* 23245.000	615.88	615.98	604.40	.00	8.56	2240.00
23335.000	615.71	615.76	604.50	.00	5.68	2240.00
23335.000	615.99	616.05	604.50	.00	5.46	2240.00
25340.000	616.54	616.55	606.70	.00	2.86	2145.00
25340.000	617.18	617.22	606.70	.00	6.27	2145.00
* 26070.000	616.77	616.78	607.70	.00	4.42	1570.00
26070.000	617.55	617.57	607.70	.00	4.01	1570.00
* 26840.000	617.24	617.29	609.80	.00	12.48	1500.00
* 26840.000	617.97	618.02	609.80	.00	11.01	1500.00
* 27770.000	618.95	619.09	612.90	.00	32.34	1500.00
* 27770.000	619.51	619.69	612.90	.00	31.55	1500.00
* 27950.000	619.57	620.29	613.30	.00	106.78	1500.00
* 27950.000	620.12	620.68	613.30	.00	74.74	1500.00

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SUMMARY PRINTOUT

SECNO	CWSEL	SSTA	STCHL	STCHR	ENDST	TOPWID
274870.000	575.70	1254.40	1430.00	1548.00	1607.00	352.60
274870.000	575.70	1254.40	1430.00	1548.00	1607.00	352.60

SECNO	CWSEL	SSTA	STCHL	STCHR	ENDST	TOPWID
* 19430.000	602.72	1998.25	2067.00	2096.00	2245.80	247.55
19430.000	603.52	2030.00	2067.00	2096.00	2210.00	180.00
20230.000	604.34	1997.92	2067.00	2096.00	2269.06	271.14
20230.000	604.87	2050.00	2067.00	2096.00	2220.00	170.00
20970.000	605.21	1694.98	2067.00	2096.00	2196.67	501.70
20970.000	605.77	1885.00	2067.00	2096.00	2145.00	260.00
21030.000	605.27	998.59	1374.00	1398.00	1451.60	453.02
21030.000	605.83	1178.00	1374.00	1398.00	1413.00	235.00
* 21075.000	605.31	997.47	1370.00	1398.00	1451.88	454.42
* 21075.000	605.86	1200.00	1370.00	1398.00	1425.00	225.00
* 21085.000	605.31	992.65	1253.00	1348.00	1366.28	373.63
21085.000	605.89	1160.00	1253.00	1348.00	1350.00	190.00
21250.000	605.44	1066.59	1253.00	1348.00	1405.10	338.51
21250.000	606.00	1200.00	1253.00	1348.00	1360.00	160.00
* 21270.000	605.45	1066.23	1288.00	1313.00	1405.25	339.01
* 21270.000	605.98	1210.00	1288.00	1313.00	1360.00	150.00
21750.000	606.45	1486.99	1652.00	1677.00	1808.73	321.73
21750.000	607.27	1595.00	1652.00	1677.00	1755.00	160.00
* 22440.000	608.46	1569.39	1652.00	1677.00	1774.73	205.35
* 22440.000	609.19	1602.00	1652.00	1677.00	1742.00	140.00
22970.000	611.22	1620.00	1682.00	1707.00	1770.00	150.00
22970.000	611.68	1645.00	1682.00	1707.00	1765.00	120.00
* 23110.000	611.77	1665.00	1682.00	1707.00	1725.00	60.00
* 23110.000	612.26	1665.00	1682.00	1707.00	1725.00	60.00
23160.000	611.99	1679.00	1679.00	1707.00	1707.00	28.00
23160.000	612.36	1679.00	1679.00	1707.00	1707.00	28.00
* 23201.000	614.36	1679.00	1679.00	1707.00	1707.00	28.00
* 23201.000	614.76	1679.00	1679.00	1707.00	1707.00	28.00
* 23245.000	615.58	1635.00	1682.00	1707.00	1755.00	120.00
* 23245.000	615.88	1635.00	1682.00	1707.00	1755.00	120.00
23335.000	615.71	1576.11	1682.00	1707.00	1833.03	256.92
23335.000	615.99	1610.00	1682.00	1707.00	1790.00	180.00

WARNING SECNO=	17790.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	17790.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	19430.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	21075.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	21075.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	21085.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	21270.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	21270.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	22440.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	22440.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	23110.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	23110.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	23201.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE

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WARNING SECNO=	23201.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	23245.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	23245.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	26070.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	26840.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	26840.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	27770.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	27770.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	27950.000	PROFILE=	1	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE
WARNING SECNO=	27950.000	PROFILE=	2	CONVEYANCE	CHANGE	OUTSIDE	ACCEPTABLE	RANGE

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FLOODWAY DATA, TRAVIS CR
PROFILE NO. 2

STATION	WIDTH	FLOODWAY SECTION AREA	-----	MEAN VELOCITY	-----	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
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STATION	WIDTH	FLOODWAY SECTION AREA	MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
274870.000	353.	3194.	4.1	575.7	575.7	.0
120.000	200.	2111.	2.4	576.2	576.3	-.1
850.000	180.	1875.	2.7	576.7	576.5	.2
935.000	120.	1466.	3.5	576.8	576.6	.2
961.000	120.	1484.	3.5	577.2	577.0	.2
1020.000	120.	1476.	3.5	577.3	577.1	.2
1650.000	170.	1659.	3.1	578.1	577.8	.3
2825.000	180.	1712.	3.0	579.9	579.3	.6
4540.000	170.	1537.	3.3	582.6	582.2	.4
5110.000	150.	1585.	3.2	583.7	583.2	.5
5770.000	75.	1063.	4.8	584.7	583.9	.8
5810.000	43.	608.	8.3	584.3	583.5	.8
5867.000	43.	671.	7.6	585.8	584.9	.9
5930.000	110.	1338.	3.6	586.6	586.0	.6
6150.000	140.	1666.	2.9	587.0	586.3	.7
7610.000	160.	1642.	2.9	588.6	587.7	.9
8310.000	160.	1853.	2.6	589.3	588.6	.7
8500.000	240.	2405.	2.0	589.6	588.9	.7
8550.000	240.	2547.	1.9	589.6	588.9	.7
8569.000	250.	3186.	1.5	590.1	589.6	.5
8610.000	260.	3214.	1.5	590.1	589.6	.5
9910.000	200.	2239.	2.1	590.6	590.1	.5
10400.000	180.	1869.	2.5	590.9	590.3	.6
11140.000	165.	1531.	2.4	591.6	591.0	.6
12770.000	165.	1665.	2.2	593.1	592.7	.4
13900.000	140.	1244.	2.9	594.4	593.9	.5
14320.000	95.	853.	4.2	595.2	594.6	.6
14365.000	65.	805.	4.4	595.6	595.0	.6
14385.000	65.	843.	4.2	595.9	595.3	.6
14435.000	100.	1099.	3.2	596.0	595.6	.4
14880.000	270.	2632.	1.2	596.5	596.0	.6
15580.000	210.	1579.	1.9	596.7	596.1	.6
16030.000	128.	651.	4.7	597.0	596.5	.5
17790.000	150.	1299.	2.3	601.3	600.6	.7
19430.000	180.	1132.	2.7	603.5	602.7	.8
20230.000	170.	1199.	2.5	604.8	604.3	.5
20970.000	260.	1747.	1.7	605.8	605.2	.6
21030.000	235.	1671.	1.4	605.9	605.3	.6
21075.000	225.	1037.	2.3	605.8	605.3	.5
21085.000	190.	1123.	2.1	605.9	605.3	.6
21250.000	160.	1000.	2.3	606.0	605.4	.6
21270.000	150.	790.	3.0	606.0	605.5	.5

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FLOODWAY DATA, TRAVIS CR
PROFILE NO. 2

STATION WIDTH FLOODWAY SECTION AREA MEAN VELOCITY WATER SURFACE ELEVATION WITH FLOODWAY WATER SURFACE ELEVATION WITHOUT FLOODWAY DIFFERENCE

TRAVISFW_DUP

21750.000	950.	2.5	607.2	606.4	.8
22440.000	668.	3.5	609.2	608.5	.7
22970.000	643.	3.6	611.7	611.2	.5
23110.000	373.	6.0	612.3	611.8	.5
23160.000	214.	10.5	612.4	612.0	.4
23201.000	284.	7.9	614.8	614.4	.4
23245.000	1118.	2.0	615.9	615.6	.3
23335.000	1487.	1.5	616.0	615.7	.3
25340.000	1521.	1.4	617.1	616.5	.6
26070.000	1567.	1.0	617.6	616.8	.8
26840.000	950.	1.6	617.9	617.2	.7
27770.000	520.	2.9	619.6	619.0	.6
27950.000	313.	4.8	620.1	619.6	.5

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr	619.67		620.41	81.63	317.81	913.80	268.39	1353.00	1353.00	1371.00	1371.00
Reach-1	27950	FW	620.15	0.48	620.72	70.00	331.29	870.75	297.96	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr	619.06		619.20	173.00	372.65	471.94	655.41	1353.00	1353.00	1371.00	1371.00
Reach-1	27770	FW	619.54	0.49	619.72	100.00	301.93	533.85	664.22	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr	617.45		617.49	331.14	647.13	305.57	547.30	1642.00	1642.00	1658.00	1658.00
Reach-1	26840	FW	618.05	0.60	618.10	200.00	653.14	336.99	509.86	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr	617.00		617.02	407.09	284.62	265.38	1020.00	1642.00	1642.00	1658.00	1658.00
Reach-1	26070	FW	617.64	0.64	617.66	250.00	224.52	289.00	1056.48	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr	616.79		616.80	557.31	520.48	314.73	1309.79	1764.00	1764.00	1785.00	1785.00
Reach-1	25340	FW	617.28	0.50	617.32	200.00	130.54	515.58	1498.89	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr	615.93		615.99	263.08	618.44	766.31	855.25	1682.00	1682.00	1707.00	1707.00
Reach-1	23335	FW	616.13	0.19	616.18	180.00	661.73	729.74	848.53	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr	615.88		615.94	264.26	618.83	765.02	856.16	1682.00	1682.00	1707.00	1707.00
Reach-1	23245	FW	616.02	0.14	616.11	120.00	650.37	907.11	682.51	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr	615.86		615.91	260.16	584.23	807.72	848.06	1679.00	1679.00	1707.00	1707.00
Reach-1	23201	FW	614.93	-0.93	615.86	28.00	2240.00	2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR U	100-Yr	615.86		615.91	159.85	95.20	2139.09	8.56	1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR U	FW	614.93	-0.93	615.86			2239.46		1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR D	100-Yr	615.75		615.91	143.24	95.20	2139.09	8.56	1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR D	FW	614.93	-0.82	615.81			2239.46		1679.00	1679.00	1707.00	1707.00
Reach-1	23160	100-Yr	610.55		613.45	28.00	2240.00	2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23160	FW	612.42	1.88	614.09	28.00	2240.00	2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23110	100-Yr	611.51		611.69	218.96	788.96	774.36	676.68	1682.00	1682.00	1707.00	1707.00
Reach-1	23110	FW	612.26	0.76	613.09	60.00	363.57	1488.78	387.66	1665.00	1682.00	1707.00	1725.00
Reach-1	22970	100-Yr	611.01		611.16	264.56	784.17	722.76	828.07	1682.00	1682.00	1707.00	1707.00
Reach-1	22970	FW	611.69	0.68	612.00	120.00	515.71	1015.23	804.06	1645.00	1682.00	1707.00	1765.00
Reach-1	22440	100-Yr	608.63		608.92	207.31	708.89	965.42	660.68	1652.00	1652.00	1677.00	1677.00
Reach-1	22440	FW	609.23	0.60	609.53	140.00	683.03	1043.66	608.31	1602.00	1652.00	1677.00	1742.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	21750	100-Yr	606.62		606.73	326.55	766.96	784.23	783.81	1652.00	1652.00	1677.00	
Reach-1	21750	FW	607.31	0.69	607.46	160.00	737.23	910.65	687.12	1595.00	1652.00	1677.00	1755.00
Reach-1	21270	100-Yr	605.62		605.71	343.42	1240.48	654.28	440.25	1288.00	1288.00	1313.00	
Reach-1	21270	FW	606.02	0.40	606.23	150.00	932.30	890.19	512.51	1210.00	1288.00	1313.00	1360.00
Reach-1	21250	100-Yr	605.60		605.68	343.05	578.36	1654.34	102.30	1253.00	1253.00	1348.00	
Reach-1	21250	FW	606.05	0.44	606.15	160.00	333.85	1948.80	52.35	1200.00	1253.00	1348.00	1360.00
Reach-1	21085	100-Yr	605.49		605.56	378.16	670.74	1635.31	28.95	1253.00	1253.00	1348.00	
Reach-1	21085	FW	605.94	0.45	606.02	190.00	536.95	1793.32	4.73	1160.00	1253.00	1348.00	1350.00
Reach-1	21075	100-Yr	605.49		605.54	459.61	1559.07	547.37	228.56	1370.00	1370.00	1398.00	
Reach-1	21075	FW	605.90	0.42	606.01	225.00	1453.62	698.48	182.91	1200.00	1370.00	1398.00	1425.00
Reach-1	21030	100-Yr	605.44		605.47	458.33	1633.78	532.09	169.13	1374.00	1374.00	1398.00	
Reach-1	21030	FW	605.87	0.43	605.91	235.00	1690.18	572.29	72.53	1178.00	1374.00	1398.00	1413.00
Reach-1	20970	100-Yr	605.39		605.44	507.38	1504.47	917.06	488.47	2067.00	2067.00	2096.00	
Reach-1	20970	FW	605.81	0.43	605.88	260.00	1531.42	985.93	392.75	1885.00	2067.00	2096.00	2145.00
Reach-1	20230	100-Yr	604.51		604.67	274.78	309.84	1388.86	1346.30	2050.00	2067.00	2096.00	
Reach-1	20230	FW	604.93	0.42	605.11	170.00	198.87	1470.88	1375.26	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.87		603.14	251.46	599.04	1689.78	756.18	2067.00	2067.00	2096.00	
Reach-1	19430	FW	603.60	0.73	603.81	180.00	561.40	1606.24	877.36	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.80		600.87	234.19	146.81	900.02	1998.17	1275.00	1275.00	1300.00	
Reach-1	17790	FW	601.45	0.66	601.57	150.00	107.87	1113.92	1823.21	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.35		597.26	118.78	714.04	1981.79	349.17	1442.00	1442.00	1464.00	
Reach-1	16030	FW	597.09	0.74	597.77	128.64	769.30	1884.89	390.81	1367.00	1442.00	1464.00	1497.00
Reach-1	15580	100-Yr	595.78		595.89	255.09	193.85	1277.42	1573.73	1366.00	1366.00	1398.00	
Reach-1	15580	FW	596.75	0.97	596.84	210.00	178.29	1190.84	1675.67	1345.00	1366.00	1398.00	1555.00
Reach-1	14880	100-Yr	595.57		595.59	504.69	439.10	739.55	1866.34	1366.00	1366.00	1398.00	
Reach-1	14880	FW	596.56	0.99	596.59	270.00	458.56	836.32	1750.12	1300.00	1366.00	1398.00	1570.00
Reach-1	14435	100-Yr	595.32		595.41	377.00	1030.58	1415.54	1118.88	1675.00	1675.00	1707.00	
Reach-1	14435	FW	596.06	0.74	596.33	100.00	842.25	2177.42	545.33	1635.00	1675.00	1707.00	1735.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	14385	100-Yr	595.30		595.38	376.68	645.14	2207.74	712.12	1660.00	1660.00	1725.00	1725.00
Reach-1	14385	FW	595.98	0.68	596.26	65.00		3565.00		1660.00	1660.00	1725.00	1725.00
Reach-1	14375 BR U	100-Yr	595.30		595.38	146.23	20.08	3544.35	1.10	1660.00	1660.00	1725.00	1725.00
Reach-1	14375 BR U	FW	595.98	0.68	596.25	65.00		3564.27		1660.00	1660.00	1725.00	1725.00
Reach-1	14375 BR D	100-Yr	595.30		595.37	146.23	20.08	3544.35	1.10	1660.00	1660.00	1725.00	1725.00
Reach-1	14375 BR D	FW	595.84	0.54	596.16	65.00		3564.27		1660.00	1660.00	1725.00	1725.00
Reach-1	14365	100-Yr	594.75		595.10	65.00		3565.00		1660.00	1660.00	1725.00	1725.00
Reach-1	14365	FW	595.69	0.94	595.99	65.00		3565.00		1660.00	1660.00	1725.00	1725.00
Reach-1	14320	100-Yr	594.81		594.95	268.76	1956.66	1233.88	374.47	1678.00	1678.00	1700.00	1700.00
Reach-1	14320	FW	595.43	0.62	595.87	95.00	985.01	1937.98	642.01	1641.00	1678.00	1700.00	1736.00
Reach-1	13900	100-Yr	594.15		594.30	264.78	1347.24	1282.14	995.62	1208.00	1208.00	1230.00	1230.00
Reach-1	13900	FW	594.61	0.46	594.81	140.00	1359.81	1434.09	831.10	1130.00	1208.00	1230.00	1270.00
Reach-1	12770	100-Yr	592.97		593.05	226.61	515.23	1012.08	2097.70	1208.00	1208.00	1230.00	1230.00
Reach-1	12770	FW	593.36	0.40	593.46	165.00	342.50	1081.81	2200.70	1185.00	1208.00	1230.00	1350.00
Reach-1	11140	100-Yr	591.31		591.45	191.75	1930.00	1294.76	400.24	1527.00	1527.00	1548.00	1580.00
Reach-1	11140	FW	591.89	0.58	592.01	165.00	1985.73	1227.32	411.95	1415.00	1527.00	1548.00	1580.00
Reach-1	10400	100-Yr	590.60		590.72	323.62	1842.42	1860.96	916.62	1618.00	1618.00	1650.00	1695.00
Reach-1	10400	FW	591.23	0.63	591.37	180.00	1839.72	1960.95	819.33	1515.00	1618.00	1650.00	1695.00
Reach-1	9910	100-Yr	590.29		590.37	320.18	1635.92	1641.44	1482.64	1618.00	1618.00	1650.00	1720.00
Reach-1	9910	FW	590.92	0.63	591.01	200.00	1764.30	1786.98	1206.72	1520.00	1618.00	1650.00	1720.00
Reach-1	8610	100-Yr	589.79		589.83	436.18	3371.16	1033.02	355.82	1166.00	1166.00	1190.00	1220.00
Reach-1	8610	FW	590.43	0.64	590.48	260.00	3404.88	1071.48	- 283.64	960.00	1166.00	1190.00	1220.00
Reach-1	8569	100-Yr	589.77		589.82	435.73	2724.71	1845.46	189.83	1161.00	1161.00	1206.00	1230.00
Reach-1	8569	FW	590.41	0.64	590.46	250.00	2650.14	1984.75	125.11	980.00	1161.00	1206.00	1230.00
Reach-1	8559.5 BR U	100-Yr	589.77		589.82	364.03	1394.36	2823.86	538.98	980.00	1161.00	1206.00	1230.00
Reach-1	8559.5 BR U	FW	590.41	0.64	590.46	250.00	1997.68	2761.77		980.00	1161.00	1206.00	1230.00
Reach-1	8559.5 BR D	100-Yr	589.32		589.76	336.34	1394.36	2823.86	538.98	1000.00	1161.00	1206.00	1240.00
Reach-1	8559.5 BR D	FW	590.12	0.81	590.30	240.00	1997.68	2761.77		1000.00	1161.00	1206.00	1240.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	8550	100-Yr	589.32		589.42	336.34	2077.57	2465.45	216.98		1161.00	1206.00	
Reach-1	8550	FW	590.12	0.81	590.21	240.00	2168.85	2405.53	185.62	1000.00	1161.00	1206.00	1240.00
Reach-1	8500	100-Yr	589.26		589.38	335.13	2620.28	1679.79	459.93		1166.00	1190.00	
Reach-1	8500	FW	590.08	0.82	590.18	240.00	2623.34	1612.11	524.55	1015.00	1166.00	1190.00	1255.00
Reach-1	8310	100-Yr	589.00		589.18	187.91	212.64	1873.53	2673.83		1166.00	1190.00	
Reach-1	8310	FW	589.88	0.87	590.03	160.00	226.96	1806.21	2726.83	1145.00	1166.00	1190.00	1305.00
Reach-1	7610	100-Yr	588.12		588.33	202.55	2069.19	2123.80	567.01		1257.00	1285.00	
Reach-1	7610	FW	589.23	1.11	589.39	160.00	2136.86	2005.91	617.23	1170.00	1257.00	1285.00	1330.00
Reach-1	6150	100-Yr	586.74		586.85	356.69	1272.28	1674.11	1813.61		2055.00	2081.00	
Reach-1	6150	FW	587.90	1.17	588.08	140.00	827.59	2004.72	1927.68	2015.00	2055.00	2081.00	2155.00
Reach-1	5930	100-Yr	586.56		586.68	351.78	1222.55	1782.40	1755.05		2055.00	2081.00	
Reach-1	5930	FW	587.55	0.99	587.83	110.00	703.06	2478.82	1578.13	2025.00	2055.00	2081.00	2135.00
Reach-1	5867	100-Yr	586.51		586.62	350.40	1081.46	2545.83	1437.71		2050.00	2093.00	
Reach-1	5867	FW	586.86	0.35	587.63	45.00	7.86	5048.67	8.47	2049.00	2050.00	2093.00	2094.00
Reach-1	5838.5 BR U	100-Yr	586.51		586.63	320.91	100.51	4875.49	95.79		2050.00	2093.00	
Reach-1	5838.5 BR U	FW	586.86	0.35	587.63	45.00	5.18	5059.82		2049.00	2050.00	2093.00	2094.00
Reach-1	5838.5 BR D	100-Yr	586.51		586.63	320.31	100.51	4875.49	95.79		2050.00	2093.00	
Reach-1	5838.5 BR D	FW	586.86	0.35	587.43	45.00	5.18	5059.82		2049.00	2050.00	2093.00	2094.00
Reach-1	5810	100-Yr	583.35		584.59	43.00		5065.00			2050.00	2093.00	
Reach-1	5810	FW	584.34	0.99	585.41	43.00		5065.00		2049.00	2050.00	2093.00	2094.00
Reach-1	5770	100-Yr	583.95		584.08	326.69	1311.21	3505.56	248.23		2035.00	2110.00	
Reach-1	5770	FW	584.67	0.72	585.02	75.00		5065.00		2035.00	2035.00	2110.00	2110.00
Reach-1	5110	100-Yr	583.38		583.52	359.59	2342.17	2137.56	670.27		1585.00	1619.00	
Reach-1	5110	FW	583.68	0.29	583.96	150.00	2324.83	2743.15	82.02	1475.00	1585.00	1619.00	1625.00
Reach-1	4540	100-Yr	582.42		582.72	236.92	1040.04	2867.66	1242.30		1585.00	1619.00	
Reach-1	4540	FW	582.65	0.23	582.97	170.00	978.52	2954.20	1217.28	1525.00	1585.00	1619.00	1695.00
Reach-1	2825	100-Yr	579.58		579.86	244.68	1793.43	2900.69	455.88		1585.00	1619.00	
Reach-1	2825	FW	579.93	0.35	580.20	180.00	1905.45	2895.14	349.41	1460.00	1585.00	1619.00	1640.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	1650	100-Yr	577.91		578.15	433.98	349.38	2675.44	2125.18	1118.00	1118.00	1148.00	
Reach-1	1650	FW	578.07	0.16	578.40	170.00	186.62	2990.83	1972.56	1108.00	1118.00	1148.00	1278.00
Reach-1	1020	100-Yr	577.03		577.31	239.83	982.47	3132.39	1035.14	1925.00	1925.00	1958.00	
Reach-1	1020	FW	577.18	0.14	577.48	120.00	1066.91	3196.55	886.54	1880.00	1925.00	1958.00	2000.00
Reach-1	961	100-Yr	577.03		577.22	120.00		5150.00		1878.00	1878.00	1998.00	
Reach-1	961	FW	577.19	0.16	577.38	120.00		5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	948	BR U	574.90		577.22			5150.00		1878.00	1878.00	1998.00	
Reach-1	948	BR U	574.90	0.00	577.37			5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	948	BR D	574.90		576.85			5150.00		1878.00	1878.00	1998.00	
Reach-1	948	BR D	574.90	0.00	577.06			5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	935	100-Yr	576.72		576.85	265.06	545.22	4472.22	132.56	1878.00	1878.00	1998.00	
Reach-1	935	FW	576.87	0.15	577.06	120.00		5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	850	100-Yr	576.59		576.78	263.06	1605.46	2774.19	770.35	1445.00	1445.00	1478.00	
Reach-1	850	FW	576.78	0.19	576.99	180.00	1436.40	2844.26	869.34	1372.00	1445.00	1478.00	1552.00
Reach-1	120	100-Yr	576.32		576.37	695.73	2460.73	1870.99	818.28	1806.00	1806.00	1840.00	
Reach-1	120	FW	576.24	-0.08	576.41	200.00	2200.43	2770.59	178.98	1650.00	1806.00	1840.00	1850.00
Reach-1	50	100-Yr	575.70		576.13	352.60	885.43	12249.81	114.75	1430.00	1430.00	1548.00	
Reach-1	50	FW	575.70	0.00	576.13	352.60	885.43	12249.81	114.75	1430.00	1430.00	1548.00	1548.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr	619.67		620.41	81.63	317.81	913.80	268.39		1353.00	1371.00	
Reach-1	27950	FW	620.15	0.48	620.72	70.00	331.29	870.75	297.96	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr	619.06		619.20	173.00	372.65	471.94	655.41		1353.00	1371.00	
Reach-1	27770	FW	619.54	0.49	619.72	100.00	301.93	533.85	664.22	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr	617.45		617.49	331.14	647.13	305.57	547.30		1642.00	1658.00	
Reach-1	26840	FW	618.05	0.60	618.10	200.00	653.14	336.99	509.86	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr	617.00		617.02	407.09	284.62	265.38	1020.00		1642.00	1658.00	
Reach-1	26070	FW	617.64	0.64	617.66	250.00	224.52	289.00	1056.48	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr	616.79		616.80	557.31	520.48	314.73	1309.79		1764.00	1785.00	
Reach-1	25340	FW	617.28	0.50	617.32	200.00	130.54	515.58	1498.89	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr	615.93		615.99	263.08	618.44	766.31	855.25		1682.00	1707.00	
Reach-1	23335	FW	616.13	0.19	616.18	180.00	661.73	729.74	848.53	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr	615.88		615.94	264.26	618.83	765.02	856.16		1682.00	1707.00	
Reach-1	23245	FW	616.02	0.14	616.11	120.00	650.37	907.11	682.51	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr	615.86		615.91	260.16	584.23	807.72	848.06		1679.00	1707.00	
Reach-1	23201	FW	614.93	-0.93	615.86	28.00		2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR U	100-Yr	615.86		615.91	159.85	95.20	2139.09	8.56		1679.00	1707.00	
Reach-1	23180.5 BR U	FW	614.93	-0.93	615.86			2239.46		1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR D	100-Yr	615.75		615.91	143.24	95.20	2139.09	8.56		1679.00	1707.00	
Reach-1	23180.5 BR D	FW	614.93	-0.82	615.81			2239.46		1679.00	1679.00	1707.00	1707.00
Reach-1	23160	100-Yr	610.55		613.45	28.00		2240.00			1679.00	1707.00	
Reach-1	23160	FW	612.42	1.88	614.09	28.00		2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23110	100-Yr	611.51		611.69	218.96	788.96	774.36	676.68		1682.00	1707.00	
Reach-1	23110	FW	612.26	0.76	613.09	60.00	363.57	1488.78	387.66	1665.00	1682.00	1707.00	1725.00
Reach-1	22970	100-Yr	611.01		611.16	264.56	784.17	722.76	828.07		1682.00	1707.00	
Reach-1	22970	FW	611.69	0.68	612.00	120.00	515.71	1015.23	804.06	1645.00	1682.00	1707.00	1765.00
Reach-1	22440	100-Yr	608.63		608.92	207.31	708.89	965.42	660.68		1652.00	1677.00	
Reach-1	22440	FW	609.23	0.60	609.53	140.00	683.03	1043.66	608.31	1602.00	1652.00	1677.00	1742.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	21750	100-Yr	606.62		606.73	326.55	766.96	784.23	783.81		1652.00	1677.00	
Reach-1	21750	FW	607.31	0.69	607.46	160.00	737.23	910.65	687.12	1595.00	1652.00	1677.00	1755.00
Reach-1	21270	100-Yr	605.62		605.71	343.42	1240.48	654.28	440.25		1288.00	1313.00	
Reach-1	21270	FW	606.02	0.40	606.23	150.00	932.30	890.19	512.51	1210.00	1288.00	1313.00	1360.00
Reach-1	21250	100-Yr	605.60		605.68	343.05	578.36	1654.34	102.30		1253.00	1348.00	
Reach-1	21250	FW	606.05	0.44	606.15	160.00	333.85	1948.80	52.35	1200.00	1253.00	1348.00	1360.00
Reach-1	21085	100-Yr	605.49		605.56	378.16	670.74	1635.31	28.95		1253.00	1348.00	
Reach-1	21085	FW	605.94	0.45	606.02	190.00	536.95	1793.32	4.73	1160.00	1253.00	1348.00	1350.00
Reach-1	21075	100-Yr	605.49		605.54	459.61	1559.07	547.37	228.56		1370.00	1398.00	
Reach-1	21075	FW	605.90	0.42	606.01	225.00	1453.62	698.48	182.91	1200.00	1370.00	1398.00	1425.00
Reach-1	21030	100-Yr	605.44		605.47	458.33	1633.78	532.09	169.13		1374.00	1398.00	
Reach-1	21030	FW	605.87	0.43	605.91	235.00	1690.18	572.29	72.53	1178.00	1374.00	1398.00	1413.00
Reach-1	20970	100-Yr	605.39		605.44	507.38	1504.47	917.06	488.47		2067.00	2096.00	
Reach-1	20970	FW	605.81	0.43	605.88	260.00	1531.42	985.83	392.75	1885.00	2067.00	2096.00	2145.00
Reach-1	20230	100-Yr	604.51		604.67	274.78	309.84	1388.86	1346.30		2067.00	2096.00	
Reach-1	20230	FW	604.93	0.42	605.11	170.00	198.87	1470.88	1375.26	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.87		603.14	251.46	599.04	1689.78	756.18		2067.00	2096.00	
Reach-1	19430	FW	603.60	0.73	603.81	180.00	561.40	1606.24	877.36	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.80		600.87	234.19	146.81	900.02	1998.17		1275.00	1300.00	
Reach-1	17790	FW	601.45	0.66	601.57	150.00	107.87	1113.92	1823.21	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.35		597.26	118.78	714.04	1981.79	349.17		1442.00	1464.00	
Reach-1	16030	FW	597.09	0.74	597.77	128.64	769.30	1884.89	390.81	1367.00	1442.00	1464.00	1497.00
Reach-1	15580	100-Yr	595.78		595.89	255.09	193.85	1277.42	1573.73		1366.00	1398.00	
Reach-1	15580	FW	596.75	0.97	596.84	210.00	178.29	1190.84	1675.87	1345.00	1366.00	1398.00	1555.00
Reach-1	14880	100-Yr	595.57		595.59	504.69	439.10	739.55	1866.34		1366.00	1398.00	
Reach-1	14880	FW	596.56	0.99	596.59	270.00	458.56	836.32	1750.12	1300.00	1366.00	1398.00	1570.00
Reach-1	14435	100-Yr	595.32		595.41	377.00	1030.58	1415.54	1118.88		1675.00	1707.00	
Reach-1	14435	FW	596.06	0.74	596.33	100.00	842.25	2177.42	545.33	1635.00	1675.00	1707.00	1735.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	14385	100-Yr FW	595.30		595.38	376.68	645.14	2207.74	712.12	1660.00	1660.00	1725.00	1725.00
Reach-1	14385		595.98	0.68	596.26	65.00	3565.00			1660.00	1660.00	1725.00	1725.00
Reach-1	14375	100-Yr BR U	595.30		595.38	146.23	20.08	3544.35	1.10	1660.00	1660.00	1725.00	1725.00
Reach-1	14375	100-Yr BR U	595.98	0.68	596.25	65.00		3564.27		1660.00	1660.00	1725.00	1725.00
Reach-1	14375	100-Yr BR D	595.30		595.37	146.23	20.08	3544.35	1.10	1660.00	1660.00	1725.00	1725.00
Reach-1	14375	100-Yr BR D	595.84	0.54	596.16	65.00		3564.27		1660.00	1660.00	1725.00	1725.00
Reach-1	14365	100-Yr FW	594.75		595.10	65.00		3565.00		1660.00	1660.00	1725.00	1725.00
Reach-1	14365		595.69	0.94	595.99	65.00		3565.00		1660.00	1660.00	1725.00	1725.00
Reach-1	14320	100-Yr FW	594.81		594.95	268.76	1956.66	1233.88	374.47	1641.00	1678.00	1700.00	1736.00
Reach-1	14320		595.43	0.62	595.87	95.00	985.01	1937.98	642.01	1641.00	1678.00	1700.00	1736.00
Reach-1	13900	100-Yr FW	594.15		594.30	264.78	1347.24	1282.14	995.62	1130.00	1208.00	1230.00	1270.00
Reach-1	13900		594.61	0.46	594.81	140.00	1359.81	1434.09	831.10	1130.00	1208.00	1230.00	1270.00
Reach-1	12770	100-Yr FW	592.97		593.05	226.61	515.23	1012.08	2097.70	1185.00	1208.00	1230.00	1350.00
Reach-1	12770		593.36	0.40	593.46	165.00	342.50	1081.81	2200.70	1185.00	1208.00	1230.00	1350.00
Reach-1	11140	100-Yr FW	591.31		591.45	191.75	1930.00	1294.76	400.24	1415.00	1527.00	1548.00	1580.00
Reach-1	11140		591.89	0.58	592.01	165.00	1985.73	1227.32	411.95	1415.00	1527.00	1548.00	1580.00
Reach-1	10400	100-Yr FW	590.60		590.72	323.62	1842.42	1860.96	916.62	1515.00	1618.00	1650.00	1695.00
Reach-1	10400		591.23	0.63	591.37	180.00	1839.72	1960.95	819.33	1515.00	1618.00	1650.00	1695.00
Reach-1	9910	100-Yr FW	590.29		590.37	320.18	1635.92	1641.44	1482.64	1520.00	1618.00	1650.00	1720.00
Reach-1	9910		590.92	0.63	591.01	200.00	1764.30	1788.98	1206.72	1520.00	1618.00	1650.00	1720.00
Reach-1	8610	100-Yr FW	589.79		589.83	436.18	3371.16	1033.02	355.82	960.00	1166.00	1190.00	1220.00
Reach-1	8610		590.43	0.64	590.48	260.00	3404.88	1071.48	283.64	960.00	1166.00	1190.00	1220.00
Reach-1	8569	100-Yr FW	589.77		589.82	435.73	2724.71	1845.46	189.83	980.00	1161.00	1206.00	1230.00
Reach-1	8569		590.41	0.64	590.46	250.00	2650.14	1984.75	125.11	980.00	1161.00	1206.00	1230.00
Reach-1	8559.5	100-Yr BR U	589.77		589.82	364.03	1394.36	2823.86	538.98	980.00	1161.00	1206.00	1230.00
Reach-1	8559.5	100-Yr BR U	590.41	0.64	590.46	250.00	1997.68	2761.77		980.00	1161.00	1206.00	1230.00
Reach-1	8559.5	100-Yr BR D	589.32		589.76	336.34	1394.36	2823.86	538.98	1000.00	1161.00	1206.00	1240.00
Reach-1	8559.5	100-Yr BR D	590.12	0.81	590.30	240.00	1997.68	2761.77		1000.00	1161.00	1206.00	1240.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	8550	100-Yr	589.32		589.42	336.34	2077.57	2465.45	216.98		1161.00	1206.00	
Reach-1	8550	FW	590.12	0.81	590.21	240.00	2168.85	2405.53	185.62	1000.00	1161.00	1206.00	1240.00
Reach-1	8500	100-Yr	589.26		589.38	335.13	2620.28	1679.79	459.93		1166.00	1190.00	
Reach-1	8500	FW	590.08	0.82	590.18	240.00	2623.34	1612.11	524.55	1015.00	1166.00	1190.00	1255.00
Reach-1	8310	100-Yr	589.00		589.18	187.91	212.64	1873.53	2673.83		1166.00	1190.00	
Reach-1	8310	FW	589.88	0.87	590.03	160.00	226.96	1806.21	2726.83	1145.00	1166.00	1190.00	1305.00
Reach-1	7610	100-Yr	588.12		588.33	202.55	2069.19	2123.80	567.01		1257.00	1285.00	
Reach-1	7610	FW	589.23	1.11	589.39	160.00	2136.86	2005.91	617.23	1170.00	1257.00	1285.00	1330.00
Reach-1	6150	100-Yr	586.74		586.85	356.69	1272.28	1674.11	1813.61		2055.00	2081.00	
Reach-1	6150	FW	587.90	1.17	588.08	140.00	827.59	2004.72	1927.68	2015.00	2055.00	2081.00	2155.00
Reach-1	5930	100-Yr	586.56		586.68	351.78	1222.55	1782.40	1755.05		2055.00	2081.00	
Reach-1	5930	FW	587.55	0.99	587.83	110.00	703.06	2478.82	1578.13	2025.00	2055.00	2081.00	2135.00
Reach-1	5867	100-Yr	586.51		586.62	350.40	1081.46	2545.83	1437.71		2050.00	2093.00	
Reach-1	5867	FW	586.86	0.35	587.63	45.00	7.86	5048.67	8.47	2049.00	2050.00	2093.00	2094.00
Reach-1	5838.5 BR U	100-Yr	586.51		586.63	320.91	100.51	4875.49	95.79		2050.00	2093.00	
Reach-1	5838.5 BR U	FW	586.86	0.35	587.63	45.00	5.18	5059.82		2049.00	2050.00	2093.00	2094.00
Reach-1	5838.5 BR D	100-Yr	586.51		586.63	320.31	100.51	4875.49	95.79		2050.00	2093.00	
Reach-1	5838.5 BR D	FW	586.86	0.35	587.43	45.00	5.18	5059.82		2049.00	2050.00	2093.00	2094.00
Reach-1	5810	100-Yr	583.35		584.59	43.00		5065.00			2050.00	2093.00	
Reach-1	5810	FW	584.34	0.99	585.41	43.00		5065.00		2049.00	2050.00	2093.00	2094.00
Reach-1	5770	100-Yr	583.95		584.08	326.69	1311.21	3505.56	248.23		2035.00	2110.00	
Reach-1	5770	FW	584.67	0.72	585.02	75.00		5065.00		2035.00	2035.00	2110.00	2110.00
Reach-1	5110	100-Yr	583.38		583.52	359.59	2342.17	2137.56	670.27		1585.00	1619.00	
Reach-1	5110	FW	583.68	0.29	583.96	150.00	2324.83	2743.15	82.02	1475.00	1585.00	1619.00	1625.00
Reach-1	4540	100-Yr	582.42		582.72	236.92	1040.04	2867.66	1242.30		1585.00	1619.00	
Reach-1	4540	FW	582.65	0.23	582.97	170.00	978.52	2954.20	1217.28	1525.00	1585.00	1619.00	1695.00
Reach-1	2825	100-Yr	579.58		579.86	244.68	1793.43	2900.69	455.88		1585.00	1619.00	
Reach-1	2825	FW	579.93	0.35	580.20	180.00	1905.45	2895.14	349.41	1460.00	1585.00	1619.00	1640.00

HEC-RAS Plan: Dup Eff FW River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	1650	100-Yr	577.91		578.15	433.98	349.38	2675.44	2125.18		1118.00	1148.00	
Reach-1	1650	FW	578.07	0.16	578.40	170.00	186.62	2990.83	1972.56	1108.00	1118.00	1148.00	1278.00
Reach-1	1020	100-Yr	577.03		577.31	239.83	982.47	3132.39	1035.14		1925.00	1958.00	
Reach-1	1020	FW	577.18	0.14	577.48	120.00	1066.91	3196.55	886.54	1880.00	1925.00	1958.00	2000.00
Reach-1	961	100-Yr	577.03		577.22	120.00		5150.00			1878.00	1998.00	
Reach-1	961	FW	577.19	0.16	577.38	120.00		5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	948	100-Yr	574.90		577.22			5150.00			1878.00	1998.00	
Reach-1	948	BR U	574.90	0.00	577.37			5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	948	100-Yr	574.90		576.85			5150.00			1878.00	1998.00	
Reach-1	948	BR D	574.90	0.00	577.06			5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	935	100-Yr	576.72		576.85	265.06	545.22	4472.22	132.56		1878.00	1998.00	
Reach-1	935	FW	576.87	0.15	577.06	120.00		5150.00		1878.00	1878.00	1998.00	1998.00
Reach-1	850	100-Yr	576.59		576.78	263.06	1605.46	2774.19	770.35		1445.00	1478.00	
Reach-1	850	FW	576.78	0.19	576.99	180.00	1436.40	2844.26	869.34	1372.00	1445.00	1478.00	1552.00
Reach-1	120	100-Yr	576.32		576.37	695.73	2460.73	1870.99	818.28		1806.00	1840.00	
Reach-1	120	FW	576.24	-0.08	576.41	200.00	2200.43	2770.59	178.98	1650.00	1806.00	1840.00	1850.00
Reach-1	50	100-Yr	575.70		576.13	352.60	885.43	12249.81	114.75		1430.00	1548.00	
Reach-1	50	FW	575.70	0.00	576.13	352.60	885.43	12249.81	114.75		1430.00	1548.00	1548.00

HEC-RAS Plan: Duppp Eff FW Trnc River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	21750	100-Yr	606.62		606.73	326.55	766.98	784.20	783.82	1652.00	1652.00	1677.00	
Reach-1	21750	FW	607.31	0.69	607.46	160.00	737.23	910.67	687.10	1595.00	1652.00	1677.00	1755.00
Reach-1	21270	100-Yr	605.62		605.72	343.44	1240.52	654.22	440.26	1288.00	1288.00	1313.00	
Reach-1	21270	FW	606.02	0.40	606.23	150.00	932.27	890.23	512.50	1210.00	1288.00	1313.00	1360.00
Reach-1	21250	100-Yr	605.60		605.68	343.06	578.41	1654.27	102.32	1253.00	1253.00	1348.00	
Reach-1	21250	FW	606.04	0.44	606.15	160.00	333.83	1948.83	52.35	1200.00	1253.00	1348.00	1360.00
Reach-1	21085	100-Yr	605.49		605.56	378.18	670.84	1635.20	28.96	1253.00	1253.00	1348.00	
Reach-1	21085	FW	605.93	0.45	606.02	190.00	536.91	1793.36	4.73	1160.00	1253.00	1348.00	1350.00
Reach-1	21075	100-Yr	605.49		605.54	459.64	1559.14	547.30	228.55	1370.00	1370.00	1398.00	
Reach-1	21075	FW	605.90	0.41	606.01	225.00	1453.58	698.51	182.90	1200.00	1370.00	1398.00	1425.00
Reach-1	21030	100-Yr	605.45		605.47	458.36	1633.83	532.03	169.14	1374.00	1374.00	1398.00	
Reach-1	21030	FW	605.87	0.43	605.91	235.00	1690.16	572.31	72.53	1178.00	1374.00	1398.00	1413.00
Reach-1	20970	100-Yr	605.39		605.44	507.40	1504.58	916.95	498.48	2067.00	2067.00	2096.00	
Reach-1	20970	FW	605.81	0.42	605.88	260.00	1531.37	985.88	392.74	1885.00	2067.00	2096.00	2145.00
Reach-1	20230	100-Yr	604.51		604.68	274.81	309.91	1388.68	1346.41	2067.00	2067.00	2096.00	
Reach-1	20230	FW	604.93	0.41	605.11	170.00	198.86	1470.97	1375.17	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.87		603.14	251.57	599.22	1689.11	756.68	2067.00	2067.00	2096.00	
Reach-1	19430	FW	603.59	0.72	603.81	180.00	561.38	1606.46	877.15	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.81		600.88	234.28	146.92	899.40	1998.68	1275.00	1275.00	1300.00	
Reach-1	17790	FW	601.45	0.64	601.56	150.00	107.87	1114.12	1823.01	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.55		597.40	122.07	729.91	1956.48	358.61	1442.00	1442.00	1464.00	
Reach-1	16030	FW	597.04	0.48	597.74	128.04	765.54	1891.59	387.87	1367.00	1442.00	1464.00	1497.00
Reach-1	15580	100-Yr	596.07		596.17	258.91	196.46	1248.87	1599.66	1366.00	1366.00	1398.00	
Reach-1	15580	FW	596.69	0.62	596.78	210.00	178.25	1194.92	1671.83	1345.00	1366.00	1398.00	1555.00

HEC-RAS Plan: Dupp Eff FW Trnc River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr	619.67		620.41	81.63	317.81	913.80	268.39		1353.00	1371.00	
Reach-1	27950	FW	620.15	0.48	620.72	70.00	331.29	870.75	297.96	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr	619.06		619.20	173.00	372.65	471.94	655.41		1353.00	1371.00	
Reach-1	27770	FW	619.54	0.49	619.72	100.00	301.93	533.85	664.22	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr	617.45		617.49	331.14	647.13	305.57	547.30		1642.00	1658.00	
Reach-1	26840	FW	618.05	0.60	618.10	200.00	653.14	336.99	509.86	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr	617.00		617.02	407.09	284.62	265.38	1020.00		1642.00	1658.00	
Reach-1	26070	FW	617.64	0.64	617.66	250.00	224.52	289.00	1056.48	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr	616.79		616.80	557.31	520.48	314.73	1309.79		1764.00	1785.00	
Reach-1	25340	FW	617.28	0.50	617.32	200.00	130.54	515.58	1498.89	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr	615.93		615.99	263.08	618.44	766.31	855.25		1682.00	1707.00	
Reach-1	23335	FW	616.13	0.19	616.18	180.00	661.73	729.74	848.53	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr	615.88		615.94	264.26	618.83	765.02	856.16		1682.00	1707.00	
Reach-1	23245	FW	616.02	0.14	616.11	120.00	650.37	907.11	682.51	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr	615.86		615.91	260.16	584.23	807.72	343.06		1679.00	1707.00	
Reach-1	23201	FW	614.93	-0.93	615.86	28.00		2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR U	100-Yr	615.86		615.91	159.85	95.20	2139.09	8.56		1679.00	1707.00	
Reach-1	23180.5 BR U	FW	614.93	-0.93	615.86			2239.46		1679.00	1679.00	1707.00	1707.00
Reach-1	23180.5 BR D	100-Yr	615.75		615.91	143.24	95.20	2139.09	8.56		1679.00	1707.00	
Reach-1	23180.5 BR D	FW	614.93	-0.82	615.81			2239.46		1679.00	1679.00	1707.00	1707.00
Reach-1	23160	100-Yr	610.55		613.45	28.00		2240.00			1679.00	1707.00	
Reach-1	23160	FW	612.42	1.88	614.09	28.00		2240.00		1679.00	1679.00	1707.00	1707.00
Reach-1	23110	100-Yr	611.51		611.69	218.96	788.96	774.36	676.68		1682.00	1707.00	
Reach-1	23110	FW	612.26	0.76	613.09	60.00	363.57	1488.78	387.66	1665.00	1682.00	1707.00	1725.00
Reach-1	22970	100-Yr	611.01		611.16	264.56	784.17	722.76	828.07		1682.00	1707.00	
Reach-1	22970	FW	611.69	0.68	612.00	120.00	515.71	1015.23	804.06	1645.00	1682.00	1707.00	1765.00
Reach-1	22440	100-Yr	608.63		608.92	207.31	708.89	965.42	660.68		1652.00	1677.00	
Reach-1	22440	FW	609.23	0.60	609.53	140.00	683.03	1043.67	608.30	1602.00	1652.00	1677.00	1742.00

HEC-RAS Plan: Corr Eff FW Trnc River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr	619.60		620.37	80.93	315.67	918.76	265.57		1353.00	1371.00	
Reach-1	27950	FW	620.09	0.49	620.67	70.00	330.22	874.11	295.67	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr	619.04		619.19	172.77	372.14	472.51	655.34		1353.00	1371.00	
Reach-1	27770	FW	619.51	0.46	619.69	100.00	301.71	534.49	663.80	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr	617.22		617.27	325.47	632.48	318.30	549.22		1642.00	1658.00	
Reach-1	26840	FW	617.95	0.73	618.00	200.00	648.92	340.66	510.42	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr	616.67		616.69	399.02	276.27	276.68	1017.05		1642.00	1658.00	
Reach-1	26070	FW	617.51	0.84	617.53	250.00	224.08	291.59	1054.33	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr	616.41		616.42	547.24	496.03	326.18	1322.80		1764.00	1785.00	
Reach-1	25340	FW	617.13	0.73	617.18	200.00	130.38	518.08	1496.53	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr	615.35		615.42	247.31	614.98	783.01	842.01		1682.00	1707.00	
Reach-1	23335	FW	615.98	0.54	615.94	180.00	658.25	735.00	846.75	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr	615.28		615.34	248.08	615.07	782.22	842.71		1682.00	1707.00	
Reach-1	23245	FW	615.77	0.49	615.87	120.00	649.09	908.98	681.93	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr	615.25		615.30	244.99	582.65	822.82	834.53		1679.70	1706.30	
Reach-1	23201	FW	615.75	0.50	615.82	143.00	677.70	869.12	693.18	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR U	100-Yr	615.25		615.31	17.44	17.85	2205.67	16.82		1679.70	1706.30	
Reach-1	23180.5 BR U	FW	615.75	0.50	615.82	110.35	76.47	2145.22	20.42	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR D	100-Yr	615.25		615.30	17.44	18.14	2205.09	17.11		1679.70	1706.30	
Reach-1	23180.5 BR D	FW	615.66	0.41	615.81	103.21	76.74	2144.66	20.70	1617.00	1679.70	1706.30	1760.00
Reach-1	23160	100-Yr	611.68		611.84	222.40	723.45	868.00	648.55		1679.70	1706.30	
Reach-1	23160	FW	612.46	0.79	612.61	143.00	722.15	887.82	630.02	1617.00	1679.70	1706.30	1760.00
Reach-1	23110	100-Yr	611.50		611.68	218.80	788.63	774.87	676.50		1682.00	1707.00	
Reach-1	23110	FW	612.34	0.84	612.50	142.00	786.05	795.92	658.03	1618.00	1682.00	1707.00	1760.00
Reach-1	22970	100-Yr	611.00		611.15	264.39	783.84	723.38	827.78		1682.00	1707.00	
Reach-1	22970	FW	611.69	0.69	612.00	120.00	515.70	1015.26	804.04	1645.00	1682.00	1707.00	1765.00
Reach-1	22440	100-Yr	608.61		608.91	207.16	708.60	966.86	659.53		1652.00	1677.00	
Reach-1	22440	FW	609.21	0.59	609.52	140.00	682.87	1044.95	607.18	1602.00	1652.00	1677.00	1742.00

HEC-RAS Plan: Corr Eff FW Trnc River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	21750	100-Yr	606.60		606.72	326.19	766.19	785.49	783.32		1652.00	1677.00	
Reach-1	21750	FW	607.28	0.68	607.44	160.00	737.13	911.85	686.02	1595.00	1652.00	1677.00	1755.00
Reach-1	21270	100-Yr	605.59		605.69	342.72	1239.05	655.41	439.54		1288.00	1313.00	
Reach-1	21270	FW	605.97	0.38	606.18	150.00	930.77	892.35	511.88	1210.00	1288.00	1313.00	1360.00
Reach-1	21250	100-Yr	605.58		605.66	342.40	576.46	1656.91	101.63		1253.00	1348.00	
Reach-1	21250	FW	606.01	0.43	606.12	160.00	332.95	1949.83	52.21	1200.00	1253.00	1348.00	1360.00
Reach-1	21085	100-Yr	605.46		605.54	377.46	667.43	1638.82	28.76		1253.00	1348.00	
Reach-1	21085	FW	605.90	0.44	605.99	190.00	535.42	1794.85	4.73	1160.00	1253.00	1348.00	1350.00
Reach-1	21075	100-Yr	605.46		605.52	458.89	1556.90	549.50	228.60		1370.00	1398.00	
Reach-1	21075	FW	605.87	0.41	605.98	225.00	1451.92	700.33	182.76	1200.00	1370.00	1398.00	1425.00
Reach-1	21030	100-Yr	605.42		605.45	457.68	1632.65	533.40	169.95		1374.00	1398.00	
Reach-1	21030	FW	605.85	0.42	605.88	235.00	1689.40	573.13	72.48	1178.00	1374.00	1398.00	1413.00
Reach-1	20970	100-Yr	605.37		605.42	506.74	1501.99	919.61	488.40		2067.00	2096.00	
Reach-1	20970	FW	605.79	0.42	605.86	260.00	1529.79	987.62	392.59	1885.00	2067.00	2096.00	2145.00
Reach-1	20230	100-Yr	604.50		604.66	274.40	308.85	1391.21	1344.95		2067.00	2096.00	
Reach-1	20230	FW	604.91	0.41	605.09	170.00	198.73	1472.79	1373.48	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.84		603.12	250.77	597.92	1694.09	752.99		2067.00	2096.00	
Reach-1	19430	FW	603.56	0.71	603.77	180.00	561.09	1610.61	873.31	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.76		600.84	233.93	146.50	901.81	1996.70		1275.00	1300.00	
Reach-1	17790	FW	601.37	0.61	601.49	150.00	107.92	1116.87	1820.22	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.47		597.34	120.72	723.38	1966.87	354.76		1442.00	1464.00	
Reach-1	16030	FW	596.99	0.52	597.67	116.00	795.61	1864.88	384.51	1379.00	1442.00	1464.00	1495.00
Reach-1	15580	100-Yr	596.07		596.17	258.91	196.46	1248.87	1599.66		1366.00	1398.00	
Reach-1	15580	FW	596.69	0.62	596.78	210.00	178.25	1194.92	1671.83	1345.00	1366.00	1398.00	1555.00

HEC-RAS Plan: Ex Cond FW Trunc River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr	619.60		620.37	80.96	315.78	918.51	265.71	1353.00	1353.00	1371.00	
Reach-1	27950	FW	620.10	0.50	620.68	70.00	330.43	873.46	296.11	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr	619.05		619.19	172.90	372.44	472.18	655.38	1353.00	1353.00	1371.00	
Reach-1	27770	FW	619.53	0.48	619.71	100.00	301.83	534.15	664.02	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr	617.47		617.51	331.66	648.41	304.47	547.12	1642.00	1642.00	1658.00	
Reach-1	26840	FW	618.03	0.56	618.08	200.00	652.15	337.85	510.00	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr	617.03		617.05	407.81	285.50	264.33	1020.17	1642.00	1642.00	1658.00	
Reach-1	26070	FW	617.61	0.58	617.63	250.00	224.43	289.55	1056.02	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr	616.82		616.83	558.28	522.74	313.69	1308.57	1764.00	1764.00	1785.00	
Reach-1	25340	FW	617.25	0.43	617.29	200.00	130.51	516.08	1498.41	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr	615.99		616.05	264.67	618.96	764.58	856.47	1682.00	1682.00	1707.00	
Reach-1	23335	FW	616.08	0.09	616.13	180.00	661.07	730.74	848.19	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr	615.94		616.00	265.89	619.38	763.23	857.39	1682.00	1682.00	1707.00	
Reach-1	23245	FW	615.97	0.03	616.07	120.00	650.15	907.44	682.41	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr	615.92		615.97	261.68	589.82	799.12	851.06	1617.00	1617.00	1706.30	
Reach-1	23201	FW	615.96	0.04	616.02	143.00	681.57	865.12	693.31	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR U	100-Yr	615.92		615.97	167.69	128.93	2090.34	21.55	1617.00	1679.70	1706.30	
Reach-1	23180.5 BR U	FW	615.96	0.04	616.02	128.17	115.20	2099.74	25.80	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR D	100-Yr	615.79		615.97	149.65	129.20	2089.90	21.71	1617.00	1679.70	1706.30	
Reach-1	23180.5 BR D	FW	615.80	0.01	616.02	115.41	115.47	2099.30	25.97	1617.00	1679.70	1706.30	1760.00
Reach-1	23160	100-Yr	610.21		610.60	192.46	640.90	1007.03	592.07	1617.00	1679.70	1706.30	
Reach-1	23160	FW	610.21	0.00	610.64	143.00	643.25	1022.43	574.33	1617.00	1679.70	1706.30	1760.00
Reach-1	23110	100-Yr	606.24		606.32	383.79	456.96	841.25	941.79	1618.00	1679.15	1709.96	
Reach-1	23110	FW	607.04	0.80	607.23	142.00	546.86	1235.60	457.54	1618.00	1679.15	1709.96	1760.00
Reach-1	22970	100-Yr	605.95		606.00	338.02	1363.51	541.77	429.72	1585.00	1681.70	1704.88	
Reach-1	22970	FW	606.65	0.69	606.74	160.00	1012.67	732.51	589.82	1585.00	1681.70	1704.88	1745.00
Reach-1	22440	100-Yr	605.64		605.75	229.22	833.86	1069.09	432.05	1573.00	1645.11	1676.53	
Reach-1	22440	FW	606.36	0.72	606.48	145.00	792.53	1111.48	431.00	1573.00	1645.11	1676.53	1718.00

HEC-RAS Plan: Ex Cond FW Trunc River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	22110	100-Yr	605.33		605.39	261.44	1437.49	562.04	335.47		1651.96	1671.78	
Reach-1	22110	FW	606.04	0.71	606.12	160.00	1430.02	676.83	228.15	1536.00	1651.96	1671.78	1696.00
Reach-1	21750	100-Yr	605.09		605.13	353.13	806.75	662.86	865.39		1651.77	1676.97	
Reach-1	21750	FW	605.68	0.60	605.78	160.00	267.08	907.47	1160.45	1629.00	1651.77	1676.97	1789.00
Reach-1	21270	100-Yr	604.96		604.98	378.81	1464.12	611.69	259.19		1283.88	1311.84	
Reach-1	21270	FW	605.50	0.54	605.55	150.00	1280.13	805.95	248.92	1189.00	1283.88	1311.84	1339.00
Reach-1	21250	100-Yr	604.95		604.97	386.80	1687.30	426.18	221.52		1289.30	1309.44	
Reach-1	21250	FW	605.49	0.54	605.54	160.00	1683.52	574.87	76.61	1159.00	1289.30	1309.44	1319.00
Reach-1	21085	100-Yr	604.93		604.94	425.23	732.88	362.74	1239.38		1290.07	1306.15	
Reach-1	21085	FW	605.45	0.52	605.49	190.00	0.04	521.49	1813.46	1290.00	1290.07	1306.15	1480.00
Reach-1	21075	100-Yr	604.92		604.94	433.04	669.31	388.78	1276.91		1379.81	1398.42	
Reach-1	21075	FW	605.45	0.53	605.48	225.00	291.87	507.86	1535.28	1329.00	1379.81	1398.42	1554.00
Reach-1	21030	100-Yr	604.92		604.93	471.38	527.31	503.32	1304.37		1366.31	1395.20	
Reach-1	21030	FW	605.44	0.52	605.46	235.00	74.48	644.92	1615.60	1352.00	1366.31	1395.20	1587.00
Reach-1	20970	100-Yr	604.89		604.91	587.33	1403.56	326.13	1180.31		2154.29	2167.61	
Reach-1	20970	FW	605.40	0.50	605.43	260.00	1706.80	439.20	764.00	2005.00	2154.29	2167.61	2265.00
Reach-1	20230	100-Yr	604.48		604.64	274.02	303.27	1418.21	1323.53		2067.00	2096.00	
Reach-1	20230	FW	604.89	0.41	605.07	170.00	195.61	1498.00	1351.38	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.84		603.12	250.77	597.92	1694.09	752.99		2067.00	2096.00	
Reach-1	19430	FW	603.56	0.71	603.77	180.00	561.09	1610.61	873.31	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.76		600.84	233.93	146.50	901.81	1996.70		1275.00	1300.00	
Reach-1	17790	FW	601.37	0.61	601.49	150.00	107.92	1116.87	1820.22	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.47		597.34	120.72	723.38	1966.87	354.76		1442.00	1464.00	
Reach-1	16030	FW	596.99	0.52	597.67	116.00	795.61	1864.88	384.51	1379.00	1442.00	1464.00	1495.00
Reach-1	15580	100-Yr	596.07		596.17	258.91	196.46	1248.87	1599.66		1366.00	1398.00	
Reach-1	15580	FW	596.69	0.62	596.78	210.00	178.25	1194.92	1671.83	1345.00	1366.00	1398.00	1555.00

HEC-RAS Plan: Prop FW Trunc River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr	619.60		620.37	80.96	315.78	918.51	265.71	1330.00	1353.00	1371.00	1400.00
Reach-1	27950	FW	620.10	0.50	620.68	70.00	330.43	873.46	296.11	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr	619.05		619.19	172.90	372.44	472.18	655.38	1327.00	1353.00	1371.00	1427.00
Reach-1	27770	FW	619.53	0.48	619.71	100.00	301.83	534.15	664.02	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr	617.47		617.51	331.66	648.41	304.47	547.12	1530.00	1642.00	1658.00	1730.00
Reach-1	26840	FW	618.03	0.56	618.08	200.00	652.15	337.85	510.00	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr	617.03		617.05	407.81	285.50	264.33	1020.17	1600.00	1642.00	1658.00	1850.00
Reach-1	26070	FW	617.61	0.58	617.63	250.00	224.43	289.55	1056.02	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr	616.82		616.83	558.28	522.74	313.69	1308.57	1745.00	1764.00	1785.00	1945.00
Reach-1	25340	FW	617.25	0.43	617.29	200.00	130.51	516.08	1498.41	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr	615.99		616.05	264.67	618.96	764.58	856.47	1610.00	1682.00	1707.00	1790.00
Reach-1	23335	FW	616.08	0.09	616.13	180.00	661.07	730.74	848.19	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr	615.94		616.00	265.89	619.38	763.23	857.39	1635.00	1682.00	1707.00	1755.00
Reach-1	23245	FW	615.97	0.03	616.07	120.00	650.15	907.44	682.41	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr	615.92		615.97	261.68	589.82	799.12	851.06	1617.00	1679.70	1706.30	1760.00
Reach-1	23201	FW	615.96	0.04	616.02	143.00	681.57	865.12	693.31	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR U	100-Yr	615.92		615.97	167.89	128.93	2090.34	21.55	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR U	FW	615.96	0.04	616.02	128.17	115.20	2099.74	25.80	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR D	100-Yr	615.79		615.97	149.65	129.20	2089.90	21.71	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR D	FW	615.80	0.01	616.02	115.41	115.47	2099.30	25.97	1617.00	1679.70	1706.30	1760.00
Reach-1	23160	100-Yr	610.21		610.60	192.46	640.90	1007.03	592.07	1617.00	1679.70	1706.30	1760.00
Reach-1	23160	FW	610.21	0.00	610.64	143.00	643.25	1022.43	574.33	1617.00	1679.70	1706.30	1760.00
Reach-1	23110	100-Yr	606.15		606.23	381.67	448.31	851.93	939.76	1618.00	1679.15	1709.96	1760.00
Reach-1	23110	FW	606.91	0.75	607.10	142.00	540.78	1246.11	453.12	1618.00	1679.15	1709.96	1760.00
Reach-1	22970	100-Yr	605.84		605.89	336.14	1356.77	547.63	430.60	1585.00	1681.70	1704.88	1745.00
Reach-1	22970	FW	606.47	0.63	606.57	160.00	1006.88	738.47	589.64	1585.00	1681.70	1704.88	1745.00
Reach-1	22440	100-Yr	605.55		605.67	227.70	781.23	1134.88	418.90	1573.00	1641.22	1675.37	1718.00
Reach-1	22440	FW	606.21	0.66	606.33	145.00	742.93	1174.93	417.14	1573.00	1641.22	1675.37	1718.00

HEC-RAS Plan: Prop FW Trunc River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	22110	100-Yr	605.26		605.31	260.75	1435.85	565.67	333.49		1651.96	1671.78	
Reach-1	22110	FW	605.90	0.64	605.98	160.00	1426.47	681.11	227.42	1536.00	1651.96	1671.78	1696.00
Reach-1	21750	100-Yr	605.04		605.08	352.14	1411.71	792.83	130.46		1737.66	1772.22	
Reach-1	21750	FW	605.62	0.58	605.69	160.00	1243.00	997.40	94.60	1629.00	1737.66	1772.22	1789.00
Reach-1	21270	100-Yr	604.94		604.96	378.43	1403.93	620.42	310.65		1277.76	1306.49	
Reach-1	21270	FW	605.45	0.52	605.52	150.00	1095.76	898.55	340.69	1189.00	1277.76	1306.49	1339.00
Reach-1	21250	100-Yr	604.93		604.96	386.44	1478.26	582.74	274.00		1274.30	1303.04	
Reach-1	21250	FW	605.45	0.51	605.50	160.00	1333.55	850.04	151.40	1159.00	1274.30	1303.04	1319.00
Reach-1	21085	100-Yr	604.91		604.92	424.78	1254.53	562.68	517.80		1365.19	1395.38	
Reach-1	21085	FW	605.40	0.50	605.44	190.00	798.02	801.68	735.29	1290.00	1365.19	1395.38	1480.00
Reach-1	21075	100-Yr	604.90		604.92	432.65	1191.38	522.88	620.74		1450.59	1479.21	
Reach-1	21075	FW	605.41	0.50	605.44	225.00	1037.03	657.45	640.52	1329.00	1450.59	1479.21	1554.00
Reach-1	21030	100-Yr	604.90		604.91	470.98	1191.67	505.64	637.69		1459.65	1491.00	
Reach-1	21030	FW	605.40	0.50	605.42	235.00	914.55	663.83	756.62	1352.00	1459.65	1491.00	1587.00
Reach-1	20970	100-Yr	604.88		604.90	586.87	1761.06	513.35	635.59		2225.71	2253.40	
Reach-1	20970	FW	605.37	0.49	605.40	260.00	2170.21	673.46	66.33	2005.00	2225.71	2253.40	2265.00
Reach-1	20230	100-Yr	604.48		604.64	274.02	303.27	1418.21	1323.53		2067.00	2096.00	
Reach-1	20230	FW	604.89	0.41	605.07	170.00	195.61	1498.00	1351.38	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.84		603.12	250.77	597.92	1694.09	752.99		2067.00	2096.00	
Reach-1	19430	FW	603.56	0.71	603.77	180.00	561.09	1610.61	873.31	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.76		600.84	233.93	146.50	901.81	1996.70		1275.00	1300.00	
Reach-1	17790	FW	601.37	0.61	601.49	150.00	107.92	1116.87	1820.22	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.47		597.34	120.72	723.38	1966.87	354.76		1442.00	1464.00	
Reach-1	16030	FW	596.99	0.52	597.67	116.00	795.61	1864.88	384.51	1379.00	1442.00	1464.00	1495.00
Reach-1	15580	100-Yr	596.07		596.17	258.91	196.46	1248.87	1599.66		1366.00	1398.00	
Reach-1	15580	FW	596.69	0.62	596.78	210.00	178.25	1194.92	1671.83	1345.00	1366.00	1398.00	1555.00

HEC-RAS Plan: Prop FW AS BUILT River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta (ft)	E.G. Elev (ft)	Top Width (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	27950	100-Yr FW	619.60		620.37	80.96	315.78	918.51	265.71	1353.00	1353.00	1371.00	
Reach-1	27950		620.10	0.50	620.68	70.00	330.43	873.46	296.11	1330.00	1353.00	1371.00	1400.00
Reach-1	27770	100-Yr FW	619.05		619.19	172.90	372.44	472.18	655.38	1353.00	1353.00	1371.00	
Reach-1	27770		619.53	0.48	619.71	100.00	301.83	534.15	664.02	1327.00	1353.00	1371.00	1427.00
Reach-1	26840	100-Yr FW	617.47		617.51	331.66	648.41	304.47	547.12	1642.00	1642.00	1658.00	
Reach-1	26840		618.03	0.56	618.08	200.00	652.15	337.85	510.00	1530.00	1642.00	1658.00	1730.00
Reach-1	26070	100-Yr FW	617.03		617.05	407.81	285.50	264.33	1020.17	1642.00	1642.00	1658.00	
Reach-1	26070		617.61	0.58	617.63	250.00	224.43	289.55	1056.02	1600.00	1642.00	1658.00	1850.00
Reach-1	25340	100-Yr FW	616.82		616.83	558.28	522.74	313.69	1308.57	1764.00	1764.00	1785.00	
Reach-1	25340		617.25	0.43	617.29	200.00	130.51	516.08	1498.41	1745.00	1764.00	1785.00	1945.00
Reach-1	23335	100-Yr FW	615.99		616.05	264.67	618.96	764.58	856.47	1682.00	1682.00	1707.00	
Reach-1	23335		616.08	0.09	616.13	180.00	661.07	730.74	848.19	1610.00	1682.00	1707.00	1790.00
Reach-1	23245	100-Yr FW	615.94		616.00	265.89	619.38	763.23	857.39	1682.00	1682.00	1707.00	
Reach-1	23245		615.97	0.03	616.07	120.00	650.15	907.44	682.41	1635.00	1682.00	1707.00	1755.00
Reach-1	23201	100-Yr FW	615.92		615.97	261.68	589.82	799.12	851.06	1617.00	1679.70	1706.30	
Reach-1	23201		615.96	0.04	616.02	143.00	681.57	865.12	693.31	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR U	100-Yr FW	615.92		615.97	167.69	128.93	2090.34	21.55	1617.00	1679.70	1706.30	
Reach-1	23180.5 BR U		615.96	0.04	616.02	128.17	115.20	2099.74	25.80	1617.00	1679.70	1706.30	1760.00
Reach-1	23180.5 BR D	100-Yr FW	615.79		615.97	149.65	129.20	2089.90	21.71	1617.00	1679.70	1706.30	
Reach-1	23180.5 BR D		615.80	0.01	616.02	115.41	115.47	2099.30	25.97	1617.00	1679.70	1706.30	1760.00
Reach-1	23160	100-Yr FW	610.21		610.60	192.46	640.90	1007.03	592.07	1617.00	1679.70	1706.30	
Reach-1	23160		610.21	0.00	610.64	143.00	643.25	1022.43	574.33	1617.00	1679.70	1706.30	1760.00
Reach-1	23110	100-Yr FW	606.09		606.18	380.14	441.95	859.82	938.23	1618.00	1679.15	1709.96	
Reach-1	23110		606.82	0.73	607.02	142.00	536.92	1252.76	450.31	1618.00	1679.15	1709.96	1760.00
Reach-1	22970	100-Yr FW	605.77		605.82	334.78	1351.99	551.78	431.23	1585.00	1681.70	1704.88	
Reach-1	22970		606.37	0.60	606.47	160.00	1003.28	742.20	589.53	1585.00	1681.70	1704.88	1745.00
Reach-1	22440	100-Yr FW	605.49		605.61	226.78	670.25	1207.48	457.27	1573.00	1636.73	1671.49	
Reach-1	22440		606.13	0.64	606.24	145.00	633.22	1237.73	464.05	1573.00	1636.73	1671.49	1718.00

HEC-RAS Plan: Prop FW AS BUILT River: RIVER-1 Reach: Reach-1 (Continued)

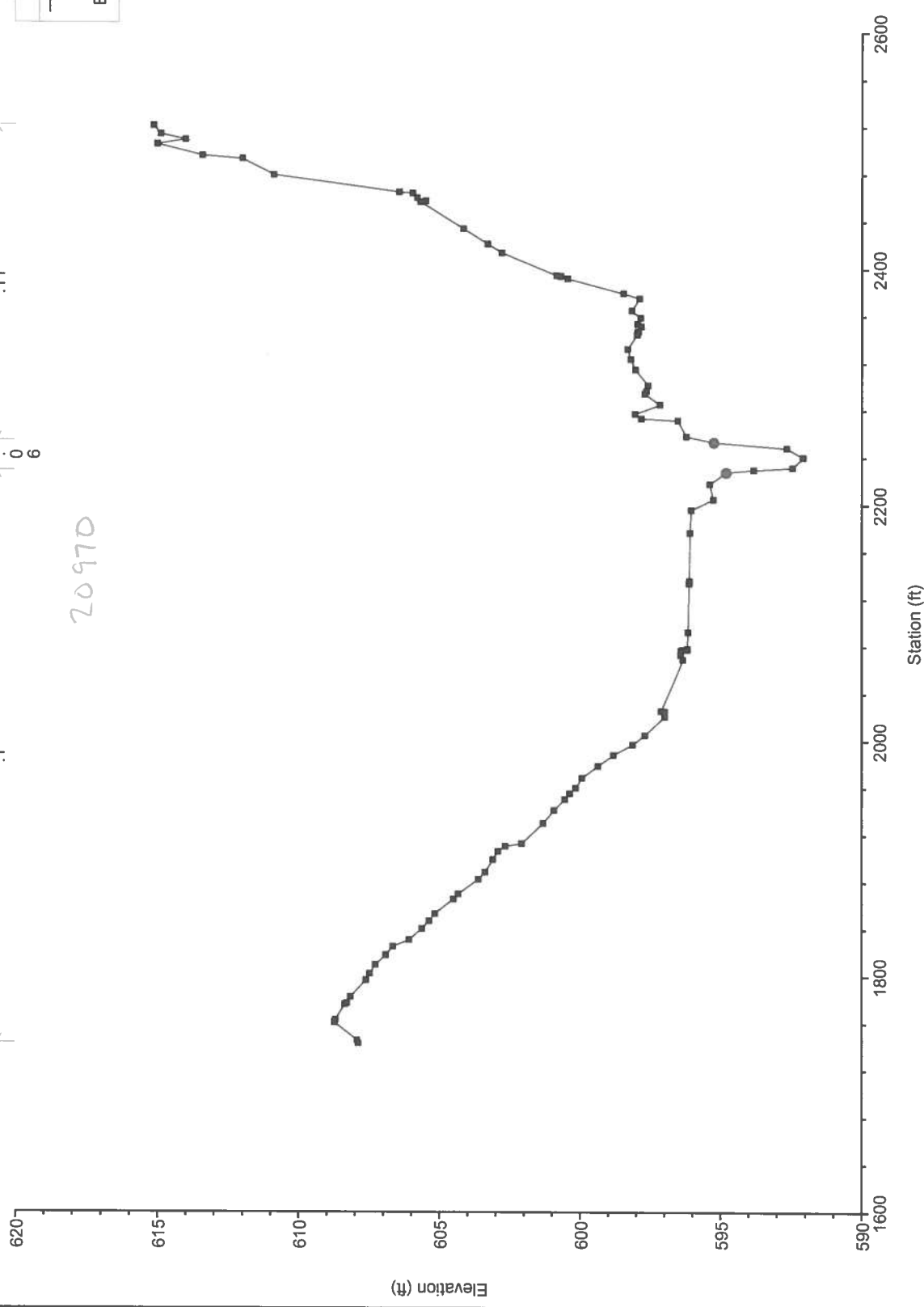
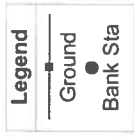
Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	22110	100-Yr	605.22		605.28	260.44	1435.11	567.27	332.61	1651.96	1651.96	1671.78	
Reach-1	22110	FW	605.84	0.62	605.93	160.00	1425.05	682.83	227.13	1536.00	1651.96	1671.78	1696.00
Reach-1	21750	100-Yr	605.02		605.06	351.65	1279.44	943.84	111.72	1629.00	1732.57	1774.34	
Reach-1	21750	FW	605.58	0.57	605.65	160.00	1087.21	1174.90	72.90	1629.00	1732.57	1774.34	1789.00
Reach-1	21270	100-Yr	604.92		604.95	378.16	1440.46	612.47	282.06		1282.00	1310.00	
Reach-1	21270	FW	605.43	0.51	605.49	150.00	1172.22	867.20	295.58	1189.00	1282.00	1310.00	1339.00
Reach-1	21250	100-Yr	604.92		604.94	386.20	1493.25	587.72	254.03		1277.00	1306.00	
Reach-1	21250	FW	605.43	0.51	605.48	160.00	1372.59	841.50	120.91	1159.00	1277.00	1306.00	1319.00
Reach-1	21085	100-Yr	604.89		604.91	424.52	1241.99	674.37	418.64		1367.00	1408.00	
Reach-1	21085	FW	605.38	0.49	605.43	190.00	798.36	953.94	582.70	1290.00	1367.00	1408.00	1480.00
Reach-1	21075	100-Yr	604.89		604.91	432.42	1195.64	533.99	605.37		1449.00	1478.00	
Reach-1	21075	FW	605.39	0.50	605.42	225.00	1053.71	662.58	618.72	1329.00	1449.00	1478.00	1554.00
Reach-1	21030	100-Yr	604.88		604.90	470.75	1138.26	633.44	563.29		1459.49	1497.95	
Reach-1	21030	FW	605.38	0.49	605.40	235.00	866.28	817.16	651.56	1352.00	1459.49	1497.95	1587.00
Reach-1	20970	100-Yr	604.87		604.89	586.50	1744.98	531.98	633.04		2227.63	2253.25	
Reach-1	20970	FW	605.36	0.49	605.39	260.00	2146.33	689.45	74.22	2005.00	2227.63	2253.25	2265.00
Reach-1	20230	100-Yr	604.48		604.64	274.02	303.27	1418.21	1323.53		2067.00	2096.00	
Reach-1	20230	FW	604.89	0.41	605.07	170.00	195.61	1498.00	1351.38	2050.00	2067.00	2096.00	2220.00
Reach-1	19430	100-Yr	602.84		603.12	250.77	597.92	1694.09	752.99		2067.00	2096.00	
Reach-1	19430	FW	603.56	0.71	603.77	180.00	561.09	1610.61	873.31	2030.00	2067.00	2096.00	2210.00
Reach-1	17790	100-Yr	600.76		600.84	233.93	146.50	901.81	1996.70		1275.00	1300.00	
Reach-1	17790	FW	601.37	0.61	601.49	150.00	107.92	1116.87	1820.22	1265.00	1275.00	1300.00	1415.00
Reach-1	16030	100-Yr	596.47		597.34	120.72	723.38	1966.87	354.76		1442.00	1464.00	
Reach-1	16030	FW	596.99	0.52	597.67	116.00	795.61	1864.88	384.51	1379.00	1442.00	1464.00	1495.00
Reach-1	15580	100-Yr	596.07		596.17	258.91	196.46	1248.87	1599.66		1366.00	1398.00	
Reach-1	15580	FW	596.69	0.62	596.78	210.00	178.25	1194.92	1671.83	1345.00	1366.00	1398.00	1555.00

Travis Creek Aycock Springs Restoration Plan:

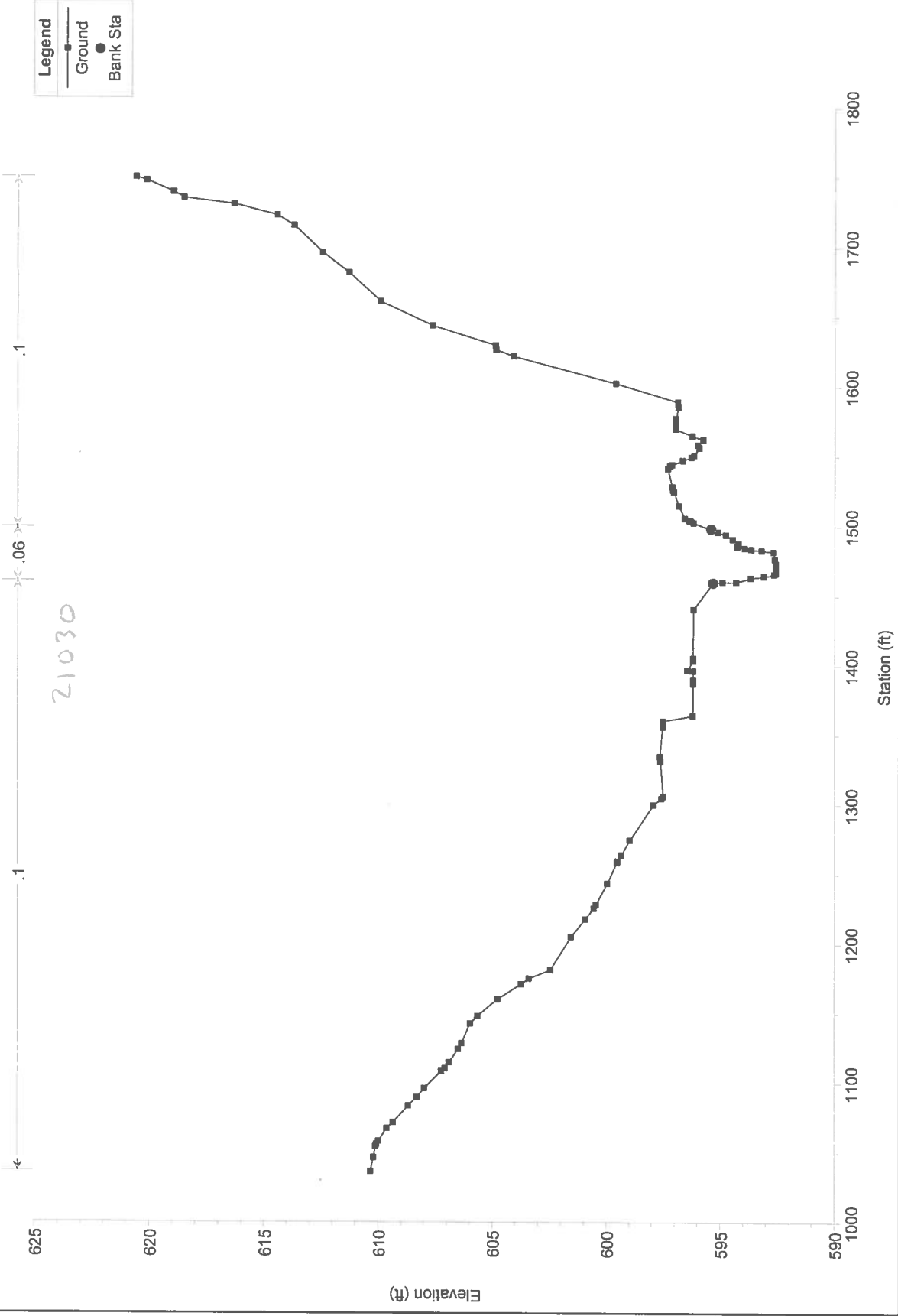
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20970

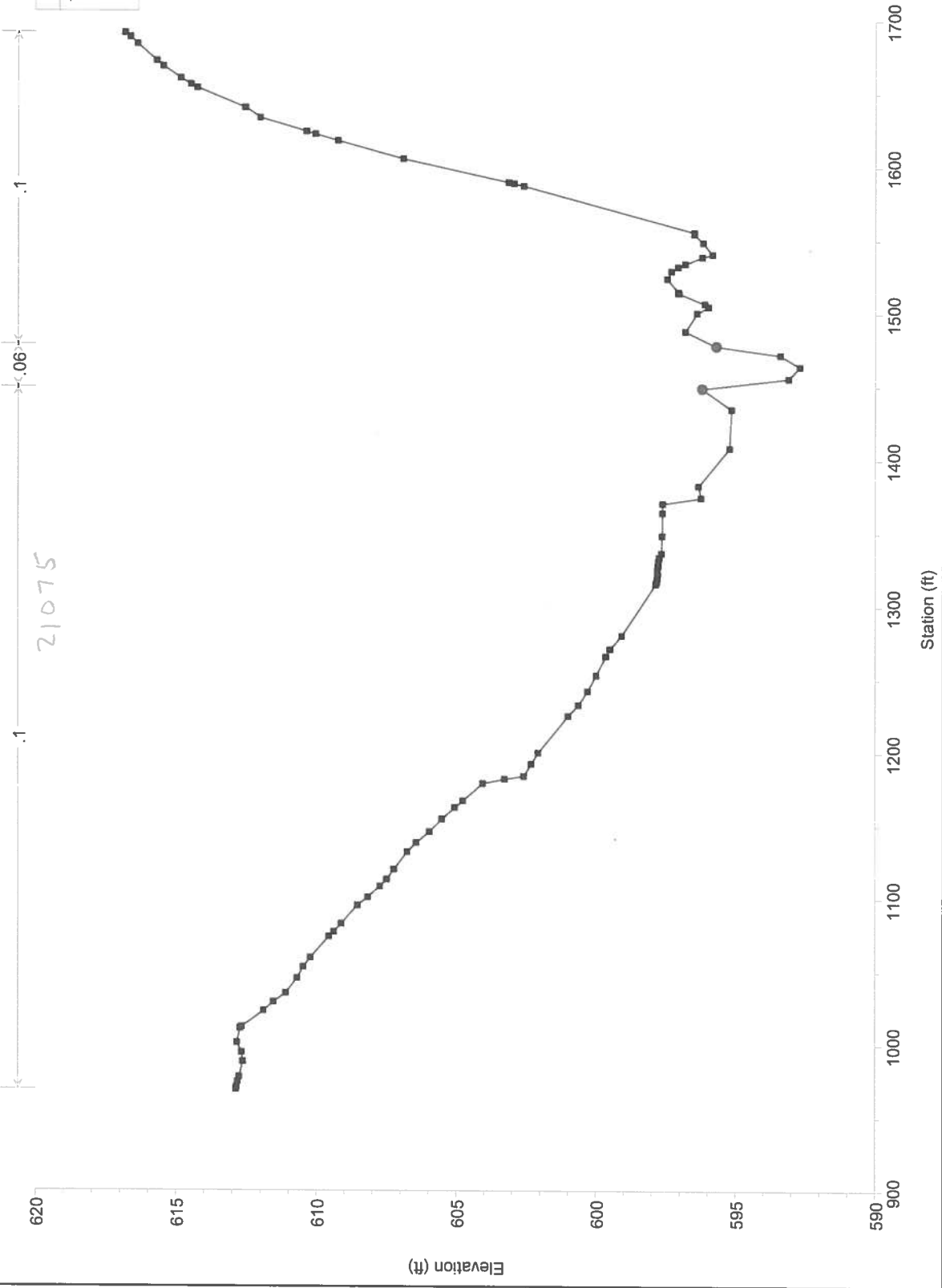


Travis Creek Aycock Springs Restoration Plan:
** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **



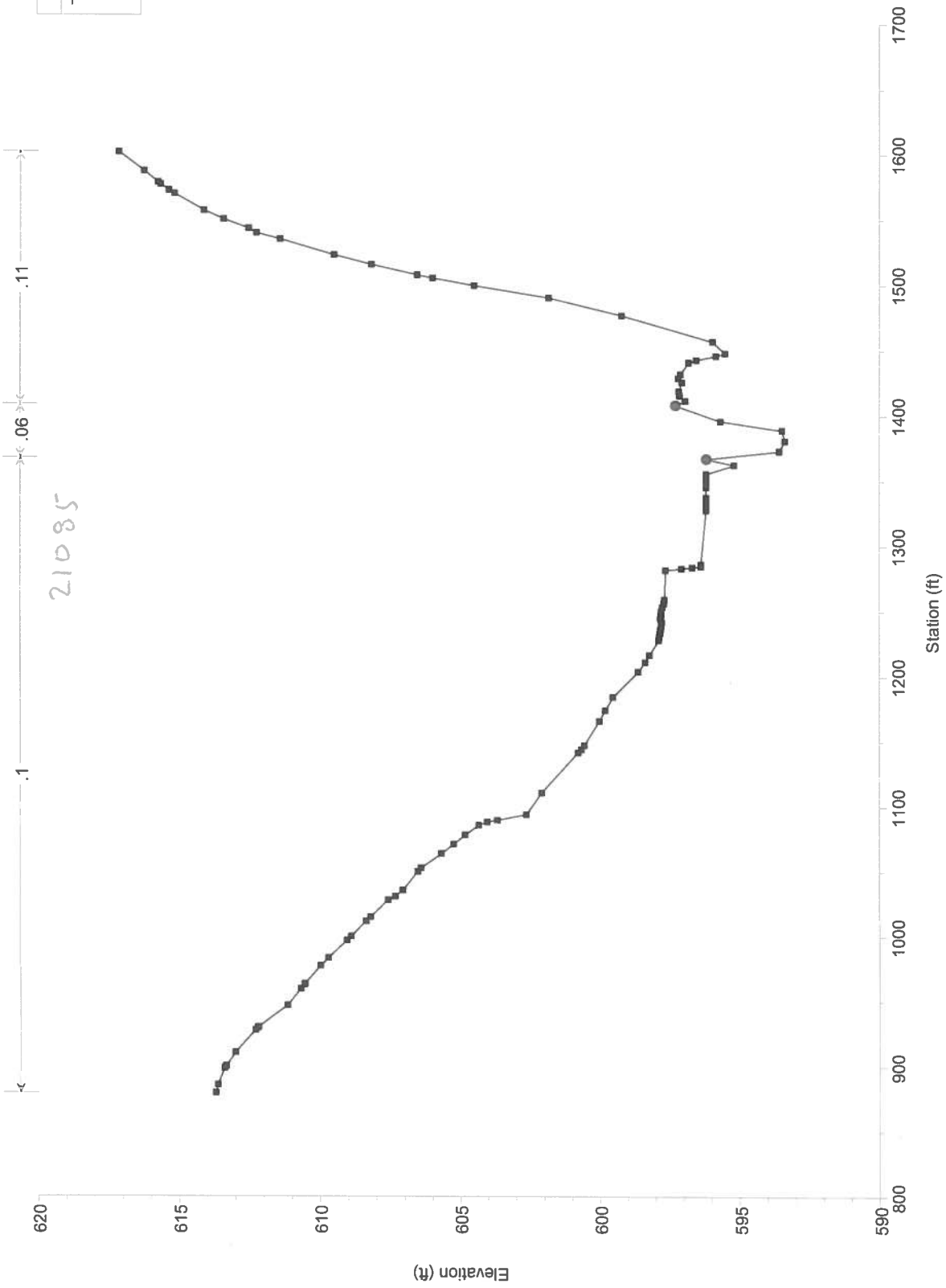
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21075



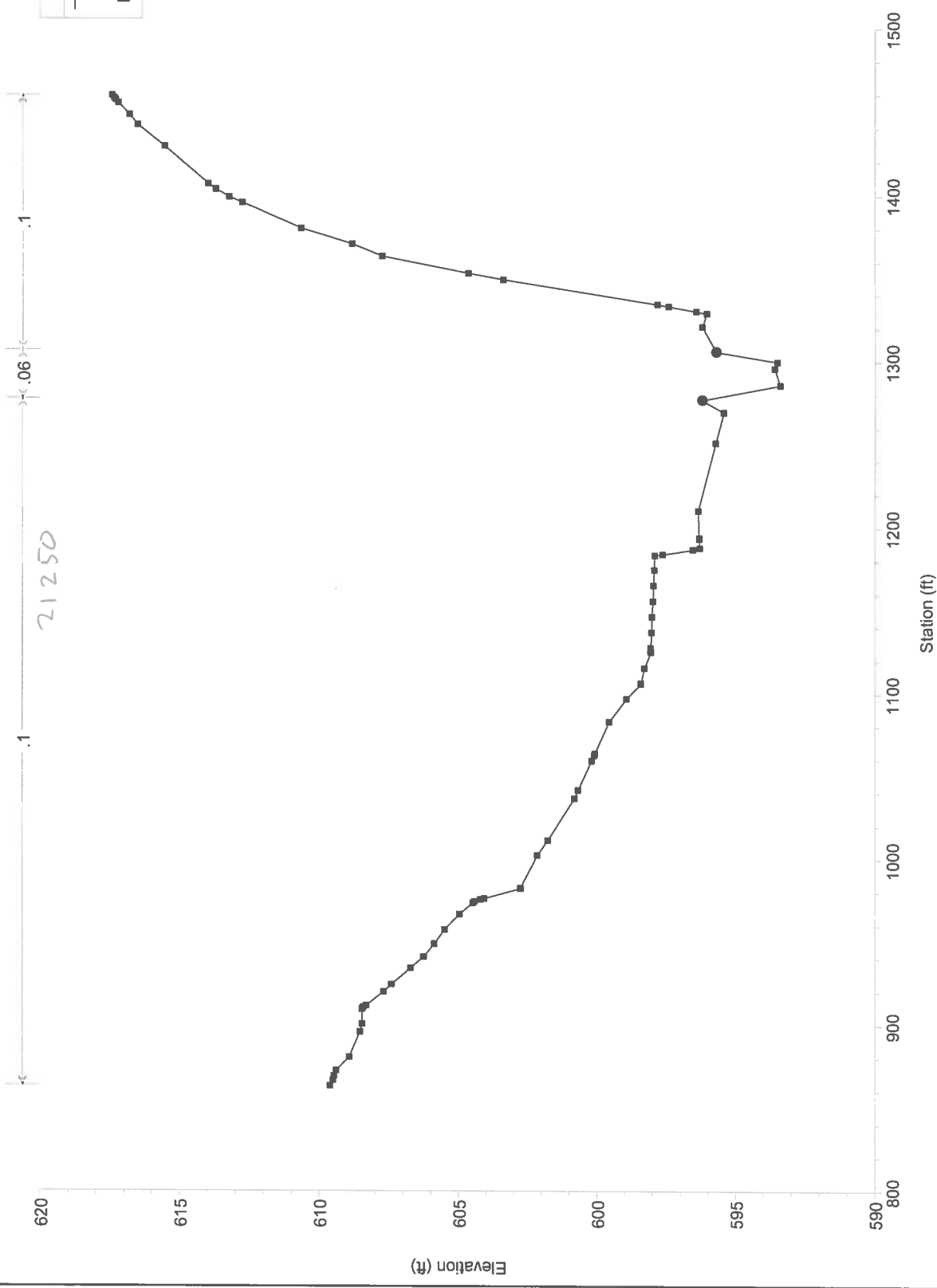
Travis Creek Aycock Springs Restoration Plan:

** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **



Travis Creek Aycock Springs Restoration
** SEC 20-A EXTENDED ON LOB **

Plan:



Legend
Ground
Bank Sta

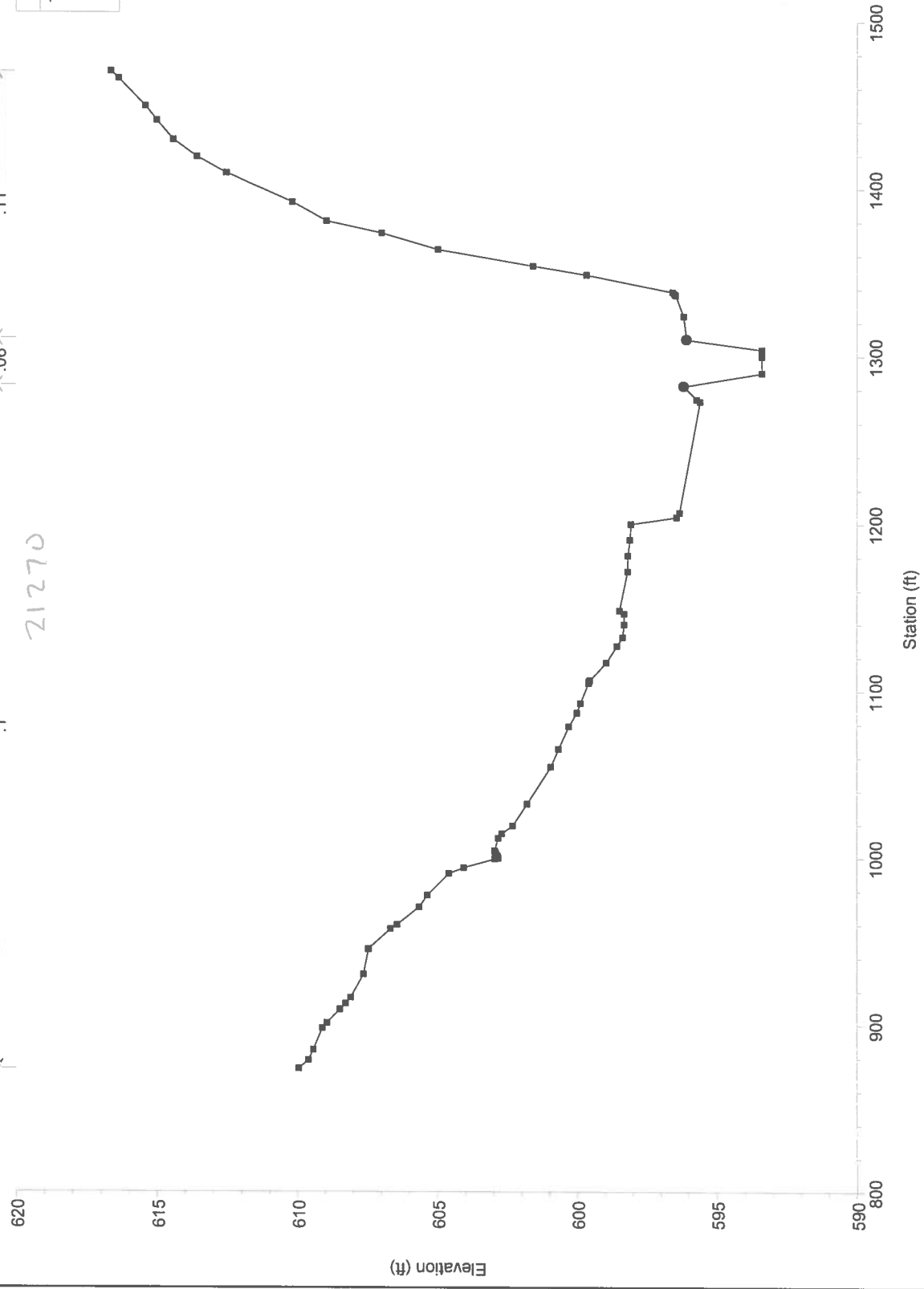
21250

Travis Creek Aycock Springs Restoration
** SEC 20-A W/CHAN FM SEC 21 **

Plan:

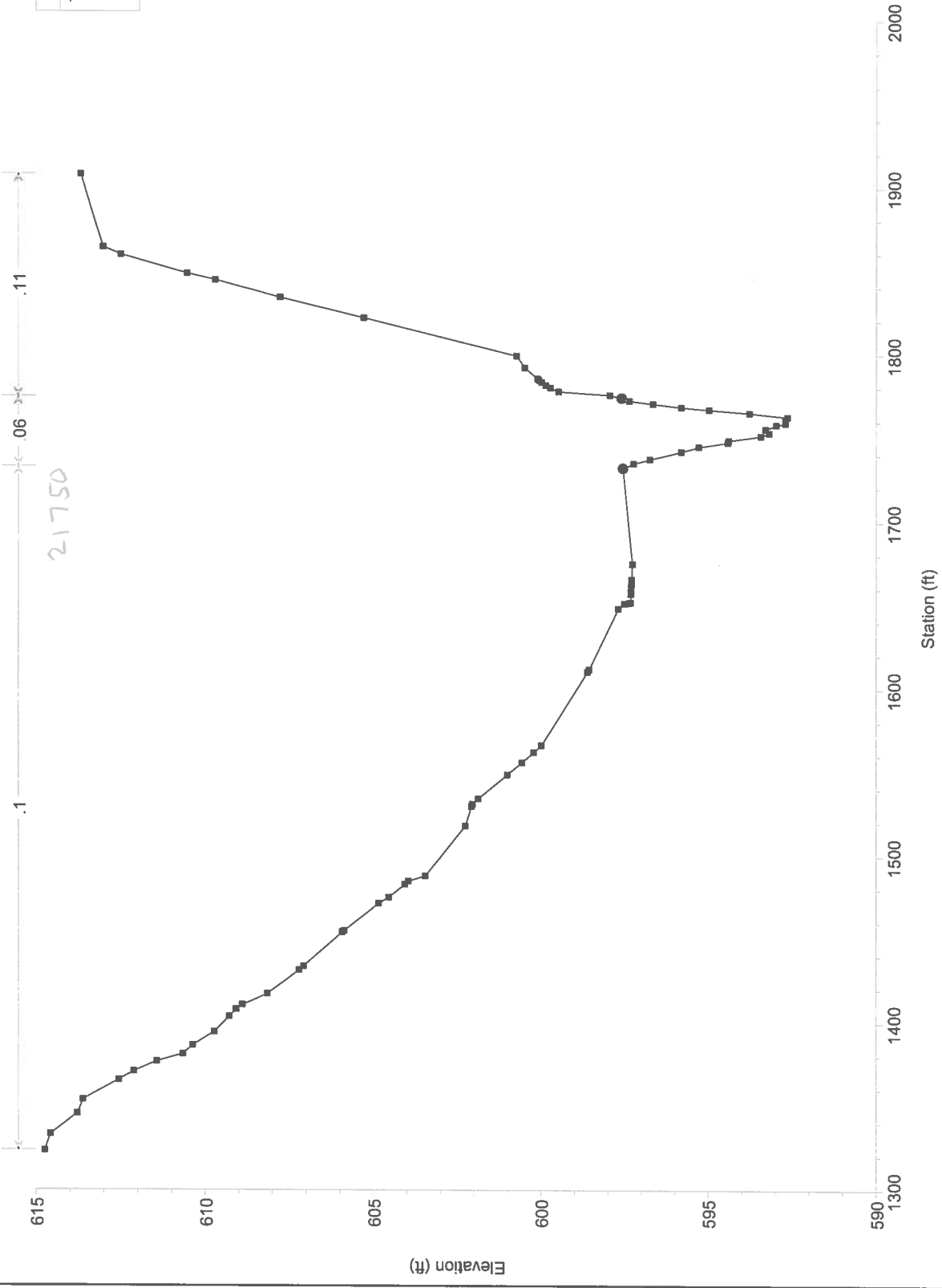


21270



Travis Creek Aycock Springs Restoration Plan:

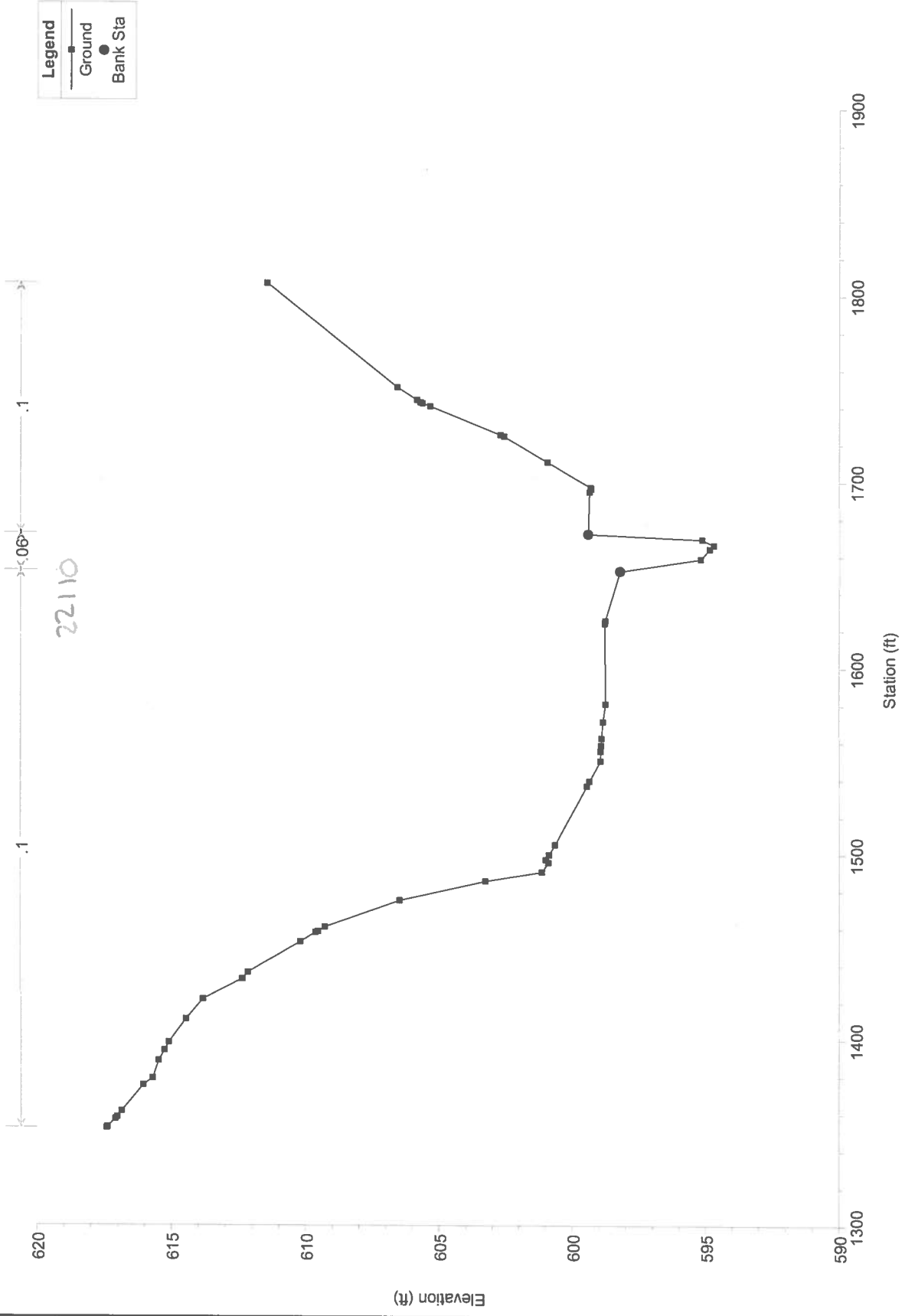
** SEC 21 **



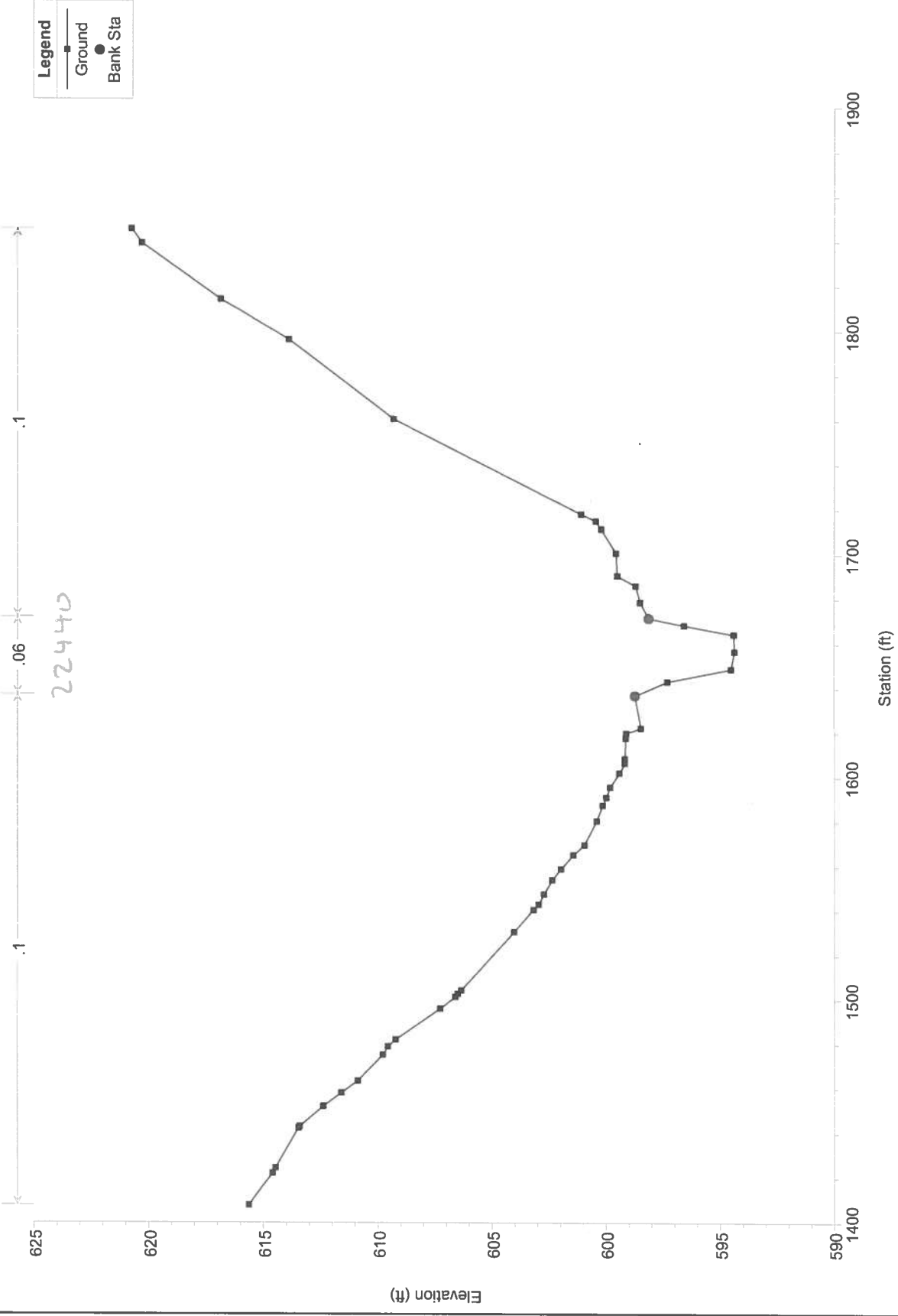
Legend

- Ground
- Bank Sta

Travis Creek Aycock Springs Restoration Plan:



Travis Creek Aycock Springs Restoration Plan:
 ** TOPO, ADJ. BASED ON 23:NR OVBK & CHAN FM 21; NEF LOB **

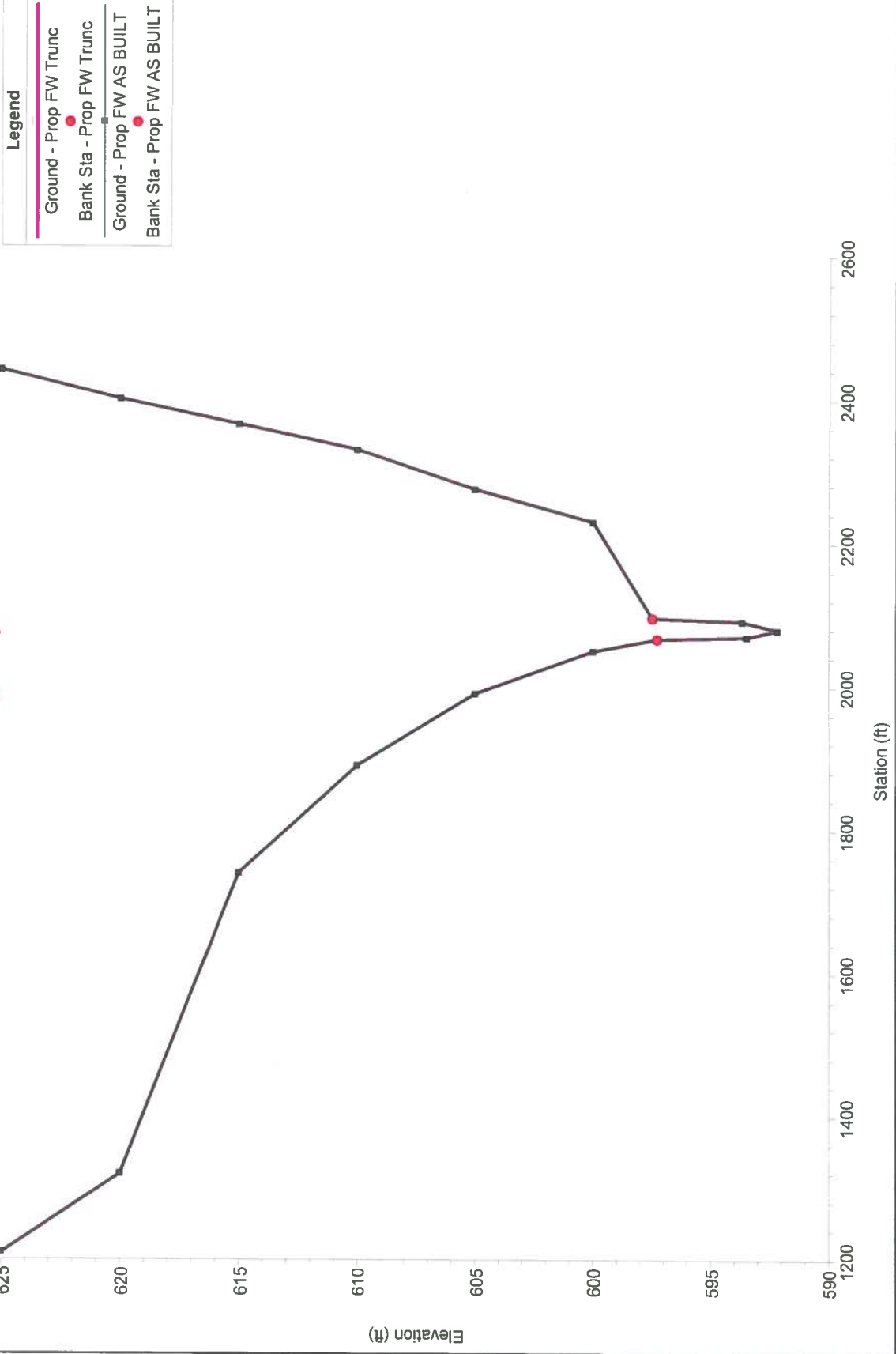


Legend
 □ Ground
 ● Bank Sta

Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** TOPO SEC: CHAN FM ATC-20 **

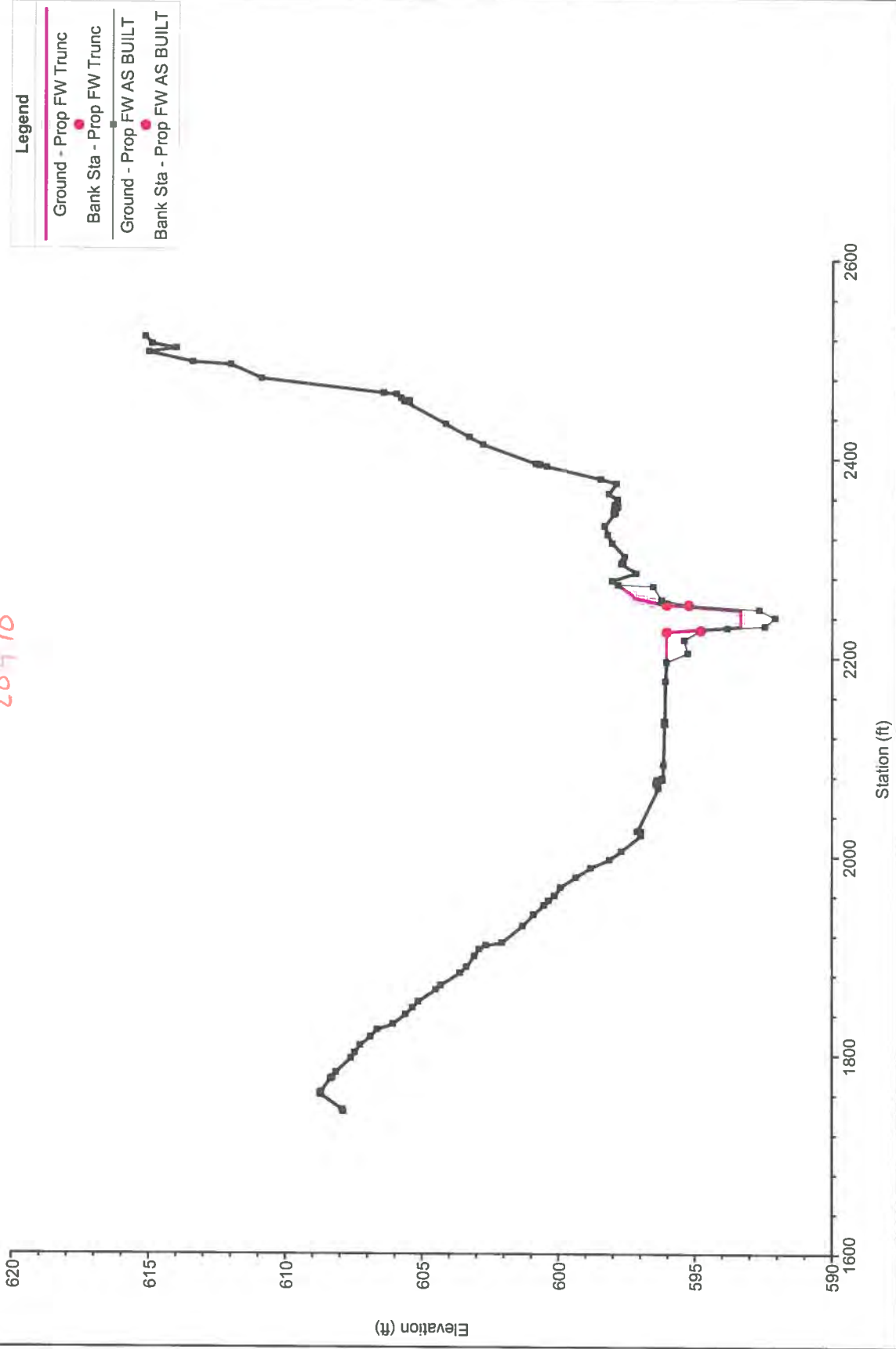
20230



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** TOPO SEC; CHAN FM ATC-20 **

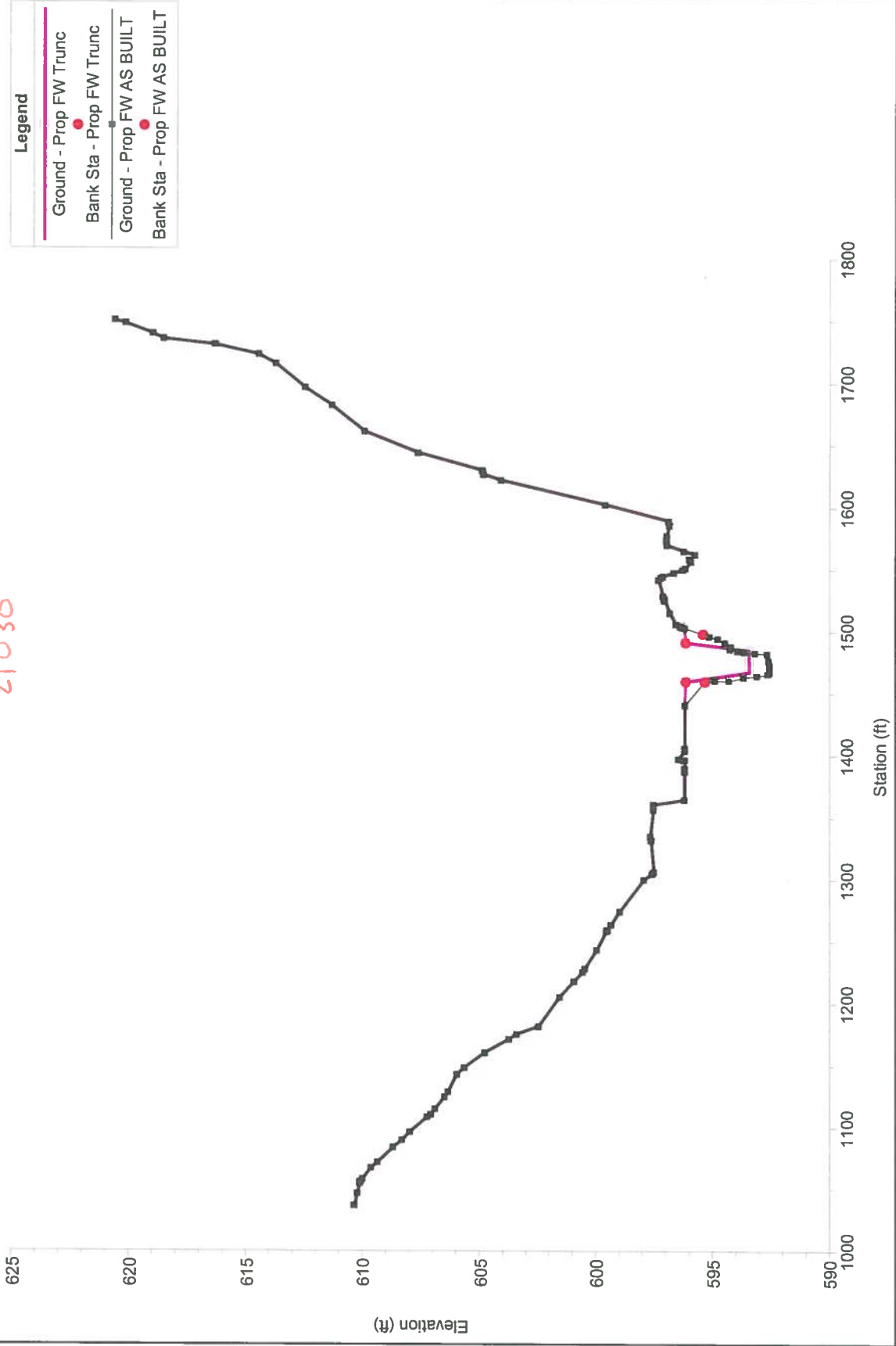
20570



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** TOPO SEC, MOD BY SEC 20-A AND NEF ROB **

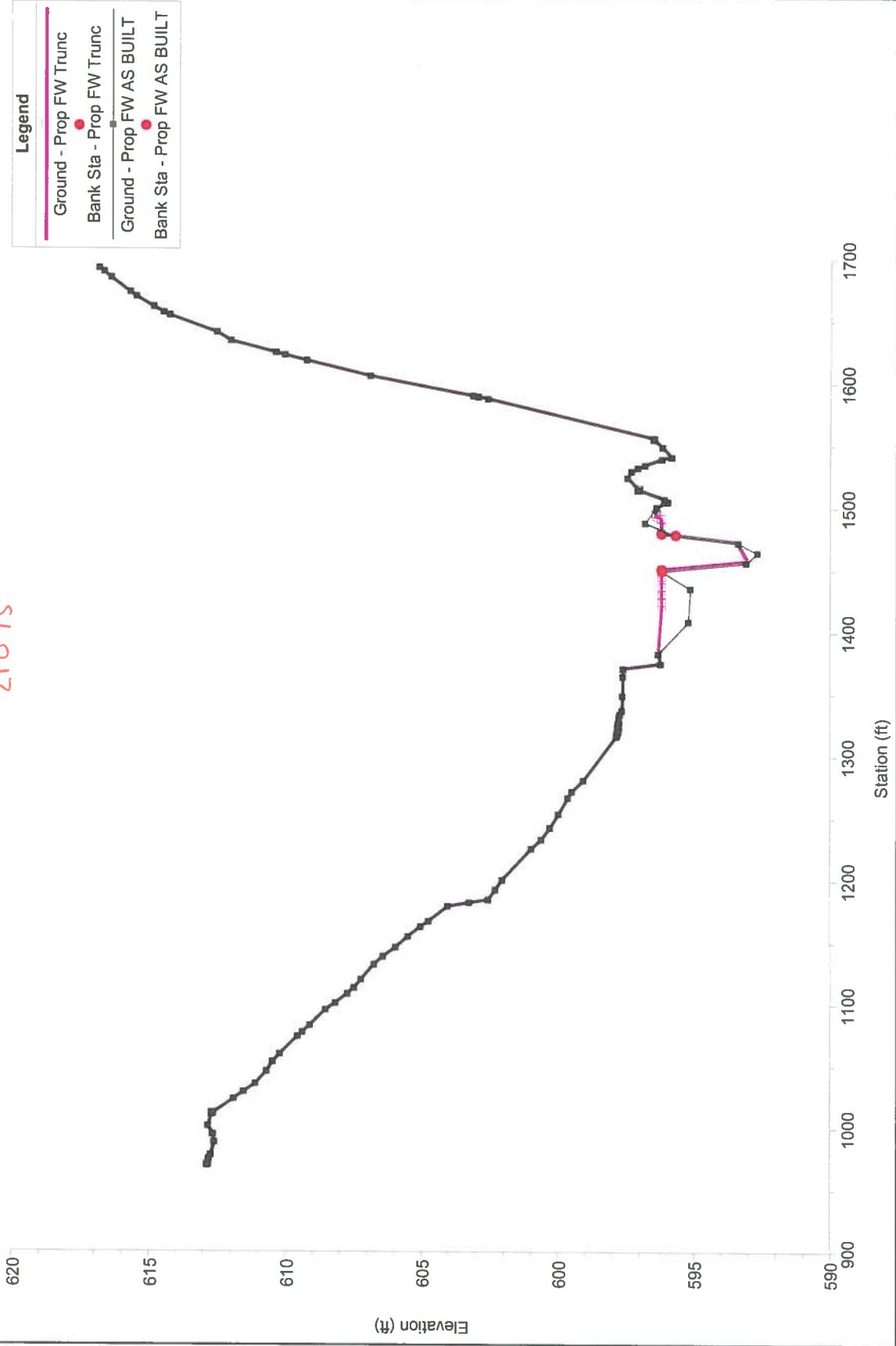
21030



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** TOPO W/ OVBKS FM 21030; XLCH BASED ON NEW CHAN; STA NOT CHG**

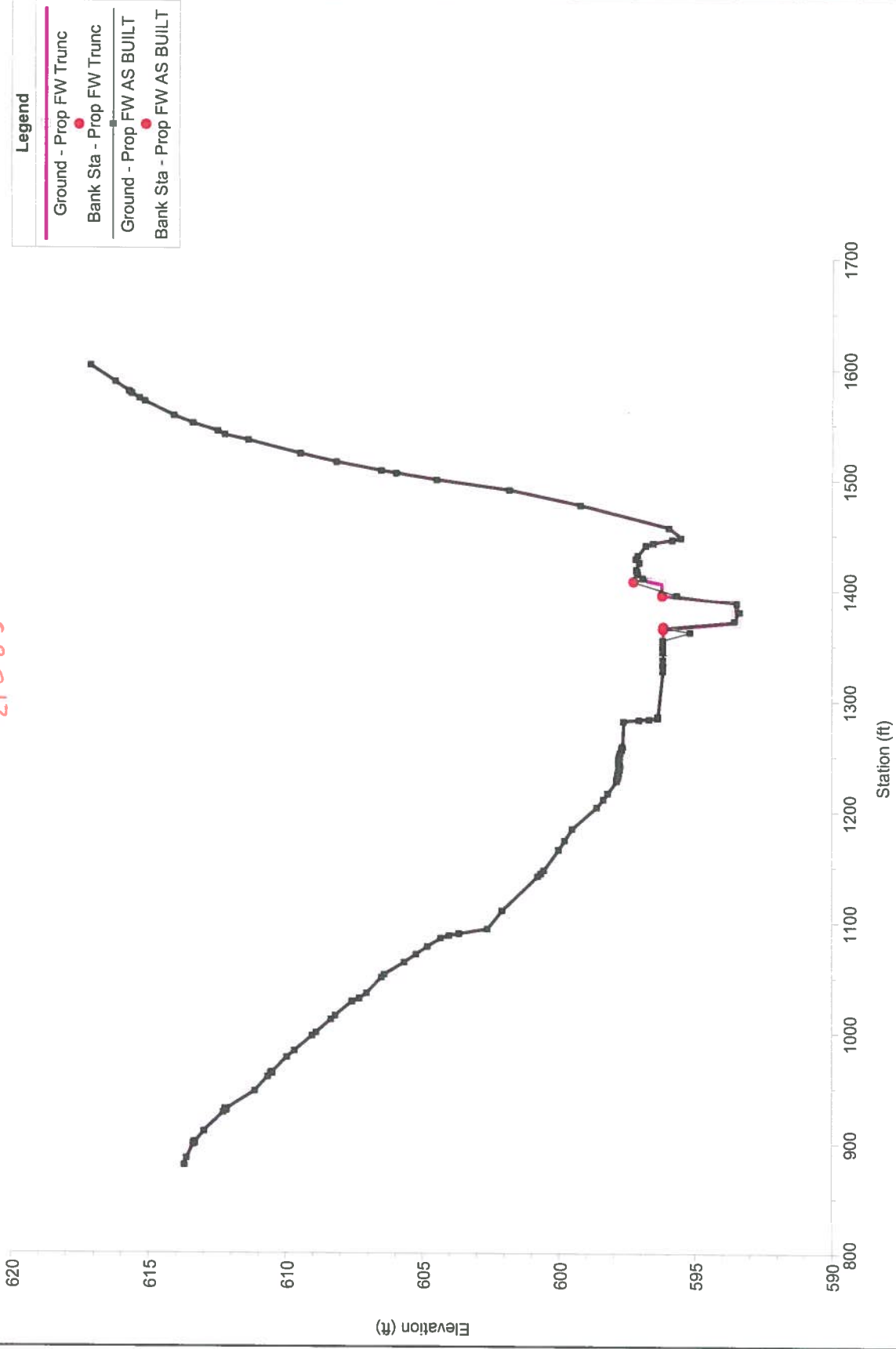
21075



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** TOPO; OVBKS MOD BY 20A ROB; CHAN FM 20-A **

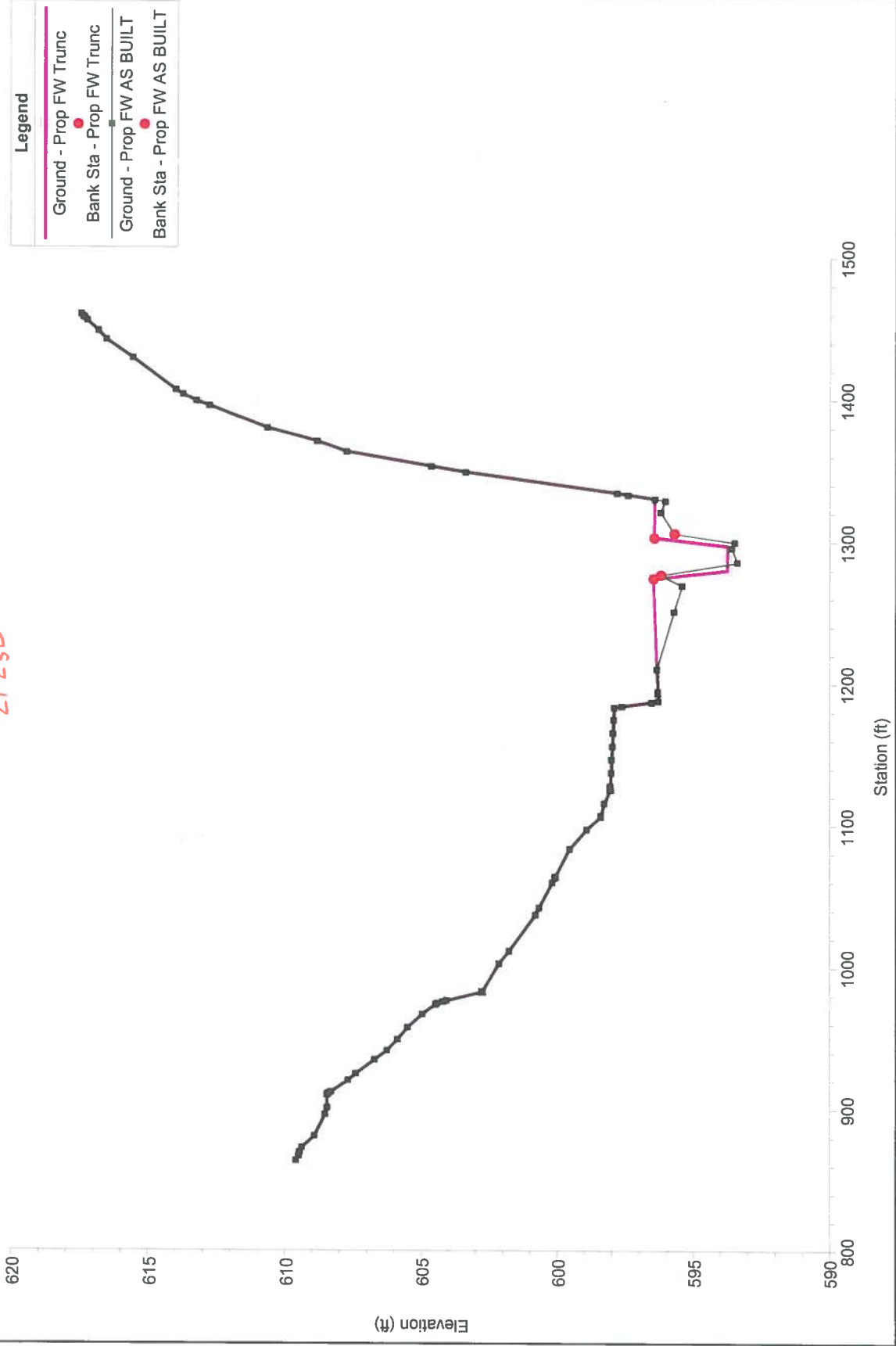
21085



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** SEC 20-A EXTENDED ON LOB **

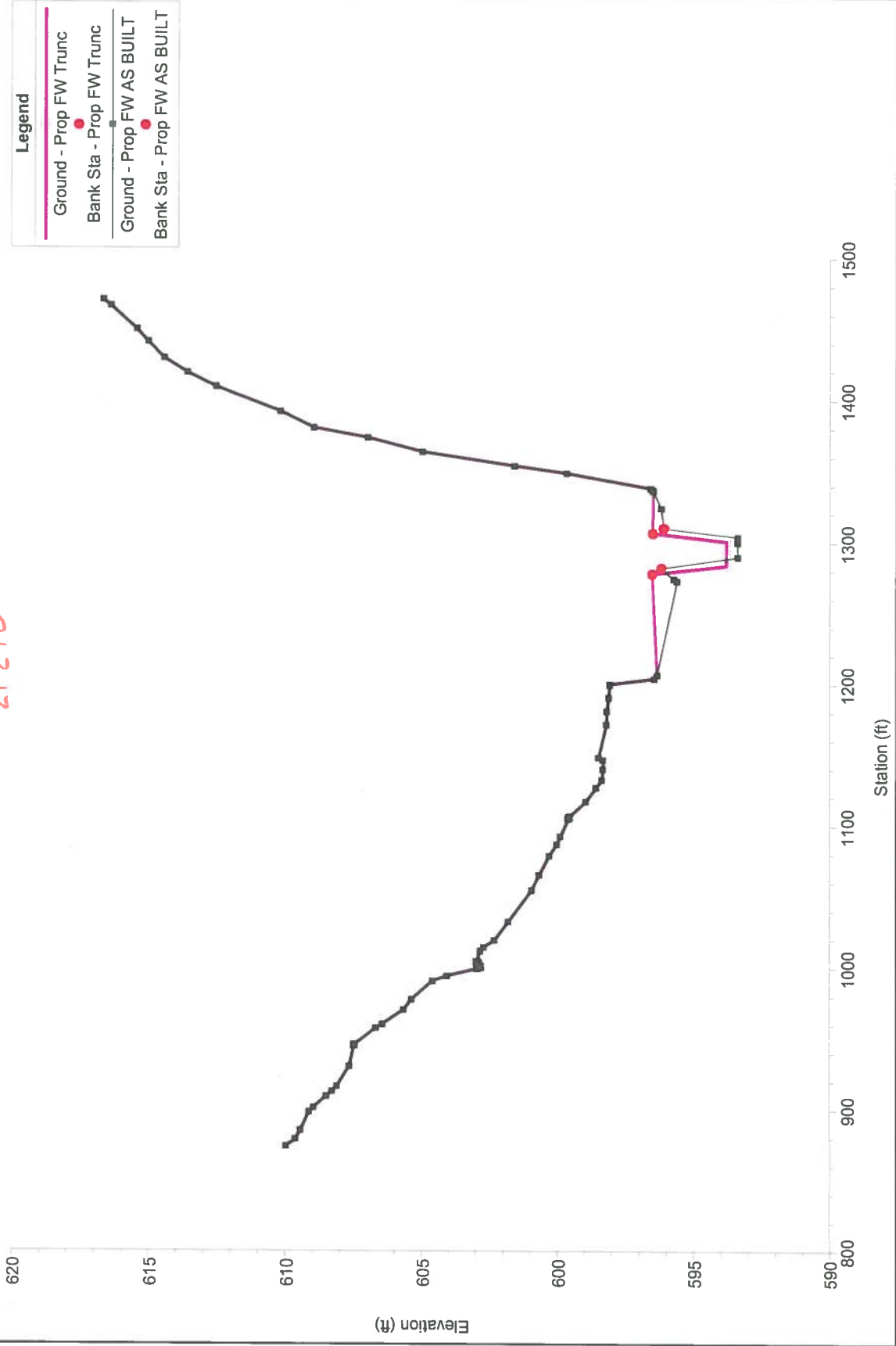
21250



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** SEC 20-A W/CHAN FM SEC 21 **

21270

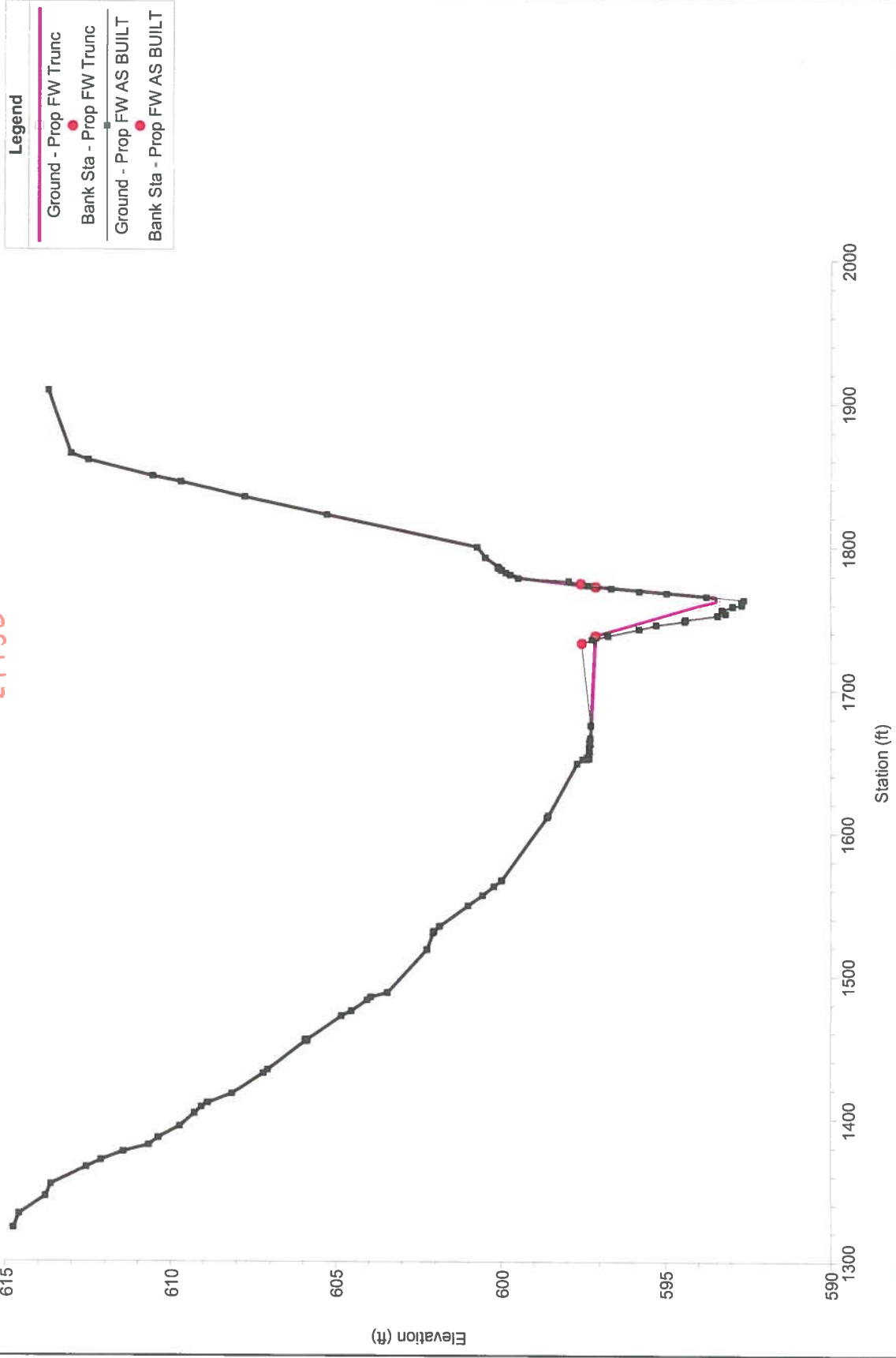


Travis Creek Aycock Springs Restoration

Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

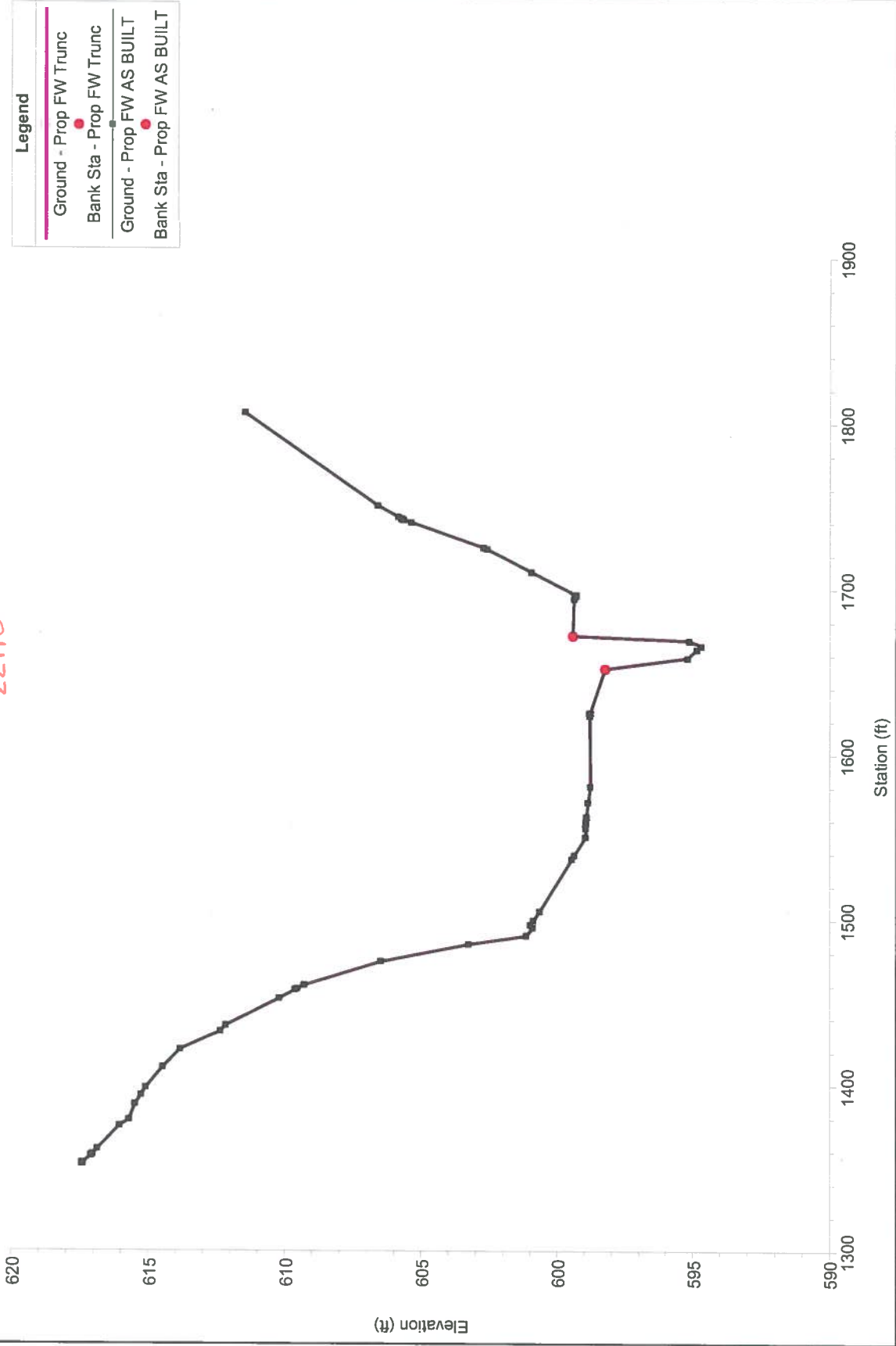
** SEC 21 **

21750



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

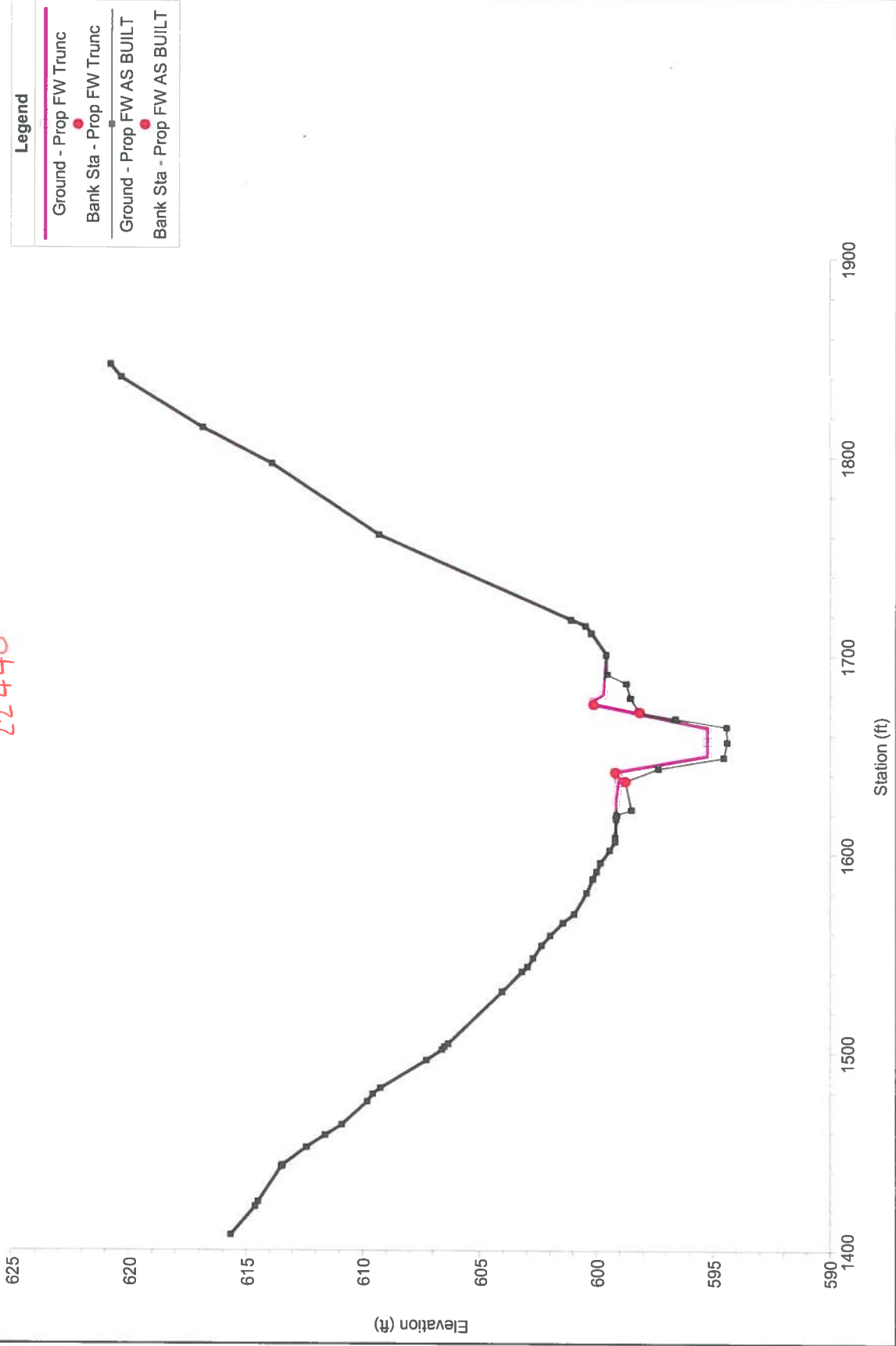
22110



Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

** TOPO,ADJ. BASED ON 23;NR OVBK & CHAN FM 21; NEF LOB **

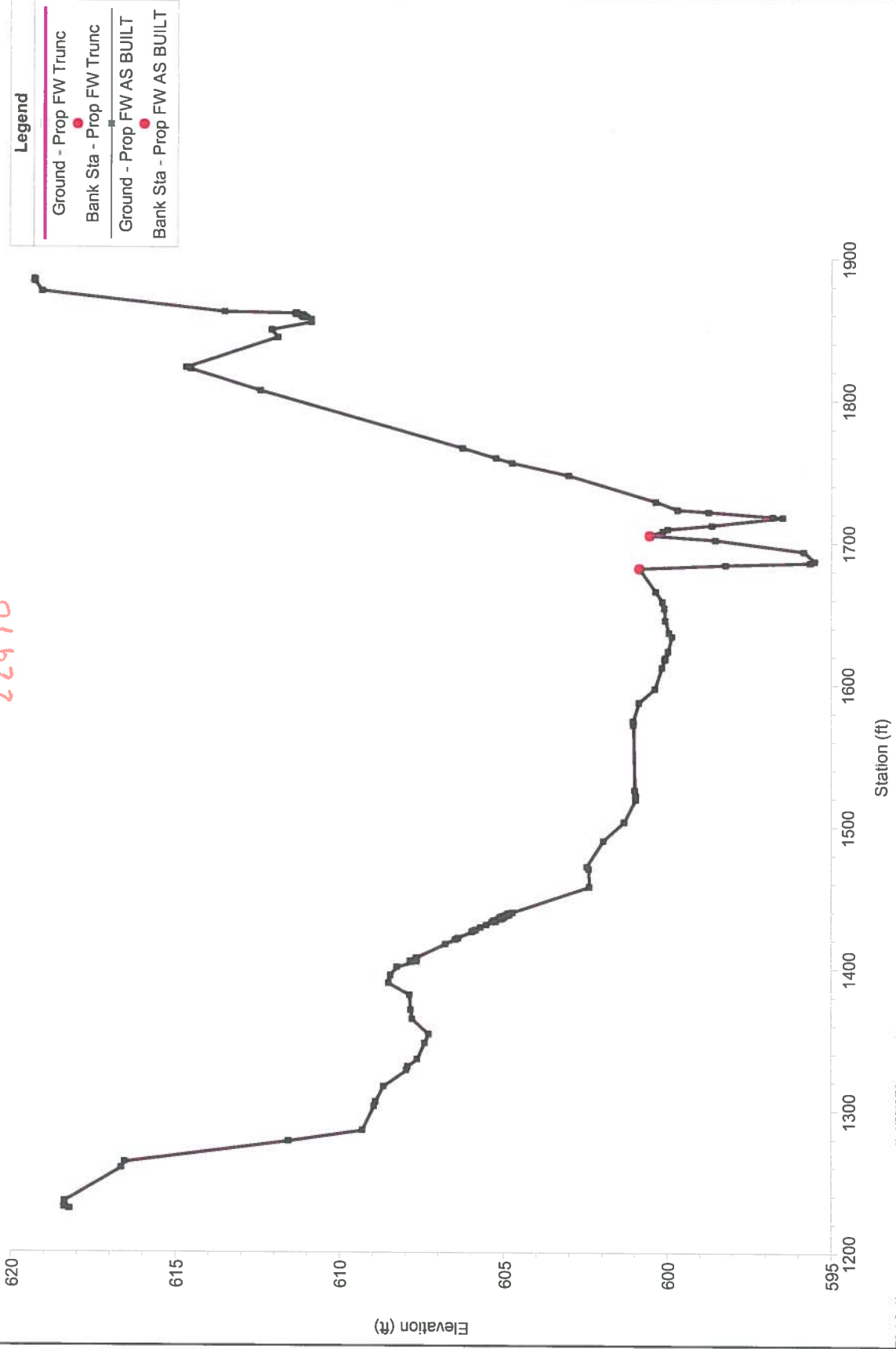
22440

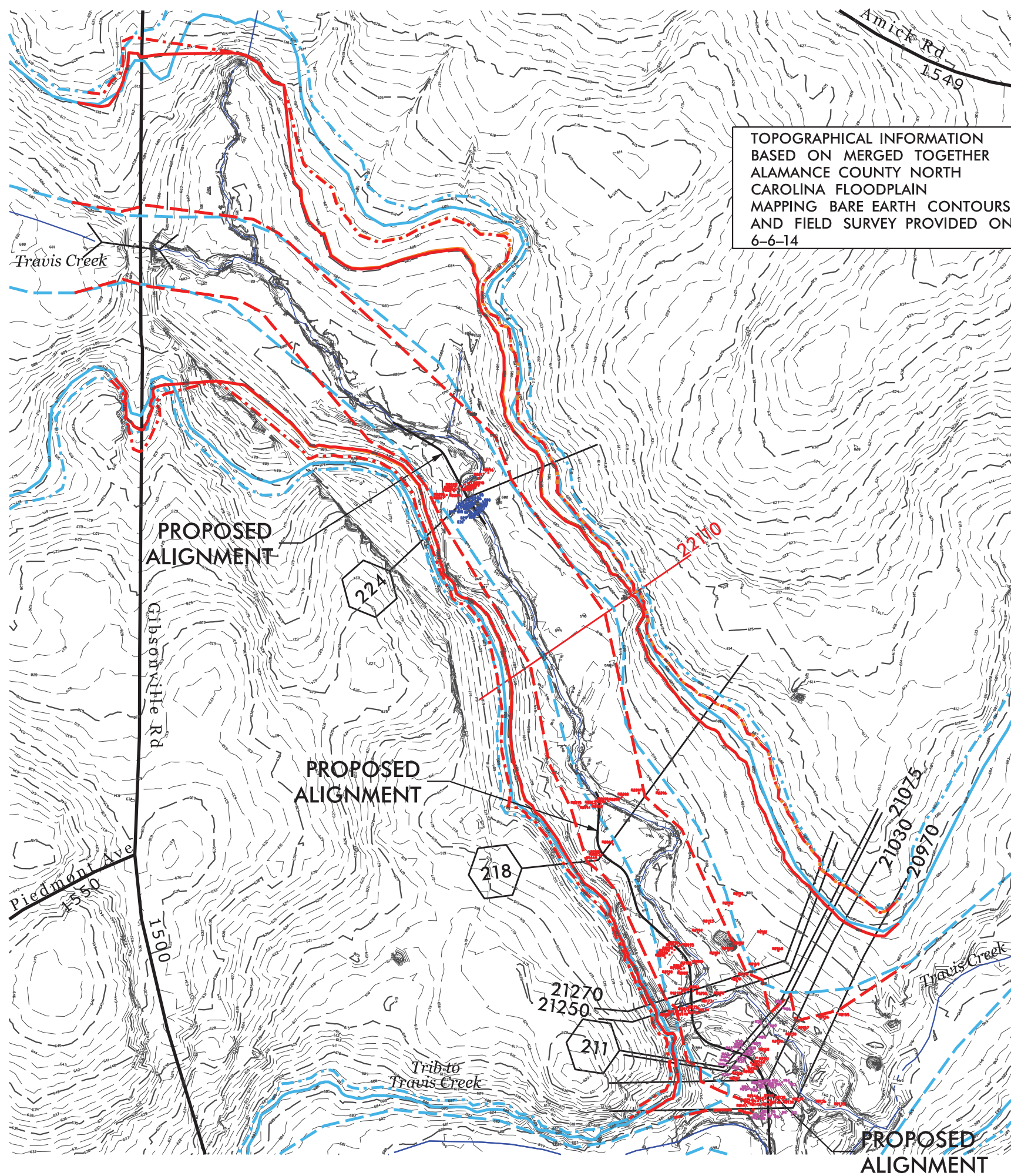


Travis Creek Aycock Springs Restoration Plan: 1) Prop FW AS BUILT 2) Prop FW Trunc

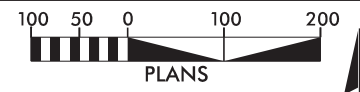
** TOPO MOD BY SEC 23; CHAN FM ATC-21 **

22970





TOPOGRAPHICAL INFORMATION
 BASED ON MERGED TOGETHER
 ALAMANCE COUNTY NORTH
 CAROLINA FLOODPLAIN
 MAPPING BARE EARTH CONTOURS
 AND FIELD SURVEY PROVIDED ON
 6-6-14



PROJECT REFERENCE NO.	SHEET NO.
AYCOCK STRM	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

04-15-16 Points			04-15-16 Points			06-06-16 Points		
Pt #	Elevation	Description	Pt #	Elevation	Description	Pt #	Elevation	Description
R1255	595.73	txcs04r	R2191	599.30	xsfema7	M3	598.03	xs1
R1261	593.07	txcs04r	R2192	599.07	xsfema7	M4	597.22	xs1
R1266	592.93	txcs04r	R2193	598.47	xsfema7	M5	596.25	xs1
R1272	596.24	txcs04r	R2194	596.54	xsfema7	M6	592.34	xs1
R2135	595.56	xsfema2	R2195	595.81	xsfema7	M7	592.37	xs1
R2136	595.00	xsfema2	R2196	595.09	xsfema7	M8	592.31	xs1
R2137	595.04	xsfema2	R2197	593.38	xsfema7	M9	592.29	xs1
R2138	595.27	xsfema2	R2198	592.79	xsfema7	M10	592.75	xs1
R2139	595.35	xsfema2	R2199	593.06	xsfema7	M11	595.00	xs1
R2140	594.90	xsfema2	R2200	595.79	xsfema7	M12	596.68	xs1
R2141	593.86	xsfema2	R2201	596.61	xsfema7			
R2142	593.45	xsfema2						
R2143	592.06	xsfema2	R1444	597.94	txcs10p	M3	598.03	xs1
R2144	592.66	xsfema2	R2069	597.54	txcs10p	M4	597.22	xs1
R2145	595.24	xsfema2	R2081	592.70	txcs10p	M5	596.25	xs1
R2146	596.27	xsfema2	R2083	592.64	txcs10p	M6	592.34	xs1
R2147	596.53	xsfema2				M7	592.37	xs1
R2155	596.53	xsfema4	R2205	598.43	xsfema8	M8	592.31	xs1
R2156	595.91	xsfema4	R2206	597.53	xsfema8	M9	592.29	xs1
R2157	596.46	xsfema4	R2207	597.17	xsfema8	M10	592.75	xs1
R2158	595.57	xsfema4	R2208	597.26	xsfema8	M11	595.00	xs1
R2159	595.22	xsfema4	R2209	596.61	xsfema8	M12	596.68	xs1
R2160	595.15	xsfema4	R2210	596.00	xsfema8			
R2161	594.95	xsfema4	R2211	593.09	xsfema8	M13	595.26	xs2
R2162	591.61	xsfema4	R2212	593.17	xsfema8	M14	595.26	xs2
R2163	592.00	xsfema4	R2213	593.44	xsfema8	M15	595.16	xs2
R2164	592.07	xsfema4	R2214	596.87	xsfema8	M16	594.96	xs2
R2165	594.78	xsfema4	R2215	597.40	xsfema8	M17	593.56	xs2
R2166	595.00	xsfema4				M18	592.31	xs2
R2167	595.83	xsfema4	R2216	598.61	xsfema9	M19	592.19	xs2
			R2217	598.47	xsfema9	M20	592.13	xs2
R2168	598.18	xsfema5	R2218	598.74	xsfema9	M21	592.47	xs2
R2169	597.66	xsfema5	R2219	597.33	xsfema9	M22	594.33	xs2
R2170	597.22	xsfema5	R2220	594.54	xsfema9	M23	595.93	xs2
R2171	596.09	xsfema5	R2221	594.39	xsfema9	M24	596.40	xs2
R2172	595.67	xsfema5	R2222	594.42	xsfema9	M25	596.45	xs2
R2173	595.71	xsfema5	R2223	596.60	xsfema9			
R2174	595.42	xsfema5	R2224	598.14	xsfema9	M26	596.64	xs3
R2175	592.62	xsfema5	R2225	598.51	xsfema9	M27	595.66	xs3
R2176	592.78	xsfema5	R2226	598.71	xsfema9	M28	595.50	xs3
R2177	592.72	xsfema5	R2227	599.52	xsfema9	M29	595.29	xs3
R2178	594.86	xsfema5				M30	595.37	xs3
R2179	595.37	xsfema5				M31	592.28	xs3
R2180	596.04	xsfema5				M32	591.86	xs3
						M33	592.64	xs3
R2181	598.76	xsfema6				M34	594.94	xs3
R2182	598.12	xsfema6				M35	596.01	xs3
R2183	597.94	xsfema6				M36	595.14	xs3
R2184	596.33	xsfema6						
R2185	595.41	xsfema6				M37	596.93	xs4
R2186	592.57	xsfema6				M38	595.49	xs4
R2187	592.64	xsfema6				M39	595.35	xs4
R2188	594.71	xsfema6				M40	595.10	xs4
R2189	595.98	xsfema6				M41	592.78	xs4
R2190	596.00	xsfema6				M42	592.60	xs4
						M43	592.68	xs4
						M44	592.80	xs4
						M45	595.34	xs4
						M46	596.45	xs4

DocuSigned by:
 Henry Wells
 C28451E80448428...
 9334
 ENGINEER
 W. HENRY WELLS JR.
 7/26/2016

06-14-16 Points		
Pt #	Elevation	Description
B5	598.47	sgxs01
B6	598.36	sgxs01
B7	598.05	sgxs01
B8	597.01	sgxs01
B9	595.32	sgxs01
B10	594.57	sgxs01
B11	594.67	sgxs01
B12	594.47	sgxs01
B13	594.15	sgxs01
B14	594.84	sgxs01
B15	596.00	sgxs01
B16	597.32	sgxs01
B17	598.06	sgxs01
B18	596.99	sgxs01
B19	598.79	sgxs01
B20	598.31	axioms02
B21	598.33	axioms02
B22	598.14	axioms02
B23	594.81	axioms02
B24	594.62	axioms02
B25	594.51	axioms02
B26	595.75	axioms02
B27	597.37	axioms02
B28	598.06	axioms02
B29	598.18	axioms02
B30	599.21	axioms02

SURVEYORS CERTIFICATION(S)

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground or aboveground utilities or any other features above, or below ground other than those shown.

I certify that the survey is of an existing parcel or parcels of land and does not create a new street or change an existing street.

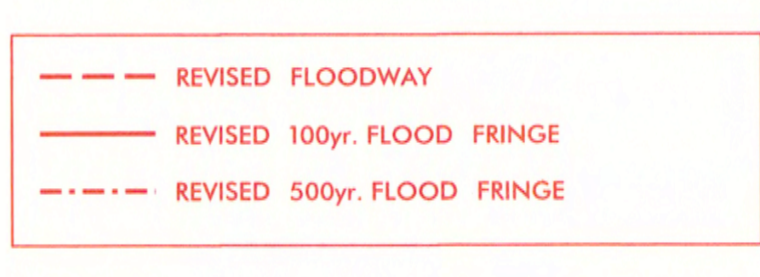
I certify that the elevations shown on said plat, meet the requirements of a Class C topographic survey in the State of North Carolina [21NCAC 56.1605(a)].

I, John A. Rudolph, certify that this project was completed under my direct and responsible charge from an actual survey made under my supervision; that this ground survey was performed at the 95 percent confidence level (2 sigma) to meet Federal Geographic Data Committee Standards; that the horizontal accuracy is 0.05 ft., that the vertical accuracy is 0.05 ft. and that the original data was obtained on May and June 2016; that the survey was completed on June 14, 2016; that contours shown as (broken lines) may not meet the stated standard; and all coordinates are base on NAD 83/2011; and all elevations are based on NAVD 88.

SEAL OR STAMP
 DocuSigned by:
 John Rudolph
 1C9D7388B9B845D...
 SEAL
 L-4194
 LAND SURVEYOR
 JOHN A. RUDOLPH
 7/26/2016

Surveyor L-4194

K2 DESIGN GROUP, P.A.
 5688 U.S. Hwy. 70 East
 Goldsboro, NC 27534
 Tel.: (919) 751-0075
 k2design@suddenlink.net
 Firm License No.: C-2111



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map flood hazard areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
 THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://FRIS.NC.GOV/FRIS](http://FRIS.NC.GOV/FRIS)

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AQ, AH, VE, AR
 - Regulatory Floodway
 - 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee See Notes Zone X
- OTHER AREAS OF FLOOD HAZARD**
- OTHER AREAS**
 - Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
 - Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- GENERAL STRUCTURES**
 - Non-accredited Levee, Dike, or Floodwall
 - North Carolina Geodetic Survey bench mark
 - National Geodetic Survey bench mark
 - Contractor Est. NCFMP Survey bench mark
 - Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
 - Coastal Transect
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
 - Limit of Study
 - Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of the FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at <http://www.ncfloodmaps.com> or contact the FEMA Map Service Center.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for that jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the North Carolina Floodplain Mapping Program (NCFMP). The source of this information can be determined from the metadata available in the digital FLOOD database and in the Technical Support Data Notebook (TSDN).

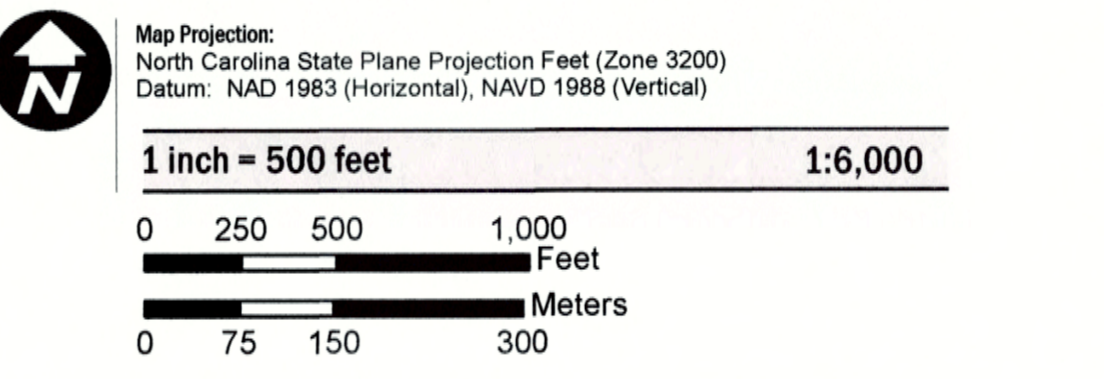
ACCREDITED LEVEE NOTES TO USERS: If an accredited levee note appears on this panel check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/nfip/index.shtm>.

PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS: If a Provisionally Accredited Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation of the data and documentation provided indicates the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/nfip/index.shtm>.

LIMIT OF MODERATE WAVE ACTION NOTES TO USERS: For some coastal flooding zones the AE Zone category has been divided by a Limit of Moderate Wave Action (LIMWA). The LIMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LIMWA (or between the shoreline and the LIMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) NOTE
 This map may include approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) indicated on the map. For more information see <http://www.fws.gov/habitatconservation/cobars/barrier.html>, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-WILD.

SCALE



PANEL LOCATOR

ROCKINGHAM COUNTY									
	8940	8960	8980		9900	9910		9820	
	8849	8859	8869	8879		8888	8808		9828
	8848	8858	8868	8878					
	8847	8857	8867	8877	8887	8897	8907	8917	8927
	8846	8856	8866	8876	8886	8896	8906	8916	8926
	8845	8855	8865	8875	8885	8895	8905	8915	8925
	8844	8854	8864	8874	8884	8894	8904	8914	8924
	8843	8853	8863	8873	8883	8893	8903	8913	8923
	8842	8852	8862	8872	8882	8892	8902	8912	8922
	8841	8851	8861	8871	8881	8891	8901	8911	8921
	8840	8850	8860	8870	8880	8890	8900	8910	8920
GUILFORD COUNTY									
	8749	8759	8769	8779	8789	8799	8809	8819	8829
	8748	8758	8768	8778	8788	8798	8808	8818	8828
	8747	8757	8767	8777	8787	8797	8807	8817	8827
	8746	8756	8766	8776	8786	8796	8806	8816	8826
	8745	8755	8765	8775	8785	8795	8805	8815	8825
	8744	8754	8764	8774	8784	8794	8804	8814	8824
	8743	8753	8763	8773	8783	8793	8803	8813	8823
	8742	8752	8762	8772	8782	8792	8802	8812	8822
	8741	8751	8761	8771	8781	8791	8801	8811	8821
	8740	8750	8760	8770	8780	8790	8800	8810	8820
ORANGE COUNTY									
	8739	8749	8759	8769	8779	8789	8799	8809	8819
	8738	8748	8758	8768	8778	8788	8798	8808	8818
	8737	8747	8757	8767	8777	8787	8797	8807	8817
	8736	8746	8756	8766	8776	8786	8796	8806	8816
	8735	8745	8755	8765	8775	8785	8795	8805	8815
	8734	8744	8754	8764	8774	8784	8794	8804	8814
	8733	8743	8753	8763	8773	8783	8793	8803	8813
	8732	8742	8752	8762	8772	8782	8792	8802	8812
	8731	8741	8751	8761	8771	8781	8791	8801	8811
	8730	8740	8750	8760	8770	8780	8790	8800	8810
RANDOLPH COUNTY									
	8729	8739	8749	8759	8769	8779	8789	8799	8809
	8728	8738	8748	8758	8768	8778	8788	8798	8808
	8727	8737	8747	8757	8767	8777	8787	8797	8807
	8726	8736	8746	8756	8766	8776	8786	8796	8806
	8725	8735	8745	8755	8765	8775	8785	8795	8805
	8724	8734	8744	8754	8764	8774	8784	8794	8804
	8723	8733	8743	8753	8763	8773	8783	8793	8803
	8722	8732	8742	8752	8762	8772	8782	8792	8802
	8721	8731	8741	8751	8761	8771	8781	8791	8801
	8720	8730	8740	8750	8760	8770	8780	8790	8800
CHATHAM COUNTY									

FEMA
 National Flood Insurance Program

NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM
NATIONAL FLOOD INSURANCE PROGRAM
 FLOOD INSURANCE RATE MAP

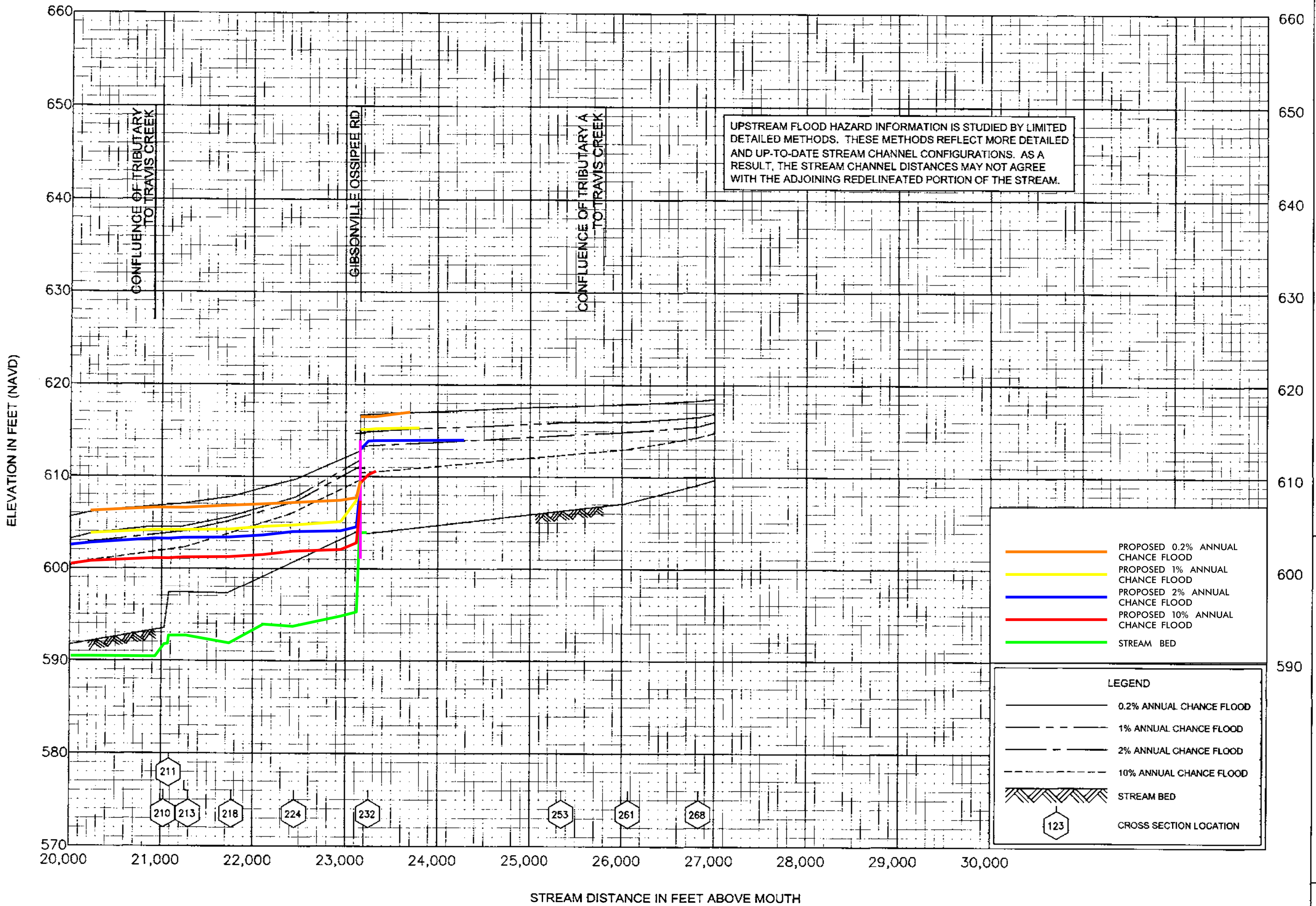
NORTH CAROLINA
 PANEL 8846

Panel Contains:

COMMUNITY	CID	PANEL SUFFIX
ALAMANCE COUNTY	37001	8846 K
ELON TOWN OF	37041	8846 K
GIBSONVILLE TOWN OF	37037	8846 K
GUILFORD COUNTY	37011	8846 K

6/10/15

MAP NUMBER 3710884600K
 MAP REVISED 06/18/07



UPSTREAM FLOOD HAZARD INFORMATION IS STUDIED BY LIMITED DETAILED METHODS. THESE METHODS REFLECT MORE DETAILED AND UP-TO-DATE STREAM CHANNEL CONFIGURATIONS. AS A RESULT, THE STREAM CHANNEL DISTANCES MAY NOT AGREE WITH THE ADJOINING REDELINEATED PORTION OF THE STREAM.

	PROPOSED 0.2% ANNUAL CHANCE FLOOD
	PROPOSED 1% ANNUAL CHANCE FLOOD
	PROPOSED 2% ANNUAL CHANCE FLOOD
	PROPOSED 10% ANNUAL CHANCE FLOOD
	STREAM BED

LEGEND	
	0.2% ANNUAL CHANCE FLOOD
	1% ANNUAL CHANCE FLOOD
	2% ANNUAL CHANCE FLOOD
	10% ANNUAL CHANCE FLOOD
	STREAM BED
	CROSS SECTION LOCATION

FLOOD PROFILES
TRAVIS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
ALAMANCE COUNTY, NC
AND INCORPORATED AREAS

FLOODING SOURCE			FLOODWAY				BASE FLOOD WATER- SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE		
Travis Creek										
001	120	200	2,111	2.4	583.8	575.5 ²	575.5	0.0		
009	850	180	1,875	2.7	583.8	575.7 ²	575.9	0.2		
010	1,020	120	1,476	3.5	583.8	576.3 ²	576.5	0.2		
017	1,650	170	1,659	3.1	583.8	577.0 ²	577.3	0.3		
028	2,825	180	1,712	3.0	583.8	578.5 ²	579.1	0.6		
051	5,110	150	1,585	3.2	583.8	582.4 ²	582.9	0.5		
058	5,770	75	1,112	4.6	583.8	583.0 ²	583.7	0.7		
062	6,150	140	1,668	2.9	585.5	586.2	586.2	0.7		
076	7,610	160	1,643	2.9	586.9	587.8	587.8	0.9		
083	8,310	160	1,854	2.6	587.8	588.5	588.5	0.7		
099	9,910	200	2,249	2.1	589.3	589.3	589.9	0.6		
111	11,140	165	1,537	2.4	590.2	590.2	590.8	0.6		
128	12,770	165	1,668	2.2	591.9	591.9	592.4	0.5		
139	13,900	140	1,246	2.9	593.1	593.1	593.7	0.6		
143	14,320	95	854	4.2	593.8	593.8	594.5	0.7		
149	14,880	270	2,634	1.2	595.1	595.1	595.7	0.6		
156	15,580	210	1,581	1.9	595.3	595.3	595.9	0.6		
160	16,030	130	652	4.7	595.7	595.7	596.2	0.5		
178	17,790	150	1,299	2.3	599.8	599.8	600.5	0.7		
194	19,430	180	1,132	2.7	601.9	601.9	602.7	0.8		
210	21,030	235	2,111	1.1	604.1	604.1	604.6	0.5		
211	21,085	190	1,742	1.3	604.1	604.1	604.6	0.5		
213	21,250	160	1,512	1.5	604.1	604.1	604.6	0.5		

¹Feet above mouth

²Elevation computed without consideration of backwater effects from Haw River

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMANCE COUNTY, NC
AND INCORPORATED AREAS

FLOODWAY DATA

TRAVIS CREEK

FLOODING SOURCE		FLOODWAY					BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE		
Travis Creek (continued)										
218	21,750 ¹	160	1,374	1.7	604.2	604.2	604.8	0.6		
224	22,440 ¹	145	1,100	2.1	604.7	604.7	605.3	0.6		
232	23,245 ¹	120	1,124	2.0	615.1	615.1	615.1	0.0		
253	25,340 ¹	200	1,528	1.4	616.0	616.0	616.4	0.4		
261	26,070 ¹	250	1,574	1.0	616.2	616.2	616.8	0.6		
268	26,840 ¹	200	955	1.6	616.7	616.7	617.2	0.6		
Tributary A to Haw Creek										
001	100 ¹	140	650	4.1	529.4	525.8 ⁴	526.4	0.6		
016	1,600 ¹	105	595	4.4	532.7	532.7	533.5	0.8		
036	3,600 ¹	105	525	5.0	543.2	543.2	543.3	0.1		
039	3,900 ¹	130	735	3.6	544.5	544.5	545.1	0.6		
45	4,516 ¹	170	1,450	1.7	551.1	551.1	551.6	0.5		
Tributary A to Travis Creek										
001	100 ¹	120	321	3.6	616.0	613.9 ⁵	613.9	0.0		
013	1,270 ¹	90	328	3.6	618.9	618.9	619.3	0.4		
015	1,470 ¹	70	221	5.0	620.1	620.1	620.4	0.3		
Tributary to Travis Creek										
010	1,019 ²	105 ³	612	2.9	607.2	607.2	608.2	1.0		
011	1,111 ²	185	1,394	1.3	610.9	610.9	611.9	1.0		
024	2,390 ²	65	441	4.0	613.1	613.1	614.0	0.9		

¹Feet above mouth
²Elevation computed without consideration of backwater effects from Haw River
³Value is inaccurate, as floodway has been adjusted in this are to match topographic-based Redelineation
⁴Elevation computed without consideration of backwater effects from Haw Creek
⁵Elevation computed without consideration of backwater effects from Travis River

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

ALAMANCE COUNTY, NC
AND INCORPORATED AREAS

FLOODWAY DATA

TRAVIS CREEK - TRIBUTARY A TO HAW CREEK -
TRIBUTARY A TO TRAVIS CREEK - TRIBUTARY TO TRAVIS CREEK

{Date}

{Affected property owner name}

{Affected property owner mailing address}

Re: Notification of Flood Hazard Revisions

Dear Mr./Ms./Mr. and Mrs. {Affected property owner}

Sungate Design Group, PA is applying for a Letter of Map Revision (LOMR) from the Federal Emergency Management Agency (DHS-FEMA) on behalf of Restoration Systems, LLC to revise FIRM 3710884600K for Alamance County, NC along Travis Creek. Restoration Systems, LLC is proposing to revise the FIRM to reflect the effects of a stream restoration project.

The Alamance County Planning Department in accordance with National Flood Insurance Program regulation 65.7(b)(1), hereby gives notice of Alamance County's intent to revise the 1% annual chance (100-year) floodway, generally located between Amick Road and Gibsonville Ossipee Road. Specifically, the floodway shall be revised from a point 740 feet downstream of Gibsonville Ossipee Road to a point 20 feet upstream of Gibsonville Ossipee Road.

The LOMR will also result in:

1. Increases and decreases in the 1% annual chance water-surface elevations along Travis Creek from a point 7150 feet downstream of Gibsonville Ossipee Road to a point upstream of Gibsonville Ossipee Road.
2. Widening and narrowing of the 1% annual chance floodplain along Travis Creek from a point 7150 feet downstream of Gibsonville Ossipee Road to a point upstream of Gibsonville Ossipee Road.
3. Widening and narrowing of the 1% annual chance floodway along Travis revised from a point 740 feet downstream of Gibsonville Ossipee Road to a point 20 feet upstream of Gibsonville Ossipee Road

This letter is to inform you of flood hazard revisions on your property at {insert physical address}.

Maps and detailed analysis of the flood hazard revision can be reviewed at the Alamance County Planning Department at 217 College Street, Suite C, Graham, NC. If you have any questions or concerns about the proposed project or its affect on your property, you may contact Ms. Libby Hodges of Alamance County at 336-570-4053 from 8:00 am to 5:00 pm Monday through Friday.

Sincerely,

Ms. Libby Hodges
Floodplain Administrator
Alamance County Planning Department

Aycock Springs Stream Restoration - Property Owners

- 1. Parcel ID # 110189**
Oakley, Gary M. Sr. & Pamela B.
3016 Amick Rd
Elon, NC 27244
Prop Add.: Gibsonville Ossipee Rd
Acres: 26.23
GPIN: 8846554072
- 2. Parcel ID # 110190**
Oakley, Gary M. Sr. & Pamela B.
3016 Amick Rd
Elon, NC 27244
Prop Add.: Amick Rd
Acres: 30.39
GPIN: 8846555814
- 3. Parcel ID # 172223**
Kate T. McMillan Heirs
C/O Crystal Gail Spivey
2059 W. Cherokee St
Blacksburg, SC 29702
Prop Add.: Gibsonville Ossipee Rd
Acres: 1.21
GPIN: 8846458428
- 4. Parcel ID # 110136**
Oakley, Gary M. Sr. & Pamela B.
3016 Amick Rd
Elon, NC 27244
Prop Add.: 1315 Gibsonville Ossipee Rd
Acres: 14.71
GPIN: 8846454775
- 5. Parcel ID # 110137**
Oakley, Gary M. Sr. & Pamela B.
3016 Amick Rd
Elon, NC 27244
Prop Add.: Amick Rd
Acres: 6.49
GPIN: 8846469557
- 6. Parcel ID # 170380**
Oakley, Gary M. Sr. & Pamela B.
3016 Amick Rd
Elon, NC 27244
Prop Add.: Gibsonville Ossipee Rd
Acres: 16.59
GPIN: 8846464882
- 7. Parcel ID # 110223**
Oakley, Gary M. Sr. & Pamela B.
3016 Amick Rd
Elon, NC 27244
Prop Add.: Amick Rd
Acres: 13.60
GPIN: 8846652886
- 8. Parcel ID # 110188**
Holt D. Lewis Family Trust
C/O Carolyn Pulley
1431 Kirkpatrick Rd
Burlington, NC 27215
Prop Add.: Gibsonville Ossipee Rd
Acres: 67.79
GPIN: 8846546133
- 9. Parcel ID #110112**
Ridge, Kathryn L. etal
1100 Metropolitan Ave #410
Charlotte, NC 28204
Prop Add: Piedmont Ave
Acres: 71.97
GPIN: 8846351505
- 10. Parcel ID #109886**
Litten, Steven Wallace
101 E Main St
Gibsonville, NC 27249
Prop Add: 805 Piedmont Ave
Acres: 53.58
GPIN: 8846144304

11. Parcel ID #109887

Litten, Tony Maxton & Pamela B.
3042 Burke Clubhouse Rd
Gibsonville, NC 27249
Prop Add: 3040 Burke Clubhouse Rd
Acres: 38.14
GPIN: 8846151285

12. Parcel ID #109997

Guilford County
Prop Add: Gibsonville Ossipee Rd
Acres:
GPIN: 8846274076

Overview Map Quick Search

Feet 1:630

Map navigation icons: Home, Previous, Next, Full Screen, Print, Share, etc.



Lat Lon [Clear](#)

All Addresses Search [Clear](#)

Parcel ID

110223

GPIN# (State ID)

Old Tax ID

Owner Name

Parcel Site Address

- [Advanced Search](#)
- [Search Builder](#)
- [Coordinate Search](#)
- [Comparable Search](#)