601 NORTH II STREAM RESTORATION SITE
BASELINE MONITORING DOCUMENT AND AS-BUILT BASELINE REPORT (FINAL)
UNION COUNTY, NORTH CAROLINA

NCEEP PROJECT No. 95925; CONTRACT No. 003991

Submittal date: **November 20, 2013**
Data collection period: **April - May 2013**

Prepared for:

NCDENR – ECOSYSTEM ENHANCEMENT PROGRAM
217 West Jones Street, Suite 3000A
Raleigh, North Carolina 27603

Prepared by:

ENVIRONMENTAL BANC & EXCHANGE, LLC, and
ATKINS NORTH AMERICA, INC.

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EXECUTIVE SUMMARY

Environmental Banc and Exchange (EBX) has performed stream restoration at the 601 North II Stream Restoration Site (hereafter referred to as the "Site") via a full delivery contract with the North Carolina Ecosystem Enhancement Program (NCEEP). Stream restoration was provided in response to a request for proposals (RFP) issued by NCEEP soliciting full delivery stream mitigation projects within Cataloging Unit 03040105 of the Yadkin River Basin (RFP No. 06-003579). This report documents the completion of restoration activities and summarizes as-built and baseline post-construction monitoring data.

The primary restoration features on the 12.3-acre Site include Wicker Branch and an unnamed tributary (UT) to Wicker Branch comprising a drainage area of 0.57 square miles. Land use within the Site is primarily agriculture and is facilitated by the historic modification of the local water table through dredging and channelization activities. Under pre-project conditions, Wicker Branch and the UT to Wicker Branch had been dredged and straightened to support various agricultural practices. Impacts resulting from stream alterations included bank erosion, channel incision, and loss of sinuosity and characteristic riffle/pool complex morphology. Natural vegetation within adjacent areas, including stream buffers zones, had been completely removed throughout a majority of the Site. The historic floodplain was impacted by deforestation and groundwater draw-down from stream channel dredging activities. These land disturbances contributed to increased nutrient and sediment loading, and the elimination and fragmentation of adjacent wildlife habitats.

This Baseline Monitoring Document presents data on planted stem counts from vegetation monitoring and stream geomorphological data from the constructed stream channels. Project construction was completed in April 2013, with baseline stream and vegetation surveys occurring in April, May, and June 2013. Subsequent monitoring reports will document changes with respect to baseline conditions and will use comparative analysis methods to assess the established monitoring success criteria.

Restoration activities have been implemented to restore historic stream functions that existed at the Site prior to dredging and vegetation removal that supported agriculture activities. Site restoration activities included floodplain grading, construction of new stream channels, backfilling of the existing channels, and the re-establishment of adjacent floodplains. These activities have reintroduced surface water flood hydrodynamics along the newly restored length of stream and floodplain. The new channel was constructed to reflect regional stream characteristics and accommodate bankfull flows. Revegetation planting to restore streamside and riparian hardwood and mixed-mesic forest communities has also been implemented.

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1.0 PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

1.1 Location and Setting

The Site is located in the Yadkin River Basin, within United States Geologic Survey hydrologic unit 03040105081010 and the North Carolina Division of Water Quality sub-basin 03-07-14. The Site is located seven miles south of Monroe in Union County, NC (Figure 1, Appendix A). To get to the Site from Monroe, travel south for approximately 6 miles on U.S. Highway 601. Turn right on McManus Circle and proceed for approximately 0.6 miles before turning left on a gravel farm road. The Site is accessed from the end of the gravel farm road.

The Site is adjacent to the 601 North Stream Restoration Site NCEEP Full Delivery Project. The primary hydrologic features on the Site include Wicker Branch and an unnamed tributary (UT). Wicker Branch has a drainage area of approximately 0.44 square miles at the point where it exits the Site. The UT has a drainage area of approximately 0.14 square miles at the confluence with Wicker Branch (Figure 2, Appendix A).

The headwaters of Wicker Branch begin approximately 1.0 mile north and west of the Site, along a ridge that bisects Magnum, Medlin and Mullis Roads. Land use within the watershed is primarily agriculture and forest land, while land use within the Site is almost entirely agriculture (row crops and pasture for livestock) with limited, narrow bands of forest cover.

1.2 Project Objectives

Restoration activities at the Site have been proposed to restore historic stream and floodplain functions that existed prior to landscape manipulations that have occurred under existing and historic land-use practices. Dredging and straightening of streams on the Site reduced stability, increased sedimentation, degraded water quality, reduced water storage and base flow release, and diminished water availability for the riparian plant community. Removal of riparian vegetation adjacent to streams degraded water quality, reduced local vegetative biodiversity, and reduced in-stream shading and wildlife habitat. The primary goals of this stream restoration project are as follows:

- Re-establish the capacity to store and transport watershed flows and sediment loads by restoring stable dimension, pattern, and profile;
- Reduce sediment within on-site and downstream receiving waters through the stabilization of eroding stream banks, introduction of livestock exclusion fencing and responsible grazing techniques, and restoration of a forested riparian buffer;
- Elevate the water table and introduce surface water flood hydrodynamics within the floodplain by re-establishing characteristic bankfull dimensions and flood frequency;
- Remove non-point sources of pollution associated with pesticides, herbicides, fertilizer, and livestock waste by filtering sheet flow through a restored riparian buffer and installed Riparian Best Management Practice (RBMP) detention devices;
- Improve aquatic habitat by reducing sedimentation, removing in-stream culverts, enhancing stream bed variability, and introducing shading, woody debris, and detritus from riparian planting
- Enhance terrestrial wildlife habitat by extending a terrestrial wildlife corridor and refuge to connect with the existing and adjacent 601 North Site, as well as to the downstream reaches of

Wicker Branch and Lanes Creek;

- Improve water quality for two populations of freshwater mussels documented to occur in Lanes Creek (Savannah Lilliput (*Toxolasma pullus*) and Carolina creekshell (*Villosa vaughniana*), both state listed and Federal Species of Concern);
- Expand on and integrate the restoration and enhancement work with the adjacently positioned, companion 601 North Restoration Site.

Project goals were addressed through the following project objectives:

- Restoration (Priority 1 and 2) of approximately 3,354 linear feet of perennial stream channel (3,169 linear feet of credited stream) to reconnect the floodplain and restore stable channel dimension, pattern, and profile;
- Enhancement (Level I) of approximately 225 linear feet of perennial stream channel by stream bank grading, and slight adjustments to either stream pattern or dimension;
- Enhancement (Level II) of approximately 615 linear feet of perennial stream channel by restoring a minimum 50 foot planted buffer;
- Removal of an existing culvert on Wicker Branch;
- Installation of Riparian Best Management Practice (RBMP) detention devices, and livestock exclusion fencing to prohibit grazing on the floodplain and hoof shear on stream banks;
- Re-vegetating floodplains adjacent to streams;
- Providing a permanent conservation easement on approximately 12.3 acres of riparian buffer along approximately 4,194 feet of restored and enhanced stream channels.

1.3 Project Structure, Restoration Type, and Approach

1.3.1 Project Structure

Refer to Table 1 (Appendix B) for a summarization of the project components and mitigation credit for the Site. Figure 3 (Appendix A) provides the restoration approaches by project reach.

1.3.2 Restoration Type and Approach

Stream restoration methods using Priority 1 and 2 methodologies (Rosgen 1996) were implemented to restore a stable, meandering stream that approximates the hydrodynamics and stream geometry relative to natural conditions in the region. Priority 1 Restoration was performed throughout the majority of the Wicker Branch reach with a transition to Priority 2 Restoration, starting at approximately Station 14+00 and extending to Station 27+08. The Priority 2 Restoration accommodated a connection to the existing bed elevation of the downstream, off-site reach. Priority 1 Restoration was also performed along UT to Wicker Branch beginning at Station 08+40 and continuing to the confluence with Wicker Branch. Primary activities designed to restore the channel using Priority 1 Restoration included plugging and backfill of the existing channel, grading and preparation of the floodplain, and finally construction of the new stream. An ephemeral channel that forms off-site and drains to Reach 2 of Wicker Branch was routed through the existing portion of the old channel. Log sills were installed throughout Wicker Branch and the UT to Wicker Branch to assist with stream stabilization, dissipate energy, pool maintenance, and in-stream habitat enhancement.

It is anticipated that restoration activities will provide a stable stream at its historic location and will likely create new wetland areas within the floodplain once hydrological connection to the stream channel is restored. New floodplain pool wetlands were created by utilizing open portions of the abandoned channel. Any wetland areas provided by the project are incidental to credits generated by the project.

Stream enhancement efforts using Level I methodology (Priority 3 Restoration, [Rosgen 1996]) are designed to widen the floodplain at the existing incised channel elevation in order to reduce shear stress. Level I Enhancement entailed the excavation of a floodplain bench on one or both sides of the existing channel at an elevation corresponding to bankfull stage. Level I Enhancement was performed along the UT of Wicker Branch from Station 00+00 to 02+25. Stream enhancement efforts using Level II methodology are designed to augment channel stability, water quality, and stream ecology by low disturbance activities including stabilization of stream banks and revegetating the riparian zone buffer. Level II Enhancement was implemented along the UT to Wicker Branch from Station 02+25 to 08+40.

Riparian Best Management Practice (RBMP) devices are proposed for this project go beyond the standard stream restoration methods used to re-establish natural streams, floodplains, and riparian condition and function. RBMP measures are expected to provide additional reduction of sediment and nutrient loading from anticipated runoff from the adjacent agriculture land. The proposed RBMP measures will be incidental to credits generated by the project and therefore do not require monitoring.

Incorporated and proposed RBMP devices include:

- Livestock exclusion fencing will be installed along the limits of the conservation easement bordering the Broadway Investments, LLC parcel (western Site boundary) to eliminate hoof shear and direct livestock waste into the on-site streams.
- Two off-site farm crossings located directly above the Site streams were improved at their existing location and incorporated into the restoration design. New culverts of an appropriate size were installed at each crossing below a re-graded surface.
- Twelve vernal pools were incorporated along swales and depressional areas throughout the Site to capture concentrated stormwater flows and sediment from the adjacent agricultural fields. The vernal pools were dug into the ground with the outlet at the surrounding floodplain elevation.

1.3.3 Project History, Contacts, and Attribute Data

Historical land use and development trends were evaluated using recent aerial photography and historic aerial photography from 1969, 1993, 1998, and 2008. Historically, land use within the watershed is characterized as rural and dominated by agriculture and wooded land.

In 1969, the watershed of Wicker Branch and the UT was dominated by agriculture (approximately 65 percent) with fragmented patches of wooded areas (approximately 35 percent). On-site stream reaches appear to have a narrow wooded buffer along both banks despite agricultural land encroaching within the eastern Site boundary. By 1993, agricultural land use within the Site actually decreased since 1969 as evidenced by additional stream buffer along the northeastern banks of Wicker Branch and the UT. This trend is also true for the entire watershed as agricultural land use decreased to approximately 55 percent.

Between 1969 and 1993, the upstream, offsite reach of Wicker Branch was channelized to facilitate agriculture.

By 1998, aerial photographs indicate a conversion of approximately 10 percent of forest land to agriculture within the watershed, largely concentrated immediately surrounding the Site. Three ponds were also created within the watershed from headwater streams that drain to Wicker Branch. In 2008 land use within the watershed was largely unchanged from 1998. At this time, Wicker Branch experienced a reduction of forested buffer within the Site and the creation of an in-line pond immediately above the Site.

Currently the watershed is rural and comprised of agriculture and wooded land. Within the Site, land use is dominated by agriculture [approximately 90 percent] (crop rotation consisting of wheat, soybeans, and corn) and 10 percent wooded land. All riparian vegetation along UT and the majority of Wicker Branch has been cleared and on-Site streams appear to have been channelized. Continued logging of forest land is the primary potential future threat to the watershed and Site. Future low density residential development is also a possibility for the watershed due to the proximity to U.S. Highway 601.

Appendix A provides the following relevant information including: Project Activity and Reporting History (Table 2), Project Contacts (Table 3), and Project Baseline Information and Attributes (Table 4).

2.0 SUCCESS CRITERIA

The five-year monitoring plan for the Site restoration work includes criteria to evaluate the success of the stream and vegetation components of the project. The specific locations of the monitoring components, including twelve vegetation monitoring plots, 3000 feet of stream longitudinal profile, nine permanent cross-sections, and six permanent photo plots are shown on Figure 4 (Appendix A).

2.1 Morphologic Parameters and Channel Stability

Stream restoration involves altering an impaired morphology to better approximate a stable stream type and verifying the design form against process-based assessments. The morphologic contribution to functional lift in hydrologic, water quality and habitat functions stem from two main morphologic objectives. The first being the maintenance of a restored or enhanced floodplain connection and associated dimension that facilitates the transport of in-stream sediment loads in equilibrium and dissipates energy associated with flood flows. The second is the maintenance of a longitudinal profile/gradient, which supports these same transport and energy management outcomes. In concert with adequate vegetation, these objectives promote the lateral and vertical stability that permits maintenance of in-stream habitat (bedform), reduces water quality stressors to the reach and watershed in the form of bank sediment export reductions and better storm flow energy dissipation.

Restored or enhanced streams should therefore demonstrate morphologic stability to be considered successful. Stability does not equate to an absence of change, but rather to sustainable rates of change or stable patterns of variation. Restored streams often demonstrate some level of initial adjustment in the period that follows construction and some change/variation subsequent to that is also to be expected. However, the observed change should not be unidirectional such that it represents a robust trend. If some trend is evident, it should be very modest or indicate migration to another stable form. Annual variation is to be expected, but over time this should demonstrate maintenance around some acceptable baseline with maintenance of or even a reduction in the amplitude of variation. Lastly, all of this must be evaluated in the context of hydrologic events to which the system is exposed.

For monitoring morphological parameter success criteria, nine permanent cross-sections and two longitudinal profiles representing reaches on both Wicker Branch and the UT to Wicker Branch were installed (Figure 4, Appendix A). Baseline stream data including geomorphology summary data, cross-section profiles, photo documentation, longitudinal profiles, and pebble count data are provided in Appendix C.

2.1.1 Dimension

Nine permanent cross-sections (5 riffles and 4 pools) were installed throughout the restored stream reaches. Cross-section endpoints were monumented with rebar and marked with 5-foot PVC pipe. General maintenance of a stable cross-section and hydrologic access to the floodplain features over the course of the monitoring period will generally represent success in dimensional stability. However, some change is natural and expected and can even indicate that the design was successful and appropriate for the hydrologic and sediment regime. Examples include depositional processes resulting in the

development of constructive features on the banks and floodplain, such as an inner berm, a slightly narrower channel, modest natural levees, and general floodplain deposition.

For stream dimension, cross-sectional overlays and key parameters such as bankfull cross-sectional area, and the channel's bankfull width to depth ratios should demonstrate modest overall change and patterns of variation that are in keeping with the channel type. Significant widening of the channel cross-section or trends of increase in the cross-sectional area generally represent concern, although some adjustment in this direction is acceptable if the process is arrested after a period of modest adjustment. In the case of riffle cross sections, maintenance of depths that represent small changes to target competency (e.g., consistently low BHRs <1.2) would also reflect stability. Although a pool cross-section may experience periodic infilling due to watershed activity and the timing of events relative to monitoring, the majority of pools within a project stream reach/component should demonstrate maintenance of greater depths and low water surface slopes over time. The habitat aspect (depth) of the pool cross-sections need to be maintained over time and the rates of lateral migration need to be moderate.

The cross-section dimension parameters for riffles and pools presented in Tables 5 and 6 were calculated assuming the bankfull elevation corresponds to the constructed top of bank. Any bankfull depositional features that develop above or below the as-built bankfull elevation (top of bank) will be documented in future monitoring years.

2.1.2 Pattern and Profile

Approximately 3,000 linear feet of restored channel will be monitored yearly over the monitoring period. Evaluated reaches include 2,435 feet of Wicker Branch and 575 feet of UT. The specific reaches under assessment should not demonstrate any trends in thalweg aggradation or degradation over any significant continuous portion of its length. Over the monitoring period, the profile should also demonstrate the maintenance or development of bed form (facets) more in keeping with reference level diversity and distributions for the stream type in question. It should also provide a meaningful contrast in terms of bed form diversity against the pre-existing condition. Bed form distributions, riffle/pool lengths and slopes will vary, but should do so with maintenance around design distributions. This requires that the majority of pools are maintained at greater depths with lower water surface slopes and riffles are shallow with greater water surface slopes. Pattern features should show little adjustment over the standard 5 year monitoring period and there measurement need not be part of annual monitoring unless issues in the profile and dimension indicate that pattern might be changing.

2.1.3 Substrate and Sediment Transport

Bed material analysis will consist of a pebble count taken in the same constructed riffle locations during annual geomorphology surveys. This sample in concert with the cross-sectional and local profile data should reveal any adjustments in sediment gradation over time. Substrate measurements should indicate the progression towards, or the maintenance of the known distributions from the design phase. Significant changes to sediment size, or aggradational or depositional trends, will be evaluated with respect to stream stability and watershed changes.

2.2 Vegetation

Vegetation monitoring procedures are designed in accordance with the NCEEP guidelines and procedures developed by the Carolina Vegetation Survey (CVS) (CVS-EEP Protocol for Recording Vegetation, Level 1-2 Plot Sampling Only, Version 4.0, 2006). At total of twelve, 10 x 10 meter plots were established across the Site. Vegetation plot corners were marked with rebar and 5-foot PVC pipe. The origin corner of each plot is marked with a 10-foot PVC pipe. Vegetation summary data including initial species presence, planted densities, vegetation vigor and damage, as well as plot photographs are provided in Appendix D.

During the first year, vegetation will receive cursory, visual evaluation on a periodic basis to ascertain the degree of overtopping of planted elements by nuisance species. The success criteria for plant community restoration will be based on the annual and cumulative survival and growth of the preferred suite of species over five years. Survival of live, planted species must be at a minimum average density of 320 stems per acre at the end of the third year of monitoring and 260 stems per acre after five years.

2.3 Hydrology

The occurrence of bankfull events during the monitoring period will be documented by a crest gauge. An automatic sampling crest gauge will be installed at the Site and will record the stage. Photographs will be used to supplement bankfull documentation. Photographs taken during regularly scheduled site visits will be used to document wrack lines and sediment deposition on the floodplain.

Two bankfull flow events must be documented by the crest gauge during the 5-year monitoring period. The two bankfull events must occur in separate years; otherwise the bankfull monitoring shall continue until the stipulated events occur.

2.4 Site Photograph Documentation

Permanent photograph stations have been established as part of the baseline assessment to visually capture the successive states of channel and vegetation development. Site photographs will be taken during the baseline assessment and for at least five years following construction at a standing height. Photograph stations have been identified in the field with rebar and PVC pipe to ensure that the same view direction is maintained throughout the monitoring period. Three types of photographic documentation are proposed including general, large view photos, permanent stream cross-section photos, and vegetation plot photos. Locations and general photo direction are provided in Figure 4 (Appendix A).

Six general site photograph stations have been established to document the overall development of the site. Photos will be taken in the same orientation once a year at the time of monitoring. Photographs taken at general Site photograph stations are provided in Appendix E.

One representative digital photo of each vegetation plot must be taken on the same day vegetative cover estimates are conducted. The photo caption should include the plot number, and the date it was taken (day/month/year and monitoring year). Vegetation photographs are taken from the vegetation plot origin point. Photographs taken at each vegetation plots are provided in Appendix D.

Photographs will be taken at each permanent stream cross-section. Photographs will be taken of each bank (left to right looking downstream) and in the up and down stream direction. Photographs taken at each permanent cross-section are provided in Appendix C.

3.0 MAINTENANCE AND CONTINGENCY PLANS

Potential problem areas, such as streambank instability, aggradation/degradation, or unsuccessful vegetation establishment will be evaluated during the annual monitoring. If, during the annual review of the stream reach, a problem area is noted, the areas will be evaluated to determine if remedial maintenance measures are required to resolve the problem. If remediation of an area is required, a proposal will be submitted for the needed work. If vegetation success criteria are not achieved, causes of failure will be investigated and measures will be taken including supplemental planting of affected areas. All maintenance activities will be documented in the yearly monitoring reports and any major repairs will be completed after consultation with the NCEEP.

4.0 APPENDICES

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- Figure 2 Watershed Map
- Figure 3 Asset Map
- Figure 3 Monitoring Components

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APPENDIX G: RECORD DRAWINGS

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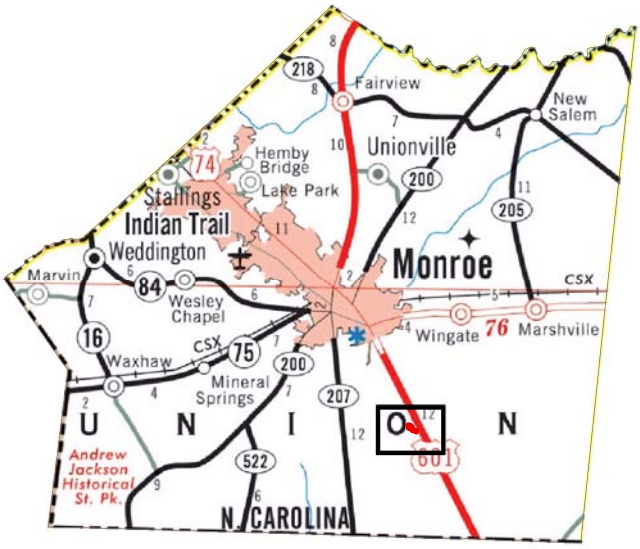
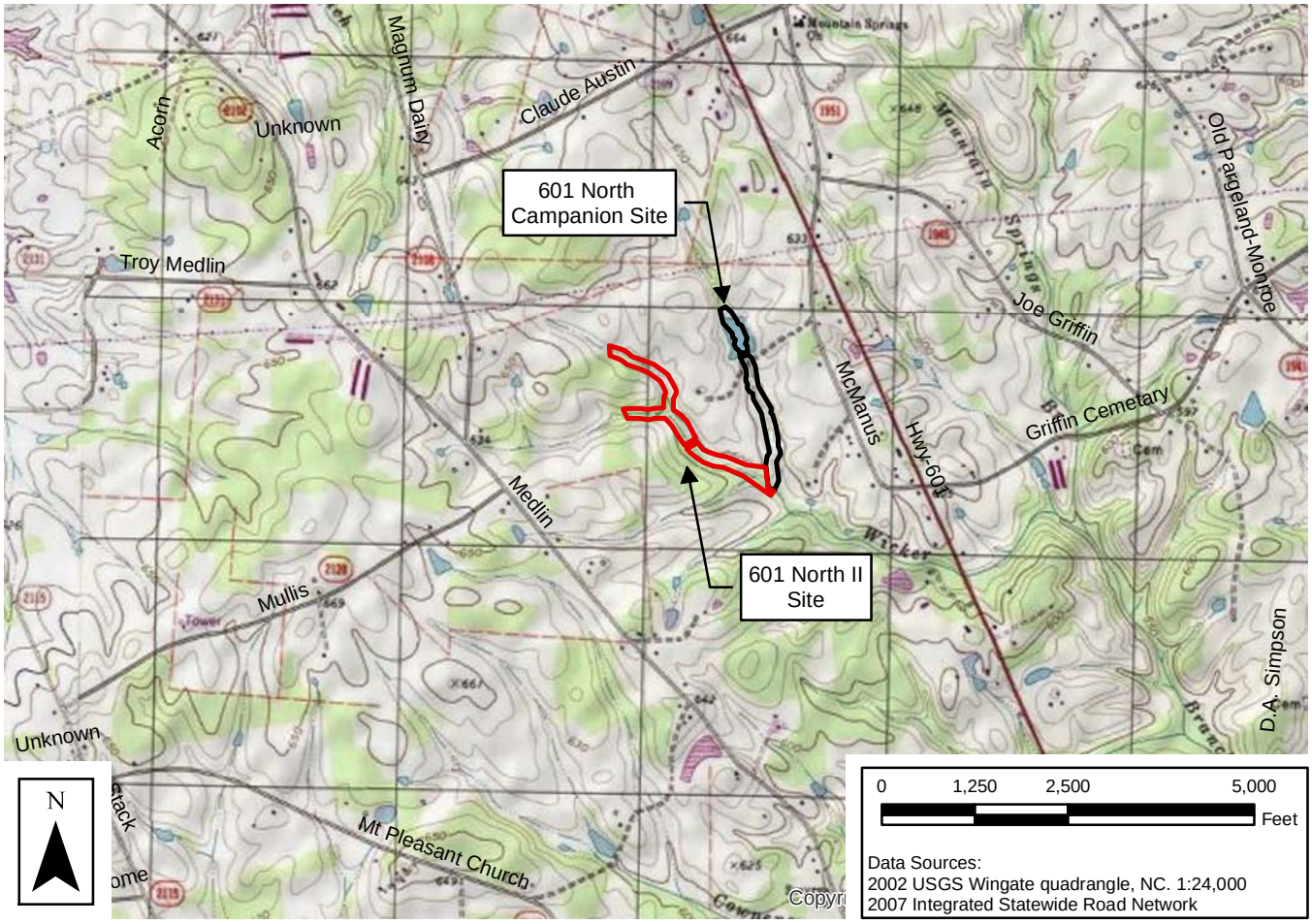
APPENDIX A: FIGURES

Driving Directions: From Monroe drive south on Hwy. 601. Turn right on McManus Circle at the southern intersection with Hwy. 601. Site is on left and is accessed by a farm path located on the west side of McManus Circle just before the road ends.

The subject project site is an environmental restoration site of the NCDENR EEP and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easment boundary and therefore access by the general public is not permitted. Access by authorized personel of state and federal agencies or their designee/contractors involved in the development, oversight, and stewardship of the restoration site is permitted within the terms and timeframes of their defined role. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.





Prepared By:	Prepared For:
EBX	Ecosystem Enhancement Program

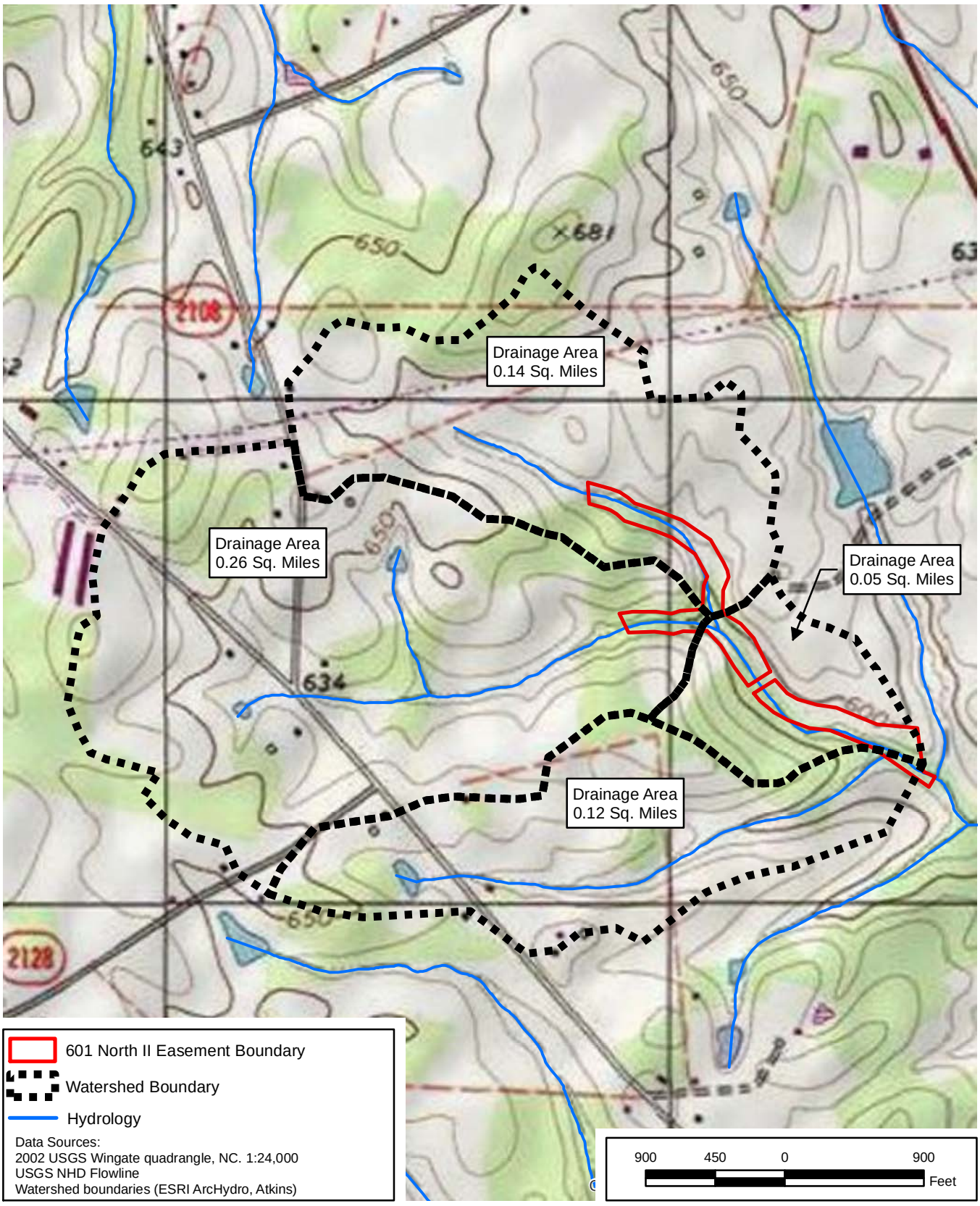
SITE LOCATION

601 NORTH II STREAM RESTORATION SITE

UNION COUNTY, NORTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	JUNE 2013
Project No.:	100024976

FIGURE 1



Prepared By: EBX

Prepared For: Ecosystem Enhancement Program

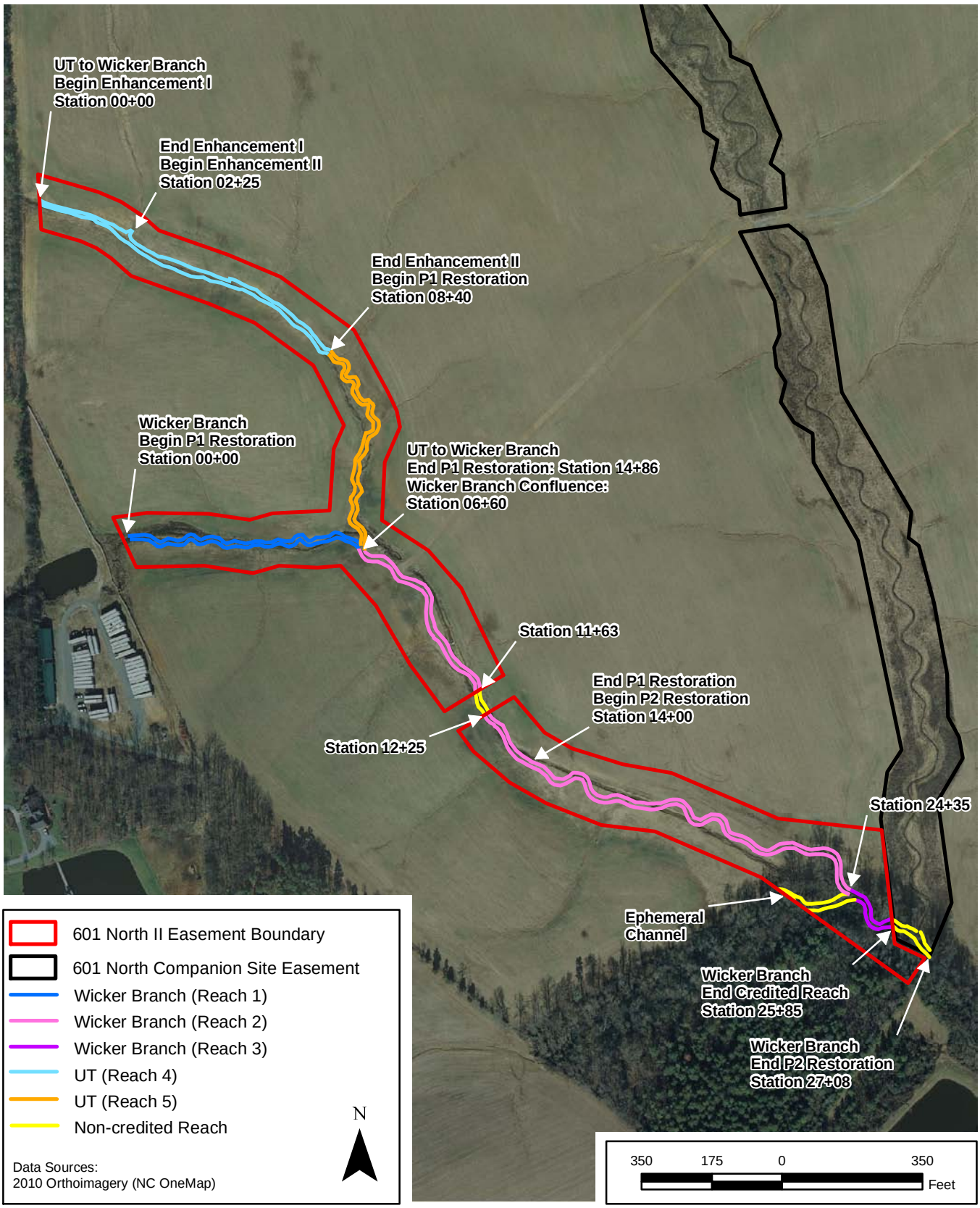
WATERSHED MAP

601 NORTH II STREAM RESTORATION SITE

UNION COUNTY, NORTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	JUNE 2013
Project No.:	100024976

FIGURE 2



Prepared By: EBX

Prepared For: Ecosystem Enhancement Program

ASSET MAP

601 NORTH II STREAM RESTORATION SITE

UNION COUNTY, NORTH CAROLINA

Dwn By:	MCG
Ckd By:	JWG
Date:	JUNE 2013
Project No.:	100024976

FIGURE 3

XS1 (R)
1
2
VP1
VP2
3
VP3
XS2 (P)
XS3 (R)
4
VP4
VP5
XS4 (R)
XS5 (P)
VP6
VP12
5
XS6 (R)
XS7 (P)
VP7
VP8
VP9
XS8 (P)
XS9 (R)
6
VP11
VP10

601N II Easement Boundary
Stream Banks
Limits of Longitudinal Profile Assessment
Cross Sections
Vegetation Plots
Permanent Photo Points

0 125 250 500 Feet

N

FIGURE 4

Dwn By:	MCG
Ckd By:	JWG
Date:	JUNE 2013
Project No.:	100024976

Monitoring Components

601 NORTH II STREAM RESTORATION SITE

UNION COUNTY, NORTH CAROLINA

Prepared For: Ecosystem Enhancement Program

Prepared By: EBX

APPENDIX B: PROJECT TABLES

Table 1. Project Components and Mitigation Credits
601 North II Stream Restoration Site – EEP Contract No. 003991

Mitigation Credits

	Stream		Riparian Wetland	Non-riparian Wetland	Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE					
Totals	3169	396					

Project Components

Project Component -or- Reach ID	Stationing /Location	Existing Footage	Approach	Restoration -or- Restoration Equivalent	Restoration Footage	Mitigation Ratio
Wicker Branch (Reach 1)	00+00-06+60	630[1]	P1	Restoration	660	1:1
Wicker Branch (Reach 2)	06+60-24+35	1356	P1, P2	Restoration	1713[2]	1:1
Wicker Branch (Reach 3)	24+35-27+08	414	P2	Restoration	150[3]	1:1
UT to Wicker Branch (Reach 4)	00+00-02+25	218	EI	Restoration Equivalent	225	1:1.5
	02+25-08+40	608	EII	Restoration Equivalent	615	1:2.5
UT to Wicker Branch (Reach 5)	08+40-14+86	534	P1	Restoration	646	1:1

Component Summation

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	3169	--	--	--	--	12.3
Enhancement I	225	--	--	--	--	
Enhancement II	615	--	--	--	--	

BMP Elements

Element	Location	Purpose/Function	Notes
Vernal Pools (12)	See as-built plans	Treat on-site storm water from adjacent agricultural fields. Remove suspended solids, help infiltration of water and remove excess nutrients prior to entering stream. Will eliminate hoof shear on banks and livestock waste into on-site streams	Target at base of drainages coming from adjacent agricultural fields.
Farm Crossing Improvements	See as-built plans	Two off-site farm crossings located above the restored streams will be improved at their existing location and incorporated into the restoration design.	
Cattle Exclusion Fencing	Along the western site boundary	Will eliminate hoof shear on banks and livestock waste into on-site streams	To be installed in 2013

[1]Includes 169 feet of hydrologic connectivity through a linear wetland persisting in the location of the relic channel.

[2]Does not include the restored portions of Wicker Branch located outside of the conservation easement (Station 11+63-12+25).

[3]Does not include the restored portions of Wicker Branch located outside of the conservation easement (Station 25+85-27+08).

Table 2. Project Activity and Reporting History 601 North II Stream Restoration Site – EEP Contract No. 003991		
Activity Report	**Data Collection Complete**	**Completion or Delivery**
Final Mitigation Plan	N/A	October 2012
Final Design (90 percent)	N/A	November 2012
Construction	N/A	April 2013
Temporary S&E mix applied to entire project area	N/A	February-April 2013
Permanent seed mix applied to reach/segments	N/A	April 2013
Bare Root Seedling Installation	N/A	April 2013
Installation of permanent cross-sections and vegetation plots	N/A	May 2013
Baseline Monitoring Report	June 2013	June 2013
Year 1 Vegetation Monitoring		
Year 1 Stream Monitoring		
Year 2 Vegetation Monitoring		
Year 2 Stream Monitoring		
Year 3 Vegetation Monitoring		
Year 3 Stream Monitoring		
Year 4 Vegetation Monitoring		
Year 4 Stream Monitoring		
Year 5 Vegetation Monitoring		
Year 5 Stream Monitoring		

*N/A- Activities and reporting history for these items are not applicable to this restoration project

Table 3. Project Contacts 601 North II Stream Restoration Site – EEP Contract No. 003991	
Prime Contractor	Environmental Banc & Exchange, LLC 909 Capability Drive, Suite 3100 Raleigh NC 27606 Phone: (919) 829-9909 Contact: Martin Hovis
Designer	Atkins North America, Inc. 1616 East Millbrook Road, Suite 310 Raleigh, NC 27609 (919) 876-6888 Contact: Jens Geratz or Michael Gloden
Construction Contractor	Wright Contracting PO Box 545 Siler City, NC 27344 (919) 663-0810 Contact: Stephen James
Planting Contractor	KBS Earthworks 5616 Cable Church Road Julian, NC 27283 (336) 314-2935 Contact: Keneth Strader
As-built Surveys	Kee Mapping and Surveying PO Box 2566 Ashville, NC 28802 Contact: Phillip Kee
Seeding Mix Source	Evergreen Seed Fuquay Varina, NC (919) 567-1333 Contact: Wistar Taylor
Nursery Stock Suppliers	Arbor Gen Super Tree Nursery (800) 222-1290 Contact: Polly Creech
Monitoring Performers	Atkins North America, Inc. 1616 East Millbrook Road, Suite 310 Raleigh, NC 27609 (919) 876-6888 Contact: Jim Cooper

Table 4. Project Baseline Information and Attributes

Project Information			
Project Name	601 North II Stream Restoration Site		
County	Union County		
Project Area (acres)	12.3		
Project Coordinates (latitude and longitude)	34.897274, -80.473416		
Project Watershed Summary Information			
Physiographic Province	Piedmont		
River Basin	Yadkin		
USGS Hydrologic Unit 8-digit	03040105	**USGS Hydrologic Unit 14-digit**	03040105081010
DWQ Sub-basin	03-07-14		
Project Drainage Area (acres)	453		
Project Drainage Area Percent Impervious Area	<1%		
CGIA Land Use Classification	Cultivated, Managed Herbaceous Cover, Mixed Hardwood		

Reach Summary Information					
Parameters	**Wicker Branch (Reach 1)**	**Wicker Branch (Reach 2)**	**Wicker Branch (Reach 3)**	**UT to Wicker Branch (Reach 4)**	**UT to Wicker Branch (Reach 5)**
Length of reach (linear feet)	630	1356	414	826	534
Valley classification	VIII	VIII	VIII	VIII	VIII
Drainage area (acres)	169	286	365	85	88
NCDWQ stream identification score	23.5	35	35	23	23
NCDWQ Water Quality Classification	WS-V	WS-V	WS-V	WS-V	WS-V
Morphological Description (stream type)	F6	E1/C1	G4	B4	B4
Evolutionary trend	E-G-F	E-G-C-E	E-G	E-G-B	E-G-B
Underlying mapped soils	Cid channery silt loam (CmB)	Cid channery silt loam (CmB)	Cid channery silt loam (CmB)	Badin channery silty clay loam (BdB2), Cid channery silt loam (CmB)	Badin channery silty clay loam (BdB2), Cid channery silt loam (CmB)
Drainage class	Moderately well drained	Moderately well drained	Moderately well drained	BdB2: Well drained, CmB: Moderately well drained	BdB2: Well drained, CmB: Moderately well drained
Soil Hydric status	Not hydric	Not hydric	Not hydric	Not hydric	Not hydric
Valley Slope	0.0095	0.0098	0.0165	0.0130	0.0124
FEMA classification	Project streams are not located within a FEMA regulated area				
Native vegetation community	N/A (cultivated land)	N/A (cultivated land)	Mesic Mixed Hardwood Forest	N/A (cultivated land)	N/A (cultivated land)
Percent composition of exotic invasive vegetation	0%	0%	60% (Chinese privet)	0%	0%

Wetland Summary Information	
Parameters	**Wetland 1**
Size of Wetland (acres)	0.05
Wetland Type	Palustrine emergent
Mapped Soil Series	Cid channery silt loam (CmB)
Drainage class	Moderately well drained
Soil Hydric Status	Not hydric
Source of Hydrology	Groundwater
Hydrologic Impairment	NA
Native vegetation community	N/A (cultivated land)
Percent composition exotic invasive vegetation	0%

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Documentation**
Waters of the United States – Section 404	**Yes**	**Yes**	**JD Notification / NWP27**
Waters of the United States – Section 401	**Yes**	**Yes**	**401 Water Quality Certification**
Endangered Species Act	**Yes**	**Yes**	**CE Documentation (Mitigation Plan, Appendix B)**
Historic Preservation Act	**No**	**NA**	**CE Documentation (Mitigation Plan, Appendix B)**
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	**No**	**NA**	**NA**
FEMA Floodplain Compliance	**No**	**NA**	**FEMA Floodplain Checklist (Mitigation Plan, Appendix B)**
Essential Fisheries Habitat	**No**	**NA**	**NA**

APPENDIX C: BASELINE STREAM DATA

Table 5A. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: Wicker Branch Reach 1 (Sta 0+00 – 6+60)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays Fork)						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	---	---	6.8	---	11.7	---	---	---	1	---	8.2	---	---	---	1	---	6.0	---	---	11.4	---	---	---	1
Floodprone Width (ft)				---	15.6	---	---	---	1	---	105.0	---	---	---	1	25	30	35	---	59.7	---	---	---	1
Bankfull Mean Depth (ft)	---	---	1.0	---	0.5	---	---	---	1	---	0.8	---	---	---	1	---	0.9	---	---	0.7	---	---	---	1
[1]Bankfull Max Depth (ft)				---	0.8	---	---	---	1	---	2.2	---	---	---	1	---	1.2	---	---	1.3	---	---	---	1
Bankfull Cross Sectional Area (ft^2)	---	---	8.8	---	5.5	---	---	---	1	---	6.3	---	---	---	1	---	5.5	---	---	7.9	---	---	---	1
Width/Depth Ratio				---	24.9	---	---	---	1	---	10.6	---	---	---	1	---	6.5	---	---	16.6	---	---	---	1
Entrenchment Ratio				---	1.3	---	---	---	1	---	12.8	---	---	---	1	4.2	5.0	5.8	---	5.2	---	---	---	1
[1]Bank Height Ratio				---	2.6	---	---	---	1	---	1.0	---	---	---	1	---	1.0	---	---	1.0	---	---	---	1
d50 (mm)				---	<2.0	---	---	---	1	---	6.5	---	---	---	1	16	24	32	---	28.7	---	---	---	1
Profile																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	5.0	8.0	15.0	4.2	12.3	11.5	33.3	6.0	22
Riffle Slope (ft/ft)										0.007	0.042	---	0.085	---	---	0.008	0.023	0.040	0.001	0.017	0.017	0.043	0.013	22
Pool Length (ft)										9.0	13.0	---	19.0	---	---	9.0	13.0	19.0	4.7	10.8	10.4	20.0	4.2	20
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	2.0	---	1.4	1.9	1.9	2.2	0.2	20
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	14.0	30.0	65.0	18.4	30.7	26.9	57.8	10.0	19
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	12.0	19.0	26.0	13.4	20.1	20.2	29.7	4.0	21
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	12.0	18.0	39.0	14.4	17.9	16.4	27.7	3.9	23
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	1.9	2.9	6.5	1.3	1.6	1.4	2.4	0.3	23
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	36.0	53.0	73.0	13.7	51.5	51.8	87.9	15.3	21
Meander Width Ratio										1.5	2.3	---	2.8	---	---	2.0	3.1	4.4	1.2	4.5	4.5	7.7	1.3	21
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				<2	<2	<2	<2	<2	<2	<2	6.3	10.6	17.3	57.9	113.9	76.0	123.0								
Reach Shear Stress (competency) lb/f^2				---														0.5			0.4			
Max part size (mm) mobilized at bankfull				---														74.6			77.5			
Stream Power (transport capacity) W/m^2				---														1.6			1.0			
Additional Reach Parameters																								
Drainage Area (SM)				0.3						0.19														
Impervious Surface estimate (%)				<1						<1														
Rosgen Classification				F6						E4								E4			C4			
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 2.8 (1.3-3.9)														HEC-RAS: 3.5 (3.3-4.1)			3.5			
Bankfull Discharge (cfs)	---	---	34.7	19.6																				
Valley length (ft)				610						240														
Channel Thalweg length (ft)				630						284								707			660			
Sinuosity (ft)				1.0						1.2								1.2			1.1			
BF slope (ft/ft)				0.009						0.016								0.008			0.009			
BEHI VL% / L% / M% / H% / VH% / E%				100	0	0	0	0	0	---	---	---	---	---	---									

Table 5B. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: Wicker Branch Reach 2 (6+60-24+35)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays Fork)						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)	---	---	8.4	10.8	12.0	12.0	13.1	1.6	2	---	8.2	---	---	---	1	---	8.0	---	11.5	11.6	11.6	11.6	0.1	2
Floodprone Width (ft)				30.3	78.3	78.3	126.2	67.8	2	---	105.0	---	---	---	1	35.0	47.5	60.0	69.2	69.5	69.5	69.7	0.4	2
Bankfull Mean Depth (ft)	---	---	1.2	0.9	1.0	1.0	1.0	0.1	2	---	0.8	---	---	---	1	---	1.3	---	1.1	1.1	1.1	1.1	0.0	2
[1]Bankfull Max Depth (ft)				1.3	1.4	1.4	1.5	0.1	2	---	2.2	---	---	---	1	---	1.7	---	1.7	1.8	1.8	1.8	0.1	2
Bankfull Cross Sectional Area (ft^2)	---	---	12.5	10.5	11.1	11.1	11.7	0.8	2	---	6.3	---	---	---	1	---	10.5	---	12.1	12.6	12.6	13.0	0.6	2
Width/Depth Ratio				11.0	12.9	12.9	14.7	2.6	2	---	10.6	---	---	---	1	---	6.1	---	10.4	10.6	10.6	10.8	0.3	2
Entrenchment Ratio				2.3	7.0	7.0	11.7	6.6	2	---	12.8	---	---	---	1	4.3	5.9	7.5	6.0	6.0	6.0	6.0	0.0	2
[1]Bank Height Ratio				1.3	1.6	1.6	1.8	0.4	2	---	1.0	---	---	---	1	---	1.0	---	1.0	1.0	1.0	1.0	0.0	2
d50 (mm)					23.0				1	---	17.3	---	---	---	1	16.0	24.0	32.0	19.3	21.4	21.4	23.5	3.0	2
Profile																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	5.0	15.0	25.0	6.3	17.3	18.1	38.7	7.5	33
Riffle Slope (ft/ft)										0.0073	0.0422	---	0.085	---	---	0.005	0.016	0.03	0.001	0.017	0.013	0.062	0.013	33
Pool Length (ft)										9.0	13.0	---	19.0	---	---	5.0	22.0	40.0	6.1	24.2	23.7	62.0	11.9	33
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	2.8	---	1.7	2.9	2.8	3.8	0.4	33
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	30.0	52.0	80.0	25.5	53.6	53.2	103.3	19.5	32
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	16.0	33.0	50.0	18.3	31.1	30.6	49.5	8.8	24
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	21.0	38.0	67.0	28.3	40.2	37.8	61.8	10.1	28
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	2.6	4.8	8.4	2.4	3.5	3.3	5.3	0.9	28
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	61.0	104.0	148.0	13.7	114.4	113.3	226.5	46.9	24
Meander Width Ratio										1.5	2.3	---	2.8	---	---	1.9	3.7	5.7	1.2	9.9	9.8	19.5	4.0	24
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				2.9	9.2	23.0	75.8	92.4	100.0	68.	6.3	10.6	17.3	57.9	113.	76.0	123.0							
Reach Shear Stress (competency) lb/f^2				0.5														0.7	0.5					
Max part size (mm) mobilized at bankfull				88.0														116.9	91.3					
Stream Power (transport capacity) W/m^2				2.3														3.2	1.8					
Additional Reach Parameters																								
Drainage Area (SM)				0.5						0.19														
Impervious Surface estimate (%)				<1						<1														
Rosgen Classification				E1/C1						E4								E4	E4					
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 2.7 (1.2-5.2)														HEC-RAS: 4.3 (3.3-5.1)	4.0 (XS6) – 4.1 (XS9)					
Bankfull Discharge (cfs)	---	---	50.1	48.5																				
Valley length (ft)				1400						240									1550					
Channel Thalweg length (ft)				1356						284								1653	1775					
Sinuosity (ft)				1.0						1.2								1.2	1.2					
BF slope (ft/ft)				0.009						0.016								0.009	0.007					
BEHI VL% / L% / M% / H% / VH% / E%				7	0	0	48	10	35	---	---	---	---	---	---									

Table 5C. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: Wicker Branch Reach 3 (24+35-27+08)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)	---	---	9.3	---	10.0	---	---	---	1	---	8.2	---	---	---	1	---	10.0	---	---	---	---	---	---	---
Floodprone Width (ft)				---	11.9	---	---	---	1	---	105.0	---	---	---	1	40.0	55.0	70.0	---	---	---	---	---	---
Bankfull Mean Depth (ft)	---	---	1.3	---	1.4	---	---	---	1	---	0.8	---	---	---	1	---	1.4	---	---	---	---	---	---	---
[1]Bankfull Max Depth (ft)				---	1.9	---	---	---	1	---	2.2	---	---	---	1	---	1.8	---	---	---	---	---	---	---
Bankfull Cross Sectional Area (ft^2)	---	---	14.6	---	14.1	---	---	---	1	---	6.3	---	---	---	1	---	14.1	---	---	---	---	---	---	---
Width/Depth Ratio				---	7.0	---	---	---	1	---	10.6	---	---	---	1	---	7.1	---	---	---	---	---	---	---
Entrenchment Ratio				---	1.2	---	---	---	1	---	12.8	---	---	---	1	4.0	5.5	7.0	---	---	---	---	---	---
[1]Bank Height Ratio				---	2.0	---	---	---	1	---	1.0	---	---	---	1	---	1.0	---	---	---	---	---	---	---
d50 (mm)				---	8.0	---	---	---	1	---	17.3	---	---	---	1	16.0	24.0	32.0	---	---	---	---	---	---
Profile																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	10.0	20.0	30.0	---	---	---	---	---	---
Riffle Slope (ft/ft)										0.007	0.0422	---	0.0854	---	---	0.009	0.016	0.03	---	---	---	---	---	---
Pool Length (ft)										9.0	13.0	---	19.0	---	---	5.0	24.0	50.0	---	---	---	---	---	---
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	3.0	---	---	---	---	---	---	---
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	30.0	61.0	95.0	---	---	---	---	---	---
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	23.0	41.0	57.0	---	---	---	---	---	---
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	30.0	37.0	40.0	---	---	---	---	---	---
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	3.0	3.7	4.0	---	---	---	---	---	---
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	112.0	127.0	142.0	---	---	---	---	---	---
Meander Width Ratio										1.5	2.3	---	2.8	---	---	2.3	4.1	5.7	---	---	---	---	---	---
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				2.0	5.2	8.0	20.3	29.7	34.0	45.0	6.3	10.6	17.3	57.9	113.9	76.0	123.0							
Reach Shear Stress (competency) lb/f^2				0.75														0.73	---					
Max part size (mm) mobilized at bankfull				123														120	---					
Stream Power (transport capacity) W/m^2				3.7														3.6	---					
Additional Reach Parameters																								
Drainage Area (SM)				0.6							0.19													
Impervious Surface estimate (%)				<1							<1													
Rosgen Classification				G4							E4							E4	---					
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 3.6 (2.4-4.8)							---							HEC-RAS: 4.0 (3.2-4.7)	---					
Bankfull Discharge (cfs)	---	---	59.4	69.2																				
Valley length (ft)				360							240								235					
Channel Thalweg length (ft)				414							284							470	273					
Sinuosity (ft)				1.2							1.2							1.2	1.2					
BF slope (ft/ft)				0.009							0.016							0.008	---					
BEHI VL% / L% / M% / H% / VH% / E%				0	0	0	0	0	100		---	---	---	---	---	---	---							

Table 5D. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: UT to Wicker Branch Reach 5 (8+40-14+86)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)	---	---	5.1	---	8.6	---	---	---	1	---	8.2	---	---	---	---	---	6.0	---	---	11.0	---	---	---	1
Floodprone Width (ft)				---	12.4	---	---	---	1	---	105.0	---	---	---	---	20.0	25.0	30.0	---	65.5	---	---	---	1
Bankfull Mean Depth (ft)	---	---	0.8	---	0.6	---	---	---	1	---	0.8	---	---	---	---	---	0.9	---	---	0.8	---	---	---	1
[1]Bankfull Max Depth (ft)				---	0.9	---	---	---	1	---	2.2	---	---	---	---	---	1.2	---	---	1.3	---	---	---	1
Bankfull Cross Sectional Area (ft^2)	---	---	5.6	---	5.4	---	---	---	1	---	6.3	---	---	---	---	---	5.5	---	---	8.5	---	---	---	1
Width/Depth Ratio				---	13.7	---	---	---	1	---	10.6	---	---	---	---	---	6.5	---	---	14.1	---	---	---	1
Entrenchment Ratio				---	1.4	---	---	---	1	---	12.8	---	---	---	---	3.3	4.1	5.0	---	6.0	---	---	---	1
[1]Bank Height Ratio				---	2.3	---	---	---	1	---	1.0	---	---	---	---		1.0		---	1.0	---	---	---	1
d50 (mm)				---	49.4	---	---	---	1	---	17.3	---	---	---	---	16.0	24.0	32.0	---	25.7	---	---	---	1
Profile*																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	5.0	10.0	15.0	5.1	12.8	12.4	23.2	4.5	16
Riffle Slope (ft/ft)										0.0073	0.0422	---	0.0854	---	---	0.010	0.025	0.060	0.001	0.016	0.016	0.035	0.010	16
Pool Length (ft)										9.0	13.0	---	19.0	---	---	4.0	12.0	27.0	3.2	12.4	12.3	29.5	6.3	18
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	2.0	---	1.6	2.2	2.3	2.6	0.3	18
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	20.0	30.0	45.0	14.5	30.2	31.7	42.2	6.9	17
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	13.0	20.0	28.0	15.7	24.3	25.6	29.8	4.7	18
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	12.0	17.0	30.0	12.3	19.9	18.8	31.4	5.8	19
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	2.0	2.8	5.0	1.1	1.8	1.7	2.9	0.5	19
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	46.0	55.0	81.0	23.3	54.3	52.3	88.5	15.6	18
Meander Width Ratio										1.5	2.3	---	2.8	---	---	2.1	3.3	4.6	2.1	4.9	4.8	8.0	1.4	18
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				10.6	23.6	49.4	75.3	82.7	86.0	78.0	6.3	10.	17.3	57.9	113.9	76.0	123.0								
Reach Shear Stress (competency) lb/f^2				0.50														0.6	0.6					
Max part size (mm) mobilized at bankfull				91.0														107.0	107.0					
Stream Power (transport capacity) W/m^2				2.1														2.6	1.4					
Additional Reach Parameters																								
Drainage Area (SM)				0.2							0.19													
Impervious Surface estimate (%)				<1							<1													
Rosgen Classification				B4							E4							E4	C4					
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 3.0 (2.0-4.0)														HEC-RAS: 4.4 (3.8-5.1)	3.9					
Bankfull Discharge (cfs)	---	---	22.7	23.1																				
Valley length (ft)				530							240													
Channel Thalweg length (ft)				534							284							646	646					
Sinuosity (ft)				1.0							1.2							1.2	1.2					
BF slope (ft/ft)				0.012							0.016							0.011	0.011					
BEHI VL% / L% / M% / H% / VH% / E%				34	25	17	24	0	0	---	---	---	---	---	---									

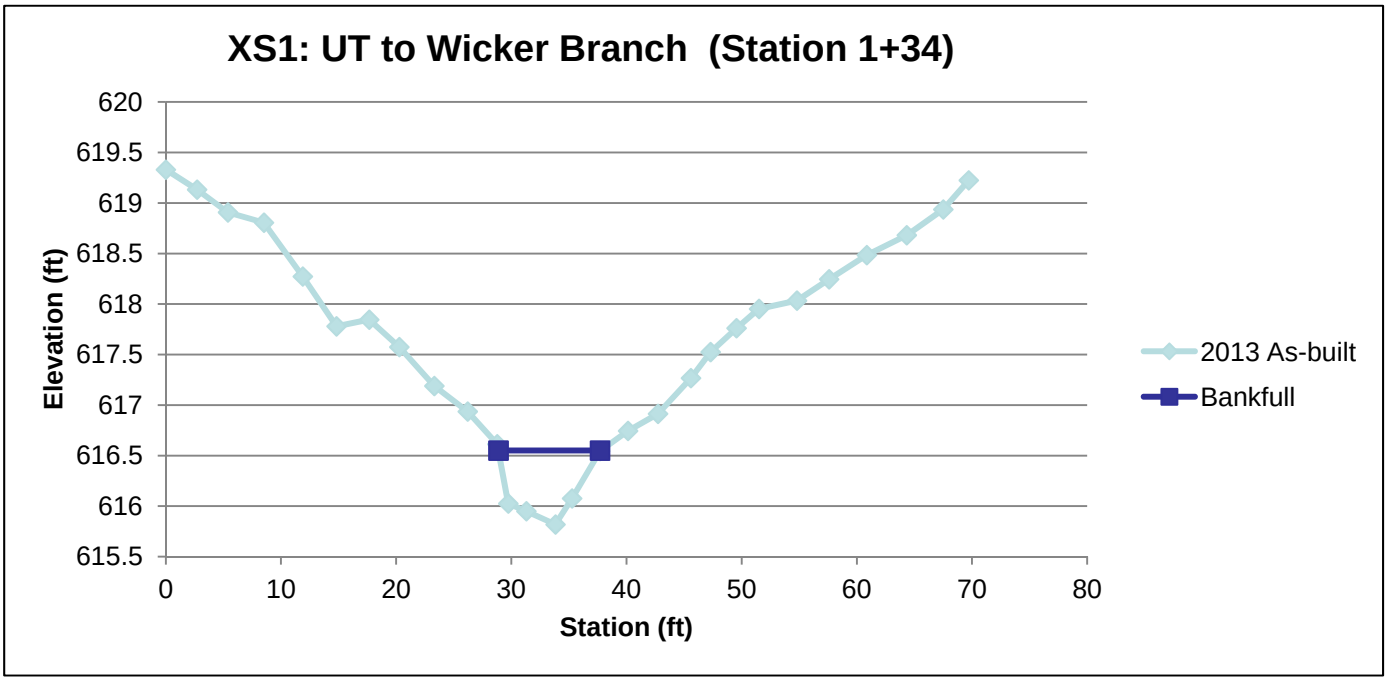
*Profile values are derived from monitoring reach 9+10-14+86 only

Table 6. Morphology and Hydraulic Monitoring Summary (Dimensional Parameters – Cross Section)
601 North II Stream Restoration Site – EEP Contract No. 003991

Parameter	Cross-Section 1 (Riffle) UT to Wicker (Reach 4)						Cross-Section 2 (Pool) UT to Wicker (Reach 5)						Cross-Section 3 (Riffle) UT to Wicker (Reach 5)						Cross-Section 4 (Riffle) Wicker Reach 1						Cross-Section 5 (Pool) Wicker Reach 1					
Dimension and Substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull																														
Bankfull Width (ft)	8.9						17.6						11.0						11.4						14.2					
Floodprone Width (ft)	23.1						64.1						65.5						59.7						65.6					
Bankfull Mean Depth (ft)	0.5						0.7						0.8						0.7						0.8					
Bankfull Max Depth (ft)	0.7						1.7						1.3						1.3						1.8					
Bkf Cross Sectional Area (ft^2)	4.2						12.8						8.5						7.9						11.5					
Bankfull Width/Depth Ratio	18.5						24.5						14.1						16.6						17.6					
Bankfull Entrenchment Ratio	2.6						3.6						6.0						5.2						4.6					
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0						1.0					
Based on current/developing bankfull																														
Bankfull Width (ft)																														
Floodprone Width (ft)																														
Bankfull Mean Depth (ft)																														
Bankfull Max Depth (ft)																														
Bkf Cross Sectional Area (ft^2)																														
Bankfull Width/Depth Ratio																														
Bankfull Entrenchment Ratio																														
Bankfull Bank Height Ratio																														
Cross Sectional Area between end pins	110.1						78.9						82.9						71.9						80.8					
D50 (mm)	NA						---						25.7						28.7						---					

	Cross-Section 6 (Riffle) Wicker Reach 2						Cross-Section 7 (Pool) Wicker Reach 2						Cross-Section 8 (Pool) Wicker Reach 2						Cross-Section 9 (Riffle) Wicker Reach 2											
Based on fixed baseline bankfull	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Width (ft)	11.5						12.8						12.7						11.6											
Floodprone Width (ft)	69.2						69.5						69.5						69.7											
Bankfull Mean Depth (ft)	1.1						1.8						1.6						1.1											
Bankfull Max Depth (ft)	1.7						3.2						2.9						1.8											
Bkf Cross Sectional Area (ft^2)	12.1						23.2						19.9						13.0											
Bankfull Width/Depth Ratio	10.8						7.0						8.1						10.4											
Bankfull Entrenchment Ratio	6.0						5.4						5.5						6.0											
Bankfull Bank Height Ratio	1.0						1.0						1.0						1.0											
Based on current/developing bankfull																														
Bankfull Width (ft)																														
Floodprone Width (ft)																														
Bankfull Mean Depth (ft)																														
Bankfull Max Depth (ft)																														
Bkf Cross Sectional Area (ft^2)																														
Bankfull Width/Depth Ratio																														
Bankfull Entrenchment Ratio																														
Bankfull Bank Height Ratio																														
Cross Sectional Area between end pins	82.2						83.7						34.3						31.9											
D50 (mm)	23.5						---						---						19.3											

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
1	UT	Riffle	C	8.9	23.1	0.5	0.7	4.2	18.5	2.6	1.0



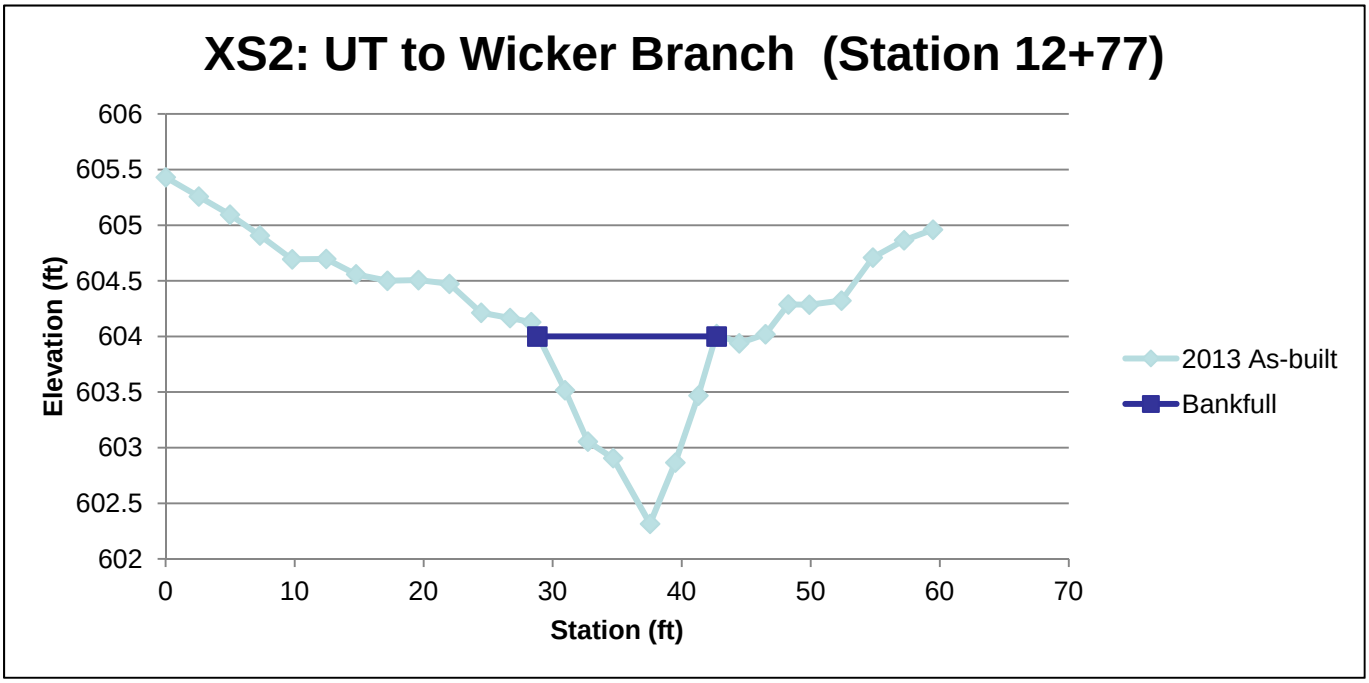
XS1 facing left bank (April 24, 2013)

XS1 facing right bank (April 24, 2013)

XS1 facing upstream (April 24, 2013)

XS1 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
2	UT	Pool	C	17.6	64.1	0.7	1.7	12.8	24.5	3.6	1.0



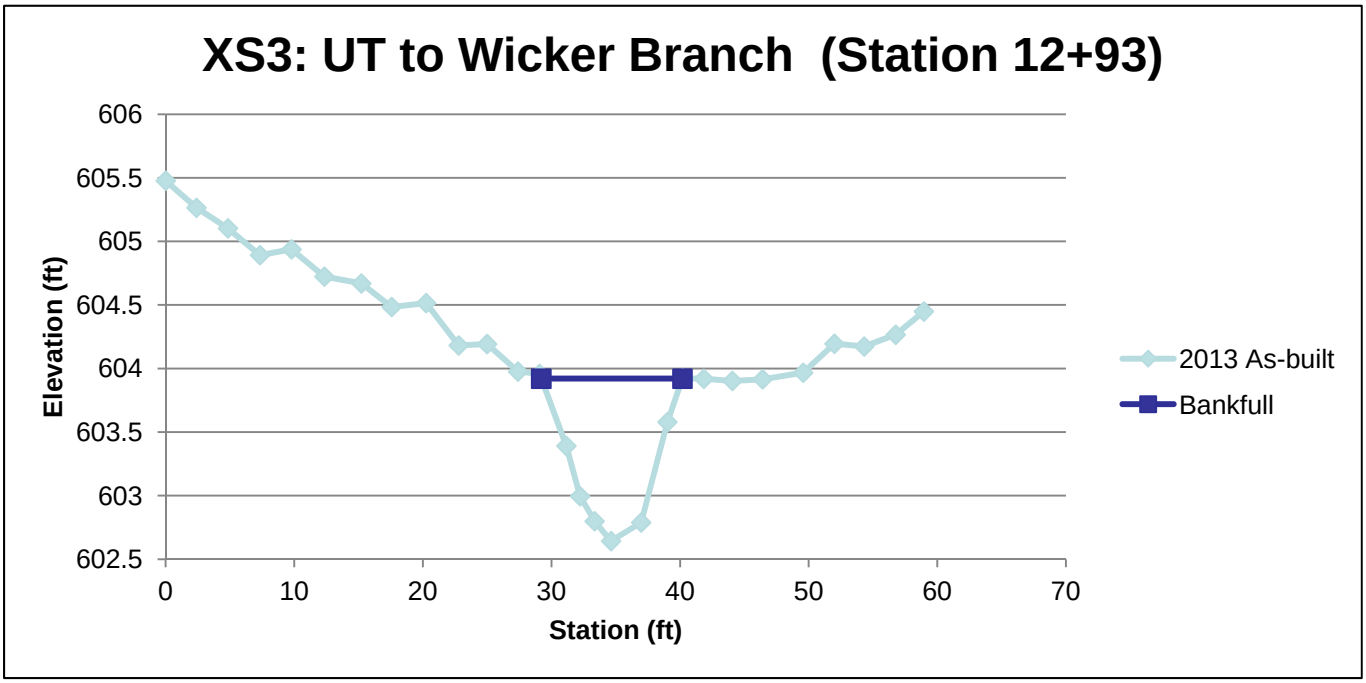
XS2 facing left bank (April 24, 2013)

XS2 facing right bank (April 24, 2013)

XS2 facing upstream (April 24, 2013)

XS2 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
3	UT	Riffle	C4	11.0	65.5	0.8	1.3	8.5	14.1	6.0	1.0



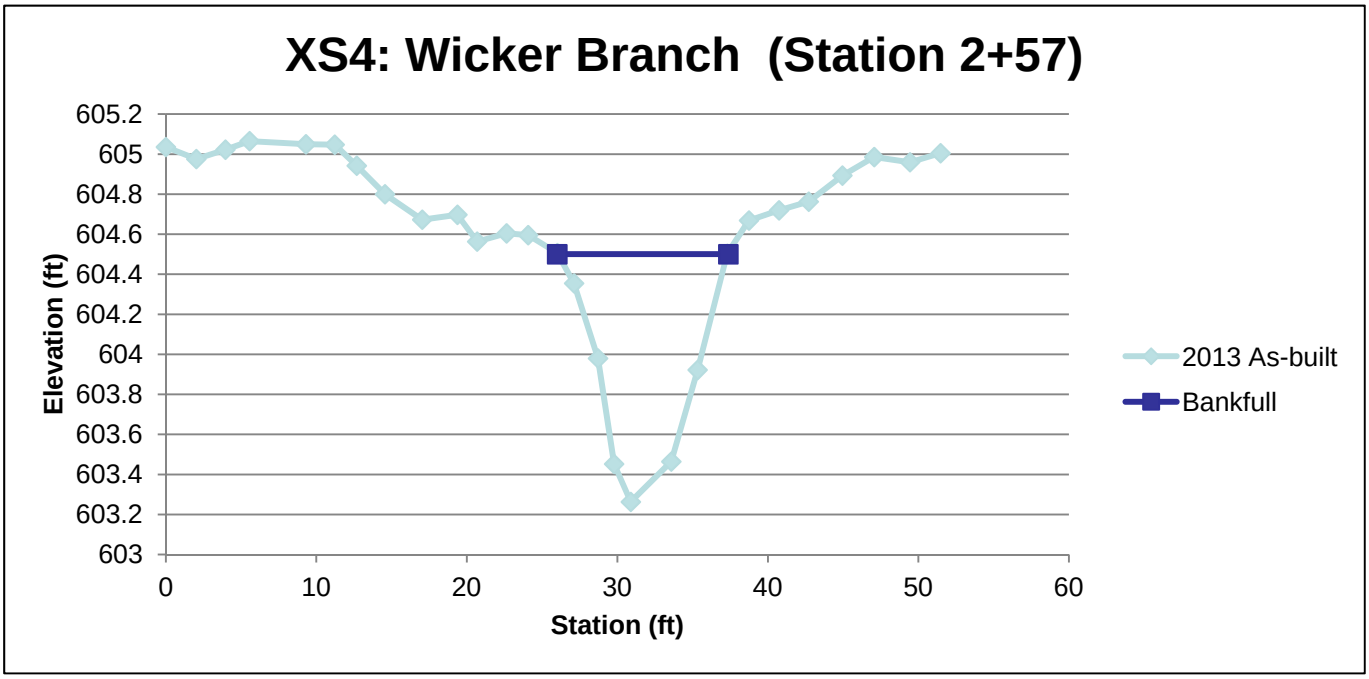
XS3 facing left bank (April 24, 2013)

XS3 facing right bank (April 24, 2013)

XS3 facing upstream (April 24, 2013)

XS3 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
4	Wicker Reach1	Riffle	C4	11.4	59.7	0.7	1.3	7.9	16.6	5.2	1.0



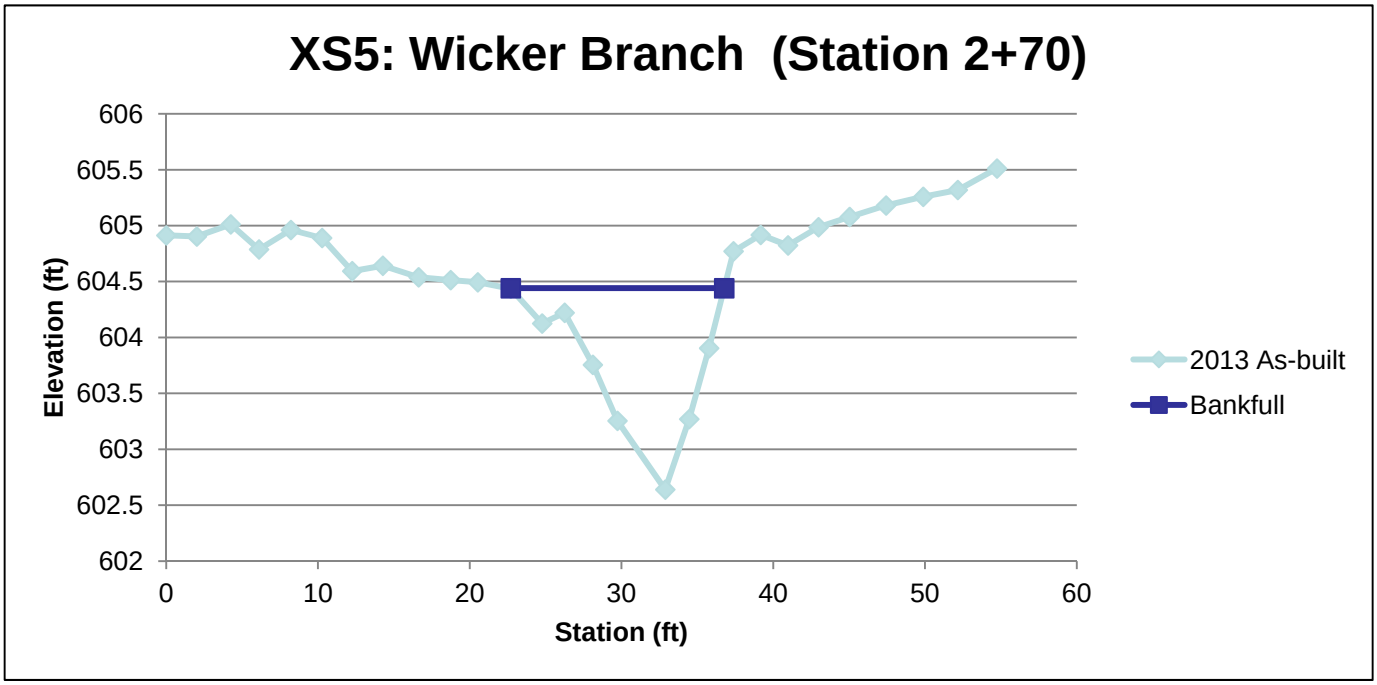
XS4 facing left bank (April 24, 2013)

XS4 facing right bank (April 24, 2013)

XS4 facing upstream (April 24, 2013)

XS4 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
5	Wicker Reach1	Pool	C	14.2	65.6	0.8	1.8	11.5	17.6	4.6	1.0



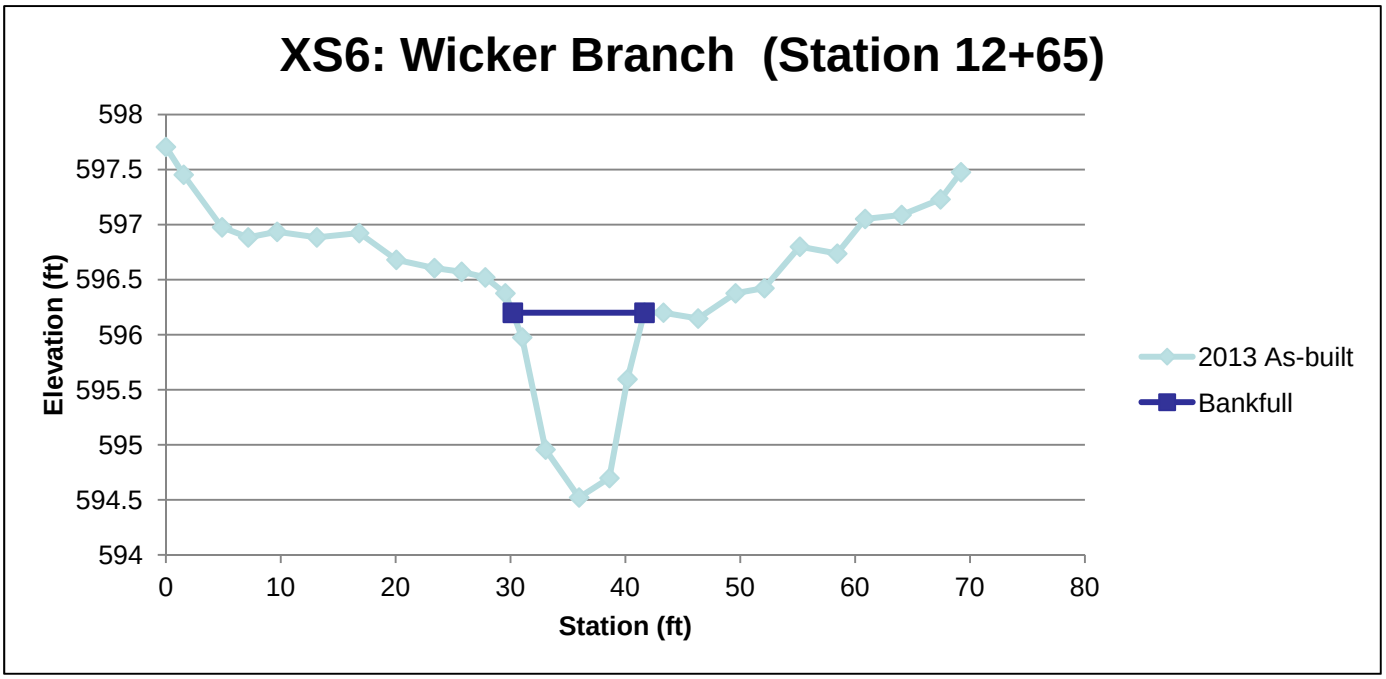
XS5 facing left bank (April 24, 2013)

XS5 facing right bank (April 24, 2013)

XS5 facing upstream (April 24, 2013)

XS5 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
6	Wicker Reach2	Riffle	E4	11.5	69.2	1.1	1.7	12.1	10.8	6.0	1.0



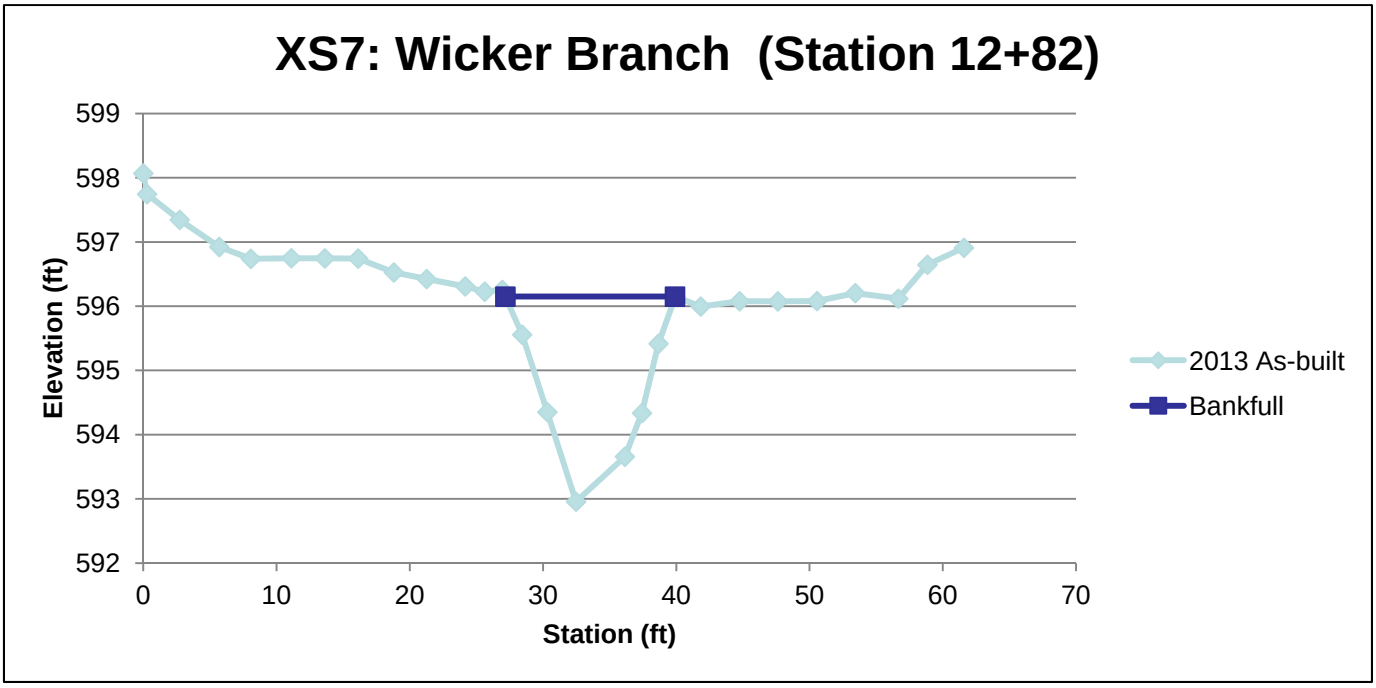
XS6 facing left bank (April 24, 2013)

XS6 facing right bank (April 24, 2013)

XS6 facing upstream (April 24, 2013)

XS6 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
7	Wicker Reach2	Pool	E	12.8	69.5	1.8	3.2	23.2	7.0	5.4	1.0



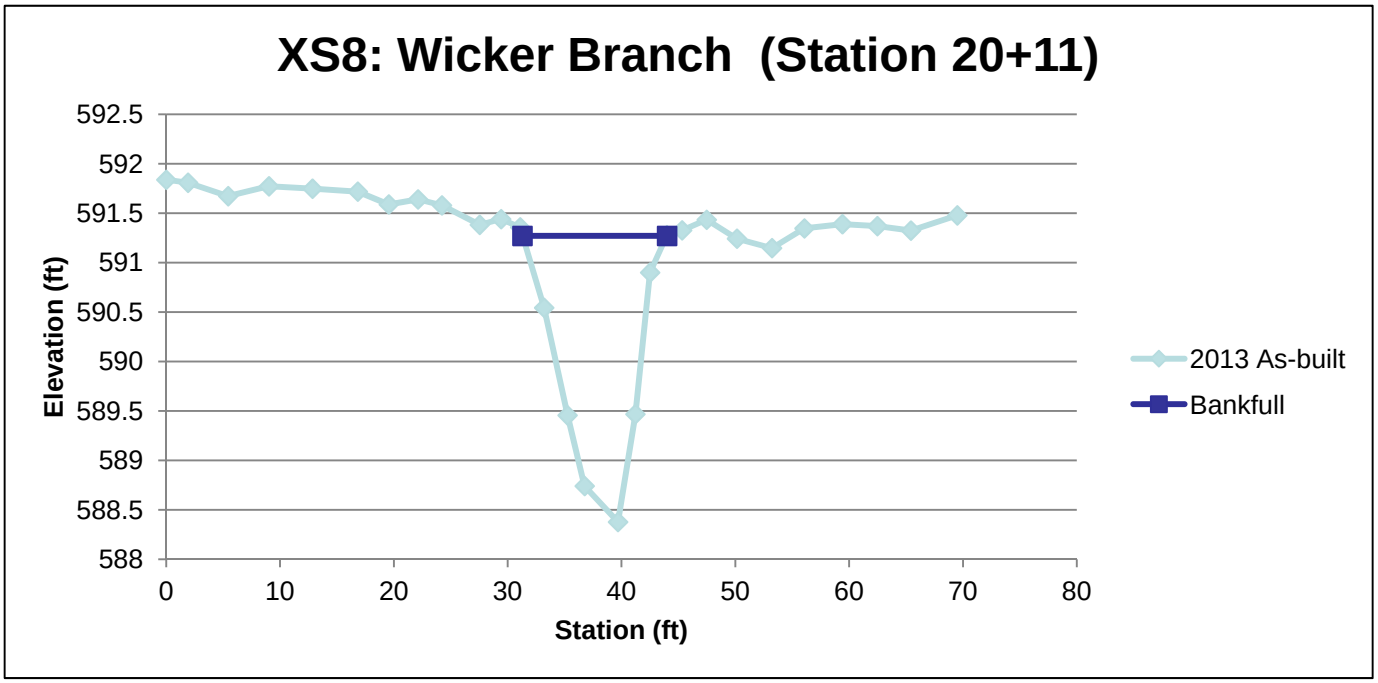
XS7 facing left bank (April 24, 2013)

XS7 facing right bank (April 24, 2013)

XS7 facing upstream (April 24, 2013)

XS7 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
8	Wicker Reach2	Pool	E	12.7	69.5	1.6	2.9	19.9	8.1	5.5	1.0



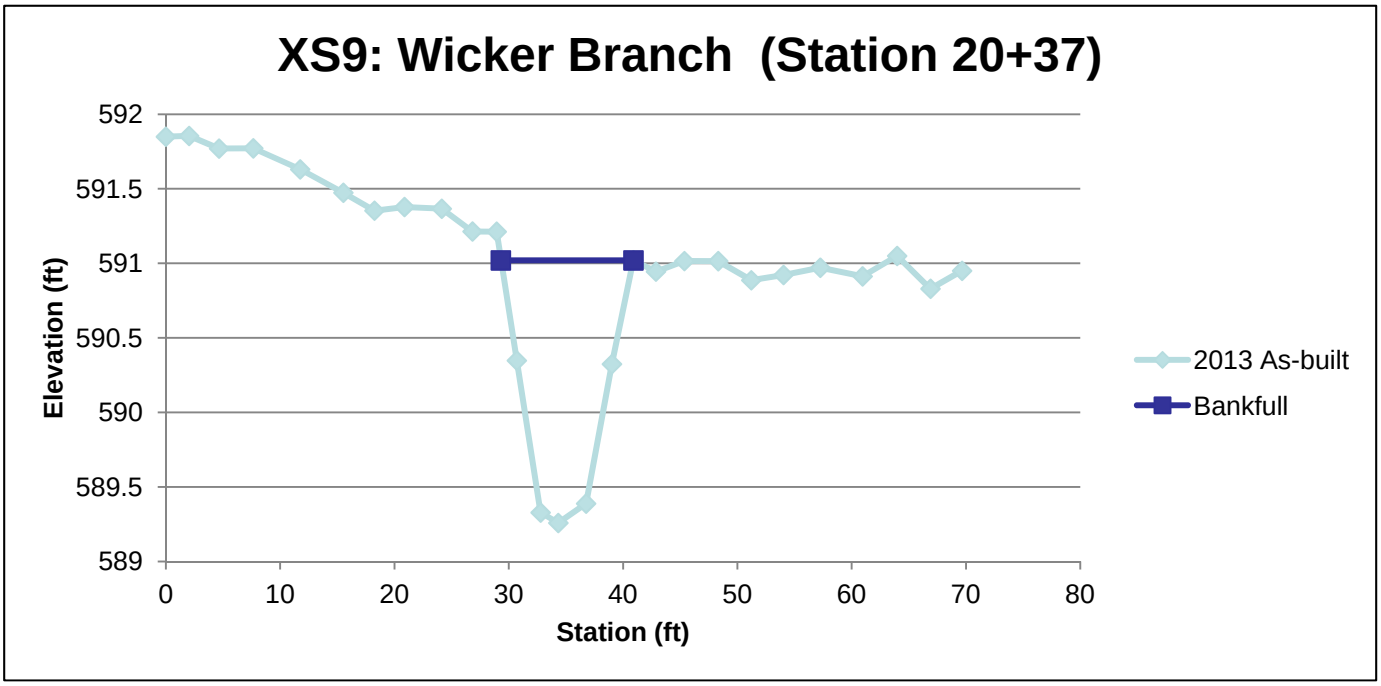
XS8 facing left bank (April 24, 2013)

XS8 facing right bank (April 24, 2013)

XS8 facing upstream (April 24, 2013)

XS8 facing downstream (April 24, 2013)

XS	Stream Reach	Feature	Stream Type	BKF Width	Floodprone Width	BKF Mean Depth	BFK Max Depth	BKF Area	W/D Ratio	ER	BH Ratio
9	Wicker Reach2	Riffle	E4	11.6	69.7	1.1	1.8	13.0	10.4	6.0	1.0

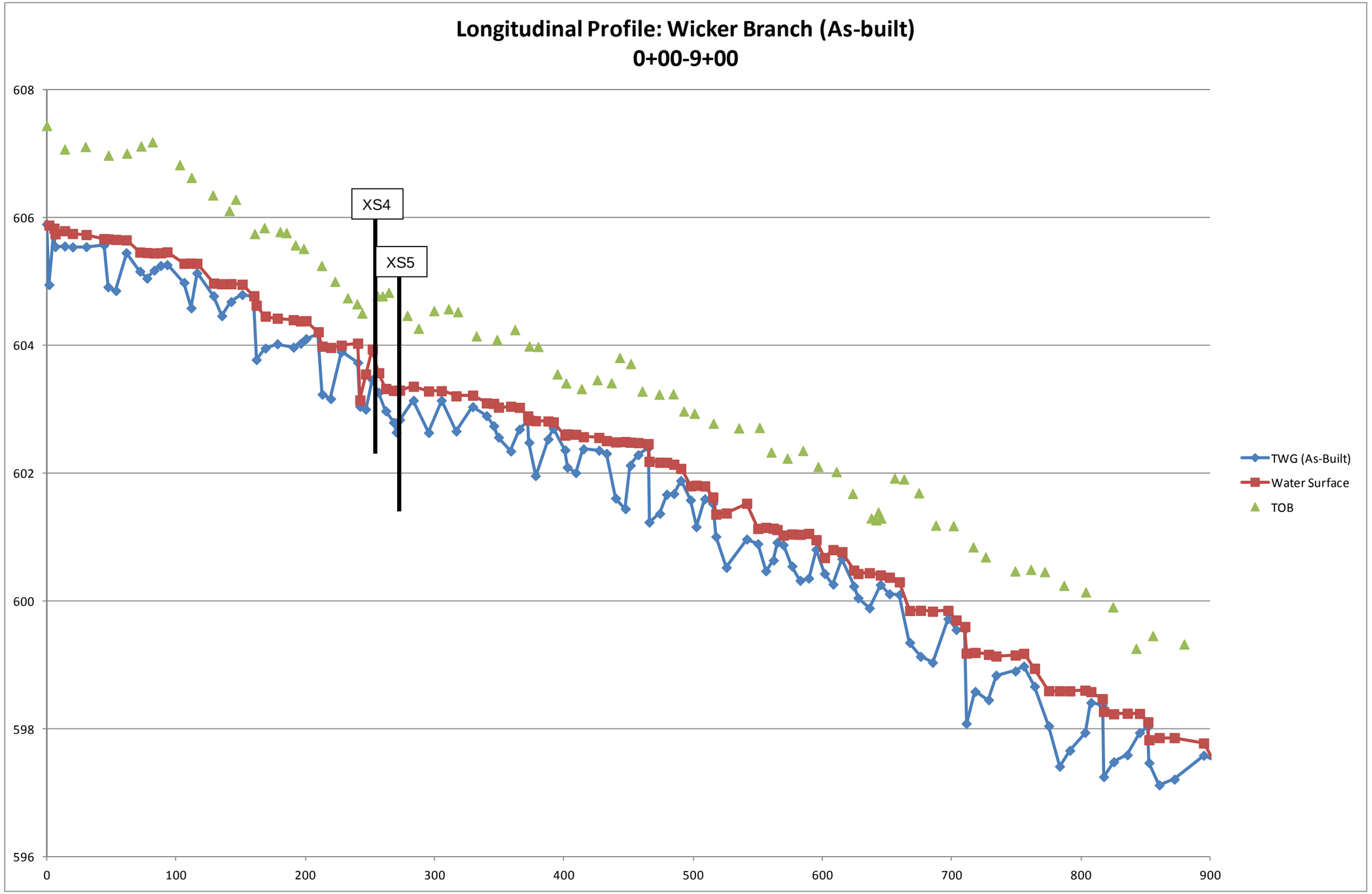


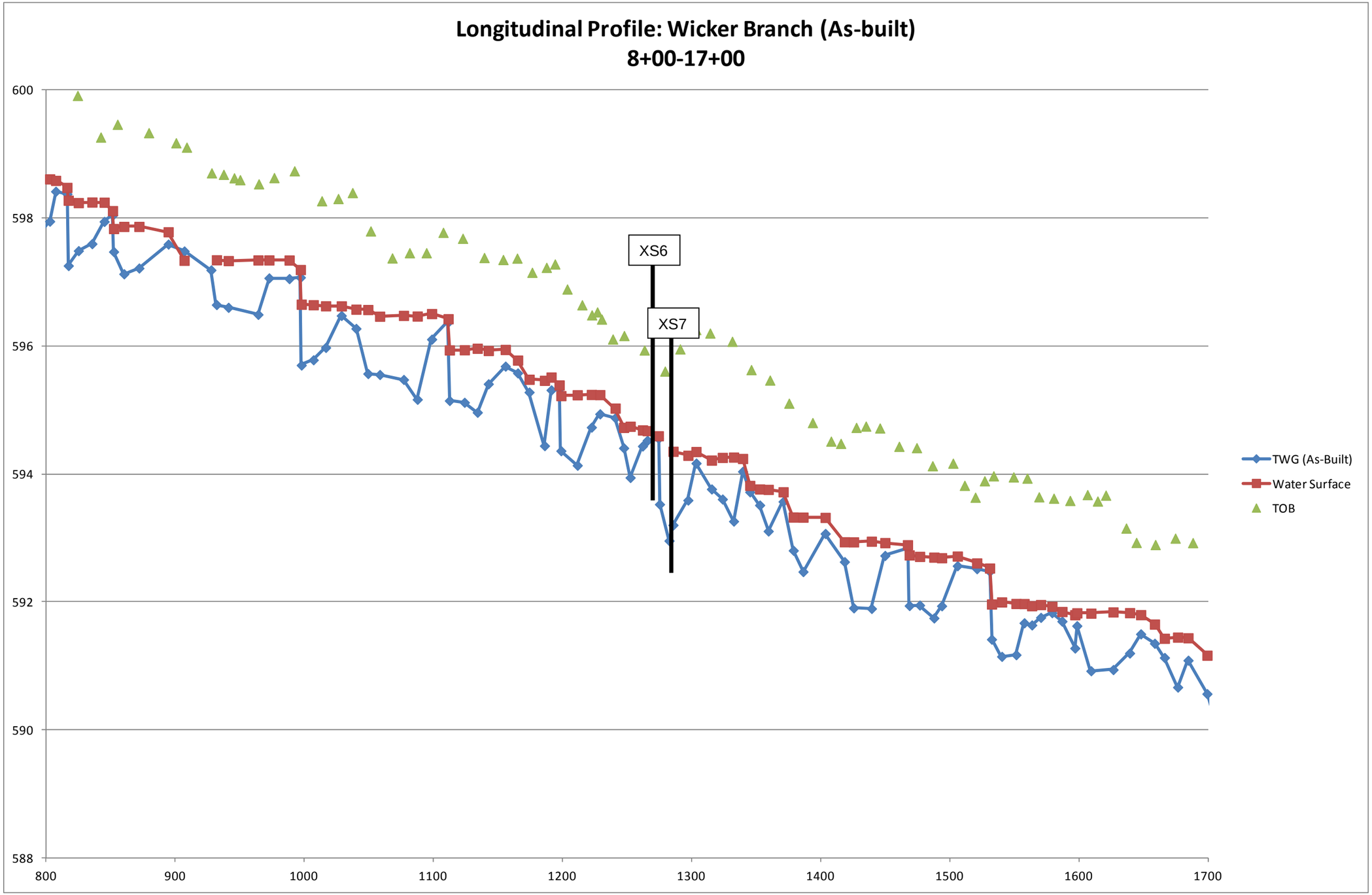
XS9 facing left bank (April 24, 2013)

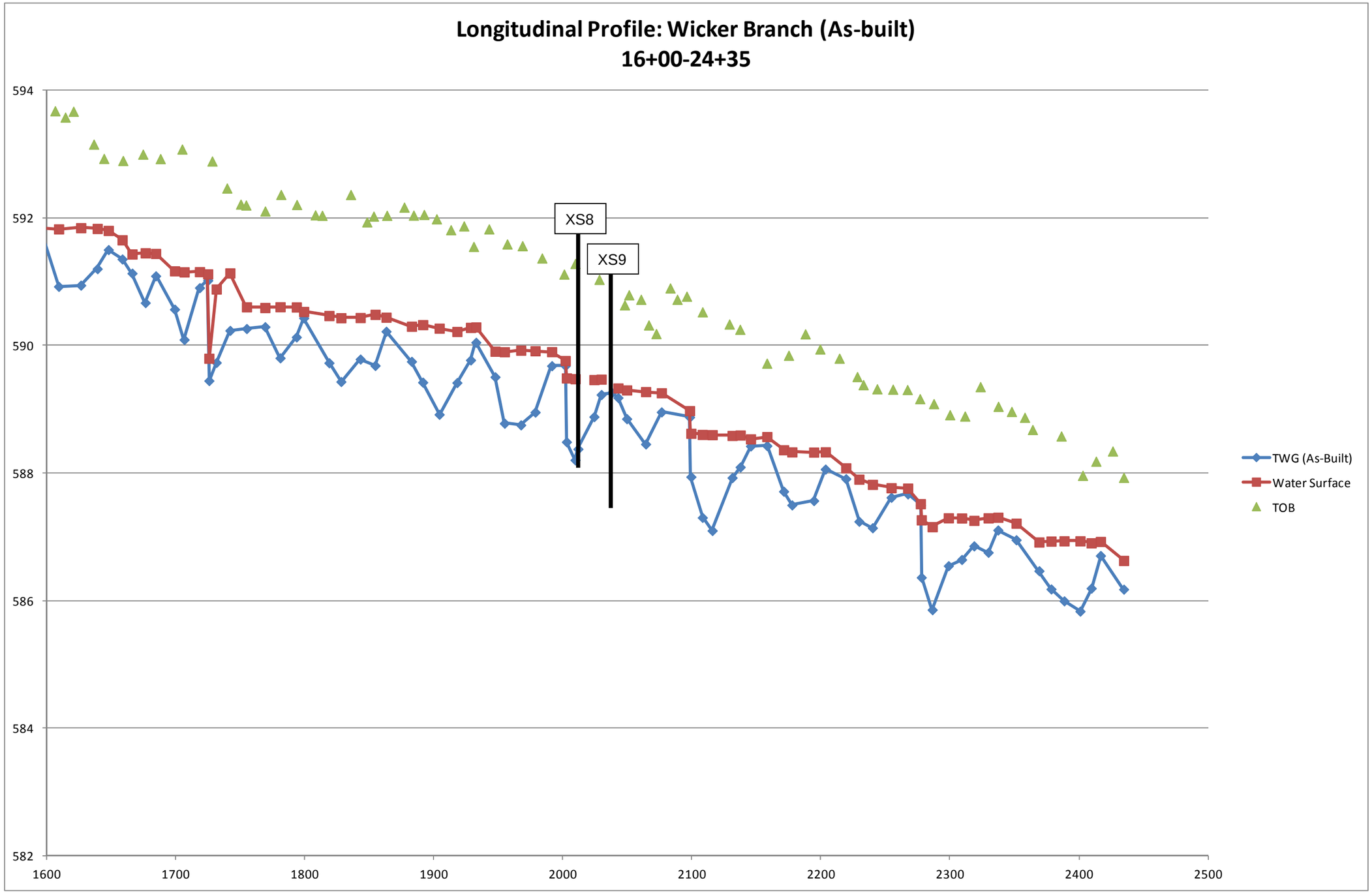
XS9 facing right bank (April 24, 2013)

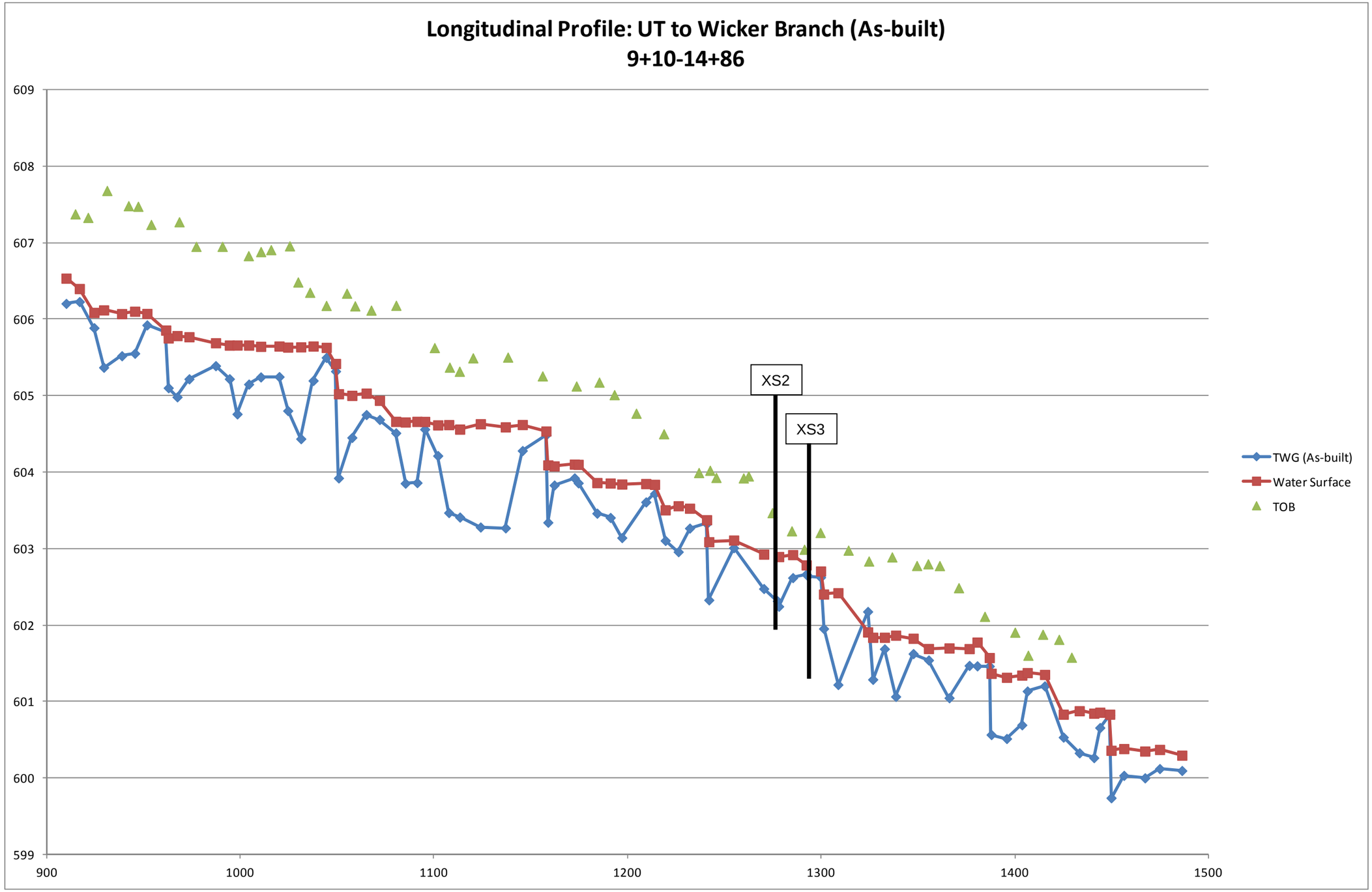
XS9 facing upstream (April 24, 2013)

XS9 facing downstream (April 24, 2013)


Longitudinal Profile: Wicker Branch (As-built)
0+00-9+00
608
606
604
602
600
598
596
0
100
200
300
400
500
600
700
800
900
XS4
XS5
TWG (As-Built)
Water Surface
TOB


Longitudinal Profile: Wicker Branch (As-built)
8+00-17+00
600
598
596
594
592
590
588
800
900
1000
1100
1200
1300
1400
1500
1600
1700
XS6
XS7
TWG (As-Built)
Water Surface
TOB


Longitudinal Profile: Wicker Branch (As-built)
16+00-24+35
594
592
590
588
586
584
582
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
XS8
XS9
TWG (As-Built)
Water Surface
TOB


Longitudinal Profile: UT to Wicker Branch (As-built)
9+10-14+86
609
608
607
606
605
604
603
602
601
600
599
900
1000
1100
1200
1300
1400
1500
XS2
XS3
TWG (As-built)
Water Surface
TOB

APPENDIX D: BASELINE VEGETATION DATA

Table 7. Planted and Total Stem Counts (Species by Plot with Annual Means)																				
			95925-01-0001			95925-01-0002			95925-01-0003			95925-01-0004			95925-01-0005			95925-01-0006		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Betula nigra	river birch	Tree	3	3	3	2	2	2	9	9	9	4	4	4	4	4	4	6	6	6
Celtis laevigata	sugarberry	Tree																		
Cercis canadensis	eastern redbud	Tree										3	3	3	5	5	5			
Fraxinus pennsylvanica	green ash	Tree	1	1	1				1	1	1							1	1	1
Nyssa sylvatica	blackgum	Tree	1	1	1				1	1	1				3	3	3			
Platanus occidentalis	American sycamore	Tree	2	2	2	3	3	3	1	1	1				1	1	1			
Quercus michauxii	swamp chestnut oak	Tree	6	6	6	1	1	1	8	8	8	6	6	6	2	2	2	2	2	2
Quercus phellos	willow oak	Tree	1	1	1							3	3	3				6	6	6
Quercus rubra	northern red oak	Tree													2	2	2	3	3	3
		Stem count	14	14	14	6	6	6	20	20	20	16	16	16	17	17	17	18	18	18
		Plot size (acres)	0.025			0.025			0.025			0.025			0.025			0.025		
		Species count	6	6	6	3	3	3	5	5	5	4	4	4	6	6	6	5	5	5
		Stems per acre	560	560	560	240	240	240	800	800	800	640	640	640	680	680	680	720	720	720

Table 7. Continued																						
			95925-01-0007			95925-01-0008			95925-01-0009			95925-01-0010			95925-01-0011			95925-01-0012			2013 ANNUAL MEANS		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Betula nigra	river birch	Tree				3	3	3	4	4	4	4	4	4	9	9	9	3	3	3	51	51	51
Celtis laevigata	sugarberry	Tree												1			1						2
Cercis canadensis	eastern redbud	Tree	1	1	1	4	4	4	1	1	1	3	3	3	2	2	2				19	19	19
Fraxinus pennsylvanica	green ash	Tree	2	2	2	1	1	1	2	2	2							2	2	2	10	10	10
Nyssa sylvatica	blackgum	Tree																2	2	2	7	7	7
Platanus occidentalis	American sycamore	Tree	4	4	4				6	6	6							2	2	2	19	19	19
Quercus michauxii	swamp chestnut oak	Tree	6	6	6	2	2	2	3	3	3	5	5	5				3	3	3	44	44	44
Quercus phellos	willow oak	Tree	2	2	2	4	4	4	1	1	1	6	6	6	1	1	1	3	3	3	27	27	27
Quercus rubra	northern red oak	Tree				2	2	2	1	1	1				4	4	4	2	2	2	14	14	14
		Stem count	15	15	15	16	16	16	18	18	18	18	18	19	16	16	17	17	17	17	191	191	193
		size (acres)	0.025			0.025			0.025			0.025			0.025			0.025			0.025		
		Species count	5	5	5	6	6	6	7	7	7	4	4	5	4	4	5	7	7	7	8	8	9
		Stems per acre	600	600	600	640	640	640	720	720	720	720	720	760	640	640	680	680	680	680	636	636	636

Table 8. Planted Stems by Plot													
Species	**Plots**												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**As-built Totals**
Betula nigra	3	2	9	4	4	6		3	4	4	9	3	51
Cercis canadensis				3	5		1	4	1	3	2		19
Fraxinus pennsylvanica	1		1			1	2	1	2			2	10
Nyssa sylvatica	1		1		3							2	7
Platanus occidentalis	2	3	1		1		4		6			2	19
Quercus michauxii	6	1	8	6	2	2	6	2	3	5		3	44
Quercus phellos	1			3		6	2	4	1	6	1	3	27
Quercus rubra					2	3		2	1		4	2	14
Stems/Plot	14	6	20	16	17	18	15	16	18	18	16	17	191
Stems/Acre	560	240	800	640	680	720	600	640	720	720	640	680	

Table 9. Planted Stems Vigor and Damage						
	Vigor					**Damaged Stems**
Species	**4**	**3**	**2**	**1**	**0**	
Betula nigra	24	26	1			0
Fraxinus pennsylvanica	9	1				0
Nyssa sylvatica	3	4				0
Quercus michauxii	18	24	2			0
Quercus phellos	11	14	2			0
Cercis canadensis	8	9	2			0
Quercus rubra	9	5				0
Platanus occidentalis	14	4		1		1
Total	**96**	**87**	**7**	**1**		**1**

Vegetation Plot 1
April 24, 2013

Vegetation Plot 2
April 24, 2013

Vegetation Plot 3
April 24, 2013

Vegetation Plot 4
June 12, 2013

Vegetation Plot 5
April 24, 2013

Vegetation Plot 6
April 24, 2013

Vegetation Plot 7
April 24, 2013

Vegetation Plot 8
April 24, 2013

Vegetation Plot 9
April 24, 2013

Vegetation Plot 10
April 24, 2013

Vegetation Plot 11
April 24, 2013

Vegetation Plot 12
June 12, 2013

APPENDIX E: PHOTOGRAPHS FROM GENERAL SITE PHOTO STATIONS

Permanent Photo Point #1: Looking downstream
April 23, 2013

Permanent Photo Point #2: Looking downstream
April 23, 2013

Permanent Photo Point #2: Looking upstream
April 23, 2013

Permanent Photo Point #3: Looking downstream
April 23, 2013

Permanent Photo Point #3: Looking upstream
April 23, 2013

Permanent Photo Point #4: Looking downstream
April 23, 2013

Permanent Photo Point #5: Looking downstream
April 23, 2013

Permanent Photo Point #5: Looking upstream
April 23, 2013

Permanent Photo Point #6: Looking downstream
April 23, 2013

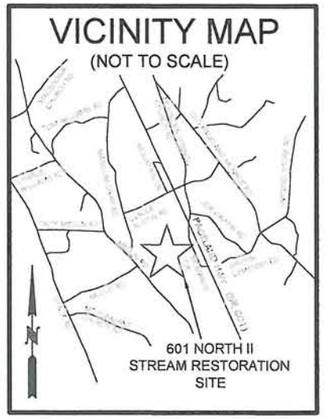
Permanent Photo Point #6: Looking upstream
April 23, 2013

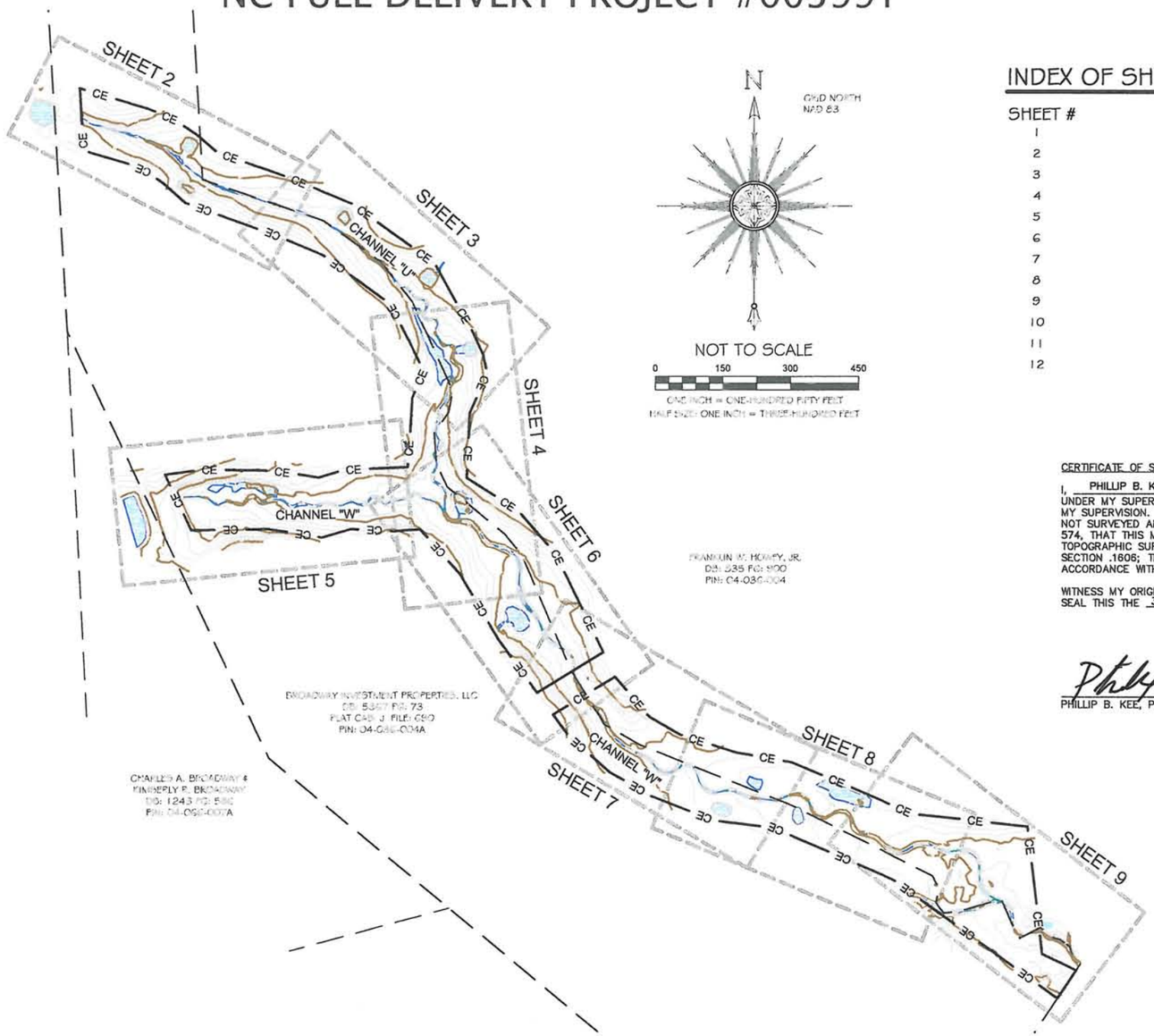
APPENDIX F: AS-BUILT SURVEY

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.
601 NORTH II STREAM RESTORATION

EEP PROJECT #95025 SCO PROJECT #10-00-249-76
NC FULL DELIVERY PROJECT #003991





INDEX OF SHEETS

SURVEYOR'S NOTES:

1. ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
2. PROPERTY SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS AND RESTRICTIONS THAT ARE RECORDED, UNRECORDED, WRITTEN AND UNWRITTEN.
3. CONSERVATION EASEMENT BOUNDARIES SHOWN HEREON WERE TAKEN FROM A PLAT OF SURVEY ENTITLED: "AN EASEMENT PLAT OF THE HOWEY PROPERTY & BROADWAY INVESTMENT PROPERTIES, LLC", PREPARED BY R.B. PHARR & ASSOCIATES, DATED 11/10/2011 AND RECORDED IN THE UNION COUNTY REGISTRY IN PLAT CABINET L, FILE 574..
4. BY GRAPHIC DETERMINATION, THE CONSERVATION EASEMENT AREA APPEARS TO LIE OUTSIDE OF THE FLOOD HAZARD AREA (ZONE X) WHERE BASE FLOOD ELEVATIONS ARE DETERMINED PER THE F.E.M.A. MAP#3710544200J; DATED OCTOBER 16, 2008 AND MAP#3710544000J; DATED OCTOBER 16,2008.
5. STATE PLANE COORDINATES AND ELEVATIONS WERE DERIVED FROM THE EXISTING CONDITIONS TOPOGRAPHIC SURVEY PREPARED BY R.B. PHARR & ASSOCIATES (704) 376-2186. THE HORIZONTAL DATUM IS NAD(83) AND THE VERTICAL DATUM IS NAVD(88). ALL COORDINATES SHOWN HEREON ARE GROUND MEASUREMENTS IN US SURVEY FEET.
6. CROSS SECTION PROFILES ARE SHOWN FROM LEFT TO RIGHT BANK.
7. UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES, THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.
8. THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.
9. LIMITS OF DISTURBANCE AREA: 13.2 ACRES

CERTIFICATE OF SURVEY

I, PHILLIP B. KEE CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION. THE CONSERVATION EASEMENT BOUNDARIES WERE NOT SURVEYED AND WERE TAKEN FROM PLAT CABINET L, FILE 574, THAT THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEYS AS STATED IN TITLE 21, CHAPTER 56, SECTION .1606; THAT THIS MAP WAS NOT PREPARED IN ACCORDANCE WITH G.S. 47-30, AS AMENDED.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS THE 31ST DAY OF MAY 2013.

Phillip B. Kee

PHILLIP B. KEE, PLS NC-4647

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

SHEET: 1 OF 12

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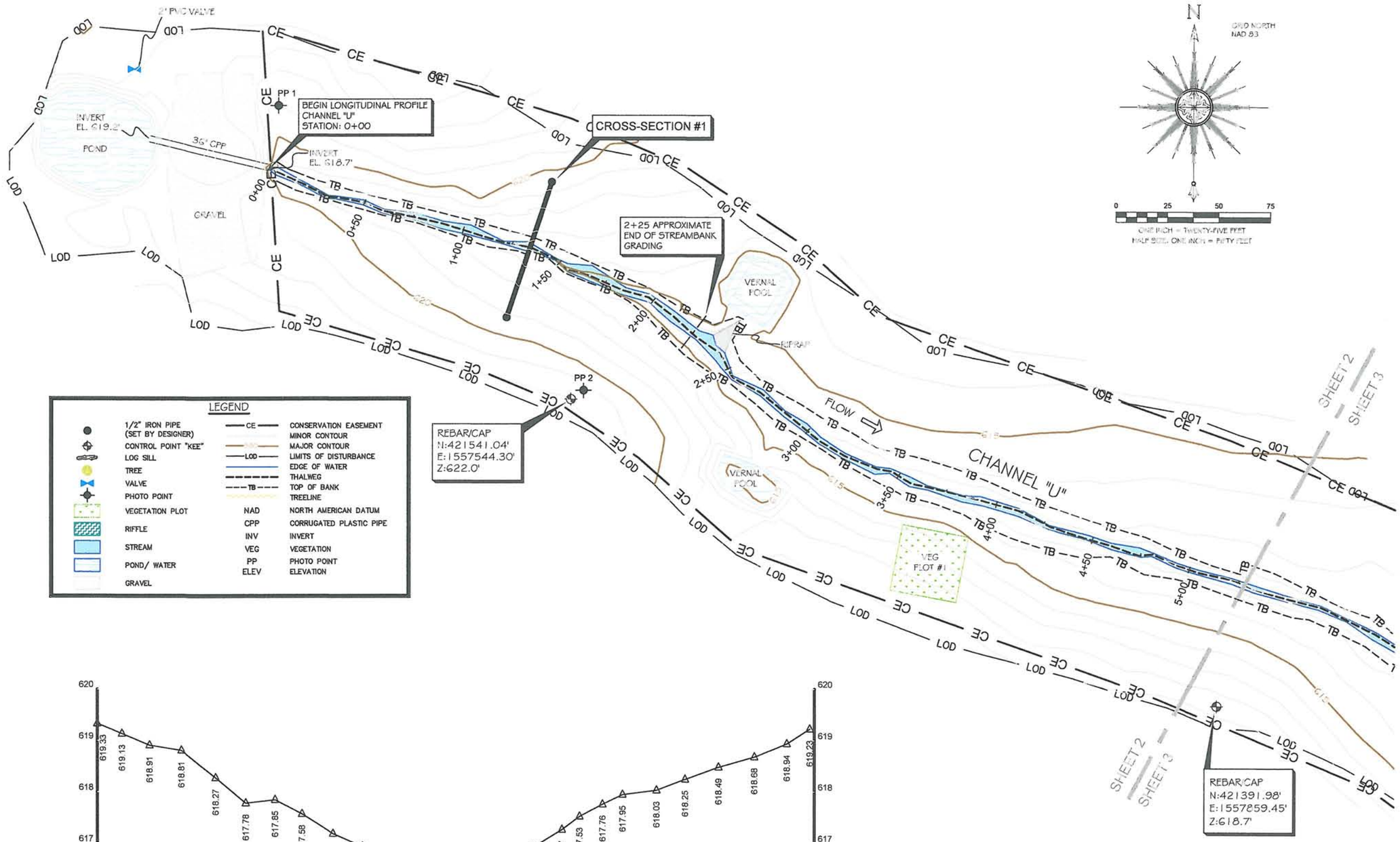
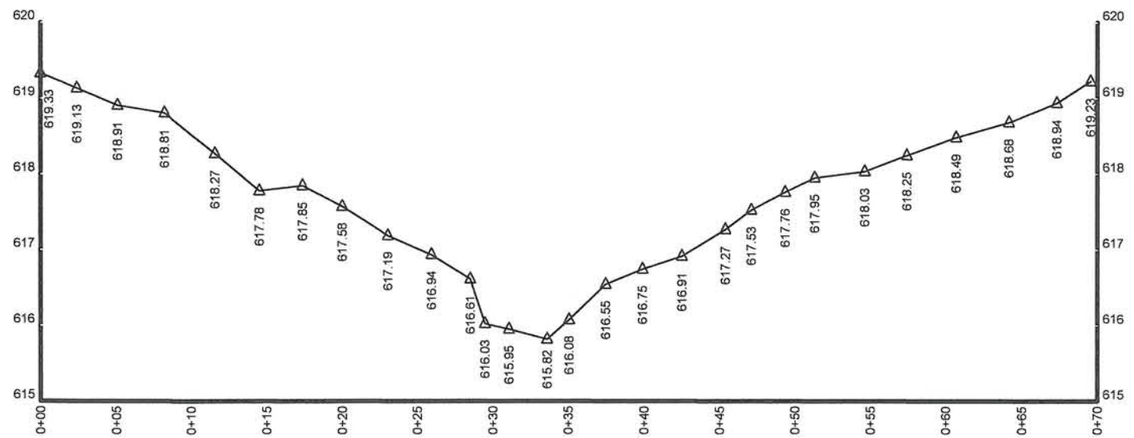
Kee MAPPING & SURVEYING



LEGEND

●	1/2" IRON PIPE (SET BY DESIGNER)	CE	CONSERVATION EASEMENT
⊕	CONTROL POINT "KEE"		MINOR CONTOUR
	LOG SILL		MAJOR CONTOUR
	TREE	LOD	LIMITS OF DISTURBANCE
	VALVE		EDGE OF WATER
	PHOTO POINT		THALWEG
	VEGETATION PLOT	TB	TOP OF BANK
	RIFFLE		TREELINE
	STREAM	NAD	NORTH AMERICAN DATUM
	POND/ WATER	CPP	CORRUGATED PLASTIC PIPE
	GRAVEL	INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION



CROSS-SECTION 1 - POOL
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4682 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

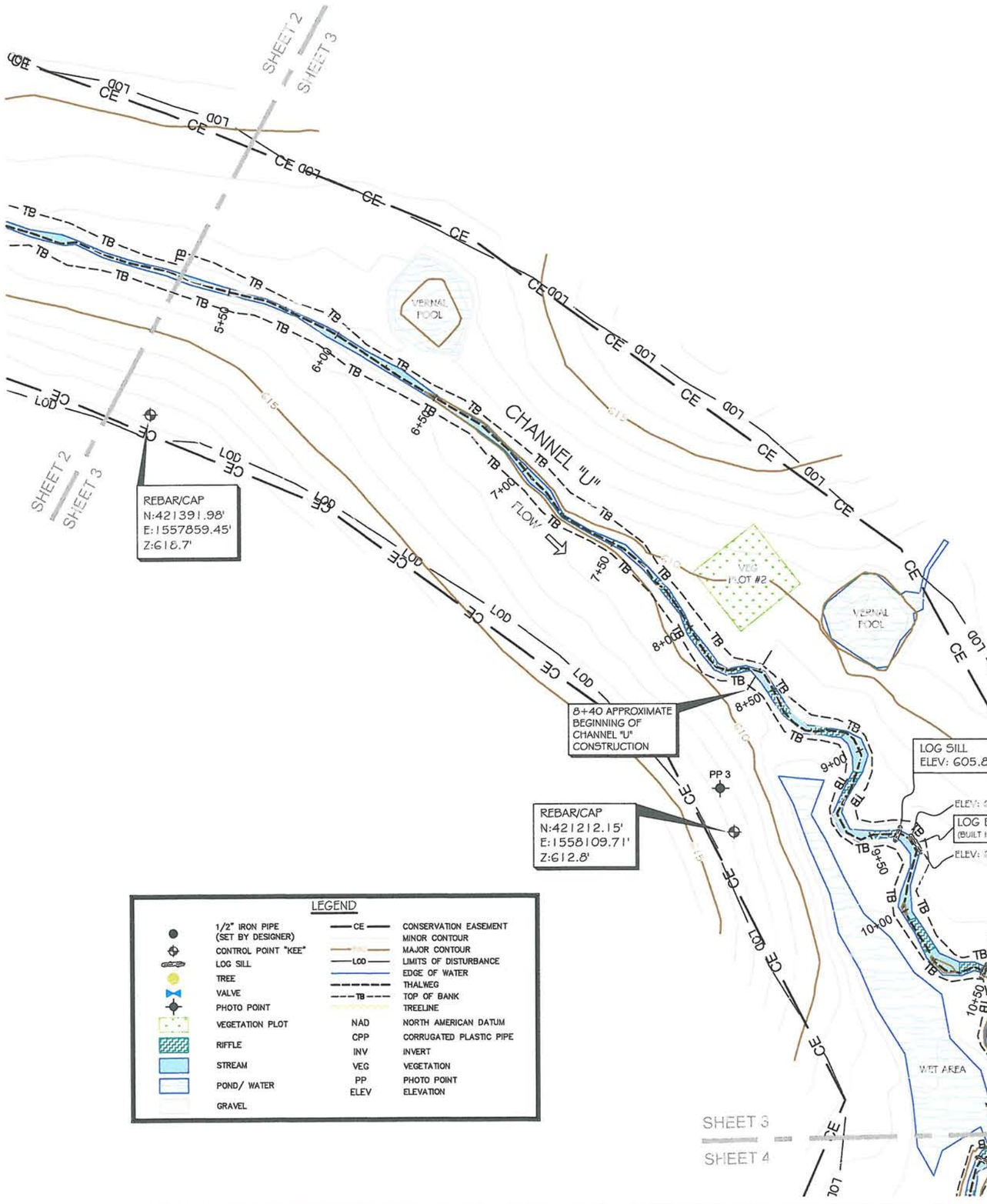
SHEET TITLE:

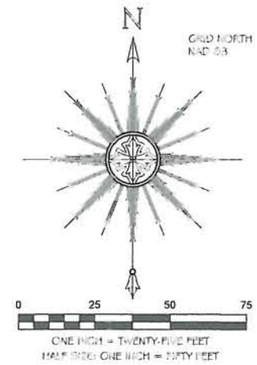
AS-BUILT SURVEY STREAM DATA: CHANNEL "U"

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 2 OF 12





LEGEND

	1/2" IRON PIPE (SET BY DESIGNER)	CE	CONSERVATION EASEMENT
	CONTROL POINT "KEE"		MINOR CONTOUR
	LOG SILL		MAJOR CONTOUR
	TREE	LOD	LIMITS OF DISTURBANCE
	VALVE		EDGE OF WATER
	PHOTO POINT		THALWEG
	VEGETATION PLOT	TB	TOP OF BANK
	RIFFLE		TREELINE
	STREAM	NAD	NORTH AMERICAN DATUM
	POND/ WATER	CPP	CORRUGATED PLASTIC PIPE
	GRAVEL	INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4684 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

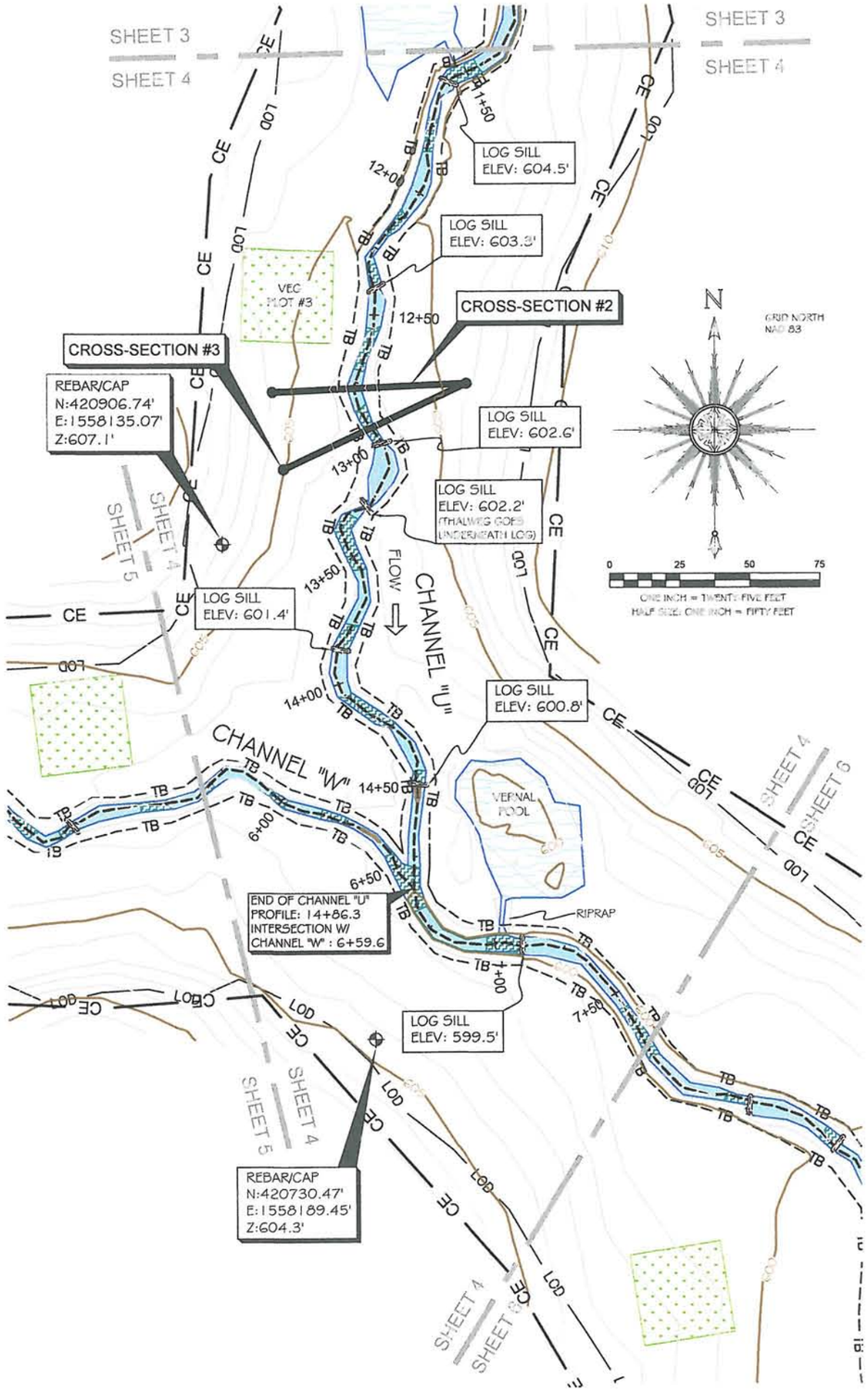
SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: CHANNEL "U

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

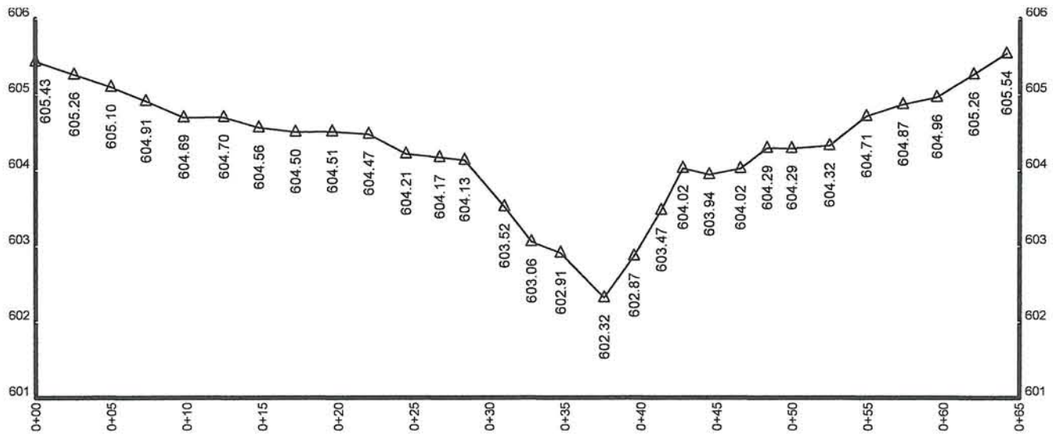
TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 3 OF 12

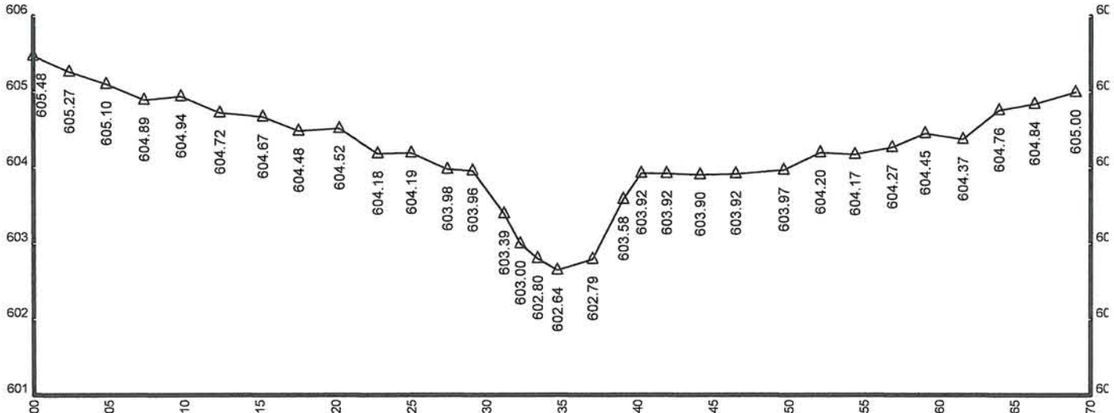


LEGEND

1/2" IRON PIPE (SET BY DESIGNER)		CE	CONSERVATION EASEMENT
CONTROL POINT "KEE"			MINOR CONTOUR
LOG SILL			MAJOR CONTOUR
TREE		LOD	LIMITS OF DISTURBANCE
VALVE			EDGE OF WATER
PHOTO POINT			THALWEG
VEGETATION PLOT		TB	TOP OF BANK
RIFFLE			TREELINE
STREAM		NAD	NORTH AMERICAN DATUM
POND/ WATER		CPP	CORRUGATED PLASTIC PIPE
GRAVEL		INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION



CROSS-SECTION 2 - POOL
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE



CROSS-SECTION 3 - RIFFLE
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4347 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

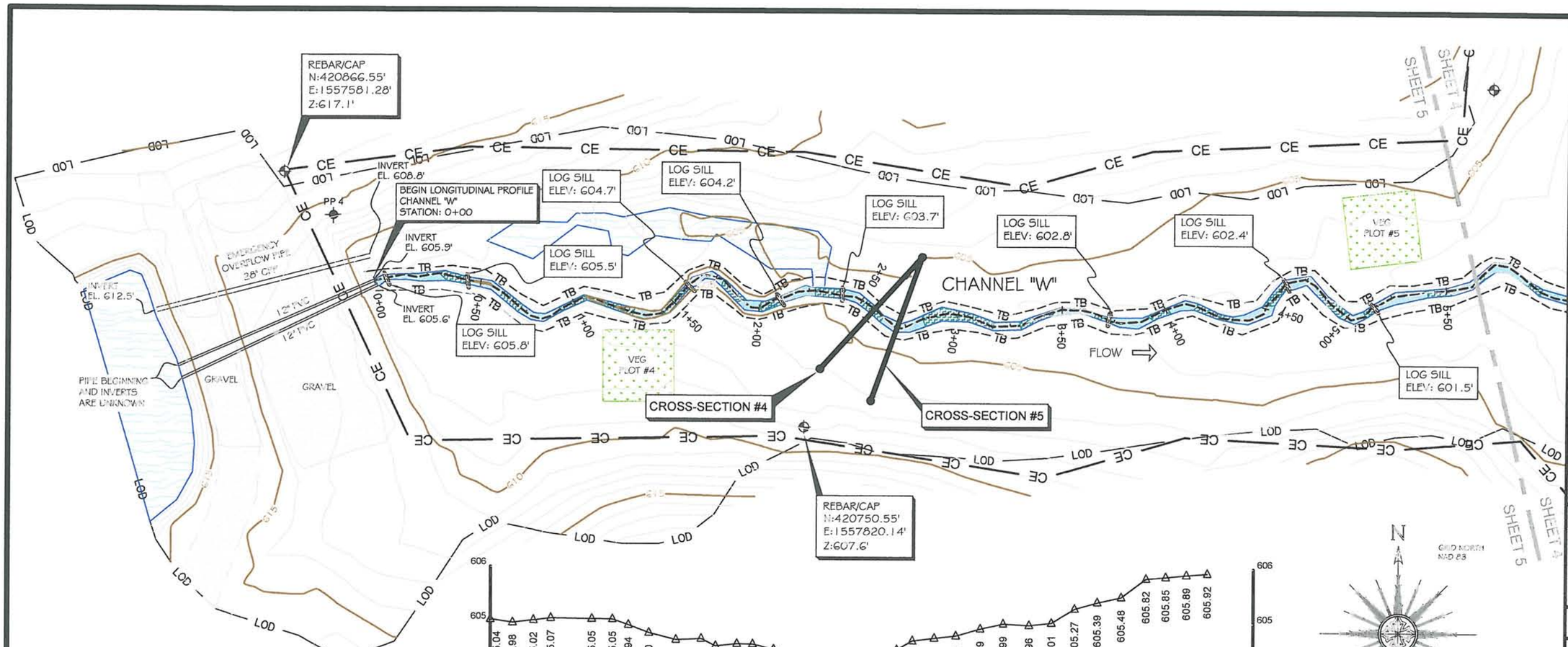
SHEET TITLE:

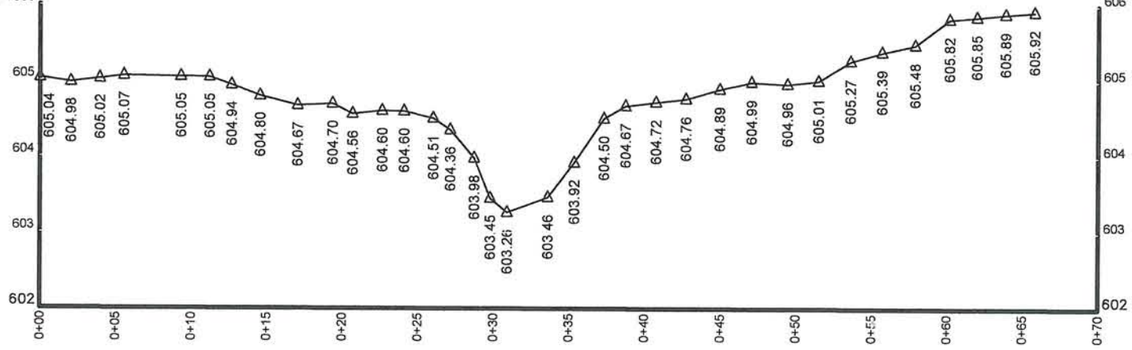
AS-BUILT SURVEY STREAM DATA: CHANNEL "U

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

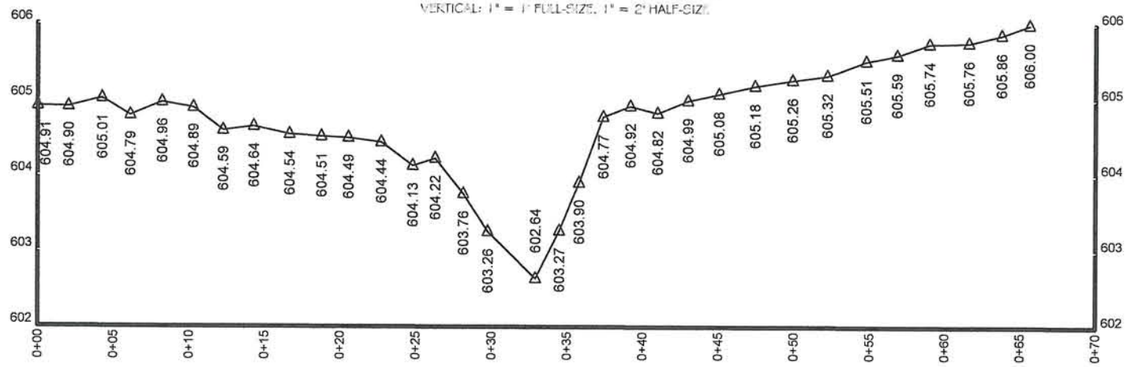
TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 4 OF 12

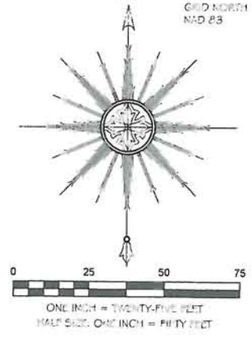




CROSS-SECTION 4 - RIFFLE
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE



CROSS-SECTION 5 - POOL
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE



LEGEND

1/2" IRON PIPE (SET BY DESIGNER)		CE	CONSERVATION EASEMENT
CONTROL POINT "KEE"			MINOR CONTOUR
LOG SILL			MAJOR CONTOUR
TREE		LOD	LIMITS OF DISTURBANCE
VALVE			EDGE OF WATER
PHOTO POINT			THALWEG
VEGETATION PLOT		TB	TOP OF BANK
RIFFLE			TREELINE
STREAM		NAD	NORTH AMERICAN DATUM
POND/ WATER		CPP	CORRUGATED PLASTIC PIPE
GRAVEL		INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

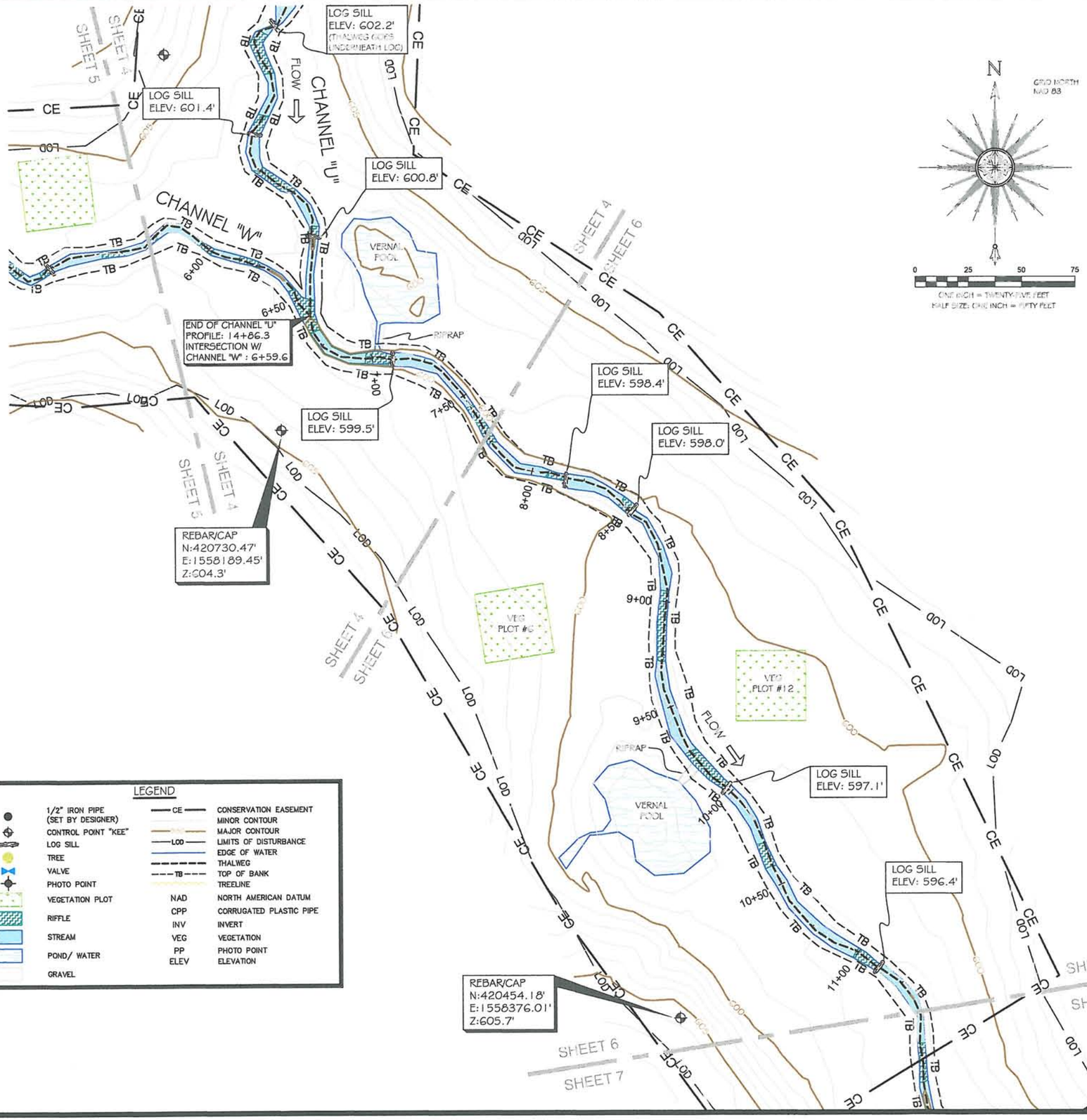
SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: CHANNEL "W"

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 5 OF 12



LEGEND

1/2" IRON PIPE (SET BY DESIGNER)		CE	CONSERVATION EASEMENT
CONTROL POINT "KEE"			MINOR CONTOUR
LOG SILL			MAJOR CONTOUR
TREE		LOD	LIMITS OF DISTURBANCE
VALVE			EDGE OF WATER
PHOTO POINT			THALWEG
VEGETATION PLOT		TB	TOP OF BANK
RIFFLE			TREELINE
STREAM		NAD	NORTH AMERICAN DATUM
POND/ WATER		CPP	CORRUGATED PLASTIC PIPE
GRAVEL		INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-3847 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

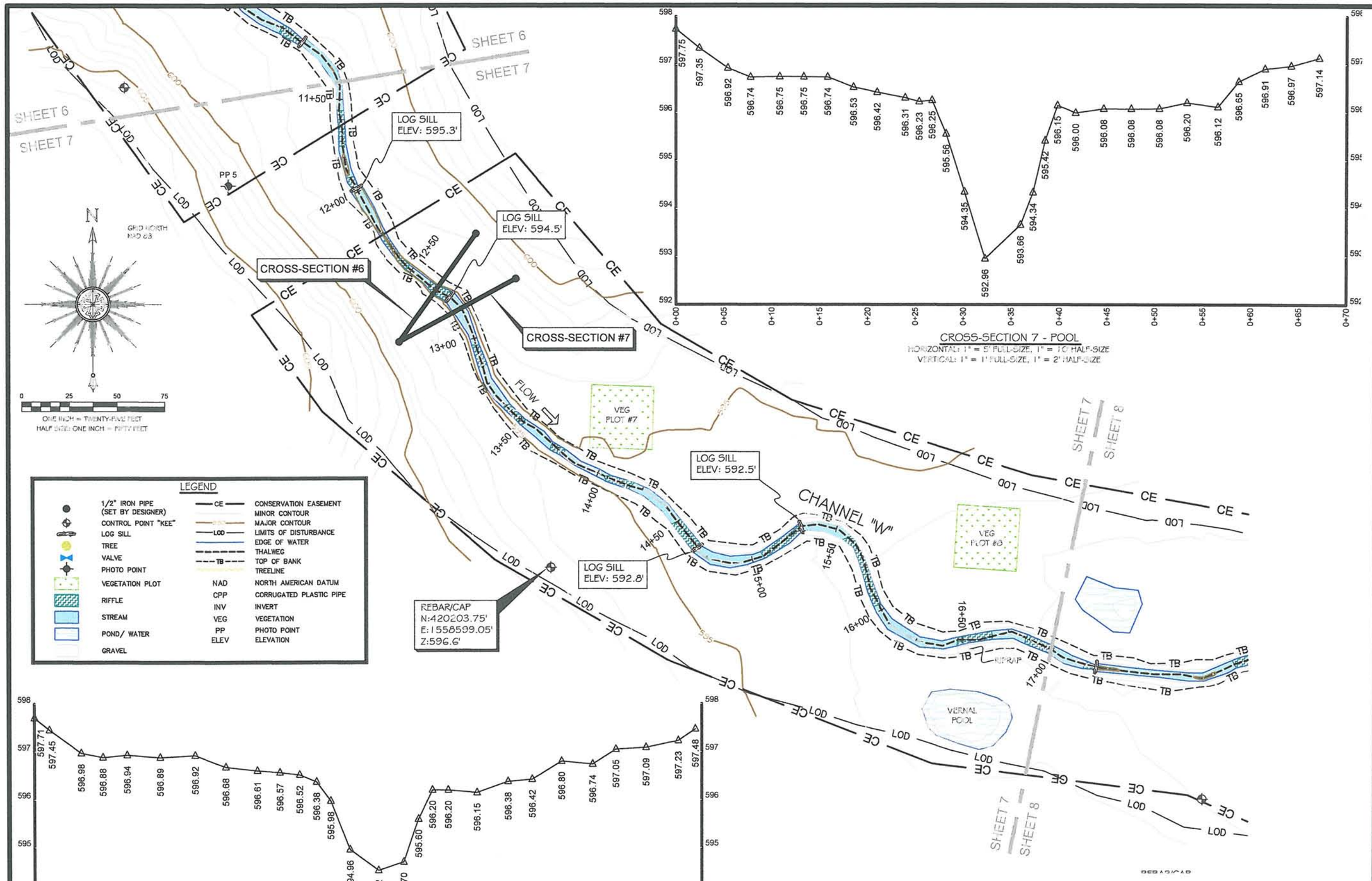
SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: CHANNEL "W"

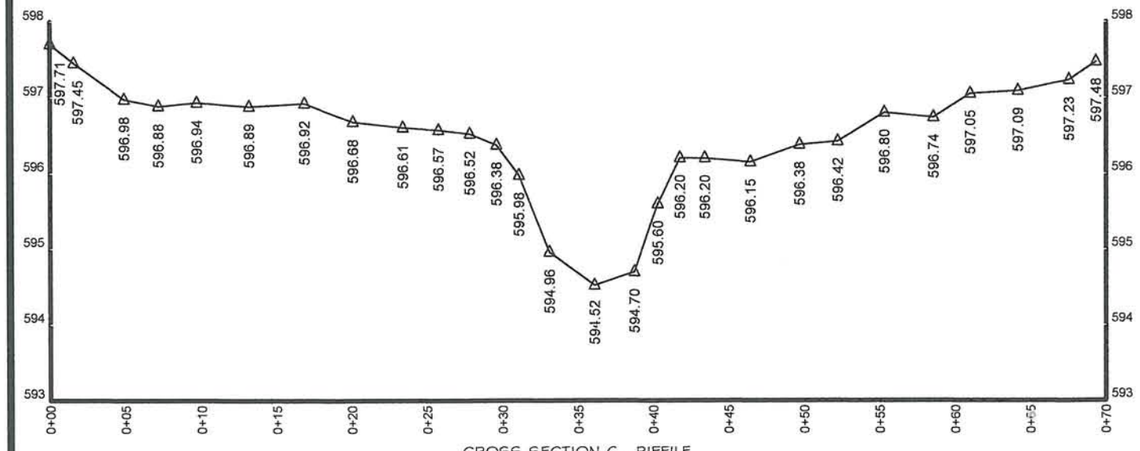
NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 6 OF 12



CROSS-SECTION 7 - POOL
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE



CROSS-SECTION 6 - RIFFLE
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4647 SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

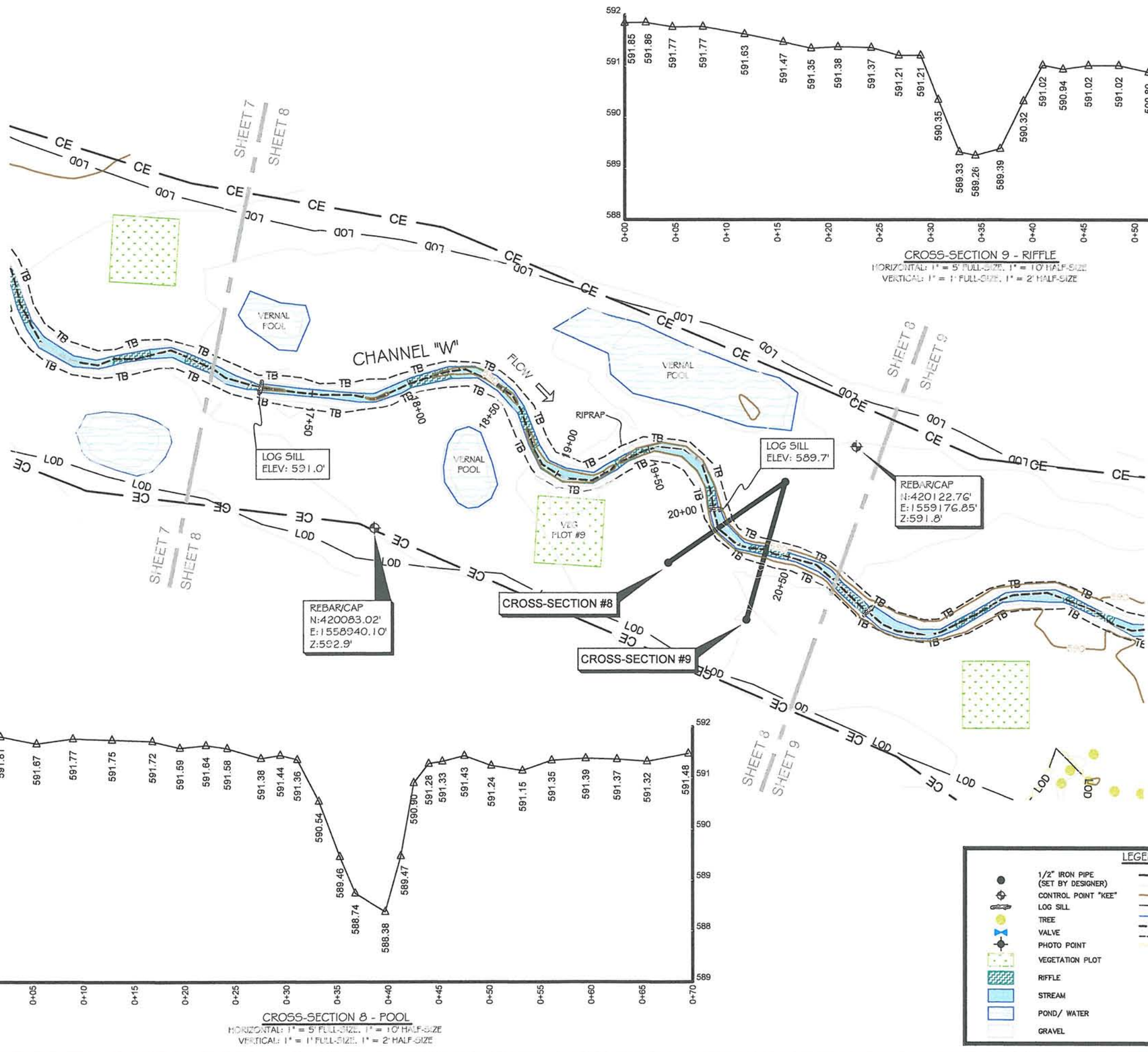
SHEET TITLE:

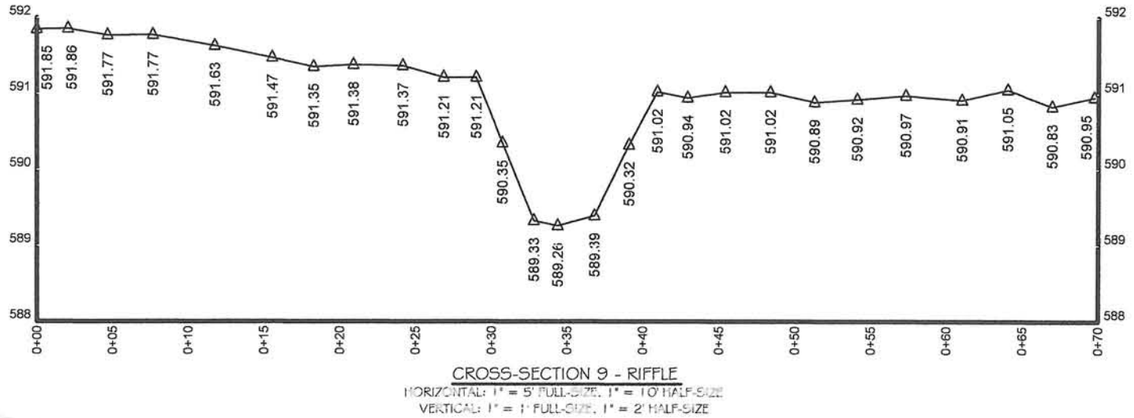
AS-BUILT SURVEY STREAM DATA: CHANNEL "W"

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 7 OF 12





CROSS-SECTION 9 - RIFFLE
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE

CROSS-SECTION 8 - POOL
HORIZONTAL: 1" = 5' FULL-SIZE, 1" = 10' HALF-SIZE
VERTICAL: 1" = 1' FULL-SIZE, 1" = 2' HALF-SIZE

LEGEND

	1/2" IRON PIPE (SET BY DESIGNER)	CE	CONSERVATION EASEMENT
	CONTROL POINT "KEE"		MINOR CONTOUR
	LOG SILL		MAJOR CONTOUR
	TREE	LOD	LIMITS OF DISTURBANCE
	VALVE		EDGE OF WATER
	PHOTO POINT		THALWEG
	VEGETATION PLOT	TB	TOP OF BANK
	RIFFLE		TREELINE
	STREAM	NAD	NORTH AMERICAN DATUM
	POND/ WATER	CPP	CORRUGATED PLASTIC PIPE
	GRAVEL	INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION

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License # C-3039

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 6485 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

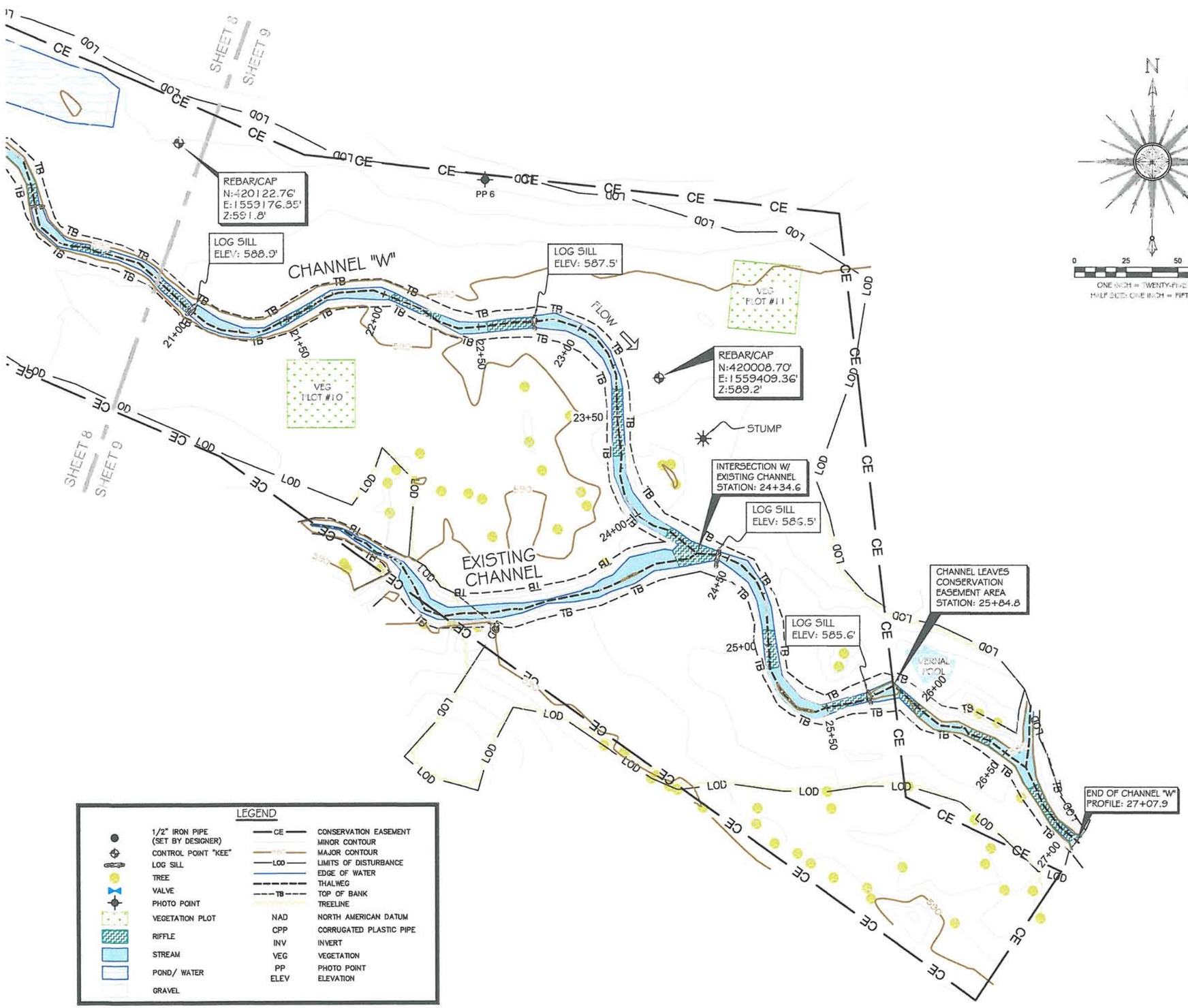
SHEET TITLE:

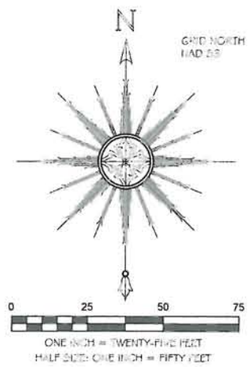
AS-BUILT SURVEY STREAM DATA: CHANNEL "W"

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 8 OF 12





LEGEND

	1/2" IRON PIPE (SET BY DESIGNER)	CE	CONSERVATION EASEMENT
	CONTROL POINT "KEE"		MINOR CONTOUR
	LOG SILL		MAJOR CONTOUR
	TREE	LOD	LIMITS OF DISTURBANCE
	VALVE		EDGE OF WATER
	PHOTO POINT		THALWEG
	VEGETATION PLOT	TB	TOP OF BANK
	RIFFLE		TREELINE
	STREAM	NAD	NORTH AMERICAN DATUM
	POND/ WATER	CPP	CORRUGATED PLASTIC PIPE
	GRAVEL	INV	INVERT
		VEG	VEGETATION
		PP	PHOTO POINT
		ELEV	ELEVATION

Kee
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License # C-3039

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 4347 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

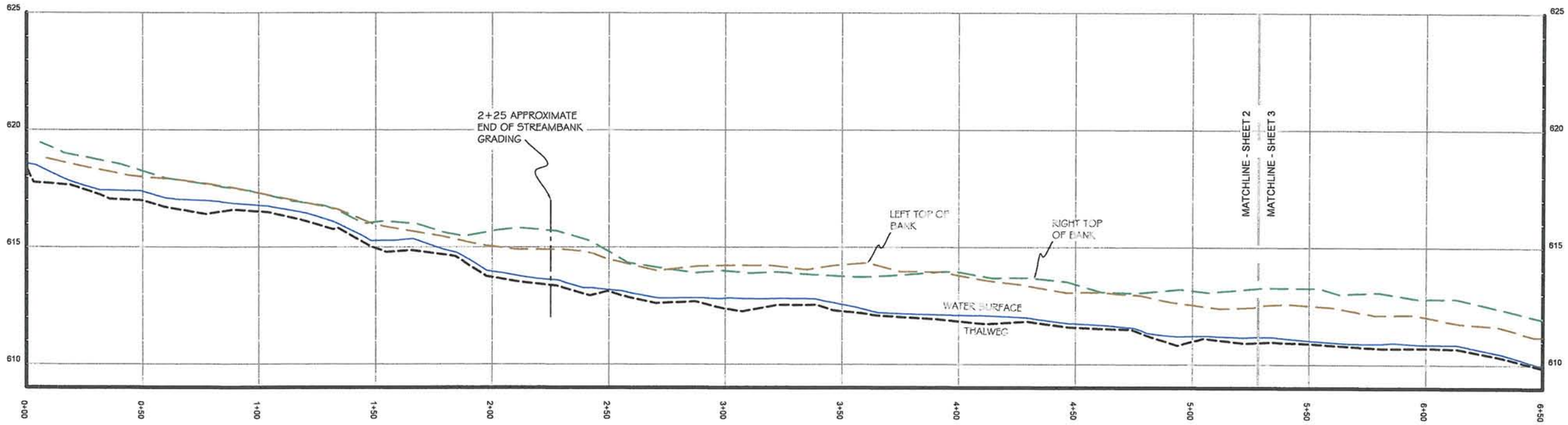
SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: CHANNEL "W"

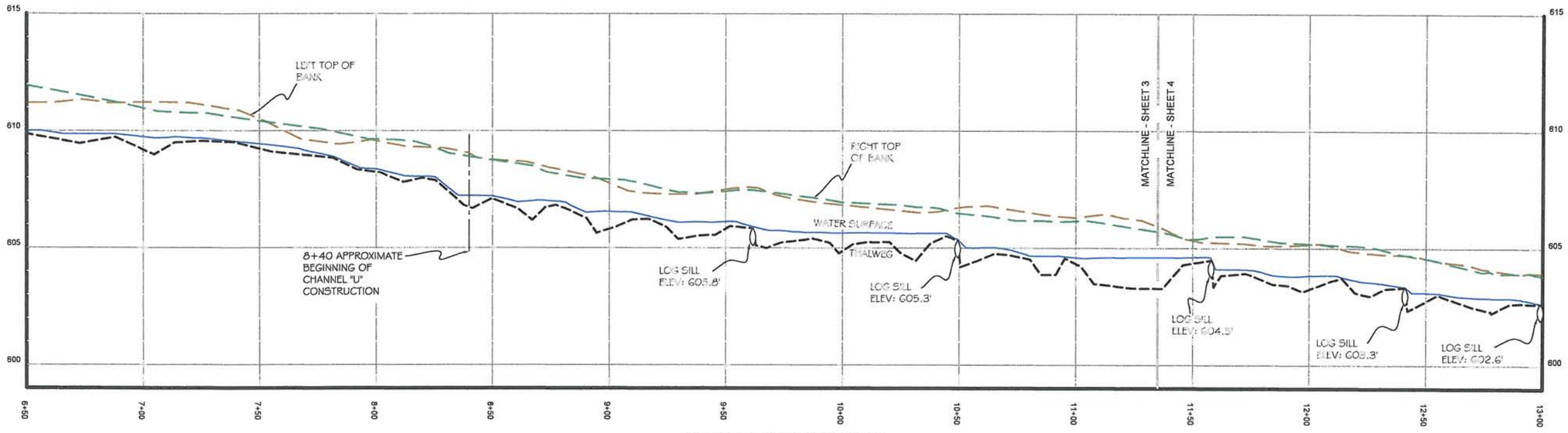
NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP:	BUFORD
COUNTY:	UNION
STATE:	NORTH CAROLINA
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY:	NH, KP
SURVEY DATES:	05/01/13 – 05/10/13
SCALE:	AS SHOWN
SHEET SIZE: 22" X 34"	JOB: #130425

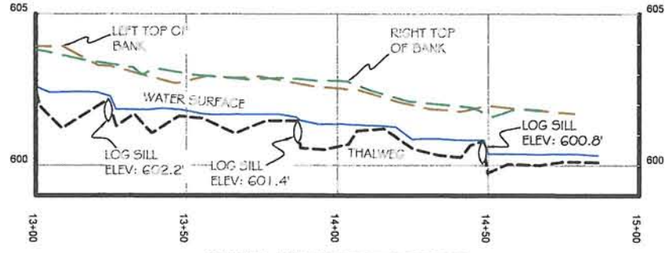
SHEET: 9 OF 12



CHANNEL "U" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE



CHANNEL "U" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE



CHANNEL "U" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE

Kee MAPPING & SURVEYING
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4247 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

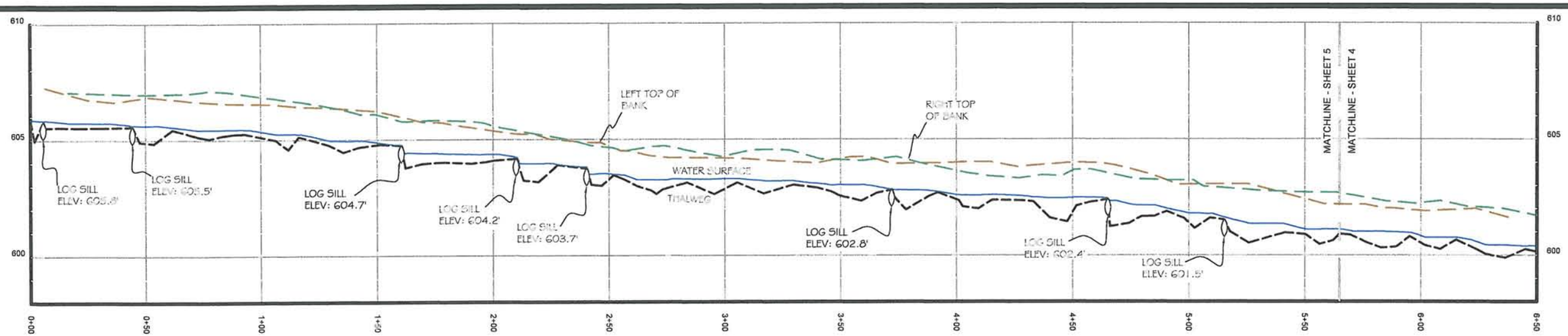
SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: PROFILES

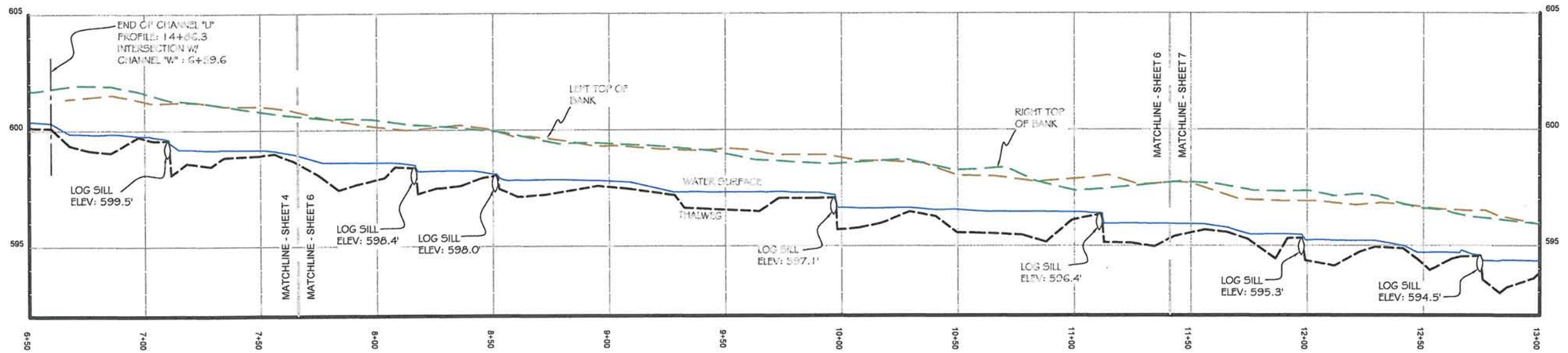
NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

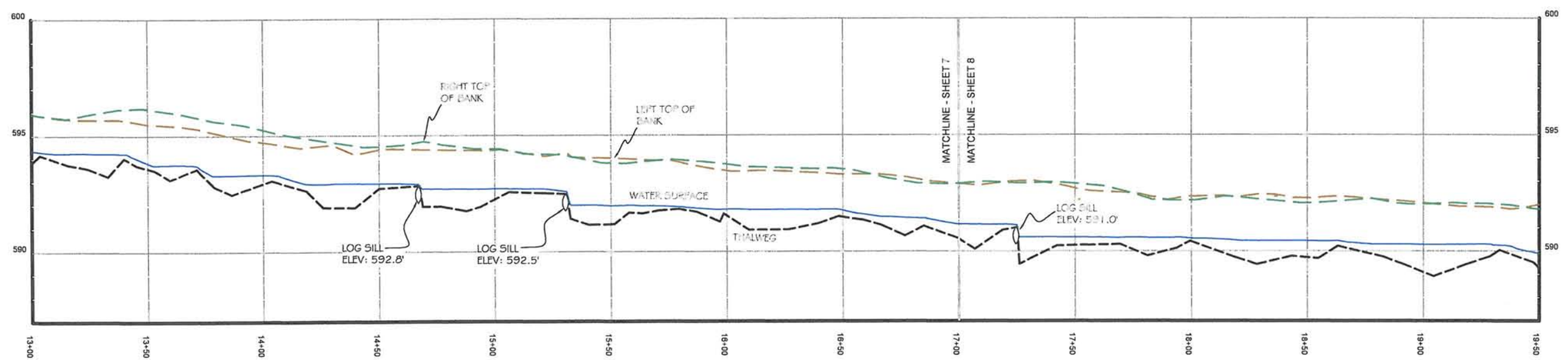
SHEET: 10 OF 12



CHANNEL "W" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE



CHANNEL "W" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE



CHANNEL "W" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE

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License # C-3039

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4048 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

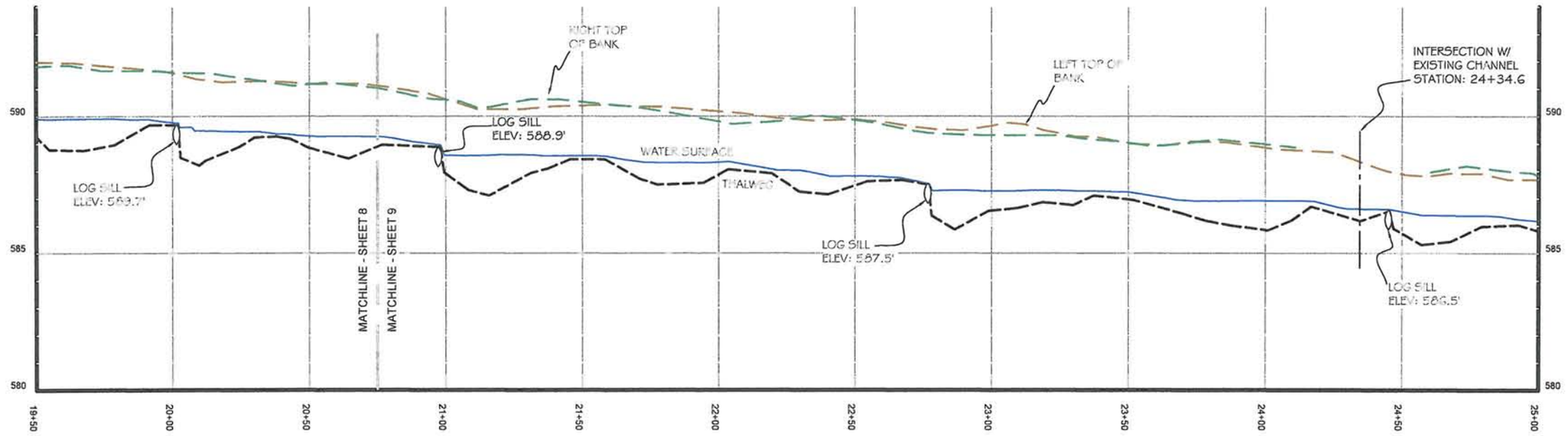
SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: PROFILES

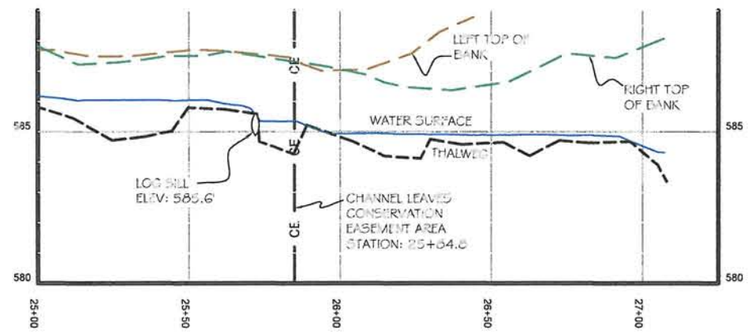
NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

SHEET: 11 OF 12



CHANNEL "W" LONGITUDINAL PROFILE
HORIZONTAL: 1" = 25' FULL-SIZE, 1" = 50' HALF-SIZE
VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE



CHANNEL "W" LONGITUDINAL PROFILE
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VERTICAL: 1" = 2.5' FULL-SIZE, 1" = 5' HALF-SIZE

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL L-4337 LAND SURVEYOR PHILLIP B. KEE

PLEASE REFER TO THE COVERSHEET FOR THE STATEMENT OF CERTIFICATION

#	DATE	REVISIONS

AN AS-BUILT SURVEY FOR:

ENVIRONMENTAL BANC & EXCHANGE, LLC.

909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

PROJECT:

601 NORTH II STREAM RESTORATION

SPO FILE NUMBER: 10-00-249-76

EEP PROJECT ID: 95025

SHEET TITLE:

AS-BUILT SURVEY STREAM DATA: PROFILES

NOTE: SEE SHEET #1 FOR SURVEYOR'S NOTES

TOWNSHIP: BUFORD	
COUNTY: UNION	
STATE: NORTH CAROLINA	
DRAWN BY: EC, NH	CHECKED BY: PBK
SURVEY BY: NH, KP	
SURVEY DATES: 05/01/13 – 05/10/13	
SCALE: AS SHOWN	
SHEET SIZE: 22" X 34"	JOB: #130425

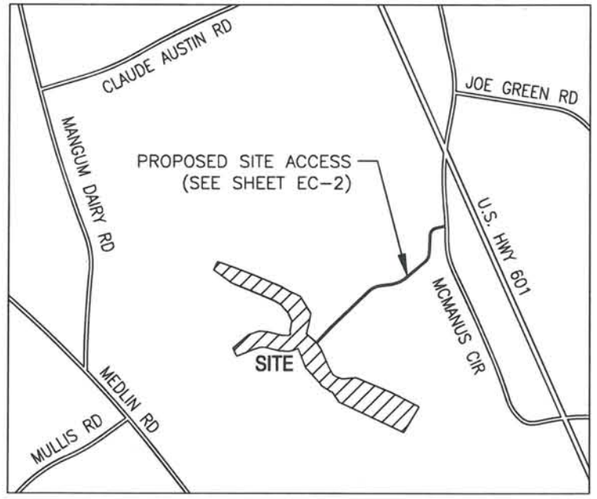
SHEET: 12 OF 12

APPENDIX G: RECORD DRAWINGS

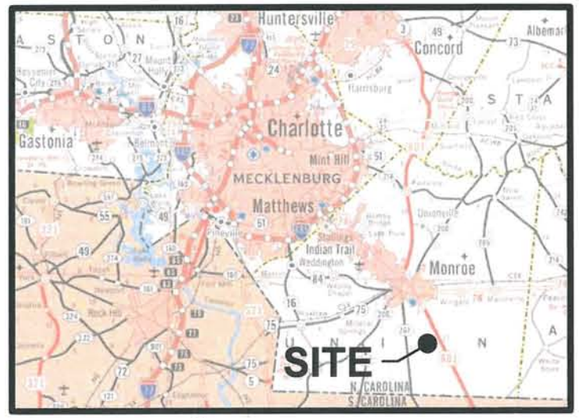
PROJECT: 601 NORTH II STREAM RESTORATION

601 NORTH II STREAM RESTORATION

UNION COUNTY, NORTH CAROLINA



VICINITY MAP
NOT TO SCALE



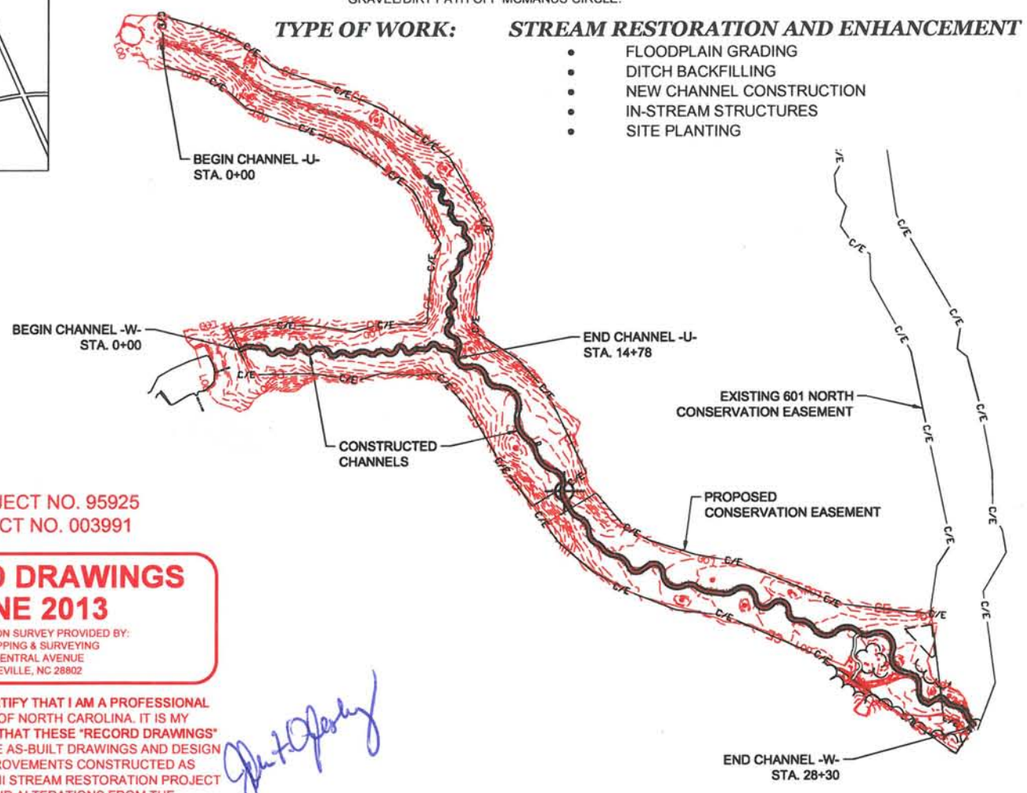
LOCATION MAP
NOT TO SCALE

LOCATION:

SITE IS LOCATED IN UNION COUNTY APPROXIMATELY 10 MILES SOUTHEAST OF MONROE, NEAR ROUTE 601. ACCESS TO SITE IS PROVIDED BY WAY OF GRAVEL/DIRT PATH OFF MCMANUS CIRCLE.

TYPE OF WORK: **STREAM RESTORATION AND ENHANCEMENT**

- FLOODPLAIN GRADING
- DITCH BACKFILLING
- NEW CHANNEL CONSTRUCTION
- IN-STREAM STRUCTURES
- SITE PLANTING



NC GRID NAD83

SITE LOCATION POINT:
(HORIZONTAL DATUM: NCGS NAD83)

N420425.00
E1558495.00

SHEET INDEX	
SHT #	SHEET TITLE
01	COVER SHEET & SHEET INDEX
02	OVERALL SITE PLAN
03	WICKER BRANCH PLAN & PROFILE
04	WICKER BRANCH PLAN &PROFILE
05	WICKER BRANCH PLAN & PROFILE
06	WICKER BRANCH PLAN & PROFILE
07	WICKER BRANCH PLAN & PROFILE
08	UT TO WICKER PLAN & PROFILE
09	UT TO WICKER PLAN & PROFILE
10	UT TO WICKER PLAN & PROFILE
11	WICKER CROSS SECTIONS
12	WICKER CROSS SECTIONS
13	WICKER CROSS SECTIONS
14	WICKER CROSS SECTIONS
15	UT TO WICKER CROSS SECTIONS

EEP PROJECT NO. 95925
CONTRACT NO. 003991

RECORD DRAWINGS
JUNE 2013

DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

"I, JOHN F. OGLESBY, CERTIFY THAT I AM A PROFESSIONAL ENGINEER IN THE STATE OF NORTH CAROLINA. IT IS MY PROFESSIONAL OPINION THAT THESE "RECORD DRAWINGS" ADEQUATELY DEPICT THE AS-BUILT DRAWINGS AND DESIGN DRAWINGS FOR THE IMPROVEMENTS CONSTRUCTED AS PART OF THE 601 NORTH II STREAM RESTORATION PROJECT AND THAT DEVIATIONS AND ALTERATIONS FROM THE APPROVED DESIGN ARE SHOWN CORRECTLY."

STREAM CONSTRUCTION OVERVIEW:

STREAM LENGTH
EXISTING: 4,190 LINEAR FEET
PROPOSED: 4,248 LINEAR FEET
CONSTRUCTED: 4,194 LINEAR FEET

STREAM VOLUMES CONSTRUCTION OVERVIEW:

BASE	COMPARSION	CUT (cuyd)	FILL (cuyd)	NET (cuyd)
EXISTING	PROPOSED	3790.38	4438.43	648.05 (F)
EXISTING	AS-BUILT	5519.31	8718.72	3199.41(F)
PROPOSED	AS-BUILT	3839.36	6458.56	2619.2 (F)

*(F) FILL REQUIRED TO COMPLETE THE CONSTRUCTION

CONSERVATION EASEMENT AREA: 12.3 ACRES

AREA OF DISTURBANCE: 13.9 ACRES (PROPOSED)
13.2 ACRES (AS-BUILT)

FOREST PLANTING: 11.7 ACRES (PROPOSED)
11.7 ACRES (AS-BUILT)

No.	Revisions	Date

Prepared in the office of:
ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

PROJECT ENGINEER: JOHN F. OGLESBY, P.E.

PROJECT MANAGER: JIM COOPER

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 32721 ENGINEER JOHN F. OGLESBY

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

Prepared for:

EBX

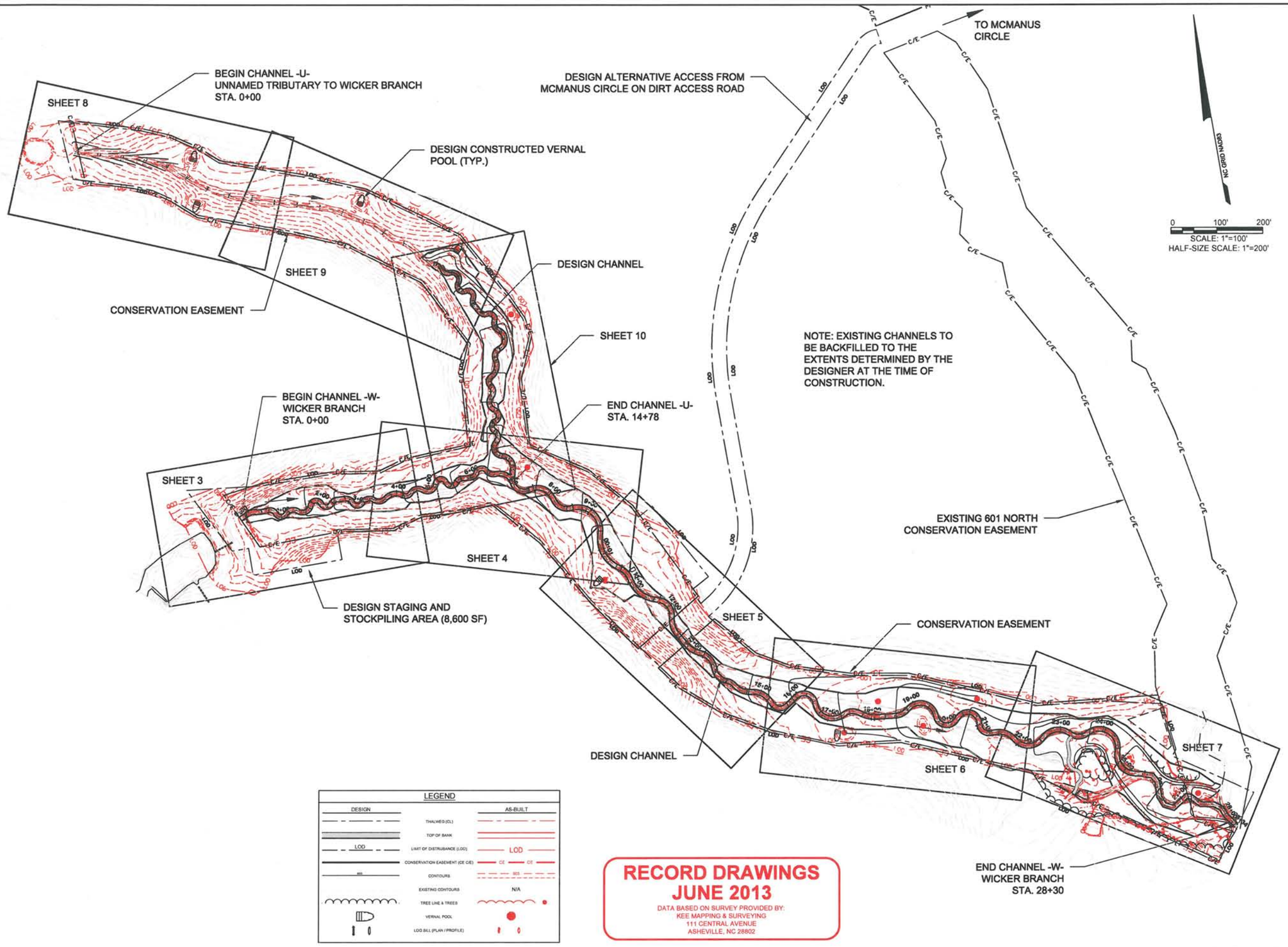
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Dsn. By:	Dwn. By:	Ckd. By:
JWG	RDM	JWG/JFO JDC/MCG

Date: JUNE 2013

ATKINS Project No.: 100024976

SHEET 01



LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRUBANCE (LOD)	LOD
	CONSERVATION EASEMENT (CE CE)	CE CE
600	CONTOURS	605
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

RECORD DRAWINGS
JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

NORTH CAROLINA PROFESSIONAL SEAL 03272 ENGINEER JOHN F. OGLESBY
JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

Client:
EBX
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:

601 NORTH II STREAM RESTORATION

UNION COUNTY, NORTH CAROLINA

Title:

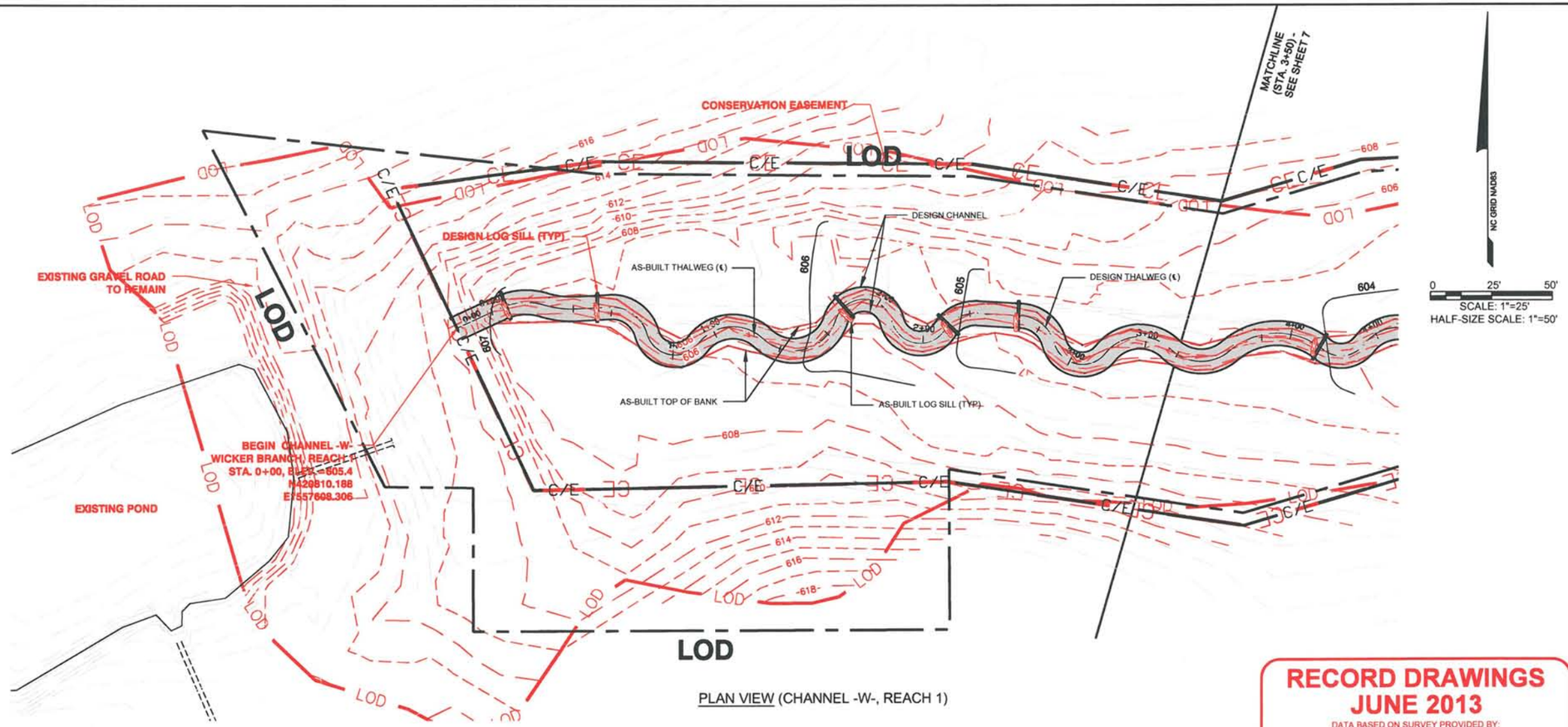
OVERALL SITE PLAN

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013

Scale: AS SHOWN

Project No.: 100024976

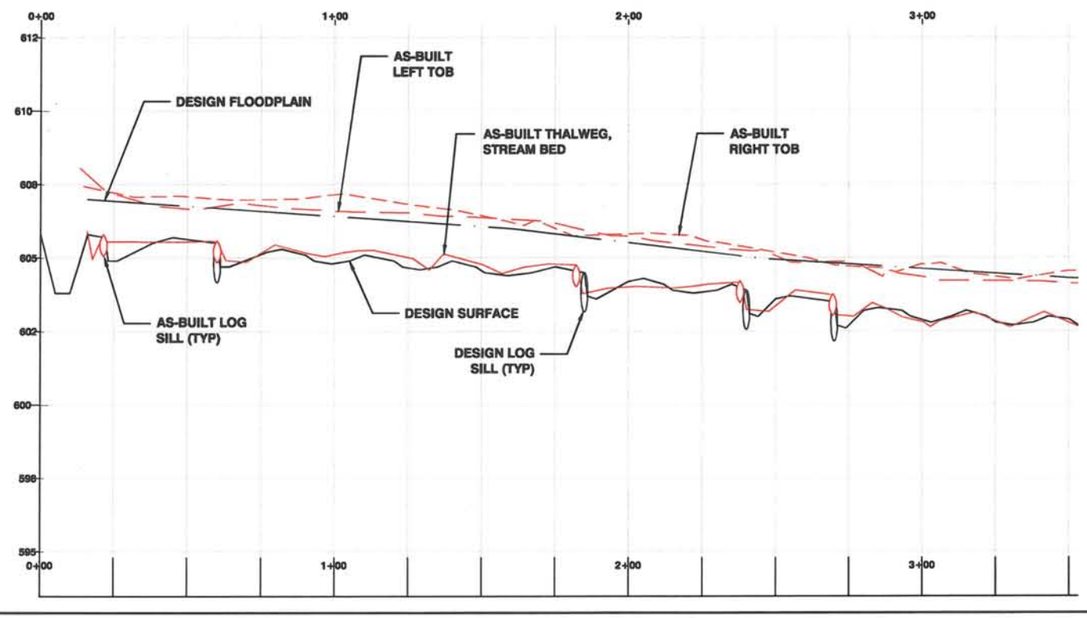
SHEET 02



PLAN VIEW (CHANNEL -W-, REACH 1)

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRUBANCE (LOD)	LOD LOD
C/E	CONSERVATION EASEMENT (CE C/E)	
600	CONTOURS	600
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	



PROFILE VIEW (CHANNEL -W-, REACH 1)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

RECORD DRAWINGS JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 03272 ENGINEERING

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

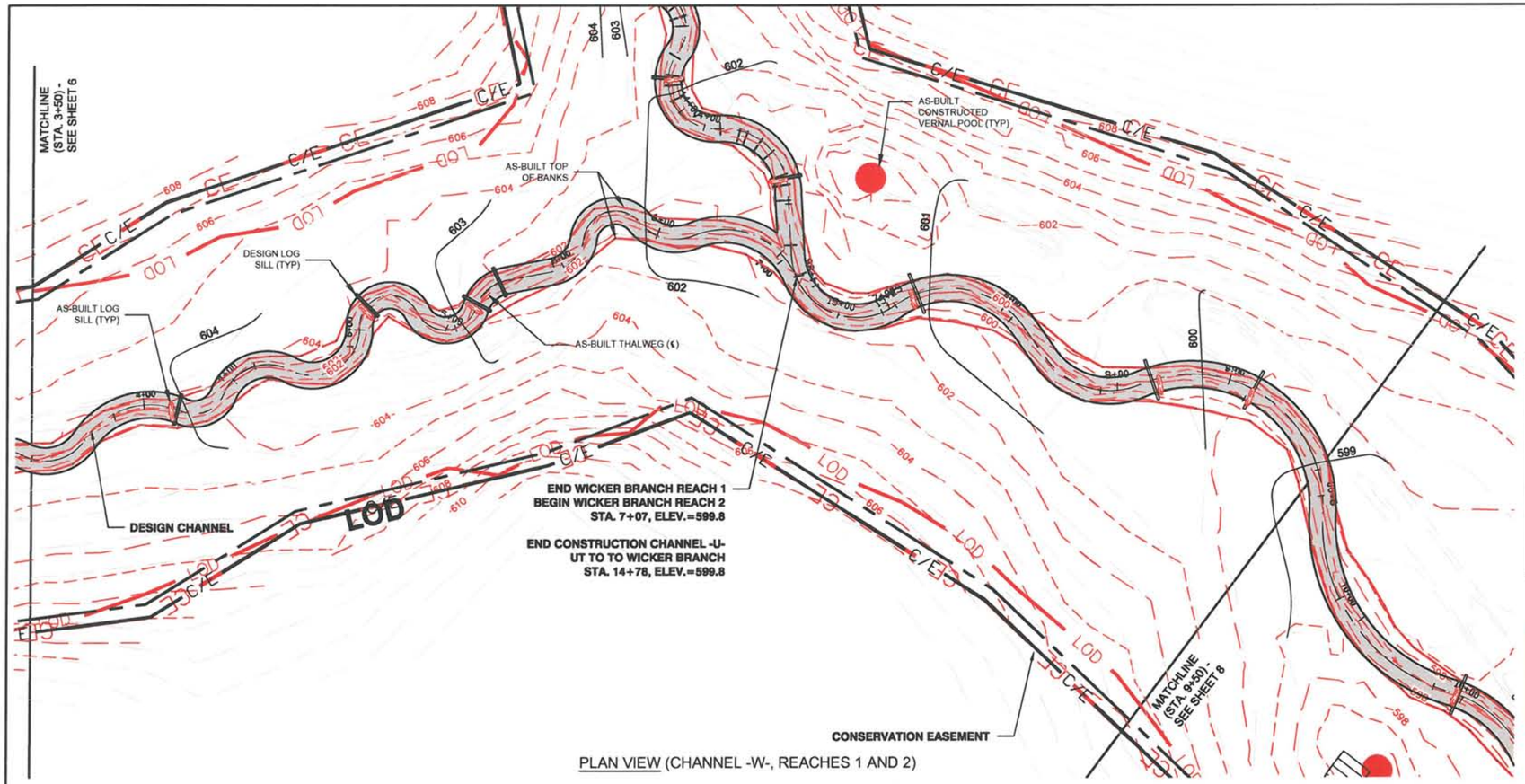
Client:
EBX
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

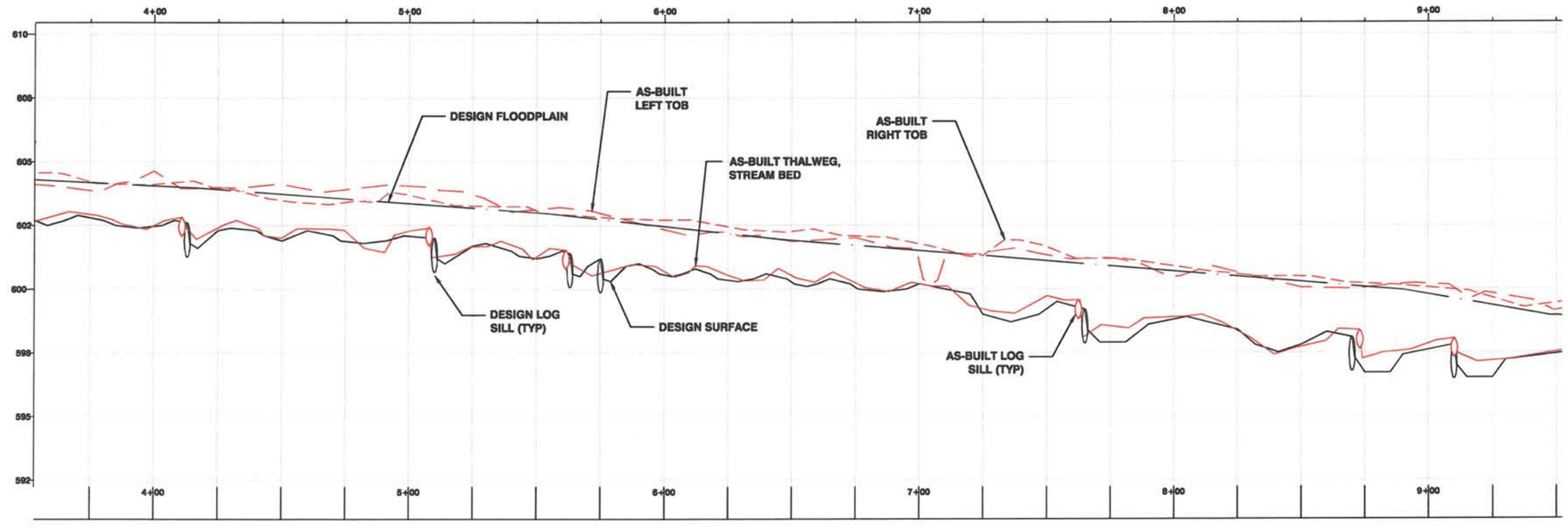
Title:
WICKER BRANCH PLAN & PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

SHEET
03



PLAN VIEW (CHANNEL -W-, REACHES 1 AND 2)



PROFILE VIEW
(CHANNEL -W-, REACHES 1 AND 2)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

NC GRID NADAS

0 25' 50'
SCALE: 1"=25'
HALF-SIZE SCALE: 1"=50'

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRUBANCE (LOD)	LOD LOD
C/E	CONSERVATION EASEMENT (CE C/E)	
603	CONTOURS	603
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

RECORD DRAWINGS
JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

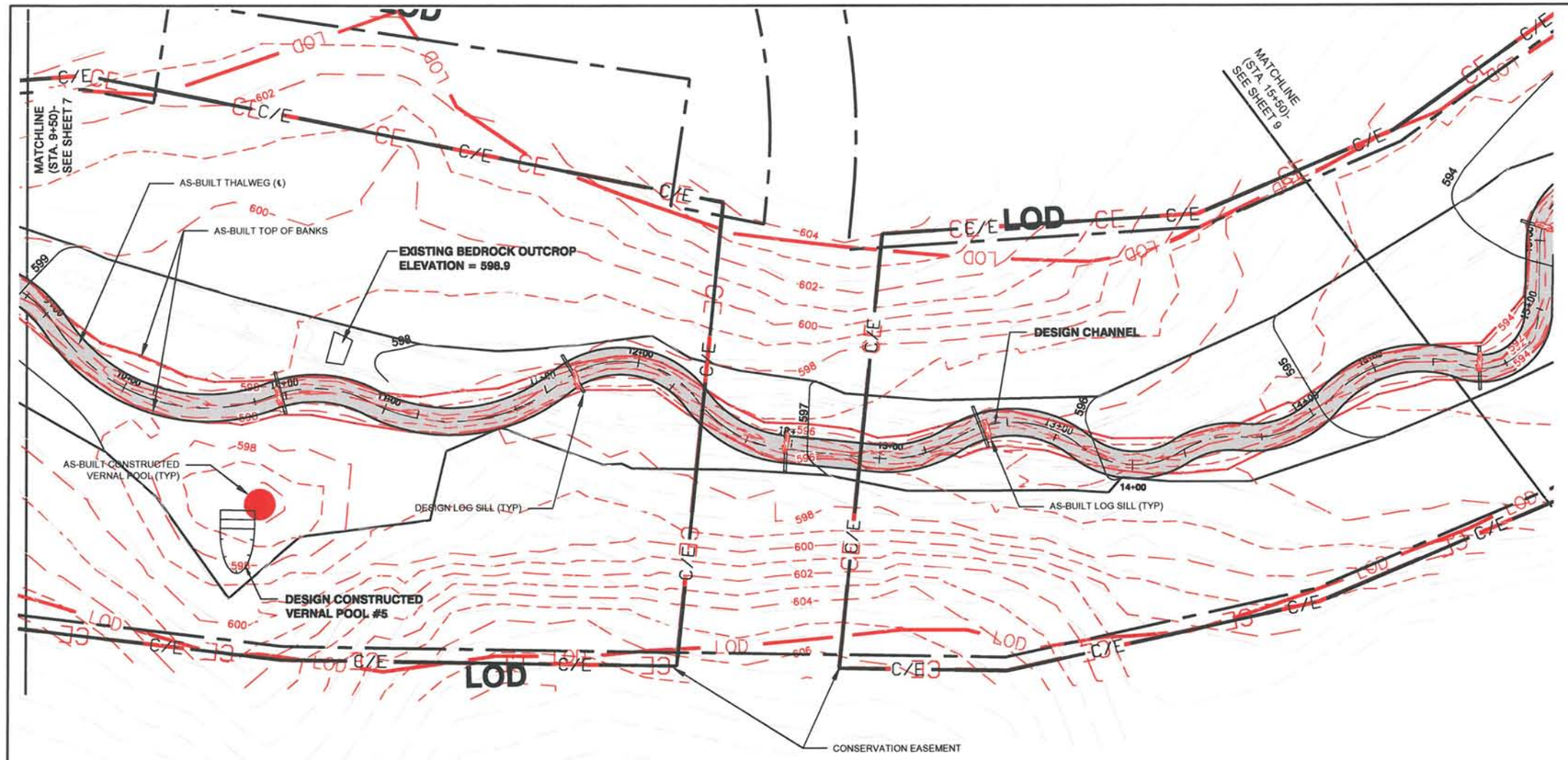
Client:
EBX
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

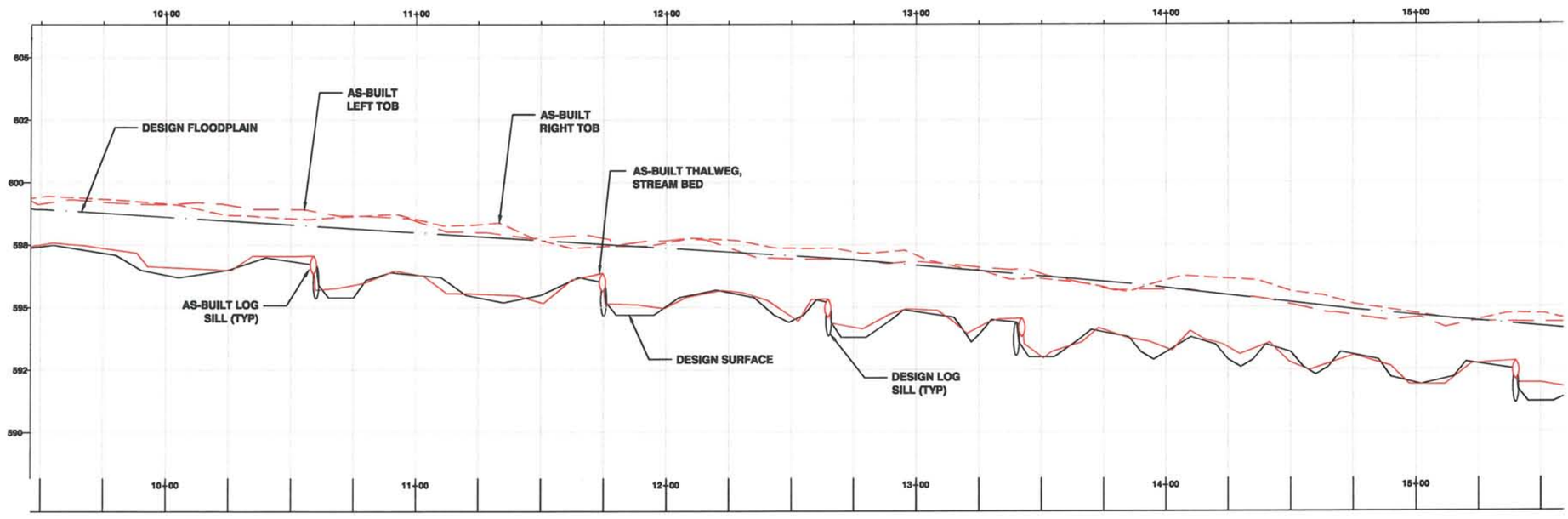
Title:
WICKER BRANCH PLAN &PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale:	AS SHOWN
Project No.:	100024976

SHEET
04



PLAN VIEW (CHANNEL -W-, REACH 2)



PROFILE VIEW (CHANNEL -W-, REACH 2)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRIBUTANCE (LOD)	LOD LOD
CE	CONSERVATION EASEMENT (CE CE)	
605	CONTOURS	605
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

RECORD DRAWINGS JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
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111 CENTRAL AVENUE
ASHEVILLE, NC 28802

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TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

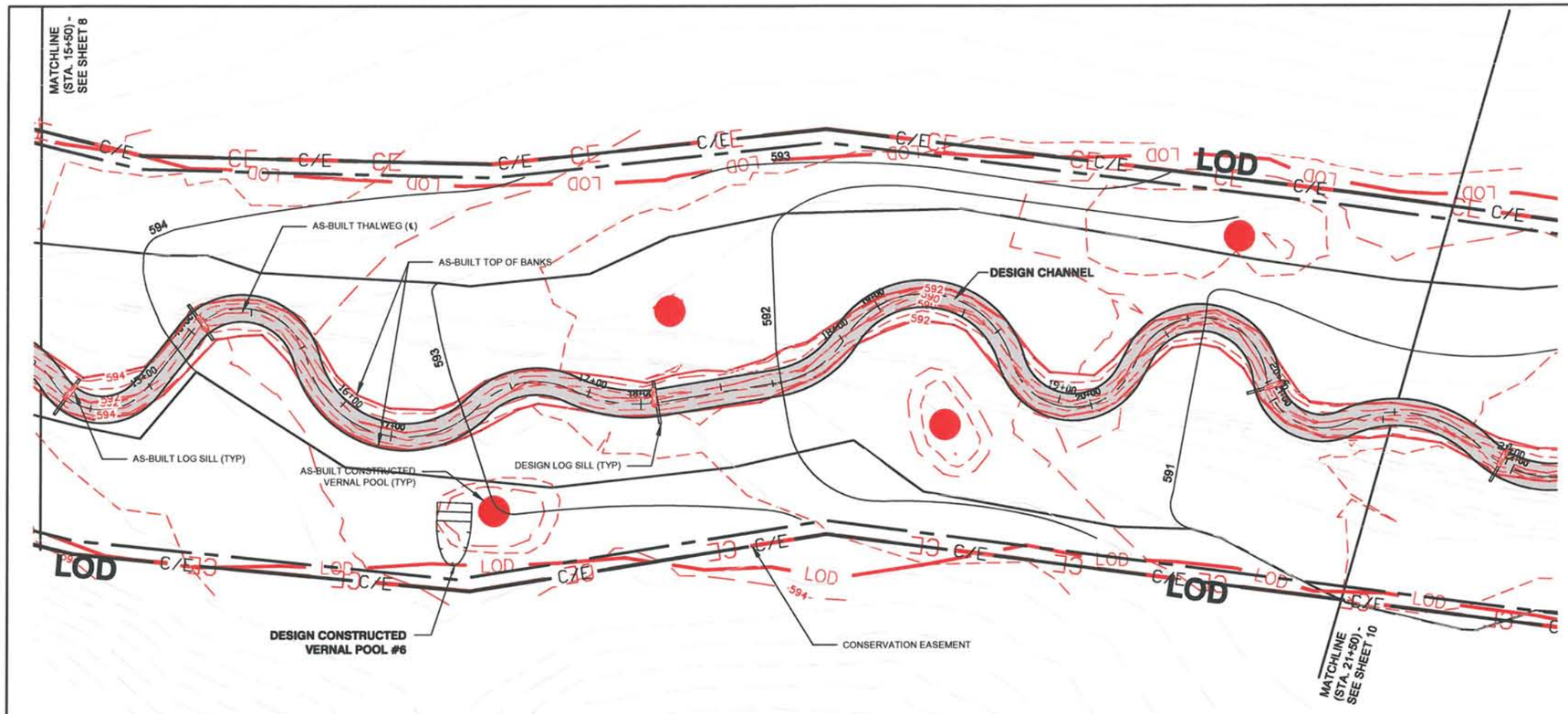
Client:
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

Title:
WICKER BRANCH PLAN & PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

SHEET
05



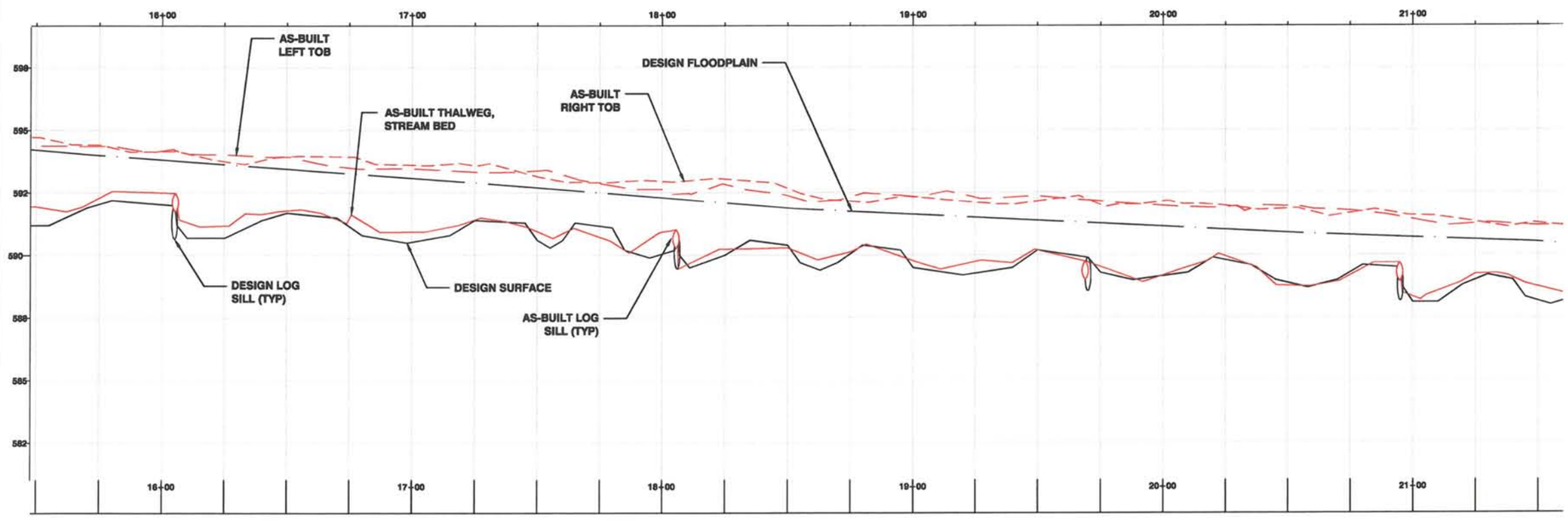
0 25' 50'
SCALE: 1"=25'
HALF-SIZE SCALE: 1"=50'

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRUBANCE (LOD)	LOD LOD
C/E	CONSERVATION EASEMENT (CE C/E)	
593	CONTOURS	593
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

RECORD DRAWINGS
JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

PLAN VIEW (CHANNEL -W-, REACH 2)



PROFILE VIEW
(CHANNEL -W-, REACH 2)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

Client:

ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:

601 NORTH II STREAM RESTORATION

UNION COUNTY, NORTH CAROLINA

Title:

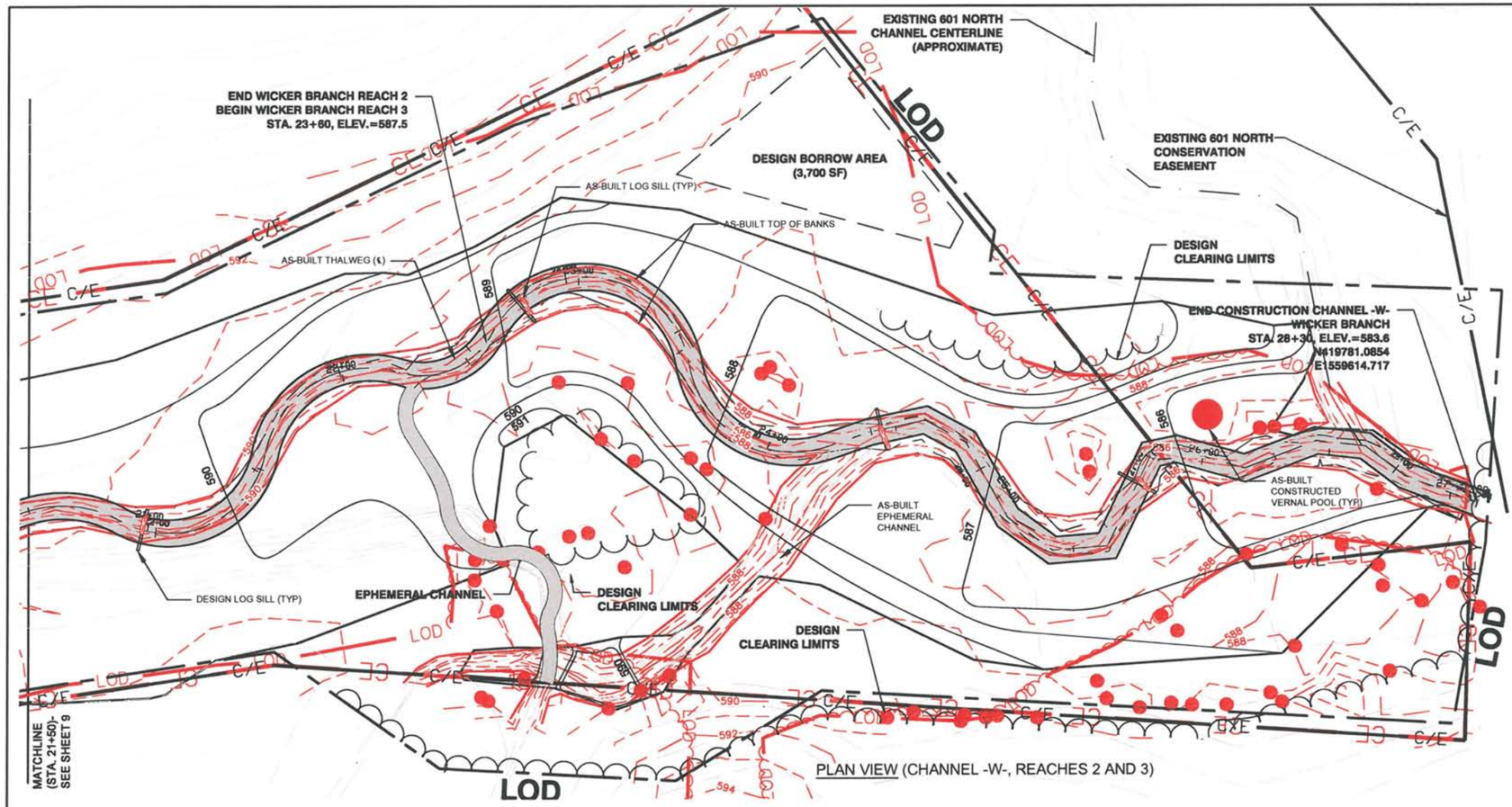
WICKER BRANCH PLAN & PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By:	Date:
JWG/JFO MCG/JDC	JUNE 2013

Scale: AS SHOWN

Project No.: 100024976

SHEET 06



RECORD DRAWINGS
JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

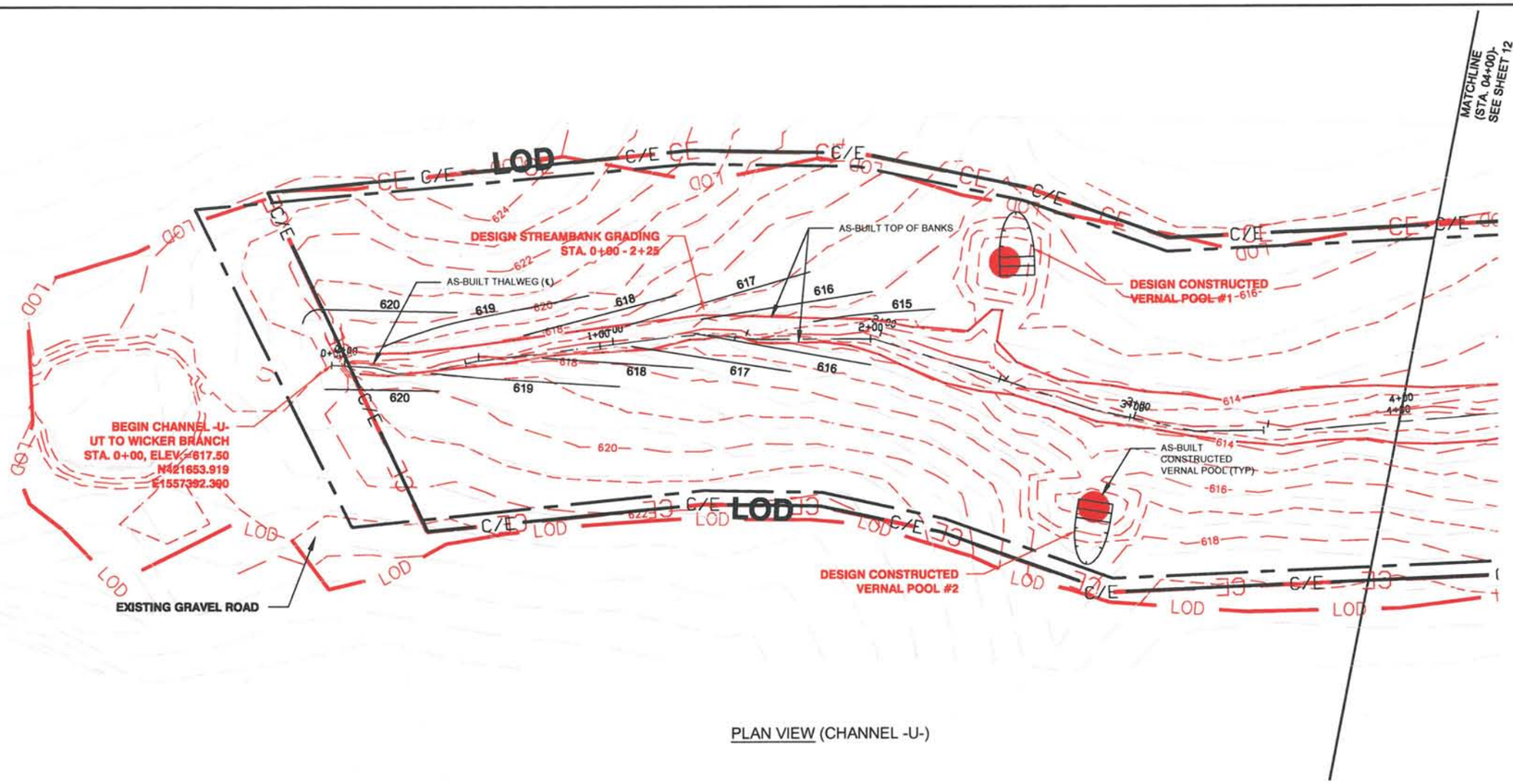
Client:
EBX
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

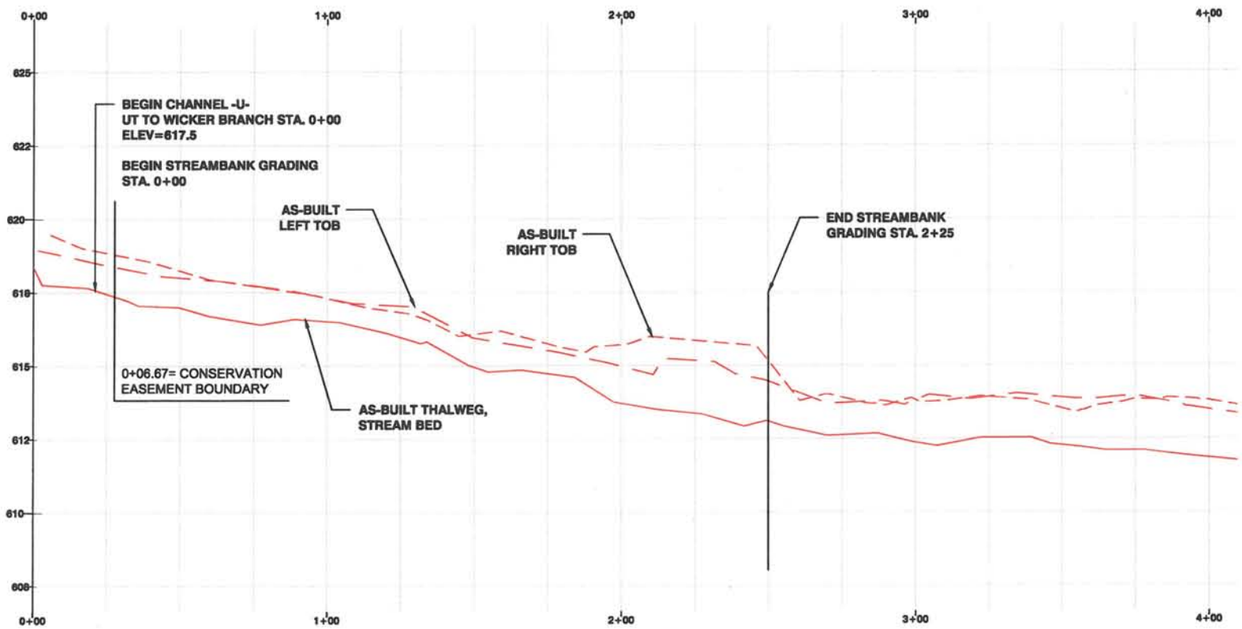
Title:
WICKER BRANCH PLAN & PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

SHEET
07



PLAN VIEW (CHANNEL -U-)



PROFILE VIEW (CHANNEL -U-)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

0 25' 50'
SCALE: 1"=25'
HALF-SIZE SCALE: 1"=50'

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRIBUANCE (LOD)	LOD LOD
C/E	CONSERVATION EASEMENT (CE C/E)	
600	CONTOURS	600
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

RECORD DRAWINGS
JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
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ASHEVILLE, NC 28802

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1616 EAST MILLBROOK ROAD
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RALEIGH, NC 27609
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FAX: (919) 876-6848

Revisions:

MARY CARLTON OGLESBY
PROFESSIONAL ENGINEER
SEAL 032721
JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 032721

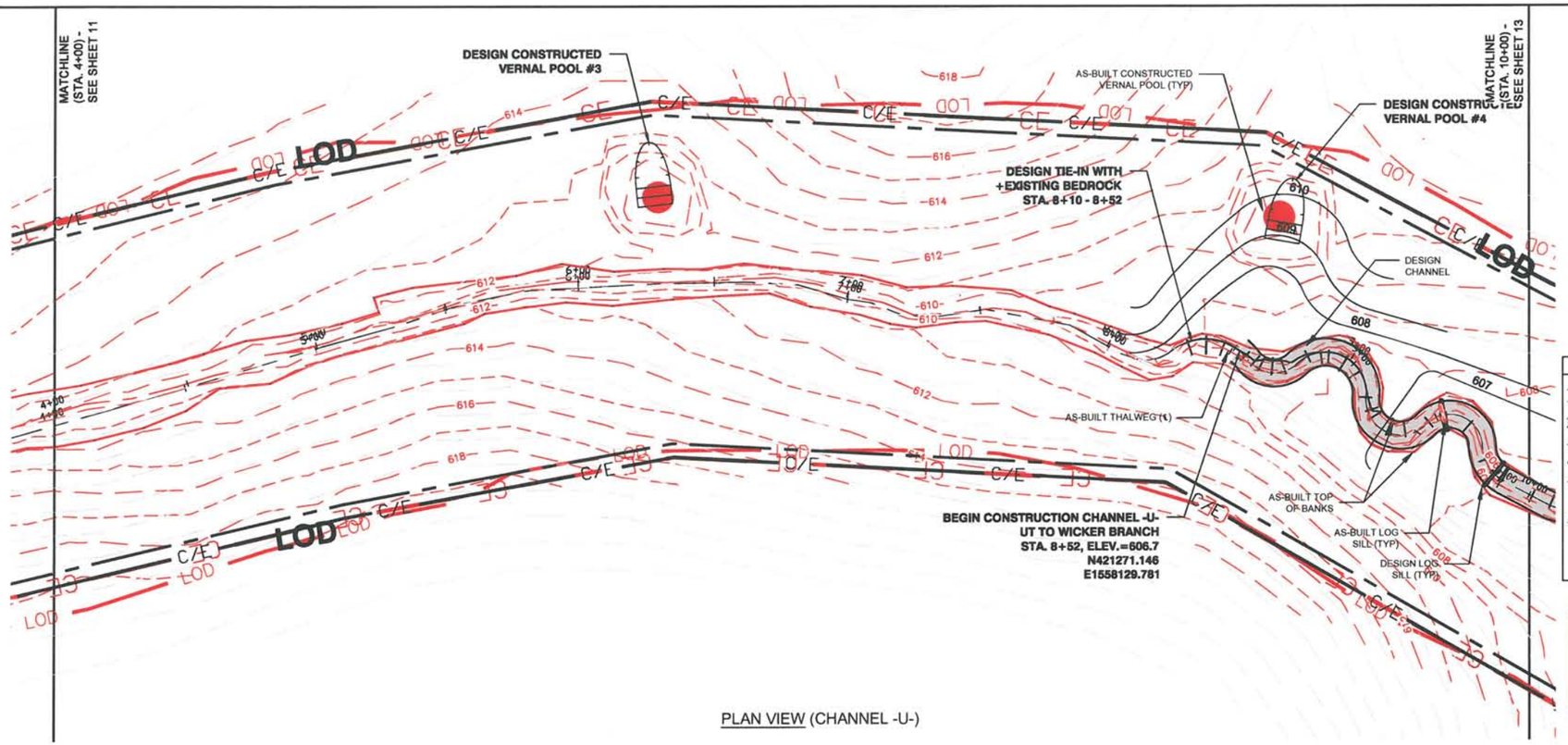
Client:
EBX
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

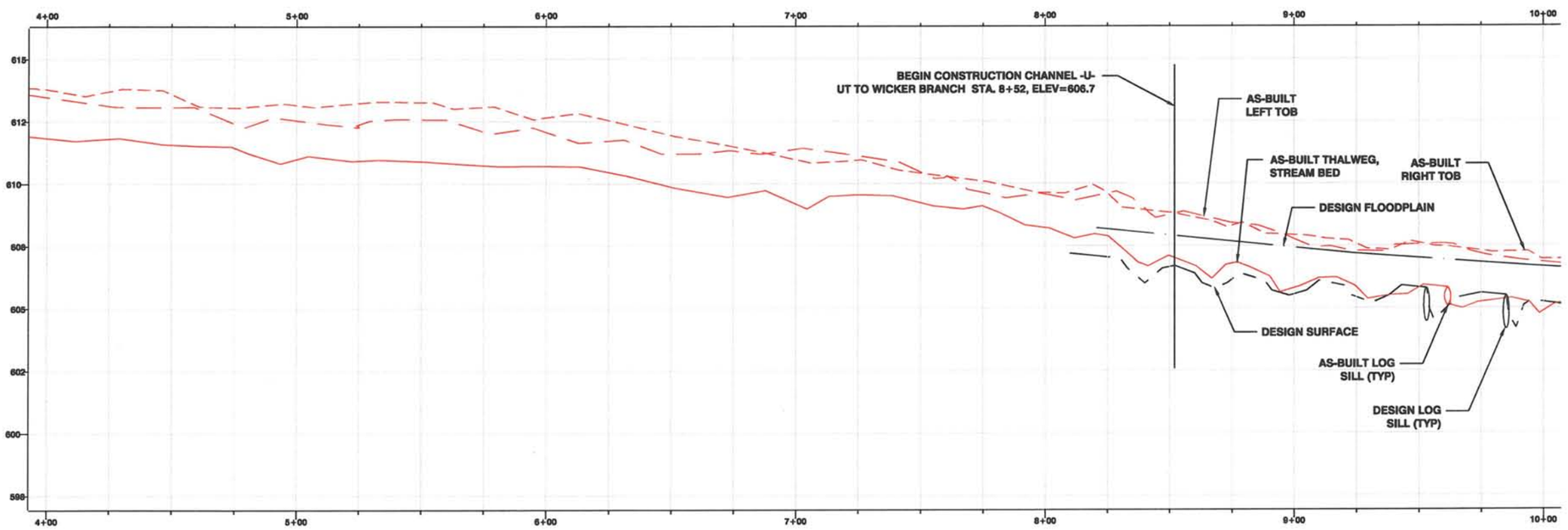
Title:
UT TO WICKER PLAN & PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

SHEET
08



PLAN VIEW (CHANNEL -U-)



PROFILE VIEW (CHANNEL -U-)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

SCALE: 1"=25'
HALF-SIZE SCALE: 1"=50'

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRUBANCE (LOD)	LOD LOD
C/E	CONSERVATION EASEMENT (CE C/E)	
605	CONTOURS	605
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

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JUNE 2013
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FAX: (919) 876-6848

Revisions:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039721 JOHN F. OGLESBY

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

Client:
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:

601 NORTH II STREAM RESTORATION

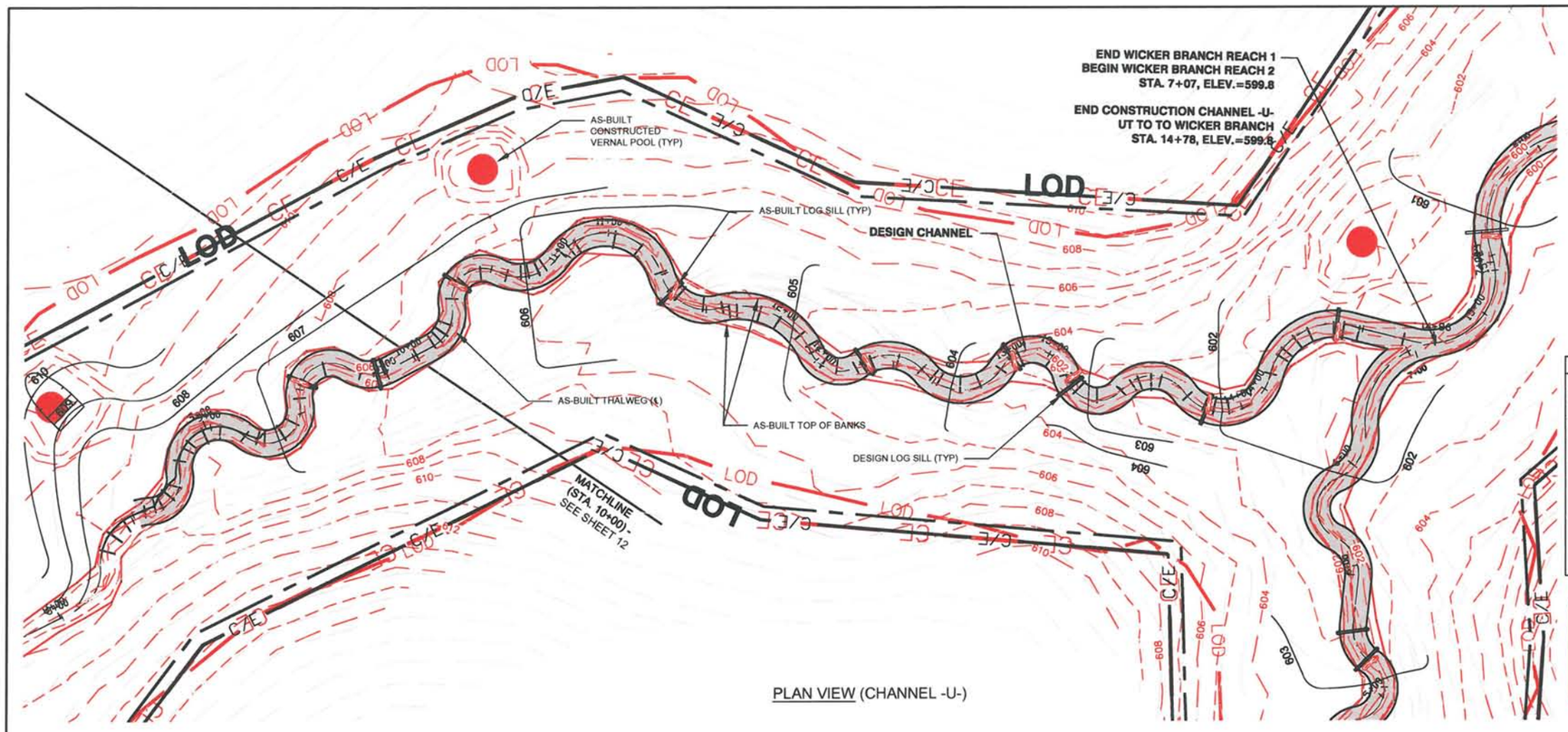
UNION COUNTY, NORTH CAROLINA

Title:

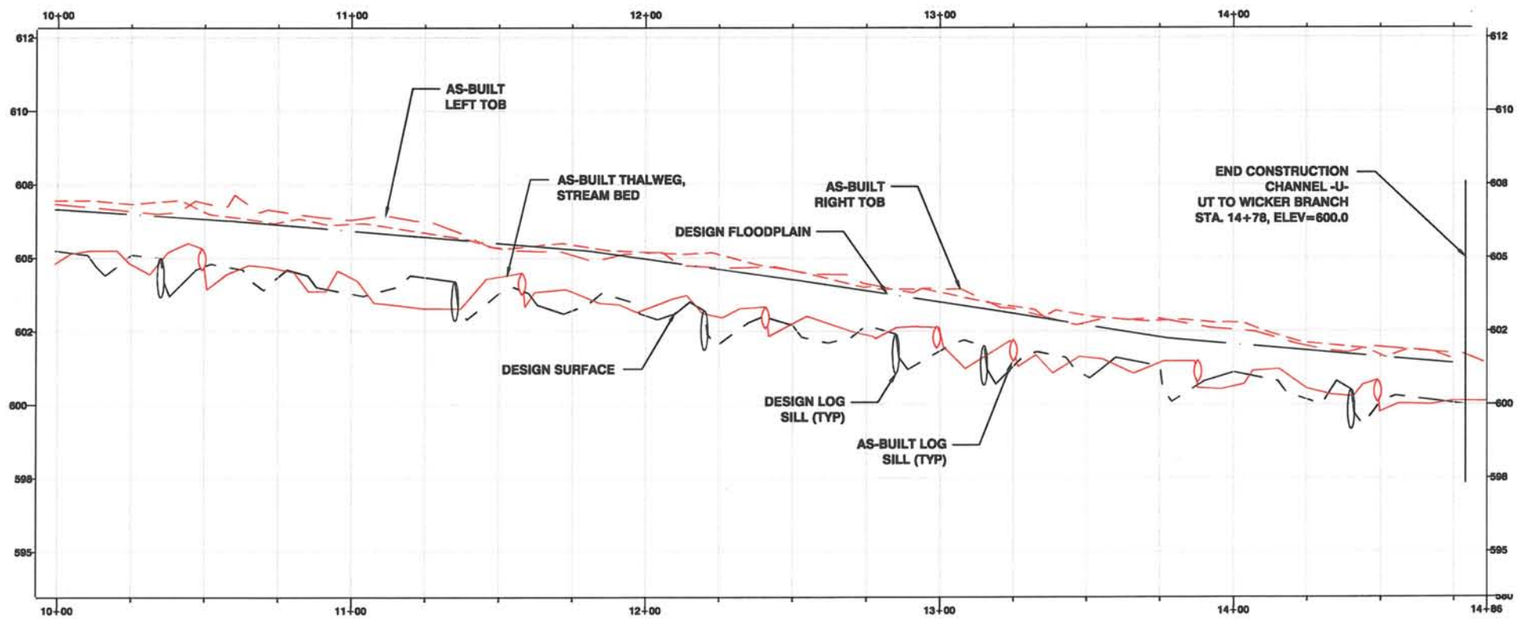
UT TO WICKER PLAN & PROFILE

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale:	AS SHOWN
Project No.:	100024976

SHEET
09



PLAN VIEW (CHANNEL -U-)



PROFILE VIEW (CHANNEL -U-)
HORIZONTAL: 1"=25' FULL-SIZE, 1"=50' HALF-SIZE
VERTICAL: 1"=2.5' FULL-SIZE, 1"=5' HALF-SIZE

NC GRID NAD83

0 25' 50'
SCALE: 1"=25'
HALF-SIZE SCALE: 1"=50'

LEGEND

DESIGN		AS-BUILT
	THALWEG (CL)	
	TOP OF BANK	
LOD	LIMIT OF DISTRUBANCE (LOD)	LOD LOD
CE CE	CONSERVATION EASEMENT (CE CE)	
605	CONTOURS	605
	EXISTING CONTOURS	N/A
	TREE LINE & TREES	
	VERNAL POOL	
	LOG SILL (PLAN / PROFILE)	

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Revisions:

NORTH CAROLINA PROFESSIONAL SEAL 032721 ENGINEER JOHN F. OGLESBY

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

Client:
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:

601 NORTH II STREAM RESTORATION

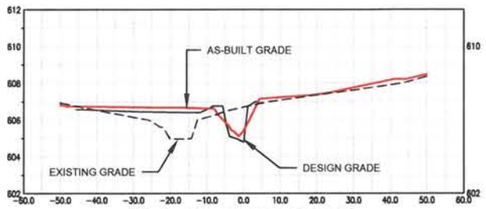
UNION COUNTY, NORTH CAROLINA

Title:

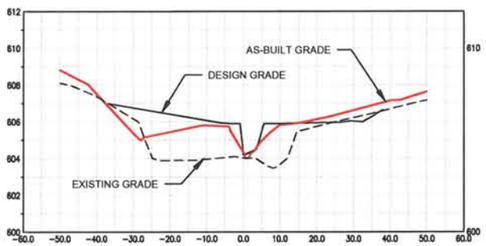
UT TO WICKER PLAN & PROFILE

Des. By:	Dwn. By:
JWG	RDM
Chd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

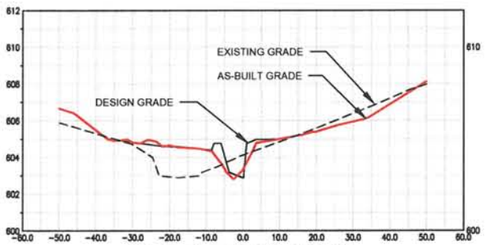
SHEET
10



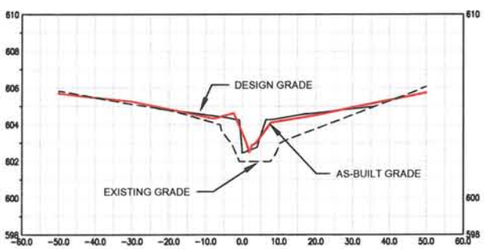
Wicker Branch STA. 1+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



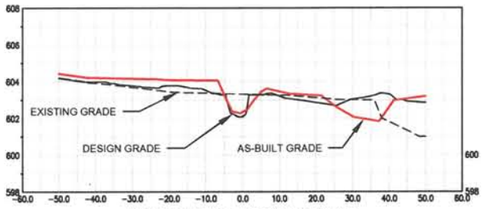
Wicker Branch STA. 2+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 3+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 4+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 5+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL

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JUNE 2013
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TELEPHONE: (919) 876-6888
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Revisions:

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

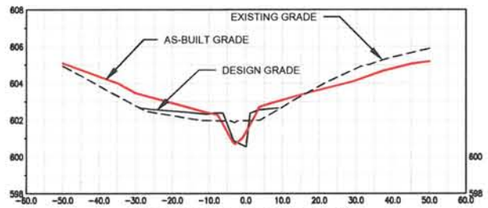
Client:
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

Title:
WICKER CROSS SECTIONS

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

SHEET
11



Wicker Branch STA. 6+00.00
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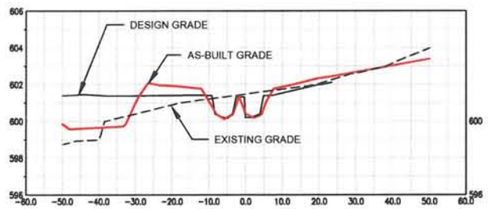
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 7+00.00
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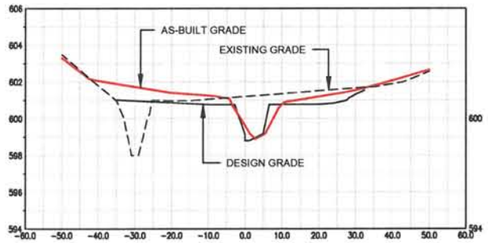
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 8+00.00
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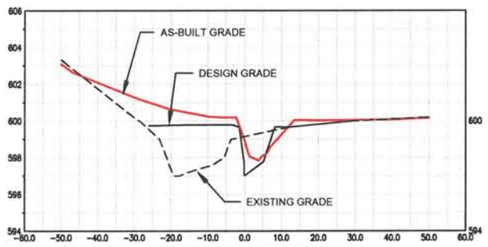
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 9+00.00
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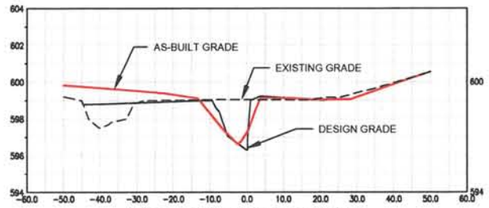
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 10+00.00
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1"=20' VERTICAL
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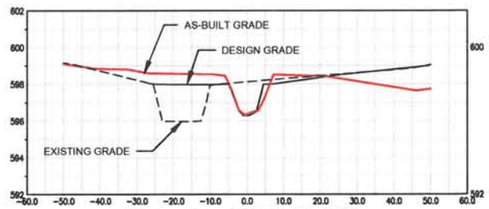

Wicker Branch STA. 11+00.00
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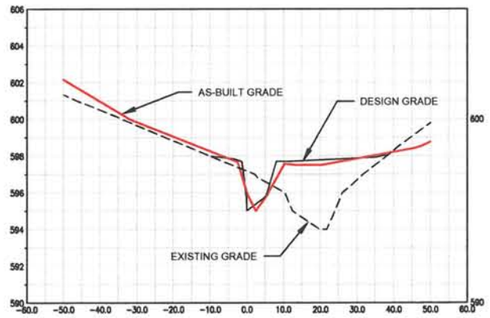
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 12+00.00
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1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
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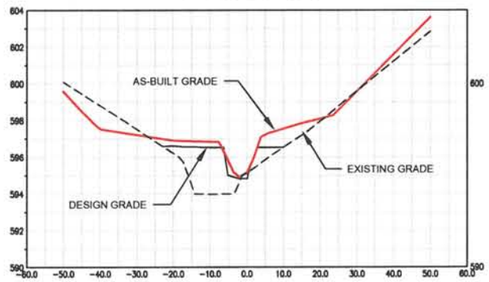

Wicker Branch STA. 13+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL

RECORD DRAWINGS
JUNE 2013
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TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

MARTA CARLA MAY
PROFESSIONAL
SEAL
032721
ENGINEER
JOHN F. OGLESBY

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 032721

Client:
EBX
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

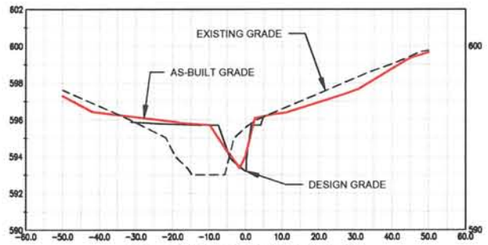
Title:
WICKER CROSS SECTIONS

Des. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013

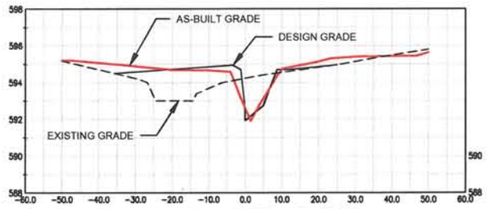
Scale: AS SHOWN

Project No.: 100024976

SHEET
12



Wicker Branch STA. 14+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



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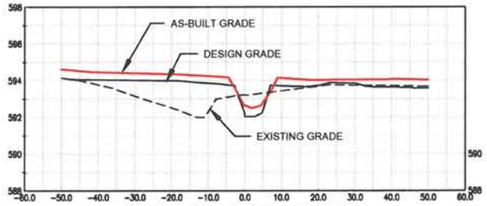
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 16+00.00
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1"=20' VERTICAL
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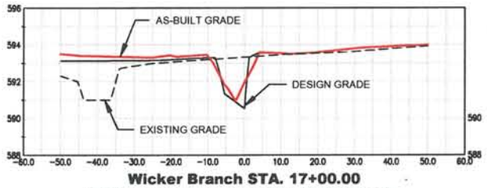
1"=40' VERTICAL



Wicker Branch STA. 17+00.00
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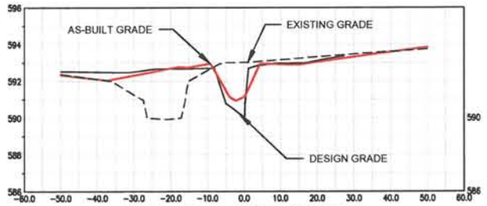
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 18+00.00
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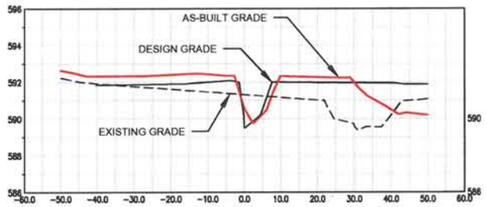
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 19+00.00
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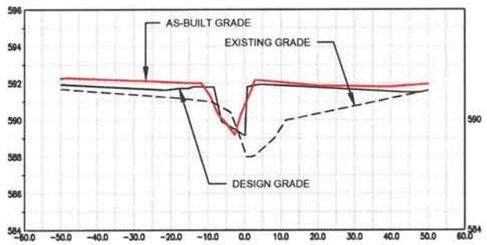
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 20+00.00
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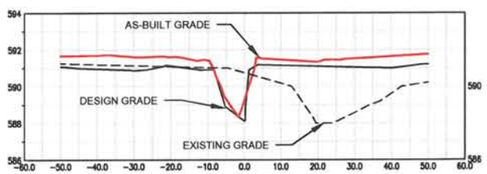
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 21+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL

RECORD DRAWINGS
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FAX: (919) 876-6848

Revisions:

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

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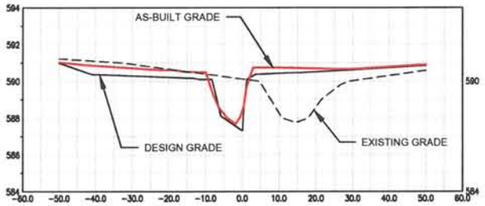
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

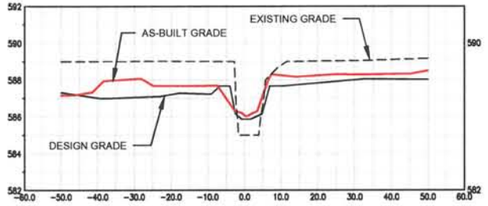
Title:
WICKER CROSS SECTIONS

Dsn. By:	Dwn. By:
JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013
Scale: AS SHOWN	
Project No.: 100024976	

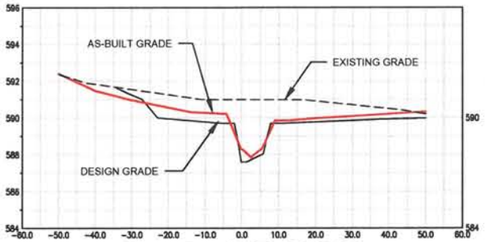
SHEET
13



Wicker Branch STA. 22+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 26+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 23+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
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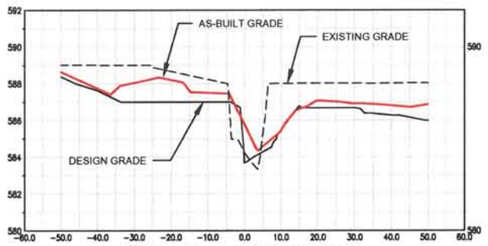
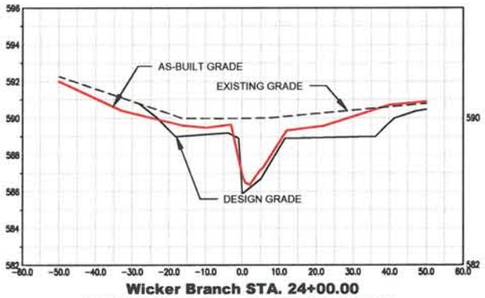
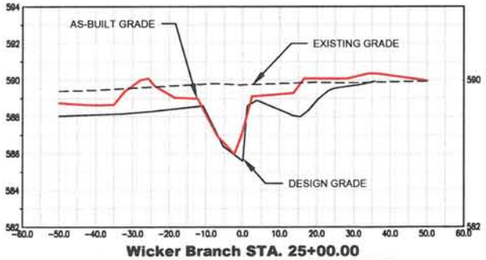
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 27+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 24+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



Wicker Branch STA. 25+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL

RECORD DRAWINGS
JUNE 2013
DATA BASED ON SURVEY PROVIDED BY:
KEE MAPPING & SURVEYING
111 CENTRAL AVENUE
ASHEVILLE, NC 28802

ATKINS
1616 EAST MILLBROOK ROAD
SUITE 310
RALEIGH, NC 27609
TELEPHONE: (919) 876-6888
FAX: (919) 876-6848

Revisions:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032721 JOHN F. OGLESBY

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

Client:
ENVIRONMENTAL BANC & EXCHANGE, LLC
909 CAPABILITY DRIVE, SUITE 3100
RALEIGH, NC 27606

Project:
601 NORTH II STREAM RESTORATION
UNION COUNTY, NORTH CAROLINA

Title:
WICKER CROSS SECTIONS

Dsn. By:	Dwn. By:
JWG	RDM
Chd. By: JWG/JFO MCG/JDC	Date: JUNE 2013

Scale: AS SHOWN

Project No.: 100024976

SHEET
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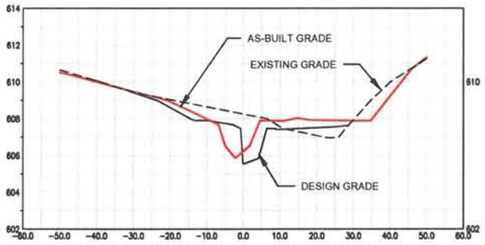
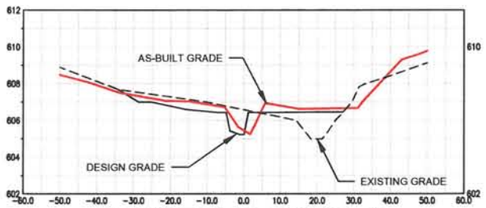
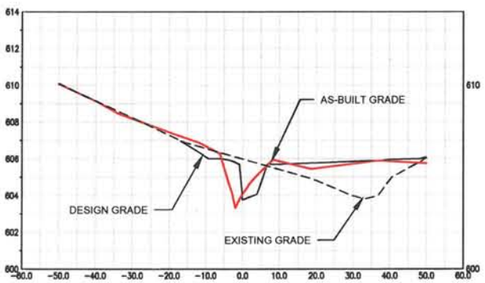


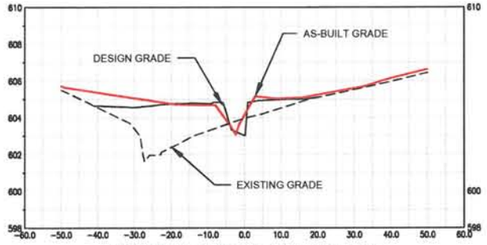
UT to Wicker Branch STA. 9+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



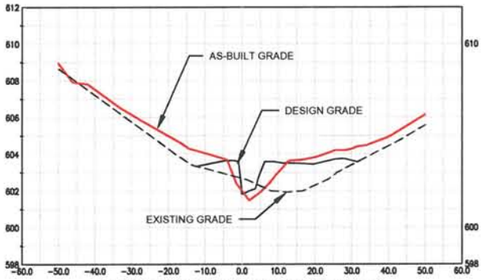
UT to Wicker Branch STA. 10+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



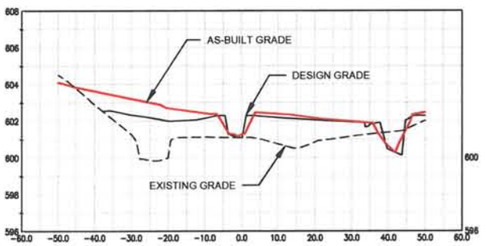
UT to Wicker Branch STA. 11+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



UT to Wicker Branch STA. 12+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



UT to Wicker Branch STA. 13+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL



UT to Wicker Branch STA. 14+00.00
FULL-SIZE SCALE: 1"=20' HORIZONTAL
1"=20' VERTICAL
HALF-SIZE SCALE: 1"=40' HORIZONTAL
1"=40' VERTICAL

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Revisions:

NORTH CAROLINA PROFESSIONAL SEAL 032721 ENGINEER J. F. OGLESBY

JOHN F. OGLESBY, P.E.
N.C. LICENSE NO.: 03272

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JWG	RDM
Ckd. By: JWG/JFO MCG/JDC	Date: JUNE 2013

Scale: AS SHOWN

Project No.: 100024976

SHEET
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